

Quality and Environmental Management System

❑ **Lelon Electronics Corp.**

Standard	Certificate Number	Date of Registration
ISO-9001: 2015	TW06/70649.00	Aug. 6, 2021
ISO-14001: 2015	TW14/10631.00	Sep. 10, 2020
IATF-16949: 2016	IATF 0415587 SGS TW06/0034.01	Aug. 6, 2021
QC 080000: 2017	IECQ-H SGSTW 14.0010	Oct. 15, 2020
ISO 45001: 2018	TW16/00842.00	Aug. 15, 2020

❑ **Lelon Electronics (Huizhou) Co., Ltd.**

Standard	Certificate Number	Date of Registration
ISO-9001: 2015	TW06/70649.00	Aug. 6, 2021
ISO-14001: 2015	TW14/10631.01	Sep. 10, 2020
IATF -16949: 2016	IATF 0415587 SGS TW06/0034.01	Aug. 6, 2021
QC 080000: 2017	IECQ-H SGSTW 14.0010-03	Oct. 15, 2020
ISO 45001: 2018	TW16/00842.00	Aug. 15, 2020

❑ **Lelon Electronics (Suzhou) Co., Ltd.**

Standard	Certificate Number	Date of Registration
ISO-9001: 2015	TW06/70648	Aug. 5, 2021
ISO-14001: 2015	TW14/10631.02	Sep. 10, 2020
IATF-16949: 2016	IATF 0415324 SGS TW06/0034.02	Aug. 5, 2021
QC 080000: 2017	IECQ-H SGSTW 14.0010-04	Oct. 15, 2020
ISO 45001: 2018	TW16/00842.00	Aug. 15, 2020

Available Product Type

	Radial	SMD	Snap-in & Screw	Polymer	Axial
Huizhou Factory	V	V	V	V	
Suzhou Factory	V	V	V		V

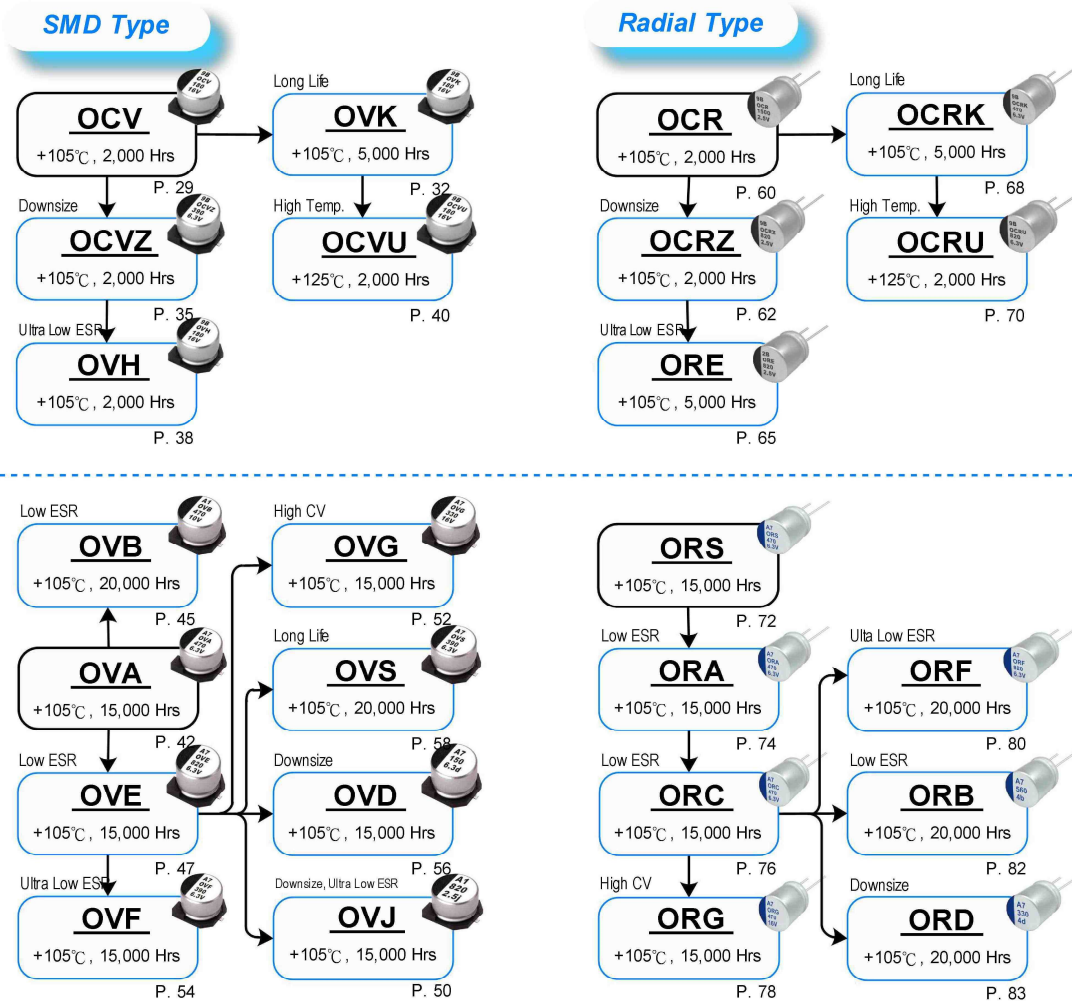


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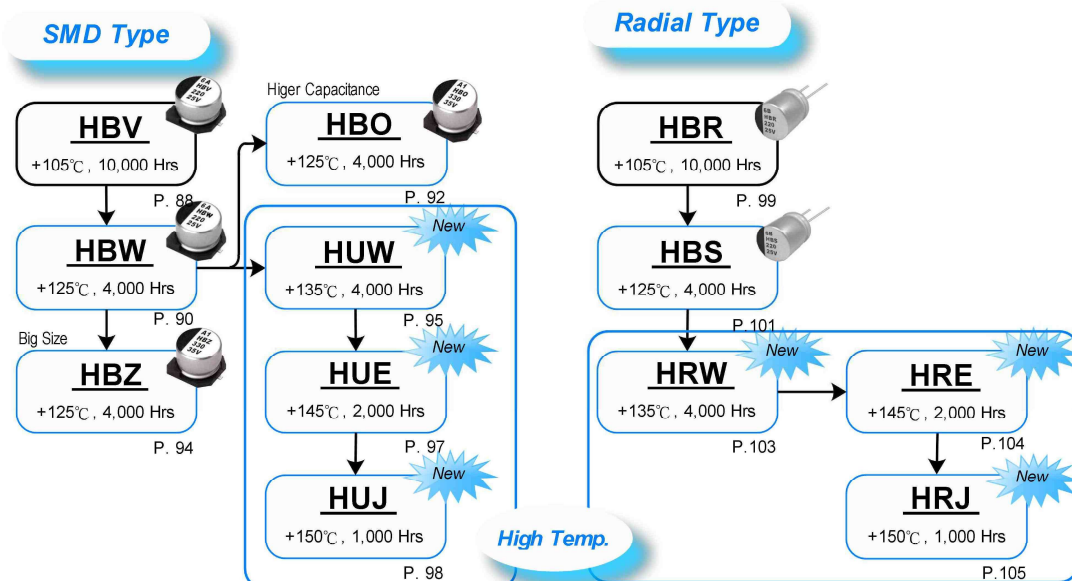
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Product Group Chart

● Organic Conductive Polymer Capacitors (OP-CAP)

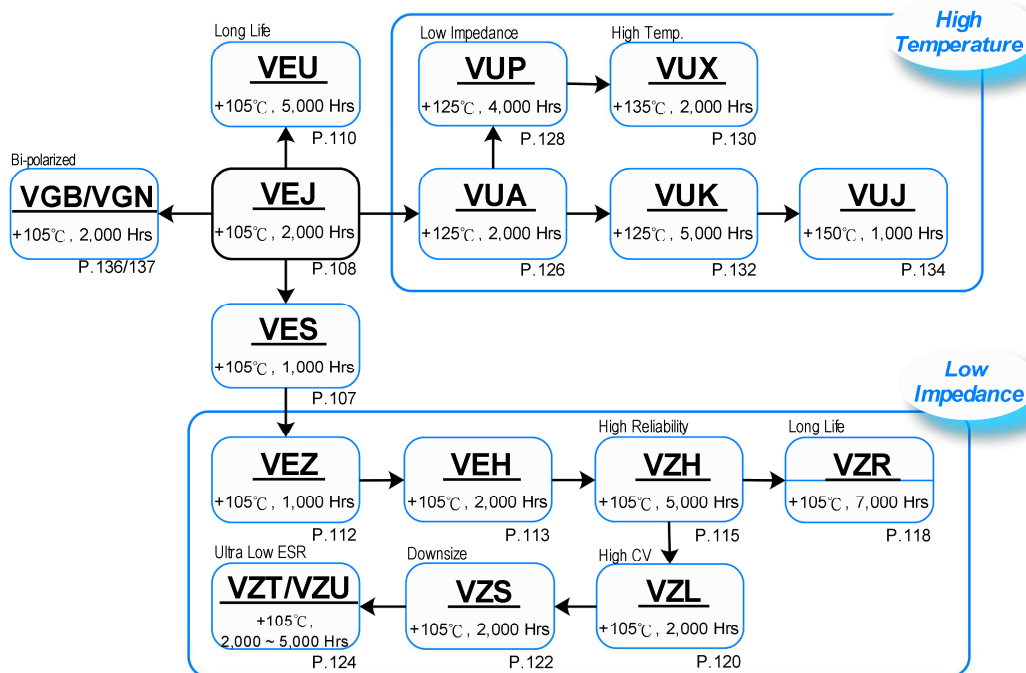


● Conductive Polymer Hybrid Capacitors

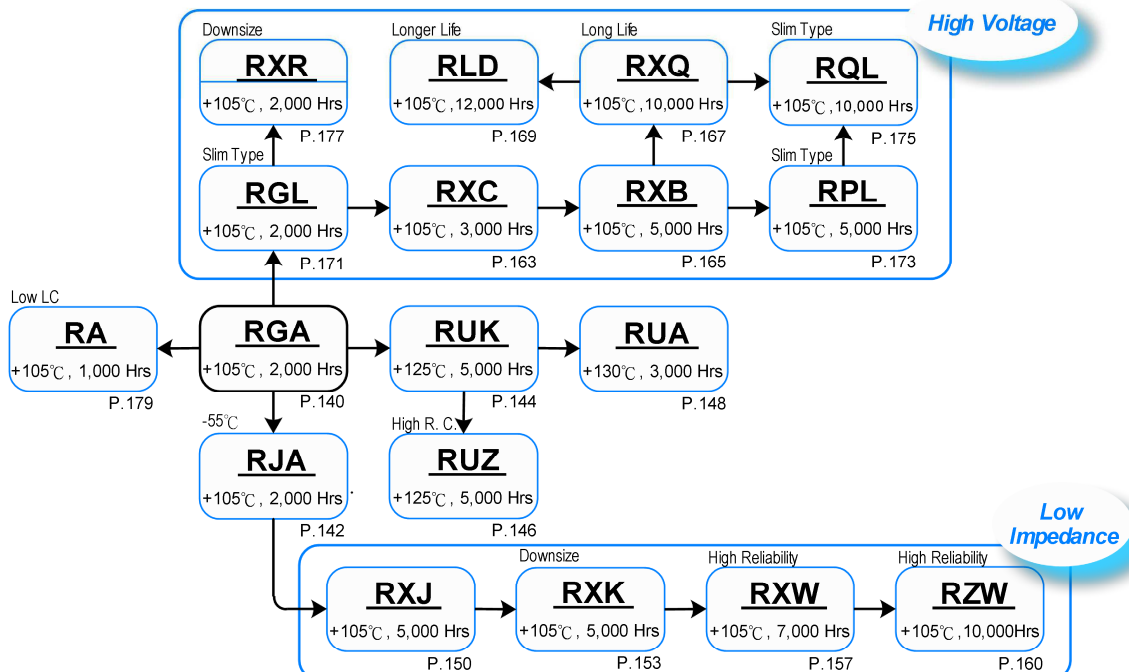


Note: Special application available upon request

SMD Aluminum Electrolytic Capacitors

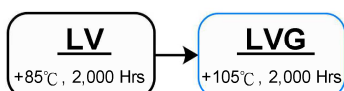


Radial Type



Flame Retardant

Snap-in Type

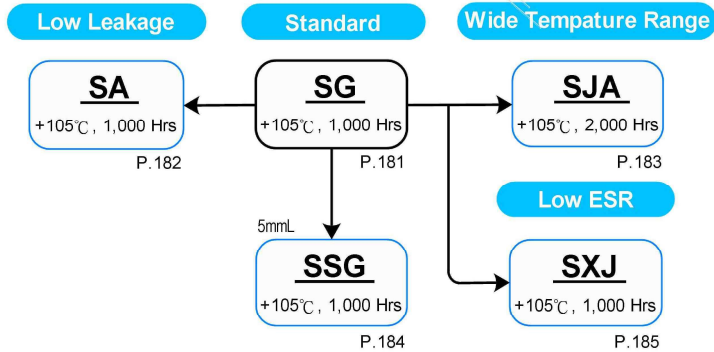


Radial Type

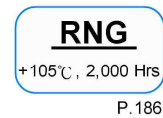


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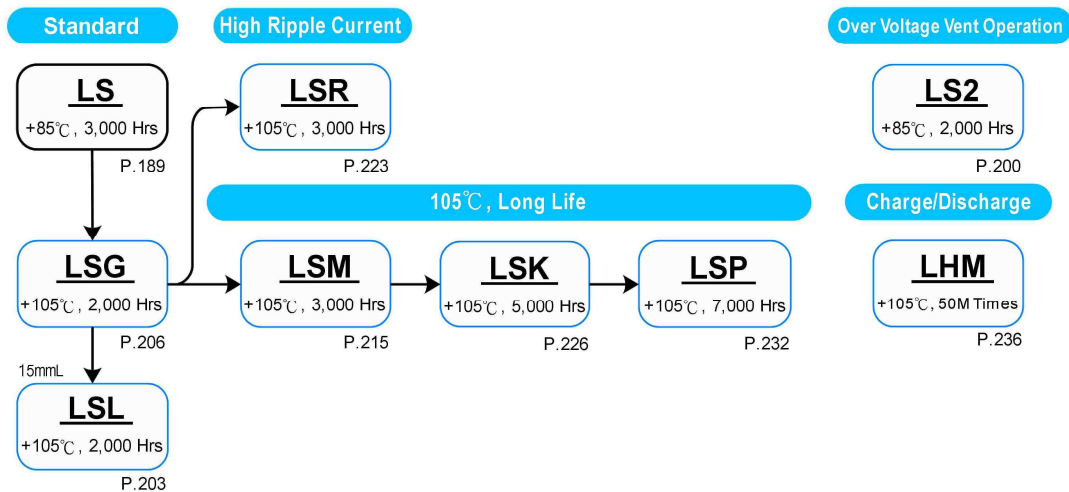
● Radial - 7mmL and 5mmL



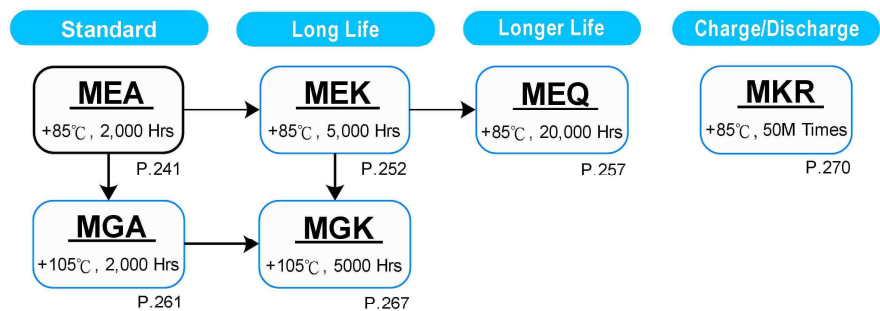
● Bi-polarized



● Snap-in Terminal



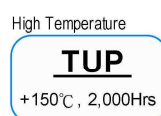
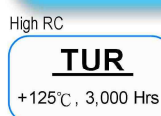
● Screw Terminal



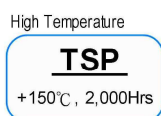
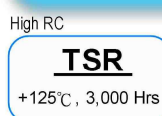
Note: Special application available upon request.

● Axial (not included in this catalog)

Axial-lead



Soldering Star



Capacitor Series Table

● Organic Conductive Polymer Capacitors (OP-CAP)

Series		Features	Temperature & Endurance	Rated Voltage Range (Voc)	Capacitance Range (μF)	Page
SMD Type	OCV	Standard	105°C, 2,000 Hrs	2.5 ~ 35	6.8 ~ 1,500	29
	OVK	Long Life	105°C, 5,000 Hrs	2.5 ~ 35	10 ~ 1,500	32
	OCVZ	Downsize, Super Low ESR	105°C, 2,000 Hrs	2.5 ~ 35	22 ~ 2,700	35
	OVH	Ultra Low ESR	105°C, 2,000 Hrs	2 ~ 16	150 ~ 2,200	38
	OCVU	High Temperature Usage, 125°C	125°C, 1,000 ~ 2,000 Hrs	2.5 ~ 16	180 ~ 1,500	40
	OVA	Standard	105°C, 15,000 Hrs	2.5 ~ 25	10 ~ 1,500	42
	OVB	Low ESR	105°C, 20,000 Hrs	2.5 ~ 25	12 ~ 2,700	45
	OVE	Low ESR	105°C, 15,000 Hrs	2.5 ~ 16	33 ~ 2,700	47
	OVJ	Low ESR, Downsize	105°C, 15,000 Hrs	2.5 ~ 25	82 ~ 1,200	50
	OVG	16 ~ 25V	105°C, 15,000 Hrs	16 ~ 25	10 ~ 1,000	52
	OVF	Ultra Low ESR	105°C, 15,000 Hrs	2 ~ 10	120 ~ 1,000	54
	OVD	Down Size	105°C, 15,000 Hrs	2.5 ~ 16	100 ~ 560	56
	OVS	Long Life	105°C, 20,000 Hrs	4 ~ 16	39 ~ 560	58
Radial Type	OCR	Standard	105°C, 2,000 Hrs	2.5 ~ 35	6.8 ~ 1,500	60
	OCRZ	Downsize, Super Low ESR	105°C, 2,000 Hrs	2.5 ~ 35	47 ~ 3,900	62
	ORE	Ultra Low ESR, Long Life	105°C, 5,000 Hrs	2.5 ~ 35	22 ~ 2,700	65
	OCRK	Long Life	105°C, 5,000 Hrs	2.5 ~ 35	68 ~ 820	68
	OCRU	High Temperature Usage, 125°C	125°C, 1,000 ~ 2,000 Hrs	2.5 ~ 20	100 ~ 1,200	70
	ORS	Standard	105°C, 15,000 Hrs	2.5 ~ 35	18 ~ 1,500	72
	ORA	Low ESR	105°C, 15,000 Hrs	2.5 ~ 16	47 ~ 1,500	74
	ORC	Low ESR, High Capacitance	105°C, 15,000 Hrs	2.5 ~ 16	270 ~ 2,700	76
	ORG	16 ~ 35V	105°C, 15,000 Hrs	16 ~ 35	56 ~ 2,700	78
	ORF	Long Life, Low ESR	105°C, 20,000 Hrs	2 ~ 16	100 ~ 1,600	80
	ORB	Long Life	105°C, 20,000 Hrs	2.5 ~ 6.3	470 ~ 820	82
	ORD	Long Life, Down Size	105°C, 20,000 Hrs	2.5 ~ 6.3	220 ~ 560	83

● Conductive Polymer Hybrid Capacitors

Series		Features	Temperature & Endurance	Rated Voltage Range (Voc)	Capacitance Range (μF)	Page
SMD Type	HBV	Ultra Low ESR, Long Life	105°C, 10,000 Hrs	16 ~ 80	10 ~ 470	88
	HBW	High Temperature Usage, 125°C	125°C, 4,000 Hrs	16 ~ 80	10 ~ 470	90
	HBO	Higher Capacitance	125°C, 4,000 Hrs	25 ~ 35	56 ~ 470	92
	HBZ	Big Size	125°C, 4,000 Hrs	25 ~ 63	100 ~ 560	94
	HUW	High Temperature Usage, 135°C	135°C, 4,000 Hrs	16 ~ 63	22 ~ 560	95
	HUE	High Temperature Usage, 145°C	145°C, 2,000 Hrs	25 ~ 63	33 ~ 330	97
	HUJ	High Temperature Usage, 150°C	150°C, 1,000 Hrs	25 ~ 63	33 ~ 270	98
Radial Type	HBR	Ultra Low ESR, Long Life	105°C, 10,000 Hrs	16 ~ 80	10 ~ 470	99
	HBS	High Temperature Usage, 125°C	125°C, 4,000 Hrs	16 ~ 80	10 ~ 470	101
	HRW	High Temperature Usage, 135°C	135°C, 4,000 Hrs	25 ~ 63	100 ~ 330	103
	HRE	High Temperature Usage, 145°C	145°C, 2,000 Hrs	25 ~ 63	33 ~ 330	104
	HRJ	High Temperature Usage, 150°C	150°C, 1,000 Hrs	25 ~ 63	33 ~ 270	105

● SMD Aluminum Electrolytic Capacitors

Series		Features	Temperature & Endurance	Rated Voltage Range (Voc)	Capacitance Range (μF)	Page
SMD Type	VES	Downsize, 105°C	105°C, 1,000 Hrs	6.3 ~ 50	1 ~ 100	107
	VEJ	Standard, 105°C	105°C, 2,000 Hrs	6.3 ~ 450	1 ~ 8,200	108
	VEU	Long Life, 105°C	105°C, 3,000 ~ 5,000 Hrs	6.3 ~ 450	1 ~ 1,500	110
	VEZ	Low ESR, Downsize	105°C, 1,000 Hrs	6.3 ~ 50	1 ~ 220	112
	VEH	Low ESR	105°C, 2,000 Hrs	6.3 ~ 50	3.3 ~ 1,000	113
	VZH	Low ESR, High Reliability	105°C, 2,000 ~ 5,000 Hrs	6.3 ~ 100	1 ~ 8,200	115
	VZR	Low ESR, Long Life	105°C, 7,000 Hrs	6.3 ~ 50	10 ~ 470	118
	VZL	Low ESR, High CV	105°C, 2,000 Hrs	6.3 ~ 50	4.7 ~ 1,500	120
	VZS	Low ESR, High CV	105°C, 2,000 Hrs	6.3 ~ 50	22 ~ 2,200	122

Capacitor Series Table

● SMD Aluminum Electrolytic Capacitors

Series		Features	Temperature & Endurance	Rated Voltage Range (V _{DC})	Capacitance Range (μF)	Page
SMD Type	VZT	Ultra Low ESR, High Reliability	105°C, 2,000 Hrs	6.3 ~ 50	10 ~ 2,200	124
	VZU	Ultra Low ESR, High Reliability	105°C, 3,000 ~ 5,000 Hrs	6.3 ~ 50	220 ~ 2,200	124
	VUA	High Temperature Usage, 125°C	125°C, 1,000 ~ 2,000 Hrs	10 ~ 63	10 ~ 4,700	126
	VUP	High Temperature Usage, 125°C, Low ESR	125°C, 2,000 ~ 4,000 Hrs	10 ~ 100	10 ~ 3,300	128
	VUX	High Temperature Usage, 135°C, Low ESR	135°C, 2,000 Hrs	10 ~ 50	47 ~ 3,300	130
	VUK	High Temperature Usage, 125°C	125°C, 3,000 ~ 5,000 Hrs	10 ~ 63	100 ~ 3,300	132
	VUJ	High Temperature Usage, 150°C	150°C, 1,000 Hrs	10 ~ 50	33 ~ 3,300	134
	VGB	Bi-polarized, 105°C	105°C, 2,000 Hrs	6.3 ~ 50	1 ~ 47	136
	VGN	Bi-polarized, 105°C	105°C, 2,000 Hrs	6.3 ~ 100	22 ~ 3,300	137

● Aluminum Electrolytic Capacitors

Series		Features	Temperature & Endurance	Rated Voltage Range (V _{DC})	Capacitance Range (μF)	Page
Radial Type	RGA	Standard, 105°C	105°C, 2,000 Hrs	6.3 ~ 450	2.2 ~ 33,000	140
	RJA	Wide Temperature Range	105°C, 2,000 Hrs	6.3 ~ 100	2.2 ~ 22,000	142
	RUK	High Temperature Usage, Long Life, 125°C	125°C, 3,000 ~ 5,000 Hrs	10 ~ 63	10 ~ 1,000	144
	RUZ	High Temperature Usage, Low Imp., 125°C	125°C, 3,000 ~ 5,000 Hrs	25 ~ 100	220 ~ 6,800	146
	RUA	High Temperature Usage, 130°C	130°C, 2,000 ~ 3,000 Hrs	10 ~ 450	4.7 ~ 1,000	148
	RXJ	Low ESR, Longer Life	105°C, 2,000 ~ 5,000 Hrs	6.3 ~ 100	2.2 ~ 4,700	150
	RXK	Low ESR, Downsize, Longer Life	105°C, 2,000 ~ 5,000 Hrs	6.3 ~ 63	12 ~ 10,000	153
	RXW	Low ESR, High Reliability	105°C, 4,000 ~ 7,000 Hrs	6.3 ~ 100	2.2 ~ 15,000	157
	RZW	Low ESR, High Reliability	105°C, 4,000 ~ 10,000 Hrs	6.3 ~ 63	3.3 ~ 18,000	160
	RXC	High Voltage, High Ripple Current	105°C, 2,000 ~ 3,000 Hrs	160 ~ 450	1.5 ~ 330	163
	RGL	High Voltage, High Ripple Current, Slim Type	105°C, 2,000 Hrs	400, 420, 450	15 ~ 220	171
	RXB	High Voltage, High Ripple Current, Longer Life	105°C, 5,000 Hrs	160 ~ 450	4.7 ~ 330	165
	RPL	High Voltage, High Ripple Current, Longer Life, Slim Type	105°C, 5,000 Hrs	400, 420, 450	33 ~ 150	173
	RXQ	High Voltage, High Ripple Current, Long Life	105°C, 8,000 ~ 10,000 Hrs	160 ~ 450	6.8 ~ 330	167
	RLD	High Voltage, High Ripple Current, Longer Life	105°C, 12,000 Hrs	160 ~ 450	15 ~ 560	169
	RQL	High Voltage, High Ripple Current, Long Life, Slim Type	105°C, 10,000 Hrs	400, 420, 450	33 ~ 180	175
	RXR	High Voltage, High Ripple Current, Downsize	105°C, 2,000 Hrs	400, 450	22 ~ 220	177
	RA	Low Leakage Current, 105°C	105°C, 1,000 Hrs	6.3 ~ 100	2.2 ~ 4,700	179
Low - profile	SG	7 mmL, Standard, 105°C	105°C, 1,000 Hrs	4 ~ 63	1 ~ 330	181
	SA	7 mmL, Low Leakage Current, 105°C	105°C, 1,000 Hrs	4 ~ 63	1 ~ 100	182
	SJA	7 mmL, Wide Temperature Range	105°C, 2,000 Hrs	4 ~ 63	1 ~ 470	183
	SSG	5 mmL, Standard, 105°C	105°C, 1,000 Hrs	4 ~ 50	1 ~ 220	184
	SXJ	5 ~ 7 mmL, Low ESR	105°C, 1,000 Hrs	6.3 ~ 35	4.7 ~ 220	185
Bi - polarized	RNG	Bi-polarized, 105°C	105°C, 2,000 Hrs	6.3 ~ 250	0.47 ~ 2,200	186
Large Size	LS	Snap-in, Standard	85°C, 3,000 Hrs	16 ~ 500	56 ~ 68,000	189
	LS2	Snap-in, For Over Voltage Vent Operation Test	85°C, 2,000 Hrs	200, 250, 400, 450	120 ~ 1,800	200
	LSL	Snap-in, 15 mmL, 105°C	105°C, 2,000 Hrs	160 ~ 400	39 ~ 390	203
	LSG	Snap-in, Standard, 105°C	105°C, 2,000 Hrs	16 ~ 500	82 ~ 47,000	206
	LSM	Snap-in, Longer Life	105°C, 3,000 Hrs	16 ~ 500	56 ~ 22,000	215
	LSR	Snap-in, Longer Life, High Ripple Current	105°C, 3,000 Hrs	400, 450	82 ~ 680	223
	LSK	Snap-in, Long Life	105°C, 5,000 Hrs	160 ~ 500	39 ~ 1,800	226
	LSP	Snap-in, Long Life	105°C, 7,000 Hrs	350, 400, 450	47 ~ 680	232
	LHM	Snap-in, High Speed Charge / Discharge	105°C, 3,000 Hrs	350, 400, 420, 450	82 ~ 820	236
	MEA	Screw Terminal, Standard, 85°C	85°C, 2,000 Hrs	10 ~ 450	270 ~ 820,000	241
	MEK	Screw Terminal, Long Life, 85°C	85°C, 5,000 Hrs	350 ~ 525	1,000 ~ 18,000	252
	MEQ	Screw Terminal, Long Life, 85°C	85°C, 20,000 Hrs	350, 400, 450	1,000 ~ 18,000	257
	MGA	Screw Terminal, Standard, 105°C	105°C, 2,000 Hrs	16 ~ 400	180 ~ 470,000	261
	MGK	Screw Terminal, Long Life, 105°C	105°C, 5,000 Hrs	350, 400, 450	1,000 ~ 10,000	267
	MKR	Screw Terminal, High Speed Charge / Discharge	85°C, 5,000 Hrs	350, 400, 450	1,000 ~ 18,000	270

Taping Specifications for SMD Type (Applicable Standard JIS C 0806-3)

1. Carrier Tape

Fig. 1-1

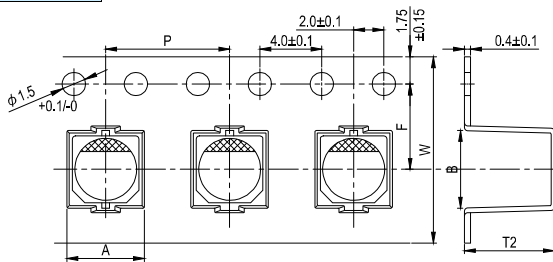


Fig. 1-3

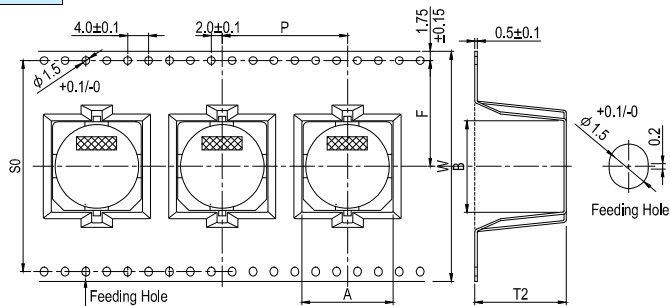
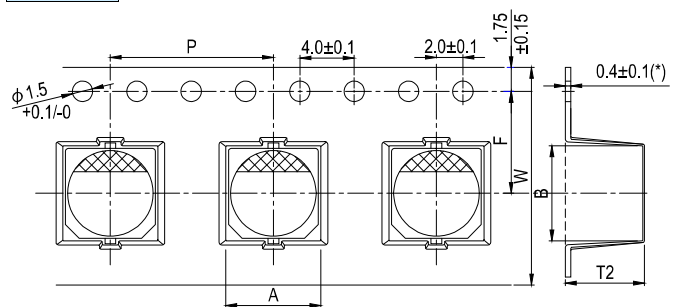


Fig. 1-2



Note: *1: The case size in the below table is marked with “*”, which means the marked with “*” in Fig. 1-2 is 0.5 mm.

*2: The carrier tape dimensions for 16 ~ 18 ϕ of the anti-vibration structure are the same as general structure.

Unit: mm

Type	φ D × L	A	B	F	P	T2	W	S0	Fig. No.	Anti-vibration	
OP-CAP / Hybrid	5 × 4.4	5.7	5.7	5.5	12	4.8	12.0	---	1-2	---	
	5 × 5.7 / 5.8					6.2					
	6.3 × 4.4	7.0	7.0	7.5		4.8	16.0				
	6.3 × 5.8 / 5.9					6.2					
	6.3 × 6.4 / 7.0					7.2 / 7.6					
	6.3 × 7.7					8.3					
	6.3 × 9.5 ⁻¹	11.5	16	9.8	24.0						
	8 × 6.7	8.7	8.7	7.5	12	7.4	16.0				
	8 × 7.7			12	8.4						
	8 × 10			16	11.0						
	8 × 12 ⁻¹			12.5							
	10 × 7.7	10.7	10.7	11.5	16	8.7	24.0				
	10 × 9.9 / 10					11.0					
	10 × 12.6 ⁻¹					13.0					
10 × 16.5 ⁻¹	17.5										
SMD	3 × 5.3	3.5	3.5	5.5	8	5.8	12.0	---	1-1	---	
	4 × 4.5 / 5.3	4.7	4.7			4.8 / 5.8					
	4 × 5.7 / 5.8					6.2					
	5 × 4.5 / 5.3	5.7	5.7		4.8 / 5.8	6.2					
	5 × 5.7 / 5.8				7.6						
	5 × 7.0			12	4.8 / 5.8	16.0					
	6.3 × 4.5 / 5.3	7.0	7.0	7.5	6.2						
	6.3 × 5.7 / 5.8				7.6 / 8.3						
	6.3 × 7.0 / 7.7				9.3						
	6.3 × 8.7				7.4						
	8 × 6.5	8.7	8.7	11.5	16	11.0	24.0				
	8 × 10					11.4					
	8 × 10.5					8.7					
	10 × 7.7	10.7	10.7			11.5			11.0		32.0
	10 × 10								11.0		
	10 × 12.5 ⁻¹			13.0							
	10 × 10.5			11.4							
	12.5 × 13.5	13.4	13.4	14.2	24	14.5	44.0		28.4	1-3	
	12.5 × 16					17.0					---
	12.5 × 13.5	13.7	13.7			15.0					V
	12.5 × 16					17.5					V
	16 × 16.5					20.2					28
	16 × 21.5	22.2									
	18 × 16.5	19.5	19.5	32	17.5						
	18 × 21.5				23.0						
	Tolerance	+ 0.2	+ 0.2	+ 0.1	+ 0.1	+ 0.2	+ 0.3		+ 0.1		

Taping Specifications for SMD Type

2. Reel Package

Fig. 2-1

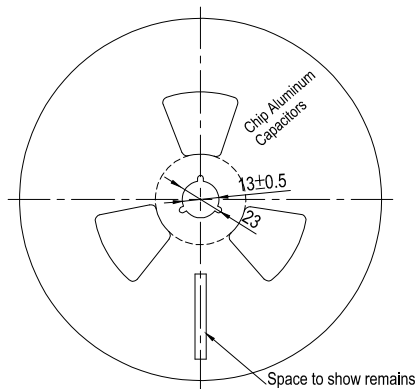
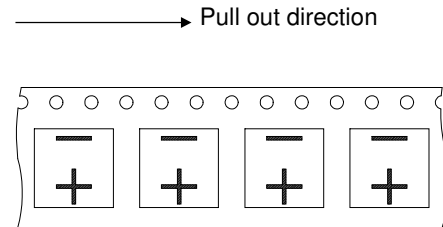


Fig. 2-2

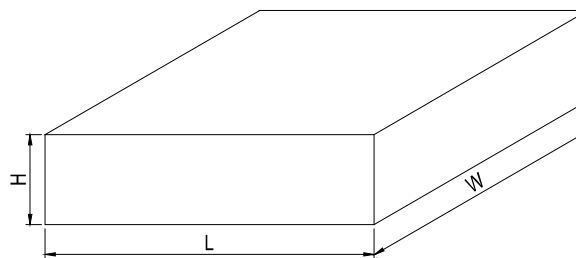


Unit: mm

Case size	3 ~ 5 ϕ	5 ϕ $\times$ 7L, 6.3 ϕ , 8 ϕ $\times$ 6.5 / 6.7L	6.3 ϕ $\times$ 9.5L, 8 ϕ $\times$ 7.7 ~ 12L, 10 ϕ	12.5 ϕ	16 ~ 18 ϕ
W1	14	18	26	34	46

3. Packing Specifications

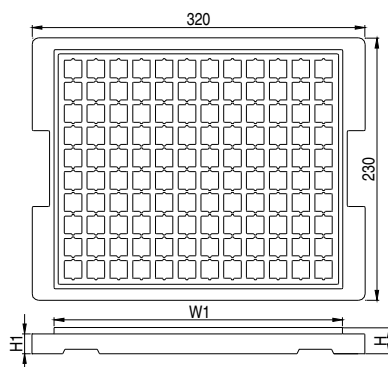
Fig. 3-1 Outer carton box of carrier tape



Unit: mm

Case size	3 ~ 5 ϕ	5 ϕ $\times$ 7L, 6.3 ϕ , 8 ϕ $\times$ 6.5 / 6.7L	6.3 ϕ $\times$ 9.5L, 8 ϕ $\times$ 7.7 ~ 12L	10 ~ 12.5 ϕ	16 ~ 18 ϕ
H	210	250	330	330	425
W, L	395				

Fig. 3-2 Chip tray

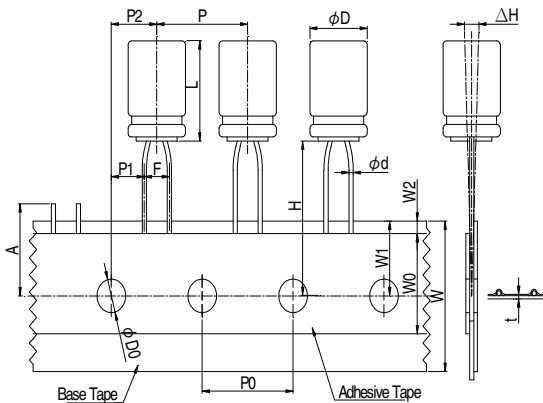
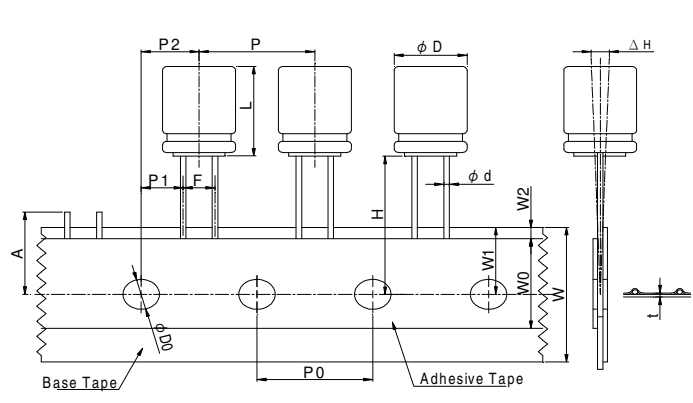


Dimensions and package quantity

Unit: mm

Case size	W1	H	H1	Q'ty / Tray	Q'ty / Box
12.5 ϕ × 13.5L	284	21	18.5	120	600
12.5 ϕ × 16L		21	18.5	120	600
16 ϕ × 16.5L		28	24.0	80	400
16 ϕ × 21.5L				80	400
18 ϕ × 16.5L				60	300
18 ϕ × 21.5L				60	300

Taping Specifications for Radial Type of OP-CAP (Applicable Standard JIS C 0806-2)

Fig. 1

Fig. 2


Unit: mm

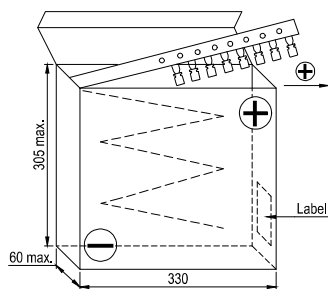
Packing	SA								
Symbol	5	6.3	8	10	11	12	13	14	15
ϕD	5	6.3	8	10	11	12	13	14	15
L	8	5.5 ~ 6.5	8	11	6.5 ~ 8	$\geq 11.5^{*1}$	$+1.0 / +1.5^{*1}$	$\geq 10^{*1}$	$+1.0 / +1.5^{*1}$
ϕd	0.5	0.45	0.6	0.5	0.6	0.6	± 0.05	0.6	± 0.05
F	2.5	2.5	3.5	3.5	$+0.8/-0.2$	5.0	$+0.8/-0.2$	5.0	$+0.8/-0.2$
H	18.5						± 0.75	18.5	± 0.75
P	12.7						± 1.0	12.7	± 1.0
P0	12.7						± 0.2	12.7	± 0.2
P1	5.1	5.1	4.6	4.6	± 0.5	3.85	± 0.7	3.85	± 0.7
P2	6.35						± 1.0	6.35	± 1.3
W	18.0						± 0.5	18.0	± 0.5
W0	10.0						min.	12.0	min.
W1	9.0						± 0.5	9.0	± 0.5
W2	1.5						max.	1.5	max.
A	11.0						max.	11.0	max.
$\phi D0$	4.0						± 0.2	4.0	± 0.2
ΔH	0						± 1.0	0	± 1.0
t	0.7						± 0.2	0.7	± 0.2
Fig. No.	1	2	---	2	---	---	---	---	---

Note: *1: The tolerance in L for 16 mm is +1.5 mm, for 20 mm is +2.0 mm.

2. If you need parts with pitch is 5.0 mm taping (5 ~ 8 ϕ), please consult with us before placing order.

3. Customized taping may be available upon request. Please consult with us.

Package

Fig. 3 Ammo pack box


Package Quantity

Unit: pcs / box

ϕD (mm)	5	6.3	8	10
Quantity	2,000	2,000	1,000	500

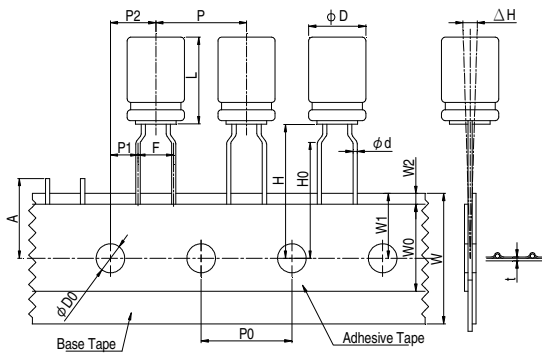
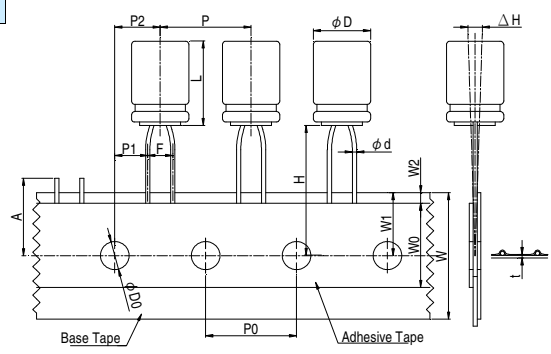
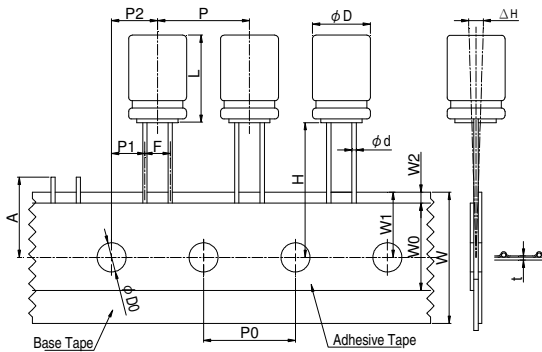
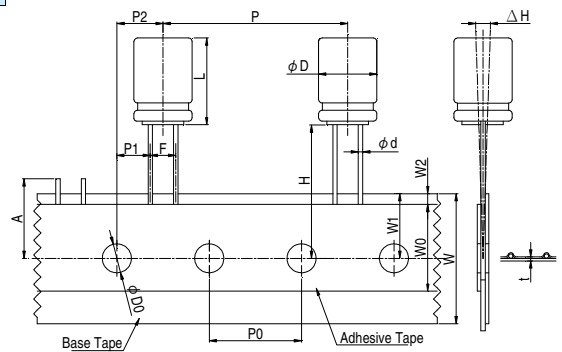
Note: The component shall be oriented on the tape as such that the positive lead is leading or the negative lead is leading with customer's request.

Lead Cutting Specifications for Radial Type of OP-CAP

Unit: mm

Forming Method	Code	Shape	Dimensions			
Cut (5 $\phi \sim 10 \phi$)	CC		$\phi D \times L$	ϕd	F	H
			5	0.5	2.0	5.0
			6.3 $\times$ 5.5 $\sim$ 6.5	0.45	2.5	
			6.3 $\times$ 8	0.6		
			6.3 $\times$ 11	0.5	3.5	
			8	0.6	5.0	4.5
			10	0.6	5.0	

Taping Specifications for Radial Type (Applicable Standard JIS C 0806-2)

Fig. 1

Fig. 2

Fig. 3

Fig. 4


Unit: mm

Packing Symbol	L φ	TA ^{*1}										SA										SP					
		5 ^{*2}					7 ~ 9			≥ 11		5 ^{*2}					≥ 7		7 ~ 9	11.5 ~ 20		9 ~ 25					
		3	4 ^{*3}	5	6.3	8	5	6.3	8	5	6.3	8	3	4 ^{*3}	5	6.3	8	5 ^{*4}	6.3 ^{*4}	8	8	Tol. ^{*1}	10	12.5	12.5	Tol.	
φ d		0.4	0.45			0.5			0.6		0.45					0.5			0.6	± 0.05		0.6		± 0.05			
F		5.0										2.5					3.5	3.5	+0.8/-0.2		5.0		+0.8 / -0.2				
H		17.5							18.5		20.0	17.5		17.5			18.5		± 0.75		18.5		± 0.75				
H0		16.0										---										± 0.5		---		---	
P		12.7										12.7										± 1.0		12.7	25.4	15.0	± 1.0
P0		12.7										12.7										± 0.2		12.7	12.7	15.0 ^{*5}	±0.2 / ±0.3 (*5)
P1		3.85					5.1					4.6	4.6	± 0.5		3.85	3.85	5.0	± 0.7								
P2		6.35					6.35					± 1.0		6.35	6.35	7.5	± 1.3										
W		18.0										18.0					± 0.5		18.0		± 0.5						
W0		6.0			10.0			12.0		6.0			10.0		12.0	min.		12.0		min.							
W1		9.0					9.0										± 0.5		9.0		± 0.5						
W2		1.5										1.5										max.		1.5		max.	
A		11.0										11.0										max.		11.0		max.	
φ D0		4.0					4.0					± 0.2		4.0		± 0.2											
ΔH		0										0										± 1.0		0		± 1.0	
t		0.7					0.7					± 0.2		0.7		± 0.2											
Fig. No.		1										2		3	3	2	3				3	4	3				

Note: *1: The "Tol." of "TA" is the same as "SA".

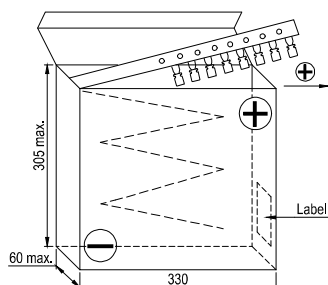
*2: For 3 ~ 8 ϕ × 5L, W0 = 10.0 mm is available.

*3: 4 ϕ × 7L the spec. is the same as 4 ϕ × 5L.

*4: H of the 5 ~ 6.3 ϕ × 11 ~ 15L for "SA" packing is 18.5 mm.

*5: The "Tol." of P0 for "SP" packing is 0.3 mm. Customized taping may be available upon request. Please consult with us.

Package

Fig. 5 Ammo pack box


Package Quantity

Unit: pcs / box

ϕD(mm)	3	4	5	6.3	8	10	12.5
Quantity	3,000	2,500	2,000	2,000	1,000	500	300

Note: The component shall be oriented on the tape as such that the positive lead is leading or the negative lead is leading with customer's request.

Lead Forming and Cutting Specifications for Radial Type

Unit: mm

Forming Method	Code	Shape	Dimensions																																																									
Forming Cut (4 $\phi \sim 8 \phi$)	FC		<table><tr><th>$\phi D \times L$</th><th>ϕd</th><th>F</th><th>F'</th><th>H</th></tr><tr><td>3 × 5</td><td>0.4</td><td>1.0</td><td rowspan="5">5.0</td><td rowspan="5">5.0</td></tr><tr><td>4 × 5</td><td rowspan="3">0.45</td><td>1.5</td></tr><tr><td>5 × 5</td><td>2.0</td></tr><tr><td>6.3 ~ 8 × 5</td><td>2.5</td></tr><tr><td>4 × 7</td><td rowspan="3">0.5</td><td>1.5</td></tr><tr><td>5 × 7~11</td><td>2.0</td></tr><tr><td>6.3 × 7 ~ 15</td><td>2.5</td></tr><tr><td>8 × 7 ~ 9</td><td>3.5</td></tr><tr><td>8 × 11.5 ~ 50</td><td rowspan="2">0.6</td><td>3.5</td><td rowspan="5">---</td><td rowspan="5">4.5</td></tr><tr><td>10</td><td>5.0</td></tr><tr><td>12.5</td><td rowspan="2">0.8</td><td>5.0</td></tr><tr><td>16</td><td>7.5</td></tr><tr><td>18</td><td rowspan="2">1.0</td><td>7.5</td></tr><tr><td>22</td><td>10.0</td></tr><tr><td>25</td><td>1.0</td><td>12.5</td></tr></table>	$\phi D \times L$	ϕd	F	F'	H	3 × 5	0.4	1.0	5.0	5.0	4 × 5	0.45	1.5	5 × 5	2.0	6.3 ~ 8 × 5	2.5	4 × 7	0.5	1.5	5 × 7~11	2.0	6.3 × 7 ~ 15	2.5	8 × 7 ~ 9	3.5	8 × 11.5 ~ 50	0.6	3.5	---	4.5	10	5.0	12.5	0.8	5.0	16	7.5	18	1.0	7.5	22	10.0	25	1.0	12.5											
$\phi D \times L$	ϕd	F	F'	H																																																								
3 × 5	0.4	1.0	5.0	5.0																																																								
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16		7.5																																																										
18	1.0	7.5																																																										
22		10.0																																																										
25	1.0	12.5																																																										
Cut (3 $\phi \sim 25 \phi$)	CC																																																											
Snap-in Forming Cut (4 $\phi \sim 8 \phi$)	SF		<table><tr><th>$\phi D \times L$</th><th>ϕd</th><th>H1</th><th>H2</th><th>H3</th><th>F</th><th>P</th><th>E</th></tr><tr><td>4 ~ 8 × 5</td><td>0.45</td><td rowspan="5">5.0</td><td rowspan="5">2.8</td><td rowspan="5">2.5</td><td rowspan="5">5.0</td><td rowspan="5">1.1</td><td rowspan="5">1.1</td></tr><tr><td>4 × 7</td><td>0.45</td></tr><tr><td>5 × 7 ~ 11</td><td rowspan="3">0.5</td><td colspan="7" rowspan="3"></td></tr><tr><td>6.3 × 7 ~ 15</td></tr><tr><td>8 × 7 ~ 9</td></tr><tr><td>8 × 11.5 ~ 50</td><td rowspan="4">0.6</td><td rowspan="4">4.5</td><td rowspan="4">2.5</td><td rowspan="4">---</td><td rowspan="4">7.5</td><td rowspan="4">1.2</td><td rowspan="4">1.3</td></tr><tr><td>10</td></tr><tr><td>12.5</td></tr><tr><td>16</td></tr><tr><td>18</td><td rowspan="2">0.8</td><td rowspan="2">1.0</td><td rowspan="2">10.0</td><td rowspan="2">12.5</td><td rowspan="2">7.5</td><td rowspan="2">1.2</td><td rowspan="2">1.3</td></tr><tr><td>22</td></tr><tr><td>25</td><td>1.0</td><td>1.0</td><td>12.5</td><td>12.5</td><td>7.5</td><td>1.2</td><td>1.3</td></tr></table>	$\phi D \times L$	ϕd	H1	H2	H3	F	P	E	4 ~ 8 × 5	0.45	5.0	2.8	2.5	5.0	1.1	1.1	4 × 7	0.45	5 × 7 ~ 11	0.5								6.3 × 7 ~ 15	8 × 7 ~ 9	8 × 11.5 ~ 50	0.6	4.5	2.5	---	7.5	1.2	1.3	10	12.5	16	18	0.8	1.0	10.0	12.5	7.5	1.2	1.3	22	25	1.0	1.0	12.5	12.5	7.5	1.2	1.3
$\phi D \times L$	ϕd	H1	H2	H3	F	P	E																																																					
4 ~ 8 × 5	0.45	5.0	2.8	2.5	5.0	1.1	1.1																																																					
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10																																																												
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16																																																												
18	0.8	1.0	10.0	12.5	7.5	1.2	1.3																																																					
22																																																												
25	1.0	1.0	12.5	12.5	7.5	1.2	1.3																																																					
Snap-in Cut (10 $\phi \sim 25 \phi$)	SC																																																											
Bending Cut (5 $\phi \sim 25 \phi$)	BC		<table><tr><th>$\phi D \times L$</th><th>ϕd</th><th>F ± 0.5</th><th>*E max.</th></tr><tr><td>5 × 11</td><td>0.5</td><td>2.0</td><td rowspan="3">---</td></tr><tr><td>6.3 × 11 ~ 15</td><td>0.5</td><td>2.5</td></tr><tr><td>8 × 11.5 ~ 50</td><td rowspan="4">0.6</td><td>3.5</td></tr><tr><td>10</td><td>5.0</td><td>2.3</td></tr><tr><td>12.5</td><td>5.0</td><td>2.3</td></tr><tr><td>16</td><td>7.5</td><td rowspan="4">2.7</td></tr><tr><td>18</td><td>0.8</td><td>7.5</td></tr><tr><td>22</td><td>1.0</td><td>10.0</td></tr><tr><td>25</td><td>1.0</td><td>12.5</td></tr></table>	$\phi D \times L$	ϕd	F ± 0.5	*E max.	5 × 11	0.5	2.0	---	6.3 × 11 ~ 15	0.5	2.5	8 × 11.5 ~ 50	0.6	3.5	10	5.0	2.3	12.5	5.0	2.3	16	7.5	2.7	18	0.8	7.5	22	1.0	10.0	25	1.0	12.5																									
$\phi D \times L$	ϕd	F ± 0.5	*E max.																																																									
5 × 11	0.5	2.0	---																																																									
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18	0.8	7.5																																																										
22	1.0	10.0																																																										
25	1.0	12.5																																																										
Cathode Lead Bending (10 $\phi \sim 25 \phi$)	SD		**E* is only suitable for SD cutting. **BU*: Leads bending cut are different direction from BC.																																																									

Package Quantity

Standard Package Quantity

1. Radial Type of Aluminum Electrolytic Capacitors

Unit: pcs

Case size	Taping		Bulk		Cutting	
	Box	Carton	Bag	Carton	Bag	Carton
3 ϕ	3,000	30,000	1,000	60,000	1,000	80,000
4 ϕ	2,500	25,000		50,000		80,000
5 $\phi \times 5 \sim 7L$	2,000	20,000		40,000		56,000
5 $\phi \times 11L$	2,000	20,000		30,000		40,000
6.3 $\phi \times 5 \sim 7L$	2,000	20,000	1,000	30,000	1,000	40,000
6.3 $\phi \times 11L$				20,000	1,000	24,000
6.3 $\phi \times 15L$				15,000	500	12,000
8 $\phi \times 5 \sim 9L$	1,000	10,000	1,000	15,000	1,000	16,000
8 $\phi \times 11.5L$				12,000	1,000	16,000
8 $\phi \times 15L$				10,000	800	12,800
8 $\phi \times 20L$				8,000	500	8,000
8 $\phi \times 25 \sim 30L$			500	6,000	500	8,000
8 $\phi \times 35 \sim 50L$			250	3,000	250	4,000
10 $\phi \times 9L$	500	5,000	1,000	12,000	500	12,000
10 $\phi \times 12.5L$			500	8,000		8,000
10 $\phi \times 16L$				7,000		8,000
10 $\phi \times 20L$				6,000	400	6,400
10 $\phi \times 25L$				6,000	300	4,800
10 $\phi \times 30 \sim 40L$	500*	5,000*	400	4,000	250	4,000
10 $\phi \times 45 \sim 50L$	250	2,500	200	3,000	200	3,200
12.5 $\phi \times 16 \sim 25L$	300	3,000	250	3,000	200	3,200
12.5 $\phi \times 30 \sim 35L$				2,500	150	2,400
12.5 $\phi \times 40L$				2,000	150	2,400
12.5 $\phi \times 45 \sim 50L$	150	1,500	100	2,000	100	1,600
16 $\phi \times 16 \sim 25L$	---	---	150	1,800	100	1,600
16 $\phi \times 31.5L$			100	1,200	100	1,600
16 $\phi \times 35.5L$				1,200	75	1,200
16 $\phi \times 40L$				1,000	75	1,200
16 $\phi \times 45 \sim 50L$				1,000	50	800
18 $\phi \times 16L$	---	---	150	1,800	100	1,600
18 $\phi \times 20 \sim 25L$			100	1,200	100	1,600
18 $\phi \times 31.5L$				1,200	75	1,200
18 $\phi \times 35.5L$				800	75	1,200
18 $\phi \times 40L$				800	50	800
18 $\phi \times 45 \sim 50L$			50	600	50	400
22 ϕ	---	---	50	500	---	400
25 $\phi \times 40L$			25	300		
25 $\phi \times 45 \sim 50L$			25	250		

Note: 1. 10 $\phi \times 35 \sim 40L$ for taping is 250 pcs / box, 2,500 pcs / carton.

2. Please refer to approval sheets for packing specifications.

2. Radial Type of Organic Conductive Polymer Capacitors

Unit: pcs

Case size	Taping		Bulk		Cutting	
	Box	Carton	Bag	Carton	Bag	Carton
5 ϕ	2,000	20,000	1,000	20,000	1,000	24,000
6.3 ϕ	2,000	20,000		20,000		20,000
8 ϕ	1,000	10,000		12,000		16,000
10 $\phi \times 10L$	500	5,000	500	10,000	500	8,000
10 $\phi \times 12L$				8,000		



Package Quantity

Standard Package Quantity

3. SMD Type

Unit: pcs

Case size	Q'ty / Reel	Q'ty / Box
3 ϕ	2,000	20,000
4 ϕ	2,000	20,000
5 ϕ	1,000	10,000
6.3 $\phi \times 4.4^* \sim 4.5L$	1,500	15,000
6.3 $\phi \times 5.3 \sim 7.7L$	1,000	10,000
6.3 $\phi \times 8.7L$	800	8,000
6.3 $\phi \times 9.5L^*$	500	5,000
8 $\phi \times 6.5 / 6.7^* \sim 7.7L^*$	1,000	10,000
8 $\phi \times 10L$	500	5,000
10 $\phi \times 12L^*$	400	4,000
10 $\phi \times 7.7 \sim 10L$	500	5,000
10 $\phi \times 12.5 / 12.6L^*$	400	4,000
10 $\phi \times 16.5L^*$	300	3,000
12.5 $\phi \times 13.5L$	200	1,600
12.5 $\phi \times 16L$		
16 $\phi \times 16.5L$		
16 $\phi \times 21.5L$	100	800
18 $\phi \times 16.5L$	150	1,200
18 $\phi \times 21.5L$	100	800

Note: Case sizes with "*" mark are for OP-CAP only.

4. Snap-in Type

Unit: pcs

ϕD	L	Inner Box	Carton	ϕD	L	Inner Box	Carton
20 ϕ	15 ~ 25	110	1,320	35 ϕ	15 ~ 25	40	480
	30		1,100		30		400
	35 ~ 40		880		35 ~ 60		320
	45 ~ 50	100	800		65 ~ 80		240
22 ϕ	15 ~ 25	90	1,080		90 ~ 100		160
	30		900	40 ϕ	25 ~ 30	30	150
	35 ~ 40		720		35 ~ 50		120
	45 ~ 60	80	640		55 ~ 70		90
25 ϕ	15 ~ 25	65	780		80 ~ 90		60
	30		650	45 ϕ	100	20	80
	35 ~ 40		520		70	25	75
	45 ~ 60		520		80 ~ 90		50
30 ϕ	15 ~ 25	50	600				
	30		500				
	35 ~ 40		400				
	45 ~ 60	45	360				
	65		270				

5. Screw Type

Unit: pcs

Case size	Q'ty / Box
35 ϕ	100
51 ϕ	36
63.5 ϕ	25
76.2 ϕ	16
89 ϕ	9

Note: Customized packages for snap-in type and screw type may be available upon request. Please consult with us.

Terminal Codes for Snap-in Type

PC board pin-out positions is viewed from component side.
Each terminal type has a restriction on the applicable case size.
For other terminal types that are not illustrated here, please consult with us.

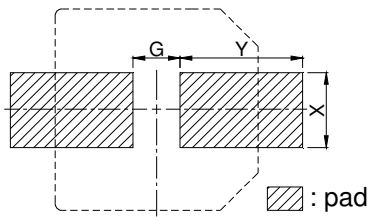
Unit: mm

Standard Type Applicable Size: 20 ϕ ~ 40 ϕ Terminal Code: - -	5-pins Terminal Type Applicable Size: 35 ϕ ~ 40 ϕ Terminal code: L5
3-pins Terminal Type Applicable Size: 20 ϕ ~ 40 ϕ Terminal Code: L3	Vibration-resistant Type Applicable Size: 30 ϕ ~ 40 ϕ Terminal Code: T2
4-pins Terminal Type Applicable Size: 35 ϕ ~ 40 ϕ Terminal Code: L4	Horizontal Type Applicable Size: 20 ϕ ~ 35 ϕ Terminal Code: H2
	Horizontal Type Applicable Size: 20 ϕ ~ 35 ϕ Terminal Code: G2

Note: The pitch of 20 ~ 22 ϕ for horizontal type (marking "10*") is 8 mm.

Reflow Conditions for SMD Type

Recommended Land Pattern and Size



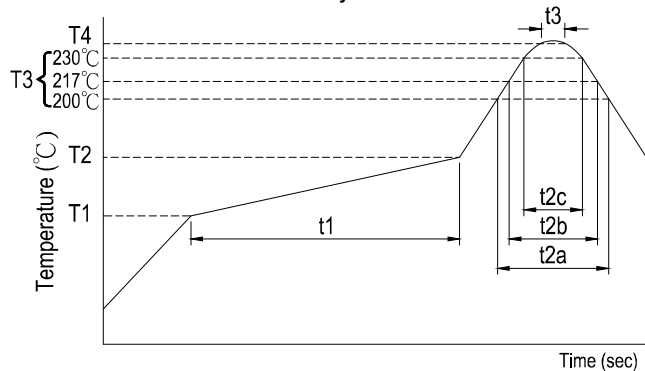
Unit: mm

Case size	Land size			Case size	Land size		
	G	Y	X		G	Y	X
3 ϕ	0.8	2.2	1.6	8 ϕ	3.0	3.5	2.5
4 ϕ	1.0	2.6		10 ϕ	4.0	4.0	2.5
5 ϕ	1.4	3.0		12.5 ϕ	4.0	6.0	3.2
6.3 ϕ	1.9	3.5		16 ϕ	6.0	7.0	
8x6.5	2.1	4.0		18 ϕ	6.0	8.0	

Recommended Soldering Methods

Method	Reflow soldering	Soldering iron	Flow soldering
Advisability	○ Recommended	○ Recommended	✕ Not Recommended

Reflow Profile for Pb-free Assembly



Test Conditions

Type	Non-solid capacitor						OP-CAP	Hybrid
Rated Voltage (V)	4 ~ 50	4 ~ 50	63 up	4 ~ 100	160 up	---	---	---
Case Diameter (mm)	4 ~ 6.3 with 4.5 mm	3* ~ 6.3	4 ~ 6.3	8 ~ 18	12.5 up	---	---	---
Preheat (T1 ~ T2, °C)	150 ~ 180						150~200	150 ~ 180
Duration (T3, °C)	Time (t1) (max., secs)	120	100				180	120
	Temp. (T3, °C)	230	217	230	217	217	230	200
	Time (max., secs)	t2c	t2b	t2c	t2b	t2b	t2c	t2a
Peak (T4, °C)	Temp. (T4, °C)	250	260*	250	250	240	250	260
	Time (t3, secs)	5						5
Reflow cycles	1	2 or less				2	1	2

- * The peak temperature (T4) in marking with “*” symbol for 3 ϕ is 250°C.
- * Please contact our representative if your condition is higher.
- * Please ensure that the capacitor became cold enough to the room temperature (5 ~ 35°C) before the second reflow.
- * Consult with us when performing reflow profile in IPC / JEDEC (J-STD-020)

Attention for OP-CAP

Reflow soldering may reduce the capacitance of products before or after soldering even if soldering conditions stipulated in Recommendable Reflow Condition are met.

Though the actual reflow conditions are subject to change depending on the kind of reflow soldering method, please be aware that the peak temperature at the top of Al-case and electrode terminals should not exceed peak temperature.

Particular notice should be given to the time that OP-CAP is heated at 200°C or higher during reflow.

If your reflow conditions (temperature and/or duration) exceed the above, OP-CAP may be damaged exhibiting; 50% decrease in capacitance, an increase of leakage current, (up to several mA) as well as damage to the exterior of the capacitor.

(1) Method is as follows.

Reflow soldering condition.

The following temperature profile condition should be observed for soldering. (For higher temperature, please contact us after measuring the capacitor's product temperature profile at your side.

Product temperature will rise slower as the product size gets bigger. It is not necessary to adjust the reflow furnace temperature setting according to the product size, for example, $\phi 4$ and $\phi 10$ products can be mixed on one PCB for reflowing.

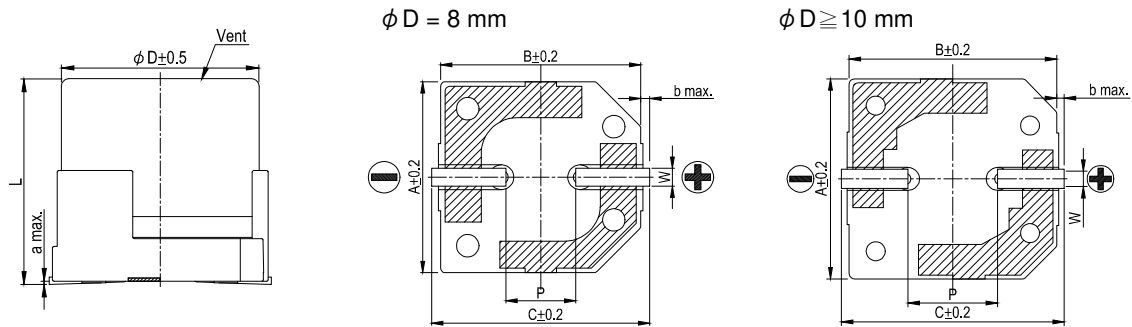
(2) Soldering precautions

- Elements related to the reflow soldering temperature
 - * Product size: The temperature rises slower as the size gets bigger.
 - * Product location: The center part of the PCB tends to have a lower temperature than the PCB edges.
 - * PCB size: The PCB temperature rises slower as the area and/or thickness of the PCB gets greater.
- Repeated reflowing
 - * Avoid reflowing twice if possible.
 - * If repeated reflowing is unavoidable, contact us after measuring the first and the second reflow profiles and reflow interval at your side.
 - * Do not attempt to reflow three times.
- Soldering with soldering iron observe the following conditions.
 - * The iron tip temperature: 350 $\pm$ 5°C
 - * Soldering time: 3 +1 / -0 seconds.

Anti-vibration Structure for SMD Type

Available for SMD $\phi 8 \sim \phi 18$ of automotive application (Terminal code: V)

Diagram of Dimensions

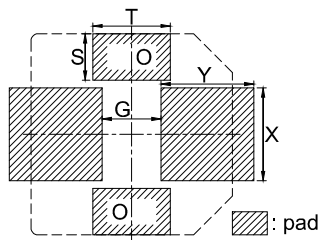


Lead Spacing and Diameter

ϕD	$L \pm 1.0$	A	B	C	W	a	b	$P \pm 0.2$
8	10.5 ± 0.5	8.5	8.9	9.9	$0.7 \sim 1.1$	0.3	0.5	3.1
10	10.5 ± 0.5	10.5	10.9	11.9	$0.7 \sim 1.3$	0.3	0.5	4.7
12.5	13.5	13.0	13.5	14.5	$1.1 \sim 1.4$	0.4	1.0	4.4
12.5	16.5	13.0	13.5	14.5				4.4
16	16.5	16.5	17.0	18.2				6.4
18	16.5	18.5	19.0	20.2				6.4

Unit: mm

Land Pattern (Anti-vibration Structure)



Unit: mm

Case Size ($\phi D \times L$)	Land size				
	G	Y	X	S	T
8×10.5	3.0	4.3	3.0	1.1	2.2
10×10.5	4.0	4.7	3.0	1.2	2.4
12.5	3.8	6.0	6.0	3.0	5.0
16×16.5	5.0	8.0	7.5	3.0	5.0
18×16.5	5.0	8.5	6.3	---	---

When using SMD capacitor with an anti-vibration structure, please dimension the land patterns like the recommended land patterns in order to achieve a high level of vibration resistance and to avoid SMD capacitors falling off the circuit board.

The shaded areas marked with "O" are optional. Please consult with us for details.

Discontinued Series

The following series are discontinued. Please use the recommended in the table.

Type	Original Series	Features	Recommended Substitution
SMD	VE2, VE3, VEA, VE, VSS	Higher Capacitance Range	VEJ, VES
	VGA, VEL, VEC	Higher Capacitance Range, 105°C	VEJ
	VEK	Long Life, 105°C	VZH
	VLV	Low ESR, High Reliability, Anti-vibration	VZH
	VLW	High Temperature Usage, 125°C, Anti-vibration	VUA
	VEB	Bi-polarized	VGB
Radial	REA / SEA	Standard, 85°C	RGA / SG
	RLA / SLA	Low Leakage Current	RA / SA
	SS, SSL	5Lmm, 85°C	SSG
	RXZ	Super Ultra Low Impedance (Design for M/B)	ORS / ORA
	RXH	Ultra Low Impedance, High Reliability (Design for M/B)	
	RZD	Ultra Low Impedance	
	RXF	High Ripple Current, Long Life	RXQ
	RXY	Low Impedance	RZW
	RZY	High Reliability	
	RZF	High Reliability, Long Life	
Axial	RN, SN, SSN	Bi-polarized	RNG
	TEA	General	

Precautions and Guidelines for Using Organic Conductive Polymer Capacitors

Organic conductive polymer capacitor (OP-CAP) is specially structured using with a solid electrolyte of conductive polymers, has several advantages over non-solid aluminum capacitors due to its compact size, wide operation temperature range, high resistance against ripple current, and especially, low ESR. The only disadvantage, however, is their low working voltage. Over past few years, Lelon has developed a number of series of OP-CAPs. Please refer to following guidelines for obtaining the highest performance and stable quality by using OP-CAP series products.

1. Guidelines for Circuit design

(1) Polarity

OP-CAPs are basically nothing but aluminum electrolytic capacitors with solid electrolyte. Therefore, they must be installed with the correct polarity. Usage in the reverse polarity results into a short-circuit condition that may damage or even explode the capacitor.

In addition, it may affect circuit functionality.

(2) Operating Voltage

Applied DC voltage must not exceed rated voltage of an OP-CAP. Applying higher voltage across a capacitor terminals than its rated voltage will cause overheating due to higher leakage currents, and dielectric/insulation deterioration that will ultimately affect a capacitor's performance. The OPCAP, however, is capable of working under short-time transient voltages such as DC transients and peak AC ripples. Note that the result of DC voltage overlapped with peak ripple voltage should not exceed rated voltage.

(3) Ripple Current

One of the key functions of any capacitor is removal of the ripple current i.e. the RMS value of AC flowing through a capacitor. But, a ripple current higher than rated ripple current will drop resultant capacitance, cause undue internal heating and thus reduces life span of the capacitor. In extreme cases, internal high temperature will cause the pressure relief vent to operate while destroying the device. Overall, it is important to note that an electrolytic capacitor must be used within a permissible range of ripple current.

(4) Operating Temperature

Capacitors should be used within a permissible range of operating temperatures. Use of a capacitor at a higher temperature than maximum rated temperature will considerably shorten its life. Usage of capacitors at an ambient room temperature assure their longer life.

(5) Leakage Current

Leakage current flows through a capacitor when DC voltage is applied across it. Leakage current varies with changes in ambient temperature and applied DC voltage level and its time of application. Overvoltage situation, presence of moisture, and thermal stresses, especially occurring during the soldering process can enhance leakage current. Initial leakage current is usually higher and does not decrease until voltage is applied for a certain period of time. It is recommended to keep initial leakage current within specified levels.

(6) Charge and Discharge

OP-CAPs are unsuitable for rapid charging/discharging circuits. Such usage may either cause reduction in overall capacitance or damage due to overheating. **Note that a protection circuit is required when inrush current in an OP-CAP exceeds 10 A.**

(7) Condition of Use

OP-CAP shall not be used / exposed to:

- Fluids including water, saltwater spray, oil, fumes, highly humidity or condensed climates, etc.
- Ambient conditions containing hazardous gases/fumes like hydrogen sulfide, sulfuric acid, nitrous acid, chlorine or bromine gas, ammonia, etc.
- Ozone, ultraviolet rays and radiation.
- Severe vibrations or physical shocks that exceeding the in specifications.

(8) Consideration to Circuit Design

- Please ensure whether application, operating and mounting conditions satisfy the conditions specified in the catalog

before installation of an OP-CAP. Please consult Lelon, if any of the conditions are beyond the conditions specified in the catalog.

- Heat-generating components or heat sinks should not be placed closer to OP-CAPs on the PCB to avoid premature failure. A cooling system is recommended to improve their reliable working.
- Electrical characteristics and performance of OP-CAPs are affected by variation of applied voltage, ripple current, ripple frequency and operating temperature. Therefore, these parameters shall not exceed specified values in the catalog.
- OP-CAPs may be connected in the parallel fashion for increasing total capacitance and/or for achieving higher ripple current capability. But, such design may cause unequal current flow through each of the capacitors due to differences in their impedances.
- When two or more capacitors are connected in series, voltage across each capacitor may differ and fall below the applied voltage. A resistor should be placed across each capacitor so as to match applied voltage with voltage across a capacitor.
- Please consult Lelon while selecting a capacitor for high-frequency switching circuit or a circuit that undergoes rapid charging/ discharging.
- Standard outer sleeve/ coating material of the capacitor is not a perfect electrical insulator therefore is unsuitable for the applications that requires perfect electrical insulation. Please consult Lelon, if your application requires perfect electrical insulation.
- Tilting or twisting capacitor body is not recommended once it is soldered to the PCB.

2. Caution for Assembling Capacitors

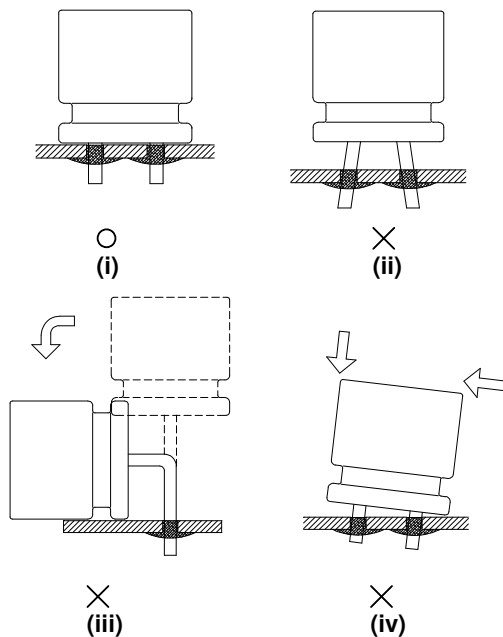
(1) Mounting

- OP-CAPs are not recommended to re-use in other circuits once they are mounted and powered in a circuit.
- OP-CAPs may hold static charge between its anode and cathode, which is recommended to be discharge through a 1kΩ resistor before use.
- A long storage of capacitors may result into its insulation deterioration. This can lead to a high leakage current when voltage is applied that may damage the capacitor. Capacitors following a long storage period must undergo voltage treatment/re-forming. Capacitors are charged by applying rated DC voltage through a resistor of 1kΩ in series at least for an hour. It is recommended to increase applied voltage gradually using a voltage regulator unit once capacitors are assembled on the board. The charging should be followed by discharging through a 1kΩ resistor.
- Please check capacitor rated voltage before mounting.
- Please check capacitor polarity before mounting.
- Please don't drop OP-CAPs on the floor/hard object.
- Please don't deform the capacitor during installation.
- Please confirm whether the lead spacing of the capacitors match with its pad spacing/footprint on PCB prior to installation.
- Please avoid excessive mechanical shocks to OP-CAPs during auto-insertion process, inspection or centering operations.

(Continued on next page)

(2) Soldering

- Please confirm that soldering conditions, especially temperature and contact time are within our specifications. Dip or flow preheat temperature is 150°C with 120 sec (max.), the soldering temperature should be limited at 260 ± 5°C for 10 ± 1sec. Please do not dip capacitor body into molten solder. An OP-CAP's life will be negatively affected if these conditions are violated.
- Storage of capacitors in *high humidity* conditions is likely to *affect the solderability of lead wires and terminals*
- Reflow soldering should ONLY be used for SMD type conductive polymer capacitors.** Please check the reflow profile prior to using such type of capacitors. The temperature and duration shall not exceed the specified temperature and duration in the catalogue. If required temperature or duration is higher than the value specified, please consult Lelon before use.
- Usually OP-CAPs are not designed to withstand multiple reflow processes. Please consult Lelon if repeated reflowing is unavoidable.
- Incorrect mounting on PCB with improper external strength applied on its lead wires or capacitor body after soldering may damage an OP-CAP's internal structure, cause short circuit, or lead to high leakage current. Do not bend or twist the capacitor body after soldering. Referring to the drawings below only case (i) is recommended.
 - Correct soldering
 - Hole-to-hole spacing on PCB differs from the lead spacing of lead wires.
 - Lead wires are bent after soldering.
 - Capacitor body doesn't stand vertical on PCB after soldering.



(3) Cleaning PCBs After Soldering

- Following chemicals are not recommended for cleaning: Solvent containing halogen ions, Alkaline solvent, Xylene, Acetone, Terpene, petro-based solvent.
- Recommended cleaning conditions: Fatty-alcohol - Pine Alpha ST-100S, Clean Through-750H and IPA (isopropyl alcohol) are examples of the most acceptable cleaning agents. Temperature of the cleaning agent must not exceed 60°C. Flux content in the cleaning agents should be limited to 2 Wt. %. Overall length of cleaning process (e.g., immersion, ultrasonic or other) shall be within 5 minutes (5 ~ 7mm height within 3 minutes).

3. Maintenance Inspection

Periodic inspection of OP-CAPs is absolutely necessary, especially when they are used with industrial equipment. The following items should be checked:

- Appearance: bloated, vent operated, leaked, etc.
 - Electrical characteristic: Capacitance, Tan δ , leakage current, and other specified items listed in specifications.
- Lelon recommends replacement of the capacitors if any of the abovementioned items fail to meet the specifications.

4. Storage

- The most suitable conditions for aluminum capacitor storage are 5°C ~ 35°C with indoor relative humidity less than 75%. High temperature and/or humidity storage is detrimental to the capacitors.
- OP-CAPs shall not be stored in wet or damp atmospheres containing water, brine, fumes or oil.
- Capacitors storage area shall neither be exposed to hazardous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc. nor to acidic/ alkaline solutions.
- OP-CAPs shall not be exposed to ozone, ultraviolet rays or radiation.
- Storage bags shall be opened just before usage. Please restore unused capacitors as soon as possible. Sealed and secured capacitors are likely to provide better solderability in next usage. Shelf-life of OP-CAPs are as follows:

Series name	Before unseal	After unseal
OCV, OCVZ, OCVU, OVH, OVK, OVA, OVE, OVG, OVS, OVf, OVD, OVB, OVJ	Within 1 year after delivery (Unopened condition)	Within 30 days from opening package
OCR, OCRZ, OCRK, OCRU, ORE, ORS, ORA, ORG, ORC, ORF, ORB, ORD	Within 1 year after delivery (Unopened condition)	Within 7 days from opening package

※ It is not applied to the regulation of JEDEC J-STD-020 (Rev. C).

(Continued on next page)

5. Estimation of life time

Formula 1	Formula 2
$L_r = L_0 \times 10^{\frac{T_0 - T_r}{20}}$	$L_r = L_0 \times 2^{\frac{T_{0\max} - T_{r\max}}{10}}$
Applicable products: ● OP-CAP OCV, OCVZ, OVH, OVK, OCVU, OCR, OCRZ, ORE, OCRK, OCRU series	Applicable products: ● OP-CAP OVA, OVE, OVG, OVS, OVF, OVD, OVB, OVJ, ORS, ORA, ORG, ORC, ORF, ORB, ORD series ● Conductive Polymer Hybrid Capacitors ● Aluminum Electrolytic Capacitors
Ex. OCV, 105°C, 2,000 Hours	Ex. OVA, 105°C, 15,000 Hours
95°C ≥ 6,324 Hours	95°C ≥ 30,000 Hours
85°C ≥ 20,000 Hours	85°C ≥ 60,000 Hours
75°C ≥ 63,245 Hours	75°C ≥ 120,000 Hours
65°C ≥ 200,000 Hours (max. 15 years)	65°C ≥ 240,000 Hours (max. 15 years)

Formula 1:

L_r : Estimated lifetime (hours)

L_0 : Base lifetime specified at maximum operating temperature with applied the DC voltage

T_0 : Rated maximum operating temperature (°C)

T_r : Actual ambient temperature (°C)

Formula 2:

L_r : Estimated lifetime (hours)

L_0 : Base lifetime specified at maximum operating temperature with applied the DC voltage and the ripple current (hours)

* For OP-CAP just applied the DC voltage

$T_{0\max}$: The core temperature that rated ripple current applied at maximum operating temperature.

$T_{r\max}$: The core temperature that applied actual ripple current at ambient temperature.

Please note that

(1) Maximum life is 15 years.

(2) Ripple current in application should be less than or equal to ripple current specified in catalogue.

If you need to realize more detail, please consult with us for further discussion.

6. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

7. Environmental Consideration

Lelon already have received IECQ QC 080000 certificate. Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr⁶⁺), PBB, PBDE, DEHP, BBP, DBP and DIBP have never been using in capacitor. If you need "Halogen-free" products, please consult with us.

8. AEC-Q200 Compliance

Automotive Electronics Counsel (AEC) has established various electronic component qualification/reliability standards in order to serve automotive electronics industry. AEC-Q200 standard is dedicated for passive components like capacitors, inductors, etc. and is widely adopted domestically as well as internationally. Lelon offers compliant product designs and support services to satisfy customers' product requirements, including the AEC-Q200 required criteria of the reliability tests. Lelon's capacitors are professionally designed to outperform all requirements of AEC-Q200

For further details, please refer to the following industrial standards:

IEC 60384-4 - Fixed capacitors for use in electronic equipment –

Part 4: Sectional specification – Fixed aluminum electrolytic capacitors with solid (MnO₂) and non-solid electrolyte (Edition 5.0 2016-08)

JEITA RCR-2367D – Safety application guide for fixed aluminum electrolytic capacitors for use in electronic equipment (Established in March 1995, Revised in October 2017)

Part Numbering System – Organic Conductive Polymer (OP-CAP)

Product Code Guide

OCV series	82μF	±20%	16V	Carrier Tape		8φ×6.7L	Pb-free and Coated Case	
OCV	820	M	1C	TR	-	0807		
□□□	□□□	□	□□	□□	□	□□□□	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal	Case Size	Lead Wire and Case Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, “-”, to fill the third blank. When the series name has 4 letters, use the following series codes. OCVZ→OVZ; OCVU→OVU

② **Capacitance:** Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. “R” represents the decimal point for capacitance under 10μF.

Example:

Capacitance	6.8	10	47	100	470	1,000	2,200
Part number	6R8	100	470	101	471	102	222

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
-----------------	-----------------	-----------------

④ **Rated voltage:** Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	2	2.5	4	6.3	10	16	20	25	35
Code	0D	0E	0G	0J	1A	1C	1D	1E	1V

⑤ **Package:**

SMD Type	TR = Reel package TT = Reel package of plastic	Radial Type	BK = Bulk Package SA = Straight Leader Taping CC = Cutting Leader
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⑥ **Terminal (SMD) / Rubber type (Radial):**

SMD Type	- = Standard	Radial Type	- = Gas escape type F = Flat rubber bung
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Note: For radial type: the case sizes of 5φ, 6.3φ×5.5 ~ 8L and 8φ×8L are used flat rubber bung is the standard design, use a hyphen, “-”:

⑦ **Case size:** The first two digits indicate case diameter and the last two digits indicate case length in mm.

SMD Type

φ D×L	5×4.4	5×5.7 5×5.8	6.3×4.4	6.3×5.8 6.3×5.9	6.3×6.4 6.3×7.0	6.3×7.7	6.3×9.5
Code	0504	0506	0604	0606	0607	0608	0610
φ D×L	8×6.7	8×7.7	8×10	8×12	10×7.7	10× 9.9 10× 10	10×12.6
Code	0807	0808	0810	0812	1008	1010	1013

Radial Type

φ D×L	5×8	6.3×5.5	6.3×6 6.3×6.5	6.3×8	6.3×11	8×6.5	8×8	8×11.5
Code	0508	0605	0606	0608	0611	0807	0808	0811
φ D×L	8×12	8×16	8×20	10×10	10×12	10×16	10×20	
Code	0812	0816	0820	1010	1012	1016	1020	

⑧ **Lead wire and case type:**

None = Pb free wire + coated case (Standard design)	E = Sn-Bi wire + coated case
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* When a supplement code following a blank digit code of lead wire and case case type (standard design), use a hyphen, “-”, to fill the blank digit. When the automotive control code is required, please contact with us for further discussion.

⑨ **Supplement code (Optional):** For special control purposes



OP-CAP Item List

SMD Type (2V ~ 10V)

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	2 V			
Cap. (μF)	Series	Size φD×L(mm)	ESR	Ripple Current
680	OVF	6.3 × 5.8	12	3,500
1,200	OVH	6.3 × 9.5	8	5,230

Rated Voltage	2.5 V				4 V				6.3 V				10 V			
Cap. (μF)	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current
33													OVK	5 × 5.7	40	1,300
													OVA	5 × 5.8	40	1,270
47									OVK	5 × 5.7	30	1,970	OCV	5 × 5.7	40	1,270
									OVA	5 × 5.8	35	1,380	OVA	5 × 5.8	40	1,270
													OVE	5 × 5.8	28	2,310
													OVA	6.3 × 4.4	41	1,560
													OVA	6.3 × 5.8	31	2,250
56													OVE	5 × 5.8	28	2,310
													OVK	6.3 × 4.4	40	1,670
													OVA	6.3 × 5.8	31	2,250
													OCV	6.3 × 5.9	31	2,250
													OVK	6.3 × 5.9	27	2,300
68					OVK	5 × 5.7	30	1,970	OVA	6.3 × 5.8	27	2,400	OVK	5 × 5.7	30	2,100
													OCVZ	5 × 5.7	23	2,540
													OVE	5 × 5.8	28	2,310
													OVK	6.3 × 5.9	27	2,300
82									OVA	6.3 × 4.4	40	1,670				
									OVK	6.3 × 4.4	40	1,670				
									OVA	6.3 × 5.8	27	2,400				
									OCV	6.3 × 5.9	27	2,400				
									OVK	6.3 × 5.9	27	2,400				
100					OVE	5 × 5.8	22	2,610	OCV	5 × 5.7	35	1,380				
					OVK	6.3 × 4.4	40	1,670	OVK	5 × 5.7	35	1,380				
					OVA	6.3 × 5.8	26	2,450	OVA	5 × 5.8	35	1,380				
									OVE	5 × 5.8	24	2,500				
									OVA	6.3 × 4.4	40	1,670				
									OVA	6.3 × 5.8	27	2,400				
									OCV	6.3 × 5.9	27	2,400				
									OVK	6.3 × 5.9	22	2,800				
120	OVK	6.3 × 4.4	40	1,670	OVA	6.3 × 4.4	38	1,710	OCVZ	5 × 5.7	21	2,660	OVF	5 × 5.8	22	2,600
									OVE	5 × 5.8	24	2,500	OVH	6.3 × 5.8	30	2,700
									OVA	6.3 × 5.8	27	2,400	OVE	6.3 × 5.8	25	2,530
									OVS	6.3 × 5.8	22	2,570	OVS	6.3 × 5.8	27	2,320
									OVK	6.3 × 5.9	22	2,800	OCVZ	6.3 × 5.9	22	2,600
									OCV	6.3 × 7	30	2,010	OVK	6.3 × 5.9	27	2,300
													OVA	8 × 6.7	27	2,800
150					OCV	5 × 5.7	30	1,490	OVF	5 × 4.4	25	2,100	OVK	6.3 × 7.7	21	2,880
					OVK	5 × 5.7	25	2,200	OVH	5 × 5.8	12	3,500	OCVZ	6.3 × 7.7	15	3,400
					OCVZ	5 × 5.7	20	2,730	OVH	5 × 5.8	12	3,520	OVE	6.3 × 7.7	21	2,880
					OVA	5 × 5.8	30	1,490	OVD	6.3 × 4.4	19	2,780	OVH	8 × 6.7	21	2,880
					OVE	5 × 5.8	22	2,610	OCV	6.3 × 7	30	2,250	OCV	8 × 6.7	27	2,800
					OVA	6.3 × 5.8	26	2,450	OCV	8 × 6.7	25	3,020	OVA	8 × 6.7	27	2,800
					OCV	6.3 × 5.9	26	2,450	OVK	8 × 6.7	25	3,020	OVK	8 × 6.7	30	2,760
					OVK	6.3 × 5.9	22	2,570	OVA	8 × 6.7	25	3,020	OVS	8 × 6.7	30	2,760
180	OCVZ	5 × 5.7	19	2,800	OVB	5 × 5.8	25	2,300	OVD	5 × 5.8	17	3,390	OVK	10 × 7.7	30	3,020
	OVE	5 × 5.8	21	2,670	OVD	6.3 × 4.4	19	2,780	OVH	5 × 5.8	15	3,150				
220									OVF	5 × 5.8	12	3,500				
									OVH	5 × 5.8	15	3,150				
									OCVZ	6.3 × 4.4	18	3,000				
									OVD	6.3 × 4.4	18	3,200				
									OVH	6.3 × 4.4	15	3,180				
									OVE	6.3 × 5.8	15	3,160				
									OVF	6.3 × 5.8	10	3,900	OVH	6.3 × 5.9	20	2,700
									OVS	6.3 × 5.8	22	2,570	OCVZ	8 × 6.7	22	3,220
									OCVZ	6.3 × 5.9	15	3,160	OVE	8 × 6.7	21	3,220
									OVH	6.3 × 5.9	10	3,900				
									OVK	6.3 × 5.9	20	2,800				
									OCV	6.3 × 7	30	2,250				
									OCV	8 × 6.7	25	3,020				
									OVA	8 × 6.7	25	3,020				
									OVK	8 × 6.7	22	3,220				

OP-CAP Item List

SMD Type (2.5V ~ 10V)

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	2.5 V				4 V				6.3 V				10 V			
Cap. (μF)	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current	Series	Size φD×L(mm)	ESR	Ripple Current
270	OVH	5 × 5.8	10	3,860	OVE OCVZ OVK	6.3 × 5.8 6.3 × 5.9 8 × 6.7	15 15 22	3,160 3,160 3,220	OVE OVF OCVZ OVV OVK OVA	6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7	14 14 14 9 14 14	3,470 3,470 3,470 4,200 3,470 3,470	OCVZ OVE OVK OVA OVA	8 × 6.7 8 × 6.7 8 × 6.7 8 × 12 10 × 7.7	22 21 22 14 24	3,220 3,220 3,200 4,420 3,770
330	OCVZ OVH OVD OVF OVH OVD OVF	6.3 × 4.4 6.3 × 4.4 5 × 5.8 5 × 5.8 5 × 5.8 6.3 × 4.4 6.3 × 4.4	16 14 16 10 10 16 12	3,180 3,180 3,500 3,900 3,860 3,500 3,500	OVE OVF OVK OCVZ OVH OCV OVK OVA	6.3 × 5.8 6.3 × 5.8 6.3 × 5.9 6.3 × 5.9 6.3 × 5.9 8 × 6.7 8 × 6.7 8 × 6.7	15 10 20 15 10 25 22 25	3,160 3,900 2,800 3,160 3,900 3,020 3,220 3,020	OVD OVF OCVZ OVV OCVZ OVE OVF OVK OVV OVH OCV OVK OVA	6.3 × 5.8 6.3 × 5.8 6.3 × 5.9 6.3 × 6.4 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 8 × 6.7 8 × 6.7 8 × 6.7 10 × 7.7 10 × 7.7 10 × 7.7	17 10 17 15 9 14 9 14 14 9 20 20 20	3,390 3,900 3,390 3,390 4,200 3,470 4,200 3,470 3,900 3,950 4,500 4,130 4,130 4,130	OCV OVK OCVU OVA OCV OVA OVK	8 × 12 8 × 12 8 × 12 8 × 12 10 × 7.7 10 × 7.7 10 × 7.7	14 14 17 14 24 24 24	4,420 4,420 3,950 4,420 3,770 3,770 3,770
390	OVF OVH OVE OVF OCVZ OVH	5 × 5.8 5 × 5.8 6.3 × 5.8 6.3 × 5.8 6.3 × 5.9 6.3 × 5.9	10 10 15 10 14 10	3,900 3,860 3,160 3,900 3,160 3,900	OVB OVD OCVZ OVE OVK OVF	6.3 × 5.8 6.3 × 5.8 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7	24 17 9 14 14 9	2,700 3,390 4,200 3,470 3,470 4,200	OCVZ OVE OVF OVH OVK OVS OVA	8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 12	22 14 10 9 22 22 12	3,220 3,950 4,500 4,500 3,220 3,220 4,770	OVJ OVJ OCVZ OVE	6.3 × 7.7 6.3 × 9.5 8 × 10 8 × 10	13 13 17 17	4,460 4,000 4,000 4,000
470	OVE OVF	6.3 × 7.7 6.3 × 7.7	13 9	3,600 4,200	OVE OVF OVH OCV OVK OVA	8 × 6.7 8 × 6.7 8 × 6.7 10 × 7.7 10 × 7.7 10 × 7.7	14 10 9 20 20 20	3,950 4,500 4,500 4,130 4,130 4,130	OVE OCV OVK OCVU OVA OVA OVF OVK	8 × 7.7 8 × 12 8 × 12 8 × 12 8 × 12 10 × 7.7 8 × 7.7 10 × 7.7	13 12 12 15 12 20 9 20	3,950 4,770 4,770 4,210 4,770 4,130 4,500 4,130	OVB OCVZ OVE OCV OCVU OVK OVA	8 × 10 10 × 7.7 10 × 7.7 10 × 9.9 10 × 9.9 10 × 9.9 10 × 12.6	17 19 19 18 18 18 12	3,800 3,800 3,800 4,400 4,400 4,400 5,300
560	OVD OVF OCVZ OVH OVV OCVZ OVE OVF OCV OVK OVA OVE OVF OVH	6.3 × 5.8 6.3 × 5.8 6.3 × 5.9 6.3 × 5.9 6.3 × 6.4 6.3 × 7.7 6.3 × 7.7 6.3 × 7.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7	16 10 16 10 16 9 13 9 23 23 23 23 13 10 9	3,500 3,900 3,500 3,900 3,500 4,200 3,600 4,200 3,100 3,100 3,100 3,100 4,100 4,500 4,200	OCVZ OVE OVF OVH OVK OVS OCV OCVU OCVZ OVK OVA	8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 12 8 × 12 8 × 12 8 × 12 8 × 12	22 14 10 9 18 22 12 13 9 12 12	3,220 3,950 4,500 4,500 3,600 3,220 4,770 4,520 5,380 4,770 4,770	OVJ OVJ OVF OCV OVK OCVU	6.3 × 7.7 6.3 × 9.5 8 × 7.7 10 × 9.9 10 × 9.9 10 × 9.9	8 10 9 16 16 16	5,000 4,300 4,500 4,700 4,700 4,700	OCV OCVU OVA OVK	10 × 12.6 10 × 12.6 10 × 12.6 10 × 12.6	12 13 12 12	5,300 5,230 5,300 5,300
680	OCVZ OVE OVF OVH OCV OVK OCVU OVA	8 × 6.7 8 × 6.7 8 × 6.7 8 × 6.7 8 × 12 8 × 12 8 × 12 8 × 12	20 13 10 9 12 12 13 12	3,370 4,100 4,500 4,500 4,770 4,770 4,520 4,770	OVF OCV OVA OVE OVK	8 × 7.7 10 × 7.7 10 × 7.7 8 × 7.7 10 × 7.7	9 20 20 13 20	4,500 4,130 4,130 3,950 4,130	OVB OCV OVA	8 × 10 10 × 12.6 10 × 12.6	12 10 10	4,600 5,500 5,500	OCVZ OVE	10 × 9.9 10 × 10	13 13	4,820 4,820
820	OVJ OVJ OVE OCVZ OVE	6.3 × 7.7 6.3 × 9.5 8 × 7.7 8 × 12 8 × 12	7 10 12 9 9	5,000 4,300 4,260 5,380 5,400	OCV OCVU OVK OVA	10 × 9.9 10 × 9.9 10 × 9.9 10 × 12.6	13 13 13 10	5,200 5,200 5,200 5,500	OVE OCVZ OVE OVH OCV OVK OCVU OVA	8 × 10 8 × 12 8 × 12 10 × 7.7 10 × 7.7 10 × 12.6 10 × 12.6 10 × 12.6	12 13 10 14 14 9 10 10 12 10	4,770 4,700 5,150 4,300 4,300 5,000 5,500 5,500 5,440 5,500	OVB	10 × 10	15	4,300

OP-CAP Item List

SMD Type (2.5V ~ 35V)

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	2.5 V				4 V				6.3 V				10 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
1,000	OVJ	6.3 × 9.5	10	4,300	OVE	8 × 10	10	5,220	OVB	8 × 12	11	4,800				
	OVF	8 × 7.7	9	4,500	OCVZ	10 × 7.7	14	4,300								
	OCV	10 × 7.7	19	4,240	OVE	10 × 7.7	14	4,300								
	OVK	10 × 7.7	19	4,240	OVH	10 × 7.7	9	5,000								
	OVA	10 × 7.7	19	4,240												
	OCVU	10 × 9.9	13	5,200												
1,200	OVJ	6.3 × 9.5	10	4,300	OVB	8 × 10	15	5,400	OCVZ OVE	10 × 9.9 10 × 10	12 12	5,025 5,025	OVB	10 × 12.6	13	4,800
	OCVZ	10 × 7.7	13	4,450	OCVZ	8 × 12	12	4,700								
	OVE	10 × 7.7	13	4,450	OVE	8 × 12	9	5,500								
	OVH	10 × 7.7	9	5,000	OCVZ	10 × 9.9	10	5,500								
	OCV	10 × 9.9	13	5,200	OVE	10 × 10	10	5,500								
	OVK	10 × 9.9	13	5,200	OCV	10 × 12.6	10	5,500								
					OCVU	10 × 12.6	12	5,440								
					OVK	10 × 12.6	10	5,500								
1,500	OVE	8 × 10	10	5,220	OVA	10 × 12.6	10	5,500	OVH	10 × 9.9	8	6,000				
	OCVZ	8 × 12	12	5,150					OVE	10 × 10	12	5,025				
	OVE	8 × 12	9	5,400	OCVZ	10 × 9.9	10	5,500	OCVZ	10 × 9.9	12	5,025				
	OCV	10 × 12.6	10	5,500	OVE	10 × 10	10	5,500	OCVZ	10 × 12.6	10	5,560				
	OVK	10 × 12.6	10	5,500					OVE	10 × 12.6	10	5,500				
	OCVU	10 × 12.6	13	5,440												
1,800	OVA	10 × 12.6	10	5,500	OVH	10 × 9.9	8	6,000	OVB	10 × 12.6	10	5,500				
					OCVZ	10 × 9.9	10	5,500	OCVZ	10 × 12.6	11	5,200				
					OCVZ	10 × 12.6	9	5,600								
					OVE	10 × 10	10	5,500								
					OVE	10 × 12.6	9	5,600								
2,200	OCVZ	10 × 9.9	10	5,500	OCVZ	10 × 12.6	9	5,700								
	OVH	10 × 9.9	8	6,000												
	OVE	10 × 10	10	5,500												
2,700	OCVZ	10 × 12.6	9	5,600												
	OVE	10 × 12.6	9	5,600												

Rated Voltage	16 V				20 V				25 V				35 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
6.8									OCV	6.3 × 5.9	80	1,200				
10									OVG	5 × 4.4	60	1,700				
									OVA	6.3 × 5.8	65	1,500				
									OCV	8 × 6.7	60	1,500				
12									OVB	6.3 × 5.8	70	1,200				
15					OVK	6.3 × 4.4	45	2,000								
18					OVA	6.3 × 4.4	57	1,300								
22	OCV	5 × 5.7	45	1,210	OVK	6.3 × 4.4	35	2,000	OVG	5 × 5.8	40	2,450	OCVZ	6.3 × 5.9	35	2,600
	OVK	5 × 5.7	45	1,100	OVA	6.3 × 5.8	50	1,650	OVG	6.3 × 4.4	45	2,350				
	OVA	5 × 5.8	45	1,210	OCV	6.3 × 5.9	50	1,650	OVA	8 × 6.7	50	1,800				
	OVA	6.3 × 4.4	45	1,490	OVK	6.3 × 5.9	48	1,300	OCV	10 × 7.7	50	2,000				
					OVG	5 × 4.4	55	1,770	OVG	5 × 5.8	40	2,450				
27					OVH	6.3 × 5.8	60	1,400								
	OVE	5 × 5.8	35	2,070	OVG	5 × 4.4	55	1,770	OVH	8 × 10	50	2,000				
	OVK	6.3 × 4.4	40	1,670					OCV	8 × 12	30	2,980				
39	OVA	6.3 × 5.8	37	2,050												
	OVG	5 × 4.4	50	1,840												
	OVK	5 × 5.7	35	2,000												
	OCVZ	5 × 5.7	27	2,350												
	OVE	5 × 5.8	35	2,070	OVA	8 × 6.7	45	2,000	OVG	6.3 × 5.8	30	2,800	OCV	8 × 12	31	2,100
	OVA	6.3 × 5.8	37	2,050	OVH	8 × 6.7	45	2,000	OVA	10 × 7.7	45	2,100				
	OVS	6.3 × 5.8	37	2,050												
	OCVZ	6.3 × 5.9	24	2,460												
	OVK	6.3 × 5.9	30	2,200												

OP-CAP Item List

SMD Type (16V ~ 35V)

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage Cap. (μF)	16 V				20 V				25 V				35 V			
	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
47	OVG	5 × 4.4	50	1,840	OVG	5 × 5.8	30	2,800	OVG	6.3 × 5.8	30	2,800				
	OVG	6.3 × 4.4	42	2,400	OVG	6.3 × 4.4	42	2,400	OVG	6.3 × 5.9	49	1,300				
	OCV	8 × 6.7	45	2,000	OCV	8 × 6.7	45	2,000								
	OVK	8 × 6.7	45	1,890	OVK	8 × 6.7	45	1,890								
	OVA	8 × 6.7	45	2,000	OVA	8 × 6.7	45	2,000								
56					OVG	5 × 5.8	30	2,800	OVG	6.3 × 5.8	30	2,800				
					OVK	6.3 × 5.9	48	1,300	OCVZ	6.3 × 5.9	30	2,800				
									OVG	6.3 × 7.7	28	2,800				
									OVV	10 × 10	45	2,200				
68	OVG	6.3 × 4.4	40	2,450					OCV	10 × 12.6	28	2,700				
	OVS	6.3 × 5.8	30	2,200	OVK	6.3 × 5.9	48	1,300	OVG	8 × 6.7	28	3,000				
	OCVZ	6.3 × 5.9	25	2,440												
	OVK	6.3 × 5.9	30	2,200												
82	OVK	6.3 × 5.9	30	2,200					OVJ	6.3 × 7.7	28	3,040	OCVZ	8 × 12	20	4,000
	OVK	6.3 × 7.7	30	2,200	OVK	6.3 × 5.9	48	1,300	OVJ	6.3 × 9.5	28	3,000	OVK	8 × 12	29	2,200
	OCVZ	6.3 × 7.7	24	2,700	OCV	10 × 7.7	40	2,500	OVG	8 × 7.7	26	3,100				
	OVS	6.3 × 7.7	24	2,700	OVA	10 × 7.7	40	2,500	OVV	10 × 12.6	30	3,800				
	OCV	8 × 6.7	30	2,700												
	OVA	8 × 6.7	30	2,700												
	OVK	8 × 6.7	28	2,800												
	OVS	8 × 6.7	30	2,760												
100	OVG	5 × 5.8	27	3,000												
	OVD	6.3 × 5.8	24	2,490												
	OVK	6.3 × 5.9	30	2,200	OVK	6.3 × 5.9	48	1,300								
	OCVZ	6.3 × 5.9	24	2,490	OCV	8 × 12	24	3,320	OVG	8 × 10	24	3,300				
	OVV	6.3 × 6.4	24	2,490	OVV	8 × 12	22	3,200								
	OVK	6.3 × 7.7	24	2,700	OCV	10 × 9.9	25	3,700								
	OCVZ	6.3 × 7.7	24	2,700												
	OVS	6.3 × 7.7	24	2,700												
	OVS	8 × 6.7	24	3,010												
	OCVZ	8 × 6.7	24	3,010												
	OVK	10 × 7.7	35	2,670												
120	OCVZ	8 × 6.7	24	3,010	OVG	6.3 × 5.8	25	3,200	OVG	8 × 10	22	3,500	OCVZ	10 × 12.6	18	4,400
	OVS	8 × 6.7	24	3,010	OVK	6.3 × 5.9	48	1,300								
	OVK	8 × 6.7	28	2,800	OCVZ	6.3 × 5.9	25	3,200								
	OVS	8 × 6.7	27	2,900												
150	OCVZ	8 × 6.7	22	3,220	OVG	6.3 × 7.7	25	3,200	OVK	8 × 12	28	2,200	OVK	10 × 12.6	28	2,600
	OVS	8 × 7.7	22	3,150	OVJ	6.3 × 7.7	18	3,790	OVG	10 × 7.7	25	3,400				
	OVA	10 × 7.7	26	3,430	OVJ	6.3 × 9.5	18	3,200								
					OCV	10 × 12.6	20	4,320								
					OVA	10 × 12.6	20	4,320								
180	OVG	6.3 × 5.8	22	3,300												
	OVH	6.3 × 9.5	11	4,460												
	OCVZ	8 × 10	18	3,890	OVG	8 × 6.7	25	3,200	OCVZ	8 × 12	16	4,650				
	OVS	8 × 10	18	3,890	OVV	10 × 12.6	20	4,300								
	OCV	8 × 12	16	4,360												
	OCVU	8 × 12	20	3,640												
	OVA	8 × 12	16	4,360												
	OCV	10 × 7.7	26	3,430												
	OVA	10 × 7.7	26	3,430												
	OVK	10 × 7.7	29	3,430												
220	OVG	6.3 × 7.7	22	3,300												
	OVS	8 × 10	18	3,890												
	OCVZ	8 × 10	18	3,890	OVG	8 × 7.7	23	3,300	OCVZ	10 × 9.9	20	3,800				
	OCVZ	10 × 7.7	22	3,450	OVV	8 × 10	23	3,400	OVG	10 × 10	20	3,800				
	OVS	10 × 7.7	22	3,450												
	OCV	10 × 9.9	20	4,200												
	OCVU	10 × 9.9	20	4,200												
	OVA	10 × 12.6	14	5,050												

OP-CAP Item List

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

SMD Type (16V ~ 25V)

Rated Voltage Cap. (μF)	16 V				20 V				25 V			
	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
270	OVJ	6.3 × 7.7	13	4,460	OVK	8 × 12	21	4,000	OCV	10 × 12.6	27	2,700
	OVJ	6.3 × 9.5	10	5,080								
	OVK	6.3 × 9.5	11	5,000								
	OVG	8 × 6.7	22	3,300								
	OVB	8 × 10	20	3,600								
	OCVZ	8 × 12	12	4,850								
330	OVG	8 × 7.7	21	3,400	OCV	10 × 12.6	26	2,700	OCVZ	10 × 12.6	14	5,000
	OVG	8 × 10	21	3,400								
	OVE	10 × 10	16	4,350								
	OCV	10 × 12.6	14	5,050								
	OVK	10 × 12.6	12	5,300								
	OCVU	10 × 12.6	16	4,720								
	OCVZ	10 × 9.9	16	4,350								
	OCVZ	10 × 12.6	12	5,300								
	OVA	10 × 12.6	14	5,050								
390	OVB	8 × 12	18	3,900	OVG	8 × 10	20	3,700				
					OCVZ	8 × 12	14	4,950				
					OVK	8 × 12	14	4,950				
470	OVB	10 × 10	16	4,200	OVK	10 × 12.6	20	4,300				
	OVK	10 × 12.6	12	5,300								
	OCVZ	10 × 12.6	10	6,100								
560	OVG	8 × 10	18	3,900	OCVZ	10 × 9.9	18	4,100				
					OVG	10 × 10	18	4,100				
					OCVZ	10 × 12.6	12	5,600				
680	OVB	10 × 12.6	14	4,700								
820	OVG	10 × 10	16	4,200								
	OCV	10 × 12.6	18	4,200								
	OCVZ	10 × 12.6	12	5,400								
	OVG	10 × 12.6	12	5,400								
	OVK	10 × 12.6	12	5,400								
1,000	OVK	10 × 12.6	12	5,400								
	OCVZ	10 × 12.6	12	5,400								
	OVG	10 × 7.7	18	4,100								
	OVG	10 × 12.6	12	5,400								

OP-CAP Item List

Radial Type (2V ~ 10V)

Rated Voltage	2 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current
1,000	ORF	6.3 × 8	5	5,900

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	2.5 V				4 V				6.3 V				10 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
47													ORA	6.3 × 11	25	2,820
68													ORA	6.3 × 11	25	2,820
100	ORE	5 × 8	7	4,180					OCR	6.3 × 5.5	40	1,810	OCR	6.3 × 6.5	45	1,700
150					OCR	6.3 × 5.5	40	1,810					ORA	6.3 × 11	25	2,820
220	ORD	5 × 8	7	4,350					OCR	6.3 × 11	18	3,160	OCR	10 × 10	17	3,950
	OCR	6.3 × 5.5	28	2,390					ORA	6.3 × 11	20	3,160				
270					OCR	6.3 × 11	15	3,200	OCRZ	5 × 8	8	3,900	ORE	8 × 6.5	22	3,220
					ORA	6.3 × 11	20	3,160	ORD	5 × 8	10	3,700	ORA	8 × 11.5	9	4,710
330	ORE	5 × 8	7	4,180					ORA	6.3 × 11	28	3,190	ORS	8 × 11.5	14	4,420
	ORD	5 × 8	7	4,350	ORD	5 × 8	8	4,050	OCRZ	5 × 8	8	3,900	OCRZ	8 × 12	8	5,000
	OCRK	6.3 × 8	7	5,600					ORD	5 × 8	8	4,050	OCR	8 × 11.5	14	4,420
	OCRZ	6.3 × 8	7	5,600					OCR	6.3 × 6.5	28	2,390	OCRK	8 × 11.5	17	3,950
	ORE	6.3 × 8	5	5,900					ORA	6.3 × 11	28	3,190	OCRZ	8 × 11.5	16	3,950
	ORF	6.3 × 8	5	5,900									ORS	8 × 11.5	14	4,420
390	ORE	6.3 × 5.5	10	3,900					OCR	8 × 11.5	12	4,770				
	OCRZ	6.3 × 6	10	3,900	ORA	6.3 × 11	24	3,300	OCRK	8 × 11.5	15	4,210	ORC	8 × 11.5	9	5,650
	OCR	6.3 × 11	18	3,160					ORA	8 × 11.5	8	5,080	OCRZ	8 × 12	8	5,000
	ORA	6.3 × 11	20	3,150					ORS	8 × 11.5	12	4,770				
470	OCRZ	5 × 8	7	4,200					OCRK	6.3 × 8	8	4,700				
	ORD	5 × 8	7	4,350	ORF	6.3 × 8	7	5,600	OCRZ	6.3 × 8	7	5,600				
	ORE	5 × 8	7	4,180					ORB	6.3 × 8	8	4,700				
	OCRK	6.3 × 8	7	5,600					ORE	6.3 × 8	7	5,600	OCRZ	10 × 12	8	6,000
	ORE	6.3 × 8	5	5,900					OCRZ	8 × 8	7	6,200	ORA	10 × 12	8	5,650
	ORF	6.3 × 8	5	5,900					ORC	8 × 8	8	5,700	ORS	10 × 12	12	5,300
	OCRZ	8 × 8	7	5,000					ORE	8 × 8	8	5,700				
									OCR	8 × 11.5	12	4,770				
									OCRK	8 × 11.5	15	4,210				
									OCRZ	8 × 11.5	15	4,210				
									ORA	8 × 11.5	7	5,700				
									ORS	8 × 11.5	12	4,770				
									OCRZ	8 × 12	7	6,200				
									ORE	8 × 12	8	5,700				
560	OCRZ	5 × 8	7	4,200	OCRK	6.3 × 8	7	5,600								
	ORD	5 × 8	7	4,350	OCRZ	6.3 × 8	7	5,000								
	ORE	5 × 8	7	4,180	ORB	6.3 × 8	7	5,000								
	OCRK	6.3 × 8	7	5,600	ORE	6.3 × 8	7	5,600	OCRK	6.3 × 8	8	4,700	OCRZ	8 × 8	9	5,600
	OCRZ	6.3 × 8	7	5,600	ORF	6.3 × 8	7	5,600	OCRZ	6.3 × 8	7	5,600	OCR	10 × 12	12	5,300
	ORE	6.3 × 8	5	5,900	OCRZ	8 × 8	7	6,200	ORB	6.3 × 8	8	4,700	OCRK	10 × 12	16	4,720
	ORF	6.3 × 8	5	5,900	ORC	8 × 8	7	6,100	ORE	6.3 × 8	7	5,600	OCRZ	10 × 12	13	5,230
	OCRZ	8 × 8	7	6,200	ORE	8 × 8	7	6,100	OCRZ	8 × 8	7	6,200	OCRZ	10 × 12	8	6,000
	ORC	8 × 8	7	6,100	OCR	8 × 11.5	10	5,230	ORC	8 × 8	8	5,700	ORS	10 × 12	12	5,300
	ORE	8 × 8	8	4,700	OCRZ	8 × 12	7	6,200	ORE	8 × 8	7	6,100				
680	OCR	8 × 11.5	10	5,230	ORA	8 × 11.5	7	5,580	OCRZ	6.3 × 8	7	5,600				
	OCRZ	8 × 11.5	13	4,520	ORC	8 × 11.5	10	5,230	ORA	10 × 12	7	5,860	ORC	10 × 12	7	6,100
	ORA	8 × 11.5	7	5,580	OCRZ	8 × 12	7	6,200	ORE	10 × 12	7	6,640				
	ORS	8 × 11.5	10	5,230	ORE	8 × 12	7	6,100	ORS	10 × 12	10	5,500				
820	OCRK	6.3 × 8	7	5,600												
	OCRZ	6.3 × 8	7	5,600					ORF	6.3 × 8	8	4,700				
	ORB	6.3 × 8	7	5,000					OCRZ	6.3 × 8	7	5,600				
	ORE	6.3 × 8	5	5,900					OCRZ	8 × 8	7	6,200				
	ORF	6.3 × 8	5	5,900					OCRZ	8 × 12	8	5,500				
	OCRZ	8 × 8	7	6,200	OCRZ	8 × 8	7	6,200	OCR	10 × 12	12	5,500	OCRZ	8 × 12	8	5,000
	ORC	8 × 8	7	6,100	ORA	10 × 12	6	5,860	OCRZ	10 × 12	12	4,360	OCRZ	10 × 12	8	6,000
	ORE	8 × 8	7	6,100	ORE	10 × 12	7	6,640	OCRZ	10 × 12	12	5,440				
	ORA	8 × 11.5	7	5,580	ORS	10 × 12	8	5,500	OCRZ	10 × 12	7	6,200				
	ORS	8 × 11.5	10	5,230					ORC	10 × 12	7	6,640				
	OCRZ	8 × 12	7	6,200					ORS	10 × 12	10	5,500				
	ORE	8 × 12	7	6,100												

OP-CAP Item List

Radial Type (2.5V ~ 35V)

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	2.5 V				4 V				6.3 V				10 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
1,000	OCRZ	8 × 8	7	6,200	OCRZ	8 × 8	7	6,200	OCRZ	8 × 8	7	6,200	OCRZ	8 × 8	7	6,200
	ORC	8 × 8	7	6,100												
	ORE	8 × 8	7	6,100												
	ORC	8 × 11.5	7	6,100												
	OCRZ	8 × 12	7	6,200	ORC	10 × 12	6	6,640	OCRZ	8 × 12	8	5,500	OCRZ	8 × 12	8	5,500
	OCR	10 × 10	14	4,700												
	OCRZ	10 × 12	7	6,200												
	ORA	10 × 12	6	5,860												
1,200	ORF	6.3 × 8	5	5,900	OCRZ	8 × 8	7	6,200	OCRZ	8 × 12	8	5,500	OCRZ	10 × 12	8	6,000
	OCRZ	6.3 × 8	7	5,600												
	OCRZ	8 × 8	7	6,200												
	OCRZ	10 × 12	13	5,440												
	ORF	8 × 8	5	6,100												
1,500	ORC	8 × 11.5	7	6,100	OCRZ	10 × 12	7	6,500	OCRZ	10 × 12	7	6,200	OCRZ	10 × 12	7	6,200
	OCRZ	8 × 12	7	6,200												
	OCR	10 × 12	12	5,500												
	OCRZ	10 × 12	7	6,500												
	ORA	10 × 12	7	5,860												
	ORS	10 × 12	8	5,500												
1,600	ORF	8 × 8	5	6,100												
1,800	OCRZ	8 × 8	7	6,200					OCRZ	10 × 12	7	6,200				
2,200	OCRZ	8 × 12	7	6,200	OCRZ	10 × 12	8	7,200								
2,700	OCRZ	10 × 12	7	7,200	OCRZ	10 × 12	8	7,200	OCRZ	10 × 12	8	7,200	OCRZ	10 × 12	8	7,200
	ORC	10 × 12	8	5,560												
	ORE	10 × 12	10	5,560												
3,900	OCRZ	10 × 12	7	7,200												

Rated Voltage	16 V				20 V				25 V				35V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
6.8									OCR	6.3 × 5.5	80	1,200				
18													ORS	8 × 11.5	34	2,830
22					OCR	6.3 × 5.5	60	1,450					ORE OCR	6.3 × 5.5 8 × 11.5	35 31	2,600 2,300
33									OCR	8 × 11.5	24	3,320	ORS	10 × 12	30	3,270
39													ORE OCR	8 × 6.5 8 × 11.5	30 31	2,800 2,300
47	OCR	6.3 × 5.5	50	1,650									OCRZ OCR	8 × 12 10 × 12	24 30	3,600 3,650
56					OCR	6.3 × 11	5	2,650	ORE ORG OCR OCR	6.3 × 5.5 6.3 × 5.5 8 × 11.5 10 × 12.5	30 30 24 20	2,800 2,600 3,320 4,320				
68									OCR ORS	8 × 11.5 8 × 11.5	24 24	3,320 3,320	OCRK ORG OCR	8 × 11.5 8 × 11.5 10 × 12	29 18 28	2,200 4,380 2,700
82									ORG ORE	6.3 × 8 8 × 6.5	28 28	2,780 3,000	ORE OCRZ	8 × 12 8 × 12	20 20	4,000 4,000
100	ORF ORE OCRZ OCRZ ORE OCR ORA ORF ORS	6.3 × 5.5 6.3 × 5.5 6.3 × 6 6.3 × 8 6.3 × 8 6.3 × 11 6.3 × 11 6.3 × 11 8 × 11.5	24 24 24 10 10 22 25 25 16	2,490 2,490 2,490 4,680 4,680 2,820 2,820 2,890 4,360	OCR OCRK OCRU ORS OCR	8 × 11.5 8 × 11.5 8 × 11.5 8 × 11.5 10 × 10	24 28 24 24 24	3,320 2,300 3,320 3,320 3,320	ORG OCRK OCR ORS	6.3 × 8 8 × 11.5 10 × 12 10 × 12	28 28 20 20	2,780 2,200 4,320 4,320				
120					ORE ORG	6.3 × 5.5 6.3 × 5.5	25 20	3,200 3,200	ORG	6.3 × 8	28	2,780	ORE OCRZ ORG	10 × 12 10 × 12 10 × 12	18 18 16	4,400 4,000 4,670
150	ORG ORE ORE	6.3 × 5.5 6.3 × 5.5 8 × 6.5	20 24 22	3,200 2,490 3,220	OCR OCRU ORS	10 × 12 10 × 12 10 × 12	20 20 20	4,320 4,320 4,320					OCR OCRK OCRZ	10 × 12 10 × 12 10 × 12	26 28 20	2,700 2,600 3,800
180	OCRZ OCRZ ORE OCR OCRK OCRU ORS ORE	6.3 × 8 8 × 8 8 × 8 8 × 11.5 8 × 11.5 8 × 11.5 8 × 11.5 8 × 12	10 10 10 16 20 18 16 16	4,680 5,000 5,000 4,360 3,640 3,640 4,360 4,360	ORG ORE	6.3 × 8 8 × 6.5	18 25	3,460 3,200	OCRZ ORG ORG ORE	8 × 8 8 × 8 8 × 11.5 8 × 12	18 18 16 16	3,770 3,770 4,650 4,650				
220	ORE	8 × 6.5	13	4,150					ORG OCRZ	8 × 11.5 8 × 12	16 16	4,650 4,650	ORE	8 × 12	16	4650

OP-CAP Item List

ESR: mΩ/at 100k ~ 300k Hz, 20°C max.

Radial Type (16V ~ 25V)

Ripple Current: mA/rms at 100k Hz, 105°C

Rated Voltage	16 V				20 V				25 V			
Cap. (μF)	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current	Series	Size φ D×L(mm)	ESR	Ripple Current
270	OCRK	6.3 × 8	15	3,800								
	OCRZ	6.3 × 8	10	4,680								
	ORE	6.3 × 8	10	5,080								
	ORG	6.3 × 8	10	5,080								
	ORE	8 × 6.5	13	4,150								
	OCRZ	8 × 8	10	5,000					OCR	10 × 12	25	2,800
	ORE	8 × 8	10	5,000					OCRK	10 × 12	27	2,700
	ORF	8 × 8	10	5,000								
	ORC	8 × 11.5	11	5,080								
	ORF	8 × 11.5	11	5,080								
	OCRZ	8 × 12	8	5,000								
	ORE	8 × 12	11	5,000								
	ORS	10 × 12	14	5,050								
330	ORG	6.3 × 8	10	5,080								
	OCRZ	8 × 8	10	5,000								
	ORF	8 × 8	13	4,700								
	OCR	10 × 10	16	4,360	OCRZ	8 × 8	17	3,880				
	OCR	10 × 12	14	5,050	ORG	8 × 8	17	3,880	ORE	10 × 12	14	5,000
	OCRK	10 × 12	16	4,720	OCR	10 × 12	24	2,800	ORG	10 × 12	14	5,000
	OCRU	10 × 12	16	4,720	OCRK	10 × 12	26	2,800				
	OCRZ	10 × 12	8	6,000								
	ORC	10 × 12	10	6,100								
390					ORG	8 × 11.5	14	4,970	OCRZ	10 × 12	14	5,000
					OCRZ	8 × 12	14	4,970	ORG	10 × 12	14	5,000
					ORE	8 × 12	14	4,970	ORE	10 × 12	14	5,000
470	ORE	8 × 8	8	5,400								
	ORG	8 × 8	16	4,000								
	OCRZ	8 × 8	16	4,000								
	ORF	8 × 11.5	11	5,400								
	OCRZ	8 × 12	10	5,400								
	OCRZ	10 × 12	8	6,000								
	ORC	10 × 12	10	6,100								
	ORE	10 × 12	10	6,100								
560	ORG	8 × 11.5	14	4,970	ORE	10 × 12	12	5,600				
	ORE	8 × 12	14	4,950								
680	ORG	8 × 11.5	8	6100	OCRZ	10 × 12	12	5,400				
					ORG	10 × 12	12	5,400				
820	ORG	8 × 16	8	7,000								
	OCRZ	10 × 12	10	6,100								
	ORG	10 × 12	12	5,400								
1,000	ORG	8 × 16	8	7,000								
	ORG	8 × 20	8	7,500								
	OCRZ	10 × 12	10	6,100								
	ORE	10 × 12	12	5,400								
	ORG	10 × 12	12	5,400								
1,200	ORG	8 × 20	8	7,500								
	ORG	10 × 12	12	5,400								
1,500	ORG	8 × 20	8	7,500								
	ORG	10 × 16	8	7,700								
1,800	ORG	10 × 16	8	7,700								
	ORG	10 × 20	8	8,100								
2,200	ORG	10 × 20	8	8,100								
2,700	ORG	10 × 20	8	8,100								

OCV Series

Features

- 105°C, 2,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS compliance



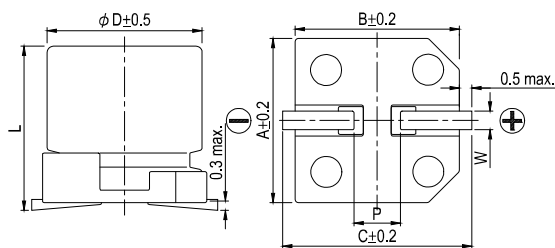
Marking color: Blue

Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at 120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		2,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.					
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.					
Resistance to Soldering Heat * (Please refer to page 15 for reflowsoldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions



Lead Spacing and Diameter

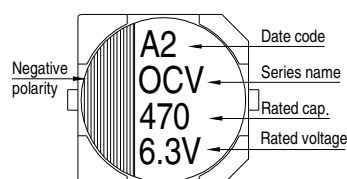
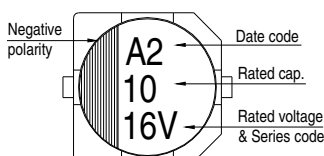
Unit: mm

φ D	L	A	B	C	W	P ± 0.2
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.9 +0.1/-0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.0 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	9.9 +0.1/-0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 5 ~ 6.3

φ D = 8 ~ 10



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	220	6.3 × 5.9	0.12	110	25	2,500
		560	8 × 6.7	0.12	280	23	3,100
		680	8 × 12	0.18	340	12	4,770
		1,000	10 × 7.7	0.12	500	19	4,240
		1,200	10 × 9.9	0.18	750	13	5,200
		1,500	10 × 12.6	0.18	750	10	5,500
4V (0G)	4.6	150	5 × 5.7	0.12	120	30	1,490
			6.3 × 5.9		120	26	2,450
		220	8 × 6.7		176	25	3,020
		330	8 × 6.7		264	25	3,020
		470	10 × 7.7		376	20	4,130
		560	8 × 12	0.18	448	12	4,770
		680	10 × 7.7	0.12	544	20	4,130
		820	10 × 9.9	0.18	656	13	5,200
		1,200	10 × 12.6	0.18	960	10	5,500
6.3V (0J)	7.2	82	6.3 × 5.9	0.12	103	27	2,400
			5 × 5.7		126	35	1,380
			6.3 × 5.9		126	27	2,400
		120	6.3 × 7		151	30	2,010
			6.3 × 7		189	30	2,250
		150	8 × 6.7		189	25	3,020
			6.3 × 7		277	30	2,250
		220	8 × 6.7		277	25	3,020
			10 × 7.7	0.15	416	20	4,130
		330	8 × 12		592	12	4,770
		560	10 × 9.9		706	16	4,700
		820	10 × 12.6		1,033	10	5,500
10V (1A)	12.0	47	5 × 5.7	0.12	94	40	1,270
		56	6.3 × 5.9	0.10	112	31	2,250
		150	8 × 6.7	0.10	300	27	2,800
		330	8 × 12	0.15	660	14	4,420
			10 × 7.7	0.10	660	24	3,770
		470	10 × 9.9	0.15	940	18	4,400
		560	10 × 12.6	0.15	1,120	12	5,300
16V (1C)	18.0	22	5 × 5.7	0.12	70	45	1,210
		47	6.3 × 5.9	0.10	150	50	1,650
		82	8 × 6.7	0.10	262	30	2,700
		180	8 × 12	0.15	576	16	4,360
			10 × 7.7	0.10	576	26	3,430
		220	10 × 9.9	0.15	704	20	4,200
		330	10 × 12.6	0.15	792	14	5,050
		820	10 × 12.6	0.12	2,624	18	4,200

Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
20V (1D)	23.0	22	6.3 × 5.9	0.10	88	50	1,650
		47	8 × 6.7		188	45	2,000
		82	10 × 7.7		328	40	2,500
		100	8 × 12	0.15	400	24	3,320
			10 × 9.9		400	25	3,700
		150	10 × 12.6		600	20	4,320
		330	10 × 12.6	0.12	1,320	26	2,700
25V (1E)	29.0	6.8	6.3 × 5.9	0.10	170	80	1,200
		10	8 × 6.7		125	60	1,500
		22	10 × 7.7		275	50	2,000
		33	8 × 12	0.12	413	30	2,980
		56	10 × 12.6		700	28	3,800
		270	10 × 12.6		1,350	27	2,700
35V (1V)	40.0	39	8 × 12	0.12	273	31	2,100
		68	10 × 12.6	0.12	476	28	2,700

Part Numbering System

OCV Series	470 μ F	±20%	6.3V	Carrier Tape		8 ϕ × 12L	Pb-free and Coated Case
OCV	471	M	0J	TR	-	0812	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVK Series

Features

- 105°C, 5,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

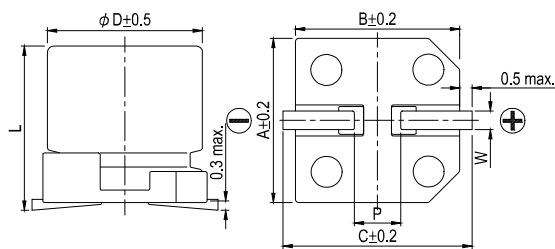
Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at 120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		5,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 5,000 hours at 105℃.					
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.					
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions



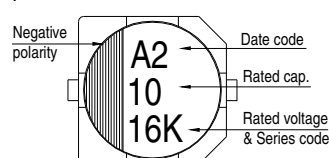
Lead Spacing and Diameter

Unit: mm

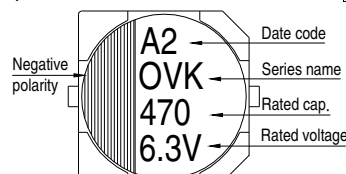
φ D	L	A	B	C	W	P ± 0.2
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.9 +0.1/-0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	9.5 ± 0.5	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	9.9 +0.1/-0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 5 ~ 6.3



φ D = 8 ~ 10



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	LC (μ A)	ESR (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	120	6.3 × 4.4	0.12	120	40	1,670
		220	6.3 × 5.9		110	25	2,500
		560	8 × 6.7		280	23	3,100
		680	8 × 12	0.18	340	12	4,770
		1,000	10 × 7.7	0.12	500	19	4,240
		1,200	10 × 9.9	0.18	750	13	5,200
		1,500	10 × 12.6	0.18	750	10	5,500
4V (0G)	4.6	68	5 × 5.7	0.12	300	30	1,970
		100	6.3 × 4.4		160	40	1,670
		150	5 × 5.7		120	25	2,200
			6.3 × 5.9		120	22	2,570
		220	8 × 6.7		176	25	3,020
		270	8 × 6.7		216	22	3,220
		330	6.3 × 5.9		264	20	2,800
			8 × 6.7		264	22	3,220
		390	6.3 × 7.7		312	14	3,470
		470	10 × 7.7		375	20	4,130
		560	8 × 6.7		448	18	3,600
			8 × 12	0.18	448	12	4,770
		680	10 × 7.7	0.12	544	20	4,130
		820	10 × 9.9	0.18	656	13	5,200
		1,200	10 × 12.6	0.18	960	10	5,500
6.3V (0J)	7.2	47	5 × 5.7	0.12	300	30	1,970
		82	6.3 × 4.4		207	40	1,670
			6.3 × 5.9		103	27	2,400
		100	5 × 5.7		126	35	1,380
			6.3 × 5.9		126	22	2,800
		120	6.3 × 5.9		151	22	2,800
		150	8 × 6.7		189	25	3,020
		20	6.3 × 5.9		277	20	2,800
			8 × 6.7		277	22	3,220
		270	6.3 × 7.7		340	14	3,470
		330	6.3 × 7.7		416	14	3,470
			10 × 7.7		416	20	4,130
		390	8 × 6.7		491	22	3,220
		470	8 × 12	0.15	592	12	4,770
			10 × 7.7	0.12	592	20	4,130
		560	10 × 9.9	0.15	706	16	4,700
		820	10 × 12.6	0.15	1,033	10	5,500
10V (1A)	12.0	33	5 × 5.7	0.12	100	40	1,300
		56	6.3 × 4.4		224	40	1,670
			6.3 × 5.9		112	27	2,300
		68	5 × 5.7		136	30	2,100
			6.3 × 5.9		136	27	2,300
		120	6.3 × 5.9		240	27	2,300
		150	6.3 × 7.7		300	21	2,880
			8 × 6.7			30	2,760
			10 × 7.7			30	3,020

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz, 105℃)		
10V (1A)	12.0	270	8 × 6.7	0.12	540	22	3,200		
		330	8 × 12	0.15	660	14	4,420		
			10 × 7.7	0.12	660	24	3,770		
		470	10 × 9.9		940	18	4,400		
		560	10 × 12.6		1,120	12	5,300		
16V (1C)	18.0	22	5 × 5.7	0.12	100	45	1,100		
		33	6.3 × 4.4		211	40	1,670		
		39	5 × 5.7		125	35	2,000		
			6.3 × 5.9		125	30	2,200		
		68			218				
		82	6.3 × 7.7		262			24	2,700
			8 × 6.7			28	2,800		
			100			6.3 × 5.9	320	30	2,200
		6.3 × 7.7			24	2,700			
		10 × 7.7			35	2,670			
		120	8 × 6.7		384	28	2,800		
		180	10 × 7.7		576	29	3,430		
		270	6.3 × 9.5		864	11	5,000		
		330	10 x 12.6		1,056	12	5,300		
		470			1,504		5,300		
		820			2,624		5,400		
		1,000			3,200		5,400		
		20V (1D)	23.0		15	6.3 × 4.4	0.12	120	45
22	6.3 × 4.4			88	35	2,000			
22	6.3 × 5.9			88	48	1,300			
47	8 × 6.7			188	45	1,890			
56	6.3 × 5.9			224	48	1,300			
68				272					
82				328					
100				400					
120	480			21	4,000				
270	8 × 12					1,080		14	4,950
390	8 × 12					1,560		20	4,300
470	10 × 12.6					1,880			
25V (1E)	29.0	10	8 × 6.7	0.10	125	60	1,500		
		47	6.3 × 5.9	0.12	235	49	1,300		
		150	8 × 12		750	28	2,200		
		270	10 × 12.6		1,350	27	2,700		
35V (1V)	40.0	18	6.3 × 5.9	0.12	126	64	900		
		82	8 × 12		574	29	2,200		
		150	10 × 12.6		1,050	28	2,600		

Note: The surface temperature of aluminum case top must not exceed 105°C. A rise in temperature due to self-heating by ripple current should be factored in.

Part Numbering System

OVK Series	470 μ F	$\pm 20\%$	6.3V	Carrier Tape	10 ϕ $\times$ 7.7L	Pb-free and Coated Case
OVK	471	M	0J	TR	-	1008
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCVZ Series

Features

- 105°C, 2,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS Compliance



Marking color: Blue

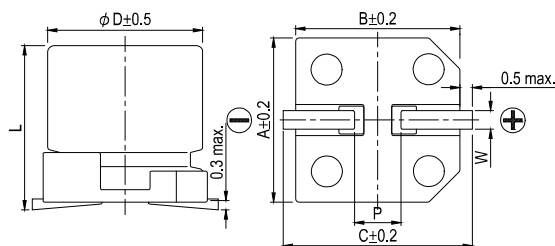
Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃ . See Standard Ratings																													
Tanδ (at 120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	2,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	2,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.																														
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested voltage treatment*.																														
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
	Capacitance Change	Within ±10% of initial value																												
	Tanδ	Within specified value																												
	ESR	Within specified value																												
	Leakage Current	Within specified value																												
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																									
Multiplier	0.05	0.3	0.7	1.0																										

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions



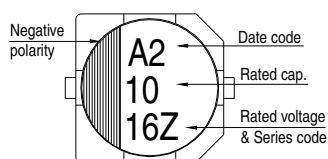
Lead Spacing and Diameter

Unit: mm

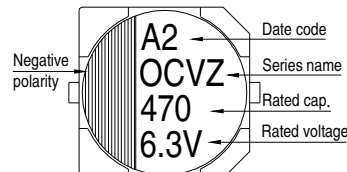
φD	L	A	B	C	W	P ± 0.2
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.9 +0.1/-0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	9.9 +0.1/-0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3



φD = 8 ~ 10



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	180	5 × 5.7	0.12	300	19	2,800
		330	6.3 × 4.4		500	16	3,180
		390	6.3 × 5.9		300	14	3,160
		560	6.3 × 5.9		300	16	3,500
			6.3 × 7.7		420	9	4,200
		680	8 × 6.7	0.15	500	20	3,370
		820	8 × 12		500	9	5,380
		1,200	10 × 7.7		600	13	4,450
		1,500	8 × 12		750	12	5,150
		2,200	10 × 9.9		1,100	10	5,500
		2,700	10 × 12.6		1,350	9	5,600
4V (0G)	4.6	150	5 × 5.7	0.12	300	20	2,730
		270	6.3 × 5.9			15	3,160
		330	6.3 × 5.9			15	3,160
		390	6.3 × 7.7		468	9	4,200
		560	8 × 6.7		500	22	3,220
			8 × 12	0.15	500	9	5,380
		1,000	10 × 7.7	0.12	800	14	4,300
		1,200	8 × 12	0.15	960	12	4,700
			10 × 9.9	0.12	960	10	5,500
		1,500	8 × 12	0.15	1,200	12	4,700
			10 × 9.9	0.12	1,200	10	5,500
		1,800	10 × 9.9		1,440	10	5,500
			10 × 12.6		1,440	9	5,600
		2,200	10 × 12.6	0.15	1,760	9	5,700
6.3V (0J)	7.2	120	5 × 5.7	0.12	300	21	2,660
		220	6.3 × 4.4		500	18	3,000
			6.3 × 5.9		300	15	3,160
		330	6.3 × 5.9		415	17	3,390
			6.3 × 7.7		623	9	4,200
		390	8 × 6.7	0.15	491	22	3,220
		820	8 × 12		1,033	13	4,700
			10 × 7.7		1,033	14	4,300
		1,200	10 × 9.9	0.12	1,512	12	5,025
		1,500	10 × 9.9		1,890	12	5,025
			10 × 12.6	0.15	1,890	10	5,560
		1,800	10 × 12.6	0.15	2,268	11	5,200
10V (1A)	12.0	68	5 × 5.7	0.12	300	23	2,540
		120	6.3 × 5.9		300	22	2,600
		150	6.3 × 7.7		450	15	3,400
		220	8 × 6.7		440	22	3,220
		270	8 × 6.7		500	22	3,220
		390	8 × 10		780	17	4,000
		470	10 × 7.7		940	19	3,800
		680	10 × 9.9		1,056	13	4,820

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size ϕ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
16V (1C)	18.0	39	5 × 5.7	0.12	300	27	2,350
			6.3 × 5.9			24	2,460
		68	6.3 × 5.9			25	2,440
		82	6.3 × 7.7		262	24	2,700
		100	6.3 × 5.9		320	24	2,490
			6.3 × 7.7				2,700
			3,010				
		120	8 × 6.7		384	24	3,010
		150			500	22	3,220
		180	8 × 10		576	18	3,890
		220	8 × 10		704	18	3,890
			10 × 7.7		704	22	3,450
		270	8 × 12	0.15	864	12	4,850
		330	10 × 9.9	0.12	1,056	16	4,350
			10 × 12.6	0.15	1,056	12	5,300
		0.15		1,504	10	6,100	
		0.12		2,624	12	5,400	
		0.12		3,200	12	5,400	
20V (1D)	23.0	120		6.3 × 5.9	0.12	480	25
		390	8 × 12	1,560		14	4,950
		560	10 × 9.9	2,240		18	4,100
			10 × 12.6	2,240		12	5,600
25V (1E)	29.0	56	6.3 × 5.9	0.12	280	30	2,800
		180	8 × 12		900	16	4,650
		220	10 × 9.9		1,100	20	3,800
		330	10 × 12.6		1,650	14	5,000
35V (1V)	40.0	22	6.3 × 5.9	0.12	154	35	2,600
		82	8 × 12		574	20	4,000
		120	10 × 12.6		840	18	4,400

Part Numbering System

OCVZ Series	820 μ F	$\pm$ 20%	6.3V	Carrier Tape		10 ϕ $\times$ 7.7L	Pb-free and Coated Case
OVZ	821	M	0J	TR	-	1008	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVH Series

Features

- 105°C, 2,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

Specifications

Items	Performance
Category Temperature Range	-55°C ~ +105°C
Capacitance Tolerance	±20% (at 120 Hz, 20°C)
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings
Tanδ (at 120 Hz, 20°C)	See Standard Ratings
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings
Endurance	Test Time
	2,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Moisture Resistance	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value
Resistance to Soldering Heat *	Test Time
	1,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Ripple Current and Frequency Multipliers	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value

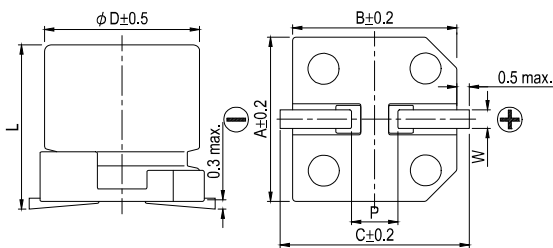
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 105°C.

* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
Multiplier	0.05	0.3	0.7	1.0

Diagram of Dimensions



Lead Spacing and Diameter

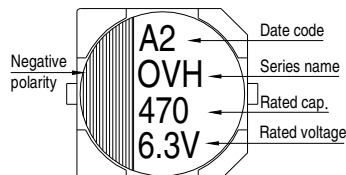
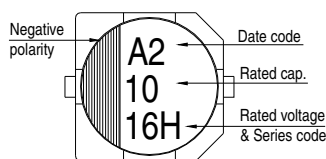
Unit: mm

φD	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.9 ± 0.1 / -0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	9.5 ± 0.5	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	9.9 ± 0.1 / -0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3

φD = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2V (0D)	2.3	1,200	6.3 $\times$ 5.9	0.12	500	8	5,230
2.5V (0E)	2.9	270	5 $\times$ 5.8	0.12	500	10	3,860
		330	5 $\times$ 5.8			10	3,860
			6.3 $\times$ 4.4			14	3,180
		390	5 $\times$ 5.8		700	10	3,860
			6.3 $\times$ 5.9		293		3,900
		560	6.3 $\times$ 5.9		700		3,900
			8 $\times$ 6.7		420	9	4,200
		680	8 $\times$ 6.7		510		4,500
		1,200	10 $\times$ 7.7		900		5,000
		2,200	10 $\times$ 9.9		1,650	8	6,000
4V (0G)	4.6	330	6.3 $\times$ 5.9	0.12	396	10	3,900
		470	8 $\times$ 6.7		564	9	4,500
		560	8 $\times$ 6.7		894		4,500
		1,000	10 $\times$ 7.7		1,200		5,000
		1,800	10 $\times$ 9.9		2,160	8	6,000
6.3V (0J)	7.2	150	5 $\times$ 5.8	0.12	500	12	3,520
		180	5 $\times$ 5.8			15	3,150
		220	5 $\times$ 5.8				3,150
			6.3 $\times$ 4.4				3,180
		330	6.3 $\times$ 5.9		416	10	3,900
			8 $\times$ 6.7		624	9	4,500
		390	8 $\times$ 6.7		737		4,500
		820	10 $\times$ 7.7		1,550		5,000
		1,500	10 $\times$ 9.9		2,835	8	6,000
10V (1A)	12.0	220	6.3 $\times$ 5.9	0.12	500	20	2,700
16V (1C)	18.0	180	6.3 $\times$ 9.5	0.12	576	11	4,460

Part Numbering System

OVH Series	820 μ F	$\pm$ 20%	6.3V	Carrier Tape	10 ϕ $\times$ 7.7L	Pb-free and Coated Case
OVH	821	M	0J	TR	-	1008
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCVU Series

Features

- 125°C, 1,000 ~ 2,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



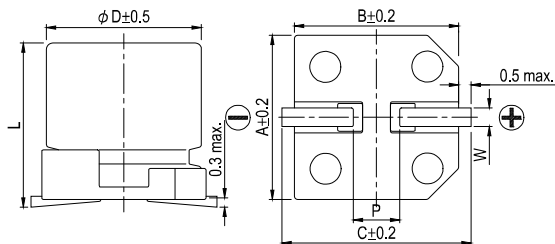
Marking color: Blue

Specifications

Items	Performance				
Category Temperature Range	-55°C ~ +125°C				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)				
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings				
Tanδ (at120 Hz, 20°C)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings				
Endurance	Test Time		1,000 Hrs for 2.5 ~ 4V; 2,000 Hrs for 6.3 ~ 16V		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 200% of specified value		
	ESR		Less than 200% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for specified hours at 125°C.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions

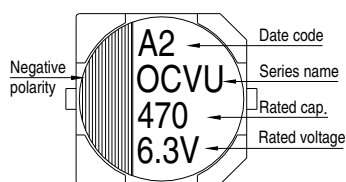


Lead Spacing and Diameter

φ D	L	A	B	C	W	P ± 0.2
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	9.9 + 0.1/-0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 + 0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Unit: mm

Marking



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	ESR (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz)	
							T $\leq$ 105°C	105°C < T $\leq$ 125°C
2.5V (0E)	2.9	680	8 $\times$ 12	0.18	340	13	4,520	1,430
		1,000	10 $\times$ 9.9		500		5,200	1,645
		1,500	10 $\times$ 12.6		750		5,440	1,721
4V (0G)	4.6	560	8 $\times$ 12	0.18	448	13	4,520	1,430
		820	10 $\times$ 9.9		656		5,200	1,645
		1,200	10 $\times$ 12.6		960	12	5,440	1,721
6.3V (0J)	7.2	470	8 $\times$ 12	0.15	592	15	4,210	1,332
		560	10 $\times$ 9.9		706	16	4,700	1,487
		820	10 $\times$ 12.6		1,033	12	5,440	1,721
10V (1A)	12.0	330	8 $\times$ 12	0.15	660	17	3,950	1,250
		470	10 $\times$ 9.9		940	18	4,400	1,392
		560	10 $\times$ 12.6		1,120	13	5,230	1,655
16V (1C)	18.0	180	8 $\times$ 12	0.15	576	20	3,640	1,151
		220	10 $\times$ 9.9		704	20	4,200	1,330
		330	10 $\times$ 12.6		1,056	16	4,720	1,493

Part Numbering System

OCVU Series 470 μ F $\pm 20\%$

6.3V

Carrier
Tape8 ϕ $\times$ 12LPb-free and
Coated Case**OVU****471****M****0J****TR****-****0812**

Series Name

Capacitance

Capacitance
ToleranceRated
VoltagePackage
TypeTerminal
Type

Case Size

Lead Wire and
Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVA Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



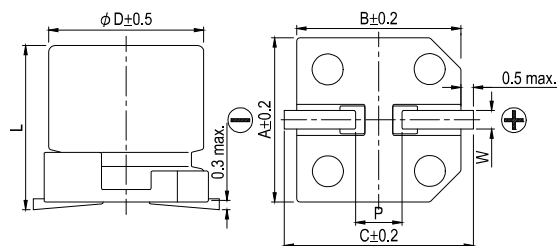
Marking color: Blue

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings																													
Tanδ (at120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">15,000 Hrs For 6.3×4.4: 3,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	15,000 Hrs For 6.3×4.4: 3,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	15,000 Hrs For 6.3×4.4: 3,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105℃.																														
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.																														
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
	Capacitance Change	Within ±10% of initial value																												
	Tanδ	Within specified value																												
	ESR	Within specified value																												
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																										
Multiplier	0.05	0.3	0.7	1.0																										

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



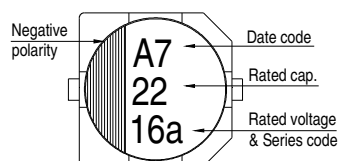
Lead Spacing and Diameter

Unit: mm

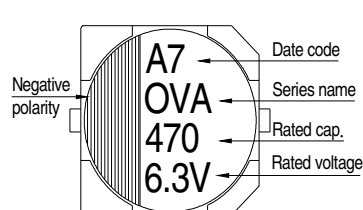
φD	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3



φD = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μA)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	220	6.3 $\times$ 5.8	0.12	110	25	2,500
		560	8 $\times$ 6.7		280	23	3,100
		680	8 $\times$ 12		340	12	4,770
		1,000	10 $\times$ 7.7		500	19	4,240
		1,500	10 $\times$ 12.6		750	10	5,500
4V (0G)	4.6	100	6.3 $\times$ 5.8	0.12	80	26	2,450
		120	6.3 $\times$ 4.4		240	38	1,710
		150	5 $\times$ 5.8		120	30	1,490
			6.3 $\times$ 5.8		120	26	2,450
		220	8 $\times$ 6.7		176	25	3,020
		330	8 $\times$ 6.7		264	25	3,020
		470	10 $\times$ 7.7		376	20	4,130
		560	8 $\times$ 12		448	12	4,770
		680	10 $\times$ 7.7		544	20	4,130
		820	10 $\times$ 12.6		656	10	5,500
6.3V (0J)	7.2	47	5 $\times$ 5.8	0.12	59.2	35	1,380
		68	6.3 $\times$ 5.8		85.6	27	2,400
		82	6.3 $\times$ 4.4		258	40	1,670
			6.3 $\times$ 5.8		103	27	2,400
		100	5 $\times$ 5.8		126	35	1,380
			6.3 $\times$ 4.4		315	40	1,670
			6.3 $\times$ 5.8		126	27	2,400
		120	6.3 $\times$ 5.8		151	27	2,400
		150	8 $\times$ 6.7		189	25	3,020
		220	8 $\times$ 6.7		277	25	3,020
		330	10 $\times$ 7.7		416	20	4,130
		390	8 $\times$ 12		491	12	4,770
		470	8 $\times$ 12		592	12	4,770
			10 $\times$ 7.7		592	20	4,130
		680	10 $\times$ 12.6		857	10	5,500
		820	10 $\times$ 12.6		1,033	10	5,500
10V (1A)	12.0	33	5 $\times$ 5.8	0.12	66	40	1,270
		47	5 $\times$ 5.8		94	40	1,270
			6.3 $\times$ 4.4		235	41	1,560
			6.3 $\times$ 5.8		94	31	2,250
		56	6.3 $\times$ 5.8		112	31	2,250
		120	8 $\times$ 6.7		240	27	2,800
		150	8 $\times$ 6.7		300	27	2,800
		270	8 $\times$ 12		540	14	4,420
			10 $\times$ 7.7		540	24	3,770
		330	8 $\times$ 12		660	14	4,420
			10 $\times$ 7.7		660	24	3,770
		470	10 $\times$ 12.6		940	12	5,300
		560	10 $\times$ 12.6		1,120	12	5,300

Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
16V (1C)	18.0	22	5 × 5.8	0.12	70	45	1,210
			6.3 × 4.4		176	45	1,490
		33	6.3 × 5.8		106	37	2,050
		39	6.3 × 5.8		125	37	2,050
		82	8 × 6.7		262	30	2,700
		150	10 × 7.7		480	26	3,430
		180	8 × 12		576	16	4,360
			10 × 7.7		576	26	3,430
		220	10 × 12.6		704	14	5,050
		330	10 × 12.6		792	14	5,050
20V (1D)	23.0	15	6.3 × 4.4	0.12	150	57	1,300
		22	6.3 × 5.8		88	50	1,650
		39	8 × 6.7		156	45	2,000
		47	8 × 6.7		188	45	2,000
		82	10 × 7.7		328	40	2,500
		150	10 × 12.6		600	20	4,320
25V (1E)	29.0	10	6.3 × 5.8	0.12	125	65	1,500
		22	8 × 6.7		275	50	1,800
		39	10 × 7.7		488	45	2,100

Part Numbering System

OVA Series	470 μ F	±20%	6.3V	Carrier Tape		8 ϕ × 12L	Pb-free and Coated Case
OVA	471	M	0J	TR	-	0812	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.



OVB Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

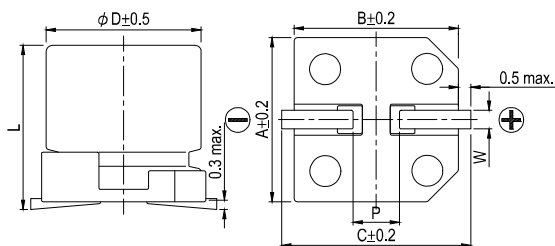
Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		20,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 20,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Lead Spacing and Diameter

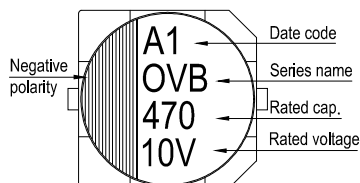
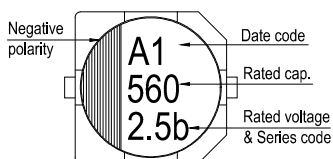
Unit: mm

φD	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	6.4 +0.1/-0.4	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3

φD = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V(0E)	2.9	560	6.3 $\times$ 6.4	0.12	300	16	3,500
4V (0G)	4.6	180	5 $\times$ 5.8	0.12	120	25	2,300
		390	6.3 $\times$ 5.8		312	24	2,700
		1,200	8 $\times$ 10		960	15	5,400
		2,700	10 $\times$ 12.6		2,160	11	5,600
6.3V (0J)	7.2	330	8 $\times$ 6.7	0.12	415	14	3,900
			6.3 $\times$ 6.4		415	15	3,390
		680	8 $\times$ 10		856	12	4,600
		1,000	8 $\times$ 12		1,260	11	4,800
		1,800	10 $\times$ 12.6		2,268	10	5,500
10V(1A)	12.0	120	6.3 $\times$ 5.8	0.12	240	30	2,700
		150	8 $\times$ 6.7		300	21	2,880
		470	8 $\times$ 10		940	17	3,800
		820	10 $\times$ 10		1,640	15	4,300
		1,200	10 $\times$ 12.6		2,400	13	4,800
16V(1C)	18.0	100	6.3 $\times$ 6.4	0.12	300	24	2,490
		270	8 $\times$ 10		864	20	3,600
		390	8 $\times$ 12		1,248	18	3,900
		470	10 $\times$ 10		1,504	16	4,200
		680	10 $\times$ 12.6		2,176	14	4,700
20V(1D)	23.0	27	6.3 $\times$ 5.8	0.12	108	60	1,400
		39	8 $\times$ 6.7		156	45	2,000
		100	8 $\times$ 12		400	22	3,200
		180	10 $\times$ 12.6		720	20	4,300
25V(1E)	29.0	12	6.3 $\times$ 5.8	0.12	100	70	1,200
		33	8 $\times$ 10		165	50	2,000
		56	10 $\times$ 10		280	45	2,200
		82	10 $\times$ 12.6		410	30	3,800

Part Numbering System

OV B Series	100 μ F	$\pm 20\%$	16V	Carrier Tape		6.3 ϕ $\times$ 6.4L	Pb-free and Coated Case
OV B	101	M	1C	TR	-	0607	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS Compliance



Marking color: Blue

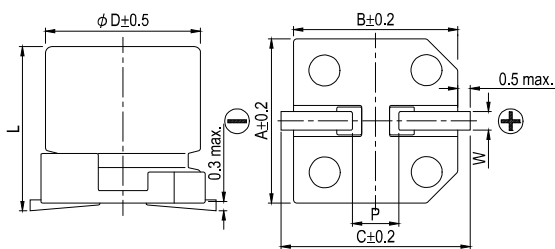
Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		15,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Lead Spacing and Diameter

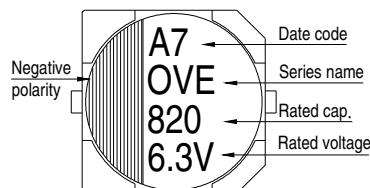
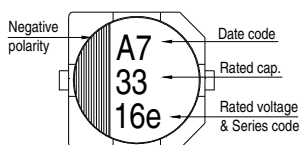
Unit: mm

φD	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	7.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 ± 0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3

φD = 8 ~ 10



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	180	5 × 5.8	0.12	90	21	2,670
		390	6.3 × 5.8		195	15	3,160
		470	6.3 × 7.7		235	13	3,600
		560	6.3 × 7.7		280		3,600
			8 × 6.7		280		4,100
		680	8 × 6.7		340		4,100
			8 × 7.7		410	12	4,260
		820	8 × 12		410	9	5,400
		1,200	10 × 7.7		600	13	4,450
			8 × 10		750	10	5,220
		1,500	8 × 12		750	9	5,400
		2,200	10 × 10		1,100	10	5,500
		2,700	10 × 12.6		1,350	9	5,600
4V (0G)	4.6	100	5 × 5.8	0.12	80	22	2,610
		150	5 × 5.8		120	22	2,610
		270	6.3 × 5.8		216	15	3,160
		330	6.3 × 5.8		264	15	3,160
		390	6.3 × 7.7		312	14	3,470
		470	8 × 6.7		376		3,950
		560	8 × 6.7		448		
		680	8 × 7.7		544	13	
			8 × 10		800	10	5,220
		1,000	10 × 7.7		800	14	4,300
		1,200	8 × 12		960	9	5,400
					960	10	5,500
		1,500	10 × 10		1,200		
		1,800			1,440		
6.3V (0J)	7.2		10 × 12.6		1,440	9	5,600
		100	5 × 5.8	0.12	126	24	2,500
		120	5 × 5.8		151	24	2,500
		220	6.3 × 5.8		277	15	3,160
		270	6.3 × 7.7		340	14	3,470
			6.3 × 7.7		415		3,470
		330	8 × 6.7		415		3,950
		390	8 × 6.7		491		
		470	8 × 7.7		592	13	
			8 × 10			12	4,770
		820	8 × 12		1,033	10	5,150
			10 × 7.7			14	4,300
		1,200	10 × 10		1,510	12	5,025
			10 × 10		1,890	12	5,025
		1,500	10 × 12.6		1,890	10	5,500

Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
10V (1A)	12.0	47	5 × 5.8	0.12	94	28	2,310
		56			112		
		68			136		
		120	6.3 × 5.8		240	25	2,530
		150	6.3 × 7.7		300	21	2,880
		220	8 × 6.7		440		3,220
		270	8 × 6.7		540		3,220
		390	8 × 10		780	17	4,000
		470	10 × 7.7		940	19	3,800
		680	10 × 10		1,360	13	4,820
16V (1C)	18.0	33	5 × 5.8	0.12	105	35	2,070
		39	5 × 5.8		124	35	2,070
		68	6.3 × 5.8		217	28	2,390
		82	6.3 × 7.7		262	24	2,700
		100	6.3 × 7.7		320		2,700
			8 × 6.7		320		3,010
		120	8 × 6.7		384		3,010
		150	8 × 7.7		480	22	3,150
		180	8 × 10		576	18	3,890
		220	8 × 10		704	18	3,890
			10 × 7.7		704	22	3,450
		330	10 × 10		1,050	16	4,350

Part Numbering System

OVE Series 820 μ F

±20%

6.3V

Carrier
Tape8 ϕ × 12LPb-free and
Coated Case**OVE****821****M****0J****TR****-****0812**

Series Name

Capacitance

Capacitance
ToleranceRated
VoltagePackage
TypeTerminal
Type

Case Size

Lead Wire and
Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVJ Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

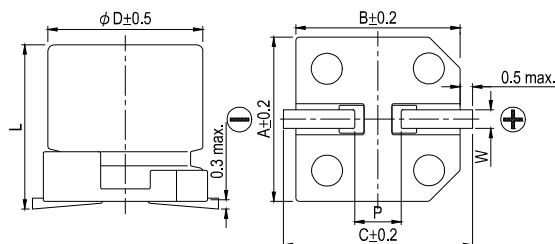
Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		15,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions

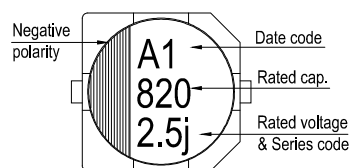


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	9.5 ± 0.5	6.6	6.6	7.2	0.5 ~ 0.8	2.0

Marking





Dimension: ϕ D×L(mm)
Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Table with 8 columns: Rated Volt. (V), Surge Voltage (V), Capacitance (μF), Size ϕ D×L(mm), Tanδ (120 Hz, 20°C), L C (μA), E S R (mΩ/at 100k ~ 300k Hz, 20°C max.), and Rated R. C. (mA/rms at 100k Hz, 105°C). Rows include ratings for 2.5V, 6.3V, 10V, 16V, 20V, and 25V series.

Part Numbering System

Table showing part numbering breakdown for OVJ Series, 820μF, ±20%, 2.5V, Carrier Tape, 6.3 ϕ ×9.5L, Pb-free and Coated Case, and Lead Wire and Case Type.

Note: For more details, please refer to "Part Numbering System" on page 20.

OVG Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS Compliance



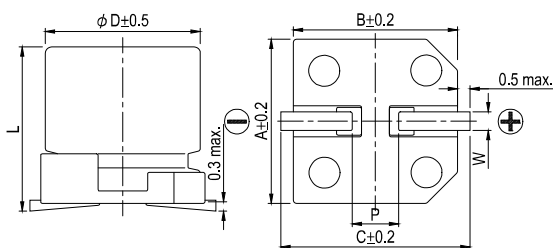
Marking color: Blue

Specifications

Items	Performance				
Category Temperature Range	-55°C ~ +105°C				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)				
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings				
Tanδ (at120 Hz, 20°C)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings				
Endurance	Test Time		15,000 Hrs For 5 ~ 6.3 × 4.4: 3,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 15,000 hours at 105°C.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



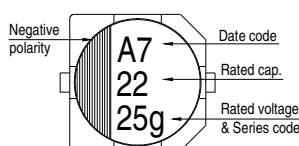
Lead Spacing and Diameter

Unit: mm

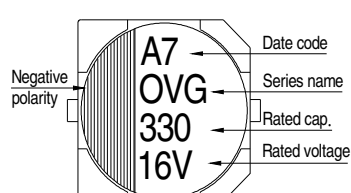
φ D	L	A	B	C	W	P ± 0.2
5	4.4 ± 0.2	5.3	5.3	5.9	0.5 ~ 0.8	1.5
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	7.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.6 +0.1/-0.4	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 5 ~ 6.3



φ D = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz, 105℃)
16V (1C)	18.0	39	5 × 4.4	0.12	312	50	1,840
		47	5 × 4.4		376	50	1,840
		68	6.3 × 4.4		544	40	2,450
		100	5 × 5.8		320	27	3,000
		180	6.3 × 5.8		576	22	3,300
		220	6.3 × 7.7		704		
		270	8 × 6.7		864		
		330	8 × 7.7		1,050	21	3,400
			8 × 10		1,050	21	3,400
		560	8 × 10		1,790	18	3,900
		820	10 × 10		2,620	16	4,200
			10 × 12.6		2,620	12	5,400
		1,000	10 × 10		3,200	18	4,100
			10 × 12.6		3,200	12	5,400
20V(1D)	23.0	27	5 × 4.4	0.12	270	55	1,770
		33	5 × 4.4		330	55	1,770
		47	5 × 5.8		188	30	2,800
			6.3 × 4.4		470	42	2,400
		56	5 × 5.8		224	30	2,800
		120	6.3 × 5.8		480	25	3,200
		150	6.3 × 7.7		600		
		180	8 × 6.7		720		
		220	8 × 7.7		880	23	3,300
			8 × 10		880	23	3,400
		390	8 × 10		1,560	20	3,700
		560	10 × 10		2,240	18	4,100
25V(1E)	29.0	10	5 × 4.4	0.12	125	60	1,700
		22	5 × 5.8		110	40	2,450
			6.3 × 4.4		275	45	2,350
		27	5 × 5.8		135	40	2,450
		39	6.3 × 5.8		195	30	2,800
		47			235		
		56			280		
		68	6.3 × 7.7		280	28	2,800
			8 × 6.7		340	28	3,000
		82	8 × 7.7		410	26	3,100
		100	8 × 10		500	24	3,300
		120	8 × 10		600	22	3,500
		150	10 × 7.7		750	25	3,400
		220	10 × 10		1,100	20	3,800

Part Numbering System

OVG Series 150 μ F $\pm 20\%$ 25V Carrier Tape 10 $\phi \times 7.7L$ Pb-free and Coated Case

OVG **151** **M** **1E** **TR** - **1008**

Series Name Capacitance Capacitance Tolerance Rated Voltage Package Type Terminal Type Case Size Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVF Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



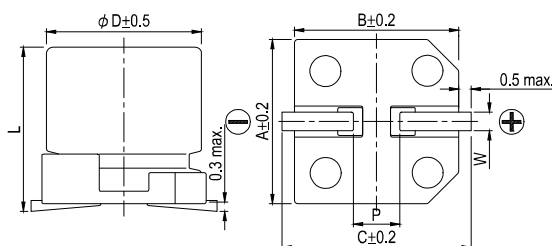
Marking color: Blue

Specifications

Items	Performance																							
Category Temperature Range	-55°C ~ +105°C																							
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																							
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings																							
Tanδ (at120 Hz, 20°C)	See Standard Ratings																							
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings																							
Endurance	<table><tr><td>Test Time</td><td colspan="3">15,000 Hrs For 5 ~ 6.3 ϕ ×4.4L: 3,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="3">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="3">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table>				Test Time	15,000 Hrs For 5 ~ 6.3 ϕ ×4.4L: 3,000 Hrs			Capacitance Change	Within ±20% of initial value			Tanδ	Less than 150% of specified value			ESR	Less than 150% of specified value			Leakage Current	Within specified value		
	Test Time	15,000 Hrs For 5 ~ 6.3 ϕ ×4.4L: 3,000 Hrs																						
	Capacitance Change	Within ±20% of initial value																						
	Tanδ	Less than 150% of specified value																						
	ESR	Less than 150% of specified value																						
Leakage Current	Within specified value																							
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105°C.																							
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="3">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="3">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="3">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table>				Test Time	1,000 Hrs			Capacitance Change	Within ±20% of initial value			Tanδ	Less than 150% of specified value			ESR	Less than 150% of specified value			Leakage Current	Within specified value		
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	ESR	Less than 150% of specified value																						
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	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.																							
Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="3">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Within specified value</td></tr><tr><td>ESR</td><td colspan="3">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table>				Capacitance Change	Within ±10% of initial value			Tanδ	Within specified value			ESR	Within specified value			Leakage Current	Within specified value						
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Leakage Current	Within specified value																							
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>				Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0										
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																			
Multiplier	0.05	0.3	0.7	1.0																				

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Lead Spacing and Diameter

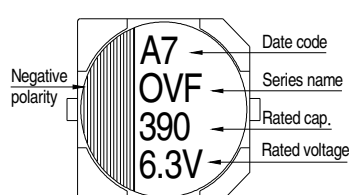
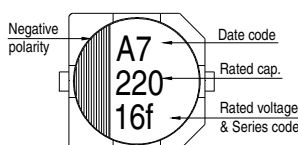
Unit: mm

φD	L	A	B	C	W	P ± 0.2
5	4.4 ± 0.2	5.3	5.3	5.9	0.5 ~ 0.8	1.5
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1
8	7.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1

Marking

φD = 5 ~ 6.3

φD = 8



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.0 (0D)	2.3	680	6.3 $\times$ 5.8	0.12	700	12	3,500
2.5V (0E)	2.9	220	5 $\times$ 4.4	0.12	700	25	2,100
		330	5 $\times$ 5.8			10	3,900
			6.3 $\times$ 4.4			12	3,500
		390	5 $\times$ 5.8			10	3,900
			6.3 $\times$ 5.8		292	10	3,900
		470	6.3 $\times$ 7.7		352	9	4,200
		560	6.3 $\times$ 5.8		700	10	3,900
			6.3 $\times$ 7.7		420	9	4,200
			8 $\times$ 6.7		420	10	4,500
		680	8 $\times$ 6.7		510	10	
4V (0G)	4.6	1,000	8 $\times$ 7.7		750	9	
		330	6.3 $\times$ 5.8	0.12	396	10	3,900
		390	6.3 $\times$ 7.7		468	9	4,200
		470	8 $\times$ 6.7		564	10	4,500
		560	8 $\times$ 6.7		672	10	
		680	8 $\times$ 7.7		816	9	
6.3V (0J)	7.2	150	5 $\times$ 4.4	0.12	700	25	2,100
			5 $\times$ 5.8			12	3,500
		220	5 $\times$ 5.8			12	3,500
			6.3 $\times$ 5.8		416	10	3,900
		270	6.3 $\times$ 7.7		510	9	4,200
		330	6.3 $\times$ 5.8		700	10	3,900
			6.3 $\times$ 7.7		623	9	4,200
			8 $\times$ 6.7		624	10	4,500
		390	8 $\times$ 6.7		737	10	4,500
		470	8 $\times$ 7.7		888	9	4,500
10V (1A)	12.0	560	8 $\times$ 7.7	0.12	1,050	9	4,500
		120	5 $\times$ 5.8		240	22	2,600

Part Numbering System

OVF Series	560 μ F	$\pm 20\%$	2.5V	Carrier Tape		6.3 $\phi \times 7.7L$	Pb-free and Coated Case
OVF	561	M	0E	TR	-	0608	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVD Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

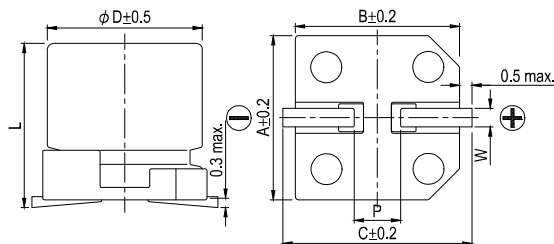
Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings																													
Tanδ (at120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">15,000 Hrs (6.3×4.4: 3,000 Hrs)</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	15,000 Hrs (6.3×4.4: 3,000 Hrs)				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
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Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
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Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
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Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
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* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



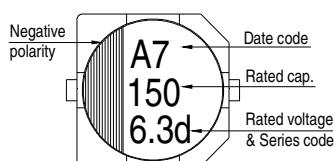
Lead Spacing and Diameter

Unit: mm

φ D	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.4 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0

Marking

φ D = 5 ~ 6.3



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	220	6.3 × 4.4	0.12	300	19	2,780
		330	5 × 5.8		412	16	3,500
			6.3 × 4.4		700		
		560	6.3 × 5.8		700		
4V (0G)	4.6	180	6.3 × 4.4	0.12	360	19	2,780
		220	5 × 5.8		440	17	3,390
		390	6.3 × 5.8		780	17	3,390
6.3V (0J)	7.2	150	6.3 × 4.4	0.12	472	19	2,780
		180	5 × 5.8		567	17	3,390
		220	6.3 × 4.4		700	18	3,200
		330	6.3 × 5.8		1,040	17	3,390
16V(1C)	18.0	100	6.3 × 5.8	0.12	320	24	2,490

Part Numbering System

OVD Series	100 μ F	±20%	16V	Carrier Tape		6.3 ϕ × 5.8L	Pb-free and Coated Case
<u>OVD</u>	<u>101</u>	<u>M</u>	<u>1C</u>	<u>TR</u>	<u>-</u>	<u>0606</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OVS Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR, solid capacitors of SMD type
- RoHS Compliance



Marking color: Blue

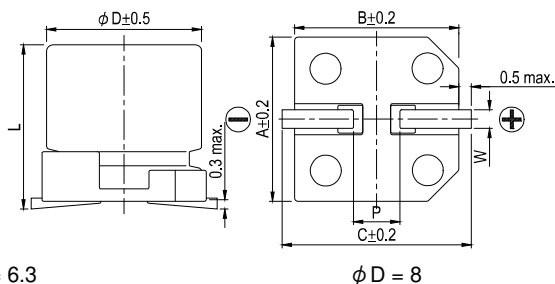
Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings																													
Tanδ (at120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">20,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	20,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
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Resistance to Soldering Heat * (Please refer to page 15 for reflow soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
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* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Lead Spacing and Diameter

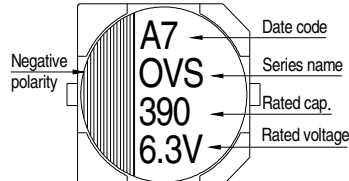
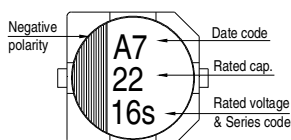
Unit: mm

φ D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.7 ± 0.3	8.3	8.3	9.0	0.7 ~ 1.1	3.1

Marking

φ D = 6.3

φ D = 8



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
4V (0G)	4.6	560	8 × 6.7	0.12	448	22	3,220
6.3V (0J)	7.2	120	6.3 × 5.8	0.12	151	22	2,570
		220	6.3 × 5.8		277		2,570
		390	8 × 6.7		491		3,220
10V(1A)	12.0	120	6.3 × 5.8	0.12	240	27	2,320
		150	8 × 6.7	0.12	300	30	2,760
16V(1C)	18.0	39	6.3 × 5.8	0.12	125	37	2,050
		68	6.3 × 5.8		218	30	2,200
		82	8 × 6.7		262	30	2,760
		120	8 × 6.7		384	27	2,900

Part Numbering System

OVS Series	120 μ F	±20%	16V	Carrier Tape	8 ϕ × 6.7L	Pb-free and Coated Case
<u>OVS</u>	<u>121</u>	<u>M</u>	<u>1C</u>	<u>TR</u>	<u>-</u>	<u>0807</u>
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCR Series

Features

- 105°C, 2,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

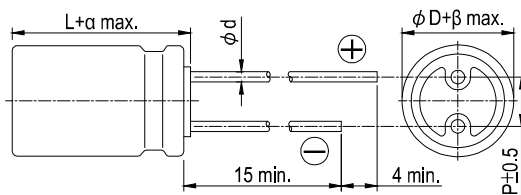
Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings																													
Tanδ (at 120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	2,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
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Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
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Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
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	ESR	Within specified value																												
	Leakage Current	Within specified value																												
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																									
Multiplier	0.05	0.3	0.7	1.0																										

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions



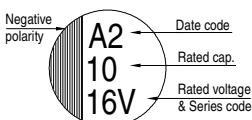
Lead Spacing and Diameter

Unit: mm

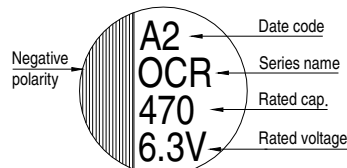
ϕD	6.3	6.3	6.3	8	10	10
L	5.5	6.5	11	11.5	10	12
P	2.5			3.5	5.0	
ϕd	0.45		0.5	0.6		
α	1.0					
β	0.5					

Marking

φ D = 6.3



φ D = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	220	6.3 $\times$ 5.5	0.12	110	28	2,390
		390	6.3 $\times$ 11	0.12	195	18	3,160
		680	8 $\times$ 11.5	0.18	340	10	5,230
		1,000	10 $\times$ 10		500	14	4,700
		1,500	10 $\times$ 12		750	12	5,500
4V (0G)	4.6	150	6.3 $\times$ 5.5	0.12	120	40	1,810
		270	6.3 $\times$ 11	0.12	216	15	3,200
		560	8 $\times$ 11.5	0.18	448	10	5,230
		1,200	10 $\times$ 12	0.18	960	12	5,500
6.3V (0J)	7.2	100	6.3 $\times$ 5.5	0.12	126	40	1,810
		220	6.3 $\times$ 11		277	18	3,160
		330	6.3 $\times$ 6.5		416	28	2,390
		390	8 $\times$ 11.5	0.15	491	12	4,770
		470	8 $\times$ 11.5		592	12	4,770
		820	10 $\times$ 12		1,033	12	5,500
10V (1A)	12.0	100	6.3 $\times$ 6.5	0.12	200	45	1,700
		220	10 $\times$ 10	0.15	440	17	3,950
		330	8 $\times$ 11.5	0.12	660	14	4,420
		560	10 $\times$ 12	0.12	1,360	12	5,300
16V (1C)	18.0	47	6.3 $\times$ 5.5	0.10	150	50	1,650
		100	6.3 $\times$ 11	0.10	320	22	2,820
		180	8 $\times$ 11.5	0.12	576	16	4,360
		330	10 $\times$ 10		1,056	16	4,360
		330	10 $\times$ 12		1,056	14	5,050
20V (1D)	23.0	22	6.3 $\times$ 5.5	0.10	88	60	1,450
		56	6.3 $\times$ 11	0.10	224	25	2,650
		100	8 $\times$ 11.5	0.15	400	24	3,320
			10 $\times$ 10		400	24	3,320
		150	10 $\times$ 12		600	20	4,320
		330	10 $\times$ 12	0.12	1,320	24	2,800
25V (1E)	29.0	6.8	6.3 $\times$ 5.5	0.10	170	80	1,200
		33	8 $\times$ 11.5	0.12	165	24	3,320
		56	8 $\times$ 11.5		280	24	3,320
			10 $\times$ 12.5		280	20	4,320
		68	8 $\times$ 11.5		340	24	3,320
		100	10 $\times$ 12		500	20	4,320
		270	10 $\times$ 12		1,350	25	2,800
35V (1V)	40.0	22	8 $\times$ 11.5	0.12	154	31	2,300
		39	8 $\times$ 11.5		273	31	2,300
		47	10 $\times$ 12		329	30	3,650
		68	10 $\times$ 12		476	28	2,700
		150	10 $\times$ 12		1,050	26	2,700

Part Numbering System

OCR Series 470 μ F $\pm 20\%$ 6.3V Bulk Package Gas Type 8 $\phi \times 11.5L$ Pb-free and Coated Case

OCR **471** **M** **0J** **BK** - **0811**

Series Name Capacitance Capacitance Tolerance Rated Voltage Lead Configuration and Package Rubber Type Case Size Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCRZ Series

Features

- 105°C, 2000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

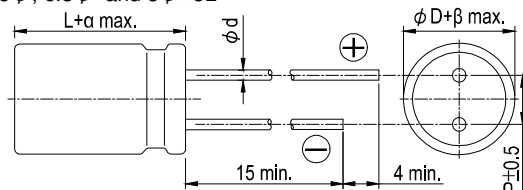
Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃ . See Standard Ratings																													
Tanδ (at 120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	2,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	2,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2000 hours at 105℃.																														
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.																														
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
	Capacitance Change	Within ±10% of initial value																												
	Tanδ	Within specified value																												
	ESR	Within specified value																												
	Leakage Current	Within specified value																												
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																									
	Multiplier	0.05	0.3	0.7	1.0																									

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

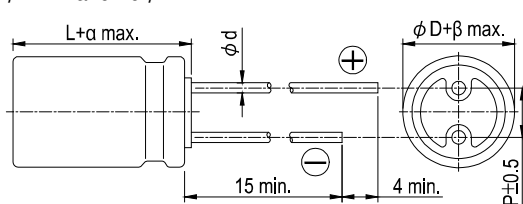
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions

5 φ, 6.3 φ and 8 φ × 8L



8 φ × 12L and 10 φ × 12L



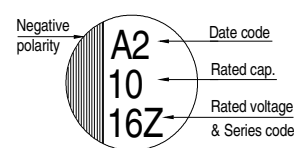
Lead Spacing and Diameter

Unit: mm

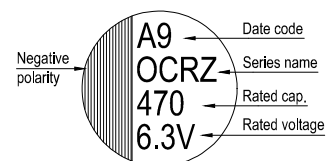
φ D	5	6.3	6.3	8	8	10
L	8	6	8	8	12	12
P	2.0	2.5		3.5		5.0
φ d	0.5	0.45		0.6		
α	1.0					
β	0.5					

Marking

φ D = 5 ~ 6.3



φ D = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)		
2.5V (0E)	2.9	330	6.3 × 8	0.10	500	7	5,600		
		390	6.3 × 6*			10	3,900		
		470	5 × 8		235	7	4,200		
			8 × 8				5,000		
		560	5 × 8		500	10	4,200		
			6.3 × 6*				4,000		
			6.3 × 8	7		5,600			
			8 × 8			6,200			
		820	6.3 × 8		0.10	500	5,600		
			8 × 8		0.10	410	6,200		
			8 × 12		410				
		1,000	8 × 8		0.12	500			
			8 × 12						
			10 × 12						
		1,200	6.3 × 8	0.10	600	5,600			
			8 × 8	0.12	600	6,200			
		1,500	8 × 12		750	6,200			
			10 × 12		750	6,500			
		1,800	8 × 8		900	6,200			
		2,200	8 × 12		1,100	6,200			
		2,700	10 × 12		1,350	7,200			
		3,900	10 × 12		1,950	7,200			
4V (0G)	4.6	560	6.3 × 8		0.10	500	7	5,600	
			8 × 8	0.10	448	6,200			
			8 × 12	0.12	448				
		820	8 × 8	0.10	656				
		1,000			800				
		1,200	8 × 12	0.12	960			6,500	
			10 × 12		1,200				
		1,500			1,760			8	7,200
		2,700			2,160			8	7,200
6.3V (0J)	7.2	270	5 × 8	0.10	680	8	3,900		
		330	5 × 8		832	8	3,900		
		470	6.3 × 8	0.12	592	7	5,600		
			8 × 8				6,200		
			8 × 12				6,200		
		560	6.3 × 8	0.10	706		5,600		
			8 × 8	0.10			6,200		
			8 × 12	0.12			6,200		
		680	6.3 × 8	0.10	857		5,600		
		820	6.3 × 8		1,033		5,600		
			8 × 8				6,200		
			8 × 12			8	5,500		
			10 × 12	0.12		7	6,200		
		1,000	8 × 8	0.10	1,260	7	6,200		
			8 × 12	0.12	1,260	8	5,500		

Remark: The case size with " * " of case length is 6.0 mm maximum.

Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
6.3V (0J)	7.2	1,200	10 × 12	0.12	1,512	8	5,500
		1,500			1,890	7	6,200
		1,800			2,268		
		2,200			2,772		
10V (1A)	12.0	270	8 × 12	0.12	540	8	5,000
		390	8 × 12		780		5,000
		470	10 × 12		940		6,000
		560	8 × 8		1,120	9	5,600
			10 × 12		1,120	8	6,000
		820	8 × 12		1,640		5,000
			10 × 12		1,640		6,000
		1,200	10 × 12		2,400		6,000
16V (1C)	18.0	100	6.3 × 6*	0.10	320	24	2,490
			6.3 × 8		500	10	4,680
		180	6.3 × 8		576		4,680
			8 × 8		576		5,000
		270	6.3 × 8	864	8		4,680
			8 × 8			5,000	
			8 × 12	0.12	8		
		330	8 × 8	0.10	1,056	10	6,000
			10 × 12	0.12	1,056	8	6,000
		470	8 × 8		1,504	16	4,000
			8 × 12			10	5,400
		820	10 × 12			8	6,000
				0.10	2,624	10	6,100
1,000	0.10	3,200	10	6,100			
20V (1D)	23.0	330	8 × 8	0.12	1,320	17	3,880
		390	8 × 12		1,560	14	4,970
		680	10 × 12		2,720	12	5,400
25V (1E)	29.0	180	8 × 8	0.12	900	18	3,770
		220	8 × 12		1,100	16	4,650
		390	10 × 12		1,950	14	5,000
35V (1V)	40.0	47	8 × 12	0.12	329	24	3,600
		82	8 × 12		574	20	4,000
		120	10 × 12		840	18	4,400
		150	10 × 12		1,050	20	3,800

Remark: The case size with “*” of case length is 6.0 mm maximum.

Part Numbering System

OCRZ Series	470 μ F	±20%	6.3V	Bulk Package	Gas Type	6.3 ϕ × 8L	Pb-free and Coated Case
ORZ	471	M	0J	BK	-	0608	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to “Part Numbering System” on page 20.



ORE Series

Features

- 105°C, 5,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

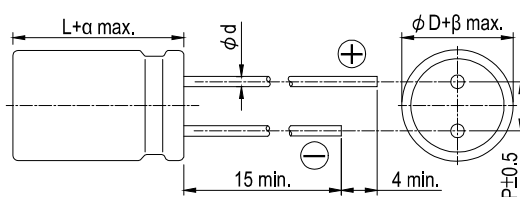
Items	Performance				
Category Temperature Range	-55°C ~ +105°C				
Capacitance Tolerance	±20%			(at 120 Hz, 20°C)	
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings				
Tanδ (at 120 Hz, 20°C)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings				
Endurance	Test Time		5,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 5,000 hours at 105°C.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions

5φ, 6.3φ and 8φ × 6.5 ~ 8L

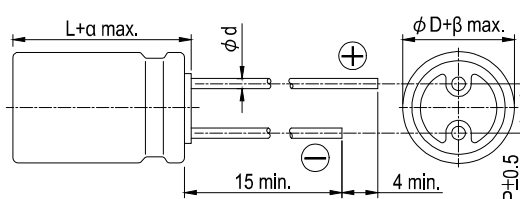


Lead Spacing and Diameter

Unit: mm

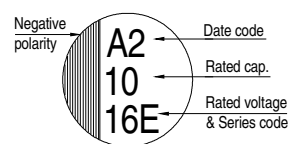
ϕD	5	6.3	6.3	8	8	8	10
L	8	5.5	8	6.5	8	12	12
P	2.0	2.5		3.5			5.0
ϕd	0.5	0.45	0.6				
α	1.0	0.5	1.0	0.5	1.0		
β	0.5						

8φ × 12L and 10φ × 12L

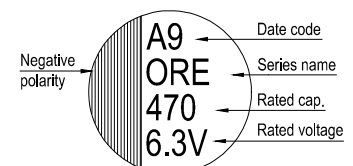


Marking

φ D = 5 ~ 6.3



φ D = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz, 105℃)
2.5V (0E)	2.9	100	5 × 8	0.10	500	7	4,180
		330	5 × 8			7	4,180
			6.3 × 8			5	5,900
		390	6.3 × 5.5	0.12		10	3,900
		470	5 × 8	0.10		7	4,180
			6.3 × 8			5	5,900
		560	5 × 8			7	4,180
			6.3 × 5.5	0.12		10	3,900
			6.3 × 8	0.10		5	5,900
			8 × 8		280	8	4,700
		820	6.3 × 8		500	5	5,900
			8 × 8			7	6,100
			8 × 12				
		1,000	8 × 8				
2,700	10 × 12	1,350	10	5,560			
4V(0G)	4.6	560	6.3 × 8	0.10	500	7	5,600
			8 × 8				6,100
			8 × 12				
		680	8 × 12		544		
		820	10 × 12		656		6,640
6.3V (0J)	7.2	470	6.3 × 8	0.10	592	7	5,600
			8 × 8			8	5,700
			8 × 12			8	5,700
		560	6.3 × 8		706	7	5,600
			8 × 8		706		6,100
		680	10 × 12		857	6,640	
		1,500	10 × 12		1,890	10	5,560
10V(1A)	12.0	270	8 × 6.5	0.12	500	22	3,220
16V (1C)	18.0	100	6.3 × 5.5	0.10	320	24	2,490
			6.3 × 8		480	10	4,680
		150	6.3 × 5.5		500	24	2,490
			8 × 6.5	0.12	500	22	3,220
		180	8 × 8	0.10	576	10	5,000
			8 × 12		576	16	4,360
		220	8 × 6.5		500	13	4,150
			270		6.3 × 8	864	10
		8 × 6.5			13		4,150
		8 × 8			10		5,000
		8 × 12			11		5,000
		470	8 × 8	0.12	1,504	8	5,400
			10 × 12	0.10	1,504	10	6,100
		560	8 × 12	0.12	1,792	14	4,950
		1,000	10 × 12	0.12	3,200	12	5,400

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
20V(1D)	23.0	120	6.3 $\times$ 5.5	0.12	480	25	3,200
		180	8 $\times$ 6.5		720	25	3,200
		390	8 $\times$ 12		1,560	14	4,970
		560	10 $\times$ 12		2,240	12	5,600
25V(1E)	29.0	56	6.3 $\times$ 5.5	0.12	280	30	2,800
		82	8 $\times$ 6.5		410	28	3,000
		180	8 $\times$ 12		900	16	4,650
		220	8 $\times$ 12		1,100	16	4,650
		330	10 $\times$ 12		1,650	14	5,000
		390	10 $\times$ 12		1,950	14	5,000
35V(1V)	40.0	22	6.3 $\times$ 5.5	0.12	154	35	2,600
		39	8 $\times$ 6.5		273	30	2,800
		82	8 $\times$ 12		574	20	4,000
		120	10 $\times$ 12		840	18	4,400

Part Numbering System

ORE Series	470 μ F	$\pm$ 20%	2.5V	Bulk Package	Gas Type	6.3 ϕ $\times$ 8L	Pb-free and Coated Case
ORE	471	M	0E	BK	-	0608	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCRK Series

Features

- 105°C, 5,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

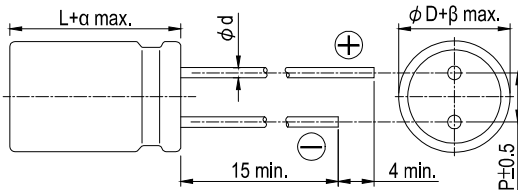
Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at 120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k~300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		5,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
*The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 5,000 hours at 105℃.					
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment.					
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions

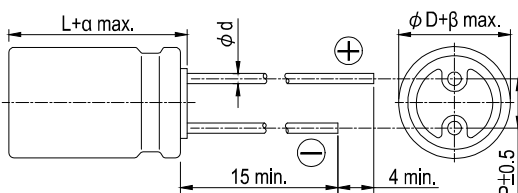
6.3 φ × 8L



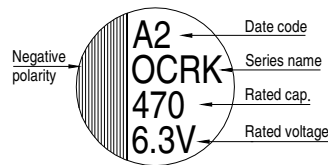
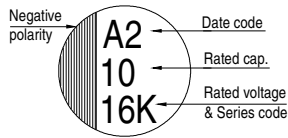
Lead Spacing and Diameter Unit: mm

φ D	6.3	8	10
L	8	11.5	12
P	2.5	3.5	5.0
φ d	0.6		
α	1.0		
β	0.5		

8 φ × 11.5L and 10 φ × 12L



Marking

 $\phi D = 6.3$
 $\phi D = 8 \sim 10$

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	330	6.3 $\times$ 8	0.10	500	7	5,600
		470					
		560					
		820					
4V (0G)	4.6	560	6.3 $\times$ 8	0.10	500	7	5,000
6.3V (0J)	7.2	390	8 $\times$ 11.5	0.15	491	15	4,210
		470	6.3 $\times$ 8	0.10	592	8	4,700
			8 $\times$ 11.5	0.15	592	15	4,210
		560	6.3 $\times$ 8	0.10	706	8	4,700
10V (1A)	12.9	820	10 $\times$ 12	0.15	1,033	12	4,360
		330	8 $\times$ 11.5	0.12	660	17	3,950
16V (1C)	18.0	560	10 $\times$ 12	0.12	1,360	16	4,720
		180	8 $\times$ 11.5	0.12	576	20	3,640
		270	6.3 $\times$ 8		864	15	3,800
20V (1D)	23.0	330	10 $\times$ 12		1,056	16	4,720
		100	8 $\times$ 11.5	0.12	400	28	2,300
25V (1E)	29.0	330	10 $\times$ 12	0.12	1,320	26	2,800
		100	8 $\times$ 11.5	0.12	500	28	2,200
35V (1V)	40.0	270	10 $\times$ 12	0.12	1,350	27	2,700
		68	8 $\times$ 11.5	0.12	476	29	2,200
		150	10 $\times$ 12	0.12	1,050	28	2,600

Part Numbering System

OCRK Series	470 μ F	$\pm 20\%$	6.3V	Bulk Package	Gas Type	8 $\phi \times 11.5L$	Pb-free and Coated Case
OR	71	M	0J	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

OCRU Series

Features

- 125°C, 1000 ~ 2,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



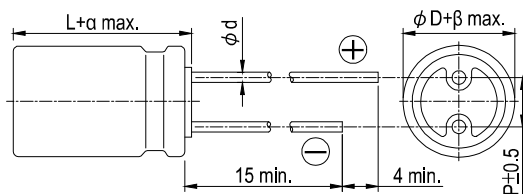
Marking color: Blue

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +125℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃ . See Standard Ratings																													
Tanδ (at 120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs for 2.5 ~ 4V; 2,000 Hrs for 6.3~ 20V</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs for 2.5 ~ 4V; 2,000 Hrs for 6.3~ 20V				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				ESR	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs for 2.5 ~ 4V; 2,000 Hrs for 6.3~ 20V																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 200% of specified value																												
	ESR	Less than 200% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for specified hours at 125℃.																														
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested voltage treatment*.																														
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
	Capacitance Change	Within ±10% of initial value																												
	Tanδ	Within specified value																												
	ESR	Within specified value																												
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																										
Multiplier	0.05	0.3	0.7	1.0																										

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C.

Diagram of Dimensions

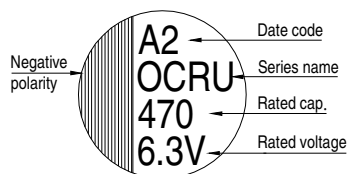


Lead Spacing and Diameter

Unit: mm

φD	8	10
L	11.5	12
P	3.5	5.0
φd	0.6	
α	1.0	
β	0.5	

Marking



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L(mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C.(mA/rms at 100k Hz)	
							T $\leq$ 105°C	105°C < T $\leq$ 125°C
2.5V (0E)	2.9	680	8 × 11.5	0.18	340	13	4,520	1,430
		1,200	10 × 12	0.18	600	13	5,440	1,721
4V (0G)	4.6	560	8 × 11.5	0.18	448	13	4,520	1,430
		1,200	10 × 12	0.18	960	12	5,440	1,721
6.3V (0J)	7.2	470	8 × 11.5	0.15	592	15	4,210	1,332
		820	10 × 12	0.15	1,033	12	5,440	1,721
10V (1A)	12.0	330	8 × 11.5	0.12	660	16	3,950	1,250
		560	10 × 12	0.12	1,120	13	5,230	1,655
16V (1C)	18.0	180	8 × 11.5	0.12	576	18	3,640	1,151
		330	10 × 12	0.12	1,056	16	4,720	1,493
20V (1D)	23.0	100	8 × 11.5	0.15	400	24	3,320	1,050
		150	10 × 12	0.15	600	20	4,320	1,367

Part Numbering System

OCRU Series	470 μ F	$\pm$ 20%	6.3V	Bulk Package	Gas Type	8 ϕ × 11.5L	Pb-free and Coated Case
ORU	471	M	0J	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORS Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS Compliance



Marking color: Blue

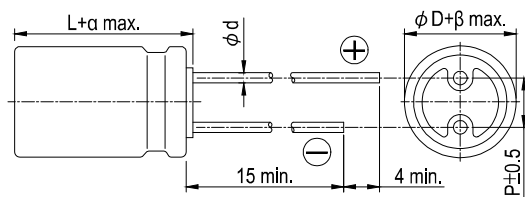
Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings																													
Tanδ (at120 Hz, 20℃)	See Standard Ratings																													
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings																													
Endurance	<table><tr><td>Test Time</td><td colspan="4">15,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	15,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	15,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for specified hours at 105℃.																														
Moisture Resistance	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>ESR</td><td colspan="4">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 150% of specified value				ESR	Less than 150% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																												
	Capacitance Change	Within ±20% of initial value																												
	Tanδ	Less than 150% of specified value																												
	ESR	Less than 150% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.																														
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	<table><tr><td>Capacitance Change</td><td colspan="4">Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Within specified value</td></tr><tr><td>ESR</td><td colspan="4">Within specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Capacitance Change	Within ±10% of initial value				Tanδ	Within specified value				ESR	Within specified value				Leakage Current	Within specified value								
	Capacitance Change	Within ±10% of initial value																												
	Tanδ	Within specified value																												
	ESR	Within specified value																												
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.05</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></table>					Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0															
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																									
Multiplier	0.05	0.3	0.7	1.0																										

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

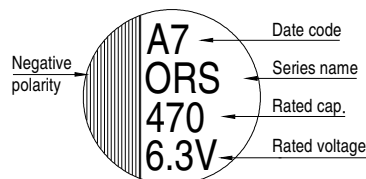
Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φD	8	10
L	11.5	12
P	3.5	5.0
φd	0.6	
α	1.0	
β	0.5	

Marking



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V(0E)	2.9	680	8 × 11.5	0.12	340	10	5,230
		820	8 × 11.5		410	10	5,230
		1,500	10 × 12		750	8	5,500
4V (0G)	4.6	560	8 × 11.5	0.12	448	10	5,230
		820	10 × 12		656	8	5,500
		1,000			800		
		1,200			960		
6.3V (0J)	7.2	390	8 × 11.5	0.12	491	12	4,770
		470	8 × 11.5		592	12	4,770
		680	10 × 12		857	10	5,500
		820			1,033		
		1,000			1,260		
10V (1A)	12.0	270	8 × 11.5	0.12	540	14	4,420
		330	8 × 11.5		660	14	4,420
		470	10 × 12		940	12	5,300
		560	10 × 12		1,360	12	5,300
16V (1C)	18.0	100	8 × 11.5	0.12	320	16	4,360
		180	8 × 11.5		576	16	4,360
		270	10 × 12		864	14	5,050
		330	10 × 12		1,056	14	5,050
20V (1D)	23.0	100	8 × 11.5	0.12	400	24	3,320
		150	10 × 12	0.12	600	20	4,320
25V (1E)	29.0	68	8 × 11.5	0.12	340	24	3,320
		100	10 × 12	0.12	500	20	4,320
35V (1V)	40.0	18	8 × 11.5	0.12	315	34	2,830
		33	10 × 12	0.12	578	30	3,270

Part Numbering System

ORS Series	470 μ F	±20%	6.3V	Bulk Package	Gas Type	8 ϕ × 11.5L	Pb-free and Coated Case
ORS	471	M	0J	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORA Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

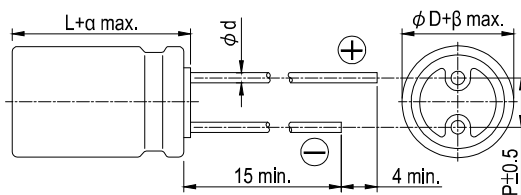
Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		15,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



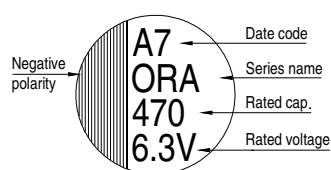
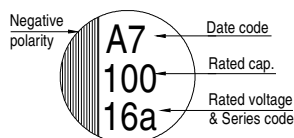
Lead Spacing and Diameter Unit: mm

ϕD	6.3	8	10
L	11	11.5	12
P	2.5	3.5	5.0
ϕd	0.5	0.6	
α	1.0		
β	0.5		

Marking

φD = 6.3

φD = 8 ~ 10



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	390	6.3 $\times$ 11	0.12	195	20	3,150
		680	8 $\times$ 11.5		340	7	5,580
		820	8 $\times$ 11.5		410	7	5,580
		1,000	10 $\times$ 12		500	6	5,860
		1,500	10 $\times$ 12		750	7	5,860
4V (0G)	4.6	270	6.3 $\times$ 11	0.12	216	20	3,160
		390	6.3 $\times$ 11	0.12	312	24	3,300
		560	8 $\times$ 11.5	0.08	448	7	5,580
		820	10 $\times$ 12	0.08	656	6	5,860
6.3V (0J)	7.2	220	6.3 $\times$ 11	0.12	277	20	3,160
		330	6.3 $\times$ 11	0.12	416	28	3,190
		390	8 $\times$ 11.5	0.08	491	8	5,080
		470	8 $\times$ 11.5		592	7	5,700
		680	10 $\times$ 12		857	7	5,860
10V (1A)	12.0	47	6.3 $\times$ 11	0.12	94	25	2,820
		68			136		
		100			200		
		150			300		
		270	8 $\times$ 11.5	0.08	540	9	4,710
		470	10 $\times$ 12	0.08	940	8	5,650
16V (1C)	18.0	100	6.3 $\times$ 11	0.12	320	25	2,820

Part Numbering System

ORA Series 470 μ F $\pm 20\%$

6.3V

Bulk Package

Gas Type

8 $\phi \times 11.5L$ Pb-free and
Coated Case**ORA****471****M****0J****BK****-****0811**

Series Name

Capacitance

Capacitance
ToleranceRated
VoltageLead Configuration
and PackageRubber
Type

Case Size

Lead Wire and
Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORC Series

Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

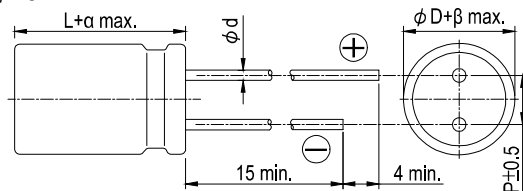
Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		15,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 15,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions

8φ×8L

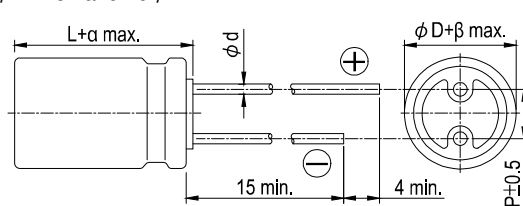


Lead Spacing and Diameter

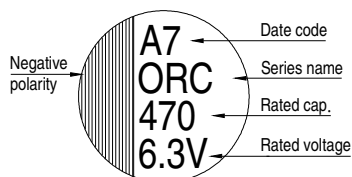
Unit: mm

φD	8	8	10
L	8	11.5	12
P	3.5		5.0
φd	0.6		
α	1.0		
β	0.5		

8φ×11.5L and 10φ×12L



Marking



Dimension: ϕ D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size ϕ D×L (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	560	8 × 8	0.10	500	7	6,100
		820					
		1,000	8 × 11.5		750	8	5,560
		1,500	8 × 11.5				
		2,700	10 × 12				
4V (0G)	4.6	560	8 × 8	0.10	448	7	6,100
		680	8 × 11.5		544	7	6,100
		1,000	10 × 12		800	6	6,640
6.3V(0J)	7.2	470	8 × 8	0.10	592	8	5,700
		560	8 × 8		706	8	5,700
		820	10 × 12		1,033	7	6,640
		1,500	10 × 12		1,890	10	5,560
10V (1A)	12.0	390	8 × 11.5	0.10	780	9	5,650
		680	10 × 12		1,360	7	6,100
16V (1C)	18.0	270	8 × 11.5	0.10	864	11	5,080
		330	10 × 12		1,056	10	6,100
		470	10 × 12		1,504	10	6,100

Part Numbering System

ORC Series	470 μ F	±20%	6.3V	Bulk Package	Gas Type	8 ϕ × 8L	Pb-free and Coated Case
ORC	471	M	0J	BK	-	0808	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORG Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		16V: 20,000 Hrs 20 ~ 35V: 15,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 20,000 / 15,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions

Fig. 1

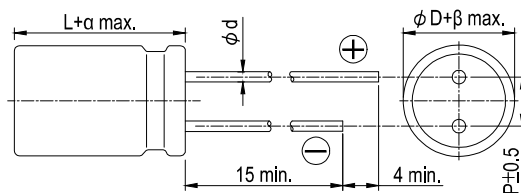
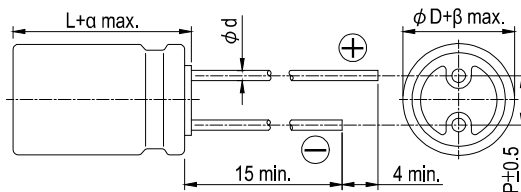


Fig. 2

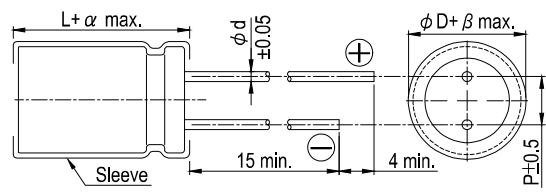


Lead Spacing and Diameter

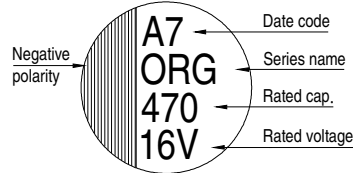
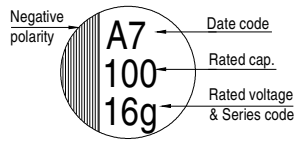
Unit: mm

ϕD	6.3		8				10		
L	5.5	8	8	11.5	16	20	12	16	20
P	2.5		3.5				5.0		
ϕd	0.45	0.6							
α	0.5	1.0	1.0	1.0	1.5	2.0	1.0	1.5	2.0
β	0.5								
Fig. No.	1			2	3		2	3	

Fig. 3



Marking

 $\phi D = 6.3$
 $\phi D = 8 \sim 10$

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
16V (1C)	18.0	150	6.3 × 5.5	0.12	480	20	3,200
		270	6.3 × 8		864	10	5,080
		330	6.3 × 8		1,056	10	5,080
		470	8 × 8		1,504	8	5,400
		560	8 × 11.5		1,792	8	6,100
		680	8 × 11.5		2,176	8	6,100
		820	8 × 16		2,624	8	7,000
			10 × 12		2,624	12	5,400
		1,000	8 × 16		3,200	8	7,000
			8 × 20			8	7,500
			10 × 12			12	5,400
		1,200	8 × 20		3,840	8	7,500
			10 × 12		3,840	12	5,400
		1,500	8 × 20		4,800	8	7,500
			10 × 16		4,800		7,700
		1,800	10 × 16		5,760		7,700
			10 × 20		5,760		8,100
		2,200	10 × 20		7,040		
		2,700	10 × 20		8,640		
20V (1D)	23.0	120	6.3 × 5.5	0.12	480	20	3,200
		180	6.3 × 8		720	18	3,460
		330	8 × 8		1,320	17	3,880
		390	8 × 11.5		1,560	14	4,970
		680	10 × 12		2,720	12	5,400
25V (1E)	29.0	56	6.3 × 5.5	0.12	280	30	2,600
		82	6.3 × 8		410	28	2,780
		100			500		
		120			600		
		180	8 × 8		900	18	3,770
			8 × 11.5		900	16	4,650
		220	8 × 11.5		1,100	16	4,650
		330	10 × 12		1,650	14	5,000
		390	10 × 12		1,950	14	5,000
35V(1V)	40.0	68	8 × 11.5	0.12	476	18	4,380
		120	10 × 12	0.12	840	16	4,670

Part Numbering System

ORG Series	560 μ F	$\pm 20\%$	16V	Bulk Package	Gas Type	8 ϕ $\times$ 11.5L	Pb-free and Coated Case
ORG	561	M	1C	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORF Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

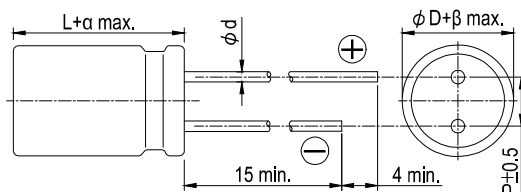
Items	Performance				
Category Temperature Range	-55℃ ~ +105℃				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)				
Leakage Current (at 20℃)*	Rated voltage applied, after 2 minutes at 20℃. See Standard Ratings				
Tanδ (at120 Hz, 20℃)	See Standard Ratings				
ESR (at 100k ~ 300k Hz, 20℃)	See Standard Ratings				
Endurance	Test Time		20,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 20,000 hours at 105℃.				
Moisture Resistance	Test Time		1,000 Hrs		
	Capacitance Change		Within ±20% of initial value		
	Tanδ		Less than 150% of specified value		
	ESR		Less than 150% of specified value		
	Leakage Current		Within specified value		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them at 60℃, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.				
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Capacitance Change		Within ±10% of initial value		
	Tanδ		Within specified value		
	ESR		Within specified value		
	Leakage Current		Within specified value		
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.05	0.3	0.7	1.0

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

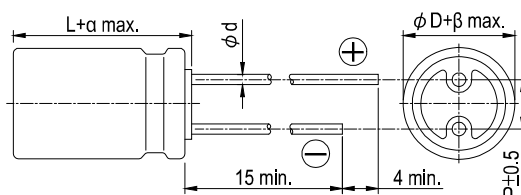
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions

6.3φ and 8φ × 8L



8φ × 11.5L and 10φ × 12L

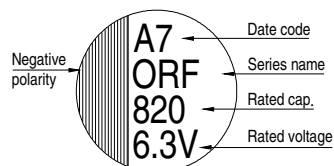
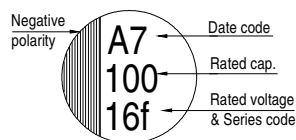


Lead Spacing and Diameter

Unit: mm

ϕD	6.3			8		10
L	5.5	8	11	8	11.5	12
P	2.5			3.5		5.0
ϕd	0.45	0.6	0.5	0.6		
α	0.5	1.0				
β	0.5					

Marking

 $\phi D = 6.3$
 $\phi D = 8 \sim 10$

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2V (0D)	2.3	1,000	6.3 $\times$ 8	0.12	500	5	5,900
2.5V(0E)	2.9	330	6.3 $\times$ 8	0.10	500	5	5,900
		470					
		560					
		820					
		1,200	8 $\times$ 8	0.12	1,200	5	6,100
		1,600		0.12	800		
4V(0G)	4.6	470	6.3 $\times$ 8	0.10	500	7	5,600
		560	6.3 $\times$ 8	0.10	500	7	5,600
6.3V(0J)	7.2	820	6.3 $\times$ 8	0.10	1,030	8	4,700
16V (1C)	18.0	100	6.3 $\times$ 5.5	0.10	500	24	2,490
			6.3 $\times$ 11		500	25	2,890
		270	8 $\times$ 8		864	10	5,000
			8 $\times$ 11.5		864	11	5,080
		330	8 $\times$ 8		1,050	13	4,700
			8 $\times$ 11.5		1,500	11	5,400
		470	8 $\times$ 11.5		1,500	11	5,400
			10 $\times$ 12		1,500	10	6,100

Part Numbering System

ORF Series	270 μ F	$\pm 20\%$	16V	Bulk Package	Gas Type	8 $\phi \times 11.5L$	Pb-free and Coated Case
ORF	271	M	1C	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORB Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

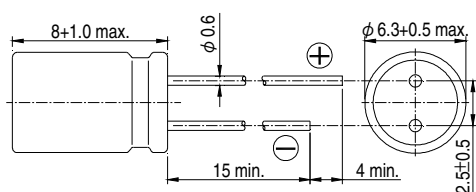
Specifications

Items	Performance
Category Temperature Range	-55°C ~ +105°C
Capacitance Tolerance	±20% (at 120 Hz, 20°C)
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings
Tanδ (at 120 Hz, 20°C)	See Standard Ratings
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings
Endurance	Test Time
	20,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Moisture Resistance	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Test Time
	1,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Ripple Current and Frequency Multipliers	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

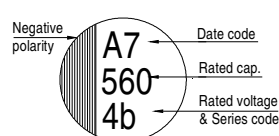
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Unit: mm

Marking


Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi D \times L$ (mm)	Tanδ (120 Hz, 20°C)	LC (μA)	ESR (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V(0E)	2.9	820	6.3 × 8	0.10	500	7	5,000
4V (0G)	4.6	560			500	7	5,000
6.3V (0J)	7.2	470			592	8	4,700
		560			706	8	4,700

Part Numbering System

ORB Series	470μF	±20%	6.3V	Bulk Package	Gas Type	6.3 ϕ × 8L	Pb-free and Coated Case
ORB	471	M	0J	BK	-	0608	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

ORD Series

Features

- 105°C, 20,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliance



Marking color: Blue

Specifications

Items	Performance
Category Temperature Range	-55°C ~ +105°C
Capacitance Tolerance	±20% (at 120 Hz, 20°C)
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings
Tanδ (at 120 Hz, 20°C)	See Standard Ratings
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings
Endurance	Test Time
	20,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Moisture Resistance	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	Test Time
	1,000 Hrs
	Capacitance Change
	Within ±20% of initial value
	Tanδ
Ripple Current and Frequency Multipliers	Less than 150% of specified value
	ESR
	Less than 150% of specified value
	Leakage Current
	Within specified value

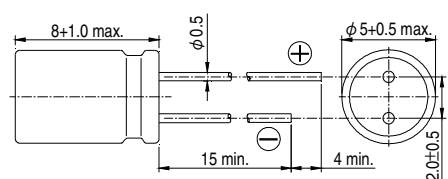
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 20,000 hours at 105°C.

* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.

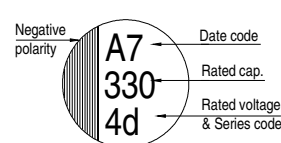
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

Diagram of Dimensions



Unit: mm

Marking


Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tanδ (120 Hz, 20°C)	LC (μ A)	E S R (mΩ/at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	220	5 × 8	0.10	500	7	4,350
		330					
		470					
		560					
4V (0G)	4.6	330				8	4,050
		270				10	3,700
		330				8	4,050

Part Numbering System

ORD Series 330 μ F ±20% 6.3V Bulk Package Gas Type 5 ϕ × 8L Pb-free and Coated Case

ORD
331
M
0J
BK
-
0508

Series Name

Capacitance

Capacitance Tolerance

Rated Voltage

Lead Configuration and Package

Rubber Type

Case Size

Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 20.

Precautions and Guidelines for Using Conductive Polymer Hybrid Capacitors and Aluminum Electrolytic Capacitors

1. Guidelines for Circuit Design (General / Application guidelines for using electrolytic capacitors)

Selecting of a right capacitor is a key to a good circuit design.

(1) Polarity

Most of the aluminum electrolytic capacitors are polarized. Therefore, they must be installed with the correct polarity. Usage in the reverse polarity results into a short-circuit condition that may damage or even explode the capacitor. In addition, it may influence circuit functionality. A bi-polar electrolytic capacitor should be installed when polarity across a capacitor is unstable / reversible. It should be, however, noted that usage of both polar and bi-polar capacitors are limited to DC applications. They must NOT be used for AC application.

(2) Operating Voltage

Applied DC voltage must not exceed rated voltage of the capacitor. Applying higher voltage than its rated voltage across a capacitor terminals cause overheating due to higher leakage currents and capacitor dielectric/insulation deterioration that will ultimately affect a capacitor's performance. The device, however, is capable of working under short-time transient voltages such as DC transients and peak AC ripples. Reverse voltages higher than 1 Volt within a specified temperature limit or AC voltages are not permissible. Overall, using capacitors at recommended operating voltages can prolong its lifespan. Note that the result of DC voltage overlapped with peak ripple voltage should not exceed rated voltage.

(3) Ripple Current

One of the key functions of any capacitor is removal of the ripple current i.e. the RMS value of AC flowing through a capacitor. But, a ripple current higher than rated ripple current will drop resultant capacitance, cause undue internal heating and thus reduces life span of the capacitor. In extreme cases, internal high temperature will cause the pressure relief vent to operate while destroying the device. Overall, it is important to note that an electrolytic capacitor must be used within a permissible range of ripple current. Indicators like temperature coefficient of allowable ripple current are generally used to determine life expectancy of the capacitor, but to avoid related complex calculations and for the sake of simplicity, we haven't provided temperature coefficient in the catalogue. But it offers key indicators like maximum operating temperature for calculation of life expectancy at a given temperature.

(4) Operating Temperature

Capacitors should be used within a permissible range of operating temperatures. Using capacitor at a higher temperature than maximum rated temperature will considerably shorten its life. In the worst-case scenario, high temperature can cause pressure relief vent to operate and the device will get destroyed. Using capacitors at an ambient room temperature assure their longer life.

(5) Leakage Current

Leakage current flows through a capacitor when DC voltage is applied across it. Leakage current varies with changes in ambient temperature and applied DC voltage level and its time of application. Overvoltage situation, presence of moisture, and thermal stresses, especially occurring during the soldering process can enhance leakage current. Initial leakage current is usually higher and does not decrease until voltage is applied for a certain period of time. It is recommended to keep initial leakage current within specified levels.

(6) Charge and Discharge

Regular electrolytic capacitors are not suitable for rapid charging/discharging circuits. Such usage may either cause reduction in overall capacitance or damage due to overheating. Lelon provides special assistance for selecting appropriate capacitors for rapid charging/discharging circuits.

(7) Surge Voltage

The Surge voltage rating is referred as the maximum DC overvoltage that may be applied to an electrolytic capacitor for a short time interval of 30 seconds at infrequent time intervals not exceeding 5.5 minutes with a limiting resistance of 1kΩ. Unless otherwise described on the catalogue or product specifications, please do not apply a voltage exceeding the capacitor's voltage rating. The rated surge voltages corresponding to rated voltages of electrolytic capacitors are presented as follows:

Rated Voltage(V)	4	6.3	10	16	25	35	50
Surge Voltage(V)	4.6	7.3	11.5	18.4	28.8	40.3	57.5

Rated Voltage(V)	63	80	100	160	180	200	250
Surge Voltage(V)	72.5	92	115	184	207	230	288

Rated Voltage(V)	315	350	400	420	450	500	525
Surge Voltage(V)	347	385	440	462	495	550	578

(8) Condition of Use

The capacitors shall NOT be exposed to:

- Fluids including water, saltwater spray, oil, fumes, highly humid or condensed climates, etc.
- Ambient conditions containing hazardous gases/fumes like hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or bromine gas, ammonia, etc.
- Exposed to ozone, ultraviolet rays and radiation.
- Severe vibrations or physical shocks that exceeds the specifications mentioned in this catalogue.

(9) Circuit Design Consideration

- Please ensure whether application, operating and mounting conditions satisfy the conditions specified in the catalog before installation of a capacitor. Please consult Lelon, if any of the conditions are beyond the conditions specified in the catalog.
- Heat-generating components or heat sinks should not be placed closer to Aluminum electrolytic capacitors on the PCB to avoid their premature failure. A cooling system is recommended to improve their reliable working.
- Electrical characteristics and performance of aluminum electrolytic capacitors are affected by variation of applied voltage, ripple current, ripple frequency and operating temperature. Therefore, these parameters shall not exceed specified values in the catalog.
- Aluminum capacitors may be connected in the parallel fashion for increasing total capacitance and/or for achieving higher ripple current capability. But, such design may cause unequal current flow through each of the capacitors due to differences in their impedances.
- When two or more capacitors are connected in series, voltage across each capacitor may differ and fall below the applied voltage. A resistor should be placed across each capacitor so as to match applied voltage with voltage across a capacitor.
- Please consult Lelon while selecting a capacitor for high-frequency switching circuit or a circuit that undergoes rapid charging/ discharging
- Standard outer sleeve of the capacitor is not a perfect electrical insulator therefore is unsuitable for the applications that requires perfect electrical insulation. Please consult Lelon, if your application requires perfect electrical insulation.
- Tilting or twisting capacitor body is not recommended once it is soldered to the PCB.

(Continued on next page)

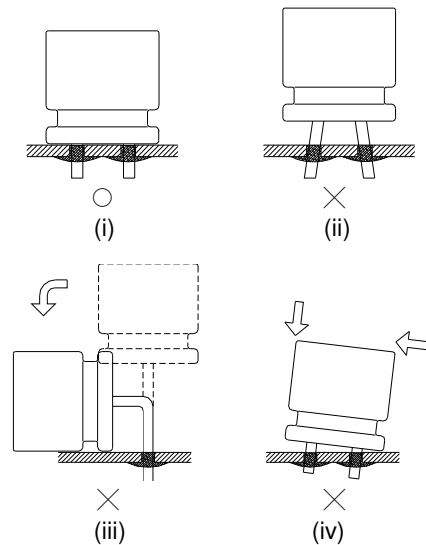
2. Caution for Assembling Capacitors

(1) Mounting

- (a) Aluminum electrolytic capacitors are not recommended to re-use in other circuits once they are mounted and powered in a circuit.
- (b) Aluminum electrolytic capacitors may hold static charge between its anode and cathode, which is recommended to be discharged through a 1k Ω resistor before re-use.
- (c) A long storage of capacitors may result into its insulation deterioration. This can lead to a high leakage current when voltage is applied that may damage the capacitor. Capacitors following a long storage period must undergo voltage treatment/re-forming. Capacitors are charged by applying rated DC voltage through a resistor of 1k Ω in series at least for an hour. It is recommended to increase applied voltage gradually using a voltage regulator unit once capacitors are assembled on the board. The charging should be followed by discharging through a 1K Ω resistor.
- (d) Please check capacitor rated voltage before mounting.
- (e) Please check capacitor polarity before mounting.
- (f) Please don't drop capacitor on the floor / hard object.
- (g) Please don't deform the capacitor during installation.
- (h) Please confirm whether the lead spacing of the capacitors match with its pad spacing / footprint on PCB prior to installation.
- (i) Please avoid excessive mechanical shocks to capacitor during the auto-insertion process, inspection or centering operations.
- (j) Please don't place any wiring or circuit over the capacitor's pressure relief vent. The pressure relief vent may fail to open if adequate clearance space is not provided. Following table shows minimum clearance space required for different case diameters.

(2) Soldering

- (a) Please confirm that soldering conditions, especially temperature and contact time are within our specifications. Dip or flow preheat temperature is 150 $^{\circ}\text{C}$ with 120 sec (max.), the soldering temperature should be limited at $260 \pm 5^{\circ}\text{C}$ for 10 ± 1 sec while manual soldering using soldering iron should be limited at $350 \pm 5^{\circ}\text{C}$ for $3 \pm 1/0$ seconds. Please do not dip capacitor body into molten solder. A capacitor's life will be negatively affected if these conditions are violated.
- (b) Storage of capacitors in *high humidity* conditions is likely to affect the *solder-ability of lead wires and terminals*.
- (c) **Reflow soldering should NOT be used for SMD type capacitors.** The temperature and duration shall not exceed the specified temperature and duration in the specification. If the temperature or duration is higher than the value specified, please consult Lelon before usage.
- (d) Standard aluminum electrolytic capacitors are not designed to withstand multiple reflow processes. Please consult Lelon if repeated reflowing is unavoidable.
- (e) Incorrect mounting on PCB with improper external strength applied on its lead wires or capacitor body after soldering may damage a capacitor's internal structure, cause short circuit, or lead to high leakage current issues. Do not bend or twist the capacitor body after soldering. Referring to the drawings below only case (i) is recommended.
 - (i) Correct soldering
 - (ii) Hole-to-hole spacing on PCB differs from the lead space of lead wires.
 - (iii) Lead wires are bent after soldering.
 - (iv) Capacitor body doesn't stand vertical on PCB after soldering.



(3) Cleaning Circuit Boards after Soldering

- (a) Following chemicals are not recommended for cleaning: Solvent containing halogen ions, Alkaline solvent, Xylene, Acetone, Terpene, petro-based solvent.
- (b) Recommended cleaning conditions: Fatty-alcohol - Pine Alpha ST-100S, Clean Through-750H and IPA (isopropyl alcohol) are examples of the most acceptable cleaning agents. Temperature of the cleaning agent must not exceed 60 $^{\circ}\text{C}$. Flux content in the cleaning agents should be limited to 2 Wt. %. Overall length of cleaning process (e.g., immersion, ultrasonic or other) shall be within 5 minutes (5 ~ 7mm height within 3 minutes). CFC substitute cleaning agents such as AK225AES can also be used for cleaning. In this case, its temperature shall not exceed 40 C and cleaning process (e.g., immersion, ultrasonic or other) shall be completed within 2 ~ 3 minutes. After cleaning capacitors should be dried with hot air for at least 10 minutes along with the PCB. Temperature of hot air shall not exceed maximum category temperature of the capacitor. Insufficient drying may cause appearance defects, sleeve shrinkage, and bottom-plate bulging. However, usage of this CFC substitute must completely regulated for protection of environment.

3. Maintenance Inspection

Periodical inspection of aluminum capacitors is absolutely necessary, especially when they are used with industrial equipment. The following items should be checked:

- (1) Appearance: Bloated, vent operated, leaked, etc.
 - (2) Electrical characteristic: Capacitance, Tan δ , leakage current, and other specified items listed in specification.
- Lelon recommend replacing the capacitors if any of the abovementioned items fail to meet specifications.

4. Storage

- (1) The most suitable conditions for aluminum capacitor storage are 5 $^{\circ}\text{C}$ ~ 35 $^{\circ}\text{C}$ and indoor relative humidity less than 75%. High temperature and/or humidity storage is detrimental to the capacitors.
- (2) Capacitors shall not be stored in wet or damp atmospheres containing water, brine, fumes or oil.
- (3) Capacitors storage area shall neither be exposed to hazardous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc. nor to acidic or alkaline solutions.
- (4) Capacitors shall not be exposed to ozone, ultraviolet rays or radiation.

(Continued on next page)

5. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors

6. Environmental Consideration

Lelon already have received IECQ QC 080000 certificate. Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr⁶⁺), PBB, PBDE, DEHP, BBP, DBP and DIBP have never been using in capacitor. If you need "Halogen-free" products, please consult with us.

7. AEC-Q200 Compliance

Automotive Electronics Counsel (AEC) has established various electronic component qualification/reliability standards in order to serve automotive electronics industry. AEC-Q200 standard is dedicated for passive components like capacitors, inductors, etc. and is widely adopted domestically as well as internationally. Lelon offers compliant product designs and support services to satisfy customers' product requirements, including the AEC-Q200 required criteria of the reliability tests. Lelon's capacitors are professionally designed to outperform all requirements of AEC-Q200.

For further details, please refer to the following industrial standards:

IEC 60384-4 - Fixed capacitors for use in electronic equipment –

Part 4: Sectional specification – Fixed aluminum electrolytic capacitors with solid (MnO₂) and non-solid electrolyte (Edition 5.0 2016-08)

JEITA RCR-2367D – Safety application guide for fixed aluminum electrolytic capacitors for use in electronic equipment (Established in March 1995, Revised in October 2017)

Part Numbering System – Conductiv Polymer Hybrid

Product Code Guide

HBV series	470μF	±20%	16V	Carrier Tape		10φ×10L	Pb-free and Coated Case	
HBV	471	M	1C	TR	-	1010		
□□□	□□□	□	□□	□□	□	□□□□	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal	Case Size	Lead Wire and Case Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, “-”, to fill the third blank.

② **Capacitance:** Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. “R” represents the decimal point for capacitance under 10μF.

Example:

Capacitance	10	47	56	100	470	560
Part number	100	470	560	101	471	561

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
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④ **Rated Voltage:** Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	16	25	35	50	63	80
Code	1C	1E	1V	1H	1J	1K

⑤ **Package:**

SMD Type	TR = Reel package TT = Reel package of plastic
Radial Type	BK = Bulk Package SA = Straight Leader Taping CC = Cutting Leader

⑥ **Terminal (SMD) / Rubber type (Radial):**

- = Standard product

Note: For radial type are used flat rubber bung is the standard design, use a hyphen, “-”:

⑦ **Case size:** The first two digits indicate case diameter and the last two digits indicate case length in mm.

SMD Type	φ D×L	6.3×5.8	6.3×7.7	8×10	10×10	10×12.5	10×16.5
	Code	0606	0608	0810	1010	1013	1016
Radial Type	φ D×L	6.3×6	6.3×8	8×10	10×10	10×12	
	Code	0606	0608	0810	1010	1012	

⑧ **Lead wire and case type:**

None = Pb free wire + coated case (Standard design)	E = Sn-Bi wire + coated case
K / L = Automotive control code	

* When a supplement code following a blank digit code of lead wire and case case type (standard design), use a hyphen, “-”, to fill the blank digit.

* When the automotive control code is required, please contact with us for further discussion.

⑨ **Supplement code (Optional):** For special control purposes

HBV Series

Features

- 105°C, 10,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

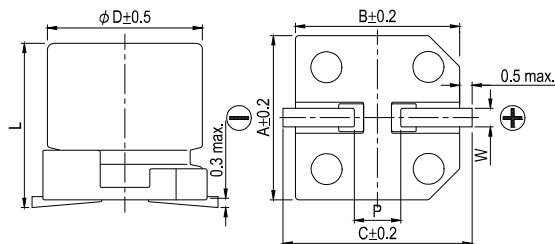


Marking color: Dark Green

Specifications

Items	Performance							
Category Temperature Range	-55°C ~ +105°C							
Capacitance Tolerance	±20% (at 120 Hz, 20°C)							
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V							
Tanδ (at 120 Hz, 20°C)	See Standard Ratings							
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below							
		Rated Voltage	16	25	35	50	63	80
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0	2.0	2.0
Endurance								
	Test Time		10,000 Hrs					
	Capacitance Change		Within ±30% of initial value					
	Tanδ		Less than 200% of specified value					
	ESR		Less than 200% of specified value					
	Leakage Current		Within specified value					
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 10,000 hours at 105°C.							
Shelf Life Test	* After storage for 1,000 hours at 105 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)								
	Capacitance Change		Within ±10% of initial value					
	Tanδ		Within specified value					
	ESR		Within specified value					
	Leakage Current		Within specified value					
Ripple Current and Frequency Multipliers								
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k			
	Multiplier	0.1	0.3	0.6	1.0			

Diagram of Dimensions



Lead Spacing and Diameter

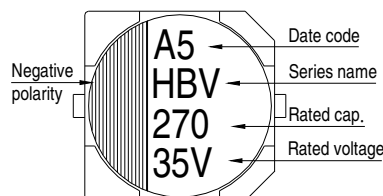
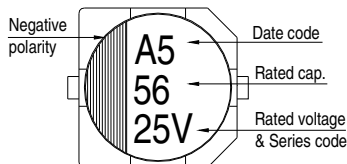
Unit: mm

φ D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 6.3

φ D = 8 ~ 10




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
16V (1C)	18.4	82	6.3 × 5.8	0.16	13.1	50	1,300
		150	6.3 × 7.7		24.0	30	2,000
		270	8 × 10		43.2	27	2,300
		470	10 × 10		75.2	20	2,500
25V (1E)	28.8	47	6.3 × 5.8	0.14	11.8	50	1,300
		56	6.3 × 5.8		14.0	50	1,300
		68	6.3 × 7.7		17.0	30	2,000
		100	6.3 × 7.7		25.0	30	2,000
		150	8 × 10		37.5	27	2,300
		220	8 × 10		55.0	27	2,300
		330	10 × 10		82.5	20	2,500
			10 × 12.5		82.5	16	2,900
35V (1V)	40.3	27	6.3 × 5.8	0.12	9.5	60	1,300
		33			11.6		
		47			16.5		
		68	6.3 × 7.7		23.8	35	2,000
		100	8 × 10		35.0	27	2,300
		150	8 × 10		52.5	27	2,300
		220	10 × 10		77.0	20	2,500
		270	10 × 10		94.5	20	2,500
		50V(1H)	57.5		22	6.3 × 5.8	0.10
33	6.3 × 7.7			16.5	40	1,600	
47	8 × 10			23.5	30	1,800	
68	8 × 10			34.0	30	1,800	
100	10 × 10			50.0	28	2,000	
63V(1J)	72.5	10	6.3 × 5.8	0.08	6.3	120	1,000
		22	6.3 × 7.7		13.9	80	1,500
		27	8 × 10		17.0	40	1,700
		33			20.8		
		47			29.6		
		56	10 × 10		35.3	30	1,800
		68			42.8		
		82			51.7		
80V(1K)	92.0	22	8 × 10	0.08	17.6	45	1,550
		33	10 × 10		26.4	36	1,700
		47	10 × 10		37.6	36	1,700

Part Numbering System

HBV Series	220μF	±20%	25V	Carrier Tape		8 ϕ × 10L	Pb-free and Coated Case
HBV	221	M	1E	TR	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87..

Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

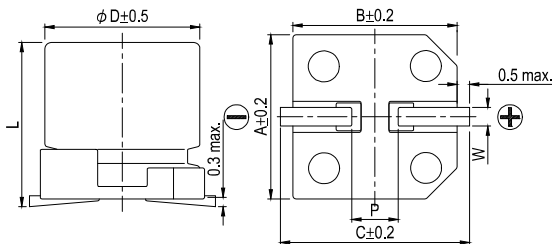


Marking color: Dark Green

Specifications

Items	Performance							
Category Temperature Range	-55°C ~ +125°C							
Capacitance Tolerance	±20% (at 120 Hz, 20°C)							
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V							
Tanδ (at 120 Hz, 20°C)	See Standard Ratings							
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below							
	Rated Voltage		16	25	35	50	63	80
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0	2.0	2.0
Endurance	Test Time		4,000 Hrs					
	Capacitance Change		Within ±30% of initial value					
	Tanδ		Less than 200% of specified value					
	ESR		Less than 200% of specified value					
	Leakage Current		Within specified value					
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C.							
Shelf Life Test	* After storage for 1,000 hours at 125 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	Capacitance Change		Within ±10% of initial value					
	Tanδ		Within specified value					
	ESR		Within specified value					
	Leakage Current		Within specified value					
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k			
	Multiplier	0.1	0.3	0.6	1.0			

Diagram of Dimensions



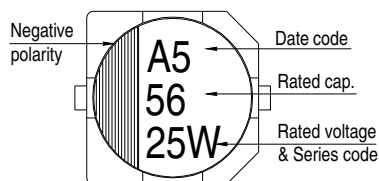
Lead Spacing and Diameter

Unit: mm

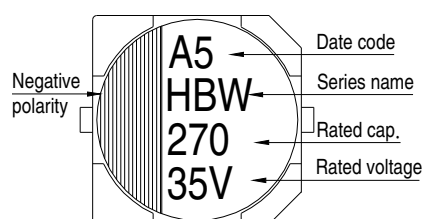
φ D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 6.3



φ D = 8 ~ 10




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 125°C

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100kHz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz, 125℃)
16V (1C)	18.4	82	6.3 × 5.8	0.16	13.1	50	900
		150	6.3 × 7.7		24.0	30	1,400
		270	8 × 10		43.2	27	1,600
		470	10 × 10		75.2	20	2,000
25V (1E)	28.8	47	6.3 × 5.8	0.14	11.8	50	900
		56	6.3 × 5.8		14.0	50	900
		68	6.3 × 7.7		17.0	30	1,400
		100	6.3 × 7.7		25.0	30	1,400
		150	8 × 10		37.5	27	1,600
		220	8 × 10		55.0	27	1,600
		330	10 × 10		82.5	20	2,000
35V (1V)	40.3	27	6.3 × 5.8	0.12	9.5	60	900
		33			11.6		
		47			16.5		
		68	6.3 × 7.7		23.8	35	1,400
		100	8 × 10		35.0	27	1,600
		150	8 × 10		52.5	27	1,600
		220	10 × 10		77.0	20	2,000
		270	10 × 10		94.5	20	2,000
50V(1H)	57.5	22	6.3 × 5.8	0.10	11.0	80	750
		33	6.3 × 7.7		16.5	40	1,100
		47	8 × 10		23.5	30	1,250
		68	8 × 10		34.0	30	1,250
		100	10 × 10		50.0	28	1,600
		120	10 × 10		60.0	28	1,600
63V(1J)	72.5	10	6.3 × 5.8	0.08	6.3	120	700
		22	6.3 × 7.7		13.9	80	900
		27	8 × 10		17.0	40	1,100
		33			20.8		
		47			29.6		
		56	10 × 10		35.3	30	1,400
			10 × 12.5		35.3	26	1,500
		68	10 × 10		42.8	30	1,400
		82	10 × 10		51.7	30	1,400
80V (1K)	92.0	22	8 × 10	0.08	17.6	45	1,050
		33	10 × 10		26.4	36	1,360
		47	10 × 10		37.6	36	1,360

Part Numbering System

HBW Series	220μF	±20%	25V	Carrier Tape		8 ϕ × 10L	Pb-free and Coated Case
HBW	221	M	1E	TR	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.

HBO Series

Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

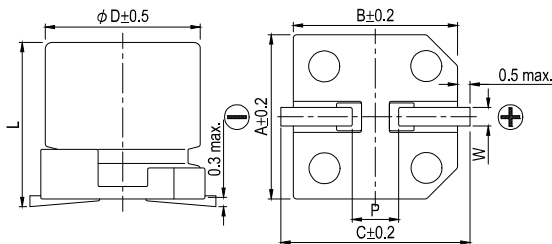


Marking color: Dark Green

Specifications

Items	Performance				
Category Temperature Range	-55°C ~ +125°C				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)				
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V				
Tanδ (at 120 Hz, 20°C)	See Standard Ratings				
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below				
	Rated Voltage		25	35	
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	
		Z (-55°C) / Z (+20°C)	2.0	2.0	
Endurance					
	Test Time	4,000 Hrs			
	Capacitance Change	Within ±30% of initial value			
	Tanδ	Less than 200% of specified value			
	ESR	Less than 200% of specified value			
	Leakage Current	Within specified value			
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C.				
Shelf Life Test	* After storage for 1,000 hours at 125 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)				
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)					
	Capacitance Change	Within ±10% of initial value			
	Tanδ	Within specified value			
	ESR	Within specified value			
	Leakage Current	Within specified value			
Ripple Current and Frequency Multipliers					
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k
	Multiplier	0.1	0.3	0.6	1.0

Diagram of Dimensions



Lead Spacing and Diameter

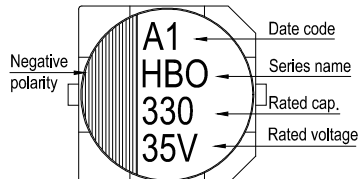
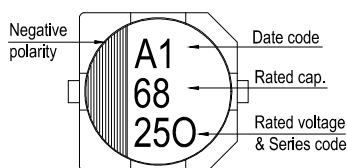
Unit: mm

φ D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φ D = 6.3

φ D = 8 ~ 10





Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 125°C

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 125°C)
25V (1E)	28.8	68	6.3 $\times$ 5.8	0.14	17.0	50	1,300
		82	6.3 $\times$ 5.8		20.5	50	1,300
		150	6.3 $\times$ 7.7		37.5	30	1,800
		270	8 $\times$ 10		67.5	27	2,000
		470	10 $\times$ 10		117	20	2,800
35V (1V)	40.3	56	6.3 $\times$ 5.8	0.12	19.6	60	1,200
		100	6.3 $\times$ 7.7		35.0	35	1,700
		180	8 $\times$ 10		63.0	27	2,000
		330	10 $\times$ 10		115	20	2,800

Part Numbering System

HBO Series	270 μ F	$\pm 20\%$	25V	Carrier Tape		8 $\phi \times 10$ L	Pb-free and Coated Case
<u>HBO</u>	<u>271</u>	<u>M</u>	<u>1E</u>	<u>TR</u>	<u>-</u>	<u>0810</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HBZ Series

Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

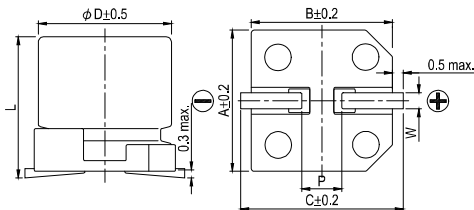


Marking color: Dark Green

Specifications

Items	Performance					
Category Temperature Range	-55°C ~ +125°C					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)					
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V					
Tanδ (at 120 Hz, 20°C)	See Standard Ratings					
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below					
	Rated Voltage		25	35	50	63
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
Endurance	Test Time		4,000 Hrs			
	Capacitance Change		Within ±30% of initial value			
	Tanδ		Less than 200% of specified value			
	ESR		Less than 200% of specified value			
	Leakage Current		Within specified value			
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C.					
Shelf Life Test	* After storage for 1,000 hours at 125 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	Capacitance Change		Within ±10% of initial value			
	Tanδ		Within specified value			
	ESR		Within specified value			
	Leakage Current		Within specified value			
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	
	Multiplier	0.1	0.3	0.6	1.0	

Diagram of Dimensions

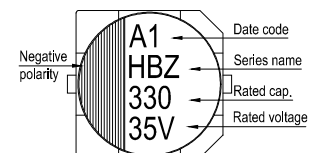


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	16.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking



Dimension: φD×L(mm)

Ripple Current: mA/rms at 100k Hz, 125°C

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L(mm)	Tanδ (120 Hz, 20°C)	LC (μA)	ESR (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 125°C)
25V (1E)	28.8	470	10 × 12.5	0.14	117	14	3,500
		560	10 × 16.5	0.14	140	11	4,000
35V (1V)	40.3	330	10 × 12.5	0.12	115	14	3,500
		470	10 × 16.5	0.12	164	11	4,000
50V (1H)	57.5	150	10 × 12.5	0.10	75.0	17	3,200
		220	10 × 16.5	0.10	110	13	3,700
63V (1J)	72.5	100	10 × 12.5	0.08	63.0	19	3,000
		150	10 × 16.5	0.08	94.5	15	3,500

Part Numbering System

HBZ Series	470μF	±20%	25V	Carrier Tape	10 φ × 12.5L	Pb-free and Coated Case
HBZ	471	M	1E	TR	-	1013
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.

HUW Series

Features

- 135°C, 2,000 ~ 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

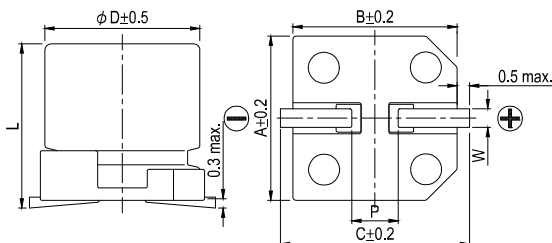


Marking color: Dark Green

Specifications

Items	Performance																				
Category Temperature Range	-55℃ ~ +135℃																				
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																				
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																				
Tanδ (at 120 Hz, 20℃)	See Standard Ratings																				
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below <table><tr><th colspan="2">Rated Voltage</th><th>16</th><th>25</th><th>35</th><th>50</th><th>63</th></tr><tr><td rowspan="2">Impedance ratio</td><td>Z (-25℃) / Z (+20℃)</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td></tr><tr><td>Z (-55℃) / Z (+20℃)</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td></tr></table>	Rated Voltage		16	25	35	50	63	Impedance ratio	Z (-25℃) / Z (+20℃)	1.5	1.5	1.5	1.5	1.5	Z (-55℃) / Z (+20℃)	2.0	2.0	2.0	2.0	2.0
Rated Voltage		16	25	35	50	63															
Impedance ratio	Z (-25℃) / Z (+20℃)	1.5	1.5	1.5	1.5	1.5															
	Z (-55℃) / Z (+20℃)	2.0	2.0	2.0	2.0	2.0															
Endurance	<table><tr><td rowspan="2">Test Time</td><td>135℃</td><td>125℃</td></tr><tr><td>2,000 Hrs for ϕ D = 6.3 mm 4,000 Hrs for ϕ D = 8~ 10 mm</td><td>4,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="2">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="2">Less than 200% of specified value</td></tr><tr><td>ESR</td><td colspan="2">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="2">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 / 4,000 hours at 125 or 135℃.	Test Time	135℃	125℃	2,000 Hrs for ϕ D = 6.3 mm 4,000 Hrs for ϕ D = 8~ 10 mm	4,000 Hrs	Capacitance Change	Within ±30% of initial value		Tanδ	Less than 200% of specified value		ESR	Less than 200% of specified value		Leakage Current	Within specified value				
Test Time	135℃		125℃																		
	2,000 Hrs for ϕ D = 6.3 mm 4,000 Hrs for ϕ D = 8~ 10 mm	4,000 Hrs																			
Capacitance Change	Within ±30% of initial value																				
Tanδ	Less than 200% of specified value																				
ESR	Less than 200% of specified value																				
Leakage Current	Within specified value																				
Shelf Life Test	* After storage for 1,000 hours at 135 ± 2℃ with no voltage applied and then being stabilized at 20℃, capacitors shall meet the limits specified in Endurance. (With voltage treatment)																				
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	<table><tr><td>Capacitance Change</td><td>Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td>Within specified value</td></tr><tr><td>ESR</td><td>Within specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>	Capacitance Change	Within ±10% of initial value	Tanδ	Within specified value	ESR	Within specified value	Leakage Current	Within specified value												
Capacitance Change	Within ±10% of initial value																				
Tanδ	Within specified value																				
ESR	Within specified value																				
Leakage Current	Within specified value																				
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.1</td><td>0.3</td><td>0.6</td><td>1.0</td></tr></table>	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.1	0.3	0.6	1.0										
Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																	
Multiplier	0.1	0.3	0.6	1.0																	

Diagram of Dimensions

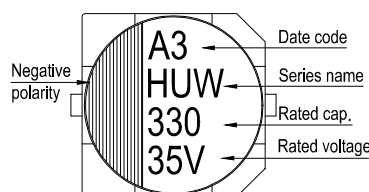
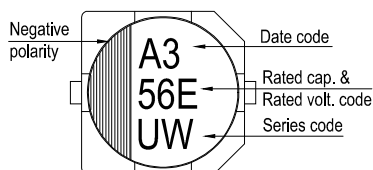


Lead Spacing and Diameter

Unit: mm

ϕD	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	16.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

 $\phi D = 6.3$
 $\phi D = 8 \sim 10$




Standard Ratings

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μ F)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μ A)	E S R (m Ω /at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz)	
							125°C	135°C
16V (1C)	18.4	82	6.3 $\times$ 5.8	0.16	13.1	45	1,700	950
		150	6.3 $\times$ 7.7		24.0	27	2,500	1,450
		270	8 $\times$ 10		43.2	20	3,050	1,700
		470	10 $\times$ 10		75.2	18	3,400	2,100
		560	10 $\times$ 12.5		89.6	15	4,200	2,550
25V (1E)	28.8	56	6.3 $\times$ 5.8	0.14	14.0	50	1,400	900
		100	6.3 $\times$ 7.7		25.0	30	2,100	1,400
		220	8 $\times$ 10		55.0	22	2,900	1,600
		330	10 $\times$ 10		82.5	20	3,300	2,000
		470	10 $\times$ 12.5		117	16	4,050	2,500
		560	10 $\times$ 16.5		140	14	4,300	2,500
35V (1V)	40.3	47	6.3 $\times$ 5.8	0.12	16.5	60	1,400	900
		68	6.3 $\times$ 7.7		23.8	35	2,100	1,400
		150	8 $\times$ 10		52.5	22	2,900	1,600
		270	10 $\times$ 10		94.5	20	3,300	2,000
		330	10 $\times$ 12.5		115	17	3,950	2,400
		470	10 $\times$ 16.5		164	14	4,300	2,500
50V (1H)	57.5	33	8 $\times$ 10	0.10	16.5	30	2,400	1,250
		47	8 $\times$ 10		23.5	30	2,400	1,250
		56	10 $\times$ 10		28.0	25	2,900	1,600
		68	8 $\times$ 10		34.0	30	2,400	1,250
		100	10 $\times$ 10		50.0	25	2,900	1,600
		120	10 $\times$ 10		60.0	25	2,900	1,600
		150	10 $\times$ 12.5		75.0	19	3,700	2,250
		220	10 $\times$ 16.5		110	16	4,100	2,400
63V (1J)	72.5	22	8 $\times$ 10	0.08	13.9	40	2,100	1,100
		33	8 $\times$ 10		20.8	40	2,100	1,100
		33	10 $\times$ 10		20.8	30	2,600	1,400
		47	8 $\times$ 10		29.6	40	2,100	1,100
		56	10 $\times$ 10		35.3	30	2,600	1,400
		82	10 $\times$ 10		51.7	30	2,600	1,400
		100	10 $\times$ 12.5		63.0	22	3,450	2,100
		150	10 $\times$ 16.5		94.5	16	4,100	2,400

Part Numbering System

HUW Series	470 μ F	$\pm 20\%$	25V	Carrier Tape	10 ϕ $\times$ 12.5L	Pb-free and Coated Case
HUW	471	M	1E	TR	-	1013
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.

HUE Series

Features

- 145°C, 2,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

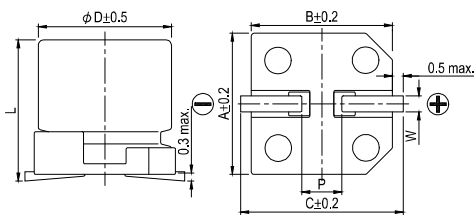


Marking color: Dark Green

Specifications

Items	Performance					
Category Temperature Range	-55°C ~ +145°C					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)					
Leakage Current (at 20°C)	I = 0.01CV or 3 (μ A) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V					
Tanδ (at 120 Hz, 20°C)	See Standard Ratings					
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below					
	Rated Voltage		25	35	50	63
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
Endurance	Test Time		145°C		135°C	
			2,000 Hrs		4,000 Hrs	
	Capacitance Change		Within ±30% of initial value			
	Tanδ		Less than 200% of specified value			
	ESR		Less than 200% of specified value			
	Leakage Current		Within specified value			
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for: 2,000 hours at 145°C / 4,000 hours at 135°C.						
Shelf Life Test	* After storage for 1,000 hours at 145 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	Capacitance Change		Within ±10% of initial value			
	Tanδ		Within specified value			
	ESR		Within specified value			
	Leakage Current		Within specified value			
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	
	Multiplier	0.1	0.3	0.6	1.0	

Diagram of Dimensions

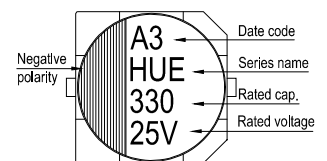


Lead Spacing and Diameter

φ D	L	A	B	C	W	P ± 0.2
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Unit: mm

Marking



Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz.)	
							135°C	145°C
25V (1E)	28.8	220	8 × 10	0.14	55.0	27	1,600	700
		330	10 × 10	0.14	82.5	20	2,000	900
35V (1V)	40.3	150	8 × 10	0.12	52.5	27	1,600	700
		270	10 × 10	0.12	94.5	20	2,000	900
50V (1H)	57.5	68	8 × 10	0.10	34.0	30	1,250	600
		100	10 × 10	0.10	50.0	28	1,600	800
63V (1J)	72.5	33	8 × 10	0.08	20.8	40	1,100	600
		56	10 × 10		35.3	30	1,400	800
		82	10 × 10		51.7	30	1,400	800

Part Numbering System

HUE Series 220μF ±20% 25V Carrier Tape 8 φ × 10L Pb-free and Coated Case

HUE 221 M 1E TR - 0810

Series Name | Capacitance | Capacitance Tolerance | Rated Voltage | Package Type | Terminal Type | Case Size | Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.

HUJ Series

Features

- 150°C, 1,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

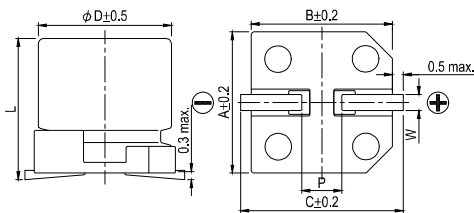


Marking color: Dark Green

Specifications

Items	Performance					
Category Temperature Range	-55℃ ~ +150℃					
Capacitance Tolerance	±20% (at 120 Hz, 20℃)					
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V					
Tanδ (at 120 Hz, 20℃)	See Standard Ratings					
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below					
		Rated Voltage	25	35	50	63
	Impedance ratio	Z (-25℃) / Z (+20℃)	1.5	1.5	1.5	1.5
		Z (-55℃) / Z (+20℃)	2.0	2.0	2.0	2.0
Endurance	Test Time		1,000 Hrs			
	Capacitance Change		Within ±30% of initial value			
	Tanδ		Less than 200% of specified value			
	ESR		Less than 200% of specified value			
	Leakage Current		Within specified value			
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hours at 150℃.					
Shelf Life Test	* After storage for 1,000 hours at 150 ± 2℃ with no voltage applied and then being stabilized at 20℃, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	Capacitance Change		Within ±10% of initial value			
	Tanδ		Within specified value			
	ESR		Within specified value			
	Leakage Current		Within specified value			
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	
	Multiplier	0.1	0.3	0.6	1.0	

Diagram of Dimensions

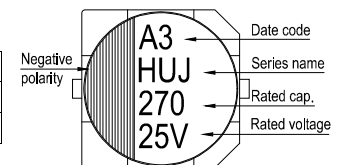


Lead Spacing and Diameter

φD	L	A	B	C	W	P ± 0.2
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Unit: mm

Marking



Standard Ratings

Dimension: φD×L(mm)

Ripple Current: mA/rms at 100k Hz, 150°C

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L(mm)	Tanδ (120 Hz, 20°C)	LC (μA)	ESR (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 150°C)
25V (1E)	28.8	150	8 × 10	0.14	37.5	27	800
		270	10 × 10	0.14	67.5	20	1,000
35V (1V)	40.3	100	8 × 10	0.12	35.0	30	770
		150	10 × 10	0.12	52.5	23	950
50V (1H)	57.5	56	8 × 10	0.10	28.0	35	700
		100	10 × 10	0.10	50.0	28	900
63V (1J)	72.5	33	8 × 10	0.08	20.8	40	650
		56	10 × 10	0.08	35.3	30	840

Part Numbering System

HUJ Series	150μF	±20%	25V	Carrier Tape	8 φ × 10L	Pb-free and Coated Case
HUJ	151	M	1E	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HBR Series

Features

- 105°C, 10,000 hours assured
- Low ESR and High ripple current
- RoHS compliance

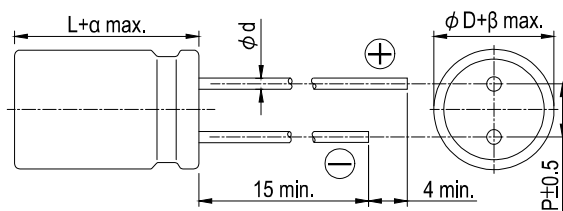


Marking color: Dare Green

Specifications

Items	Performance																							
Category Temperature Range	-55°C ~ +105°C																							
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																							
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																							
Tanδ (at 120 Hz, 20°C)	See Standard Ratings																							
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below																							
	<table><tr><td colspan="2">Rated Voltage</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td></tr><tr><td rowspan="2">Impedance ratio</td><td>Z (-25°C) / Z (+20°C)</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td></tr><tr><td>Z (-55°C) / Z (+20°C)</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td></tr></table>	Rated Voltage		16	25	35	50	63	80	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5	Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0	2.0	2.0
	Rated Voltage		16	25	35	50	63	80																
Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5																	
	Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0	2.0	2.0																	
Endurance	<table><tr><td>Test Time</td><td>10,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>ESR</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>	Test Time	10,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 200% of specified value	ESR	Less than 200% of specified value	Leakage Current	Within specified value													
	Test Time	10,000 Hrs																						
	Capacitance Change	Within ±30% of initial value																						
	Tanδ	Less than 200% of specified value																						
	ESR	Less than 200% of specified value																						
Leakage Current	Within specified value																							
Shelf Life Test	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 10,000 hours at 105°C.																							
Resistance to Soldering Heat	* After storage for 1,000 hours at 105 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)																							
	<table><tr><td>Capacitance Change</td><td>Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td>Within specified value</td></tr><tr><td>ESR</td><td>Within specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>	Capacitance Change	Within ±10% of initial value	Tanδ	Within specified value	ESR	Within specified value	Leakage Current	Within specified value															
	Capacitance Change	Within ±10% of initial value																						
	Tanδ	Within specified value																						
ESR	Within specified value																							
Leakage Current	Within specified value																							
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.1</td><td>0.3</td><td>0.6</td><td>1.0</td></tr></table>	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.1	0.3	0.6	1.0													
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k																			
Multiplier	0.1	0.3	0.6	1.0																				

Diagram of Dimensions



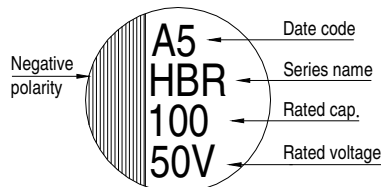
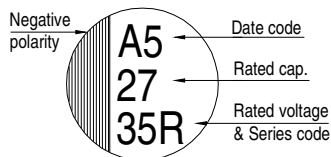
Lead Spacing and Diameter

ϕD	6.3	6.3	8	10	10
L	6	8	10	10	12
P	2.5	2.5	3.5	5.0	5.0
ϕd	0.45		0.6		
α	1.0				
β	0.5				

Marking

φ D = 6.3

φ D = 8 ~ 10





Dimension: ϕ D×L(mm)
Ripple Current: mA/rms at 100k Hz, 105℃

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100kHz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz, 105℃)
16V (1C)	18.4	82	6.3 × 6	0.16	13.1	50	1,300
		150	6.3 × 8		24.0	30	2,000
		270	8 × 10		43.2	27	2,300
		470	10 × 10		75.2	20	2,500
25V (1E)	28.8	47	6.3 × 6	0.14	11.8	50	1,300
		56	6.3 × 6		14.0	50	1,300
		68	6.3 × 8		17.0	30	2,000
		100	6.3 × 8		25.0	30	2,000
		150	8 × 10		37.5	27	2,300
		220	8 × 10		55.0	27	2,300
		330	10 × 10		82.5	20	2,500
			10 × 12		82.5	16	2,900
35V (1V)	40.3	27	6.3 × 6	0.12	9.5	60	1,300
		33			11.6		
		47			16.5		
		68	6.3 × 8		23.8	35	2,000
		100	8 × 10		35.0	27	2,300
		150	8 × 10		52.5	27	2,300
		220	10 × 10		77.0	20	2,500
		270	10 × 10		94.5	20	2,500
50V(1H)	57.5	22	6.3 × 6	0.10	11.0	80	1,100
		33	6.3 × 8		16.5	40	1,600
		47	8 × 10		23.5	30	1,800
		68	8 × 10		34.0	30	1,800
		100	10 × 10		50.0	28	2,000
63V(1J)	72.5	10	6.3 × 6	0.08	6.3	120	1,000
		22	6.3 × 8		13.9	80	1,500
		27	8 × 10		17.0	40	1,700
		33			20.8		
		47			29.6		
		56	10 × 10		35.3	30	1,800
		68			42.8		
		82			51.7		
80V(1K)	92.0	22	8 × 10	0.08	17.6	45	1,550
		33	10 × 10		26.4	36	1,700
		47	10 × 10		37.6	36	1,700

Part Numbering System

HBR Series	220μF	±20%	25V	Bulk Package	Gas Type	8 ϕ × 10L	Pb-free and Coated Case
HBR	221	M	1E	BK	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HBS Series

Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance

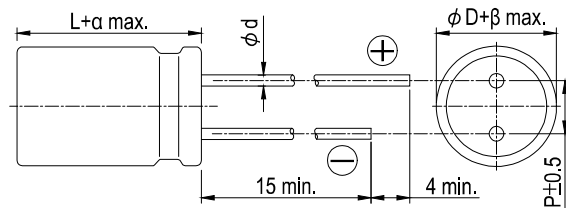


Marking color: Dark Green

Specifications

Items	Performance							
Category Temperature Range	-55°C ~ +125°C							
Capacitance Tolerance	±20% (at 120 Hz, 20°C)							
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V							
Tanδ (at 120 Hz, 20°C)	See Standard Ratings							
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below							
	Rated Voltage		16	25	35	50	63	80
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5
Z (-55°C) / Z (+20°C)		2.0	2.0	2.0	2.0	2.0	2.0	
Endurance	Test Time		4,000 Hrs					
	Capacitance Change		Within ±30% of initial value					
	Tanδ		Less than 200% of specified value					
	ESR		Less than 200% of specified value					
	Leakage Current		Within specified value					
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C.							
Shelf Life Test	* After storage for 1,000 hours at 125 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat	Capacitance Change		Within ±10% of initial value					
	Tanδ		Within specified value					
	ESR		Within specified value					
	Leakage Current		Within specified value					
Ripple Current and Frequency Multipliers	Frequency (Hz)		120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k		
	Multiplier		0.1	0.3	0.6	1.0		

Diagram of Dimensions

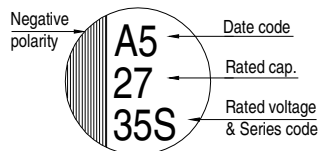


Lead Spacing and Diameter Unit: mm

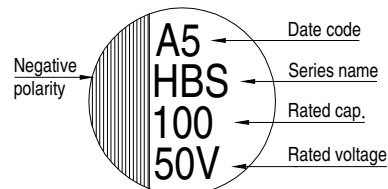
ϕD	6.3	6.3	8	10	10
L	6	8	10	10	12
P	2.5	2.5	3.5	5.0	5.0
ϕd	0.45		0.6		
α	1.0				
β	0.5				

Marking

φ D = 6.3



φ D = 8 ~ 10




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 125°C

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size ϕ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 125°C)
16V (1C)	18.4	82	6.3 × 6	0.16	13.1	50	900
		150	6.3 × 8		24.0	30	1,400
		270	8 × 10		43.2	27	1,600
		470	10 × 10		75.2	20	2,000
25V (1E)	28.8	47	6.3 × 6	0.14	11.8	50	900
		56			14.0		
		68			17.0		
		100	6.3 × 8		17.0	30	1,400
			6.3 × 8		25.0	30	1,400
		150	8 × 10		37.5	27	1,600
		220	8 × 10		55.0	27	1,600
		330	10 × 10		82.5	20	2,000
35V (1V)	40.3	27	6.3 × 6	0.12	9.5	60	900
		33			11.6		
		47			16.5		
		68	6.3 × 8		23.8	35	1,400
		100	8 × 10		35.0	27	1,600
		150	8 × 10		52.5	27	1,600
		220	10 × 10		77.0	20	2,000
		270	10 × 10		94.5	20	2,000
50V(1H)	57.5	22	6.3 × 6	0.10	11.0	80	750
		33	6.3 × 8		16.5	40	1,100
		47	8 × 10		23.5	30	1,250
		68	8 × 10		34.0	30	1,250
		100	10 × 10		50.0	28	1,600
		120	10 × 10		60.0	28	1,600
63V(1J)	72.5	10	6.3 × 6	0.08	6.3	120	700
		22	6.3 × 8		13.9	80	900
		27	8 × 10		17.0	40	1,100
		33			20.8		
		47			29.6		
		56	10 × 10		35.3	30	1,400
			10 × 12		35.3	26	1,500
		68	10 × 10		42.8	30	1,400
		82	10 × 10		51.7	30	1,400
80V (1K)	92.0	22	8 × 10	0.08	17.6	45	1,050
		33	10 × 10		26.4	36	1,360
		47	10 × 10		37.6	36	1,360

Part Numbering System

HBS Series	220 μ F	$\pm$ 20%	25V	Bulk Package	Gas Type	8 ϕ $\times$ 10L	Pb-free and Coated Case
HBS	221	M	1E	BK	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HRW Series

Features

- 135°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance

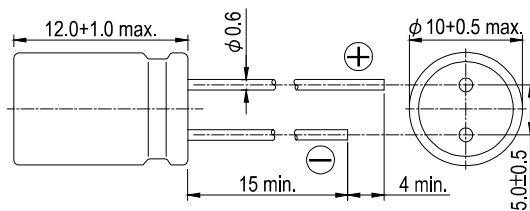


Marking color: Dark Green

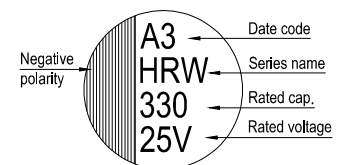
Specifications

Items	Performance					
Category Temperature Range	-55°C ~ +135°C					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)					
Leakage Current (at 20°C)	I = 0.01CV or 3 (μ A) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V					
Tanδ (at 120 Hz, 20°C)	See Standard Ratings					
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below					
	Rated Voltage		25	35	50	63
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
Endurance	Test Time		125°C		135°C	
			4,000 Hrs		4,000 Hrs	
	Capacitance Change		Within ±30% of initial value			
	Tanδ		Less than 200% of specified value			
	ESR		Less than 200% of specified value			
	Leakage Current		Within specified value			
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C or 135°C.					
Shelf Life Test	* After storage for 1,000 hours at 135 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
Resistance to Soldering Heat	Capacitance Change		Within ±10% of initial value			
	Tanδ		Within specified value			
	ESR		Within specified value			
	Leakage Current		Within specified value			
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	
	Multiplier	0.1	0.3	0.6	1.0	

Diagram of Dimensions



Marking



Standard Ratings

Dimension: φD×L(mm)

Ripple Current: mA/rms at 100k Hz

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L (mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz.)	
							125°C	135°C
25V (1E)	28.8	330	10 × 12.0	0.14	82.5	16	3,800	2,300
35V (1V)	40.3	270	10 × 12.0	0.12	94.5	17	3,700	2,200
50V (1H)	57.5	120	10 × 12.0	0.10	60.0	19	3,500	2,100
63V (1J)	72.5	100	10 × 12.0	0.08	63.0	20	3,400	2,000

Part Numbering System

HRW Series	330μF	±20%	25V	Bulk Package	Gas Type	10 φ×12.0L	Pb-free and Coated Case
HRW	331	M	1E	BK	-	1012	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HRE Series

Features

- 145°C, 2,000 hours assured
- Low ESR and High ripple current
- RoHS compliance

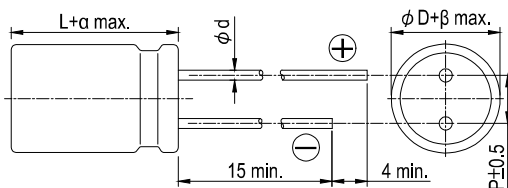


Marking color: Dark Green

Specifications

Items	Performance					
Category Temperature Range	-55°C ~ +145°C					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)					
Leakage Current (at 20°C)	I = 0.01CV or 3 (μ A) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V					
Tanδ (at 120 Hz, 20°C)	See Standard Ratings					
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below					
	Rated Voltage		25	35	50	63
	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5
		Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
Endurance	Test Time		145°C		135°C	
			2,000 Hrs		4,000 Hrs	
	Capacitance Change		Within ±30% of initial value			
	Tanδ		Less than 200% of specified value			
	ESR		Less than 200% of specified value			
	Leakage Current		Within specified value			
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 145°C / 4,000 hours at 135°C.						
Shelf Life Test	* After storage for 1,000 hours at 145 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
Resistance to Soldering Heat	Capacitance Change		Within ±10% of initial value			
	Tanδ		Within specified value			
	ESR		Within specified value			
	Leakage Current		Within specified value			
Ripple Current and Frequency Multipliers	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	
	Multiplier	0.1	0.3	0.6	1.0	

Diagram of Dimensions

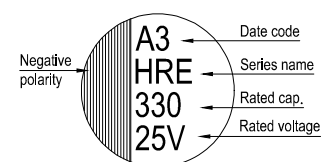


Lead Spacing and Diameter

φ D	8	10
L	10	10
P	3.5	5.0
φ d	0.6	
α	1.0	
β	0.5	

Unit: mm

Marking



Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φ D×L(mm)	Tanδ (120 Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz)	
							135°C	145°C
25V (1E)	28.8	220	8 × 10	0.14	55.0	27	1,600	700
		330	10 × 10		82.5	20	2,000	900
35V (1V)	40.3	150	8 × 10	0.12	52.5	27	1,600	700
		270	10 × 10		94.5	20	2,000	900
50V (1H)	57.5	68	8 × 10	0.10	34.0	30	1,250	600
		100	10 × 10		50.0	28	1,600	800
63V (1J)	72.5	33	8 × 10	0.08	20.8	40	1,100	600
		56	10 × 10		35.3	30	1,400	800
		82	10 × 10		51.7	30	1,400	800

Part Numbering System

HRE Series	220μF	±20%	25V	Bulk Package	Gas Type	8φ × 10L	Pb-free and Coated Case
HRE	221	M	1E	BK	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.



HRJ Series

Features

- 150°C, 1,000 hours assured
- Low ESR and High ripple current
- RoHS compliance

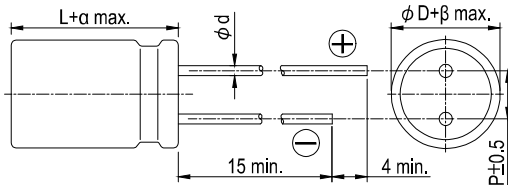


Marking color: Dark Green

Specifications

Items	Performance																	
Category Temperature Range	-55°C ~ +150°C																	
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																	
Leakage Current (at 20°C)	I = 0.01CV or 3 (μ A) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																	
Tanδ (at 120 Hz, 20°C)	See Standard Ratings																	
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below <table><tr><td colspan="2">Rated Voltage</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance ratio</td><td>Z (-25°C) / Z (+20°C)</td><td>1.5</td><td>1.5</td><td>1.5</td><td>1.5</td></tr><tr><td>Z (-55°C) / Z (+20°C)</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td></tr></table>	Rated Voltage		25	35	50	63	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
Rated Voltage		25	35	50	63													
Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5													
	Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0													
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>ESR</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 1,000 hours at 150°C.	Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 200% of specified value	ESR	Less than 200% of specified value	Leakage Current	Within specified value							
Test Time	1,000 Hrs																	
Capacitance Change	Within ±30% of initial value																	
Tanδ	Less than 200% of specified value																	
ESR	Less than 200% of specified value																	
Leakage Current	Within specified value																	
Shelf Life Test	* After storage for 1,000 hours at 150 ± 2°C with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)																	
Resistance to Soldering Heat	<table><tr><td>Capacitance Change</td><td>Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td>Within specified value</td></tr><tr><td>ESR</td><td>Within specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>	Capacitance Change	Within ±10% of initial value	Tanδ	Within specified value	ESR	Within specified value	Leakage Current	Within specified value									
Capacitance Change	Within ±10% of initial value																	
Tanδ	Within specified value																	
ESR	Within specified value																	
Leakage Current	Within specified value																	
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f < 1k</td><td>1k ≤ f < 10k</td><td>10k ≤ f < 100k</td><td>100k ≤ f < 500k</td></tr><tr><td>Multiplier</td><td>0.1</td><td>0.3</td><td>0.6</td><td>1.0</td></tr></table>	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.1	0.3	0.6	1.0							
Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k														
Multiplier	0.1	0.3	0.6	1.0														

Diagram of Dimensions

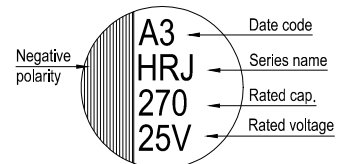


Lead Spacing and Diameter

φD	8	10
L	10	10
P	3.5	5.0
φd	0.6	
α	1.0	
β	0.5	

Unit: mm

Marking



Standard Ratings

Dimension: φD×L(mm)

Ripple Current: mA/rms at 100k Hz, 150°C

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L (mm)	Tanδ (120 Hz, 20°C)	LC (μA)	ESR (mΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 150°C)
25V (1E)	28.8	150	8 × 10	0.14	37.5	27	800
		270	10 × 10		67.5	20	1,000
35V (1V)	40.3	100	8 × 10	0.12	35.0	30	770
		150	10 × 10		52.5	23	950
50V (1H)	57.5	56	8 × 10	0.10	28.0	35	700
		100	10 × 10		50.0	28	900
63V (1J)	72.5	33	8 × 10	0.08	20.8	40	650
		56	10 × 10		35.3	30	840

Part Numbering System

HRJ Series	150μF	±20%	25V	Bulk Package	Gas Type	8φ×10L	Pb-free and Coated Case
HRJ	151	M	1E	BK	-	0810	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System" on page 87.

Part Numbering System - SMD Type

Product Code Guide

VES series	10μF	±20%	16V	Carrier Tape		4φ × 5.3L	Pb-free and Coated Case	
VES	100	M	1C	TR	-	0405		
□□□	□□□	□	□□	□□	□	□□□□	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal	Case Size	Lead Wire and Case Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank.

② **Capacitance:** Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. "R" represents the decimal point for capacitance under 10μF.

Example:

Capacitance	0.47	1	4.7	10	47	100	470	1,000	4,700
Part number	R47	010	4R7	100	470	101	471	102	472

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
-----------------	-----------------	-----------------

④ **Rated voltage:** Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	4	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
Code	0G	0J	1A	1C	1E	1V	1H	1J	2A	2C	2D	2E	2V	2G	2W

⑤ **Package:**

TR	Reel package
TT	Reel package of plastic
T-	Tray package for case diameter 12.5 ~ 18 mm

⑥ **Terminal:**

-	Standard product
A	For application 10G (A must be used with automotive control code "K / L" together)
V	Anti-vibration structure

⑦ **Case size:** The first two digits indicate case diameter and the last two digits indicate case length in mm.

φ D×L	3×5.3	4×4.5	4×5.3	4×5.7 4×5.8 ^{*1}	5×4.5	5×5.3	5×5.7 5×5.8 ^{*1}	5×7 ^{*2}	6.3×4.5
Code	0305	0404	0405	0406	0504	0505	0506	0507	0604

φ D×L	6.3×5.3	6.3×5.7 6.3×5.8 ^{*1}	6.3×7.0 ^{*2}	6.3×7.7	6.3×8.7 ^{*2}	8×6.5	8×10 8×10.5 ^{*3}	10×7.7	10×10 10×10.5 ^{*3}
Code	0605	0606	0607	0607	0608	0806	0810	1008	1010

φ D×L	10×12.5	12.5×13.5	12.5×16	16×16.5	16×21.5	18×16.5	18×21.5		
Code	1013	1313	1316	1616	1621	1816	1821		

Note: ^{*1}: The case size are for VZL, VZS, VZT series only.

^{*2}: The case size are for VZR series only.

^{*3}: The case size are for anti-vibration structure.

When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ **Lead wire and case type:**

None = Pb free wire + coated case (Standard design)	E = Sn-Bi wire + coated case
K / L = Automotive control code	

* When a supplement code following a blank digit code of lead wire and case case type (standard design), use a hyphen, "-", to fill the blank digit.

* When the automotive control code is required, please contact with us for further discussion.

⑨ **Supplement code (Optional):**

For special control purposes

VES Series

Features

- 4 ϕ ~ 6.3 ϕ , 105°C, 1,000 hours assured
- Vertical chip type miniaturized for 5.5mm high capacitor
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

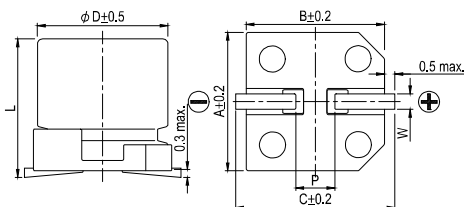


Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.16</td><td>0.13</td><td>0.12</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.12									
Rated Voltage	6.3	10	16	25	35	50																								
Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.12																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3
Rated Voltage		6.3	10	16	25	35	50																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																							
	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3																							
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 1,000 hours at 105℃.							Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.3</td><td>1.4</td></tr></table>							Frequency (Hz)	50	120	1k	10k up	Multiplier	0.7	1.0	1.3	1.4													
Frequency (Hz)	50	120	1k	10k up																										
Multiplier	0.7	1.0	1.3	1.4																										

Diagram of Dimensions

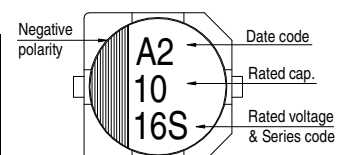


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2
4	5.3 ± 0.2	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.3 ± 0.2	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.3 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0

Marking



Dimension: φD × L(mm)
Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (Voc)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
Cap. (μF)	Contents	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010											4×5.3	7
2.2	2R2											4×5.3	10
3.3	3R3											4×5.3	12
4.7	4R7							4×5.3	12	4×5.3	14	5×5.3	17
10	100			4×5.3	15	4×5.3	16	5×5.3	21	5×5.3	23	6.3×5.3	26
22	220	4×5.3	21	5×5.3	25	5×5.3	28	6.3×5.3	36	6.3×5.3	50	6.3×5.3	51
33	330	5×5.3	30	5×5.3	31	6.3×5.3	40	6.3×5.3	44				
47	470	5×5.3	36	6.3×5.3	43	6.3×5.3	47	6.3×5.3	60				
100	101	6.3×5.3	61	6.3×5.3	65	6.3×5.3	70						

Part Numbering System

VES Series	10μF	±20%	16V	Carrier Tape		4 ϕ ×5.3L	Pb-free and Coated Case
<u>VES</u>	<u>100</u>	<u>M</u>	<u>1C</u>	<u>TR</u>	<u>-</u>	<u>0405</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VEJ Series

Features

- 4 ϕ ~ 18 ϕ , 105°C, 2,000 hours assured
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified



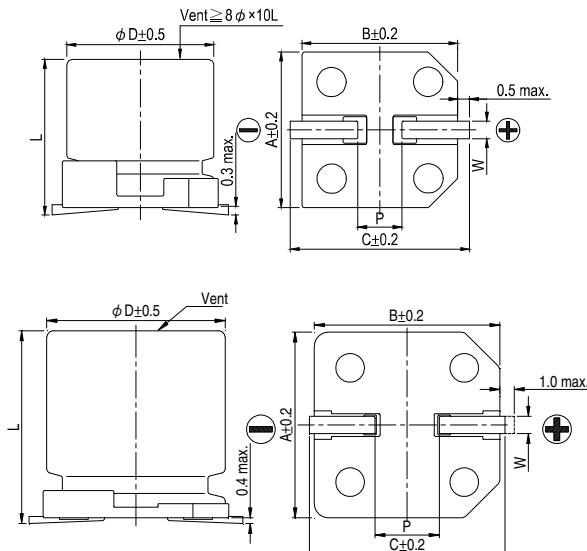
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Specifications

Items	Performance																																												
Category Temperature Range	6.3 ~ 100V				160 ~ 400V				450V																																				
	-55°C ~ +105°C				-40°C ~ +105°C				-25°C ~ +105°C																																				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																												
Leakage Current (at 20°C)	Rated voltage		6.3 ~ 100V						160 ~ 450V																																				
	Time		after 2 minutes						after 5 minutes																																				
	Case size		4 ~ 10 φ			12.5 ~ 18 φ			12.5 ~ 18 φ																																				
	Leakage Current		I = 0.01CV or 3μA, whichever is greater			I = 0.03CV or 4μA, whichever is greater			I = 0.04CV + 100μA																																				
	Where, C = rated capacitance in μF, V = rated DC working voltage in V																																												
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160 ~ 250</td><td>400 ~ 450</td></tr><tr><td>4 ~ 10 φ</td><td>0.45</td><td>0.35</td><td>0.28</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td><td>-</td><td>-</td></tr><tr><td>12.5 ~ 18 φ</td><td>0.40</td><td>0.38</td><td>0.34</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.14</td><td>0.10</td><td>0.20</td><td>0.25</td></tr></table>												Rated Voltage	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450	4 ~ 10 φ	0.45	0.35	0.28	0.18	0.16	0.14	0.12	0.12	-	-	12.5 ~ 18 φ	0.40	0.38	0.34	0.26	0.22	0.18	0.14	0.10	0.20	0.25
	Rated Voltage	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450																																		
	4 ~ 10 φ	0.45	0.35	0.28	0.18	0.16	0.14	0.12	0.12	-	-																																		
12.5 ~ 18 φ	0.40	0.38	0.34	0.26	0.22	0.18	0.14	0.10	0.20	0.25																																			
When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.																																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																												
	Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	400	450																														
	Impedance Ratio	Z(-25°C)	φ D < 12.5	4	4	3	2	2	2	2	3	-	-	-	-																														
		/Z(+20°C)	φ D ≥ 12.5	5	4	3	2	2	2	2	2	3	3	3	6	6																													
		Z(-55/-40°C)	φ D < 12.5	12	8	6	4	3	3	3	4	-	-	-	-	-																													
/Z(+20°C)		φ D ≥ 12.5	10	8	6	4	3	3	3	3	6	6	6	10	-																														
Note: The ratio value with " - " is only available for 400V.																																													
Endurance	Test Time		2,000 Hrs																																										
	Capacitance Change		Within ±25% of initial value for φ D ≤ 6.3 mm; Within ±20% of initial value for φ D ≥ 8 mm																																										
	Tanδ		Less than 300% of specified value for φ D ≤ 6.3 mm; Less than 200% of specified value for φ D ≥ 8 mm																																										
	Leakage Current		Within specified value																																										
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 105°C.																																												
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1).																																												
Ripple Current and Frequency Multipliers	<table><tr><td>Freq. (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Cap. (μF) ≤ 1,000</td><td>0.80</td><td>1.00</td><td>1.25</td><td>1.40</td></tr><tr><td>1,000 < C ≤ 8,200</td><td>0.85</td><td>1.00</td><td>1.15</td><td>1.25</td></tr></table>												Freq. (Hz)	50	120	1k	10k up	Cap. (μF) ≤ 1,000	0.80	1.00	1.25	1.40	1,000 < C ≤ 8,200	0.85	1.00	1.15	1.25																		
	Freq. (Hz)	50	120	1k	10k up																																								
	Cap. (μF) ≤ 1,000	0.80	1.00	1.25	1.40																																								
1,000 < C ≤ 8,200	0.85	1.00	1.15	1.25																																									

Diagram of Dimensions

Fig. 1

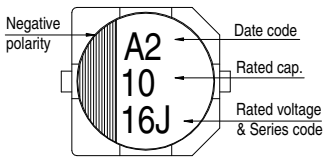
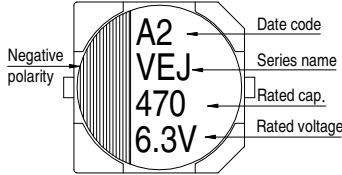
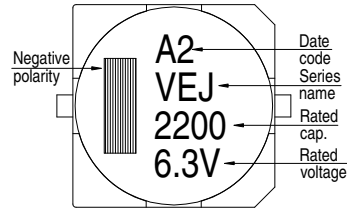


Lead Spacing and Diameter

Unit: mm

ϕD	L	A	B	C	W	P ± 0.2	Fig. No.
4	5.7 $\pm$ 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0	1
5	5.7 $\pm$ 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5	1
6.3	5.7 $\pm$ 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
6.3	7.7 $\pm$ 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	6.5 $\pm$ 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3	1
8	10 $\pm$ 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	7.7 $\pm$ 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
10	10 $\pm$ 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 $\pm$ 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 $\pm$ 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 $\pm$ 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 $\pm$ 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 $\pm$ 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 $\pm$ 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D \leq 6.3 \text{ mm}$

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$


Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (Vdc)	6.3V (0J)	10V (1A)	16V (1C)	25V (1E)	35V (1V)	50V (1H)	63V (1J)	100V (2A)
Cap. (μF) Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
1 010						4×5.7 8	4×5.7 8	
2.2 2R2						4×5.7 12	4×5.7 12	
3.3 3R3						4×5.7 14	5×5.7 17	
4.7 4R7				4×5.7 17	4×5.7 17	5×5.7 20	6.3×5.7 22	
10 100			4×5.7 20	4×5.7 20	5×5.7 27	6.3×5.7 32	6.3×5.7 32	
22 220	4×5.7 22	4×5.7 22	5×5.7 30	5×5.7 30	6.3×5.7 44	6.3×5.7 38	6.3×7.7 58	8×10 100
33 330	5×5.7 34	5×5.7 34	5×5.7 34	6.3×5.7 46	6.3×5.7 46	6.3×7.7 65	8×10 140	10×10 150
47 470	5×5.7 38	5×5.7 38	6.3×5.7 48	6.3×5.7 48	6.3×7.7 80	6.3×7.7 70	8×10 170	12.5×13.5 250
100 101	6.3×5.7 69	6.3×5.7 69	6.3×5.7 69	6.3×7.7 100	8×10 240	8×10 210	10×10 310	12.5×13.5 380
220 221	6.3×7.7 120	6.3×7.7 120	6.3×7.7 120	8×10 270	8×10 270	10×10 330	12.5×13.5 470	16×16.5 450
330 331	8×10 290	8×10 290	8×10 290	8×10 290	10×10 370	12.5×13.5 490	16×16.5 650	18×16.5 590
470 471	8×10 320	8×10 320	10×10 380	10×10 380	12.5×13.5 520	12.5×16 550	16×16.5 700	18×21.5 980
1,000 102	10×10 410	10×10 410	12.5×13.5 500	12.5×16 550	16×16.5 800	18×16.5 990		
2,200 222	12.5×13.5 680	12.5×13.5 680	16×16.5 900	16×16.5 900	18×16.5 1,050			
3,300 332	12.5×16 850	16×16.5 950	16×16.5 950	18×16.5 1,150				
4,700 472	16×16.5 1,000	16×16.5 1,000	18×16.5 1,225	18×21.5 1,300				
6,800 682	18×16.5 1,290	18×16.5 1,290						
8,200 822	18×21.5 1,450	18×21.5 1,450						

Rated Volt. (Vdc)		160V (2C)		200V (2D)		250V (2E)		400V (2G)		450V (2W)	
Cap. (μF)	Contents	ϕ D×L	mA	ϕ D×L	mA	ϕ D×L	mA	ϕ D×L	mA	ϕ D×L	mA
4.7	4R7					12.5×13.5	65	12.5×13.5	45	12.5×13.5	45
10	100			12.5×13.5	80	12.5×13.5	70	12.5×13.5	50	12.5×16	75
22	220			12.5×16	110	12.5×13.5	105	16×16.5	85	16×16.5	85
33	330	12.5×13.5	95	12.5×16	120	16×16.5	180	18×16.5	100	18×16.5	100
47	470	12.5×16	205	16×16.5	220	16×16.5	220	18×21.5	130		
100	101	16×16.5	250	18×16.5	280	18×21.5	290				

Part Numbering System

VEJ Series	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VEJ	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VEU Series

Features

- $4\phi \sim 18\phi$, 105°C, 3,000 ~ 5,000 hours assured
- Long life assured
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																																												
Category Temperature Range	6.3 ~ 100V					160 ~ 400V					450V																																		
	-55℃ ~ +105℃					-40℃ ~ +105℃					-25℃ ~ +105℃																																		
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																												
Leakage Current (at 20℃)	Rated Voltage		6.3 ~ 100V					160 ~ 450V																																					
	Time		after 2 minutes					after 5 minutes																																					
	Leakage Current		I = 0.01CV or 3 (μA), whichever is greater					I = 0.04CV + 100 (μA)																																					
	Where, C = rated capacitance in μF, V = rated DC working voltage in V																																												
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td><td>160</td><td>200</td><td>250</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.13</td><td>0.12</td><td>0.09</td><td>0.08</td><td>0.07</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.20</td></tr></table>															Rated Voltage	6.3	10	16	25	35	50	63	80	100	160	200	250	400	450	Tanδ (max)	0.30	0.24	0.20	0.16	0.13	0.12	0.09	0.08	0.07	0.15	0.15	0.15	0.20	0.20
Rated Voltage	6.3	10	16	25	35	50	63	80	100	160	200	250	400	450																															
Tanδ (max)	0.30	0.24	0.20	0.16	0.13	0.12	0.09	0.08	0.07	0.15	0.15	0.15	0.20	0.20																															
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																												
	Rated Voltage		6.3	10	16	25	35	50	63	80	100	160	200	250	400	450																													
	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	2	3	3	3	6	6																													
Z(-55/-40℃)/Z(+20℃)		10	7	5	3	3	3	3	3	3	6	6	6	10	-																														
Endurance	Test Time		3,000 Hrs for ϕ D ≤ 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm																																										
	Capacitance Change		Within ±30% of initial value																																										
	Tanδ		Less than 300% of specified value																																										
	Leakage Current		Within specified value																																										
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 3,000 ~ 5,000 hours at 105℃.																																													
Shelf Life Test	Test Time		1,000 Hrs																																										
	Capacitance Change		Within ±30% of initial value																																										
	Tanδ		Less than 300% of specified value																																										
	Leakage Current		Within specified value																																										
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.																																													
Ripple Current and Frequency Multipliers	Frequency (Hz)		50	120	1k	10k up																																							
	Cap.(μF)		0.70	1.00	1.30	1.40																																							
	≤ 1,000		0.70	1.00	1.30	1.40																																							
1,000 < C ≤ 1,500		0.85	1.00	1.13	1.15																																								

Diagram of Dimensions

Fig. 1

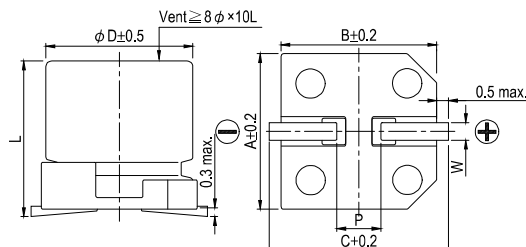
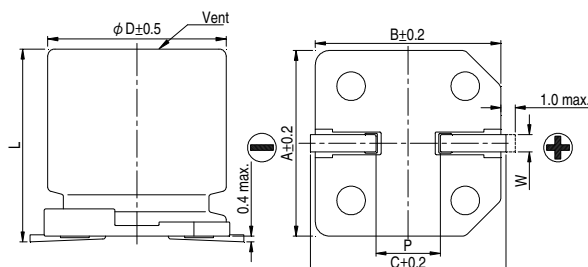


Fig. 2

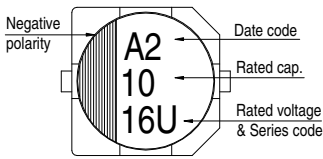
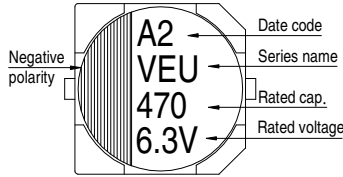
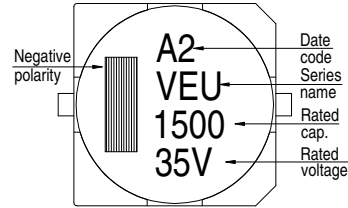


Lead Spacing and Diameter

Unit: mm

ϕD	L	A	B	C	W	P ± 0.2	Fig. No.
4	5.7 $\pm$ 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0	1
5	5.7 $\pm$ 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5	1
6.3	5.7 $\pm$ 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
6.3	7.7 $\pm$ 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	10 $\pm$ 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 $\pm$ 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 $\pm$ 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 $\pm$ 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 $\pm$ 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 $\pm$ 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 $\pm$ 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 $\pm$ 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D \leq 6.3 \text{ mm}$

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$


Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (Voc)	6.3V (0J)	10V (1A)	16V (1C)	25V (1E)	35V (1V)	50V (1H)	63V (1J)	80V (1K)
Cap. (μF) Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
1 010						4×5.7 8		
2.2 2R2						4×5.7 12		
3.3 3R3						4×5.7 17		
4.7 4R7					4×5.7 16	5×5.7 22		
10 100			4×5.7 18	5×5.7 27	5×5.7 27	6.3×5.7 32		
22 220	4×5.7 22	4×5.7 22	5×5.7 30	6.3×5.7 44	6.3×5.7 44	6.3×7.7 58		
33 330	5×5.7 35	5×5.7 35	6.3×5.7 48	6.3×5.7 50	6.3×7.7 57	8×10 130		
47 470	5×5.7 38	6.3×5.7 50	6.3×5.7 50	6.3×7.7 63	8×10 92	8×10 141		
100 101	6.3×5.7 69	6.3×7.7 81	6.3×7.7 81	8×10 116	10×10 151	10×10 160		12.5×13.5 220
150 151							12.5×13.5 240	12.5×16 290
220 221	6.3×7.7 120	8×10 141	8×10 141	10×10 290	10×10 320	12.5×13.5 280	12.5×16 320	16×16.5 410
330 331	8×10 141	10×10 290	10×10 290	10×10 320	12.5×13.5 320	12.5×16 360	16×16.5 450	16×16.5 510
470 471	10×10 320	10×10 320	10×10 320		12.5×16 410	16×16.5 510	16×16.5 540	18×16.5 650
1,000 102	10×10 410				16×16.5 690	18×16.5 780		
1,500 152					18×16.5 900			

Rated Volt. (Voc)	100V (2A)	160V (2C)	200V (2D)	250V (2E)	400V (2G)	450V (2W)
Cap. (μF) Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
3.3 3R3						12.5×13.5 40
4.7 4R7				12.5×13.5 65	12.5×16 50	12.5×16 50
10 100			12.5×13.5 80	12.5×16 105	16×16.5 85	16×16.5 85
22 220			12.5×16 105	16×16.5 180	18×21.5 130	18×21.5 130
33 330		12.5×13.5 95	16×16.5 220	18×16.5 230		
47 470		16×16.5 260	18×16.5 270	18×21.5 280		
68 680	12.5×13.5 180	18×16.5 320	18×21.5 330			
100 101	12.5×16 240	16×21.5 380				
150 151	16×16.5 340					
220 221	16×16.5 410					
330 331	18×16.5 540					

Part Numbering System

VEU Series	470μF	±20%	6.3V	Carrier Tape	10 ϕ × 10L	Pb-free and Coated Case
VEU	471	M	0J	TR	-	1010
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VEZ Series

Features

- 4 ϕ ~ 6.3 ϕ , 105°C, 1,000 hours assured
- Low ESR capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

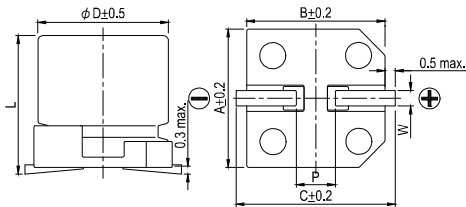


Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.28	0.24	0.20	0.16	0.14	0.12									
Rated Voltage	6.3	10	16	25	35	50																								
Tanδ (max)	0.28	0.24	0.20	0.16	0.14	0.12																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>10</td><td>7</td><td>5</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-55℃)/Z(+20℃)	10	7	5	3	3	3
Rated Voltage		6.3	10	16	25	35	50																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																							
	Z(-55℃)/Z(+20℃)	10	7	5	3	3	3																							
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 1,000 hours at 105℃.							Test Time	1,000 Hrs	Capacitance Change	Within ±25% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs																													
Capacitance Change	Within ±25% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency(Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.64</td><td>0.8</td><td>0.93</td><td>1.0</td></tr></table>							Frequency(Hz)	50, 60	120	1k	10k up	Multiplier	0.64	0.8	0.93	1.0													
Frequency(Hz)	50, 60	120	1k	10k up																										
Multiplier	0.64	0.8	0.93	1.0																										

Diagram of Dimensions

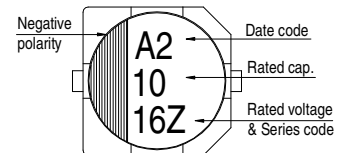


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2
4	5.3 ± 0.2	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.3 ± 0.2	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.3 ± 0.2	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0

Marking



Dimension: φD × L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω/ at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})	6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF) Contents	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA
1.0 010																4×5.3	5.0	30
2.2 2R2																4×5.3	5.0	30
3.3 3R3																4×5.3	5.0	30
4.7 4R7										4×5.3	3.20	65	4×5.3	3.20	65	5×5.3	3.0	50
10 100				4×5.3	3.20	65	4×5.3	3.20	65	5×5.3	1.50	110	5×5.3	1.50	110	6.3×5.3	2.0	70
22 220	4×5.3	3.20	65	5×5.3	1.50	110	5×5.3	1.50	110	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×5.3	2.0	70
33 330	5×5.3	1.50	110	5×5.3	1.50	110	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×7.7	1.0	170
47 470	5×5.3	1.50	110	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×7.7	0.50	255			
100 101	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×5.3	0.85	170	6.3×7.7	0.50	255						
150 151	6.3×7.7	0.50	255	6.3×7.7	0.50	255	6.3×7.7	0.50	255									
220 221	6.3×7.7	0.50	255	6.3×7.7	0.50	255	6.3×7.7	0.50	255									

Part Numbering System

VEZ Series	10μF	±20%	16V	Carrier Tape	4 φ × 5.3L	Pb-free and Coated Case
VEZ	100	M	1C	TR	-	0405
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VEH Series

Features

- $4\phi \sim 10\phi$, 105°C, 2,000 hours assured
- Vertical chip type miniaturized, Low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

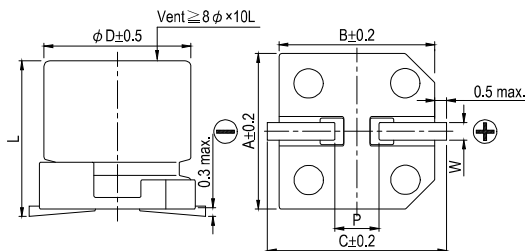


Marking color: Black

Specifications

Items	Performance																																		
Category Temperature Range	-55°C ~ +105°C																																		
Capacitance Tolerance	± 20% (at 120 Hz, 20°C)																																		
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																		
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.16</td><td>0.13</td><td>0.13</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.13														
Rated Voltage	6.3	10	16	25	35	50																													
Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.13																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25°C)/Z(+20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C)/Z(+20°C)</td><td>10</td><td>7</td><td>5</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	Z(-55°C)/Z(+20°C)	10	7	5	3	3	3					
Rated Voltage		6.3	10	16	25	35	50																												
Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2																												
	Z(-55°C)/Z(+20°C)	10	7	5	3	3	3																												
Endurance	<table><tr><td>Test Time</td><td colspan="6">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 105°C.							Test Time	2,000 Hrs						Capacitance Change	Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm						Tanδ	Less than 200% of specified value						Leakage Current	Within specified value					
Test Time	2,000 Hrs																																		
Capacitance Change	Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm																																		
Tanδ	Less than 200% of specified value																																		
Leakage Current	Within specified value																																		
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="6">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.							Test Time	1,000 Hrs						Capacitance Change	Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm						Tanδ	Less than 200% of specified value						Leakage Current	Within specified value					
Test Time	1,000 Hrs																																		
Capacitance Change	Within ±25% of initial value for ϕ D ≤ 6.3 mm; Within ±20% of initial value for ϕ D ≥ 8 mm																																		
Tanδ	Less than 200% of specified value																																		
Leakage Current	Within specified value																																		
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.64</td><td>0.8</td><td>0.93</td><td>1.0</td></tr></table>							Frequency (Hz)	50, 60	120	1k	10k up	Multiplier	0.64	0.8	0.93	1.0																		
Frequency (Hz)	50, 60	120	1k	10k up																															
Multiplier	0.64	0.8	0.93	1.0																															

Diagram of Dimensions

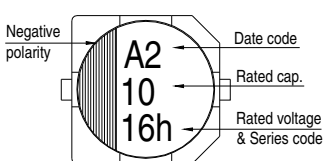
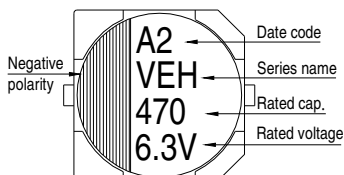


Lead Spacing and Diameter

Unit: mm

φ D	L	A	B	C	W	P ± 0.2
4	5.7 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

 $\phi D \leq 6.3$ mm

 $\phi D = 8 \sim 10$ mm




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc)		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Contents	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA	φ D×L	Imp.	mA
3.3	3R3																4×5.7	5.0	30
4.7	4R7										4×5.7	3.2	65	4×5.7	3.2	65	4×5.7	5.0	30
10	100							4×5.7	3.2	65	5×5.7	1.5	110	5×5.7	1.5	110	5×5.7	3.0	50
22	220				4×5.7	3.2	65	5×5.7	1.5	110	6.3×5.7	0.85	170	6.3×5.7	0.85	170	6.3×5.7	2.0	70
33	330	4×5.7	3.2	65	5×5.7	1.5	110	6.3×5.7	0.85	170	6.3×5.7	0.85	170	6.3×5.7	0.85	170	8×10	0.6	300
47	470	5×5.7	1.5	110	6.3×5.7	0.85	170	6.3×5.7	0.85	170	6.3×5.7	0.85	170	8×10	0.45	450	8×10	0.6	300
100	101	6.3×5.7	0.85	170	6.3×5.7	0.85	170	8×10	0.45	450	8×10	0.45	450	8×10	0.45	450	8×10	0.6	300
150	151	6.3×5.7	0.85	170	6.3×5.7	0.85	170	8×10	0.45	450	8×10	0.45	450	8×10	0.45	450	10×10	0.3	500
220	221	6.3×5.7	0.85	170	8×10	0.45	450	8×10	0.45	450	8×10 10×10	0.45 0.25	450 670	10×10	0.25	670			
330	331	8×10	0.45	450	8×10	0.45	450	8×10	0.45	450	10×10	0.25	670						
470	471	8×10	0.45	450	8×10	0.45	450	10×10	0.25	670									
820	821	10×10	0.25	670	10×10	0.25	670												
1,000	102	10×10	0.25	670															

Part Numbering System

VEH Series	470μF	±20%	6.3V	Carrier Tape	8 $\phi \times 10L$	Pb-free and Coated Case
VEH	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VZH Series

Features

- 4 ϕ ~ 18 ϕ , 105°C, 2,000 ~ 5,000 hours assured
- Large capacitance with ultra low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																																									
Category Temperature Range	-55℃ ~ +105℃																																									
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																									
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																									
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.16</td><td>0.13</td><td>0.10</td><td>0.08</td><td>0.08</td><td>0.07</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.										Rated Voltage	6.3	10	16	25	35	50	63	80	100	Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.10	0.08	0.08	0.07												
Rated Voltage	6.3	10	16	25	35	50	63	80	100																																	
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Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>										Rated Voltage		6.3	10	16	25	35	50	63	80	100	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	2	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3	3	3	3
Rated Voltage		6.3	10	16	25	35	50	63	80	100																																
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	2																																
	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3	3	3	3																																
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs for ϕ D ≤ 6.3mm & 8×6.5L & 10 ϕ ×7.7L; 5,000 Hrs for ϕ D ≥ 8mm</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 ~ 5,000 hours at 105℃.										Test Time	2,000 Hrs for ϕ D ≤ 6.3mm & 8×6.5L & 10 ϕ ×7.7L; 5,000 Hrs for ϕ D ≥ 8mm	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																								
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Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.										Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																								
Test Time	1,000 Hrs																																									
Capacitance Change	Within ±30% of initial value																																									
Tanδ	Less than 300% of specified value																																									
Leakage Current	Within specified value																																									
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency(Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.60</td><td>0.70</td><td>0.85</td><td>1.0</td></tr></table>										Frequency(Hz)	50, 60	120	1k	10k up	Multiplier	0.60	0.70	0.85	1.0																						
Frequency(Hz)	50, 60	120	1k	10k up																																						
Multiplier	0.60	0.70	0.85	1.0																																						

Diagram of Dimensions

Fig. 1

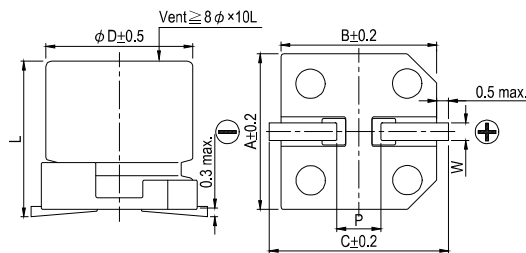
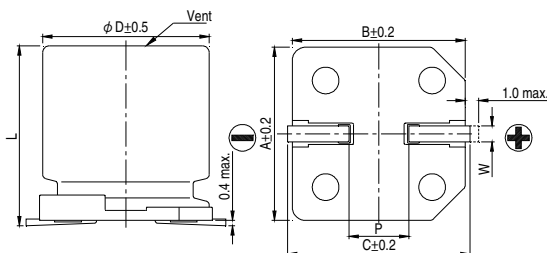


Fig. 2

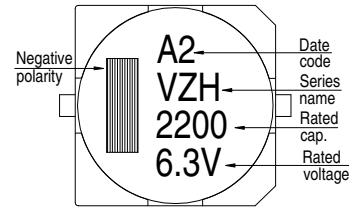
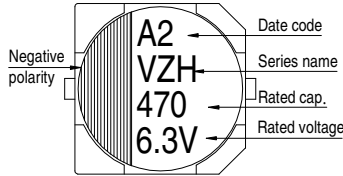
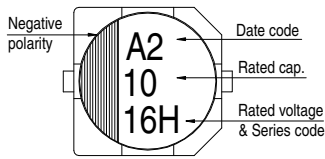


Lead Spacing and Diameter

Unit: mm

φ D	L	A	B	C	W	P ± 0.2	Fig. No.
4	5.7 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0	1
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5	1
6.3	5.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	6.5 ± 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3	1
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D \leq 6.3 \text{ mm}$
 $\phi D = 8 \sim 10 \text{ mm}$
 $\phi D \geq 12.5 \text{ mm}$

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})	Cap. (μF)	Contents	6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
			$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
1	010																	4×5.7	2.9	60
2.2	2R2																	4×5.7	2.9	60
3.3	3R3																	4×5.7	2.9	60
4.7	4R7														4×5.7	1.35	80	5×5.7	1.52	85
10	100								4×5.7	1.35	80	4×5.7	1.35	80	5×5.7	0.80	150	6.3×5.7	0.88	165
22	220		4×5.7	1.35	80	4×5.7	1.35	80	5×5.7	0.80	150	5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.88	165
33	330		4×5.7	1.35	80	5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7	0.68	185
47	470		5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7 8×6.5	0.68 0.68	185 185
68	680											6.3×5.7	0.44	230	8×6.5	0.36	280	8×10	0.34	369
100	101		6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7 8×6.5	0.36 0.36	280 280	8×10	0.17	450	8×10 10×10	0.34 0.18	369 553
150	151		6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7 8×6.5	0.36 0.36	280 280	8×10	0.17	450	8×10 10×7.7	0.17 0.17	450 450	10×10	0.12	650
220	221		6.3×5.7 6.3×7.7	0.44 0.36	230 280	6.3×7.7 8×6.5	0.36 0.36	280 280	6.3×7.7	0.36	280	8×10 10×7.7	0.17 0.17	450 450	8×10 10×10	0.17 0.09	450 670	12.5×13.5	0.12	650
330	331		8×6.5 8×10	0.36 0.17	280 450	8×10 10×7.7	0.17 0.17	450 450	8×10 10×7.7	0.17 0.17	450 450	8×10	0.17	450	10×10 12.5×13.5	0.090 0.070	670 820	12.5×13.5	0.12	650
470	471		8×10 10×7.7	0.17 0.17	450 450	8×10 10×7.7	0.17 0.17	450 450	8×10 10×10	0.17 0.09	450 670	10×10	0.09	670	12.5×16	0.060	950	16×16.5	0.073	1,000
680	681		8×10 10×7.7	0.17 0.17	450 450	10×10	0.09	670	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.073	1,000
1,000	102		8×10	0.17	450	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5 18×16.5	0.073 0.066	1,000 1,500
1,500	152		10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.054	1,260	18×16.5 16×21.5	0.048 0.038	1,500 1,630	18×21.5	0.05	1,620
2,200	222		12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×21.5	0.038	1,750			
3,300	332		12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5 16×21.5	0.054 0.038	1,260 1,630	18×16.5 16×21.5 18×21.5	0.048 0.038 0.038	1,500 1,630 1,750						
4,700	472		16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5 16×21.5	0.048 0.038	1,500 1,630									
6,800	682		18×16.5 16×21.5	0.048 0.038	1,500 1,630	18×16.5 16×21.5	0.048 0.038	1,500 1,630												
8,200	822		18×16.5 16×21.5	0.048 0.038	1,500 1,630	18×21.5	0.038	1,750												



Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		63V (1J)			80V (1K)			100V (2A)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
4.7	4R7	5×5.7	1.90	70						
10	100	6.3×5.7	1.20	130						
22	220	6.3×7.7	0.90	150	8×10	1.3	130	8×10	1.3	130
33	330	8×10	0.50	280	8×10	1.3	130	10×10	0.7	200
47	470	8×10	0.50	280	10×10	0.7	200	10×10	0.7	200
100	101	10×10	0.25	450	10×10	0.7	200	12.5×13.5	0.32	450
150	151	12.5×13.5	0.15	700	12.5×13.5	0.32	450	16×16.5	0.17	650
220	221	12.5×13.5	0.15	700	16×16.5	0.17	650	16×16.5 18×21.5	0.17 0.15	650 950
330	331	16×16.5	0.082	900	16×16.5	0.17	650	18×16.5 16×21.5	0.15 0.15	850 900
470	471	16×16.5	0.082	900	16×21.5	0.15	900	18×21.5	0.15	950
680	681	18×16.5 16×21.5	0.080 0.080	1,150 1,150	18×21.5	0.15	950			
1,000	102	18×21.5	0.06	1,250						

Part Numbering System

VZH Series	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VZH	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

Features

- 5 ϕ ~ 10 ϕ , 105°C, 7,000 hours assured
- Low Impedance temperature range up to +105°C
- For automobile modules and high temperature applications
- RoHS Compliance
- AEC-Q200 qualified

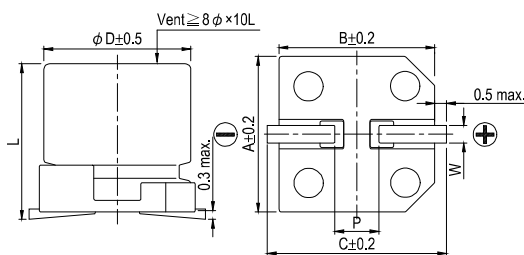


Marking color: Black

Specifications

Items	Performance																																		
Category Temperature Range	-25℃ ~ +105℃																																		
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																		
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																		
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.32</td><td>0.28</td><td>0.26</td><td>0.16</td><td>0.14</td><td>0.14</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.32	0.28	0.26	0.16	0.14	0.14														
Rated Voltage	6.3	10	16	25	35	50																													
Tanδ (max)	0.32	0.28	0.26	0.16	0.14	0.14																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2												
Rated Voltage		6.3	10	16	25	35	50																												
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																												
Endurance	<table><tr><td>Test Time</td><td colspan="6">7,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 7,000 hours at 105℃.							Test Time	7,000 Hrs						Capacitance Change	Within ±30% of initial value						Tanδ	Less than 300% of specified value						Leakage Current	Within specified value					
Test Time	7,000 Hrs																																		
Capacitance Change	Within ±30% of initial value																																		
Tanδ	Less than 300% of specified value																																		
Leakage Current	Within specified value																																		
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="6">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.							Test Time	1,000 Hrs						Capacitance Change	Within ±30% of initial value						Tanδ	Less than 300% of specified value						Leakage Current	Within specified value					
Test Time	1,000 Hrs																																		
Capacitance Change	Within ±30% of initial value																																		
Tanδ	Less than 300% of specified value																																		
Leakage Current	Within specified value																																		
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency(Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.35</td><td>0.50</td><td>0.83</td><td>1.0</td></tr></table>							Frequency(Hz)	50	120	1k	10k up	Multiplier	0.35	0.50	0.83	1.0																		
Frequency(Hz)	50	120	1k	10k up																															
Multiplier	0.35	0.50	0.83	1.0																															

Diagram of Dimensions



Lead Spacing and Diameter

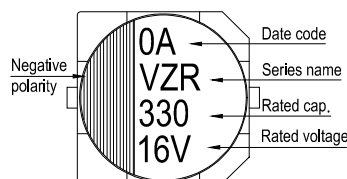
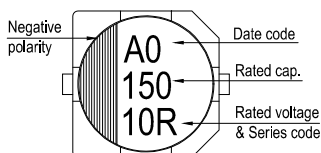
Unit: mm

φD	L	A	B	C	W	P ± 0.2
5	7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	8.7 ± 0.5	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

φD = 5 ~ 6.3 mm

φD = 8 ~ 10 mm





Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{50C})		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
10	100													5×7	2.2	95			
22	220							5×7	2.2	95	5×7	2.2	95	5×7	2.2	95			
33	330				5×7	2.2	95				6.3×7	1.1	140	6.3×8.7	1.0	230			
47	470	5×7	2.2	95				6.3×7	1.1	140	6.3×7	1.1	140	6.3×8.7	1.0	230	8×10	0.53	350
100	101	6.3×7	1.1	140				6.3×7	1.1	140	6.3×8.7	1.0	230				8×10	0.53	350
150	151				6.3×7	1.1	140	6.3×8.7	1.0	230									
220	221	6.3×8.7	1.0	230				6.3×8.7	1.0	230	8×10	0.22	600	8×10	0.22	600	10×10	0.35	670
330	331	6.3×8.7	1.0	230				8×10	0.22	600	8×10	0.22	600	10×10	0.16	850			
470	471	8×10	0.22	600				8×10	0.22	600	10×10	0.16	850						

Part Numbering System

VZR Series	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VZR	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VZL Series

Features

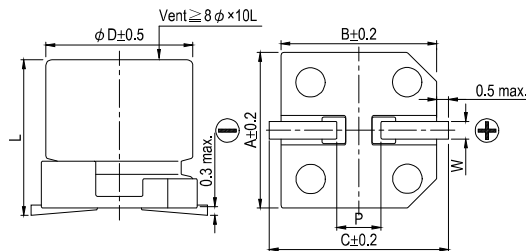
- $4\phi \sim 10\phi$, 105°C, 2,000 hours assured
- Large capacitance with ultra low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

Marking color: Black

Specifications

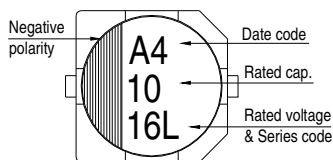
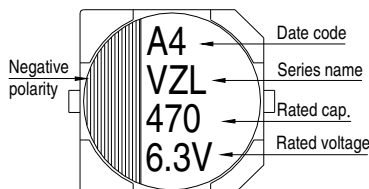
Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.26	0.19	0.16	0.14	0.12	0.10									
Rated Voltage	6.3	10	16	25	35	50																								
Tanδ (max)	0.26	0.19	0.16	0.14	0.12	0.10																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3
Rated Voltage		6.3	10	16	25	35	50																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																							
	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3																							
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.							Test Time	2,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	2,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency(Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.60</td><td>0.70</td><td>0.85</td><td>1.0</td></tr></table>							Frequency(Hz)	50, 60	120	1k	10k up	Multiplier	0.60	0.70	0.85	1.0													
Frequency(Hz)	50, 60	120	1k	10k up																										
Multiplier	0.60	0.70	0.85	1.0																										

Diagram of Dimensions



Lead Spacing and Diameter						Unit: mm
φD	L	A	B	C	W	P ± 0.2
4	5.8 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.5 ± 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

Marking

 $\phi D \leq 6.3 \text{ mm}$

 $\phi D = 8 \sim 10 \text{ mm}$




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
4.7	4R7													4×5.8	1.35	90			
10	100							4×5.8	1.35	90	4×5.8	1.35	90	5×5.8	0.70	160			
22	220	4×5.8	1.35	90	4×5.8	1.35	90	5×5.8	0.70	160	5×5.8	0.70	160	6.3×5.8	0.36	240			
33	330	4×5.8	1.35	90	5×5.8	0.70	160	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240			
47	470	5×5.8	0.70	160	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240			
68	680	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7 8×6.5	0.32 0.26	290 300			
100	101	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7 8×6.5	0.32 0.26	290 300	6.3×7.7 8×10	0.32 0.16	290 600	8×10	0.34	350
150	151	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600			
220	221	6.3×5.8	0.36	240	6.3×7.7 8×6.5	0.32 0.26	290 300	6.3×7.7 8×6.5	0.32 0.26	290 300	8×10	0.16	600	10×10	0.08	850	10×10	0.18	670
330	331	6.3×7.7 8×6.5 8×10	0.32 0.26 0.16	290 300 600	8×10	0.16	600	8×10	0.16	600	8×10	0.16	600	10×10	0.08	850			
470	471	8×10	0.16	600	8×10	0.16	600	8×10 10×10	0.16 0.08	600 850	10×10	0.08	850						
680	681	8×10	0.16	600	10×10	0.08	850	10×10	0.08	850									
1,000	102	8×10	0.16	600	10×10	0.08	850												
1,500	152	10×10	0.08	850															

Part Numbering System

VZL Series	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VZL	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VZS Series

Features

- 5 ϕ ~ 10 ϕ , 105°C, 2,000 hours assured
- Low impedance 30 ~ 50% less than VZH series
- Large capacitance with ultra low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

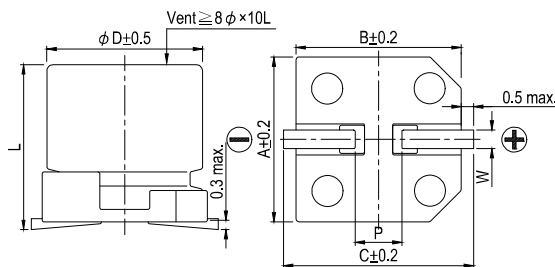
Marking color: Black



Specifications

Items	Performance																							
Category Temperature Range	-55℃ ~ +105℃																							
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																							
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																							
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.16</td><td>0.13</td><td>0.10</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.	Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.10									
Rated Voltage	6.3	10	16	25	35	50																		
Tanδ (max)	0.30	0.26	0.22	0.16	0.13	0.10																		
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3
Rated Voltage		6.3	10	16	25	35	50																	
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																	
	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3																	
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.	Test Time	2,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	2,000 Hrs																							
Capacitance Change	Within ±30% of initial value																							
Tanδ	Less than 300% of specified value																							
Leakage Current	Within specified value																							
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																							
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.60</td><td>0.70</td><td>0.85</td><td>1.0</td></tr></table>	Frequency (Hz)	50, 60	120	1k	10k up	Multiplier	0.60	0.70	0.85	1.0													
Frequency (Hz)	50, 60	120	1k	10k up																				
Multiplier	0.60	0.70	0.85	1.0																				

Diagram of Dimensions

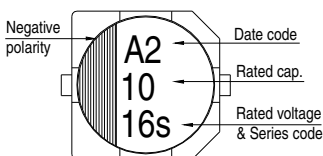
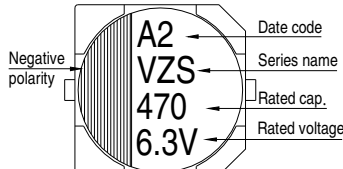


Lead Spacing and Diameter

Unit: mm

ϕ D	L	A	B	C	W	P ± 0.2
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	6.5 ± 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.3	10.3	11	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11	0.7 ~ 1.3	4.7

Marking

 ϕ D ≤ 6.3 mm

 ϕ D = 8 ~ 10 mm




Dimension: $\phi D \times L$ (mm)
Ripple Current: mA/rms at 100k Hz, 105°C
Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
22	220							5×5.8	0.36	240	5×5.8	0.36	240	5×5.8	0.36	240			
33	330				5×5.8	0.36	240				5×5.8 6.3×5.8	0.36 0.26	240 300	6.3×5.8	0.26	300			
47	470	5×5.8	0.36	240				5×5.8 6.3×5.8	0.36 0.26	240 300	6.3×5.8	0.26	300	6.3×5.8	0.26	300			
68	680							6.3×5.8	0.26	300	6.3×5.8	0.26	300	6.3×7.7	0.16	600			
100	101	5×5.8 6.3×5.8	0.36 0.26	240 300	5×5.8	0.36	240	6.3×5.8 6.3×7.7	0.26 0.16	300 600	6.3×5.8 6.3×7.7 8×6.5	0.26 0.16 0.18	300 600 500	8×10	0.08	850	8×10	0.18	670
150	151				6.3×5.8	0.26	300	6.3×7.7	0.16	600	8×10	0.08	850	8×10	0.08	850			
220	221	6.3×5.8	0.26	300	6.3×7.7 8×6.5	0.16 0.18	600 500	6.3×7.7 8×6.5 8×10	0.16 0.18 0.08	600 500 850	8×10	0.08	850				10×10	0.15	900
330	331	6.3×7.7 8×6.5	0.16 0.18	600 500	8×10	0.08	850	8×10	0.08	850				10×10	0.06	1,190			
470	471	8×10	0.08	850	8×10	0.08	850	8×10	0.08	850	10×10	0.06	1,190	10×12.5	0.06	1,190			
680	681	8×10	0.08	850	8×10	0.08	850	10×10	0.06	1,190	10×12.5	0.06	1,190						
1,000	102				10×10	0.06	1,190	10×10	0.06	1,190									
1,500	152	10×10	0.06	1,190	10×12.5	0.06	1,190												
2,200	222	10×12.5	0.06	1,190															

Part Numbering System

VZS Series	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VZS	471	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VZT/VZU Series

FeaturesU

- $4\phi \sim 10\phi$, 105°C, 2,000 ~ 5,000 hours assured
- Capacitance more than VZS series
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

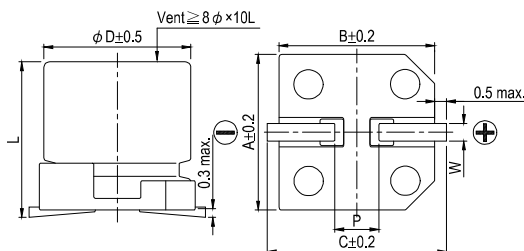


Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.26	0.19	0.16	0.14	0.12	0.10									
Rated Voltage	6.3	10	16	25	35	50																								
Tanδ (max)	0.26	0.19	0.16	0.14	0.12	0.10																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3
Rated Voltage		6.3	10	16	25	35	50																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																							
	Z(-55℃)/Z(+20℃)	8	5	4	3	3	3																							
Endurance of VZT Series	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.							Test Time	2,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	2,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Endurance of VZU Series	<table><tr><td>Test Time</td><td>3,000 Hrs for voltage = 6.3 V 5,000 Hrs for voltage ≥ 10 V</td></tr><tr><td>Capacitance Change</td><td>Within ±35% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 3,000 ~ 5,000 hours at 105℃.							Test Time	3,000 Hrs for voltage = 6.3 V 5,000 Hrs for voltage ≥ 10 V	Capacitance Change	Within ±35% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	3,000 Hrs for voltage = 6.3 V 5,000 Hrs for voltage ≥ 10 V																													
Capacitance Change	Within ±35% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz) Cap. (μF)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 470</td><td>0.50</td><td>0.65</td><td>0.85</td><td>1.00</td></tr><tr><td>470 < C ≤ 2,200</td><td>0.55</td><td>0.70</td><td>0.90</td><td>1.00</td></tr></table>							Frequency (Hz) Cap. (μF)	50, 60	120	1k	10k up	≤ 470	0.50	0.65	0.85	1.00	470 < C ≤ 2,200	0.55	0.70	0.90	1.00								
Frequency (Hz) Cap. (μF)	50, 60	120	1k	10k up																										
≤ 470	0.50	0.65	0.85	1.00																										
470 < C ≤ 2,200	0.55	0.70	0.90	1.00																										

Diagram of Dimensions



Lead Spacing and Diameter

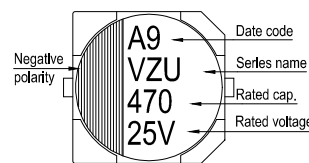
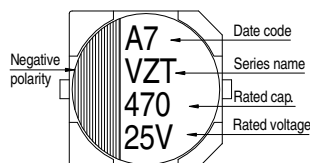
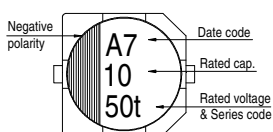
Unit: mm

φD	L	A	B	C	W	P ± 0.2
4	5.8 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.8 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.3	10.3	11	0.7 ~ 1.3	4.7

Marking

φD ≤ 6.3 mm

φD = 8 ~ 10 mm




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Cap. (μF)	Contents	6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
		$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
10	100																4×5.8 5×5.8	2.30 0.88	85 165
22	220										4×5.8	0.85	160	4×5.8	0.85	160	5×5.8	0.88	165
33	330										4×5.8	0.85	160	5×5.8	0.36	240			
47	470							4×5.8	0.85	160	5×5.8	0.36	240	5×5.8	0.36	240	6.3×5.8	0.68	195
68	680				4×5.8	0.85	160	5×5.8	0.36	240	5×5.8	0.36	240	6.3×5.8	0.26	300			
100	101	4×5.8	0.85	160				5×5.8	0.36	240	6.3×5.8	0.26	300	6.3×5.8	0.26	300	6.3×7.7	0.34	350
150	151				5×5.8	0.36	240	6.3×5.8	0.26	300	6.3×7.7	0.16	600	6.3×7.7	0.16	600			
220	221	5×5.8	0.36	240	6.3×5.8	0.26	300	6.3×5.8	0.26	300	6.3×7.7	0.16	600				8×10*	0.18	670
330	331	6.3×5.8	0.26	300	6.3×7.7	0.16	600	6.3×7.7	0.16	600				8×10*	0.08	850	10×10*	0.12	900
470	471	6.3×7.7	0.16	600	6.3×7.7	0.16	600				8×10*	0.08	850						
560	561													10×10*	0.06	1,190			
680	681	6.3×7.7	0.16	600				8×10*	0.08	850									
820	821										10×10*	0.06	1,190						
1,000	102				8×10*	0.08	850	10×10*	0.06	1,190									
1,500	152	8×10*	0.08	850	10×10*	0.06	1,190												
2,200	222	10×10*	0.06	1,190															

Note: For the case sizes with the mark of " * ", the endurance requirements of VZU series are available.

Part Numbering System

VZT Series	1500 μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and Coated Case
VZT	152	M	0J	TR	-	0810
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: 1. If the life time of product was required 5,000 hours, the series name is VZU.

2. For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VUA Series

Features

- 6.3 ϕ ~ 18 ϕ , 125°C, 1,000 ~ 2,000 hours assured
- Chip type high temperature range, for +125°C use
- For automobile modules and other high temperature applications
- RoHS compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +125℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.03CV or 4 (μA) whichever is greater (after 1 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.32</td><td>0.24</td><td>0.21</td><td>0.18</td><td>0.15</td><td>0.15</td></tr></table> When the capacitance exceeds 1,000 μF, 0.02 shall be added every 1,000μF increase.							Rated Voltage	10	16	25	35	50	63	Tanδ (max)	0.32	0.24	0.21	0.18	0.15	0.15									
Rated Voltage	10	16	25	35	50	63																								
Tanδ (max)	0.32	0.24	0.21	0.18	0.15	0.15																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>6</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>12</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td></tr></table>							Rated Voltage		10	16	25	35	50	63	Impedance Ratio	Z(-25℃)/Z(+20℃)	6	5	4	3	3	3	Z(-40℃)/Z(+20℃)	12	8	6	4	4	4
Rated Voltage		10	16	25	35	50	63																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	6	5	4	3	3	3																							
	Z(-40℃)/Z(+20℃)	12	8	6	4	4	4																							
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs for ϕ D ≤ 8 × 6.5 mm 2,000 Hrs for ϕ D ≥ 8 × 10 mm</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 1,000 / 2,000 hours at 125℃.							Test Time	1,000 Hrs for ϕ D ≤ 8 × 6.5 mm 2,000 Hrs for ϕ D ≥ 8 × 10 mm	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs for ϕ D ≤ 8 × 6.5 mm 2,000 Hrs for ϕ D ≥ 8 × 10 mm																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied.							Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap.(μF)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 330</td><td>0.80</td><td>1.0</td><td>1.25</td><td>1.40</td></tr><tr><td>330 < C ≤ 4,700</td><td>0.85</td><td>1.0</td><td>1.20</td><td>1.30</td></tr></table>							Freq.(Hz) Cap.(μF)	50	120	1k	10k up	≤ 330	0.80	1.0	1.25	1.40	330 < C ≤ 4,700	0.85	1.0	1.20	1.30								
Freq.(Hz) Cap.(μF)	50	120	1k	10k up																										
≤ 330	0.80	1.0	1.25	1.40																										
330 < C ≤ 4,700	0.85	1.0	1.20	1.30																										

Diagram of Dimensions

Fig. 1

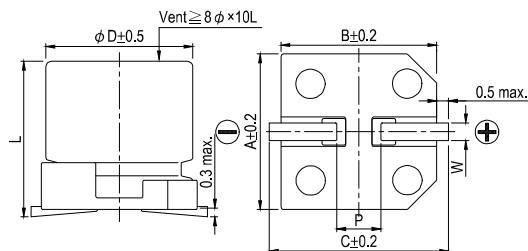
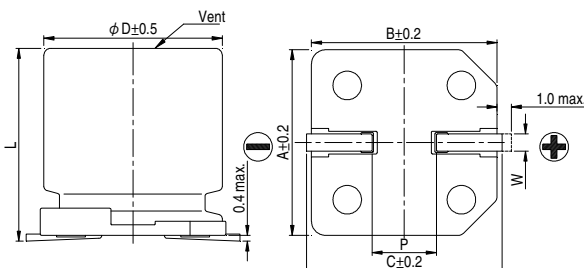


Fig. 2

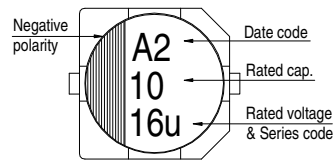
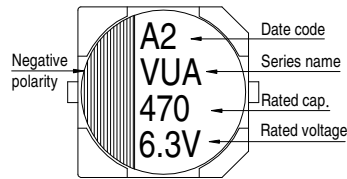
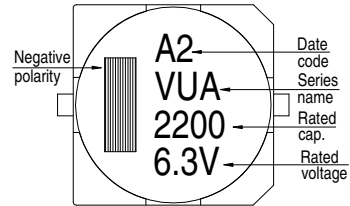


Lead Spacing and Diameter

Unit: mm

ϕD	L	A	B	C	W	P ± 0.2	Fig. No.
6.3	5.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	6.5 ± 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3	1
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D = 6.3 \text{ mm}$

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$


Dimension and Permissible Ripple Current

Dimension: $\phi D \times L \text{ (mm)}$

Ripple Current: mA/rms at 120 Hz, 125°C

Rated Volt. (Voc)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
10	100											8×6.5	60
22	220							6.3×5.7	50	8×6.5	75	8×10	100
33	330			6.3×5.7	50	6.3×5.7	50	6.3×7.7	70	8×10	130	10×10	150
47	470			6.3×7.7	70	6.3×7.7	70	8×6.5	75	8×10	130	10×10	150
68	680	6.3×5.7	50	8×6.5	75	8×6.5	75	8×10	130	10×10	180	10×10	150
100	101	8×6.5	75	8×6.5	75	8×10	130	10×10	180	12.5×13.5	357	12.5×13.5	300
220	221	8×10	130	10×10	180	10×10	180	12.5×13.5	357	12.5×16	400	16×16.5	600
330	331	8×10	130	12.5×13.5	480	12.5×13.5	480	16×16.5	650	16×16.5	650	16×16.5	600
470	471	12.5×13.5	480	12.5×13.5	480	12.5×13.5	480	16×16.5	650	16×16.5	650	18×16.5	800
680	681	12.5×13.5	480	12.5×13.5	480	12.5×16	585	16×16.5	650	18×16.5	855		
1,000	102	12.5×16	585	12.5×16	585	16×16.5	650	18×16.5	855				
1,500	152	12.5×16	585	16×16.5	650	18×16.5	855						
2,200	222	16×16.5	650	18×16.5	855								
3,300	332	18×16.5	855										
4,700	472	18×16.5	855										

Part Numbering System

VUA Series	33μF	±20%	16V	Carrier Tape	6.3 ϕ × 5.7L	Pb-free and Coated Case
VUA	330	M	1C	TR	-	0606
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VUP Series

Features

- 6.3 ϕ ~ 18 ϕ , 125°C, 2,000 ~ 4,000 hours assured
- Low impedance capacitors
- Chip type high temperature range, for +125°C use
- For automobile modules and other high temperature applications
- RoHS compliance and AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																			
Category Temperature Range	-40℃ ~ +125℃																			
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																			
Leakage Current (at 20℃)	I = 0.01CV or 3(μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																			
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.23</td><td>0.18</td><td>0.16</td><td>0.16</td><td>0.12</td><td>0.12</td><td>0.10</td></tr></table> When the capacitance exceeds 1,000 μF, 0.02 shall be added every 1,000μF increase.	Rated Voltage	10	16	25	35	50	63	80	100	Tanδ (max)	0.30	0.23	0.18	0.16	0.16	0.12	0.12	0.10	
Rated Voltage	10	16	25	35	50	63	80	100												
Tanδ (max)	0.30	0.23	0.18	0.16	0.16	0.12	0.12	0.10												
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>Impedance Ratio</td><td>Z(-40℃) / Z(+20℃)</td><td>12</td><td>8</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage	10	16	25	35	50	63	80	100	Impedance Ratio	Z(-40℃) / Z(+20℃)	12	8	6	4	4	3	3	3
Rated Voltage	10	16	25	35	50	63	80	100												
Impedance Ratio	Z(-40℃) / Z(+20℃)	12	8	6	4	4	3	3	3											
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs for ϕD = 6.3 mm 3,000 Hrs for ϕD = 8 ~ 12.5 mm 3,500 Hrs for 16 ~ 18 ϕ × 16.5L 4,000 Hrs for 16 ~ 18 ϕ × 21.5L</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 ~ 4,000 hours at 125℃.	Test Time	2,000 Hrs for ϕD = 6.3 mm 3,000 Hrs for ϕD = 8 ~ 12.5 mm 3,500 Hrs for 16 ~ 18 ϕ × 16.5L 4,000 Hrs for 16 ~ 18 ϕ × 21.5L	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value											
Test Time	2,000 Hrs for ϕD = 6.3 mm 3,000 Hrs for ϕD = 8 ~ 12.5 mm 3,500 Hrs for 16 ~ 18 ϕ × 16.5L 4,000 Hrs for 16 ~ 18 ϕ × 21.5L																			
Capacitance Change	Within ±30% of initial value																			
Tanδ	Less than 300% of specified value																			
Leakage Current	Within specified value																			
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value											
Test Time	1,000 Hrs																			
Capacitance Change	Within ±30% of initial value																			
Tanδ	Less than 300% of specified value																			
Leakage Current	Within specified value																			
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50</td><td>120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.35</td><td>0.50</td><td>0.64</td><td>0.83</td><td>1.0</td></tr></table>	Frequency (Hz)	50	120	300	1k	10k up	Multiplier	0.35	0.50	0.64	0.83	1.0							
Frequency (Hz)	50	120	300	1k	10k up															
Multiplier	0.35	0.50	0.64	0.83	1.0															

Diagram of Dimensions

Fig. 1

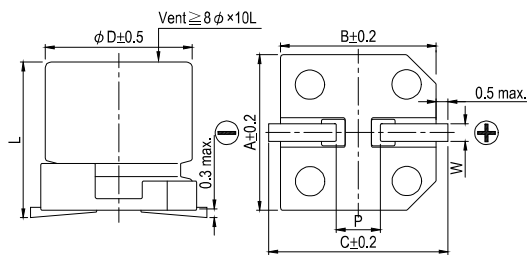
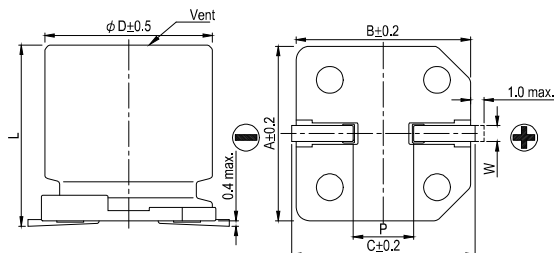


Fig. 2

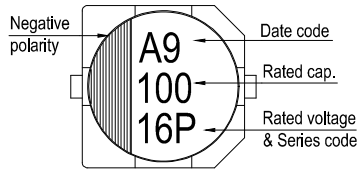
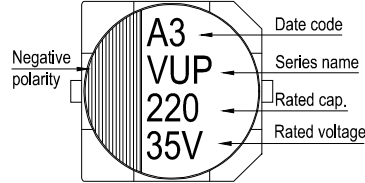
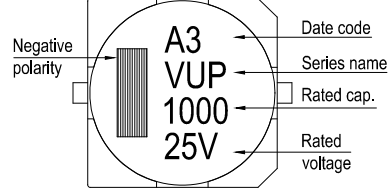


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2	Fig. No.
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D = 6.3 \text{ mm}$

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 100k Hz, 125°C

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)			63V (1J)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
10	100																6.3×7.7	2.0	60
22	22													6.3×7.7	0.5	197	8×10	0.7	100
33	330										6.3×7.7	0.5	197	6.3×7.7	0.5	197	8×10	0.7	100
47	470										6.3×7.7	0.5	197	8×10	0.2	270	10×10	0.5	170
82	820										8×10	0.2	270	8×10	0.2	270	8×10	0.7	100
100	101				6.3×7.7	0.5	197	6.3×7.7	0.5	197	8×10	0.2	270	8×10	0.2	270	10×10	0.5	170
150	151																12.5×13.5	0.2	1,000
180	181																12.5×13.5	0.2	1,000
220	221	8×10	0.2	270	8×10	0.2	270	8×10	0.2	270	10×10	0.15	500	10×10	0.15	500	12.5×13.5	0.2	1,000
330	331	8×10	0.2	270	10×10	0.15	500	10×10	0.15	500									
390	391	10×10	0.15	500													16×16.5	0.13	1,900
470	471	10×10	0.15	500	10×10	0.15	500				12.5×13.5	0.08	1,700	16×16.5	0.08	2,000	18×16.5	0.11	2,000
560	561										12.5×13.5	0.08	1,700	16×16.5	0.08	2,000	16×21.5	0.07	2,500
680	681										12.5×13.5	0.08	1,700	18×16.5	0.078	2,100			
750	751																18×21.5	0.068	2,600
820	821							12.5×13.5	0.08	1,700	16×16.5	0.05	2,400	18×16.5	0.078	2,100			
1,000	102							12.5×13.5	0.08	1,700	16×16.5	0.05	2,400	16×21.5	0.04	2,800			
1,200	122							16×16.5	0.05	2,400	18×16.5	0.045	2,600	18×21.5	0.038	2,900			
1,400	142										18×16.5	0.045	2,600						
1,600	162							16×16.5	0.05	2,400	16×21.5	0.038	3,000						
2,200	222							18×16.5	0.045	2,600	18×21.5	0.032	3,250						
2,700	272							16×21.5	0.038	3,000									
3,300	332							18×21.5	0.032	3,250									

Rated Volt. (V _{DC})		80V (1K)			100V (2A)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
10	100	8×10	0.75	70	8×10	0.75	70
22	22	8×10	0.75	70	8×10	0.75	70
33	330	8×10	0.75	70	10×10	0.55	115
47	470	10×10	0.55	115			
82	820				12.5×13.5	0.28	700
150	151	12.5×13.5	0.28	700	16×16.5	0.19	1,000
180	181				18×16.5	0.17	1,100
220	221				16×21.5	0.12	1,600
270	271	16×16.5	0.19	1,000			
300	301				18×21.5	0.11	1,700
330	331	18×16.5	0.17	1,100			
390	391	16×21.5	0.12	1,600			
520	521	18×21.5	0.11	1,700			

Part Numbering System

VUP series 100μF ±20% 16V Carrier Tape 6.3 ϕ × 7.7L Pb-free and Coated Case

VUP **101** **M** **1C** **TR** - **0607**

Series name Capacitance Capacitance Tolerance Rated Voltage Package Type Terminal Type Case Size Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VUX Series

Features

- 8 ϕ ~ 18 ϕ , 135°C, 2,000 hours assured
- Chip type, high temperature range, for +135°C use
- For automobile modules and high temperature applications
- RoHS Compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +135℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.23</td><td>0.18</td><td>0.16</td><td>0.16</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.						Rated Voltage	10	16	25	35	50	Tanδ (max)	0.30	0.23	0.18	0.16	0.16												
Rated Voltage	10	16	25	35	50																									
Tanδ (max)	0.30	0.23	0.18	0.16	0.16																									
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Impedance Ratio</td><td>Z(-40℃)/Z(+20℃)</td><td>12</td><td>8</td><td>6</td><td>4</td><td>4</td></tr></table>						Rated Voltage		10	16	25	35	50	Impedance Ratio	Z(-40℃)/Z(+20℃)	12	8	6	4	4										
Rated Voltage		10	16	25	35	50																								
Impedance Ratio	Z(-40℃)/Z(+20℃)	12	8	6	4	4																								
Endurance	<table><tr><td>Test Time</td><td colspan="5">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 135℃.						Test Time	2,000 Hrs					Capacitance Change	Within ±30% of initial value					Tanδ	Less than 300% of specified value					Leakage Current	Within specified value				
Test Time	2,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 135℃ without voltage applied.						Test Time	1,000 Hrs					Capacitance Change	Within ±30% of initial value					Tanδ	Less than 300% of specified value					Leakage Current	Within specified value				
Test Time	1,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency(Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.35</td><td>0.50</td><td>0.83</td><td>1.0</td></tr></table>						Frequency(Hz)	50	120	1k	10k up	Multiplier	0.35	0.50	0.83	1.0														
Frequency(Hz)	50	120	1k	10k up																										
Multiplier	0.35	0.50	0.83	1.0																										

Diagram of Dimensions

Fig. 1

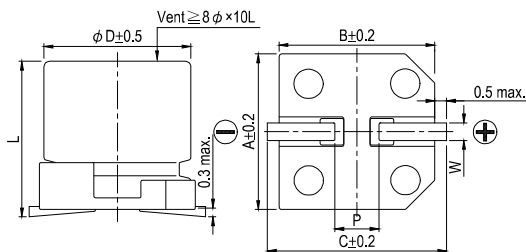
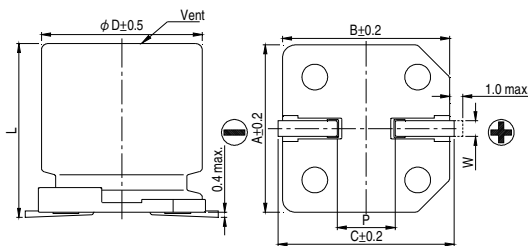


Fig. 2

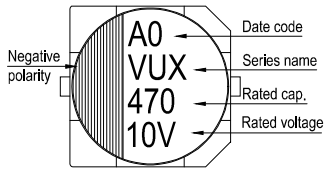
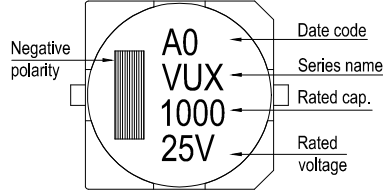


Lead Spacing and Diameter

Unit: mm

ϕ D	L	A	B	C	W	P ± 0.2	Fig. No.
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 100k Hz, 135°C

Impedance: $\Omega/$ at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc)		10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
47	470										8×10	0.20	270	8×10	0.30	270
68	680										8×10	0.20	270			
100	101				8×10	0.20	270	8×10	0.20	270	8×10	0.20	270	10×10	0.25	500
220	221	8×10	0.20	270	8×10	0.20	270	10×10	0.15	500	10×10	0.15	500			
330	331	8×10 10×10	0.20 0.15	270 500	10×10	0.15	500	10×10	0.15	500						
470	471	10×10	0.15	500	10×10	0.15	500				12.5×13.5	0.08	750	16×16.5	0.075	1,000
560	561										12.5×13.5	0.08	750	16×16.5	0.075	1,000
680	681										16×16.5	0.06	1,200	18×16.5	0.075	1,200
820	821							12.5×13.5	0.08	750	16×16.5	0.06	1,200	18×16.5	0.075	1,200
1,000	102							12.5×13.5	0.08	750	16×16.5	0.06	1,200	16×21.5	0.06	1,600
1,200	122							16×16.5	0.06	1,200	18×16.5	0.05	1,400	18×21.5	0.04	1,900
1,500	152							16×16.5	0.06	1,200	16×21.5 18×16.5	0.04 0.05	1,900 1,400			
1,800	182							16×16.5	0.06	1,200	18×21.5	0.035	2,200			
2,200	222							18×16.5	0.05	1,400	18×21.5	0.035	2,200			
2,700	272							16×21.5	0.04	1,900						
3,300	332							18×21.5	0.035	2,200						

Part Numbering System

VUX Series	470μF	±20%	10V	Carrier Tape	10 $\phi \times 10L$	Pb-free and Coated Case
VUX	471	M	1A	TR	-	1010
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VUK Series

Features

- 8 ϕ ~ 18 ϕ , 125°C, 3,000 ~ 5,000 hours assured
- Chip type high temperature range, for +125°C use
- For automobile modules and other high temperature applications
- RoHS compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +125℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.03CV or 4 (μA) whichever is greater (after 1 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.							Rated Voltage	10	16	25	35	50	63	Tanδ (max)	0.22	0.18	0.16	0.14	0.12	0.12									
Rated Voltage	10	16	25	35	50	63																								
Tanδ (max)	0.22	0.18	0.16	0.14	0.12	0.12																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>6</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>12</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td></tr></table>							Rated Voltage		10	16	25	35	50	63	Impedance Ratio	Z(-25℃)/Z(+20℃)	6	5	4	3	3	3	Z(-40℃)/Z(+20℃)	12	8	6	4	4	4
Rated Voltage		10	16	25	35	50	63																							
Impedance Ratio	Z(-25℃)/Z(+20℃)	6	5	4	3	3	3																							
	Z(-40℃)/Z(+20℃)	12	8	6	4	4	4																							
Endurance	<table><tr><td>Test Time</td><td>3,000 Hrs for ϕ D ≤ 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 3,000 / 5,000 hours at 125℃.							Test Time	3,000 Hrs for ϕ D ≤ 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	3,000 Hrs for ϕ D ≤ 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm																													
Capacitance Change	Within ±30% of initial value																													
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Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied.							Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs																													
Capacitance Change	Within ±30% of initial value																													
Tanδ	Less than 300% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap.(μF)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 330</td><td>0.80</td><td>1.0</td><td>1.25</td><td>1.40</td></tr><tr><td>330 < C ≤ 3,300</td><td>0.85</td><td>1.0</td><td>1.20</td><td>1.30</td></tr></table>							Freq.(Hz) Cap.(μF)	50	120	1k	10k up	≤ 330	0.80	1.0	1.25	1.40	330 < C ≤ 3,300	0.85	1.0	1.20	1.30								
Freq.(Hz) Cap.(μF)	50	120	1k	10k up																										
≤ 330	0.80	1.0	1.25	1.40																										
330 < C ≤ 3,300	0.85	1.0	1.20	1.30																										

Diagram of Dimensions

Fig. 1

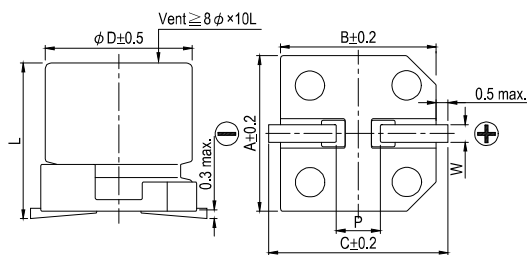
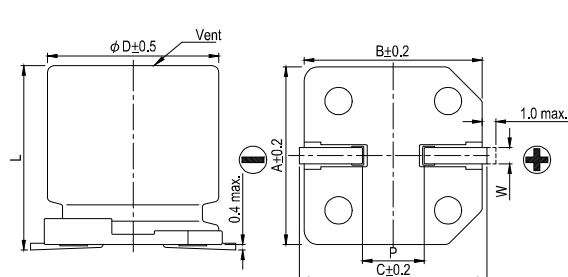


Fig. 2

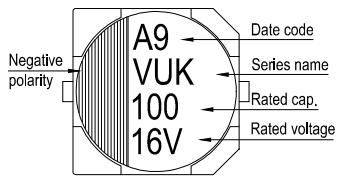
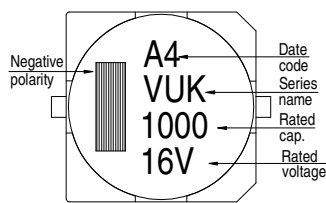


Lead Spacing and Diameter

Unit: mm

ϕD	L	A	B	C	W	P ± 0.2	Fig. No.
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D = 8 \sim 10 \text{ mm}$

 $\phi D \geq 12.5 \text{ mm}$


Dimension and Permissible Ripple Current

Dimension: $\phi D \times L (\text{mm})$

Ripple Current: mA/rms at 120 Hz, 125°C

Rated Volt. (V _{DC})		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
100	101			8×10	85	8×10	85	10×10	110	12.5×13.5	170	12.5×13.5	150
220	221	8×10	85	10×10	150	10×10	150	12.5×13.5	200	16×16.5	250	16×16.5	230
330	331	10×10	150	12.5×13.5	230	12.5×13.5	230	16×16.5	280	18×16.5	340	18×16.5	320
470	471	12.5×13.5	230	12.5×13.5	250	16×16.5	310	18×16.5	380	18×21.5	430	18×21.5	410
680	681	12.5×13.5	250	12.5×13.5	280	16×16.5	350	18×16.5	450				
1,000	102	12.5×16	350	16×16.5	440	18×21.5	540						
1,500	152	12.5×16	350	16×16.5	460								
2,200	222	18×16.5	620	18×21.5	710								
3,300	332	18×21.5	770										

Part Numbering System

VUK Series	330μF	±20%	16V	Carrier Tape	12.5 ϕ × 13.5L	Pb-free and Coated Case
VUK	331	M	1C	TR	-	1313
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VUJ Series

Features

- $8\phi \sim 18\phi$, 150°C, 1,000 hours assured
- Chip type high temperature range, for +150°C use
- For automobile modules and other high temperature applications
- RoHS compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																						
Category Temperature Range	-55℃ ~ +150℃																						
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																						
Leakage Current (at 20℃)	I = 0.03CV or 4 (μA) whichever is greater (after 1 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																						
Tanδ (at 120 Hz, 20℃)	<table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Tanδ (max)</td><td>D ϕ ≤ 10</td><td>0.26</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.14</td></tr><tr><td>D ϕ ≥ 12.5</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.	Rated Voltage		10	16	25	35	50	Tanδ (max)	D ϕ ≤ 10	0.26	0.20	0.16	0.14	0.14	D ϕ ≥ 12.5	0.22	0.18	0.16	0.14	0.12		
Rated Voltage		10	16	25	35	50																	
Tanδ (max)	D ϕ ≤ 10	0.26	0.20	0.16	0.14	0.14																	
	D ϕ ≥ 12.5	0.22	0.18	0.16	0.14	0.12																	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-40℃) / Z(+20℃)</td><td>D ϕ ≤ 10</td><td>10</td><td>8</td><td>6</td><td>4</td><td>4</td></tr><tr><td></td><td>D ϕ ≥ 12.5</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td></tr></table>	Rated Voltage		10	16	25	35	50	Impedance Ratio	Z(-40℃) / Z(+20℃)	D ϕ ≤ 10	10	8	6	4	4		D ϕ ≥ 12.5	8	6	4	4	4
Rated Voltage		10	16	25	35	50																	
Impedance Ratio	Z(-40℃) / Z(+20℃)	D ϕ ≤ 10	10	8	6	4	4																
		D ϕ ≥ 12.5	8	6	4	4	4																
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 1,000 hours at 150℃.	Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value														
Test Time	1,000 Hrs																						
Capacitance Change	Within ±30% of initial value																						
Tanδ	Less than 300% of specified value																						
Leakage Current	Within specified value																						
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 150℃ without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value														
Test Time	1,000 Hrs																						
Capacitance Change	Within ±30% of initial value																						
Tanδ	Less than 300% of specified value																						
Leakage Current	Within specified value																						
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.67</td><td>0.79</td><td>0.91</td><td>1.00</td></tr></table>	Frequency (Hz)	120	300	1k	10k up	Multiplier	0.67	0.79	0.91	1.00												
Frequency (Hz)	120	300	1k	10k up																			
Multiplier	0.67	0.79	0.91	1.00																			

Diagram of Dimensions

Fig. 1

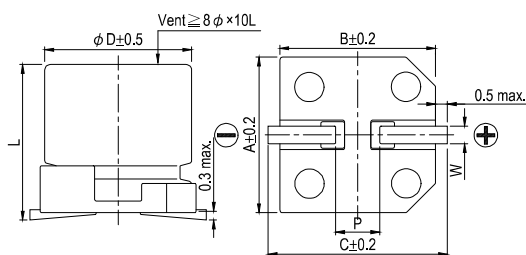
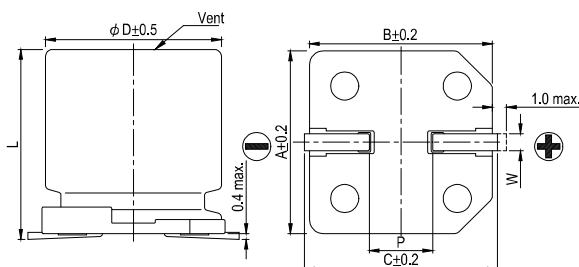


Fig. 2

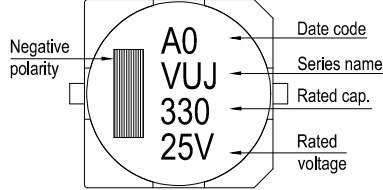
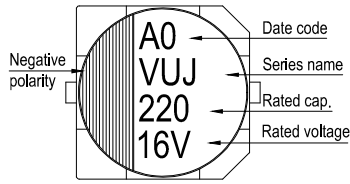


Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2	Fig. No.
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking

 $\phi D = 8 \sim 10 \text{ mm}$
 $\phi D \geq 12.5 \text{ mm}$


Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 100k Hz, 150°C

Rated Volt. (V _{DC})		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
33	330									8×10	70
47	470							8×10	80	10×10	100
100	101			8×10	110	8×10	110	10×10	120	12.5×13.5	420
220	221	8×10	110	10×10	150	10×10	150	12.5×13.5	550	16×16.5	550
330	331	10×10	150			12.5×13.5	650	12.5×13.5	650	16×21.5	650
470	471			12.5×13.5	750	12.5×13.5	700	16×16.5	750	16×21.5	850
680	681	12.5×13.5	800	12.5×13.5	800	16×16.5	800	16×21.5	950	18×21.5	1,100
1,000	102	12.5×13.5	900	16×16.5	850	16×21.5	1,000	18×21.5	1,150		
2,200	222	18×21.5	1,350	18×21.5	1,350						
3,300	332	18×21.5	1,400								

Part Numbering System

VUJ series	220μF	±20%	10V	Carrier Tape		8Φ×10L	Pb-free and Coated Case
VUJ	221	M	1A	TR	-	0810	
Series name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VGB Series

Features

- $4\phi \sim 6.3\phi$, 105°C, 2,000 hours assured
- Bi-polarized capacitors for 6 mm high capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 qualified

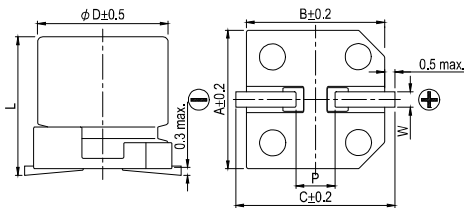


Marking color: Black

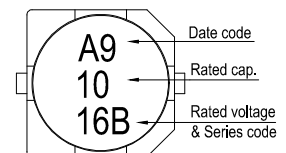
Specifications

Items	Performance																																		
Category Temperature Range	-55℃ ~ +105℃																																		
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																		
Leakage Current (at 20℃)	I = 0.05CV or 10 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																		
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.24</td><td>0.20</td><td>0.17</td><td>0.17</td><td>0.15</td><td>0.15</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max)	0.24	0.20	0.17	0.17	0.15	0.15														
Rated Voltage	6.3	10	16	25	35	50																													
Tanδ (max)	0.24	0.20	0.17	0.17	0.15	0.15																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>8</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	Z(-40℃)/Z(+20℃)	8	6	4	4	3	3					
Rated Voltage		6.3	10	16	25	35	50																												
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2																												
	Z(-40℃)/Z(+20℃)	8	6	4	4	3	3																												
Endurance (with the polarity inverted every 250 hours)	<table><tr><td>Test Time</td><td colspan="6">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.							Test Time	2,000 Hrs						Capacitance Change	Within ±30% of initial value						Tanδ	Less than 300% of specified value						Leakage Current	Within specified value					
Test Time	2,000 Hrs																																		
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Shelf Life Test	<table><tr><td>Test Time</td><td colspan="6">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.							Test Time	1,000 Hrs						Capacitance Change	Within ±30% of initial value						Tanδ	Less than 300% of specified value						Leakage Current	Within specified value					
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Capacitance Change	Within ±30% of initial value																																		
Tanδ	Less than 300% of specified value																																		
Leakage Current	Within specified value																																		
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.36</td><td>1.5</td></tr></table>							Frequency (Hz)	50	120	1k	10k up	Multiplier	0.7	1.0	1.36	1.5																		
Frequency (Hz)	50	120	1k	10k up																															
Multiplier	0.7	1.0	1.36	1.5																															

Diagram of dimensions



Marking



Lead Spacing and Diameter

Unit: mm

φD	L	A	B	C	W	P ± 0.2
4	5.7 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	5.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0

Dimension: φD × L(mm)

Dimension and Permissible Ripple Current

Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (V _{DC})		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
Cap. (μF)	Contents	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010											4×5.7	8.4
2.2	2R2									4×5.7	8.4	5×5.7	13
3.3	3R3							5×5.7	12	5×5.7	16	5×5.7	17
4.7	4R7					4×5.7	12	5×5.7	16	5×5.7	18	6.3×5.7	20
10	100			4×5.7	17	5×5.7	23	6.3×5.7	27	6.3×5.7	29		
22	220	5×5.7	28	6.3×5.7	33	6.3×5.7	37						
33	330	6.3×5.7	37	6.3×5.7	41	6.3×5.7	49						
47	470	6.3×5.7	45										

Part Numbering System

VGB Series	10μF	±20%	16V	Carrier Tape	5φ × 5.7L	Pb-free and Coated Case
VGB	100	M	1C	TR	-	0506
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size
						Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

VGN Series

Features

- 8 ϕ ~ 18 ϕ , 105°C, 2,000 hours assured
- Bi-polarized series for operations wide temperature range
- Designed for surface mounting on high density PC board
- RoHS Compliance
- AEC-Q200 qualified



Marking color: Black

Specifications

Items	Performance																													
Category Temperature Range	-55℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.03CV or 4 (μA) whichever is greater (after 1 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.	Rated Voltage	6.3	10	16	25	35	50	63	100	Tanδ (max)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.09											
Rated Voltage	6.3	10	16	25	35	50	63	100																						
Tanδ (max)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.09																						
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage		6.3	10	16	25	35	50	63	100	Impedance Ratio	Z(-25℃)/Z(+20℃)	5	4	3	2	2	2	2	2	Z(-40℃)/Z(+20℃)	10	8	6	4	3	3	3	3
Rated Voltage		6.3	10	16	25	35	50	63	100																					
Impedance Ratio	Z(-25℃)/Z(+20℃)	5	4	3	2	2	2	2	2																					
	Z(-40℃)/Z(+20℃)	10	8	6	4	3	3	3	3																					
Endurance (with the polarity inverted every 250 hours)	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.	Test Time	2,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
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Test Time	1,000 Hrs																													
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Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Cap. (μ F)</td><td></td><td></td><td></td><td></td></tr><tr><td>22 ~ 47</td><td>0.75</td><td>1.00</td><td>1.57</td><td>2.00</td></tr><tr><td>100 ~ 470</td><td>0.80</td><td>1.00</td><td>1.34</td><td>1.50</td></tr><tr><td>1,000 ~ 3,300</td><td>0.85</td><td>1.00</td><td>1.13</td><td>1.15</td></tr></table>	Frequency (Hz)	50	120	1k	10k up	Cap. (μ F)					22 ~ 47	0.75	1.00	1.57	2.00	100 ~ 470	0.80	1.00	1.34	1.50	1,000 ~ 3,300	0.85	1.00	1.13	1.15				
Frequency (Hz)	50	120	1k	10k up																										
Cap. (μ F)																														
22 ~ 47	0.75	1.00	1.57	2.00																										
100 ~ 470	0.80	1.00	1.34	1.50																										
1,000 ~ 3,300	0.85	1.00	1.13	1.15																										

Diagram of Dimensions

Fig. 1

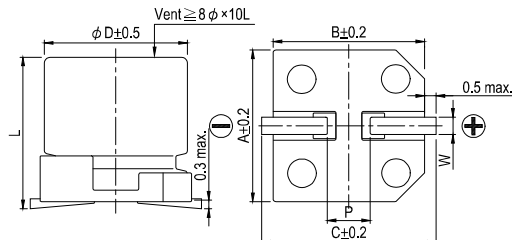
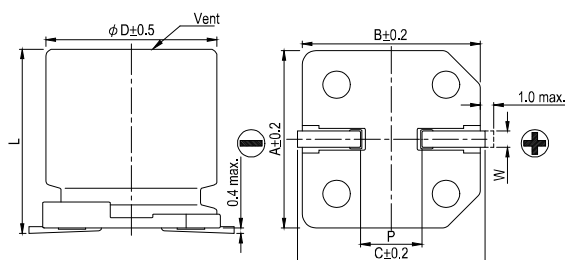


Fig. 2

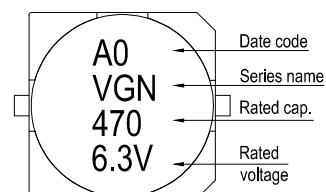


Lead Spacing and Diameter

Unit: mm

ϕ D	L	A	B	C	W	P ± 0.2	Fig. No.
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	10 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
12.5	13.5 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
12.5	16 ± 0.5	13.0	13.0	13.7	1.1 ~ 1.4	4.4	2
16	16.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
16	21.5 ± 0.5	17.0	17.0	18.0	1.1 ~ 1.4	6.4	2
18	16.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2
18	21.5 ± 0.5	19.0	19.0	20.0	1.1 ~ 1.4	6.4	2

Marking




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
22	220											8×10	40			12.5×13.5	100
33	330							8×10	50	8×10	50	10×10	60			12.5×16	150
47	470							8×10	60	10×10	70	12.5×13.5	130	12.5×13.5	140	16×16.5	180
100	101			8×10	100	8×10	100	10×10	110	12.5×13.5	180	12.5×16	230	16×16.5	270	18×21.5	310
220	221	8×10	120	10×10	150	10×10	150	12.5×13.5	270	16×16.5	330	18×16.5 16×21.5	400 400	18×21.5	440		
330	331	10×10	170	10×10	170	12.5×13.5	310	16×16.5	370	18×16.5 16×21.5	450 450	18×21.5	540	18×21.5	590		
470	471	12.5×13.5	270	12.5×13.5	340	16×16.5	420	16×16.5	490	18×21.5	590	18×21.5	640				
1,000	102	12.5×16	500	16×16.5	600	18×16.5 16×21.5	670 670	18×21.5	780								
2,200	222	18×16.5 16×21.5	740 740	18×21.5	830												
3,300	332	18×21.5	920														

Part Numbering System

VGN Series	470μF	±20%	6.3V	Carrier Tape		12.5 ϕ × 13.5L	Pb-free and Coated Case
VGN	471	M	0J	TR	-	1313	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Lead Wire and Case Type

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.

Part Numbering System - Radial Type

Product Code Guide

RGA series	10 μ F	$\pm 20\%$	50V	Lead Forming Tape	Gas Type	5 ϕ ×11L	Pb-free Wire + PET Sleeve	
RGA	100	M	1H	TA	-	0511		
□□□	□□□	□	□□	□□	□	□□□□	□	⑨
①	②	③	④	⑤	⑥	⑦	⑧	
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank.

② **Capacitance:** Capacitance in μ F is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. "R" represents the decimal point for capacitance under 10 μ F.

Example:

Capacitance	0.47	1	4.7	10	47	100	470	1,000	4,700	10,000
Part number	R47	010	4R7	100	470	101	471	102	472	103

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
-----------------	-----------------	-----------------

④ **Rated voltage:** Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	4	6.3	10	16	20	25	35	50	63	100
Code	0G	0J	1A	1C	1D	1E	1V	1H	1J	2A

Rated Voltage (V)	160	200	250	315	350	400	420	450
Code	2C	2D	2E	2F	2V	2G	2P	2W

⑤ **Lead configuration and package (Please refer to page 6 ~ 7):**

BK = Bulk Package	TA = Formed Lead Taping
FC = Formed & Cut Lead	SA = Straight Lead Taping
CC = Cut Lead	SD = Bent Cathode Lead
SF = Snap-in & Formed Cut Lead	BC = Bent & Cut Lead (Leads in Right Direction)
SC = Snap-in & Cut Lead	BU = Bent & Cut Lead (Leads in Left Direction)

⑥ **Rubber type:**

- = Gas escape type	F = Flat rubber bung
---------------------	----------------------

Note: For case sizes of 3 ϕ ×5L, 12.5 ϕ ×16L, 16 ϕ ×16L, 16 ϕ ×20L, 18 ϕ ×16L, 18 ϕ ×20L, 18 ϕ ×25L which used flat rubber bung is the standard design, use a hyphen, "-".

⑦ **Case size:** The first two digits indicate case diameter and the last two digits indicate case length in mm.

ϕ D×L	3×5	4×5	4×7	5×5	5×7	5×11	6.3×5	6.3×7	6.3×11	6.3×15	8×5	8×7	8×9	8×11.5
Code	0305	0405	0407	0505	0507	0511	0605	0607	0611	0615	0805	0807	0809	0811
ϕ D×L	8×15	8×20	10×9	10×10	10×12.5	10×16	10×20	10×25	10×30	10×35	10×40	10×45	10×50	12.5×16
Code	0815	0820	1009	1010*	1012	1016	1020	1025	1030	1035	1040	1045	1050	1316
ϕ D×L	12.5×20	12.5×25	12.5×30	12.5×35	12.5×40	12.5×45	12.5×50	16×16	16×20	16×25	16×31.5	16×35.5	16×40	16×45
Code	1320	1325	1330	1335	1340	1345	1350	1616	1620	1625	1632	1636	1640	1645
ϕ D×L	16×50	18×16	18×20	18×25	18×31.5	18×35.5	18×40	18×45	18×50	22×40	22×45	25×40	25×45	
Code	1650	1816	1820	1825	1832	1836	1840	1845	1850	2240	2245	2540	2545	

Note: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ **Lead wire and sleeve type:**

None = Pb-free wire + PET sleeve (Standard design)	G = Pb-free wire + Black PET sleeve (for RGA, SG series only)
B = Sn-Bi wire + PET sleeve	K / L = Automotive control code

* When a supplement code following a blank digit code of lead wire and sleeve type (standard design), use a hyphen, "-", to fill the blank digit. When the automotive control code is required, please contact with us for further discussion.

⑨ **Supplement code (Optional):** For special control purposes

RGA Series

Features

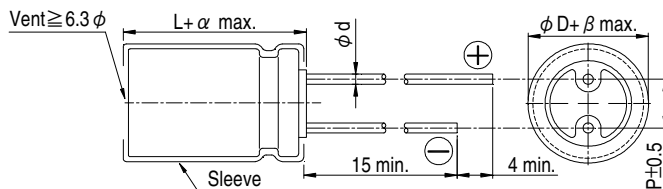
- 105°C, 2,000 hours assured
- 105°C standard series for general purposes
- RoHS compliance
- If there is any requirement on ESR, it's suggested to use low ESR series instead of RGA. Please consult us for any inquiry.



Specifications

Items	Performance																																													
Category Temperature Range	6.3~400V								450V																																					
	-40°C ~ +105°C								-25°C ~ +105°C																																					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																													
Leakage Current (at 20°C)	Rated voltage		≤ 100V								> 100V																																			
	Time		after 2 minutes								after 5 minutes																																			
	Leakage Current		I = 0.01CV or 3 (μA) whichever is greater								CV ≤ 1,000 I = 0.03CV + 15(μA)				CV > 1,000 I = 0.02CV + 25(μA)																															
			Where, C = rated capacitance in μF, V = rated DC working voltage in V																																											
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.23</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td><td>0.12</td><td>0.14</td><td>0.17</td><td>0.20</td><td>0.25</td><td>0.25</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.																Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	Tanδ (max)	0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.14	0.17	0.20	0.25	0.25
Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450																																
Tanδ (max)	0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.14	0.17	0.20	0.25	0.25																																
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																													
	Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	350	400	450																														
	Impedance Ratio	Z(-25°C)	φ D < 16	4	3	3	2	2	2	2	2	3	6	8	12	14	16																													
		/Z(+20°C)	φ D ≥ 16	6	4	4	3	3	3	3	3																																			
Endurance	Test Time		2,000 Hrs																																											
	Capacitance Change		Within ±20% of initial value																																											
	Tanδ		Less than 200% of specified value																																											
	Leakage Current		Within specified value																																											
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 105°C.																																														
Shelf Life Test	Test Time		1,000 Hrs																																											
	Capacitance Change		Within ±20% of initial value																																											
	Tanδ		Less than 200% of specified value																																											
	Leakage Current		Within specified value																																											
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1).																																														
Ripple Current and Frequency Multipliers	Freq. (Hz)		60 (50)	120	500	1k	10k up																																							
	Cap. (μF)		≤ 100	0.70	1.00	1.30	1.40	1.50																																						
	100 < C ≤ 1,000		0.75	1.00	1.20	1.30	1.35																																							
	1,000 <		0.80	1.00	1.10	1.12	1.15																																							

Diagram of Dimensions

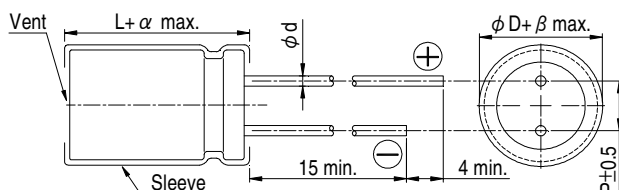


Lead Spacing and Diameter

Unit: mm

ϕD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12.5
ϕd	0.5		0.6			0.8		1.0	
α	L<20: 1.5, L $\geq$ 20: 2.0							2.0	
β	0.5								

The case size of 12.5×16, 16×16, 16×20, 18×16, 18×20 and 18×25 are suitable for below diagram:



Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Cap.(μF)	Rated Volt. (Vdc) Contents	6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
2.2	2R2											5×11	20			5×11	30
3.3	3R3											5×11	30			5×11	31
4.7	4R7											5×11	33			5×11	36
10	100											5×11	50			6.3×11	54
22	220											5×11	78	6.3×11	86	6.3×11 8×11.5	93 99
33	330									5×11	75	5×11	90	6.3×11	100	8×11.5	130
47	470							5×11	97	5×11	90	6.3×11	120	6.3×11 8×11.5	130 141	10×12.5	165
100	101					5×11	110	6.3×11	142	6.3×11	150	8×11.5	188	10×12.5	235	10×20 12.5×16	265 290
220	221	5×11	140	6.3×11	175	6.3×11	190	8×11.5	236	8×11.5	270	10×12.5	300	10×16	335	12.5×25 16×16	440 420
330	331			6.3×11	200	8×11.5	270	8×11.5 10×12.5	310 335	10×12.5	350	10×16	410	10×20 12.5×16	510 460	16×25	620
470	471	6.3×11	230	8×11.5	290	8×11.5	310	10×12.5	380	10×16	460	10×20 12.5×16	530 425	12.5×20 16×16	640 665	16×31.5 18×25	715 745
1,000	102	8×11.5	380	10×12.5	460	10×16	560	10×20 12.5×16	680 590	12.5×20 16×16	810 720	12.5×25 16×20	950 830	16×25	930	18×40	1,275
2,200	222	10×16	690	10×20	760	12.5×16	780	12.5×25	1,110	16×25 18×20	1,260 1,110	16×35.5 18×31.5	1,470 1,520	18×40	2,280	25×45	2,400
3,300	332	10×20 12.5×16	840 850	12.5×20 16×16	1,100 940	12.5×25 16×16	1,170 950	16×25 18×20	1,440 1,220	16×31.5 18×25	1,420 1,570	18×35.5	1,770	22×40	2,510		
4,700	472	12.5×20 16×16	1,090 1,010	12.5×25 16×16	1,260 1,060	16×20 18×16	1,185 1,290	16×31.5 18×25	1,650 1,550	18×35.5	1,900	22×40	2,340	25×40	3,000		
6,800	682	12.5×25 16×20	1,460 1,190	16×20	1,270	16×31.5 18×20	1,930 1,585	16×40 18×35.5	2,000 2,160	18×40	2,250	25×40	2,530				
10,000	103	16×20	1,340	16×31.5 18×25	2,220 1,800	16×35.5 18×31.5	2,210 2,330	22×40 18×45	2,720 2,410								
15,000	153	16×31.5 18×25	2,365 2,290	18×31.5 16×35.5	2,620 2,590	18×40	2,950	25×40	3,200								
22,000	223	16×40 18×35.5	2,800 2,930	18×40	3,230	22×40	3,460										
33,000	333	18×45	3,080	22×40	4,090	25×45	4,500										

Cap.(μF)	Rated Volt. (Vdc) Contents	160V (2C)		200V (2D)		250V (2E)		350V (2V)		400V (2G)		450V (2W)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
1	010									6.3×11	21	8×11.5	27
2.2	2R2			6.3×11	30	6.3×11	35	6.3×11	35	8×11.5	39	8×11.5	39
3.3	3R3			6.3×11	39	6.3×11	40	8×11.5	43	8×11.5	45	8×11.5	45
4.7	4R7			6.3×11	43	8×11.5	45	8×11.5 10×12.5	45 55	8×11.5 10×12.5	50 55	8×11.5 10×12.5	50 55
10	100	8×11.5	65	8×11.5	65	10×12.5	92	10×16	95	10×16	95	10×20	105
22	220	10×12.5	110	10×16	140	10×16	140	12.5×20	220	12.5×20	160	12.5×20	160
33	330	10×16	150	10×20	170	12.5×16	175	12.5×25 16×16	215 205	16×20	225	16×20 18×16	225 220
47	470	10×20	195	12.5×16	215	12.5×20 16×16	230 245	16×20	255	16×25	295	16×25 18×20	280 285
68	680	12.5×20	275	12.5×20 16×16	265 290	16×20	320	18×25 16×31.5	360 370	18×25 16×31.5	360 375	16×35.5 18×31.5	400 420
100	101	12.5×25	355	16×20 18×16	365 360	16×25 18×20	425 415	18×31.5 16×35.5	460 430	18×35.5	540	18×40	560
150	151	16×25	470	18×20	510	16×31.5 18×25	550 535	18×40	600	22×40	730	22×40	770
220	221	16×31.5	660	18×31.5	750	18×35.5	760	25×40 22×45	865 850	22×45	930		
330	331	18×35.5	820	18×40	965	22×40	1,140	25×45	1,070				
470	471	22×40	1,130	22×40	1,130	25×40	1,325						

Part Numbering System

RGA Series	470 μF	±20%	6.3V	Bulk Package	Gas Type	6.3 $\phi \times 11\text{L}$	Pb-free and PET sleeve
RGA	471	M	0J	BK	-	0611	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RJA Series

Features

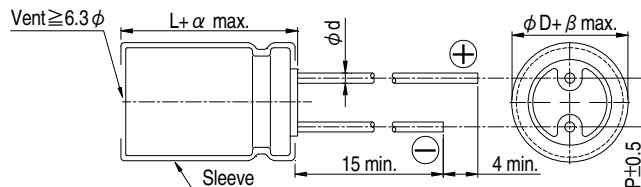
- 105°C, wide temperature range
- Suitable for high reliability products
- RoHS compliance



Specifications

Items	Performance									
Category Temperature Range	6.3 ~ 63V					100V				
	-55°C ~ +105°C					-40°C ~ +105°C				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)									
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V									
Tanδ (at 120 Hz, 20°C)										
	Rated Voltage	6.3	10	16	25	35	50	63	100	
	Tanδ (max)	0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	
	When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.									
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.									
	Rated Voltage		6.3	10	16	25	35	50	63	100
	Impedance Ratio	Z(-25°C)	φ D < 16	4	3	3	2	2	2	2
		/Z(+20°C)	φ D ≥ 16	5	4	3	2	2	2	3
		Z(-40/-55°C)	φ D < 16	8	6	4	4	4	3	3
/Z(+20°C)		φ D ≥ 16	12	8	6	4	3	3	6	
Endurance										
	Test Time		2,000 Hrs							
	Capacitance Change		Within ±20% of initial value							
	Tanδ		Less than 200% of specified value							
	Leakage Current		Within specified value							
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 105°C.									
Shelf Life Test										
	Test Time		1,000 Hrs							
	Capacitance Change		Within ±20% of initial value							
	Tanδ		Less than 200% of specified value							
	Leakage Current		Within specified value							
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.									
Ripple Current and Frequency Multipliers										
	Freq.(Hz)		60 (50)	120	500	1k	10k up			
	Cap.(μF)									
	≤ 100		0.70	1.00	1.30	1.40	1.50			
	100 < C ≤ 1,000		0.75	1.00	1.20	1.30	1.35			
1,000 <		0.80	1.00	1.10	1.12	1.15				

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φ D	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φ d	0.5			0.6		0.8	
α	L < 20: 1.5, L ≥ 20: 2.0						
β	0.5						


Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Cap.(μF)	Rated Volt. (V _{DC}) Contents	6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
2.2	2R2											5×11	20			5×11	26
3.3	3R3											5×11	30			5×11	31
4.7	4R7											5×11	33	5×11	36	5×11 6.3×11	36 40
10	100											5×11	50	5×11	54	6.3×11	54
22	220											5×11	78	5×11 6.3×11	64 86	6.3×11 8×11.5	93 111
33	330									5×11	85	5×11	90	6.3×11	100	8×11.5 10×12.5	144 183
47	470							5×11	97	5×11	90	6.3×11	117	6.3×11	129	10×12.5	204
100	101					5×11	110	5×11 6.3×11	120 142	6.3×11	150	8×11.5	188	10×12.5	235	10×20	285
220	221			5×11	150	6.3×11	180	8×11.5	236	8×11.5	270	10×16	335	10×20	400	12.5×25	440
330	331			6.3×11	200	8×11.5	260	8×11.5	330	10×12.5	350	10×16 10×20	410 460	10×20 12.5×20	490 520	16×25	478
470	471	6.3×11	230	6.3×11 8×11.5	250 290	8×11.5	310	10×12.5	380	10×16	460	12.5×20	590	12.5×20 12.5×25	665 720	16×31.5	688
1,000	102	8×11.5	380	10×12.5	460	10×16	560	10×20	680	12.5×20	830	16×25	1,080	16×25	1,190		
2,200	222	10×16	690	10×20	760	12.5×20	920	12.5×25	1,090	16×25	1,260	16×35.5	1,470				
3,300	332	10×20	840	12.5×20	1,100	12.5×25	1,170	16×25	1,400	16×35.5	1,610	18×35.5	1,650				
4,700	472	12.5×20	1,090	12.5×25	1,260	16×25	1,480	16×31.5	1,710	18×35.5	1,900						
6,800	682	12.5×25	1,460	16×25	1,690	16×31.5	1,930	18×35.5	2,160								
10,000	103	16×25	1,990	16×31.5	2,220	18×31.5	2,330										
22,000	223	18×35.5	2,930	18×40	3,230												

Part Numbering System

RJA Series	470 μF	$\pm 20\%$	6.3V	Bulk Package	Gas Type	6.3 $\phi \times 11\text{L}$	Pb-free and PET sleeve
RJA	471	M	0J	BK	-	0611	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RUK Series

Features

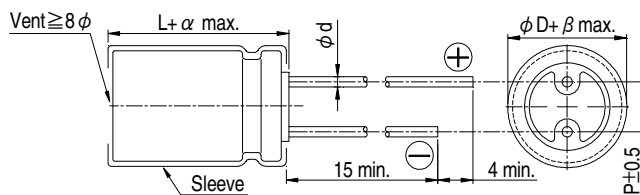
- 125°C, 3,000 ~ 5,000 hours assured
- For automobile modules and other high temperature applications
- RoHS compliance



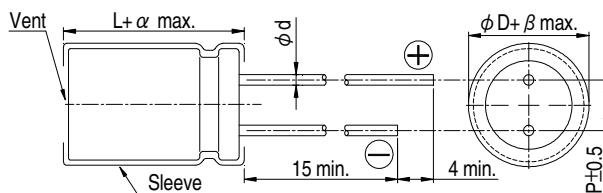
Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +125℃																													
Capacitance Tolerance	± 20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td><td>0.08</td></tr></table>							Rated Voltage	10	16	25	35	50	63	Tanδ (max)	0.15	0.12	0.10	0.10	0.08	0.08									
Rated Voltage	10	16	25	35	50	63																								
Tanδ (max)	0.15	0.12	0.10	0.10	0.08	0.08																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃) / Z(+20℃)</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃) / Z(+20℃)</td><td>6</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr></table>							Rated Voltage		10	16	25	35	50	63	Impedance Ratio	Z(-25℃) / Z(+20℃)	3	2	2	2	2	2	Z(-40℃) / Z(+20℃)	6	4	4	4	4	4
Rated Voltage		10	16	25	35	50	63																							
Impedance Ratio	Z(-25℃) / Z(+20℃)	3	2	2	2	2	2																							
	Z(-40℃) / Z(+20℃)	6	4	4	4	4	4																							
Endurance	<table><tr><td>Test Time</td><td>3,000 Hrs for ϕ D = 8mm; 5,000 Hrs for ϕ D ≥ 10mm</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after applied with rated subjected to DC voltage with the rated ripple current is applied for 3,000 / 5,000 hours at 125℃.							Test Time	3,000 Hrs for ϕ D = 8mm; 5,000 Hrs for ϕ D ≥ 10mm	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	3,000 Hrs for ϕ D = 8mm; 5,000 Hrs for ϕ D ≥ 10mm																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Less than 500% of specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied.							Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Less than 500% of specified value															
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Less than 500% of specified value																													
Ripple Current and Frequency Multipliers	<table><tr><th>Cap.(μF) \ Freq.(Hz)</th><th>120</th><th>1k</th><th>10k</th><th>100k up</th></tr><tr><td>0.47 ~ 100</td><td>1.00</td><td>1.70</td><td>1.88</td><td>2.00</td></tr><tr><td>150 ~ 470</td><td>1.00</td><td>1.45</td><td>1.58</td><td>1.65</td></tr><tr><td>1,000</td><td>1.00</td><td>1.20</td><td>1.25</td><td>1.33</td></tr></table>							Cap.(μF) \ Freq.(Hz)	120	1k	10k	100k up	0.47 ~ 100	1.00	1.70	1.88	2.00	150 ~ 470	1.00	1.45	1.58	1.65	1,000	1.00	1.20	1.25	1.33			
Cap.(μF) \ Freq.(Hz)	120	1k	10k	100k up																										
0.47 ~ 100	1.00	1.70	1.88	2.00																										
150 ~ 470	1.00	1.45	1.58	1.65																										
1,000	1.00	1.20	1.25	1.33																										

Diagram of Dimensions



The case size of 16×20 is suitable for below diagram:



Lead Spacing and Diameter

Unit: mm

ϕD	8	10	12.5	16
P	3.5	5.0	5.0	7.5
ϕd	0.6			0.8
α	L < 20: 1.5, L $\geq$ 20: 2.0			
β	0.5			


Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 125°C

Dimension and Permissible Ripple Current

Cap.(μF)	Contents	10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
10	100									8×11.5	56	8×11.5	56
22	220							8×11.5	75	10×12.5	99	10×12.5	99
33	330					8×11.5	92	10×12.5	108	10×16	133	10×16	133
47	470			8×11.5	100	10×12.5	129	10×16	142	10×16	159	10×20	173
100	101	10×12.5	154	10×16	190	10×16	208	10×20	225				
220	221	10×16	252	10×20	305	12.5×20	371	12.5×25	403	12.5×20	279	12.5×20	279
330	331	10×16	308	12.5×20	414	12.5×25	493	16×20	503				
470	471	10×20	399	12.5×25	537	16×20	601			16×20	459		
1,000	102	16×20	715										

Part Numbering System

RUK Series	470 μF	±20%	16V	Bulk Package	Gas Type	12.5 $\phi \times 25\text{L}$	Pb-free and PET sleeve
RUK	471	M	1C	BK	-	1325	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RUZ Series

Features

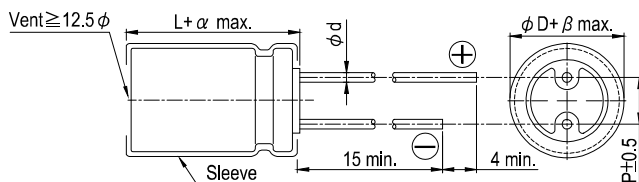
- 125°C, 3,000 ~ 5,000 hours assured
- Low impedance and high-ripple current
- For automobile modules and other high temperature applications
- RoHS Compliance



Specifications

Items	Performance																																				
Category Temperature Range	-40℃ ~ +125℃																																				
Capacitance Tolerance	± 20% (at 120 Hz, 20℃)																																				
Leakage Current (at 20℃)	I = 0.03CV or 4 (μA) whichever is greater (after 1 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V.																																				
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td><td>0.08</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.							Rated Voltage	25	35	50	63	80	100	Tanδ (max)	0.14	0.12	0.10	0.10	0.08	0.08																
Rated Voltage	25	35	50	63	80	100																															
Tanδ (max)	0.14	0.12	0.10	0.10	0.08	0.08																															
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃) / Z(+20℃)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃) / Z(+20℃)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr></table> When the capacitance exceeds 1000μF, 0.02 shall be added every 1000μF increase							Rated Voltage		25	35	50	63	80	100	Impedance Ratio	Z(-25℃) / Z(+20℃)	2	2	2	2	2	2	Z(-40℃) / Z(+20℃)	4	4	4	4	4	4							
Rated Voltage		25	35	50	63	80	100																														
Impedance Ratio	Z(-25℃) / Z(+20℃)	2	2	2	2	2	2																														
	Z(-40℃) / Z(+20℃)	4	4	4	4	4	4																														
Endurance	<table><tr><td>Test Time</td><td>3,000 Hrs for L ≤ 25mm; 5,000 Hrs for L > 25mm</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 3,000 / 5,000 hours at 125℃.							Test Time	3,000 Hrs for L ≤ 25mm; 5,000 Hrs for L > 25mm	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																						
Test Time	3,000 Hrs for L ≤ 25mm; 5,000 Hrs for L > 25mm																																				
Capacitance Change	Within ±30% of initial value																																				
Tanδ	Less than 300% of specified value																																				
Leakage Current	Within specified value																																				
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied.							Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																						
Test Time	1,000 Hrs																																				
Capacitance Change	Within ±30% of initial value																																				
Tanδ	Less than 300% of specified value																																				
Leakage Current	Within specified value																																				
Ripple Current and Frequency Multipliers	<table><tr><th>Freq. (Hz) Cap. (μF)</th><th>120</th><th>1k</th><th>10k</th><th>100k</th></tr><tr><td>200</td><td>0.40</td><td>0.82</td><td>0.93</td><td>1.00</td></tr><tr><td>330 ~ 560</td><td>0.50</td><td>0.85</td><td>0.94</td><td>1.00</td></tr><tr><td>680 ~ 1,800</td><td>0.60</td><td>0.87</td><td>0.95</td><td>1.00</td></tr><tr><td>2,200 ~ 3,900</td><td>0.75</td><td>0.90</td><td>0.95</td><td>1.00</td></tr><tr><td>4,700 ~ 6,800</td><td>0.85</td><td>0.95</td><td>0.98</td><td>1.00</td></tr></table>							Freq. (Hz) Cap. (μF)	120	1k	10k	100k	200	0.40	0.82	0.93	1.00	330 ~ 560	0.50	0.85	0.94	1.00	680 ~ 1,800	0.60	0.87	0.95	1.00	2,200 ~ 3,900	0.75	0.90	0.95	1.00	4,700 ~ 6,800	0.85	0.95	0.98	1.00
Freq. (Hz) Cap. (μF)	120	1k	10k	100k																																	
200	0.40	0.82	0.93	1.00																																	
330 ~ 560	0.50	0.85	0.94	1.00																																	
680 ~ 1,800	0.60	0.87	0.95	1.00																																	
2,200 ~ 3,900	0.75	0.90	0.95	1.00																																	
4,700 ~ 6,800	0.85	0.95	0.98	1.00																																	

Diagram of Dimensions

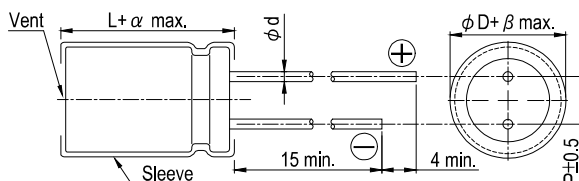


Lead Spacing and Diameter

Unit: mm

ϕD	12.5	16	18
P	5.0	7.5	7.5
ϕd	0.6	0.8	
α	2.0		
β	0.5		

The case size of 16×20 and 18×25 are suitable for below diagram:




Dimension: $\phi D \times L(\text{mm})$

Impedance: $\Omega/$ at 100k Hz, 20°C

Ripple Current: mA/rms at 100 kHz, 125°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		25V (1E)			35V (1V)			50V (1H)			63V (1J)			80V (1K)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
330	331													16×20	0.085	1,790
470	471							12.5×20	0.065	1,500	16×20	0.085	1,790	16×25	0.061	2,030
560	561													18×25	0.049	2,280
680	681				12.5×20	0.044	1820	12.5×25 16×20	0.048 0.043	1,900 2,040	16×25	0.061	2,030	16×35.5	0.044	2,580
820	821							12.5×30	0.041	2,150				16×40 18×35.5	0.036 0.035	2,900 2,890
1,000	102				12.5×25	0.033	2,400	12.5×35 16×25	0.034 0.031	2,510 2,620	16×35.5 18×25	0.044 0.049	2,580 2,280			
1,200	122	12.5×20	0.044	1,820	12.5×30 16×20	0.029 0.034	2,560 2,280	12.5×40 18×25	0.028 0.029	2,870 2,750	16×40	0.036	2,900	18×40	0.030	3,210
1,500	152				12.5×35	0.024	2,970	16×35.5	0.023	3,300	18×35.5	0.035	2,890			
1,800	182	12.5×25 16×20	0.033 0.034	2,400 2,280	12.5×40 16×25	0.021 0.026	3,600 3,100				18×40	0.030	3,210			
2,200	222	12.5×30	0.029	2,560	18×25	0.024	3,200	16×40 18×35.5	0.020 0.022	3,720 3,510						
2,700	272	12.5×35 16×25	0.024 0.026	2,970 3,100	16×35.5	0.020	3,590	18×40	0.018	3,940						
3,300	332	12.5×40	0.021	3,600	16×40 18×35.5	0.017 0.019	4,300 4,200									
3,900	392	16×35.5 18×25	0.020 0.024	3,590 3,200												
4,700	472				18×40	0.016	4,600									
5,600	562	16×40 18×35.5	0.017 0.019	4,300 4,200												
6,800	682	18×40	0.016	4,600												

Rated Volt. (V _{DC})		100V (2A)		
Cap. (μF)	Contents	$\phi D \times L$	Imp.	mA
200	201	16×20	0.11	1,580
330	331	16×25 18×25	0.079 0.064	1,990 2,110
470	471	16×35.5	0.056	2,500
560	561	16×40 18×35.5	0.046 0.044	2,700 2,690
680	681	18×40	0.039	2,880

Part Numbering System

RUZ series	1200μF	±20%	25V	Bulk Package	Gas Type	12.5φ×20L	Pb-free and PET sleeve
RUZ	122	M	1E	BK	-	1320	
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



RUA Series

Features

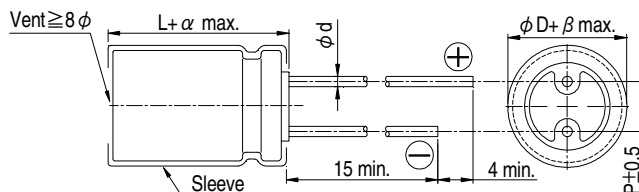
- 130°C, 2,000 ~ 3,000 hours assured
- For automobile modules and other high temperature applications
- RoHS compliance



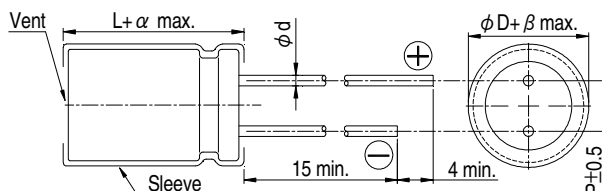
Specifications

Items	Performance																																					
Category Temperature Range	10 ~ 250V						350 ~ 450V																															
	-40°C ~ +130°C						-25°C ~ +130°C																															
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																					
Leakage Current (at 20°C)	Rated voltage		≤ 100V						> 100V																													
	Time		after 2 minutes						after 1 minutes																													
	Leakage Current		I = 0.01CV or 3 (μA) whichever is greater						CV ≤ 1,000 I = 0.1CV + 40(μA)			CV > 1,000 I = 0.04CV + 100(μA)																										
			Where, C = rated capacitance in μF, V = rated DC working voltage in V																																			
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td><td>0.08</td><td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>												Rated Voltage	10	16	25	35	50	63	160	200	250	350	400	450	Tanδ (max)	0.15	0.12	0.10	0.10	0.08	0.08	0.20	0.20	0.20	0.24	0.24	0.24
Rated Voltage	10	16	25	35	50	63	160	200	250	350	400	450																										
Tanδ (max)	0.15	0.12	0.10	0.10	0.08	0.08	0.20	0.20	0.20	0.24	0.24	0.24																										
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																					
	Rated Voltage		10	16	25	35	50	63	160	200	250	350	400	450																								
	Impedance Ratio	Z(-25°C) / Z(+20°C)	3	2	2	2	2	2	3	3	3	6	6	6																								
Z(-40°C) / Z(+20°C)		6	4	4	4	4	4	6	6	6	-	-	-																									
Endurance	Test Time		2,000 Hrs for ϕ D ≤ 8 mm; 3,000 Hrs for ϕ D ≥ 10 mm																																			
	Capacitance Change		Within ±20% of initial value																																			
	Tanδ		Less than 200% of specified value																																			
	Leakage Current		Within specified value																																			
* The above specifications shall be satisfied when the capacitors are restored to 20°C after applied with ratedsubjected to DC voltage with the rated ripple current is applied for 2,000 / 3,000 hours at 130°C.																																						
Shelf Life Test	Test Time		1,000 hrs																																			
	Capacitance Change		Within ±20% of initial value																																			
	Tanδ		Less than 200% of specified value																																			
	Leakage Current		Less than 500% of specified value																																			
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 130°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1).																																						
Ripple Current and Frequency Multipliers	Rated Voltage (V)	Freq.(Hz) Cap.(μF)	120	1k	10k	100k up																																
	10 ~ 63	0.47 ~ 100	1.00	1.85	2.25	2.50																																
		150 ~ 470	1.00	1.70	1.88	2.00																																
		1,000	1.00	1.45	1.58	1.65																																
	160 ~ 450	≤ 33	1.00	1.50	1.75	1.80																																
47 ≤		1.00	1.30	1.40	1.50																																	

Diagram of Dimensions



The case size of 16×20 is suitable for below diagram:



Lead Spacing and Diameter

Unit: mm

ϕ D	8	10	12.5	16
P	3.5	5.0	5.0	7.5
ϕ d	0.6			0.8
α	L<20: 1.5, L≥20: 2.0			
β	0.5			



Dimension: $\phi D \times L(\text{mm})$
 Dimension and Permissible Ripple Current
 Ripple Current: mA/rms at 120 Hz, 130°C

Cap.(μF)	Rated Volt. (V_{DC}) Contents	10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
10	100									8×11.5	84	8×11.5	84
22	220							8×11.5	113	10×12.5	149	10×12.5	149
33	330					8×11.5	138	10×12.5	162	10×16	200	10×16	200
47	470			8×11.5	150	10×12.5	194	10×16	213	10×16	239	10×20	260
100	101	10×12.5	231	10×16	285	10×16	312	10×20	338				
220	221	10×16	378	10×20	458	12.5×20	557	12.5×25	605	12.5×20	419	12.5×20	419
330	331	10×16	462	12.5×20	621	12.5×25	740	16×20	755				
470	471	10×20	599	12.5×25	806	16×20	902			16×20	689		
1,000	102	16×20	1073										

Cap.(μF)	Rated Volt. (V_{DC}) Contents	160V (2C)		200V (2D)		250V (2E)		350V (2V)		400V (2G)		450V (2W)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
4.7	4R7							10×20	53	10×20	53	10×25	58
10	100			10×20	78	10×20	78	10×25	85	10×25	86	12.5×20	86
22	220	10×20	115	10×25	126	12.5×20	128	12.5×25	139	12.5×25	142	16×25	154
33	330	10×25	154	12.5×20	157	12.5×25	171	16×25	189	16×25	189	16×31.5	203
47	470	12.5×20	187	12.5×25	204	16×25	225	16×31.5	243	16×31.5	243		
68	680	12.5×25	245	16×20	250	16×31.5	292						
100	101	16×25	329	16×25	329								
150	151	16×31.5	434										

Part Numbering System

RUA Series	470 μF	$\pm 20\%$	16V	Bulk Package	Gas Type	12.5 $\phi \times 25\text{L}$	Pb-free and PET sleeve
RUA	471	M	1C	BK	-	1325	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RXJ Series

Features

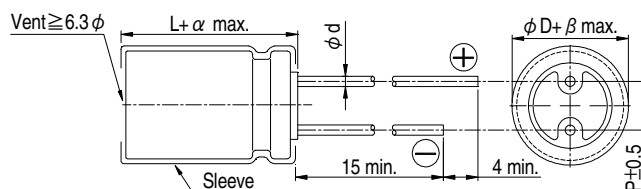
- 105°C, 2,000 ~ 5,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHS compliance



Specifications

Items	Performance																																																	
Category Temperature Range	6.3 ~ 63V					100V																																												
	-55°C ~ +105°C					-40°C ~ +105°C																																												
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																																	
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																																	
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td></tr></table>										Rated Voltage	6.3	10	16	25	35	50	63	100	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08																						
	Rated Voltage	6.3	10	16	25	35	50	63	100																																									
	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08																																									
When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.																																																		
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																																	
	Rated Voltage		6.3	10	16	25	35	50	63	100																																								
	Impedance Ratio	Z(-55°C)/Z(+20°C)	4	4	3	3	3	3	3	3																																								
Endurance	<table><tr><td>Test Time</td><td colspan="9">2,000 Hrs for ϕ D ≤ 8 mm; 5,000 Hrs for ϕ D ≥ 10 mm</td></tr><tr><td>Capacitance Change</td><td colspan="9">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="9">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="9">Within specified value</td></tr></table>										Test Time	2,000 Hrs for ϕ D ≤ 8 mm; 5,000 Hrs for ϕ D ≥ 10 mm									Capacitance Change	Within ±20% of initial value									Tanδ	Less than 200% of specified value									Leakage Current	Within specified value								
	Test Time	2,000 Hrs for ϕ D ≤ 8 mm; 5,000 Hrs for ϕ D ≥ 10 mm																																																
	Capacitance Change	Within ±20% of initial value																																																
	Tanδ	Less than 200% of specified value																																																
	Leakage Current	Within specified value																																																
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000/5,000 hours at 105°C.																																																		
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="9">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="9">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="9">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="9">Within specified value</td></tr></table>										Test Time	1,000 Hrs									Capacitance Change	Within ±20% of initial value									Tanδ	Less than 200% of specified value									Leakage Current	Within specified value								
	Test Time	1,000 Hrs																																																
	Capacitance Change	Within ±20% of initial value																																																
	Tanδ	Less than 200% of specified value																																																
	Leakage Current	Within specified value																																																
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.																																																		
Ripple Current and Frequency Multipliers	<table><tr><td rowspan="2">Cap.(μF) \ Freq.(Hz)</td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k</td><td>100k</td></tr><tr><td>≤ 33</td><td>0.40</td><td>0.55</td><td>0.65</td><td>0.80</td><td>0.90</td><td>1.00</td></tr><tr><td>39 ~ 330</td><td>0.60</td><td>0.70</td><td>0.80</td><td>0.90</td><td>0.95</td><td>1.00</td></tr><tr><td>390 ~ 1,000</td><td>0.65</td><td>0.80</td><td>0.85</td><td>0.98</td><td>1.00</td><td>1.00</td></tr><tr><td>1,200 ≤</td><td>0.80</td><td>0.90</td><td>0.95</td><td>0.98</td><td>1.00</td><td>1.00</td></tr></table>										Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k	100k	≤ 33	0.40	0.55	0.65	0.80	0.90	1.00	39 ~ 330	0.60	0.70	0.80	0.90	0.95	1.00	390 ~ 1,000	0.65	0.80	0.85	0.98	1.00	1.00	1,200 ≤	0.80	0.90	0.95	0.98	1.00	1.00					
	Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k	100k																																											
		≤ 33	0.40	0.55	0.65	0.80	0.90	1.00																																										
	39 ~ 330	0.60	0.70	0.80	0.90	0.95	1.00																																											
	390 ~ 1,000	0.65	0.80	0.85	0.98	1.00	1.00																																											
	1,200 ≤	0.80	0.90	0.95	0.98	1.00	1.00																																											

Diagram of Dimensions



Lead Spacing and Diameter

ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						



Dimension: $\phi D \times L$ (mm)
Impedance: Ω / at 100k Hz
Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap. (μF)	6.3V (0J)					10V (1A)					16V (1C)				
	$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz
33											5×11	1.30	3.90	108	154
39											5×11	1.30	3.90	108	154
47						5×11	2.10	5.50	78	111	6.3×11	0.60	1.80	182	260
56						5×11	1.90	4.80	85	121	6.3×11	0.60	1.80	182	260
68						5×11	1.30	3.90	108	154	6.3×11	0.60	1.80	182	260
100	5×11	1.30	3.90	108	154	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260
220	6.3×11	0.60	1.80	182	260	8×11.5	0.33	0.99	280	400	8×11.5	0.33	0.99	320	400
330	8×11.5	0.33	0.88	280	400	8×11.5	0.33	0.99	280	400	10×12.5	0.25	0.75	360	510
390	8×11.5	0.33	0.88	320	400	10×12.5	0.27	0.75	410	510	10×16	0.19	0.57	510	635
470	10×12.5	0.25	0.75	410	510	10×12.5	0.25	0.75	410	510	10×16	0.19	0.57	510	635
560	10×12.5	0.25	0.75	410	510	10×16	0.19	0.57	510	635	10×20	0.14	0.42	775	860
680	10×16	0.19	0.57	510	635	10×16	0.19	0.57	510	635	10×20	0.14	0.42	775	860
1,000	10×20	0.14	0.42	690	860	10×20	0.14	0.37	690	860	12.5×20	0.085	0.26	1,000	1,250
1,200	10×20	0.14	0.42	775	860	10×25	0.12	0.30	930	1,030	12.5×20	0.085	0.26	1,125	1,250
2,200	12.5×20	0.085	0.26	1,125	1,250	12.5×25	0.070	0.21	1,200	1,355	12.5×25	0.070	0.21	1,200	1,355
3,300	12.5×25	0.070	0.21	1,200	1,355	12.5×25	0.070	0.21	1,200	1,355	16×31.5	0.048	0.14	1,830	2,030
4,700	16×25	0.060	0.18	1,595	1,770	16×31.5	0.048	0.14	1,830	2,030	16×35.5	0.044	0.13	2,065	2,295

Rated Volt. (Vdc) Contents Cap. (μF)	25V (1E)					35V (1V)					50V (1H)				
	$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
		20°C	-10°C	120 Hz	100KHz		20°C	-10°C	120 Hz	100KHz		20°C	-10°C	120 Hz	100KHz
2.2											5×11	4.0	12.0	48	88
3.3											5×11	3.50	11.0	52	94
4.7											5×11	3.00	9.00	55	100
6.8											5×11	3.00	9.00	55	100
10											5×11	2.00	6.00	68	124
22						5×11	1.30	3.90	108	154	6.3×11	0.60	1.80	143	260
33	5×11	1.30	3.90	108	154	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	143	260
39	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260
47	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260	8×11.5	0.33	0.99	320	400
56	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260	8×11.5	0.33	0.99	320	400
68	6.3×11	0.60	1.80	182	260	6.3×11	0.60	1.80	182	260	8×11.5	0.33	0.99	320	400
100	8×11.5	0.33	0.99	320	400	8×11.5	0.33	0.99	320	400	10×16	0.19	0.57	445	635
220	10×12.5	0.25	0.75	360	510	10×16	0.19	0.57	445	635	10×25	0.12	0.30	825	1,030
330	10×16	0.19	0.57	445	635	10×20	0.12	0.42	600	860	12.5×20	0.085	0.26	875	1,250
390	10×20	0.14	0.42	775	965	10×25	0.12	0.30	930	1,030	12.5×25	0.070	0.21	1,085	1,355
470	10×20	0.14	0.42	775	965	12.5×20	0.085	0.26	1,000	1,250	12.5×25	0.070	0.21	1,085	1,355
560	10×25	0.12	0.30	930	1,030	12.5×20	0.085	0.26	1,000	1,250	12.5×25	0.070	0.21	1,085	1,355
680	12.5×20	0.085	0.26	1,000	1,250	12.5×25	0.070	0.21	1,085	1,355	16×25	0.060	0.18	1,415	1,770
1,000	12.5×25	0.070	0.23	1,080	1,355	12.5×25	0.070	0.21	1,085	1,355	16×25	0.060	0.18	1,595	1,770
1,200	12.5×25	0.070	0.21	1,200	1,355	12.5×25	0.070	0.21	1,200	1,355	16×31.5	0.048	0.14	1,830	2,030
2,200	16×25	0.060	0.18	1,595	1,770	16×35.5	0.044	0.13	2,065	2,295	18×40	0.037	0.10	2,465	2,740
3,300	16×35.5	0.044	0.13	2,065	2,295	18×40	0.037	0.10	2,465	2,740					
4,700	18×40	0.037	0.10	2,465	2,740										


Dimension: ϕ D×L(mm)

Impedance: Ω / at 100k Hz

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap. (μF)	63V (1J)					100V (2A)				
	ϕ D×L	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		ϕ D×L	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz
2.2						5×11	6.00	21.0	40	72
3.3						5×11	5.00	18.0	43	78
4.7						6.3×11	1.20	4.20	100	180
6.8						6.3×11	1.20	4.20	100	180
10	6.3×11	1.20	4.20	100	180	8×11.5	0.56	2.00	168	305
22	6.3×11	1.20	4.20	100	180	8×11.5	0.56	2.00	168	308
33	8×11.5	0.56	2.00	170	305	10×12.5	0.50	1.80	210	380
39	8×11.5	0.56	2.00	170	305	10×16	0.32	1.10	350	500
47	8×11.5	0.56	2.00	170	305	10×20	0.27	0.95	435	620
56	10×12.5	0.50	1.80	265	380	10×20	0.27	0.95	435	620
68	10×12.5	0.50	1.80	265	380	10×25	0.21	0.63	530	760
100	10×20	0.27	0.95	435	620	12.5×20	0.16	0.56	625	890
220	12.5×20	0.094	0.24	570	820	16×25	0.090	0.32	1,010	1,440
330	12.5×25	0.073	0.21	770	1,100	16×31.5	0.060	0.17	1,255	1,790
390	12.5×25	0.073	0.21	770	1,100	16×35.5	0.056	0.14	1,650	2,065
470	16×25	0.060	0.18	1,420	1,770					
560	16×31.5	0.048	0.14	1,625	2,030					
680	16×31.5	0.048	0.14	1,625	2,030					
1,000	18×35.5	0.041	0.11	1,790	2,240					

Part Numbering System

RXJ Series	470μF	±20%	6.3V	Bulk Package	Gas Type	10 ϕ ×12.5L	Pb-free and PET sleeve
RXJ	471	M	0J	BK	-	1012	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RXK Series

Features

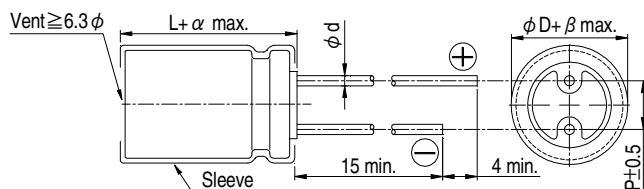
- 105°C, 2,000 ~ 5,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHS compliance



Specifications

Items	Performance																																			
Category Temperature Range	-55℃ ~ +105℃																																			
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																			
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																			
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.	Rated Voltage	6.3	10	16	25	35	50	63	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09																			
Rated Voltage	6.3	10	16	25	35	50	63																													
Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Impedance Ratio</td><td>Z(-55℃)/Z(+20℃)</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-55℃)/Z(+20℃)	4	4	3	3	3	3																			
Rated Voltage	6.3	10	16	25	35	50	63																													
Impedance Ratio	Z(-55℃)/Z(+20℃)	4	4	3	3	3	3																													
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs for ϕ D ≤ 6.3 mm; 3,000 Hrs for ϕ D = 8 mm; 4,000 Hrs for ϕ D = 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 ~ 5,000 hours at 105℃.	Test Time	2,000 Hrs for ϕ D ≤ 6.3 mm; 3,000 Hrs for ϕ D = 8 mm; 4,000 Hrs for ϕ D = 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																											
Test Time	2,000 Hrs for ϕ D ≤ 6.3 mm; 3,000 Hrs for ϕ D = 8 mm; 4,000 Hrs for ϕ D = 10 mm; 5,000 Hrs for ϕ D ≥ 12.5 mm																																			
Capacitance Change	Within ±20% of initial value																																			
Tanδ	Less than 200% of specified value																																			
Leakage Current	Within specified value																																			
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																											
Test Time	1,000 Hrs																																			
Capacitance Change	Within ±20% of initial value																																			
Tanδ	Less than 200% of specified value																																			
Leakage Current	Within specified value																																			
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap.(μF)</td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k</td><td>100k</td></tr><tr><td>≤ 33</td><td>0.40</td><td>0.55</td><td>0.65</td><td>0.80</td><td>0.90</td><td>1.00</td></tr><tr><td>39 ~ 330</td><td>0.60</td><td>0.70</td><td>0.80</td><td>0.90</td><td>0.95</td><td>1.00</td></tr><tr><td>390 ~ 1,000</td><td>0.65</td><td>0.80</td><td>0.85</td><td>0.98</td><td>1.00</td><td>1.00</td></tr><tr><td>1,200 ≤</td><td>0.80</td><td>0.90</td><td>0.95</td><td>0.98</td><td>1.00</td><td>1.00</td></tr></table>	Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k	100k	≤ 33	0.40	0.55	0.65	0.80	0.90	1.00	39 ~ 330	0.60	0.70	0.80	0.90	0.95	1.00	390 ~ 1,000	0.65	0.80	0.85	0.98	1.00	1.00	1,200 ≤	0.80	0.90	0.95	0.98	1.00	1.00
Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k	100k																														
≤ 33	0.40	0.55	0.65	0.80	0.90	1.00																														
39 ~ 330	0.60	0.70	0.80	0.90	0.95	1.00																														
390 ~ 1,000	0.65	0.80	0.85	0.98	1.00	1.00																														
1,200 ≤	0.80	0.90	0.95	0.98	1.00	1.00																														

Diagram of Dimensions

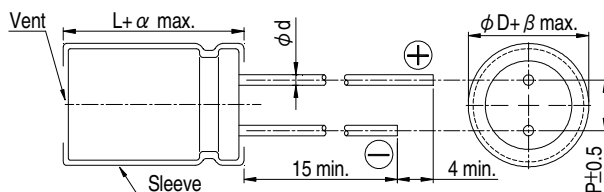


Lead Spacing and Diameter

Unit: mm

ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						

The case size of 16×20 is suitable for below diagram:





Dimension: $\phi D \times L(\text{mm})$
 Impedance: $\Omega/$ at 100k Hz
 Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap. (μF)	6.3V (0J)					10V (1A)					16V (1C)				
	$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz
56											5×11	0.72	1.8	116	165
68											5×11	0.72	1.8	126	180
82						5×11	0.72	1.8	116	165					
100						5×11	0.72	1.8	126	180					
120	5×11	0.72	1.8	116	165						6.3×11	0.38	0.95	179	255
180						6.3×11	0.38	0.95	179	255	6.3×15	0.27	0.68	231	330
220	6.3×11	0.38	0.95	179	255	6.3×11	0.38	0.95	196	280					
270	6.3×11	0.38	0.95	196	280	6.3×15	0.27	0.68	231	330	8×11.5 10×12.5	0.20 0.12	0.50 0.30	291 438	415 625
330	6.3×15	0.27	0.68	231	330	8×11.5	0.20	0.50	291	415	8×11.5 8×15 10×12.5	0.20 0.16 0.12	0.50 0.40 0.30	315 347 540	450 495 675
390	8×11.5	0.20	0.50	332	415	8×11.5 10×12.5	0.20 0.12	0.50 0.30	360 500	450 625					
470	8×11.5 10×12.5	0.20 0.12	0.50 0.30	360 500	450 625	8×15 10×12.5	0.16 0.12	0.40 0.30	396 540	495 675	8×15 8×20 10×16	0.16 0.11 0.084	0.40 0.28 0.21	472 512 660	590 640 825
560	8×15 10×12.5	0.16 0.12	0.40 0.30	396 540	495 675	8×15	0.16	0.40	472	590	8×20 10×16	0.11 0.084	0.28 0.21	560 728	700 910
680	10×16	0.084	0.21	660	825	8×20 10×16	0.11 0.084	0.28 0.21	512 660	640 825	10×20	0.062	0.16	832	1,040
820	8×15 8×20 10×16	0.16 0.11 0.084	0.40 0.28 0.21	472 512 728	590 640 910	8×20 10×16	0.11 0.084	0.28 0.21	560 728	700 910	10×20 10×25	0.062 0.052	0.16 0.13	904 1,008	1,130 1,260
1,000	8×20	0.11	0.28	560	700	10×20	0.062	0.16	832	1,040	10×25	0.052	0.13	1,112	1,390
1,200	10×20	0.062	0.16	936	1,040	10×20 10×25	0.062 0.052	0.16 0.13	1,017 1,134	1,130 1,260	10×30 12.5×20	0.044 0.046	0.11 0.12	1,296 1,206	1,440 1,340
1,500	10×20 10×25	0.062 0.052	0.16 0.13	1,017 1,134	1,130 1,260	10×25 10×30	0.052 0.044	0.13 0.11	1,251 1,296	1,390 1,440	10×30 12.5×20 12.5×25	0.044 0.046 0.034	0.11 0.12 0.085	1,413 1,305 1,521	1,570 1,450 1,690
1,800	10×25	0.052	0.13	1,251	1,390	10×30 12.5×20	0.044 0.046	0.11 0.12	1,413 1,206	1,570 1,340	12.5×25	0.034	0.085	1,629	1,810
2,200	10×30 12.5×20	0.044 0.046	0.11 0.12	1,296 1,206	1,440 1,340	12.5×20 12.5×25	0.046 0.034	0.12 0.085	1,305 1,521	1,450 1,690	12.5×30 16×20	0.030 0.035	0.075 0.087	1,755 1,485	1,950 1,650
2,700	10×30 12.5×20 12.5×25	0.044 0.046 0.034	0.11 0.12 0.085	1,413 1,305 1,521	1,570 1,450 1,690	12.5×25 12.5×30	0.034 0.030	0.085 0.075	1,629 1,755	1,810 1,950	12.5×30 12.5×35 16×25	0.030 0.027 0.028	0.075 0.068 0.070	1,917 1,980 1,863	2,130 2,200 2,070
3,300	12.5×25	0.034	0.085	1,629	1,810	12.5×30 12.5×35	0.030 0.027	0.075 0.068	1,917 1,980	2,130 2,200	12.5×35 12.5×40 16×25	0.027 0.024 0.028	0.068 0.060 0.070	2,151 2,196 2,025	2,390 2,440 2,250
3,900	12.5×30	0.030	0.075	1,755	1,950	12.5×35 12.5×40 16×20 16×25	0.027 0.024 0.035 0.028	0.068 0.060 0.087 0.070	2,196 2,151 1,692 1,863	2,390 2,440 1,880 2,070	16×31.5	0.025	0.063	2,115	2,350
4,700	12.5×30 12.5×35 16×20	0.030 0.027 0.035	0.075 0.068 0.087	1,917 1,980 1,440	2,130 2,200 1,600	12.5×40 16×25	0.024 0.028	0.060 0.070	2,358 2,025	2,620 2,250	16×31.5 16×35.5	0.025 0.022	0.055 0.055	2,295 2,295	2,550 2,550
5,600	12.5×35 12.5×40 16×25	0.027 0.024 0.028	0.068 0.060 0.070	2,151 2,196 1,863	2,390 2,440 2,070	16×31.5	0.025	0.063	2,115	2,350	16×35.5 16×40	0.022 0.018	0.055 0.045	2,394 2,610	2,660 2,900
6,800	12.5×40 16×25 16×31.5	0.024 0.028 0.025	0.060 0.070 0.063	2,358 2,025 2,115	2,620 2,250 2,350	16×31.5 16×35.5	0.025 0.022	0.063 0.055	2,295 2,295	2,550 2,550	16×40 18×35.5	0.018 0.021	0.045 0.053	2,844 2,448	3,160 2,720
8,200	16×31.5	0.025	0.063	2,295	2,550	16×35.5	0.022	0.055	2,448	2,720	18×35.5	0.021	0.053	2,601	2,890
10,000	16×35.5	0.022	0.055	2,691	2,990										


Dimension: $\phi D \times L(\text{mm})$

Impedance: Ω / at 100k Hz

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Cap. (μF)	Contents	25V (1E)					35V (1V)					50V (1H)				
		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
			20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz		20°C	-10°C	120 Hz	100k Hz
18												5×11	1.1	3.3	72	130
22												5×11	1.1	3.3	83	150
27							5×11	0.72	1.8	91	165					
33							5×11	0.72	1.8	99	180					
39		5×11	0.72	1.8	116	165						6.3×11	0.56	1.6	154	220
47		5×11	0.72	1.8	126	180						6.3×11	0.56	1.6	161	230
56							6.3×11	0.38	0.95	179	255	6.3×15	0.41	1.2	217	310
68							6.3×11	0.38	0.95	196	280	8×11.5	0.29	0.84	238	340
82		6.3×11	0.38	0.95	179	255	6.3×15	0.27	0.68	231	330	8×11.5	0.29	0.84	249	355
												8×15	0.25	0.75	329	470
												10×12.5	0.16	0.40	336	480
100		6.3×11	0.38	0.95	196	280						10×12.5	0.16	0.40	371	530
120		6.3×15	0.27	0.68	231	330	8×11.5	0.20	0.50	291	415	8×15	0.25	0.75	392	560
							10×12.5	0.12	0.30	438	625	8×20	0.18	0.52	427	610
												10×16	0.12	0.30	529	755
150		8×11.5	0.20	0.50	291	415	8×11.5	0.20	0.50	315	450	10×16	0.12	0.30	588	840
							10×12.5	0.12	0.30	473	675					
180		8×11.5	0.20	0.50	315	450	8×15	0.16	0.40	347	495	8×20	0.18	0.52	525	750
		10×12.5	0.12	0.30	438	625						10×20	0.088	0.22	662	945
220		8×15	0.16	0.40	347	495	8×15	0.16	0.40	413	590	10×20	0.088	0.22	728	1,040
		10×12.5	0.12	0.30	473	675	8×20	0.11	0.28	448	640	10×25	0.068	0.17	805	1,150
							10×16	0.084	0.21	578	825					
270							8×20	0.11	0.28	490	700	10×25	0.068	0.17	896	1,280
							10×16	0.084	0.21	637	910					
330		8×15	0.16	0.40	413	590	10×20	0.062	0.16	728	1,040	10×30	0.059	0.15	882	1,260
		8×20	0.11	0.28	448	640						12.5×20	0.059	0.15	833	1,190
		10×16	0.084	0.21	578	825										
390		8×20	0.11	0.28	560	700	10×20	0.062	0.16	904	1,130	12.5×20	0.059	0.15	952	1,190
		10×16	0.084	0.21	728	910	10×25	0.052	0.13	1,008	1,260					
470		10×20	0.062	0.16	832	1,040	10×25	0.052	0.13	1,112	1,390	10×30	0.059	0.15	1,176	1,470
												12.5×25	0.045	0.11	1,192	1,490
560		10×20	0.062	0.16	904	1,130	10×30	0.044	0.11	1,152	1,440	12.5×25	0.045	0.11	1,304	1,630
		10×25	0.052	0.13	1,008	1,260	12.5×20	0.046	0.12	1,072	1,340	12.5×30	0.039	0.098	1,376	1,720
680		10×25	0.052	0.13	1,112	1,390	10×30	0.044	0.11	1,256	1,570	12.5×30	0.039	0.098	1,520	1,800
							12.5×20	0.046	0.12	1,160	1,450	12.5×35	0.033	0.083	1,512	1,900
							12.5×25	0.034	0.085	1,352	1,690	16×20	0.048	0.120	1,248	1,560
820		10×30	0.044	0.11	1,152	1,440	12.5×25	0.034	0.085	1,448	1,810	12.5×35	0.033	0.083	1,624	2,030
		12.5×20	0.046	0.12	1,072	1,340						12.5×40	0.029	0.073	1,656	2,070
												16×25	0.033	0.083	1,504	1,880
1,000		10×30	0.044	0.11	1,256	1,570	12.5×30	0.030	0.075	1,560	1,950	12.5×40	0.029	0.073	1,800	2,250
		12.5×20	0.046	0.12	1,160	1,450	16×20	0.035	0.087	1,376	1,720	16×25	0.033	0.083	1,664	2,080
		12.5×25	0.034	0.085	1,352	1,690						16×31.5	0.029	0.073	1,720	2,150
1,200		12.5×25	0.034	0.085	1,629	1,810	12.5×30	0.030	0.075	1,917	2,130	16×31.5	0.029	0.073	2,088	2,320
							12.5×35	0.027	0.068	1,980	2,200	16×35.5	0.025	0.063	2,115	2,350
							16×25	0.028	0.070	1,863	2,070					
1,500		12.5×30	0.030	0.075	1,755	1,950	12.5×35	0.027	0.068	2,151	2,390	16×35.5	0.025	0.063	2,160	2,400
		16×20	0.035	0.087	1,539	1,710	12.5×40	0.024	0.060	2,196	2,440	16×40	0.021	0.063	2,336	2,595
							16×25	0.028	0.070	2,025	2,250					
1,800		12.5×30	0.030	0.075	1,917	2,130	12.5×40	0.024	0.060	2,358	2,620	16×40	0.021	0.063	2,466	2,740
		12.5×35	0.027	0.068	1,980	2,200	16×31.5	0.025	0.063	2,115	2,350	18×35.5	0.023	0.058	2,286	2,540
		16×25	0.028	0.070	1,863	2,070										
2,200		12.5×35	0.027	0.068	2,151	2,390	16×31.5	0.025	0.063	2,295	2,550	18×35.5	0.023	0.058	2,349	2,610
		12.5×40	0.024	0.060	2,196	2,440	16×35.5	0.022	0.055	2,295	2,550	18×40	0.020	0.050	2,385	2,650
		16×25	0.028	0.070	2,025	2,250										
2,700		16×31.5	0.025	0.063	2,115	2,350	16×35.5	0.022	0.055	2,394	2,660					
							16×40	0.018	0.045	2,610	2,900					
							18×35.5	0.021	0.053	2,448	2,720					
3,300		16×31.5	0.025	0.063	2,295	2,550	18×35.5	0.021	0.053	2,601	2,890					
		16×35.5	0.022	0.055	2,295	2,550	18×40	0.017	0.043	2,709	3,010					
3,900		16×35.5	0.022	0.055	2,394	2,660										
		16×40	0.018	0.045	2,610	2,900										
		18×35.5	0.021	0.053	2,448	2,720										
4,700		18×35.5	0.021	0.053	2,601	2,890										
		18×40	0.017	0.043	2,709	3,010										
5,600		18×40	0.017	0.043	2,934	3,260										



Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$
 Impedance: Ω / at 100k Hz
 Ripple Current: mA/rms at 105°C

Cap. (μF)	Contents	63V(1J)				
		$\phi D \times L$	Impedance (Ω , max./100k Hz)		Ripple Current (mA/rms, 105°C)	
			20°C	-10°C	120 Hz	100k Hz
12		5×11	1.90	4.78	55	100
27		6.3×11	1.10	2.78	88	160
33		6.3×11	1.10	2.75	96	175
39		6.3×15	0.62	1.55	161	230
47		8×11.5	0.49	1.23	193	275
56		8×11.5	0.49	1.23	203	290
		10×12.5	0.27	0.675	294	420
68		8×15	0.34	0.850	252	360
		10×12.5	0.27	0.675	354	505
		10×16	0.21	0.525	366	523
82		8×20	0.21	0.525	350	500
100		8×15	0.34	0.850	308	440
120		10×16	0.210	0.525	455	650
		10×20	0.160	0.400	490	700
150		8×20	0.210	0.525	476	680
		10×25	0.130	0.325	546	780
180		10×20	0.160	0.400	553	790
		10×30	0.100	0.250	672	960
220		10×25	0.130	0.325	648	925
		12.5×20	0.110	0.275	609	870
270		10×30	0.100	0.250	812	1,160
		12.5×25	0.074	0.185	805	1,150
330		12.5×20	0.110	0.275	746	1,065
390		12.5×25	0.074	0.185	1,088	1,280
		12.5×30	0.068	0.170	1,024	1,360
470		12.5×30	0.068	0.170	1,120	1,360
		12.5×35	0.063	0.158	1,112	1,400
		16×20	0.059	0.148	1,080	1,350
		16×25	0.055	0.138	1,184	1,480
		12.5×40	0.051	0.128	1,224	1,530
560		16×25	0.055	0.138	1,296	1,620
		12.5×40	0.051	0.128	1,336	1,670
680		16×31.5	0.046	0.115	1,376	1,720
		12.5×40	0.051	0.128	1,480	1,850
820		16×31.5	0.046	0.115	1,512	1,890
		16×35.5	0.040	0.100	1,528	1,910
		16×35.5	0.040	0.100	1,576	1,970
1,000		18×35.5	0.040	0.100	1,688	2,110
1,500		18×35.5	0.040	0.100	2,169	2,410

Part Numbering System

RXK Series	470μF	±20%	6.3V	Bulk Package	Gas Type	8 ϕ × 11.5L	Pb-free and PET sleeve
RXK	471	M	0J	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RXW Series

Features

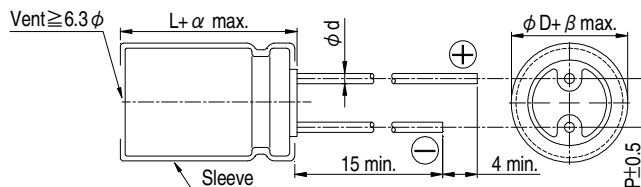
- 105°C, 4,000 ~ 7,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHS compliance



Specifications

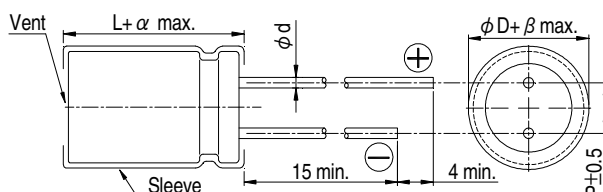
Items	Performance																																													
Category Temperature Range	6.3 ~ 63V					100V																																								
	-55°C ~ +105°C					-40°C ~ +105°C																																								
Capacitance Tolerance	± 20 % (at 120 Hz, 20°C)																																													
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																													
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td></tr></table> When the capacitance exceeds 1000μF, 0.02 shall be added every 1000μF increase.									Rated Voltage	6.3	10	16	25	35	50	63	100	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08																			
	Rated Voltage	6.3	10	16	25	35	50	63	100																																					
	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08																																					
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Impedance Ratio</td><td>Z(-55°C/-40°C) / Z(+20°C)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>									Rated Voltage		6.3	10	16	25	35	50	63	100	Impedance Ratio	Z(-55°C/-40°C) / Z(+20°C)	3	3	3	3	3	3	3	3																	
Rated Voltage		6.3	10	16	25	35	50	63	100																																					
Impedance Ratio	Z(-55°C/-40°C) / Z(+20°C)	3	3	3	3	3	3	3	3																																					
Endurance	<table><tr><td>Test Time</td><td colspan="8">4,000 Hrs for ϕ D ≤ 6.3 mm; 5,000 Hrs for ϕ D = 8 mm; 6,000 Hrs for ϕ D = 10 mm; 7,000 Hrs for ϕ D ≥ 12.5 mm</td></tr><tr><td>Capacitance Change</td><td colspan="8">Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td colspan="8">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="8">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 ~ 7,000 hours at 105°C.									Test Time	4,000 Hrs for ϕ D ≤ 6.3 mm; 5,000 Hrs for ϕ D = 8 mm; 6,000 Hrs for ϕ D = 10 mm; 7,000 Hrs for ϕ D ≥ 12.5 mm								Capacitance Change	Within ±25% of initial value								Tanδ	Less than 200% of specified value								Leakage Current	Within specified value								
	Test Time	4,000 Hrs for ϕ D ≤ 6.3 mm; 5,000 Hrs for ϕ D = 8 mm; 6,000 Hrs for ϕ D = 10 mm; 7,000 Hrs for ϕ D ≥ 12.5 mm																																												
	Capacitance Change	Within ±25% of initial value																																												
	Tanδ	Less than 200% of specified value																																												
	Leakage Current	Within specified value																																												
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="8">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="8">Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td colspan="8">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="8">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.									Test Time	1,000 Hrs								Capacitance Change	Within ±25% of initial value								Tanδ	Less than 200% of specified value								Leakage Current	Within specified value								
	Test Time	1,000 Hrs																																												
	Capacitance Change	Within ±25% of initial value																																												
	Tanδ	Less than 200% of specified value																																												
	Leakage Current	Within specified value																																												
Ripple Current and Frequency Multipliers	<table><tr><td colspan="2">Freq.(Hz)</td><td>120</td><td>1k</td><td>10k</td><td>100k up</td></tr><tr><td>Cap.(μF)</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>≤ ~ 33</td><td>0.42</td><td>0.70</td><td>0.90</td><td>1.0</td></tr><tr><td>39 ~ 270</td><td>0.5</td><td>0.73</td><td>0.92</td><td>1.0</td></tr><tr><td>330 ~ 680</td><td>0.55</td><td>0.77</td><td>0.94</td><td>1.0</td></tr><tr><td>820 ~ 1,800</td><td>0.6</td><td>0.80</td><td>0.96</td><td>1.0</td></tr><tr><td>2,200 ~ 15,000</td><td>0.7</td><td>0.85</td><td>0.98</td><td>1.0</td></tr></table>									Freq.(Hz)		120	1k	10k	100k up	Cap.(μF)						≤ ~ 33	0.42	0.70	0.90	1.0	39 ~ 270	0.5	0.73	0.92	1.0	330 ~ 680	0.55	0.77	0.94	1.0	820 ~ 1,800	0.6	0.80	0.96	1.0	2,200 ~ 15,000	0.7	0.85	0.98	1.0
	Freq.(Hz)		120	1k	10k	100k up																																								
	Cap.(μF)																																													
	≤ ~ 33	0.42	0.70	0.90	1.0																																									
	39 ~ 270	0.5	0.73	0.92	1.0																																									
	330 ~ 680	0.55	0.77	0.94	1.0																																									
	820 ~ 1,800	0.6	0.80	0.96	1.0																																									
2,200 ~ 15,000	0.7	0.85	0.98	1.0																																										

Diagram of Dimensions



Lead Spacing and Diameter							Unit: mm
ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						

The case size of 16×20, 18×20 and 18×25 are suitable for below diagram:





Dimension: $\phi D \times L$ (mm)
Impedance: Ω / at 100k Hz
Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Contents Cap. (μF)	6.3V (0J)				10V (1A)				16V (1C)				25V (1E)			
	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz
		20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
4.7													5×11	0.6	1.2	180
10									5×11	0.6	1.2	180	5×11	0.6	1.2	180
22	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180
33	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180
39													5×11	0.6	1.2	180
47	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180	5×11	0.6	1.2	180
56									5×11	0.6	1.2	180				
82					5×11	0.6	1.2	180					6.3×11	0.25	0.50	290
100	5×11	0.6	1.2	180	5×11	0.6	1.2	180	6.3×11	0.25	0.5	290	6.3×11	0.25	0.50	290
120									6.3×11	0.25	0.5	290	6.3×15	0.23	0.46	430
150	6.3×11	0.25	0.5	290	6.3×11	0.25	0.5	290	6.3×11	0.25	0.5	290	8×11.5	0.117	0.234	555
180					6.3×11	0.25	0.5	290	6.3×15	0.23	0.46	430				
220	6.3×11	0.25	0.5	290	6.3×11 6.3×15	0.25 0.23	0.5 0.46	290 430	8×11.5	0.117	0.234	555	8×11.5	0.117	0.234	555
330	6.3×11 6.3×15	0.25 0.23	0.50 0.46	290 430	8×11.5	0.117	0.234	555	8×11.5	0.117	0.234	555	8×15 10×12.5	0.085 0.090	0.17 0.18	730 755
470	8×11.5	0.117	0.234	555	8×11.5	0.117	0.234	555	8×15 10×12.5	0.085 0.090	0.17 0.18	730 755	8×20 10×16	0.065 0.068	0.130 0.136	995 1,050
560	8×11.5	0.117	0.234	555									10×20	0.052	0.104	1,220
680	10×12.5	0.090	0.180	755	8×15 10×12.5	0.085 0.090	0.170 0.180	730 755	8×20 10×16	0.065 0.068	0.130 0.136	995 1,050	10×20	0.052	0.104	1,220
820	8×15 10×12.5	0.085 0.090	0.170 0.180	730 755					10×20	0.052	0.104	1,220	10×25	0.045	0.090	1,440
1,000	10×12.5	0.090	0.180	755	8×20 10×16	0.065 0.068	0.130 0.136	995 1,050	10×20	0.052	0.104	1,220	10×30 12.5×20	0.035 0.038	0.070 0.076	1,815 1,655
1,200	8×20 10×16	0.065 0.068	0.130 0.136	955 1,050	10×20	0.052	0.104	1,220	10×25	0.045	0.090	1,440				
1,500	10×20	0.052	0.104	1,220	10×20 10×25	0.052 0.045	0.104 0.090	1,220 1,440	12.5×20 10×30	0.038 0.035	0.076 0.070	1,655 1,815	12.5×25 16×25	0.030 0.022	0.060 0.044	1,945 2,555
1,800													12.5×30 16×20	0.025 0.029	0.050 0.058	2,310 2,205
2,200	10×25 12.5×20	0.045 0.038	0.090 0.076	1,440 1,615	10×30 12.5×20	0.035 0.038	0.070 0.076	1,815 1,655	12.5×25	0.030	0.06	1,945	12.5×35 16×25 18×20	0.022 0.022 0.028	0.044 0.044 0.056	2,510 2,555 2,490
2,700	10×30	0.035	0.070	1,815	12.5×25	0.030	0.060	1,945	12.5×30 16×20	0.025 0.029	0.05 0.058	2,310 2,205	16×25	0.022	0.044	2,555
3,300	12.5×20	0.038	0.076	1,655	12.5×25 12.5×30	0.030 0.025	0.060 0.050	1,945 2,310	16×25 12.5×35	0.022 0.022	0.044 0.044	2,555 2,510	16×31.5 18×25	0.018 0.020	0.036 0.040	3,010 2,740
3,900	12.5×25	0.030	0.060	1,945	12.5×35 16×20	0.022 0.029	0.044 0.058	2,510 2,205	16×25 18×20	0.022 0.028	0.044 0.056	2,555 2,490	16×35.5 18×31.5	0.016 0.016	0.032 0.032	3,150 3,635
4,700	12.5×30 16×25	0.025 0.022	0.050 0.044	2,310 2,555	16×25	0.022	0.044	2,555	16×31.5 18×25	0.018 0.020	0.036 0.040	3,010 2,740	18×35.5	0.015	0.030	3,680
5,600	12.5×35 16×20	0.022 0.029	0.044 0.058	2,510 2,205	16×25 18×20	0.022 0.028	0.044 0.056	2,555 2,490	16×35.5 18×31.5	0.016 0.016	0.032 0.032	3,150 3,635				
6,800	16×25 18×20	0.022 0.028	0.044 0.056	2,555 2,490	16×31.5 18×25	0.018 0.020	0.036 0.040	3,010 2,740	18×35.5	0.015	0.030	3,680	18×40	0.014	0.028	3,800
8,200	16×31.5	0.018	0.036	3,010	16×35.5 18×31.5	0.016 0.016	0.032 0.032	3,150 3,635	18×35.5	0.015	0.030	3,680				
10,000	16×31.5 18×25	0.016 0.020	0.032 0.040	3,150 2,740	18×35.5	0.015	0.030	3,680	18×40	0.014	0.028	3,800				
12,000	18×31.5	0.016	0.032	3,635												
15,000	18×35.5	0.015	0.030	3,680	18×40	0.014	0.028	3,800								

Dimension: ϕ D×L(mm)Impedance: Ω / at 100k Hz

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Contents Cap. (μF)	35V (1V)				50V (1H)				63V (1J)				100V (2A)			
	ϕ D×L	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz
		20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
2.2													5×11	9.8	19.6	44
3.3													5×11	6.6	13.2	58
4.7	5×11	0.6	1.2	180	5×11	2.3	4.6	90	5×11	4.7	9.4	68	5×11	4.6	9.2	74
6.8									5×11	2.5	5.0	95	5×11	3.5	7.0	95
10	5×11	0.6	1.2	180	5×11	1.4	2.8	120	5×11	2.1	4.2	110	6.3×11	1.8	3.6	130
12									5×11	2.0	4.0	145				
15									6.3×11	1.2	2.4	160				
18					5×11	1.3	2.6	155					6.3×15	0.83	1.66	180
22	5×11	0.6	1.2	180	5×11	1.2	2.4	170	6.3×11	0.71	1.42	250	8×11.5	0.68	1.36	230
27	5×11	0.6	1.2	180												
33	5×11	0.6	1.2	180	6.3×11	0.43	0.86	300	6.3×11	0.71	1.42	250	8×15 10×12.5	0.45 0.46	0.90 0.92	360 320
39									6.3×15	0.70	1.40	330				
47	6.3×11	0.25	0.5	290	6.3×11	0.43	0.86	300	8×11.5	0.342	0.684	405	10×16 8×20	0.37 0.37	0.74 0.74	420 420
56	6.3×11	0.25	0.5	290	6.3×15	0.40	0.80	360								
68									8×11.5	0.342	0.684	405	10×20	0.30	0.60	490
82	6.3×15	0.23	0.46	430	8×11.5	0.234	0.468	485					10×25	0.25	0.50	540
100	8×11.5	0.117	0.234	555	8×11.5	0.234	0.468	485	10×12.5 8×15	0.256 0.230	0.512 0.460	535 535	12.5×20	0.18	0.36	580
120					8×15 10×12.5	0.155 0.162	0.310 0.324	635 615	10×16	0.194	0.388	600				
150	8×11.5	0.117	0.234	555	10×12.5	0.162	0.324	615	10×16	0.194	0.388	660	12.5×25	0.13	0.26	710
180					8×20 10×16	0.120 0.119	0.240 0.238	860 850	10×20 12.5×16	0.147 0.150	0.294 0.300	885 1,020	12.5×30 16×20	0.12 0.13	0.24 0.26	790 750
220	8×15 10×12.5	0.085 0.090	0.17 0.18	730 755	10×16 10×20	0.119 0.090	0.238 0.180	850 1,030	10×20 10×25	0.147 0.130	0.294 0.260	885 1,050	16×25 18×20	0.10 0.11	0.20 0.22	890 850
270					10×25	0.082	0.164	1,200	16×16	0.090	0.180	1,410				
330	8×20 10×16	0.065 0.068	0.130 0.136	995 1,050	10×20 10×30	0.090 0.060	0.180 0.120	1,030 1,610	12.5×20	0.085	0.170	1,285	16×25	0.090	0.180	1,080
390	10×20	0.052	0.104	1,220	12.5×20	0.063	0.126	1,480	12.5×25 18×16	0.070 0.086	0.140 0.172	1,720 1,690	18×25	0.083	0.166	1,260
470	10×20	0.052	0.104	1,220	12.5×20	0.060	0.120	1,500	12.5×25 12.5×30 16×20	0.070 0.055 0.059	0.140 0.110 0.118	1,720 2,090 1,765	16×31.5	0.076	0.152	1,310
560	10×25	0.045	0.090	1,440	12.5×25	0.050	0.100	1,832	16×25	0.050	0.100	2,160	18×31.5 18×35.5	0.068 0.064	0.136 0.128	1,370 1,410
680	10×30 12.5×20	0.035 0.038	0.070 0.076	1,815 1,655	12.5×25 16×20	0.050 0.048	0.100 0.096	1,832 1,835	12.5×35 18×20	0.047 0.055	0.094 0.110	2,265 2,290				
820					12.5×35 18×20	0.034 0.042	0.068 0.084	2,285 2,200	16×31.5 18×25	0.043 0.043	0.086 0.086	2,670 2,585	18×40	0.047	0.094	1,520
1,000	12.5×25	0.030	0.060	1,945	16×25	0.034	0.068	2,235	16×31.5 16×35.5	0.043 0.036	0.086 0.072	2,670 2,770				
1,200	12.5×30 16×20	0.025 0.029	0.050 0.058	2,310 2,205	16×31.5 18×25	0.028 0.029	0.056 0.058	2,700 2,610	18×31.5	0.032	0.064	2,950				
1,500	12.5×35 16×25	0.022 0.022	0.044 0.044	2,510 2,555	16×31.5 16×35.5	0.028 0.025	0.056 0.050	2,700 2,790	18×35.5	0.030	0.060	3,095				
1,800	16×25 18×20	0.022 0.028	0.044 0.056	2,555 2,490	18×31.5	0.025	0.05	3,000								
2,200	16×31.5 18×25	0.018 0.020	0.036 0.040	3,010 2,740	18×35.5	0.023	0.046	3,100	18×40	0.028	0.056	3,200				
2,700	16×35.5 18×31.5	0.016 0.016	0.032 0.032	3,150 3,635												
3,300	18×35.5	0.015	0.030	3,680												
4,700	18×40	0.014	0.028	3,800												

Part Numbering System

RXW Series 470μF

±20%

6.3V

Bulk Package

Gas Type

8 ϕ × 11.5L

Pb-free and PET sleeve

RXW**471****M****0J****BK****-****0811**

Series Name

Capacitance

Capacitance Tolerance

Rated Voltage

Lead Configuration and Package

Rubber Type

Case Size

Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



RZW Series

Features

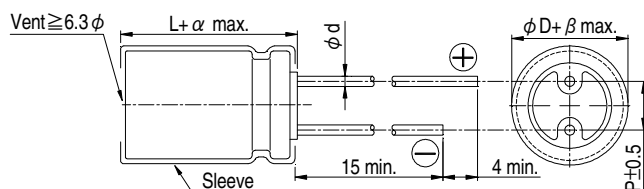
- 105°C, 4,000 ~ 10,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHs compliance



Specifications

Items	Performance																														
Category Temperature Range	-55°C ~ +105°C																														
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																														
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																														
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td></tr></table> When the capacitance exceeds 1000μF, 0.02 shall be added every 1000μF increase.	Rated Voltage	6.3	10	16	25	35	50	63	Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09														
Rated Voltage	6.3	10	16	25	35	50	63																								
Tanδ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09																								
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Impedance Ratio</td><td>Z(-55°C)/Z(+20°C)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-55°C)/Z(+20°C)	3	3	3	3	3	3														
Rated Voltage	6.3	10	16	25	35	50	63																								
Impedance Ratio	Z(-55°C)/Z(+20°C)	3	3	3	3	3	3																								
Endurance	<table><tr><td rowspan="2">Time</td><td>6.3 ~ 10V</td><td>4,000 Hrs for ϕ D = 5 ~ 6.3 mm; 6,000 Hrs for ϕ D = 8 ~ 10 mm; 8,000 Hrs for ϕ D ≥ 12.5 mm</td></tr><tr><td>16 ~ 63V</td><td>5,000 Hrs for ϕ D = 5 ~ 6.3 mm; 7,000 Hrs for ϕ D = 8 ~ 10 mm; 10,000 Hrs for ϕ D ≥ 12.5 mm</td></tr><tr><td colspan="2">Capacitance Change</td><td>Within ±25% of initial value</td></tr><tr><td colspan="2">Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td colspan="2">Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 ~ 10,000 hours at 105°C.	Time	6.3 ~ 10V	4,000 Hrs for ϕ D = 5 ~ 6.3 mm; 6,000 Hrs for ϕ D = 8 ~ 10 mm; 8,000 Hrs for ϕ D ≥ 12.5 mm	16 ~ 63V	5,000 Hrs for ϕ D = 5 ~ 6.3 mm; 7,000 Hrs for ϕ D = 8 ~ 10 mm; 10,000 Hrs for ϕ D ≥ 12.5 mm	Capacitance Change		Within ±25% of initial value	Tanδ		Less than 200% of specified value	Leakage Current		Within specified value																
Time	6.3 ~ 10V		4,000 Hrs for ϕ D = 5 ~ 6.3 mm; 6,000 Hrs for ϕ D = 8 ~ 10 mm; 8,000 Hrs for ϕ D ≥ 12.5 mm																												
	16 ~ 63V	5,000 Hrs for ϕ D = 5 ~ 6.3 mm; 7,000 Hrs for ϕ D = 8 ~ 10 mm; 10,000 Hrs for ϕ D ≥ 12.5 mm																													
Capacitance Change		Within ±25% of initial value																													
Tanδ		Less than 200% of specified value																													
Leakage Current		Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±25% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																						
Test Time	1,000 Hrs																														
Capacitance Change	Within ±25% of initial value																														
Tanδ	Less than 200% of specified value																														
Leakage Current	Within specified value																														
Ripple Current and Frequency Multipliers	<table><tr><td> Freq.(Hz) Cap.(μF) </td><td>120</td><td>1k</td><td>10k</td><td>100k up</td></tr><tr><td>≤ ~ 33</td><td>0.42</td><td>0.70</td><td>0.90</td><td>1.0</td></tr><tr><td>39 ~ 270</td><td>0.50</td><td>0.73</td><td>0.92</td><td>1.0</td></tr><tr><td>330 ~ 680</td><td>0.55</td><td>0.77</td><td>0.94</td><td>1.0</td></tr><tr><td>820 ~ 1,800</td><td>0.6</td><td>0.80</td><td>0.96</td><td>1.0</td></tr><tr><td>2,200 ~ 18,000</td><td>0.7</td><td>0.85</td><td>0.98</td><td>1.0</td></tr></table>	Freq.(Hz) Cap.(μF)	120	1k	10k	100k up	≤ ~ 33	0.42	0.70	0.90	1.0	39 ~ 270	0.50	0.73	0.92	1.0	330 ~ 680	0.55	0.77	0.94	1.0	820 ~ 1,800	0.6	0.80	0.96	1.0	2,200 ~ 18,000	0.7	0.85	0.98	1.0
Freq.(Hz) Cap.(μF)	120	1k	10k	100k up																											
≤ ~ 33	0.42	0.70	0.90	1.0																											
39 ~ 270	0.50	0.73	0.92	1.0																											
330 ~ 680	0.55	0.77	0.94	1.0																											
820 ~ 1,800	0.6	0.80	0.96	1.0																											
2,200 ~ 18,000	0.7	0.85	0.98	1.0																											

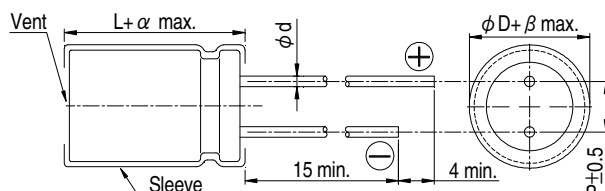
Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						

The case size of 12.5×16, 16×16, 16×20, 18×16, 18×20 and 18×25 are suitable for below diagram:





Dimension: $\phi D \times L(\text{mm})$

Impedance: Ω / at 100k Hz

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Contents Cap. (μF)	6.3V (0J)				10V (1A)				16V (1C)				25V (1E)							
	ϕ D×L	Impedance (Ω, max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω, max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω, max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	ϕ D×L	Impedance (Ω, max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz				
		20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C					
47													5×11	0.58	1.16	210				
56									5×11	0.58	1.16	210								
100					5×11	0.58	1.16	210					6.3×11	0.22	0.44	340				
120									6.3×11	0.22	0.44	340								
150	5×11	0.58	1.16	210																
220					6.3×11	0.22	0.44	340	8×11.5	0.11	0.22	640	8×11.5	0.11	0.22	640				
330	6.3×11	0.22	0.44	340					8×11.5	0.11	0.22	640	8×15 10×12.5	0.083 0.080	0.166 0.160	840 865				
470					8×11.5	0.11	0.22	640	8×15 10×12.5	0.083 0.080	0.166 0.160	840 865	8×20 10×16	0.064 0.060	0.128 0.120	1,050 1,210				
680	8×11.5	0.11	0.22	640	8×15 10×12.5	0.083 0.080	0.166 0.160	840 865	8×20 10×16	0.064 0.060	0.128 0.120	1,050 1,210	10×20 12.5×16	0.046 0.049	0.092 0.098	1,400 1,450				
820	10×12.5	0.080	0.16	865									10×25	0.042	0.084	1,650				
1,000	8×15	0.087	0.174	840	8×20 10×16	0.064 0.060	0.128 0.120	1,050 1,210	10×20 12.5×16	0.046 0.049	0.092 0.098	1,400 1,450	10×30 12.5×20 16×16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940				
1,200	8×20 10×16	0.069 0.060	0.128 0.120	1,050 1,210	10×20	0.046	0.092	1,400	10×25	0.042	0.084	1,650	18×16	0.043	0.086	2,210				
1,500	10×20	0.046	0.092	1,400	10×25 12.5×16	0.042 0.049	0.084 0.090	1,650 1,450	10×30 12.5×20 16×16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5×25	0.027	0.054	2,230				
1,800	12.5×16	0.045	0.090	1,450									12.5×30 16×20	0.024 0.027	0.048 0.054	2,650 2,530				
2,200	10×25	0.042	0.084	1,650	10×30 12.5×20 16×16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5×25 18×16	0.027 0.043	0.054 0.086	2,230 2,210	12.5×35 18×20	0.020 0.026	0.040 0.052	2,880 2,860				
2,700	10×30 16×16	0.031 0.042	0.062 0.084	1,910 1,940	18×16	0.043	0.086	2,210	12.5×30 16×20	0.024 0.027	0.048 0.054	2,650 2,530	12.5×40 16×25	0.017 0.021	0.034 0.042	3,350 2,930				
3,300	12.5×20	0.035	0.070	1,900	12.5×25	0.027	0.054	2,230	12.5×35	0.020	0.040	2,880	16×31.5 18×25	0.017 0.019	0.034 0.038	3,450 3,140				
3,900	12.5×25 18×16	0.027 0.043	0.054 0.086	2,230 2,210	12.5×30 16×20	0.024 0.027	0.048 0.054	2,650 2,530	12.5×40 16×25 18×20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16×35.5 18×31.5	0.015 0.015	0.030 0.030	3,610 4,170				
4,700	12.5×30	0.024	0.048	2,650	12.5×35	0.020	0.040	2,880	16×31.5 18×25	0.017 0.019	0.034 0.038	3,450 3,140	16×40 18×35.5	0.013 0.014	0.026 0.028	4,080 4,220				
5,600	12.5×35 16×20	0.020 0.027	0.040 0.054	2,880 2,530	12.5×40 16×25 18×20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16×35.5 18×31.5	0.015 0.015	0.030 0.03	3,610 4,170	18×40	0.012	0.024	4,280				
6,800	12.5×40 16×25 18×20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16×31.5 18×25	0.017 0.019	0.034 0.038	3,450 3,140	16×40	0.013	0.026	4,080								
8,200	16×31.5	0.017	0.034	3,450	16×35.5 18×31.5	0.015 0.015	0.030 0.030	3,610 4,170	18×35.5	0.014	0.02	4,220								
10,000	16×35.5 18×25	0.015 0.019	0.030 0.038	3,610 3,140	16×40 18×35.5	0.013 0.014	0.026 0.028	4,080 4,220	18×40	0.012	0.024	4,280								
12,000	16×40 18×31.5	0.013 0.015	0.026 0.030	4,080 4,170	18×40	0.012	0.024	4,280												
15,000	18×35.5	0.014	0.028	4,220																
18,000	18×40	0.012	0.024	4,280																


Dimension: $\phi D \times L(\text{mm})$

Impedance: $\Omega/$ at 100k Hz

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap. (μF)	35V (1V)				50V (1H)				63V (1J)			
	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C)	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C)	$\phi D \times L$	Impedance (Ω , max./100kHz)		Ripple Current (mA/rms, 105°C)
		20°C	-10°C			20°C	-10°C			20°C	-10°C	
3.3					5×11	2.9	5.8	53				
4.7					5×11	2.5	5.0	95				
10					5×11	2.0	4.0	130				
15									5×11	1.2	2.4	165
22					5×11	0.91	1.82	180				
33	5×11	0.58	1.16	210					6.3×11	0.49	0.98	265
56	6.3×11	0.22	0.44	340	6.3×11	0.39	0.78	295	8×11.5	0.31	0.62	500
82									8×15 10×12.5	0.22 0.15	0.44 0.30	665 690
100					8×11.5	0.22	0.44	555				
120					8×15	0.190	0.38	730	8×20 10×16	0.17 0.11	0.34 0.22	820 950
150	8×11.5	0.11	0.22	640	10×12.5	0.160	0.32	760				
180					8×20	0.17	0.34	880	10×20 12.5×16	0.078 0.101	0.156 0.202	1,150 1,150
220	8×15 10×12.5	0.083 0.080	0.166 0.160	840 865	10×16	0.110	0.22	1,050	10×25	0.064	0.128	1,350
270	8×20	0.064	0.128	1,050	10×20 12.5×16	0.078 0.079	0.156 0.158	1,220 1,260	12.5×20	0.057	0.114	1,500
330	10×16	0.060	0.120	1,210	10×25	0.072	0.144	1,440				
390									12.5×25	0.043	0.086	1,900
470	10×20 12.5×16	0.046 0.049	0.092 0.098	1,400 1,450	10×30 12.5×20 16×16	0.056 0.059 0.072	0.112 0.118 0.114	1,690 1,660 1,690	12.5×30 16×20	0.039 0.045	0.078 0.090	2,300 2,000
560	10×25	0.042	0.084	1,650	12.5×25 18×16	0.044 0.070	0.088 0.140	1,950 1,930	12.5×35	0.034	0.068	2,500
680	10×30 12.5×20 16×16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5×30	0.039	0.078	2,310	12.5×40 16×25 18×20	0.029 0.035 0.042	0.058 0.070 0.084	2,800 2,600 2,500
820					12.5×35 16×20	0.033 0.044	0.066 0.088	2,510 2,210	16×31.5 18×25	0.029 0.034	0.058 0.068	2,850 2,800
1,000	12.5×25 18×16	0.027 0.043	0.054 0.086	2,230 2,210	12.5×40 16×25 18×20	0.027 0.033 0.047	0.054 0.066 0.094	2,920 2,555 2,490	16×35.5	0.027	0.054	2,900
1,200	12.5×30 16×20	0.024 0.027	0.048 0.054	2,650 2,530	16×31.5 18×25	0.027 0.028	0.054 0.056	3,010 2,740	16×40 18×31.5	0.025 0.028	0.050 0.056	3,400 3,300
1,500	12.5×35	0.020	0.040	2,880	16×35.5	0.024	0.048	3,150	18×35.5	0.025	0.050	3,400
1,800	12.5×40 16×25 18×20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16×40 18×31.5	0.021 0.024	0.042 0.048	3,710 3,635	18×40	0.024	0.048	3,500
2,200	16×31.5 18×25	0.017 0.019	0.034 0.038	3,450 3,140	18×35.5	0.022	0.044	3,680				
2,700	16×35.5 18×31.5	0.015 0.015	0.030 0.030	3,610 4,170	18×40	0.018	0.036	3,800				
3,300	16×40 18×35.5	0.013 0.014	0.026 0.028	4,080 4,220								
3,900	18×40	0.012	0.024	4,280								

Part Numbering System

RZW Series	470μF	±20%	16V	Bulk Package	Gas Type	8 $\phi \times 15L$	Pb-free and PET sleeve
<u>RZW</u>	<u>471</u>	<u>M</u>	<u>1C</u>	<u>BK</u>	<u>-</u>	<u>0815</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RXC Series

Features

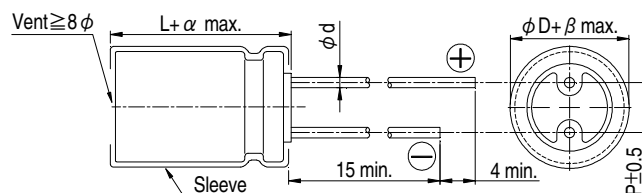
- 105°C, 2,000 ~ 3,000 hours assured
- Suitable for switching power supplies, UPS
- Smaller size with large permissible ripple current
- RoHS compliace



Specifications

Items	Performance																					
Category Temperature Range	160 ~ 400V				450V																	
	-40°C ~ +105°C				-25°C ~ +105°C																	
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																					
Leakage Current (at 20°C)	Time		After 5 minutes																			
	Leakage Current		CV ≤ 1,000 I = 0.03CV(μA)		CV > 1,000 I = 0.02CV(μA)																	
	Where, C = rated capacitance in μF, V = rated DC working voltage in V																					
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>							Rated Voltage	160	200	250	350	400	450	Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24	
Rated Voltage	160	200	250	350	400	450																
Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24																
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																					
	Rated Voltage		160	200	250	350	400	450														
	Impedance Ratio	Z(-25°C)/Z(+20°C)	3	3	3	3	5	6														
Z(-40°C)/Z(+20°C)		4	4	4	4	6	-															
Endurance	Test Time		2,000 Hrs for ϕ D ≤ 10 mm; 3,000 Hrs for ϕ D ≥ 12.5 mm																			
	Capacitance Change		Within ±20% of initial value																			
	Tanδ		Less than 200% of specified value																			
	Leakage Current		Within specified value																			
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 ~ 3,000 hours at 105°C.																					
Shelf Life Test	Test Time		1,000 Hrs																			
	Capacitance Change		Within ±20% of initial value																			
	Tanδ		Less than 200% of specified value																			
	Leakage Current		Within specified value																			
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																					
Ripple Current and Frequency Multipliers	<table><tr><td>Cap. (μF) \ Freq.(Hz)</td><td>120</td><td>1k</td><td>10k</td><td>100k</td></tr><tr><td>≤ 82</td><td>1.00</td><td>1.20</td><td>1.40</td><td>1.50</td></tr><tr><td>100 ≤</td><td>1.00</td><td>1.18</td><td>1.35</td><td>1.45</td></tr></table>							Cap. (μF) \ Freq.(Hz)	120	1k	10k	100k	≤ 82	1.00	1.20	1.40	1.50	100 ≤	1.00	1.18	1.35	1.45
Cap. (μF) \ Freq.(Hz)	120	1k	10k	100k																		
≤ 82	1.00	1.20	1.40	1.50																		
100 ≤	1.00	1.18	1.35	1.45																		

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
ϕd	0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0				
β	0.5				


Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms, 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Contents Cap.(μF)	160V (2C)			200V (2D)			250V (2E)			350V (2V)			400V (2G)		
	φ D×L	Ripple Current		φ D×L	Ripple Current		φ D×L	Ripple Current		φ D×L	Ripple Current		φ D×L	Ripple Current	
		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz
2.2										10×12.5	55	83	10×12.5	55	83
3.3	8×11.5	48	72	8×11.5	52	78	8×11.5	65	98	10×16	75	113	10×16	75	113
4.7	8×11.5	58	87	10×12.5	88	132	10×12.5	90	135	10×20	120	180	10×20	100	150
10	10×12.5 10×16	88 100	132 150	10×16	125	188	10×16	150	225	10×20	150	225	10×20	145	218
22	10×16	155	233	10×20	170	255	12.5×20	240	360	12.5×20	240	360	12.5×25	260	390
33	10×20	220	330	12.5×20	275	415	12.5×25	365	550	12.5×25	300	450	12.5×25	285	430
47	12.5×25	340	510	12.5×20	295	445	12.5×25	390	585	16×25	410	615	16×25	400	600
68	12.5×25	385	580	12.5×25	395	595	16×25	485	730	16×31.5	485	730	16×31.5	490	735
100	12.5×25	450	655	16×25	550	800	16×31.5	630	915	16×31.5	520	755	18×31.5	610	885
150	16×25	610	885	16×31.5	720	1,045	18×31.5	780	1,130						
220	16×31.5	755	1,095	18×35.5	900	1,305	18×40	970	1,405						
330	18×35.5	940	1,360												

Rated Volt. (Vdc) Contents Cap.(μF)	450V (2W)			
	$\phi D \times L$	Ripple Current		
		120 Hz	100k Hz	
1.5	10×12.5	50	75	
2.2	10×16	68	102	
3.3	10×20	88	132	
4.7	12.5×16	127	190	
10	12.5×25	200	300	
22	16×25	305	460	
33	16×31.5	410	615	
47	18×31.5	495	745	
68	18×35.5	540	810	

Part Numbering System

RXC Series	22 μF	±20%	450V	Bulk Package	Gas Type	16 ϕ ×25L	Pb-free and PET sleeve
RXC	220	M	2W	BK	-	1625	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



RXB Series

Features

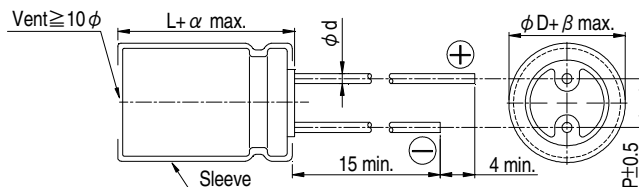
- 105°C, 5,000 hours assured
- Suitable for switching power supplies, UPS, Ballast
- Smaller size with large permissible ripple current
- RoHS compliance



Specifications

Items	Performance																												
Category Temperature Range	160 ~ 400V			450V																									
	-40℃ ~ +105℃			-25℃ ~ +105℃																									
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																												
Leakage Current (at 20℃)	Time		after 5 minutes																										
	Leakage Current	CV ≤ 1,000 I = 0.03CV(μA)		CV > 1,000 I = 0.02CV(μA)																									
		Where, C = rated capacitance in μF, V = rated DC working voltage in V																											
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>						Rated Voltage	160	200	250	350	400	450	Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24									
Rated Voltage	160	200	250	350	400	450																							
Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24																							
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃) / Z(+20℃)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>5</td><td>6</td></tr><tr><td>Z(-40℃) / Z(+20℃)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>6</td><td>-</td></tr></table>						Rated Voltage		160	200	250	350	400	450	Impedance Ratio	Z(-25℃) / Z(+20℃)	3	3	3	3	5	6	Z(-40℃) / Z(+20℃)	4	4	4	4	6	-
Rated Voltage		160	200	250	350	400	450																						
Impedance Ratio	Z(-25℃) / Z(+20℃)	3	3	3	3	5	6																						
	Z(-40℃) / Z(+20℃)	4	4	4	4	6	-																						
Endurance	<table><tr><td>Test Time</td><td>5,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 5,000 hours at 105℃.						Test Time	5,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	5,000 Hrs																												
Capacitance Change	Within ±20% of initial value																												
Tanδ	Less than 200% of specified value																												
Leakage Current	Within specified value																												
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).						Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value															
Test Time	1,000 Hrs																												
Capacitance Change	Within ±20% of initial value																												
Tanδ	Less than 200% of specified value																												
Leakage Current	Within specified value																												
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap. (μF)</td><td>120</td><td>1k</td><td>10k</td><td>100k up</td></tr><tr><td>4.7 ~ 82</td><td>1.00</td><td>1.20</td><td>1.40</td><td>1.50</td></tr><tr><td>100 ≤</td><td>1.00</td><td>1.18</td><td>1.35</td><td>1.45</td></tr></table>						Freq.(Hz) Cap. (μF)	120	1k	10k	100k up	4.7 ~ 82	1.00	1.20	1.40	1.50	100 ≤	1.00	1.18	1.35	1.45								
Freq.(Hz) Cap. (μF)	120	1k	10k	100k up																									
4.7 ~ 82	1.00	1.20	1.40	1.50																									
100 ≤	1.00	1.18	1.35	1.45																									

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0			
β	0.5			



Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap.(μF)	160V (2C)			200V (2D)			250V (2E)			350V (2V)			400V (2G)		
	$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current	
		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz
4.7													10×16	98	147
6.8										10×16	100	150	10×16	120	180
10							10×16	155	233	10×20	160	240	10×20	170	255
22	10×16	190	285	10×16	205	305	12.5×20	210	315	12.5×25	305	460	12.5×25	320	480
33	10×20	255	380	10×20	280	420	12.5×20	335	505	16×25	410	615	16×25	425	635
47	10×20	265	395	12.5×20	330	495	16×25	560	840	16×31.5	510	765	16×31.5	530	795
68	12.5×20	430	645	12.5×25	480	720	16×25	600	900	18×31.5	580	870	18×31.5	600	900
100	12.5×25	540	780	16×20	570	825	16×31.5	700	1,015	18×35.5	665	965	18×40	700	1,015
120	16×20	555	805	16×25	700	1,015	18×31.5	790	1,145	18×40	715	1,035	18×45	780	1,130
150	16×25	645	935	16×31.5	750	1,090	18×35.5	875	1,270						
180	16×31.5	745	1,080	18×31.5	830	1,205	18×40	980	1,420						
220	18×31.5	825	1,196	18×35.5	900	1,305	18×45	1,100	1,595						
270	18×35.5	930	1,350	18×40	1,100	1,595									
330	18×40	995	1,440	18×45	1,250	1,815									

Rated Volt. (Vdc) Contents Cap.(μF)	450V (2W)		
	$\phi D \times L$	Ripple Current	
		120 Hz	100k Hz
4.7	10×16	105	158
6.8	10×20	170	255
10	12.5×20	280	420
22	16×25	405	610
33	16×31.5	490	735
47	18×31.5	575	865
68	18×40	665	1,000

Part Numbering System

RXB Series 22 μF $\pm 20\%$ 450V Bulk Package Gas Type 16 $\phi \times 25\text{L}$ Pb-free and PET sleeve
RXB **220** **M** **2W** **BK** - **1625**
 Series Name Capacitance Capacitance Tolerance Rated Voltage Lead Configuration and Package Rubber Type Case Size Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



RXQ Series

Features

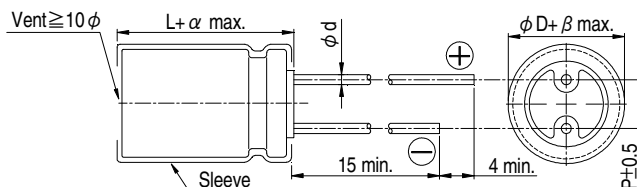
- 105°C, 8,000 ~ 10,000 hours assured
- Suitable for switching power supplies, UPS, Ballast
- Smaller case size current
- RoHS compliance



Specifications

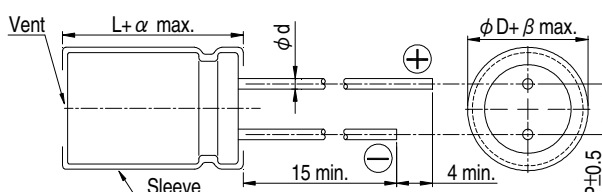
Items	Performance																				
Category Temperature Range	160 ~ 400V				450V																
	-40℃ ~ +105℃				-25℃ ~ +105℃																
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																				
Leakage Current (at 20℃)	Time		after 5 minutes																		
	Leakage Current		CV ≤ 1,000 I = 0.03CV + 15(μA)		CV > 1,000 I = 0.02CV + 25(μA)																
			Where, C = rated capacitance in μF, V = rated DC working voltage in V																		
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>							Rated Voltage	160	200	250	350	400	450	Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24
Rated Voltage	160	200	250	350	400	450															
Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24															
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																				
	Rated Voltage		160	200	250	350	400	450													
	Impedance Ratio	Z(-25℃)/Z(+20℃)	3	3	3	5	5	6													
Z(-40℃)/Z(+20℃)		6	6	6	6	6	-														
Endurance	Test Time		8,000 Hrs for ϕ D = 10 mm; 10,000 Hrs for ϕ D ≥ 12.5 mm																		
	Capacitance Change		Within ±20% of initial value																		
	Tanδ		Less than 200% of specified value																		
	Leakage Current		Within specified value																		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 8,000 / 10,000 hours at 105℃.																				
Shelf Life Test	Test Time		1,000 Hrs																		
	Capacitance Change		Within ±20% of initial value																		
	Tanδ		Less than 200% of specified value																		
	Leakage Current		Within specified value																		
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																				
Ripple Current and Frequency Multipliers	Frequency (Hz)		120	1k	10k	100k up															
	Cap. (μF)																				
	6.8 ~ 82		1.00	1.75	2.25	2.50															
	100 ≤		1.00	1.67	2.05	2.25															

Diagram of Dimensions



Lead Spacing and Diameter				Unit: mm
ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0			
β	0.5			

The case size of 16×20, 18×20 and 18×25 are suitable for below diagram:




Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc) Contents Cap.(μ F)	160V (2C)			200V (2D)			250V (2E)			350V (2V)			400V (2G)		
	$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current	
		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz
6.8										10×16	110	275	10×16	110	275
10	10×12.5	100	250	10×16	125	313	10×20	140	350	10×20	140	350	10×20	140	350
22	10×16 10×20	170 200	425 500	10×20	200	500	10×20	200	500	12.5×20	260	650	12.5×20	260	650
33	10×20	250	625	10×20	260	650	12.5×20	320	800	16×20	360	900	16×20	360	900
47	10×20	300	750	12.5×20	390	975	12.5×20	390	975	16×20	430	1,075	16×25 18×20	470 450	1,175 1,125
68	12.5×20	470	1,175	12.5×20	470	1,175	16×20	520	1,300	16×25 18×20	560 550	1,400 1,375	18×25	585	1,463
82	12.5×20	510	1,275	16×20	550	1,375	16×20	550	1,375	18×25	610	1,525	18×25	610	1,525
100	12.5×25 16×20	620 630	1,395 1,418	16×20	630	1,418	16×25	680	1,530	18×25	700	1,575	18×31.5	765	1,721
120										18×31.5	830	1,868	18×35.5	865	1,946
150	16×25	770	1,733	16×25	840	1,890	18×25	860	1,935	18×35.5	960	2,160	18×40	985	2,216
220	16×31.5	1,020	2,295	18×25	1,050	2,363	18×31.5	1,130	2,543						
330	18×35.5	1,390	3,128	18×35.5	1,430	3,218									

Rated Volt. (Vdc) Contents Cap.(μ F)	450V (2W)		
	$\phi D \times L$	Ripple Current	
		120 Hz	100k Hz
6.8	10×20	110	275
10	12.5×20	180	450
22	16×20	290	725
33	16×25 18×20	390 380	975 950
47	18×25	480	1,200
68	18×31.5	630	1,575
82	18×35.5	715	1,788
100	18×40	800	1,800

Part Numbering System

RXQ Series	10 μ F	±20%	450V	Bulk Package	Gas Type	12.5 ϕ ×20L	Pb-free and PET sleeve
<u>RXQ</u>	<u>100</u>	<u>M</u>	<u>2W</u>	<u>BK</u>	<u>-</u>	<u>1320</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RLD Series

Features

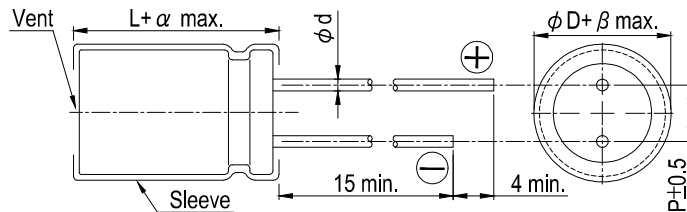
- 105°C, 12,000 hours assured
- 10 ϕ ~ 18 ϕ with large permissible ripple current
- Suitable for switching power supplies, UPS, Ballast
- Smaller case size current
- RoHS compliance



Specifications

Items	Performance																																		
Category Temperature Range	160 ~ 400V				450V																														
	-40°C ~ +105°C				-25°C ~ +105°C																														
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																		
Leakage Current (at 20°C)	<table><tr><td>Time</td><td colspan="6">after 5 minutes</td></tr><tr><td rowspan="2">Leakage Current</td><td colspan="3">CV ≤ 1,000 I = 0.03CV + 15(μA)</td><td colspan="3">CV > 1,000 I = 0.02CV + 25(μA)</td></tr></table>							Time	after 5 minutes						Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)			CV > 1,000 I = 0.02CV + 25(μA)																
	Time	after 5 minutes																																	
	Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)			CV > 1,000 I = 0.02CV + 25(μA)																														
Where, C = rated capacitance in μF, V = rated DC working voltage in V																																			
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>							Rated Voltage	160	200	250	350	400	450	Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24														
Rated Voltage	160	200	250	350	400	450																													
Tanδ (max)	0.20	0.20	0.20	0.24	0.24	0.24																													
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																		
	Rated Voltage		160	200	250	350	400	450																											
	Impedance Ratio	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6																											
Z(-40°C)/Z(+20°C)		6	6	6	6	6	-																												
Endurance	<table><tr><td>Test Time</td><td colspan="6">12,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table>							Test Time	12,000 Hrs						Capacitance Change	Within ±20% of initial value						Tanδ	Less than 200% of specified value						Leakage Current	Within specified value					
	Test Time	12,000 Hrs																																	
	Capacitance Change	Within ±20% of initial value																																	
	Tanδ	Less than 200% of specified value																																	
	Leakage Current	Within specified value																																	
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 12,000 hours at 105°C.																																			
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="6">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Less than 500% of specified value</td></tr></table>							Test Time	1,000 Hrs						Capacitance Change	Within ±20% of initial value						Tanδ	Less than 200% of specified value						Leakage Current	Less than 500% of specified value					
	Test Time	1,000 Hrs																																	
	Capacitance Change	Within ±20% of initial value																																	
	Tanδ	Less than 200% of specified value																																	
	Leakage Current	Less than 500% of specified value																																	
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																																			
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120</td><td>1k</td><td>10k</td><td>100k up</td></tr><tr><td>Cap. (μF)</td><td></td><td></td><td></td><td></td></tr><tr><td>15 ~ 82</td><td>1.00</td><td>1.75</td><td>2.25</td><td>2.50</td></tr><tr><td>100 ≤</td><td>1.00</td><td>1.67</td><td>2.05</td><td>2.25</td></tr></table>							Frequency (Hz)	120	1k	10k	100k up	Cap. (μF)					15 ~ 82	1.00	1.75	2.25	2.50	100 ≤	1.00	1.67	2.05	2.25								
	Frequency (Hz)	120	1k	10k	100k up																														
	Cap. (μF)																																		
15 ~ 82	1.00	1.75	2.25	2.50																															
100 ≤	1.00	1.67	2.05	2.25																															

Diagram of Dimensions



Lead Spacing and Diameter				Unit: mm
ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	2.0			
β	0.5			

Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 105°C

[illegible]

Rated Volt. (V _{oc}) Contents Cap.(μF)	450V (2W)		
	φ D×L	Ripple Current	
		120 Hz	100k Hz
15	10×25	185	463
22	10×35	250	625
27	10×40	290	725
	12.5×25	340	850
33	12.5×30	400	1,000
47	12.5×40	525	1,313
	16×25	500	1,250
56	12.5×50	605	1,513
	16×31.5	585	1,463
68	16×35.5	660	1,650
	18×31.5	660	1,650
82	16×45	760	1,900
	18×35.5	755	1,888
100	16×50	855	1,924
	18×40	845	1,901
120	18×45	945	2,126

Part Numbering System

RDL Series	15 µF	±20%	450V	Bulk Package	Flat Type	10 ϕ ×25L	Pb-free and PET sleeve
<u>RDL</u>	<u>150</u>	<u>M</u>	<u>2W</u>	<u>BK</u>	<u>F</u>	<u>1025</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to “Part Numbering System - Radial Type” on page 139.

RGL Series

Features

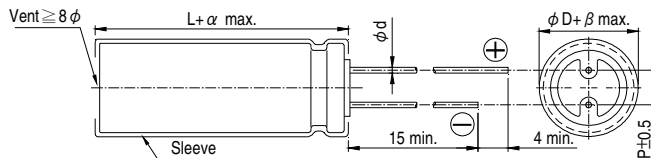
- 105°C, for general purposes
- 8 ϕ ~ 18 ϕ with large permissible ripple current
- Slim type included
- RoHS compliance



Specifications

Items	Performance																			
Category Temperature Range	400V		420 ~ 450V																	
	-40℃ ~ +105℃		-25℃ ~ +105℃																	
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																			
Leakage Current (at 20℃)	<table><tr><td>Time</td><td colspan="4">after 5 minutes</td></tr><tr><td rowspan="2">Leakage Current</td><td colspan="2">CV ≤ 1,000 I = 0.03CV + 15(μA)</td><td colspan="2">CV > 1,000 I = 0.02CV + 25(μA)</td></tr></table> Where, C = rated capacitance in μF, V = rated DC working voltage in V					Time	after 5 minutes				Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)		CV > 1,000 I = 0.02CV + 25(μA)						
Time	after 5 minutes																			
Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)		CV > 1,000 I = 0.02CV + 25(μA)																	
	Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>400</td><td>420</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.24</td><td>0.24</td><td>0.24</td></tr></table>				Rated Voltage	400	420	450	Tanδ (max)	0.24	0.24	0.24							
Rated Voltage	400	420	450																	
Tanδ (max)	0.24	0.24	0.24																	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>400</td><td>420</td><td>450</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>5</td><td>6</td><td>6</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>6</td><td>-</td><td>-</td></tr></table>				Rated Voltage		400	420	450	Impedance Ratio	Z(-25℃)/Z(+20℃)	5	6	6	Z(-40℃)/Z(+20℃)	6	-	-		
Rated Voltage		400	420	450																
Impedance Ratio	Z(-25℃)/Z(+20℃)	5	6	6																
	Z(-40℃)/Z(+20℃)	6	-	-																
Endurance	<table><tr><td>Test Time</td><td colspan="3">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="3">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 105℃.				Test Time	2,000 Hrs			Capacitance Change	Within ±20% of initial value			Tanδ	Less than 200% of specified value			Leakage Current	Within specified value		
Test Time	2,000 Hrs																			
Capacitance Change	Within ±20% of initial value																			
Tanδ	Less than 200% of specified value																			
Leakage Current	Within specified value																			
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="3">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="3">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).				Test Time	1,000 Hrs			Capacitance Change	Within ±20% of initial value			Tanδ	Less than 200% of specified value			Leakage Current	Within specified value		
Test Time	1,000 Hrs																			
Capacitance Change	Within ±20% of initial value																			
Tanδ	Less than 200% of specified value																			
Leakage Current	Within specified value																			
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>60</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>Multipliers</td><td>0.8</td><td>1.00</td><td>1.25</td><td>1.45</td><td>1.50</td></tr></table>					Frequency (Hz)	60	120	500	1k	10k up	Multipliers	0.8	1.00	1.25	1.45	1.50			
Frequency (Hz)	60	120	500	1k	10k up															
Multipliers	0.8	1.00	1.25	1.45	1.50															

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕ D	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
ϕ d	0.6			0.8	
α	2.0				
β	0.5				



Dimension and Permissible Ripple Current										Dimension: ϕ D × L(mm) Ripple Current: mA/rms at 105°C							
Rated Voltage (V _{DC})	Cap. (μF)	8 ϕ			10 ϕ			12.5 ϕ			16 ϕ			18 ϕ			
		ϕ D×L	Ripple Current 120 Hz 100k Hz		ϕ D×L	Ripple Current 120 Hz 100k Hz		ϕ D×L	Ripple Current 120 Hz 100k Hz		ϕ D×L	Ripple Current 120 Hz 100k Hz		ϕ D×L	Ripple Current 120 Hz 100k Hz		
400V (2G)	15	8×30	190	285													
	22	8×35	250	375													
	27	8×40	300	450	10×30	245	370										
	33	8×45	350	525	10×35	295	445										
	39	8×50	390	585	10×40	345	515										
	47				10×45	400	600										
	56				10×50	450	675	12.5×30	470	705							
	68							12.5×35	540	810							
	82							12.5×40	620	930							
	100																
	120										16×35.5 16×40	800 840	1,200 1,260				
	150										16×45	940	1,410	18×35.5	920	1,380	
	180										16×50	1,050	1,575	18×40	1,060	1,590	
220													18×45	1,200	1,800		
420V (2P)	15	8×30	195	293													
	22	8×35	255	383													
	27	8×45	320	480	10×30	245	370										
	33	8×50	370	555	10×35	295	445										
	39				10×40	345	515										
	47				10×45	400	600										
	56				10×50	450	675	12.5×30	470	705							
	68							12.5×35	540	810							
	82							12.5×45	630	945							
	100							12.5×50	730	1,095	16×35.5	730	1,095				
	120										16×40 16×45	840 885	1,260 1,330	18×35.5	850	1,275	
	150										16×50	1030	1,545	18×35.5 18×40	920 960	1,380 1,440	
	180													18×45	1,100	1,650	
220													18×50	1,220	1,830		
450V (2W)	15	8×30	195	293													
	22	8×40	270	405	10×30	225	330										
	27	8×45	320	480	10×35	265	400										
	33	8×50	370	555	10×40	315	475										
	39				10×45	360	545	12.5×30	400	600							
	47				10×50	420	625	12.5×35	460	690							
	56							12.5×40	520	780							
	68							12.5×45	580	870							
	82							12.5×50	660	990	16×35.5	660	990				
	100										16×40	750	1,125				
	120										16×45	840	1,260	18×35.5	820	1,230	
	150										16×50	980	1,470	18×45	995	1,490	
	180													18×50	1,140	1,710	

Remark: Other sizes and specification are available, please contact us for detail.

Part Numbering System

RGL Series	22μF	±20%	450V	Bulk Package	Gas Type	10 ϕ ×30L	Pb-free and PET sleeve
RGL	220	M	2W	BK	-	1030	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RPL Series

Features

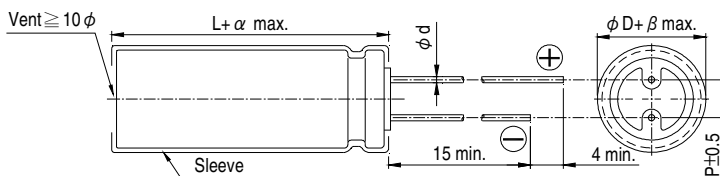
- 105°C, 5,000 hours assured
- 10 ϕ ~ 18 ϕ with large permissible ripple current
- Slim type included
- RoHS compliance



Specifications

Items	Performance																								
Category Temperature Range	400V		420 ~ 450V																						
	-40°C ~ +105°C		-25°C ~ +105°C																						
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																								
Leakage Current (at 20°C)	<table><tr><td>Time</td><td colspan="4">after 5 minutes</td></tr><tr><td rowspan="2">Leakage Current</td><td>CV ≤ 1,000 I = 0.03CV + 15(μA)</td><td colspan="3">CV > 1,000 I = 0.02CV + 25(μA)</td></tr></table>					Time	after 5 minutes				Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)	CV > 1,000 I = 0.02CV + 25(μA)												
	Time	after 5 minutes																							
	Leakage Current	CV ≤ 1,000 I = 0.03CV + 15(μA)	CV > 1,000 I = 0.02CV + 25(μA)																						
Where, C = rated capacitance in μF, V = rated DC working voltage in V																									
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>400</td><td>420</td><td colspan="2">450</td></tr><tr><td>Tanδ (max)</td><td>0.24</td><td>0.24</td><td colspan="2">0.24</td></tr></table>					Rated Voltage	400	420	450		Tanδ (max)	0.24	0.24	0.24											
	Rated Voltage	400	420	450																					
Tanδ (max)	0.24	0.24	0.24																						
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																								
	Rated Voltage		400	420	450																				
	Impedance Ratio	Z(-25°C)/Z(+20°C)	5	6	6																				
Z(-40°C)/Z(+20°C)		6	-	-																					
Endurance	<table><tr><td>Test Time</td><td colspan="4">5,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	5,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	5,000 Hrs																							
	Capacitance Change	Within ±20% of initial value																							
	Tanδ	Less than 200% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 5,000 hours at 105°C.																									
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																							
	Capacitance Change	Within ±20% of initial value																							
	Tanδ	Less than 200% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																									
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>60</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>Multipliers</td><td>0.80</td><td>1.00</td><td>1.25</td><td>1.40</td><td>1.50</td></tr></table>					Frequency (Hz)	60	120	500	1k	10k up	Multipliers	0.80	1.00	1.25	1.40	1.50								
	Frequency (Hz)	60	120	500	1k	10k up																			
Multipliers	0.80	1.00	1.25	1.40	1.50																				

Diagram of Dimensions



Lead Spacing and Diameter

Unit: mm

ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	2.0			
β	0.5			



Dimension and Permissible Ripple Current

Dimension: $\phi D \times L(\text{mm})$
Ripple Current: mA/rms at 105°C

Rated Voltage (V _{DC})	Cap. (μF)	10 ϕ				12.5 ϕ				16 ϕ				18 ϕ			
		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$
			120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz	
400V (2G)	33	10×35	320	480													
	39	10×40	380	570	12.5×30	380	570										
	47	10×45	425	638													
	56	10×50	490	735	12.5×35	475	713										
	68				12.5×40	550	825	16×31.5	530	795							
	82				12.5×45	615	923	16×35.5	605	908							
	100							16×40	740	1,110							
	120							16×45	795	1,193	18×35.5	730	1,095				
	150							16×50	865	1,300	18×45	910	1,365				
420V (2P)	33	10×40	350	525													
	39	10×45	390	585	12.5×30	380	570										
	47	10×50	445	668	12.5×35	410	615										
	56				12.5×40	490	735	16×31.5	475	713							
	68				12.5×45	560	840	16×35.5	550	825							
	82				12.5×50	625	938	16×40	630	945							
	100							16×45	750	1,125	18×35.5	675	1,013				
	120							16×50	865	1,298	18×40 18×45	810 825	1,238 1,215				
	150										18×45 18×50	950 950	1,425 1,425				
450V (2W)	33	10×45	315	475	12.5×30	350	525										
	39	10×50	360	545	12.5×35	400	600										
	47				12.5×40	425	683	16×31.5	455	683							
	56				12.5×45	500	750	16×35.5	560	750							
	68				12.5×50	540	810	16×40 16×35.5	590 530	885 795							
	82							16×45	675	1,013	18×35.5	645	968				
	100							16×50	785	1,178	18×40 18×35.5	740 685	1,110 1,025				
	120										18×45 18×40	825 790	1,238 1,185				
	150										18×50	950	1,425				

Remark: Other sizes and specification are available, please contact us for detail.

Part Numbering System

RPL Series	33 μF	$\pm 20\%$	450V	Bulk Package	Gas Type	10 ϕ × 45L	Pb-free and PET sleeve
RPL	330	M	2W	BK	-	1045	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RQL Series

Features

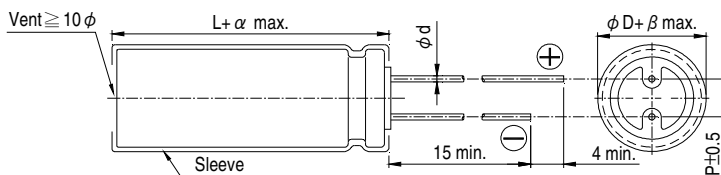
- 105°C, 10,000 hours assured
- 10 ϕ ~ 18 ϕ with large permissible ripple current
- Slim type included
- RoHS compliance



Specifications

Items	Performance																								
Category Temperature Range	400V		420 ~ 450V																						
	-40℃ ~ +105℃		-25℃ ~ +105℃																						
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																								
Leakage Current (at 20℃)	<table><tr><td>Time</td><td colspan="4">after 5 minutes</td></tr><tr><td rowspan="2">Leakage Current</td><td>CV ≤ 1,000</td><td colspan="3">CV > 1,000</td></tr><tr><td>I = 0.03CV + 15(μA)</td><td colspan="3">I = 0.02CV + 25(μA)</td></tr></table>					Time	after 5 minutes				Leakage Current	CV ≤ 1,000	CV > 1,000			I = 0.03CV + 15(μA)	I = 0.02CV + 25(μA)								
	Time	after 5 minutes																							
	Leakage Current	CV ≤ 1,000	CV > 1,000																						
		I = 0.03CV + 15(μA)	I = 0.02CV + 25(μA)																						
Where, C = rated capacitance in μF, V = rated DC working voltage in V																									
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>400</td><td>420</td><td colspan="2">450</td></tr><tr><td>Tanδ (max)</td><td>0.24</td><td>0.24</td><td colspan="2">0.24</td></tr></table>					Rated Voltage	400	420	450		Tanδ (max)	0.24	0.24	0.24											
	Rated Voltage	400	420	450																					
Tanδ (max)	0.24	0.24	0.24																						
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																								
	Rated Voltage		400	420	450																				
	Impedance Ratio	Z(-25℃)/Z(+20℃)	5	6	6																				
		Z(-40℃)/Z(+20℃)	6	-	-																				
Endurance	<table><tr><td>Test Time</td><td colspan="4">10,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	10,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	10,000 Hrs																							
	Capacitance Change	Within ±20% of initial value																							
	Tanδ	Less than 200% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 10,000 hours at 105℃.																									
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																							
	Capacitance Change	Within ±20% of initial value																							
	Tanδ	Less than 200% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																									
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>60</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>Multipliers</td><td>0.80</td><td>1.00</td><td>1.25</td><td>1.40</td><td>1.50</td></tr></table>					Frequency (Hz)	60	120	500	1k	10k up	Multipliers	0.80	1.00	1.25	1.40	1.50								
	Frequency (Hz)	60	120	500	1k	10k up																			
Multipliers	0.80	1.00	1.25	1.40	1.50																				

Diagram of Dimensions



Lead Spacing and Diameter

ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	2.0			
β	0.5			



Dimension: $\phi D \times L(\text{mm})$
 Dimension and Permissible Ripple Current
 Ripple Current: mA/rms at 105°C

Rated Voltage (V _{DC})	Cap. (μF)	10 ϕ			12.5 ϕ			16 ϕ			18 ϕ		
		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current	
			120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz
400V (2G)	33	10×40	315	475									
	39	10×45	360	545									
	47	10×50	420	630	12.5×30	440	660						
	56				12.5×35	500	750						
	68				12.5×40	580	870	16×31.5	530	795			
	82				12.5×50	625	935	16×35.5	615	920			
	100							16×40	715	1,070			
	120							16×40 16×45	800 840	1,200 1,260	18×35.5 18×40	790 870	1,185 1,305
	150							16×50	990	1,485	18×45	985	1,475
	180										18×50	1,120	1,685
420V (2P)	33	10×40	370	555									
	39	10×45	410	615	12.5×30	390	585						
	47	10×50	465	700	12.5×35	450	675						
	56				12.5×40	520	780	16×31.5	500	750			
	68				12.5×45	580	870	16×35.5	580	870			
	82				12.5×50	660	990	16×35.5 16×40	730 675	1,095 1,010			
	100							16×40 16×45	750 755	1,125 1,130	18×35.5	725	1,085
	120							16×50	865	1,300	18×40 18×45	835 880	1,250 1,320
	150										18×50	1,030	1,550
450V (2W)	33	10×45	330	495	12.5×30	370	555						
	39	10×50	380	570	12.5×35	420	630						
	47				12.5×40	480	720						
	53				12.5×45	500	750						
	56				12.5×45	530	795	16×31.5	510	765			
	68				12.5×50	620	930	16×35.5	590	885			
	82							16×40	615	920	18×35.5	645	965
	100							16×45	715	1,070	18×40	750	1,125
	120							16×50	820	1,230	18×45	835	1,250
	150										18×50	975	1,465

Remark: Other sizes and specification are available, please contact us for detail.

Part Numbering System

RQL Series	39 μF	$\pm 20\%$	450V	Bulk Package	Gas Type	10 ϕ × 50L	Pb-free and PET sleeve
RQL	390	M	2W	BK	-	1050	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RXR Series

Features

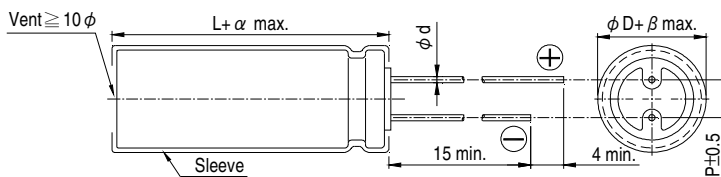
- 105°C, 2,000 hours assured
- Downsize, high allowable ripple current design
- Slim type included
- RoHS compliance



Specifications

Items	Performance																
Category Temperature Range	400V			450V													
	-40°C ~ +105°C			-25°C ~ +105°C													
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																
Leakage Current (at 20°C)	I = 0.02CV+25(μA, after 5 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.20</td></tr></table>					Rated Voltage	400	450	Tanδ (max)	0.15	0.20						
	Rated Voltage	400	450														
Tanδ (max)	0.15	0.20															
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																
	Rated Voltage		400	450													
	Impedance Ratio	Z(-25°C)/Z(+20°C)	5	6													
Z(-40°C)/Z(+20°C)		6	-														
Endurance	Test Time		2,000 Hrs														
	Capacitance Change		Within ±20% of initial value														
	Tanδ		Less than 200% of specified value														
	Leakage Current		Within specified value														
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 105°C.																
Shelf Life Test	Test Time		1,000 Hrs														
	Capacitance Change		Within ±20% of initial value														
	Tanδ		Less than 200% of specified value														
	Leakage Current		Less than 500% of specified value														
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>60</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>Multipliers</td><td>0.8</td><td>1.00</td><td>1.25</td><td>1.45</td><td>1.50</td></tr></table>					Frequency (Hz)	60	120	500	1k	10k up	Multipliers	0.8	1.00	1.25	1.45	1.50
Frequency (Hz)	60	120	500	1k	10k up												
Multipliers	0.8	1.00	1.25	1.45	1.50												

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
ϕd	0.6		0.8	
α	2.0			
β	0.5			



Dimension: $\phi D \times L(\text{mm})$
Ripple Current: mA/rms at 105°C

Dimension and Permissible Ripple Current

Rated Voltage (V _{DC})	Cap. (μF)	10 ϕ			12.5 ϕ			16 ϕ			18 ϕ		
		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current		$\phi D \times L$	Ripple Current	
			120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz		120 Hz	100k Hz
400V (2G)	27	10×30	315	475									
	33	10×35	355	535									
	39	10×40	425	640									
	47	10×45	485	730									
	56	10×50	535	805	12.5×35	530	795						
	68				12.5×40	610	915						
	82				12.5×45	690	1,035	16×31.5	680	1,020			
	100				12.5×50	765	1,150	16×35.5	775	1,165			
	120							16×40	865	1,300	18×31.5	825	1,240
	150							16×45	960	1,440	18×40	1,015	1,525
	180							16×50	1,090	1,635	18×45	1,140	1,710
450V (2W)	220										18×50	1,240	1,860
	22	10×30	290	435									
	27	10×35	340	510									
	33	10×40	395	595									
	39	10×45	440	660	12.5×30	420	630						
	47				12.5×35	485	730						
	56				12.5×40	550	825						
	68				12.5×45	630	945	16×31.5	625	940			
	82				12.5×50	680	1,020	16×35.5	700	1,050			
	100							16×40	785	1,180	18×31.5	780	1,170
	120							16×50	915	1,375	18×35.5	840	1,260
	150										18×45	1,045	1,570
	180										18×50	1,160	1,740

Remark: Other sizes and specification are available, please contact us for detail.

Part Numbering System

RXR Series	82 μF	±20%	450V	Bulk Package	Gas Type	12.5 ϕ × 50L	Pb-free and PET sleeve
RXR	820	M	2W	BK	-	1350	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



RA Series

Features

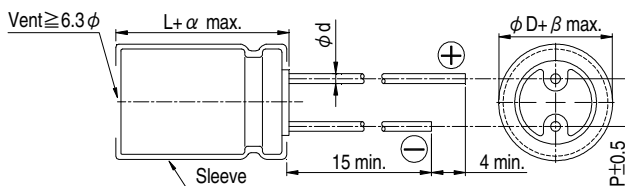
- 105°C, 1,000 hours assured
- Very low leakage current
- Use in high temperature industrial equipment
- RoHS compliance



Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.002CV or 0.4 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Tanδ (max)</td><td>0.24</td><td>0.21</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td></tr></table> When the capacitance exceeds 1,000 μF, 0.02 shall be added every 1,000 μF increase.	Rated Voltage	6.3	10	16	25	35	50	63	100	Tanδ (max)	0.24	0.21	0.16	0.14	0.12	0.10	0.09	0.08											
Rated Voltage	6.3	10	16	25	35	50	63	100																						
Tanδ (max)	0.24	0.21	0.16	0.14	0.12	0.10	0.09	0.08																						
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>8</td><td>6</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>	Rated Voltage		6.3	10	16	25	35	50	63	100	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	3	2	2	2	2	2	Z(-40℃)/Z(+20℃)	8	6	6	4	4	3	3	3
Rated Voltage		6.3	10	16	25	35	50	63	100																					
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	3	2	2	2	2	2																					
	Z(-40℃)/Z(+20℃)	8	6	6	4	4	3	3	3																					
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hours at 105℃.	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap.(μF)</td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 100</td><td>0.75</td><td>1.00</td><td>1.35</td><td>1.55</td><td>1.90</td></tr><tr><td>100 < C ≤ 1,000</td><td>0.83</td><td>1.00</td><td>1.23</td><td>1.32</td><td>1.45</td></tr><tr><td>1,000 <</td><td>0.90</td><td>1.00</td><td>1.10</td><td>1.12</td><td>1.12</td></tr></table>	Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up	≤ 100	0.75	1.00	1.35	1.55	1.90	100 < C ≤ 1,000	0.83	1.00	1.23	1.32	1.45	1,000 <	0.90	1.00	1.10	1.12	1.12					
Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up																									
≤ 100	0.75	1.00	1.35	1.55	1.90																									
100 < C ≤ 1,000	0.83	1.00	1.23	1.32	1.45																									
1,000 <	0.90	1.00	1.10	1.12	1.12																									

Diagram of Dimensions



Lead Spacing and Diameter							Unit: mm
ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						



Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Cap. (μF)	Contents	6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
		$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
2.2	2R2											5×11	20			5×11	23
3.3	3R3											5×11	25			5×11	29
4.7	4R7							5×11	26	5×11	28	5×11	30	5×11	32	5×11	34
10	100					5×11	35	5×11	38	5×11	41	5×11	46	5×11	50	6.3×11	56
22	220			5×11	49	5×11	54	5×11	57	5×11	61	5×11	68	6.3×11	82	8×11.5	96
33	330	5×11	54	5×11	60	5×11	64	5×11	69	5×11	75	6.3×11	90	6.3×11	100	10×12.5	140
47	470	5×11	65	5×11	70	5×11	99	5×11	82	6.3×11	100	6.3×11	110	8×11.5	135	10×16	180
100	101	5×11	95	5×11	105	6.3×11	125	6.3×11	135	8×11.5	170	8×11.5	180	10×12.5	225	12.5×20	320
220	221	6.3×11	160	6.3×11	175	8×11.5	215	8×11.5	230	10×12.5	300	10×16	345	10×20	400	16×25	570
330	331	6.3×11	195	8×11.5	245	8×11.5	260	10×12.5	335	10×16	400	10×20	460	12.5×20	540	16×25	700
470	471	8×11.5	270	8×11.5	290	10×12.5	370	10×16	440	10×20	520	12.5×20	610	12.5×25	700	16×31.5	880
1,000	102	10×12.5	460	10×16	550	10×20	640	12.5×20	770	12.5×25	920	16×25	1,080	16×31.5	1,210		
2,200	222	12.5×20	810	12.5×20	860	12.5×25	1,000	16×25	1,170	16×31.5	1,340	18×35.5	1,530				
3,300	332	12.5×20	960	12.5×25	1,100	16×25	1,300	16×31.5	1,460	18×35.5	1,650						
4,700	472	16×25	1,330	16×25	1,400	16×31.5	1,600	18×35.5	1,780	18×40	1,900						

Part Numbering System

RA Series	470μF	±20%	6.3V	Bulk Package	Gas Type	8 ϕ × 11.5L	Pb-free and PET sleeve
RA-	471	M	0J	BK	-	0811	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

SG Series

Features

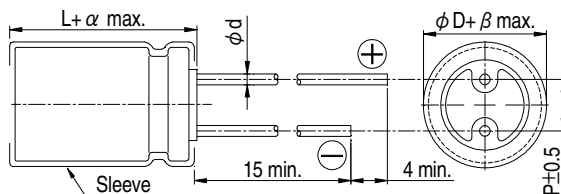
- 105°C, 1,000 hours assured
- High temperature Category range, with 7mm height
- RoHS compliance



Specifications

Items	Performance																																					
Category Temperature Range	-40℃ ~ +105℃																																					
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																					
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																					
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.35</td><td>0.23</td><td>0.20</td><td>0.17</td><td>0.15</td><td>0.12</td><td>0.10</td><td>0.10</td></tr></table>									Rated Voltage	4	6.3	10	16	25	35	50	63	Tanδ (max)	0.35	0.23	0.20	0.17	0.15	0.12	0.10	0.10											
Rated Voltage	4	6.3	10	16	25	35	50	63																														
Tanδ (max)	0.35	0.23	0.20	0.17	0.15	0.12	0.10	0.10																														
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>6</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td><td>4</td></tr></table>									Rated Voltage		4	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-25℃)/Z(+20℃)	6	4	3	3	2	2	2	2	Z(-40℃)/Z(+20℃)	12	10	8	6	4	4	4	4
Rated Voltage		4	6.3	10	16	25	35	50	63																													
Impedance Ratio	Z(-25℃)/Z(+20℃)	6	4	3	3	2	2	2	2																													
	Z(-40℃)/Z(+20℃)	12	10	8	6	4	4	4	4																													
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hours at 105℃.									Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
Test Time	1,000 Hrs																																					
Capacitance Change	Within ±20% of initial value																																					
Tanδ	Less than 200% of specified value																																					
Leakage Current	Within specified value																																					
Shelf Life Test	Test time: 500 hours; other items are the same as those for the Endurance.																																					
Ripple Current and Frequency Multipliers	<table><tr><td> Cap.(μF) \ Freq.(Hz) </td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 47</td><td>0.75</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.45</td></tr><tr><td>100 ~ 330</td><td>0.88</td><td>1.00</td><td>1.10</td><td>1.15</td><td>1.20</td></tr></table>									Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k up	≤ 47	0.75	1.00	1.20	1.30	1.45	100 ~ 330	0.88	1.00	1.10	1.15	1.20											
Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k up																																	
≤ 47	0.75	1.00	1.20	1.30	1.45																																	
100 ~ 330	0.88	1.00	1.10	1.15	1.20																																	

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.5		
α		1.0		
β		0.5		

Dimension and Permissible Ripple Current

Dimension: φD × L(mm)

Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (V _{DC})		4V (0G)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
μF	Contents	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010													4×7	10	4×7	11
2.2	2R2													4×7	15	4×7	17
3.3	3R3													4×7	18	4×7	21
4.7	4R7											4×7	22	5×7*	23	5×7	26
10	100							4×7	25	4×7	26	5×7*	30	6.3×7*	34	6.3×7	40
22	220			4×7	31	4×7	32	5×7*	39	5×7*	41	6.3×7	47	6.3×7	53	8×7	70
33	330	4×7	32	4×7	32	4×7	35	5×7	43	6.3×7	53	8×7*	71	8×7	76		
47	470	4×7	38	4×7	38	5×7*	47	6.3×7*	59	6.3×7	65	8×7	83	8×7	85		
100	101	5×7	61	6.3×7*	75	6.3×7	80	6.3×7	90	8×7	125						
220	221	6.3×7	90	6.3×7	99	8×7	140	8×7	146								
330	331	8×7	156	8×7	156												

Note: Case size in mark of "*" is available to product down size.

Part Numbering System

SG Series	330μF	±20%	6.3V	Bulk Package	Gas Type	8 φ × 7L	Pb-free and PET sleeve
SG-	331	M	0J	BK	-	0807	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

SA Series

Features

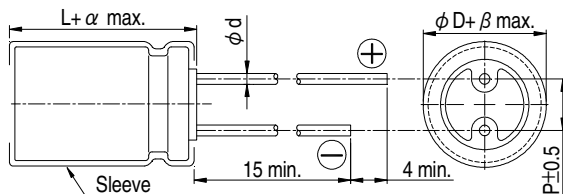
- 105°C, 1,000 hours assured, 7mm height with low leakage current
- Use in very compact high temperature industrial equipment
- RoHS compliance



Specifications

Items	Performance																													
Category Temperature Range	-40℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 0.002CV or 0.4 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.35</td><td>0.24</td><td>0.21</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td></tr></table>	Rated Voltage	4	6.3	10	16	25	35	50	63	Tanδ (max)	0.35	0.24	0.21	0.16	0.14	0.12	0.10	0.10											
Rated Voltage	4	6.3	10	16	25	35	50	63																						
Tanδ (max)	0.35	0.24	0.21	0.16	0.14	0.12	0.10	0.10																						
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>6</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>12</td><td>10</td><td>8</td><td>6</td><td>5</td><td>4</td><td>4</td><td>3</td></tr></table>	Rated Voltage		4	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-25℃)/Z(+20℃)	6	4	3	3	2	2	2	2	Z(-40℃)/Z(+20℃)	12	10	8	6	5	4	4	3
Rated Voltage		4	6.3	10	16	25	35	50	63																					
Impedance Ratio	Z(-25℃)/Z(+20℃)	6	4	3	3	2	2	2	2																					
	Z(-40℃)/Z(+20℃)	12	10	8	6	5	4	4	3																					
Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hours at 105℃.	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 500 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Freq.(Hz) Cap.(μF)</td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 47</td><td>0.70</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.45</td></tr><tr><td>100</td><td>0.80</td><td>1.00</td><td>1.10</td><td>1.15</td><td>1.20</td></tr></table>	Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up	≤ 47	0.70	1.00	1.20	1.30	1.45	100	0.80	1.00	1.10	1.15	1.20											
Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up																									
≤ 47	0.70	1.00	1.20	1.30	1.45																									
100	0.80	1.00	1.10	1.15	1.20																									

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
φd	0.45	0.5		
α		1.0		
β		0.5		

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		4V (0G)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
μF	Contents	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010													4×7	10	4×7	10
2.2	2R2													4×7	16	5×7	19
3.3	3R3											4×7	18	4×7	20	6.3×7	29
4.7	4R7									4×7	19	5×7	21	6.3×7	24	6.3×7	36
10	100							4×7	27	5×7	29	6.3×7	32	8×7	40		
22	220					4×7	36	4×7	40	6.3×7	44	6.3×7	49				
33	330	4×7	33	4×7	41	5×7	44	5×7	50	6.3×7	55	8×7	67				
47	470	4×7	39	5×7	49	6.3×7	54	6.3×7	62	8×7	74						
100	101	6.3×7	59	6.3×7	75	8×7	90										

Part Numbering System

SA Series	100μF	±20%	6.3V	Bulk Package	Gas Type	6.3 φ × 7L	Pb-free and PET sleeve
SA-	101	M	0J	BK	-	0607	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



SJA Series

Features

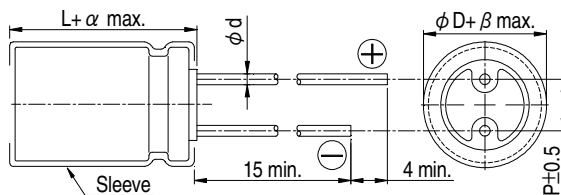
- 105°C, 2,000 hours assured
- High temperature category range, with 7mm height
- RoHS compliance



Specifications

Items	Performance																																					
Category Temperature Range	-55°C ~ +105°C																																					
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																					
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																					
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.35</td><td>0.23</td><td>0.20</td><td>0.17</td><td>0.15</td><td>0.12</td><td>0.10</td><td>0.10</td></tr></table>									Rated Voltage	4	6.3	10	16	25	35	50	63	Tanδ (max)	0.35	0.23	0.20	0.17	0.15	0.12	0.10	0.10											
Rated Voltage	4	6.3	10	16	25	35	50	63																														
Tanδ (max)	0.35	0.23	0.20	0.17	0.15	0.12	0.10	0.10																														
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25°C)/Z(+20°C)</td><td>6</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C)/Z(+20°C)</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td><td>3</td></tr></table>									Rated Voltage		4	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-25°C)/Z(+20°C)	6	4	3	3	2	2	2	2	Z(-55°C)/Z(+20°C)	12	10	8	6	4	4	4	3
Rated Voltage		4	6.3	10	16	25	35	50	63																													
Impedance Ratio	Z(-25°C)/Z(+20°C)	6	4	3	3	2	2	2	2																													
	Z(-55°C)/Z(+20°C)	12	10	8	6	4	4	4	3																													
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 105°C.									Test Time	2,000 Hrs	Capacitance Change	Within ±25% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																					
Test Time	2,000 Hrs																																					
Capacitance Change	Within ±25% of initial value																																					
Tanδ	Less than 200% of specified value																																					
Leakage Current	Within specified value																																					
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																																					
Ripple Current and Frequency Multipliers	<table><tr><td> Freq.(Hz) Cap.(μF) </td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 47</td><td>0.75</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.45</td></tr><tr><td>100 ~ 470</td><td>0.88</td><td>1.00</td><td>1.10</td><td>1.15</td><td>1.20</td></tr></table>									Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up	≤ 47	0.75	1.00	1.20	1.30	1.45	100 ~ 470	0.88	1.00	1.10	1.15	1.20											
Freq.(Hz) Cap.(μF)	60 (50)	120	500	1k	10k up																																	
≤ 47	0.75	1.00	1.20	1.30	1.45																																	
100 ~ 470	0.88	1.00	1.10	1.15	1.20																																	

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

ϕD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
ϕd	0.45	0.5		
α	1.0			
β	0.5			

Dimension: φD×L(mm)

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		4V (0G)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
μF	Contents	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010													4×7	10	4×7	11
2.2	2R2													4×7	15	4×7	17
3.3	3R3													4×7	18	4×7	21
4.7	4R7											4×7	22	5×7	23	5×7	26
10	100							4×7	25	4×7	26	5×7	30	6.3×7	34	6.3×7	40
22	220			4×7	31	4×7	32	5×7	39	5×7	41	6.3×7	47	6.3×7	53	8×7	70
33	330	4×7	32	4×7	32	4×7	35	5×7	43	6.3×7	53	8×7	71	8×7	76		
47	470	4×7	38	4×7	38	5×7	47	6.3×7	59	6.3×7	65	8×7	83	8×7	85		
100	101	5×7	61	6.3×7	75	6.3×7	80	6.3×7	90	8×7	125	8×7	145				
220	221	6.3×7	90	6.3×7	99	8×7	140	8×7	146								
330	331	8×7	156	8×7	156	8×7	160										
470	471	8×7	180	8×7	180												

Part Numbering System

SJA Series	470μF	±20%	6.3V	Bulk Package	Gas Type	8φ×7L	Pb-free and PET sleeve
SJA	471	M	0J	BK	-	0807	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

SSG Series

Features

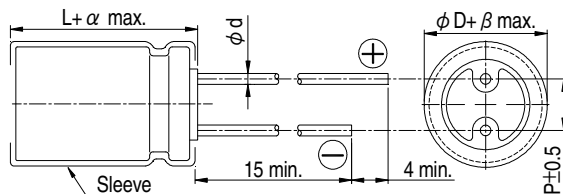
- 105°C, 1,000 hours assured
- Standard micro miniature size with 5mm height
- RoHS compliance



Specifications

Items	Performance																																							
Category Temperature Range	-40℃ ~ +105℃																																							
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																							
Leakage Current (at 20℃)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																							
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.35</td><td>0.25</td><td>0.20</td><td>0.17</td><td>0.15</td><td>0.13</td><td>0.10</td></tr></table>								Rated Voltage	4	6.3	10	16	25	35	50	Tanδ (max)	0.35	0.25	0.20	0.17	0.15	0.13	0.10																
Rated Voltage	4	6.3	10	16	25	35	50																																	
Tanδ (max)	0.35	0.25	0.20	0.17	0.15	0.13	0.10																																	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>7</td><td>6</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>15</td><td>12</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td></tr></table>								Rated Voltage		4	6.3	10	16	25	35	50	Impedance Ratio	Z(-25℃)/Z(+20℃)	7	6	4	3	2	2	2	Z(-40℃)/Z(+20℃)	15	12	8	6	4	4	4						
Rated Voltage		4	6.3	10	16	25	35	50																																
Impedance Ratio	Z(-25℃)/Z(+20℃)	7	6	4	3	2	2	2																																
	Z(-40℃)/Z(+20℃)	15	12	8	6	4	4	4																																
Endurance	<table><tr><td>Test Time</td><td colspan="7">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="7">Within ±30% of initial value for 4 ~ 6.3V; Within ±25% of initial value for 10 ~ 50V</td></tr><tr><td>Tanδ</td><td colspan="7">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="7">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hours at 105℃.								Test Time	1,000 Hrs							Capacitance Change	Within ±30% of initial value for 4 ~ 6.3V; Within ±25% of initial value for 10 ~ 50V							Tanδ	Less than 200% of specified value							Leakage Current	Within specified value						
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Tanδ	Less than 200% of specified value																																							
Leakage Current	Within specified value																																							
Shelf Life Test	Test time: 500 hours; other items are the same as those for the Endurance.																																							
Ripple Current and Frequency Multipliers	<table><tr><td> Cap.(μF) \ Freq.(Hz) </td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>≤ 47</td><td>0.75</td><td>1.00</td><td>1.15</td><td>1.34</td><td>1.50</td></tr><tr><td>100 ~ 220</td><td>0.80</td><td>1.00</td><td>1.08</td><td>1.20</td><td>1.30</td></tr></table>								Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k up	≤ 47	0.75	1.00	1.15	1.34	1.50	100 ~ 220	0.80	1.00	1.08	1.20	1.30														
Cap.(μF) \ Freq.(Hz)	60 (50)	120	500	1k	10k up																																			
≤ 47	0.75	1.00	1.15	1.34	1.50																																			
100 ~ 220	0.80	1.00	1.08	1.20	1.30																																			

Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φ D	4	5	6.3
P	1.5	2.0	2.5
φ d	0.45		
α	1.0		
β	0.5		

Dimension: φ D × L(mm)

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Cap. (μF)	Contents	4V (0G)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
		φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
1	010													4×5	7
2.2	2R2											4×5	8.7	4×5	10
3.3	3R3									4×5	11	4×5	12	4×5	13
4.7	4R7							4×5	14	4×5	15	4×5	17	5×5	20
10	100					4×5	14	4×5	23	5×5	27	5×5	27	6.3×5	31
22	220			4×5	21	5×5	27	5×5	30	6.3×5	42	6.3×5	46	6.3×5	46
33	330	4×5	27	5×5	30	5×5	34	6.3×5	40	6.3×5	52	6.3×5	52		
47	470	4×5	34	5×5	36	6.3×5	43	6.3×5	48	6.3×5	58				
100	101	5×5	50	6.3×5	56	6.3×5	70								
220	221	6.3×5	74												

Part Numbering System

SSG Series	100μF	±20%	6.3V	Bulk Package	Gas Type	6.3 φ ×5L	Pb-free and PET sleeve
SSG	101	M	0J	BK	-	0605	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.



SXJ Series

Features

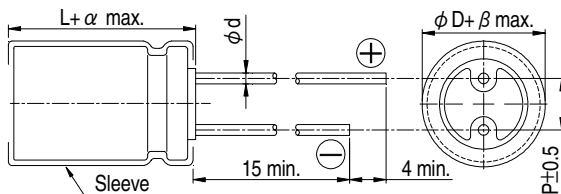
- 105°C, 1,000 hours assured
- Low impedance with 5 ~ 7mm height
- RoHS compliance



Specifications

Items	Performance																													
Category Temperature Range	-55°C ~ +105°C																													
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																													
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																													
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Tanδ (max)</td><td>0.25</td><td>0.20</td><td>0.17</td><td>0.15</td><td>0.13</td></tr></table>						Rated Voltage	6.3	10	16	25	35	Tanδ (max)	0.25	0.20	0.17	0.15	0.13												
Rated Voltage	6.3	10	16	25	35																									
Tanδ (max)	0.25	0.20	0.17	0.15	0.13																									
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25°C)/Z(+20°C)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C)/Z(+20°C)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr></table>						Rated Voltage		6.3	10	16	25	35	Impedance Ratio	Z(-25°C)/Z(+20°C)	2	2	2	2	2	Z(-55°C)/Z(+20°C)	4	4	4	4	4				
Rated Voltage		6.3	10	16	25	35																								
Impedance Ratio	Z(-25°C)/Z(+20°C)	2	2	2	2	2																								
	Z(-55°C)/Z(+20°C)	4	4	4	4	4																								
Endurance	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 1,000 hours at 105°C.						Test Time	1,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	Test time: 500 hours; other items are the same as those for the Endurance.																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>60 (50)</td><td>120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.35</td><td>0.5</td><td>0.64</td><td>0.83</td><td>1.0</td></tr></table>						Frequency (Hz)	60 (50)	120	300	1k	10k up	Multiplier	0.35	0.5	0.64	0.83	1.0												
Frequency (Hz)	60 (50)	120	300	1k	10k up																									
Multiplier	0.35	0.5	0.64	0.83	1.0																									

Diagram of Dimensions



Lead Spacing and Diameter

Unit: mm

φ D	4	5	6.3	8
L	5	7	5	7
P	1.5	2.0	2.5	3.5
φ d	0.45	0.5	0.45	0.5
α	1.0			
β	0.5			

Dimension: φ D × L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance: Ω/100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (Voc)		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)		
Cap.(μF)	Contents	φ D×L	mA	Imp.	φ D×L	mA	Imp.	φ D×L	mA	Imp.	φ D×L	mA	Imp.	φ D×L	mA	Imp.
4.7	4R7													4×7 4×5	70 50	3.3 5.0
10	100							4×5	50	5.0	4×7 5×5	70 80	3.3 2.6	5×7 5×5	110 80	1.7 2.6
22	220	4×5	50	5.0	4×7 5×5	70 80	3.3 2.6	5×7 5×5	110 80	1.7 2.6	5×7 6.3×5	110 115	1.7 1.3	6.3×7 6.3×5	160 115	0.8 1.3
33	330	5×7 5×5	110 80	1.7 2.6	5×7 5×5	110 80	1.7 2.6	6.3×7 6.3×5	160 115	0.8 1.3	6.3×7 6.3×5	160 115	0.8 1.3	8×7 6.3×7	200 160	0.5 0.8
47	470	5×7 5×5	110 80	1.7 2.6	6.3×7 6.3×5	160 115	0.8 1.3	6.3×7 6.3×5	160 115	0.8 1.3	8×7 6.3×7	200 160	0.5 0.8			
100	101	6.3×7 6.3×5	160 115	0.8 1.3	8×7 6.3×7	200 160	0.5 0.8	8×7 6.3×7	200 160	0.5 0.8						
150	151	8×7 6.3×7	200 160	0.5 0.8	8×7	200	0.5									
220	221	8×7	200	0.5												

Part Numbering System

SXJ Series	220μF	±20%	6.3V	Bulk Package	Gas Type	8 φ × 7L	Pb-free and PET sleeve
SXJ	221	M	0J	BK	-	0807	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

RNG Series

Features

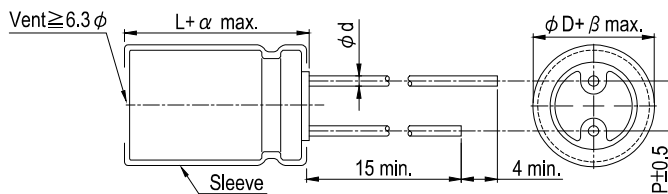
- 105°C, 2,000 hours assured, standard bi-polarized series
- Suitable for use in circuits which has a reversed or unknown polarity
- RoHS compliance



Specifications

Items	Performance																																																											
Category Temperature Range	-40℃ ~ +105℃																																																											
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																																											
Leakage Current (at 20℃)	<table><tr><td>Rated voltage</td><td colspan="6">≤ 100V</td><td colspan="6">> 100V</td></tr><tr><td>Time</td><td colspan="6">after 2 minutes</td><td colspan="6">after 5 minutes</td></tr><tr><td>Leakage Current</td><td colspan="6">I = 0.03CV or 4 (μA) whichever is greater</td><td colspan="3">CV ≤ 1,000 I = 0.03CV+15(μA)</td><td colspan="3">CV > 1,000 I = 0.02CV+25(μA)</td></tr></table> Where, C = rated capacitance in μF, V = rated DC working voltage in V												Rated voltage	≤ 100V						> 100V						Time	after 2 minutes						after 5 minutes						Leakage Current	I = 0.03CV or 4 (μA) whichever is greater						CV ≤ 1,000 I = 0.03CV+15(μA)			CV > 1,000 I = 0.02CV+25(μA)											
Rated voltage	≤ 100V						> 100V																																																					
Time	after 2 minutes						after 5 minutes																																																					
Leakage Current	I = 0.03CV or 4 (μA) whichever is greater						CV ≤ 1,000 I = 0.03CV+15(μA)			CV > 1,000 I = 0.02CV+25(μA)																																																		
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td></tr><tr><td>Tanδ (max)</td><td>0.25</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.15</td><td>0.15</td><td>0.20</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.												Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	Tanδ (max)	0.25	0.22	0.18	0.16	0.14	0.12	0.10	0.09	0.15	0.15	0.20																								
Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250																																																	
Tanδ (max)	0.25	0.22	0.18	0.16	0.14	0.12	0.10	0.09	0.15	0.15	0.20																																																	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="3">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td></tr><tr><td rowspan="2">Impedance Ratio</td><td colspan="2">Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td colspan="2">Z(-40℃)/Z(+20℃)</td><td>8</td><td>6</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td><td>4</td><td>4</td><td>4</td></tr></table>												Rated Voltage			6.3	10	16	25	35	50	63	100	160	200	250	Impedance Ratio	Z(-25℃)/Z(+20℃)		4	3	3	2	2	2	2	2	2	2	2	Z(-40℃)/Z(+20℃)		8	6	6	4	4	3	3	3	4	4	4							
Rated Voltage			6.3	10	16	25	35	50	63	100	160	200	250																																															
Impedance Ratio	Z(-25℃)/Z(+20℃)		4	3	3	2	2	2	2	2	2	2	2																																															
	Z(-40℃)/Z(+20℃)		8	6	6	4	4	3	3	3	4	4	4																																															
Endurance (After application of the rated voltage at 105℃, the polarity inverted every 250 hours.)	<table><tr><td>Test Time</td><td colspan="11">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="11">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="11">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="11">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 105℃.												Test Time	2,000 Hrs											Capacitance Change	Within ±20% of initial value											Tanδ	Less than 200% of specified value											Leakage Current	Within specified value										
Test Time	2,000 Hrs																																																											
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Leakage Current	Within specified value																																																											
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="11">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="11">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="11">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="11">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 250V (Refer to JIS C 5101-4 4.1).												Test Time	1,000 Hrs											Capacitance Change	Within ±20% of initial value											Tanδ	Less than 200% of specified value											Leakage Current	Within specified value										
Test Time	1,000 Hrs																																																											
Capacitance Change	Within ±20% of initial value																																																											
Tanδ	Less than 200% of specified value																																																											
Leakage Current	Within specified value																																																											

Diagram of Dimensions



Lead Spacing and Diameter

Unit: mm

ϕD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5		0.6			0.8	
α	L<20: 1.5, L $\geq$ 20: 2.0						
β	0.5						

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
1	010											5×11	10	5×11	11	5×11	12
2.2	2R2											5×11	15	5×11	16	6.3×11	20
3.3	3R3											5×11	18	5×11	20	6.3×11	25
4.7	4R7									5×11	21	5×11	22	6.3×11	24	6.3×11	30
10	100					5×11	27	5×11	27	5×11	30	6.3×11	37	6.3×11	40	8×11.5	50
22	220	5×11	34	5×11	34	5×11	40	6.3×11	46	6.3×11	51	8×11.5	63	8×11.5	68	10×16	97
33	330	5×11	45	5×11	45	5×11	49	6.3×11	56	8×11.5	72	8×11.5	77	10×12.5	98	10×20	140
47	470	5×11	54	5×11	54	6.3×11	67	6.3×11	67	8×11.5	86	10×12.5	105	10×16	130	12.5×20	170
100	101	6.3×11	90	6.3×11	90	8×11.5	110	8×11.5	110	10×16	160	10×20	190	12.5×20	225	16×25	300
220	221	8×11.5	150	8×11.5	150	10×12.5	195	10×16	215	12.5×20	290	12.5×25	340	16×25	405	16×35.5	510
330	331	8×11.5	185	10×16	240	10×16	265	12.5×20	320	12.5×20	350	16×25	460	16×31.5	535		
470	471	10×12.5	260	10×20	290	10×20	345	12.5×25	380	12.5×25	465	16×31.5	590	18×35.5	680		
1,000	102	10×20	460	12.5×20	510	12.5×25	605	16×25	670	16×31.5	805						
2,200	222	12.5×25	820	16×25	940	16×31.5	1,070	18×35.5	1,140								

Rated Volt. (V _{DC})		160V (2C)		200V (2D)		250V (2E)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
0.47	R47	5×11	8	5×11	9	6.3×11	10
1	010	6.3×11	11	8×11.5	12	8×11.5	13
2.2	2R2	8×11.5	18	8×11.5	22	10×12.5	26
3.3	3R3	8×11.5	26	10×12.5	30	10×16	37
4.7	4R7	10×12.5	31	10×16	37	10×20	50
10	100	10×16	60	10×20	66	10×20	79
22	220	12.5×20	117	12.5×20	117	12.5×25	138
33	330	12.5×20	143	12.5×25	158	16×25	169
47	470	16×25	188				

Part Numbering System

RNG Series 470μF ±20% 6.3V Bulk Package Gas Type 10 ϕ × 12.5L Pb-free and PET sleeve

RNG **471** **M** **0J** **BK** **-** **1012**

Series Name Capacitance Capacitance Tolerance Rated Voltage Lead Configuration and Package Rubber Type Case Size Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

Part Numbering System - Snap-in Type

Product Code Guide

LS Series	100μF	±20%	400V	3-pin Terminal	Terminal Length 4.0mm	22φ×30L	Pb-free Terminal + PET Sleeve	
LS-	101	M	2G	L3	A	2230		
□ □ □	□ □ □	□	□ □	□ □	□	□ □ □ □	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Terminal Type	Terminal Length	Case Size	Terminal and Sleeve Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank.

② **Capacitance:** Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure.

Example:

Capacitance	100	470	820	1,000	4,700	6,800	10,000	15,000
Part number	101	471	821	102	472	682	103	153

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
-----------------	-----------------	-----------------

④ **Rated voltage:** Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	16	20	25	35	50	63	80	100
Code	1C	1D	1E	1V	1H	1J	1K	2A

Rated Voltage (V)	160	180	200	250	315	350	400	420	450	500
Code	2C	2S	2D	2E	2F	2V	2G	2P	2W	2H

⑤ **Terminal type (Refer to page 14):**

Terminal type(pins)	2 (Standard)	3	4	5	Vibration-resistant	Horizontal Mounting
Terminal code	- -	L3	L4	L5	T2	H2 G2

⑥ **Terminal length:**

Terminal length(mm)	4.0	6.3
Terminal code	A	-

⑦ **Case size:** The first two digits indicate case diameter in mm. The last two digits indicate case length in mm.

φ D×L	20×15	20×20	20×25	20×30	20×35	20×40	20×45	20×50	22×15	22×20	22×25	22×30	22×35	22×40
Code	2015	2020	2025	2030	2035	2040	2045	2050	2215	2220	2225	2230	2235	2240

φ D×L	22×45	22×50	22×55	22×60	25×15	25×20	25×25	25×30	25×35	25×40	25×45	25×50	25×55	25×60
Code	2245	2250	2255	2260	2515	2520	2525	2530	2535	2540	2545	2550	2555	2560

φ D×L	30×15	30×20	30×25	30×30	30×35	30×40	30×45	30×50	30×55	30×60	30×65	35×15	35×20	35×25
Code	3015	3020	3025	3030	3035	3040	3045	3050	3055	3060	3065	3515	3520	3525

φ D×L	35×30	35×35	35×40	35×45	35×50	35×60	35×70	35×80	35×90	35×100	40×25	40×30	40×35	40×40
Code	3530	3535	3540	3545	3550	3560	3570	3580	3590	35A0	4025	4030	4035	4040

φ D×L	40×45	40×50	40×55	40×60	40×65	40×70	40×80	40×90	40×100	45×70	45×80	45×90
Code	4045	4050	4055	4060	4065	4070	4080	4090	40A0	4570	4580	4590

Note: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ **Terminal and sleeve type**

None = Pb free terminal + PET sleeve (Standard design)	M = Pb free terminal + PET sleeve + No bottom insulation + Rilled
R = Pb free terminal + PET sleeve + Rilled	C = Pb free terminal + Nano carbon coating insulation
N = Pb free terminal + PET sleeve + No bottom insulation	K / L = Automotive control code

* When a supplement code following a blank digit code of terminal and sleeve type (standard design), use a hyphen, "-", to fill the blank digit. When the bottom insulation plate is not required or a rilled construction is necessary, please consult with us.

⑨ **Supplement code (Optional):** For special control purposes



LS Series

Features

- Snap-in terminal type
- 85°C, 3,000 hours assured
- RoHS compliance

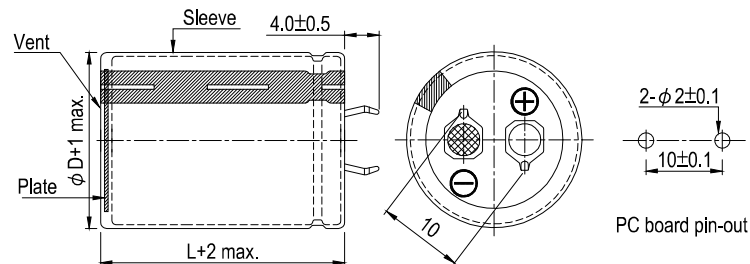


Specifications

Items	Performance																																																																															
Category Temperature Range	16 ~ 400V								420 ~ 500V																																																																							
	-40℃ ~ +85℃								-25℃ ~ +85℃																																																																							
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																																																															
Leakage Current (at 20℃)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																																																															
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>420</td><td>450</td><td>500</td></tr><tr><td>Tanδ (max)</td><td>0.50</td><td>0.45</td><td>0.40</td><td>0.35</td><td>0.30</td><td>0.25</td><td>0.20</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td></tr></table>																Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500	Tanδ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15																																
Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500																																																																	
Tanδ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15																																																																	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																																																															
	Rated Voltage		16	25	35	50	63	80	100	160	200	250	350	400	420	450	500																																																															
	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	3	2	2	2	4	4	4	4	8	8	8	8	8																																																															
		Z(-40℃)/Z(+20℃)	15	10	8	6	5	5	4	8	10	10	16	18	-	-	-																																																															
Endurance	<table><tr><td>Test Time</td><td colspan="15">3,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="15">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="15">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="15">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 3,000 hours at 85℃.																Test Time	3,000 Hrs															Capacitance Change	Within ±20% of initial value															Tanδ	Less than 200% of specified value															Leakage Current	Within specified value														
	Test Time	3,000 Hrs																																																																														
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Shelf Life Test	<table><tr><td>Test Time</td><td colspan="15">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="15">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="15">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="15">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																Test Time	1,000 Hrs															Capacitance Change	Within ±20% of initial value															Tanδ	Less than 150% of specified value															Leakage Current	Within specified value														
	Test Time	1,000 Hrs																																																																														
	Capacitance Change	Within ±20% of initial value																																																																														
	Tanδ	Less than 150% of specified value																																																																														
	Leakage Current	Within specified value																																																																														
Ripple Current and Frequency Multipliers	<table><tr><td rowspan="2">Case size</td><td colspan="2">Freq.(Hz)</td><td rowspan="2">50 / 60</td><td rowspan="2">100 / 120</td><td rowspan="2">500</td><td rowspan="2">1k</td><td rowspan="2">10k up</td></tr><tr><td colspan="2">Rated Volt.(V)</td></tr><tr><td rowspan="3">Length ≤ 55L</td><td colspan="2">≤ 100</td><td>0.92</td><td>1.00</td><td>1.13</td><td>1.19</td><td>1.20</td></tr><tr><td colspan="2">160 ~ 250</td><td>0.81</td><td>1.00</td><td>1.32</td><td>1.45</td><td>1.50</td></tr><tr><td colspan="2">350 ≤</td><td>0.77</td><td>1.00</td><td>1.30</td><td>1.41</td><td>1.43</td></tr><tr><td>Length ≥ 60L</td><td colspan="2">160 ~ 500</td><td>0.88</td><td>1.00</td><td>1.20</td><td>1.25</td><td>1.40</td></tr></table>																Case size	Freq.(Hz)		50 / 60	100 / 120	500	1k	10k up	Rated Volt.(V)		Length ≤ 55L	≤ 100		0.92	1.00	1.13	1.19	1.20	160 ~ 250		0.81	1.00	1.32	1.45	1.50	350 ≤		0.77	1.00	1.30	1.41	1.43	Length ≥ 60L	160 ~ 500		0.88	1.00	1.20	1.25	1.40																								
	Case size	Freq.(Hz)		50 / 60	100 / 120	500	1k	10k up																																																																								
		Rated Volt.(V)																																																																														
	Length ≤ 55L	≤ 100		0.92	1.00	1.13	1.19	1.20																																																																								
		160 ~ 250		0.81	1.00	1.32	1.45	1.50																																																																								
350 ≤		0.77	1.00	1.30	1.41	1.43																																																																										
Length ≥ 60L	160 ~ 500		0.88	1.00	1.20	1.25	1.40																																																																									
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																																																																															

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
16	8,200	20 × 25	2.41	0.50	0.081	1.09	LS-822M1C--A2025
	8,200	22 × 25	2.56	0.50	0.081	1.09	LS-822M1C--A2225
	10,000	20 × 25	2.46	0.50	0.066	1.20	LS-103M1C--A2025
	10,000	22 × 25	2.60	0.50	0.066	1.20	LS-103M1C--A2225
	10,000	25 × 25	2.81	0.50	0.066	1.20	LS-103M1C--A2525
	12,000	20 × 30	2.92	0.50	0.055	1.31	LS-123M1C--A2030
	12,000	22 × 25	2.88	0.50	0.055	1.31	LS-123M1C--A2225
	12,000	25 × 25	2.96	0.50	0.055	1.31	LS-123M1C--A2525
	15,000	20 × 35	3.49	0.50	0.044	1.47	LS-153M1C--A2035
	15,000	22 × 30	3.45	0.50	0.044	1.47	LS-153M1C--A2230
	15,000	25 × 25	3.38	0.50	0.044	1.47	LS-153M1C--A2525
	15,000	30 × 25	3.73	0.50	0.044	1.47	LS-153M1C--A3025
	18,000	20 × 40	3.72	0.50	0.037	1.50	LS-183M1C--A2040
	18,000	22 × 30	3.47	0.50	0.037	1.50	LS-183M1C--A2230
	18,000	25 × 25	3.47	0.50	0.037	1.50	LS-183M1C--A2525
	22,000	20 × 45	4.07	0.50	0.030	1.50	LS-223M1C--A2045
	22,000	22 × 35	3.84	0.50	0.030	1.50	LS-223M1C--A2235
	22,000	25 × 30	3.93	0.50	0.030	1.50	LS-223M1C--A2530
	22,000	30 × 25	4.08	0.50	0.030	1.50	LS-223M1C--A3025
	22,000	35 × 25	4.15	0.50	0.030	1.50	LS-223M1C--A3525
	27,000	22 × 45	4.63	0.50	0.025	1.50	LS-273M1C--A2245
	27,000	25 × 40	4.72	0.50	0.025	1.50	LS-273M1C--A2540
	33,000	22 × 50	5.20	0.50	0.020	1.50	LS-333M1C--A2250
	33,000	25 × 45	5.41	0.50	0.020	1.50	LS-333M1C--A2545
	33,000	30 × 35	5.40	0.50	0.020	1.50	LS-333M1C--A3035
	33,000	35 × 25	5.19	0.50	0.020	1.50	LS-333M1C--A3525
	39,000	30 × 40	6.02	0.50	0.017	1.50	LS-393M1C--A3040
	39,000	35 × 30	5.88	0.50	0.017	1.50	LS-393M1C--A3530
	47,000	30 × 45	6.95	0.50	0.014	1.50	LS-473M1C--A3045
	47,000	35 × 35	6.85	0.50	0.014	1.50	LS-473M1C--A3535
	56,000	35 × 40	7.39	0.50	0.012	1.50	LS-563M1C--A3540
	68,000	35 × 45	8.06	0.50	0.010	1.50	LS-683M1C--A3545
25	5,600	20 × 25	2.18	0.45	0.107	1.12	LS-562M1E--A2025
	5,600	22 × 25	2.31	0.45	0.107	1.12	LS-562M1E--A2225
	6,800	20 × 25	2.25	0.45	0.088	1.24	LS-682M1E--A2025
	6,800	22 × 25	2.38	0.45	0.088	1.24	LS-682M1E--A2225
	6,800	25 × 25	2.78	0.45	0.088	1.24	LS-682M1E--A2525
	8,200	20 × 30	2.30	0.45	0.073	1.36	LS-822M1E--A2030
	8,200	22 × 25	2.43	0.45	0.073	1.36	LS-822M1E--A2225
	8,200	25 × 25	2.85	0.45	0.073	1.36	LS-822M1E--A2525
	10,000	20 × 35	2.97	0.45	0.060	1.50	LS-103M1E--A2035
	10,000	22 × 30	2.97	0.45	0.060	1.50	LS-103M1E--A2230
	10,000	25 × 25	2.93	0.45	0.060	1.50	LS-103M1E--A2525
	10,000	30 × 25	3.21	0.45	0.060	1.50	LS-103M1E--A3025
	12,000	22 × 35	3.33	0.45	0.050	1.50	LS-123M1E--A2235
	12,000	25 × 30	3.26	0.45	0.050	1.50	LS-123M1E--A2530
	12,000	30 × 25	3.59	0.45	0.050	1.50	LS-123M1E--A3025
	12,000	35 × 25	3.58	0.45	0.050	1.50	LS-123M1E--A3525
	15,000	22 × 40	3.68	0.45	0.040	1.50	LS-153M1E--A2240
	15,000	25 × 35	3.77	0.45	0.040	1.50	LS-153M1E--A2535
	15,000	30 × 25	3.60	0.45	0.040	1.50	LS-153M1E--A3025
	15,000	35 × 25	3.96	0.45	0.040	1.50	LS-153M1E--A3525
	18,000	22 × 45	4.36	0.45	0.033	1.50	LS-183M1E--A2245
	18,000	25 × 35	4.20	0.45	0.033	1.50	LS-183M1E--A2535
	18,000	30 × 30	4.40	0.45	0.033	1.50	LS-183M1E--A3030
	18,000	35 × 25	4.34	0.45	0.033	1.50	LS-183M1E--A3525
	22,000	25 × 45	4.71	0.45	0.027	1.50	LS-223M1E--A2545
	22,000	30 × 35	4.70	0.45	0.027	1.50	LS-223M1E--A3035
	22,000	35 × 25	4.60	0.45	0.027	1.50	LS-223M1E--A3525
	27,000	30 × 45	5.79	0.45	0.022	1.50	LS-273M1E--A3045
	27,000	35 × 35	5.71	0.45	0.022	1.50	LS-273M1E--A3535
	33,000	35 × 40	6.31	0.45	0.018	1.50	LS-333M1E--A3540
	39,000	35 × 45	6.92	0.45	0.015	1.50	LS-393M1E--A3545
35	4,700	22 × 25	2.21	0.40	0.113	1.22	LS-472M1V--A2225
	4,700	25 × 25	2.42	0.40	0.113	1.22	LS-472M1V--A2525



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
35	5,600	20 × 30	2.54	0.40	0.095	1.33	LS-562M1V--A2030
	5,600	22 × 30	2.69	0.40	0.095	1.33	LS-562M1V--A2230
	5,600	25 × 25	2.69	0.40	0.095	1.33	LS-562M1V--A2525
	6,800	20 × 35	2.60	0.40	0.078	1.46	LS-682M1V--A2035
	6,800	22 × 35	2.70	0.40	0.078	1.46	LS-682M1V--A2235
	6,800	25 × 25	2.67	0.40	0.078	1.46	LS-682M1V--A2525
	6,800	30 × 25	2.99	0.40	0.078	1.46	LS-682M1V--A3025
	8,200	20 × 40	3.02	0.40	0.065	1.50	LS-822M1V--A2040
	8,200	22 × 35	3.09	0.40	0.065	1.50	LS-822M1V--A2235
	8,200	25 × 30	3.12	0.40	0.065	1.50	LS-822M1V--A2530
	8,200	30 × 25	3.04	0.40	0.065	1.50	LS-822M1V--A3025
	10,000	22 × 40	3.22	0.40	0.053	1.50	LS-103M1V--A2240
	10,000	25 × 35	3.37	0.40	0.053	1.50	LS-103M1V--A2535
	10,000	30 × 25	3.28	0.40	0.053	1.50	LS-103M1V--A3025
	10,000	35 × 25	3.60	0.40	0.053	1.50	LS-103M1V--A3525
	12,000	22 × 45	3.71	0.40	0.044	1.50	LS-123M1V--A2245
	12,000	25 × 40	3.79	0.40	0.044	1.50	LS-123M1V--A2540
	12,000	30 × 30	3.74	0.40	0.044	1.50	LS-123M1V--A3030
	12,000	35 × 25	3.75	0.40	0.044	1.50	LS-123M1V--A3525
	15,000	25 × 45	4.55	0.40	0.035	1.50	LS-153M1V--A2545
	15,000	30 × 35	4.54	0.40	0.035	1.50	LS-153M1V--A3035
	15,000	35 × 25	4.37	0.40	0.035	1.50	LS-153M1V--A3525
	18,000	25 × 50	4.84	0.40	0.029	1.50	LS-183M1V--A2550
	18,000	30 × 40	4.87	0.40	0.029	1.50	LS-183M1V--A3040
	18,000	35 × 30	5.03	0.40	0.029	1.50	LS-183M1V--A3530
	22,000	30 × 45	5.79	0.40	0.024	1.50	LS-223M1V--A3045
	22,000	35 × 35	5.71	0.40	0.024	1.50	LS-223M1V--A3535
	27,000	35 × 45	6.81	0.40	0.020	1.50	LS-273M1V--A3545
50	2,200	22 × 25	1.93	0.35	0.211	0.99	LS-222M1H--A2225
	2,700	22 × 25	2.05	0.35	0.172	1.10	LS-272M1H--A2225
	3,300	22 × 30	2.41	0.35	0.141	1.22	LS-332M1H--A2230
	3,300	25 × 25	2.38	0.35	0.141	1.22	LS-332M1H--A2525
	3,900	22 × 30	2.51	0.35	0.119	1.32	LS-392M1H--A2230
	3,900	25 × 25	2.46	0.35	0.119	1.32	LS-392M1H--A2525
	4,700	22 × 35	2.83	0.35	0.099	1.45	LS-472M1H--A2235
	4,700	25 × 30	3.03	0.35	0.099	1.45	LS-472M1H--A2530
	4,700	30 × 25	3.01	0.35	0.099	1.45	LS-472M1H--A3025
	5,600	22 × 40	3.21	0.35	0.083	1.50	LS-562M1H--A2240
	5,600	25 × 35	3.37	0.35	0.083	1.50	LS-562M1H--A2535
	5,600	30 × 25	3.17	0.35	0.083	1.50	LS-562M1H--A3025
	5,600	35 × 25	3.47	0.35	0.083	1.50	LS-562M1H--A3525
	6,800	22 × 45	3.73	0.35	0.068	1.50	LS-682M1H--A2245
	6,800	25 × 35	3.59	0.35	0.068	1.50	LS-682M1H--A2535
	6,800	30 × 30	3.56	0.35	0.068	1.50	LS-682M1H--A3030
	6,800	35 × 25	3.64	0.35	0.068	1.50	LS-682M1H--A3525
	8,200	25 × 40	4.10	0.35	0.057	1.50	LS-822M1H--A2540
	8,200	30 × 30	4.12	0.35	0.057	1.50	LS-822M1H--A3030
	8,200	35 × 25	4.07	0.35	0.057	1.50	LS-822M1H--A3525
	10,000	25 × 50	4.91	0.35	0.046	1.50	LS-103M1H--A2550
	10,000	30 × 35	4.68	0.35	0.046	1.50	LS-103M1H--A3035
	10,000	35 × 30	4.59	0.35	0.046	1.50	LS-103M1H--A3530
	12,000	30 × 40	5.10	0.35	0.039	1.50	LS-123M1H--A3040
	12,000	35 × 35	5.30	0.35	0.039	1.50	LS-123M1H--A3535
	15,000	30 × 50	6.28	0.35	0.031	1.50	LS-153M1H--A3050
	15,000	35 × 40	6.24	0.35	0.031	1.50	LS-153M1H--A3540
	18,000	35 × 45	7.18	0.35	0.026	1.50	LS-183M1H--A3545
63	1,800	22 × 25	1.90	0.30	0.221	1.01	LS-182M1J--A2225
	2,200	22 × 30	2.35	0.30	0.181	1.12	LS-222M1J--A2230
	2,200	25 × 25	2.30	0.30	0.181	1.12	LS-222M1J--A2525
	2,700	22 × 35	2.50	0.30	0.147	1.24	LS-272M1J--A2235
	2,700	25 × 25	2.34	0.30	0.147	1.24	LS-272M1J--A2525
	3,300	22 × 35	2.62	0.30	0.121	1.37	LS-332M1J--A2235
	3,300	25 × 30	2.69	0.30	0.121	1.37	LS-332M1J--A2530
	3,300	30 × 25	2.78	0.30	0.121	1.37	LS-332M1J--A3025
	3,900	22 × 40	2.90	0.30	0.102	1.49	LS-392M1J--A2240

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
63	3,900	25 × 35	3.09	0.30	0.102	1.49	LS-392M1J--A2535
	3,900	30 × 30	3.09	0.30	0.102	1.49	LS-392M1J--A3030
	4,700	22 × 50	3.49	0.30	0.085	1.50	LS-472M1J--A2250
	4,700	25 × 40	3.37	0.30	0.085	1.50	LS-472M1J--A2540
	4,700	30 × 30	3.37	0.30	0.085	1.50	LS-472M1J--A3030
	4,700	35 × 25	3.36	0.30	0.085	1.50	LS-472M1J--A3525
	5,600	25 × 45	3.77	0.30	0.071	1.50	LS-562M1J--A2545
	5,600	30 × 35	3.75	0.30	0.071	1.50	LS-562M1J--A3035
	5,600	35 × 30	3.88	0.30	0.071	1.50	LS-562M1J--A3530
	6,800	25 × 50	4.41	0.30	0.059	1.50	LS-682M1J--A2550
	6,800	30 × 40	4.41	0.30	0.059	1.50	LS-682M1J--A3040
	6,800	35 × 30	4.04	0.30	0.059	1.50	LS-682M1J--A3530
	10,000	30 × 50	5.49	0.30	0.040	1.50	LS-103M1J--A3050
	10,000	35 × 40	5.47	0.30	0.040	1.50	LS-103M1J--A3540
	12,000	35 × 45	5.97	0.30	0.033	1.50	LS-123M1J--A3545
80	1,200	22 × 25	1.62	0.25	0.276	0.93	LS-122M1K--A2225
	1,500	22 × 25	1.81	0.25	0.221	1.04	LS-152M1K--A2225
	1,800	22 × 30	2.14	0.25	0.184	1.14	LS-182M1K--A2230
	1,800	25 × 25	2.14	0.25	0.184	1.14	LS-182M1K--A2525
	2,200	22 × 35	2.37	0.25	0.151	1.26	LS-222M1K--A2235
	2,200	25 × 30	2.39	0.25	0.151	1.26	LS-222M1K--A2530
	2,200	30 × 25	2.48	0.25	0.151	1.26	LS-222M1K--A3025
	2,700	22 × 40	2.78	0.25	0.123	1.39	LS-272M1K--A2240
	2,700	25 × 35	2.82	0.25	0.123	1.39	LS-272M1K--A2535
	2,700	30 × 25	2.74	0.25	0.123	1.39	LS-272M1K--A3025
	3,300	22 × 45	3.14	0.25	0.101	1.50	LS-332M1K--A2245
	3,300	25 × 40	3.20	0.25	0.101	1.50	LS-332M1K--A2540
	3,300	30 × 30	3.16	0.25	0.101	1.50	LS-332M1K--A3030
	3,300	35 × 25	3.24	0.25	0.101	1.50	LS-332M1K--A3525
	3,900	22 × 50	3.58	0.25	0.085	1.50	LS-392M1K--A2250
	3,900	25 × 45	3.67	0.25	0.085	1.50	LS-392M1K--A2545
	3,900	30 × 35	3.66	0.25	0.085	1.50	LS-392M1K--A3035
	3,900	35 × 25	3.52	0.25	0.085	1.50	LS-392M1K--A3525
	4,700	25 × 50	4.10	0.25	0.071	1.50	LS-472M1K--A2550
	4,700	30 × 40	4.13	0.25	0.071	1.50	LS-472M1K--A3040
	4,700	35 × 30	4.03	0.25	0.071	1.50	LS-472M1K--A3530
	5,600	30 × 45	4.61	0.25	0.059	1.50	LS-562M1K--A3045
	5,600	35 × 35	4.54	0.25	0.059	1.50	LS-562M1K--A3535
	6,800	30 × 50	5.18	0.25	0.049	1.50	LS-682M1K--A3050
	6,800	35 × 40	5.15	0.25	0.049	1.50	LS-682M1K--A3540
	8,200	35 × 45	5.80	0.25	0.040	1.50	LS-822M1K--A3545
	10,000	35 × 50	6.69	0.25	0.033	1.50	LS-103M1K--A3550
100	1,200	22 × 30	2.12	0.20	0.221	1.04	LS-122M2A--A2230
	1,200	25 × 25	2.10	0.20	0.221	1.04	LS-122M2A--A2525
	1,500	22 × 35	2.45	0.20	0.177	1.16	LS-152M2A--A2235
	1,500	25 × 30	2.43	0.20	0.177	1.16	LS-152M2A--A2530
	1,500	30 × 25	2.46	0.20	0.177	1.16	LS-152M2A--A3025
	1,800	22 × 40	2.77	0.20	0.147	1.27	LS-182M2A--A2240
	1,800	25 × 35	2.77	0.20	0.147	1.27	LS-182M2A--A2535
	1,800	30 × 25	2.65	0.20	0.147	1.27	LS-182M2A--A3025
	2,200	22 × 45	3.12	0.20	0.121	1.41	LS-222M2A--A2245
	2,200	25 × 40	3.20	0.20	0.121	1.41	LS-222M2A--A2540
	2,200	30 × 30	3.10	0.20	0.121	1.41	LS-222M2A--A3030
	2,200	35 × 25	3.14	0.20	0.121	1.41	LS-222M2A--A3525
	2,700	25 × 45	3.61	0.20	0.098	1.50	LS-272M2A--A2545
	2,700	30 × 35	3.60	0.20	0.098	1.50	LS-272M2A--A3035
	2,700	35 × 30	3.71	0.20	0.098	1.50	LS-272M2A--A3530
	3,300	25 × 50	4.06	0.20	0.080	1.50	LS-332M2A--A2550
	3,300	30 × 40	4.05	0.20	0.080	1.50	LS-332M2A--A3040
	3,300	35 × 35	4.07	0.20	0.080	1.50	LS-332M2A--A3535
	3,900	30 × 45	4.60	0.20	0.068	1.50	LS-392M2A--A3045
	3,900	35 × 35	4.50	0.20	0.068	1.50	LS-392M2A--A3535
	4,700	30 × 50	5.13	0.20	0.056	1.50	LS-472M2A--A3050
	4,700	35 × 40	5.12	0.20	0.056	1.50	LS-472M2A--A3540
	5,600	35 × 45	5.75	0.20	0.047	1.50	LS-562M2A--A3545



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
100	6,800	35 × 50	6.01	0.20	0.039	1.50	LS-682M2A--A3550
160	270	20 × 25	1.12	0.15	0.737	0.62	LS-271M2C--A2025
	270	22 × 25	1.27	0.15	0.737	0.62	LS-271M2C--A2225
	330	20 × 30	1.28	0.15	0.603	0.69	LS-331M2C--A2030
	330	22 × 25	1.40	0.15	0.603	0.69	LS-331M2C--A2225
	390	22 × 30	1.62	0.15	0.510	0.75	LS-391M2C--A2230
	470	22 × 30	1.77	0.15	0.423	0.82	LS-471M2C--A2230
	470	25 × 25	1.77	0.15	0.423	0.82	LS-471M2C--A2525
	560	22 × 30	1.92	0.15	0.355	0.90	LS-561M2C--A2230
	560	22 × 35	2.05	0.15	0.355	0.90	LS-561M2C--A2235
	560	25 × 25	1.92	0.15	0.355	0.90	LS-561M2C--A2525
	560	30 × 25	2.02	0.15	0.355	0.90	LS-561M2C--A3025
	680	22 × 35	2.12	0.15	0.293	0.99	LS-681M2C--A2235
	680	25 × 30	2.22	0.15	0.293	0.99	LS-681M2C--A2530
	680	30 × 25	2.22	0.15	0.293	0.99	LS-681M2C--A3025
	820	22 × 40	2.32	0.15	0.243	1.09	LS-821M2C--A2240
	820	25 × 30	2.32	0.15	0.243	1.09	LS-821M2C--A2530
	820	30 × 25	2.31	0.15	0.243	1.09	LS-821M2C--A3025
	820	35 × 25	2.50	0.15	0.243	1.09	LS-821M2C--A3525
	1,000	22 × 50	2.88	0.15	0.199	1.20	LS-102M2C--A2250
	1,000	25 × 40	2.86	0.15	0.199	1.20	LS-102M2C--A2540
	1,000	30 × 30	2.82	0.15	0.199	1.20	LS-102M2C--A3030
	1,000	35 × 25	2.79	0.15	0.199	1.20	LS-102M2C--A3525
	1,200	25 × 45	3.27	0.15	0.166	1.31	LS-122M2C--A2545
	1,200	30 × 35	3.25	0.15	0.166	1.31	LS-122M2C--A3035
	1,200	35 × 30	3.24	0.15	0.166	1.31	LS-122M2C--A3530
	1,500	30 × 40	3.77	0.15	0.133	1.47	LS-152M2C--A3040
	1,500	35 × 35	3.75	0.15	0.133	1.47	LS-152M2C--A3535
	1,800	30 × 45	4.10	0.15	0.111	1.50	LS-182M2C--A3045
	1,800	35 × 35	4.08	0.15	0.111	1.50	LS-182M2C--A3535
	2,200	35 × 45	4.72	0.15	0.090	1.50	LS-222M2C--A3545
	2,700	35 × 55	5.53	0.15	0.074	1.50	LS-272M2C--A3555
	3,300	35 × 70	6.80	0.15	0.060	1.50	LS-332M2C--A3570
	3,300	40 × 50	6.34	0.15	0.060	1.50	LS-332M2C--A4050
	3,900	35 × 80	7.84	0.15	0.051	1.50	LS-392M2C--A3580
	3,900	40 × 60	7.45	0.15	0.051	1.50	LS-392M2C--A4060
	4,700	35 × 90	8.62	0.15	0.042	1.50	LS-472M2C--A3590
	4,700	40 × 80	8.79	0.15	0.042	1.50	LS-472M2C--A4080
200	220	22 × 25	1.15	0.15	0.905	0.63	LS-221M2D--A2225
	270	22 × 25	1.30	0.15	0.737	0.70	LS-271M2D--A2225
	330	22 × 25	1.40	0.15	0.603	0.77	LS-331M2D--A2225
	330	25 × 25	1.43	0.15	0.603	0.77	LS-331M2D--A2525
	390	22 × 25	1.42	0.15	0.510	0.84	LS-391M2D--A2225
	390	25 × 25	1.63	0.15	0.510	0.84	LS-391M2D--A2525
	470	22 × 30	1.68	0.15	0.423	0.92	LS-471M2D--A2230
	470	25 × 25	1.68	0.15	0.423	0.92	LS-471M2D--A2525
	470	30 × 25	1.85	0.15	0.423	0.92	LS-471M2D--A3025
	560	22 × 35	1.97	0.15	0.355	1.00	LS-561M2D--A2235
	560	25 × 30	2.05	0.15	0.355	1.00	LS-561M2D--A2530
	560	30 × 25	2.05	0.15	0.355	1.00	LS-561M2D--A3025
	680	22 × 40	2.24	0.15	0.293	1.11	LS-681M2D--A2240
	680	25 × 30	2.13	0.15	0.293	1.11	LS-681M2D--A2530
	680	30 × 25	2.21	0.15	0.293	1.11	LS-681M2D--A3025
	680	35 × 25	2.43	0.15	0.293	1.11	LS-681M2D--A3525
	820	22 × 45	2.32	0.15	0.243	1.21	LS-821M2D--A2245
	820	25 × 35	2.23	0.15	0.243	1.21	LS-821M2D--A2535
	820	30 × 30	2.62	0.15	0.243	1.21	LS-821M2D--A3030
	820	35 × 25	2.68	0.15	0.243	1.21	LS-821M2D--A3525
	1,000	22 × 50	2.57	0.15	0.199	1.34	LS-102M2D--A2250
	1,000	25 × 40	2.50	0.15	0.199	1.34	LS-102M2D--A2540
	1,000	30 × 30	2.47	0.15	0.199	1.34	LS-102M2D--A3030
	1,000	35 × 25	2.53	0.15	0.199	1.34	LS-102M2D--A3525
	1,200	25 × 45	2.89	0.15	0.166	1.47	LS-122M2D--A2545
	1,200	30 × 35	2.88	0.15	0.166	1.47	LS-122M2D--A3035
	1,200	35 × 30	2.97	0.15	0.166	1.47	LS-122M2D--A3530



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
200	1,500	25 × 55	3.41	0.15	0.133	1.50	LS-152M2D--A2555
	1,500	30 × 45	3.46	0.15	0.133	1.50	LS-152M2D--A3045
	1,500	35 × 35	3.42	0.15	0.133	1.50	LS-152M2D--A3535
	1,800	30 × 50	3.97	0.15	0.111	1.50	LS-182M2D--A3050
	1,800	35 × 40	3.95	0.15	0.111	1.50	LS-182M2D--A3540
	2,200	30 × 60	4.51	0.15	0.090	1.50	LS-222M2D--A3060
	2,200	35 × 45	4.35	0.15	0.090	1.50	LS-222M2D--A3545
	2,200	40 × 40	4.48	0.15	0.090	1.50	LS-222M2D--A4040
	2,700	35 × 55	4.79	0.15	0.074	1.50	LS-272M2D--A3555
	2,700	40 × 50	5.00	0.15	0.074	1.50	LS-272M2D--A4050
	3,300	35 × 65	5.69	0.15	0.060	1.50	LS-332M2D--A3565
	3,300	40 × 60	5.90	0.15	0.060	1.50	LS-332M2D--A4060
	3,900	35 × 80	6.30	0.15	0.051	1.50	LS-392M2D--A3580
	3,900	40 × 60	5.97	0.15	0.051	1.50	LS-392M2D--A4060
	4,700	35 × 90	7.10	0.15	0.042	1.50	LS-472M2D--A3590
	4,700	40 × 70	6.77	0.15	0.042	1.50	LS-472M2D--A4070
	5,600	35 × 100	7.36	0.15	0.036	1.50	LS-562M2D--A35A0
	6,800	40 × 100	8.65	0.15	0.029	1.50	LS-682M2D--A40A0
250	180	22 × 25	1.01	0.15	1.106	0.64	LS-181M2E--A2225
	220	22 × 25	1.18	0.15	0.905	0.70	LS-221M2E--A2225
	220	25 × 25	1.24	0.15	0.905	0.70	LS-221M2E--A2525
	270	22 × 25	1.21	0.15	0.737	0.78	LS-271M2E--A2225
	270	25 × 25	1.49	0.15	0.737	0.78	LS-271M2E--A2525
	330	22 × 30	1.58	0.15	0.603	0.86	LS-331M2E--A2230
	330	25 × 25	1.53	0.15	0.603	0.86	LS-331M2E--A2525
	330	30 × 25	1.59	0.15	0.603	0.86	LS-331M2E--A3025
	390	22 × 30	1.57	0.15	0.510	0.94	LS-391M2E--A2230
	390	25 × 25	1.57	0.15	0.510	0.94	LS-391M2E--A2525
	390	30 × 25	1.77	0.15	0.510	0.94	LS-391M2E--A3025
	470	22 × 35	1.72	0.15	0.423	1.03	LS-471M2E--A2235
	470	25 × 30	1.73	0.15	0.423	1.03	LS-471M2E--A2530
	470	30 × 25	1.80	0.15	0.423	1.03	LS-471M2E--A3025
	560	22 × 45	2.12	0.15	0.355	1.12	LS-561M2E--A2245
	560	25 × 35	2.04	0.15	0.355	1.12	LS-561M2E--A2535
	560	30 × 25	2.01	0.15	0.355	1.12	LS-561M2E--A3025
	560	35 × 25	2.21	0.15	0.355	1.12	LS-561M2E--A3525
	680	22 × 50	2.48	0.15	0.293	1.24	LS-681M2E--A2250
	680	25 × 45	2.54	0.15	0.293	1.24	LS-681M2E--A2545
	680	30 × 30	2.38	0.15	0.293	1.24	LS-681M2E--A3030
	680	35 × 30	2.54	0.15	0.293	1.24	LS-681M2E--A3530
	820	25 × 50	2.92	0.15	0.243	1.36	LS-821M2E--A2550
	820	30 × 35	2.78	0.15	0.243	1.36	LS-821M2E--A3035
	820	35 × 30	2.87	0.15	0.243	1.36	LS-821M2E--A3530
	1,000	25 × 55	3.06	0.15	0.199	1.50	LS-102M2E--A2555
	1,000	30 × 45	3.11	0.15	0.199	1.50	LS-102M2E--A3045
	1,000	35 × 35	3.06	0.15	0.199	1.50	LS-102M2E--A3535
	1,200	25 × 60	3.33	0.15	0.166	1.50	LS-122M2E--A2560
	1,200	30 × 50	3.39	0.15	0.166	1.50	LS-122M2E--A3050
	1,200	35 × 35	3.20	0.15	0.166	1.50	LS-122M2E--A3535
	1,500	30 × 60	4.06	0.15	0.133	1.50	LS-152M2E--A3060
	1,500	35 × 45	3.92	0.15	0.133	1.50	LS-152M2E--A3545
	1,500	40 × 40	4.04	0.15	0.133	1.50	LS-152M2E--A4040
	1,800	30 × 65	4.27	0.15	0.111	1.50	LS-182M2E--A3065
	1,800	35 × 50	4.15	0.15	0.111	1.50	LS-182M2E--A3550
	1,800	40 × 50	4.50	0.15	0.111	1.50	LS-182M2E--A4050
	2,200	35 × 60	4.92	0.15	0.090	1.50	LS-222M2E--A3560
	2,200	40 × 60	5.30	0.15	0.090	1.50	LS-222M2E--A4060
	2,700	35 × 90	5.40	0.15	0.074	1.50	LS-272M2E--A3590
	2,700	40 × 80	6.30	0.15	0.074	1.50	LS-272M2E--A4080
	3,300	35 × 90	6.10	0.15	0.060	1.50	LS-332M2E--A3590
	3,300	40 × 80	7.00	0.15	0.060	1.50	LS-332M2E--A4080
	3,900	35 × 100	7.47	0.15	0.051	1.50	LS-392M2E--A35A0
	4,700	40 × 100	8.88	0.15	0.042	1.50	LS-472M2E--A40A0



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
350	82	20 × 20	0.58	0.15	2.427	0.51	LS-820M2V--A2020
	82	22 × 25	0.70	0.15	2.427	0.51	LS-820M2V--A2225
	100	20 × 25	0.70	0.15	1.990	0.56	LS-101M2V--A2025
	100	22 × 25	0.77	0.15	1.990	0.56	LS-101M2V--A2225
	100	25 × 20	0.73	0.15	1.990	0.56	LS-101M2V--A2520
	120	20 × 30	0.95	0.15	1.659	0.61	LS-121M2V--A2030
	120	22 × 25	0.99	0.15	1.659	0.61	LS-121M2V--A2225
	120	25 × 20	0.80	0.15	1.659	0.61	LS-121M2V--A2520
	150	20 × 35	1.05	0.15	1.327	0.69	LS-151M2V--A2035
	150	25 × 25	1.16	0.15	1.327	0.69	LS-151M2V--A2525
	150	30 × 25	1.24	0.15	1.327	0.69	LS-151M2V--A3025
	180	20 × 35	1.08	0.15	1.106	0.75	LS-181M2V--A2035
	180	22 × 35	1.28	0.15	1.106	0.75	LS-181M2V--A2235
	180	25 × 30	1.30	0.15	1.106	0.75	LS-181M2V--A2530
	180	30 × 25	1.37	0.15	1.106	0.75	LS-181M2V--A3025
	220	20 × 45	1.36	0.15	0.905	0.83	LS-221M2V--A2045
	220	22 × 40	1.40	0.15	0.905	0.83	LS-221M2V--A2240
	220	25 × 30	1.28	0.15	0.905	0.83	LS-221M2V--A2530
	220	30 × 25	1.47	0.15	0.905	0.83	LS-221M2V--A3025
	270	22 × 45	1.62	0.15	0.737	0.92	LS-271M2V--A2245
	270	25 × 35	1.65	0.15	0.737	0.92	LS-271M2V--A2535
	270	30 × 30	1.71	0.15	0.737	0.92	LS-271M2V--A3030
	270	35 × 25	1.72	0.15	0.737	0.92	LS-271M2V--A3525
	330	22 × 50	1.89	0.15	0.603	1.02	LS-331M2V--A2250
	330	25 × 40	1.84	0.15	0.603	1.02	LS-331M2V--A2540
	330	30 × 30	1.74	0.15	0.603	1.02	LS-331M2V--A3030
	330	35 × 25	1.77	0.15	0.603	1.02	LS-331M2V--A3525
	390	25 × 45	2.04	0.15	0.510	1.11	LS-391M2V--A2545
	390	30 × 35	2.12	0.15	0.510	1.11	LS-391M2V--A3035
	390	35 × 30	2.19	0.15	0.510	1.11	LS-391M2V--A3530
	470	30 × 40	2.41	0.15	0.423	1.22	LS-471M2V--A3040
	470	35 × 30	2.25	0.15	0.423	1.22	LS-471M2V--A3530
	560	30 × 45	2.60	0.15	0.355	1.33	LS-561M2V--A3045
	560	35 × 35	2.62	0.15	0.355	1.33	LS-561M2V--A3535
	680	35 × 40	2.80	0.15	0.293	1.46	LS-681M2V--A3540
	820	35 × 45	3.35	0.15	0.243	1.50	LS-821M2V--A3545
400	68	20 × 25	0.66	0.15	2.927	0.49	LS-680M2G--A2025
	68	22 × 25	0.72	0.15	2.927	0.49	LS-680M2G--A2225
	82	20 × 25	0.72	0.15	2.427	0.54	LS-820M2G--A2025
	82	22 × 25	0.80	0.15	2.427	0.54	LS-820M2G--A2225
	100	20 × 25	0.75	0.15	1.990	0.60	LS-101M2G--A2025
	100	22 × 25	0.81	0.15	1.990	0.60	LS-101M2G--A2225
	100	25 × 20	0.79	0.15	1.990	0.60	LS-101M2G--A2520
	120	22 × 30	1.04	0.15	1.659	0.66	LS-121M2G--A2230
	120	25 × 25	1.06	0.15	1.659	0.66	LS-121M2G--A2525
	150	20 × 35	1.00	0.15	1.327	0.66	LS-151M2G--A2035
	150	22 × 30	1.06	0.15	1.327	0.73	LS-151M2G--A2230
	150	25 × 25	1.06	0.15	1.327	0.73	LS-151M2G--A2525
	150	30 × 25	1.24	0.15	1.327	0.73	LS-151M2G--A3025
	180	20 × 40	1.17	0.15	1.106	0.80	LS-181M2G--A2040
	180	22 × 35	1.16	0.15	1.106	0.80	LS-181M2G--A2235
	180	25 × 30	1.23	0.15	1.106	0.80	LS-181M2G--A2530
	180	30 × 25	1.45	0.15	1.106	0.80	LS-181M2G--A3025
	180	35 × 25	1.54	0.15	1.106	0.80	LS-181M2G--A3525
	220	20 × 45	1.39	0.15	0.905	0.89	LS-221M2G--A2045
	220	22 × 40	1.39	0.15	0.905	0.89	LS-221M2G--A2240
	220	25 × 30	1.33	0.15	0.905	0.89	LS-221M2G--A2530
	220	30 × 25	1.38	0.15	0.905	0.89	LS-221M2G--A3025
	220	35 × 25	1.44	0.15	0.905	0.89	LS-221M2G--A3525
	270	22 × 45	1.54	0.15	0.737	0.99	LS-271M2G--A2245
	270	25 × 35	1.48	0.15	0.737	0.99	LS-271M2G--A2535
	270	30 × 30	1.56	0.15	0.737	0.99	LS-271M2G--A3030
	270	35 × 25	1.53	0.15	0.737	0.99	LS-271M2G--A3525
	330	22 × 50	1.70	0.15	0.603	1.09	LS-331M2G--A2250
	330	25 × 45	1.76	0.15	0.603	1.09	LS-331M2G--A2545
	330	30 × 35	1.76	0.15	0.603	1.09	LS-331M2G--A3035

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
400	330	35 × 25	1.68	0.15	0.603	1.09	LS-331M2G--A3525
	390	25 × 45	1.86	0.15	0.510	1.18	LS-391M2G--A2545
	390	30 × 35	1.89	0.15	0.510	1.18	LS-391M2G--A3035
	390	35 × 30	1.97	0.15	0.510	1.18	LS-391M2G--A3530
	470	25 × 55	2.26	0.15	0.423	1.30	LS-471M2G--A2555
	470	30 × 40	2.18	0.15	0.423	1.30	LS-471M2G--A3040
	470	35 × 30	2.12	0.15	0.423	1.30	LS-471M2G--A3530
	470	40 × 25	2.16	0.15	0.423	1.30	LS-471M2G--A4025
	560	30 × 45	2.37	0.15	0.355	1.42	LS-561M2G--A3045
	560	35 × 35	2.34	0.15	0.355	1.42	LS-561M2G--A3535
	680	30 × 55	2.85	0.15	0.293	1.50	LS-681M2G--A3055
	680	35 × 40	2.72	0.15	0.293	1.50	LS-681M2G--A3540
	680	40 × 35	2.79	0.15	0.293	1.50	LS-681M2G--A4035
	820	30 × 60	3.25	0.15	0.243	1.50	LS-821M2G--A3060
	820	35 × 50	3.28	0.15	0.243	1.50	LS-821M2G--A3550
	820	40 × 40	3.23	0.15	0.243	1.50	LS-821M2G--A4040
	1,000	35 × 55	3.77	0.15	0.199	1.50	LS-102M2G--A3555
	1,000	40 × 45	3.75	0.15	0.199	1.50	LS-102M2G--A4045
	1,200	35 × 65	4.50	0.15	0.166	1.50	LS-122M2G--A3565
	1,200	40 × 60	4.68	0.15	0.166	1.50	LS-122M2G--A4060
	1,500	35 × 80	5.51	0.15	0.133	1.50	LS-152M2G--A3580
	1,500	40 × 70	5.60	0.15	0.133	1.50	LS-152M2G--A4070
	1,800	40 × 80	6.50	0.15	0.111	1.50	LS-182M2G--A4080
420	220	22 × 45	1.38	0.15	0.905	0.91	LS-221M2P--A2245
	220	25 × 35	1.33	0.15	0.905	0.91	LS-221M2P--A2535
	330	25 × 50	1.90	0.15	0.603	1.12	LS-331M2P--A2550
	330	30 × 40	1.99	0.15	0.603	1.12	LS-331M2P--A3040
	470	35 × 35	2.37	0.15	0.423	1.33	LS-471M2P--A3535
	560	30 × 50	2.73	0.15	0.355	1.45	LS-561M2P--A3050
	560	35 × 40	2.73	0.15	0.355	1.45	LS-561M2P--A3540
	680	35 × 45	3.16	0.15	0.293	1.50	LS-681M2P--A3545
	680	40 × 50	3.70	0.15	0.293	1.50	LS-681M2P--A4050
	820	35 × 55	3.69	0.15	0.243	1.50	LS-821M2P--A3555
	820	40 × 45	3.66	0.15	0.243	1.50	LS-821M2P--A4045
	1,000	35 × 65	4.48	0.15	0.199	1.50	LS-102M2P--A3565
	1,000	40 × 50	4.27	0.15	0.199	1.50	LS-102M2P--A4050
	1,200	35 × 70	4.90	0.15	0.166	1.50	LS-122M2P--A3570
	1,200	40 × 55	4.76	0.15	0.166	1.50	LS-122M2P--A4055
	1,500	40 × 70	5.90	0.15	0.133	1.50	LS-152M2P--A4070
	1,800	40 × 80	6.86	0.15	0.111	1.50	LS-182M2P--A4080
450	56	20 × 25	0.57	0.15	3.554	0.48	LS-560M2W--A2025
	56	22 × 25	0.68	0.15	3.554	0.48	LS-560M2W--A2225
	68	20 × 25	0.62	0.15	2.927	0.52	LS-680M2W--A2025
	68	22 × 20	0.58	0.15	2.927	0.52	LS-680M2W--A2220
	82	20 × 30	0.74	0.15	2.427	0.58	LS-820M2W--A2030
	82	22 × 25	0.69	0.15	2.427	0.58	LS-820M2W--A2225
	82	25 × 25	0.75	0.15	2.427	0.58	LS-820M2W--A2525
	100	20 × 30	0.78	0.15	1.990	0.64	LS-101M2W--A2030
	100	22 × 25	0.77	0.15	1.990	0.64	LS-101M2W--A2225
	100	25 × 25	0.83	0.15	1.990	0.64	LS-101M2W--A2525
	120	20 × 35	0.92	0.15	1.659	0.70	LS-121M2W--A2035
	120	22 × 35	0.97	0.15	1.659	0.70	LS-121M2W--A2235
	120	25 × 25	0.91	0.15	1.659	0.70	LS-121M2W--A2525
	120	30 × 25	1.10	0.15	1.659	0.70	LS-121M2W--A3025
	150	20 × 40	1.06	0.15	1.327	0.78	LS-151M2W--A2040
	150	22 × 35	1.20	0.15	1.327	0.78	LS-151M2W--A2235
	150	25 × 30	1.16	0.15	1.327	0.78	LS-151M2W--A2530
	150	30 × 25	1.16	0.15	1.327	0.78	LS-151M2W--A3025
	180	20 × 45	1.21	0.15	1.106	0.85	LS-181M2W--A2045
	180	22 × 40	1.21	0.15	1.106	0.85	LS-181M2W--A2240
	180	25 × 35	1.31	0.15	1.106	0.85	LS-181M2W--A2535
	180	30 × 25	1.19	0.15	1.106	0.85	LS-181M2W--A3025
	180	35 × 25	1.35	0.15	1.106	0.85	LS-181M2W--A3525
	220	22 × 50	1.48	0.15	0.905	0.94	LS-221M2W--A2250
	220	25 × 40	1.47	0.15	0.905	0.94	LS-221M2W--A2540



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
450	220	30 × 30	1.42	0.15	0.905	0.94	LS-221M2W--A3030
	220	35 × 25	1.45	0.15	0.905	0.94	LS-221M2W--A3525
	270	22 × 55	1.71	0.15	0.737	1.05	LS-271M2W--A2255
	270	25 × 45	1.59	0.15	0.737	1.05	LS-271M2W--A2545
	270	30 × 35	1.65	0.15	0.737	1.05	LS-271M2W--A3035
	270	35 × 25	1.61	0.15	0.737	1.05	LS-271M2W--A3525
	330	25 × 50	1.76	0.15	0.603	1.16	LS-331M2W--A2550
	330	30 × 40	1.93	0.15	0.603	1.16	LS-331M2W--A3040
	330	35 × 30	1.88	0.15	0.603	1.16	LS-331M2W--A3530
	390	25 × 55	2.08	0.15	0.510	1.26	LS-391M2W--A2555
	390	30 × 40	2.00	0.15	0.510	1.26	LS-391M2W--A3040
	390	35 × 30	1.95	0.15	0.510	1.26	LS-391M2W--A3530
	470	30 × 45	2.35	0.15	0.423	1.38	LS-471M2W--A3045
	470	35 × 40	2.45	0.15	0.423	1.38	LS-471M2W--A3540
	560	30 × 55	2.76	0.15	0.355	1.50	LS-561M2W--A3055
	560	35 × 40	2.63	0.15	0.355	1.50	LS-561M2W--A3540
	680	35 × 50	2.91	0.15	0.293	1.50	LS-681M2W--A3550
	680	40 × 40	2.98	0.15	0.293	1.50	LS-681M2W--A4040
	820	35 × 55	3.86	0.15	0.243	1.50	LS-821M2W--A3555
	820	40 × 50	4.00	0.15	0.243	1.50	LS-821M2W--A4050
	1,000	35 × 70	4.74	0.15	0.199	1.50	LS-102M2W--A3570
	1,000	40 × 55	4.60	0.15	0.199	1.50	LS-102M2W--A4055
	1,200	35 × 80	5.51	0.15	0.166	1.50	LS-122M2W--A3580
	1,200	40 × 65	5.42	0.15	0.166	1.50	LS-122M2W--A4065
	1,500	35 × 100	5.99	0.15	0.133	1.50	LS-152M2W--A35A0
	2,200	45 × 90	8.48	0.15	0.090	1.50	LS-222M2W--A4590
500	56	20 × 25	0.54	0.15	3.554	0.50	LS-560M2H--A2025
	56	22 × 25	0.57	0.15	3.554	0.50	LS-560M2H--A2225
	68	20 × 30	0.65	0.15	2.927	0.55	LS-680M2H--A2030
	68	22 × 25	0.63	0.15	2.927	0.55	LS-680M2H--A2225
	68	25 × 20	0.62	0.15	2.927	0.55	LS-680M2H--A2520
	82	20 × 30	0.71	0.15	2.427	0.61	LS-820M2H--A2030
	82	22 × 30	0.75	0.15	2.427	0.61	LS-820M2H--A2230
	82	25 × 25	0.75	0.15	2.427	0.61	LS-820M2H--A2525
	100	22 × 35	0.85	0.15	1.990	0.67	LS-101M2H--A2235
	100	25 × 30	0.86	0.15	1.990	0.67	LS-101M2H--A2530
	100	30 × 20	0.82	0.15	1.990	0.67	LS-101M2H--A3020
	120	22 × 40	0.98	0.15	1.659	0.73	LS-121M2H--A2240
	120	25 × 30	0.94	0.15	1.659	0.73	LS-121M2H--A2530
	120	30 × 30	1.04	0.15	1.659	0.73	LS-121M2H--A3030
	120	35 × 25	1.07	0.15	1.659	0.73	LS-121M2H--A3525
	150	22 × 45	1.16	0.15	1.327	0.73	LS-151M2H--A2245
	150	25 × 35	1.12	0.15	1.327	0.82	LS-151M2H--A2535
	150	30 × 30	1.17	0.15	1.327	0.82	LS-151M2H--A3030
	150	35 × 25	1.20	0.15	1.327	0.82	LS-151M2H--A3525
	180	22 × 50	1.33	0.15	1.106	0.90	LS-181M2H--A2250
	180	25 × 40	1.30	0.15	1.106	0.90	LS-181M2H--A2540
	180	30 × 30	1.28	0.15	1.106	0.90	LS-181M2H--A3030
	180	35 × 20	1.21	0.15	1.106	0.90	LS-181M2H--A3520
	220	30 × 35	1.51	0.15	0.905	0.99	LS-221M2H--A3035
	220	35 × 30	1.55	0.15	0.905	0.99	LS-221M2H--A3530
	270	30 × 40	1.77	0.15	0.737	1.10	LS-271M2H--A3040
	270	35 × 35	1.83	0.15	0.737	1.10	LS-271M2H--A3530
	330	30 × 50	2.15	0.15	0.603	1.22	LS-331M2H--A3050
	330	35 × 35	2.03	0.15	0.603	1.22	LS-331M2H--A3535
	390	35 × 45	2.44	0.15	0.510	1.32	LS-391M2H--A3545
	470	35 × 50	2.80	0.15	0.423	1.45	LS-471M2H--A3550
	560	35 × 60	3.37	0.15	0.355	1.50	LS-561M2H--A3560
	560	40 × 50	3.31	0.15	0.355	1.50	LS-561M2H--A4050
	680	35 × 70	3.91	0.15	0.293	1.50	LS-681M2H--A3570
	680	40 × 55	3.79	0.15	0.293	1.50	LS-681M2H--A4055
	820	35 × 80	4.56	0.15	0.243	1.50	LS-821M2H--A3580
	820	40 × 60	4.33	0.15	0.243	1.50	LS-821M2H--A4060
	1,000	35 × 90	5.31	0.15	0.199	1.50	LS-102M2H--A3590
	1,000	40 × 80	5.42	0.15	0.199	1.50	LS-102M2H--A4080
	1,500	40 × 100	6.56	0.15	0.133	1.50	LS-152M2H--A40A0

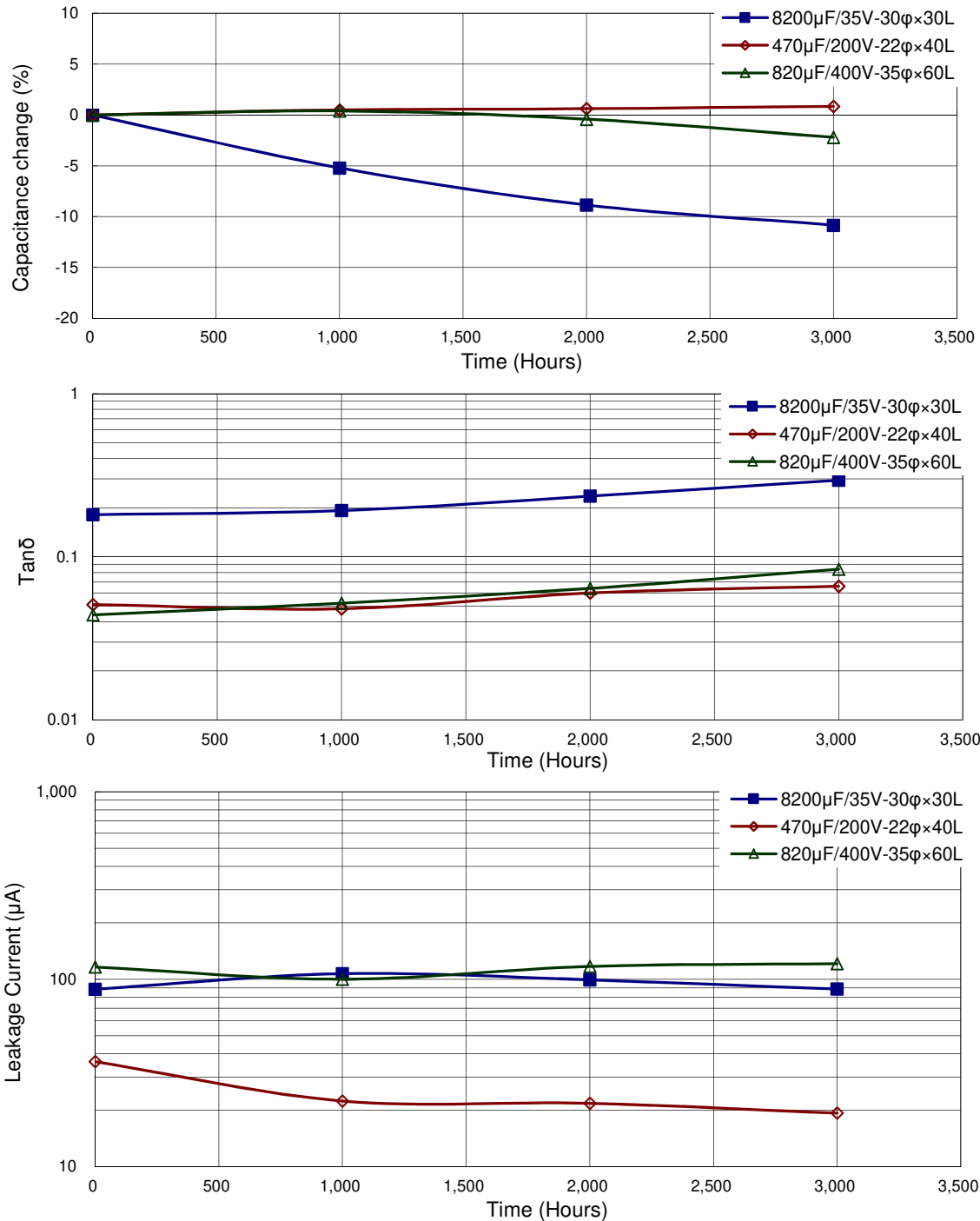


Part Numbering System

LS Series	100μF	±20%	400V		4.0±0.5mm	22 ϕ ×30L	Pb-free Terminal + PET Sleeve
<u>LS-</u>	<u>101</u>	<u>M</u>	<u>2G</u>	- -	<u>A</u>	<u>2230</u>	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:			Example:	Example:		Example:	
Cap.	Symbol		Voltage	Type		ϕ D×L	Code
56	560	M = ±20%	400	2 pins		22×30	2230
220	221	K = ±10%	450	5 pins		25×25	2525
470	471					30×40	3040

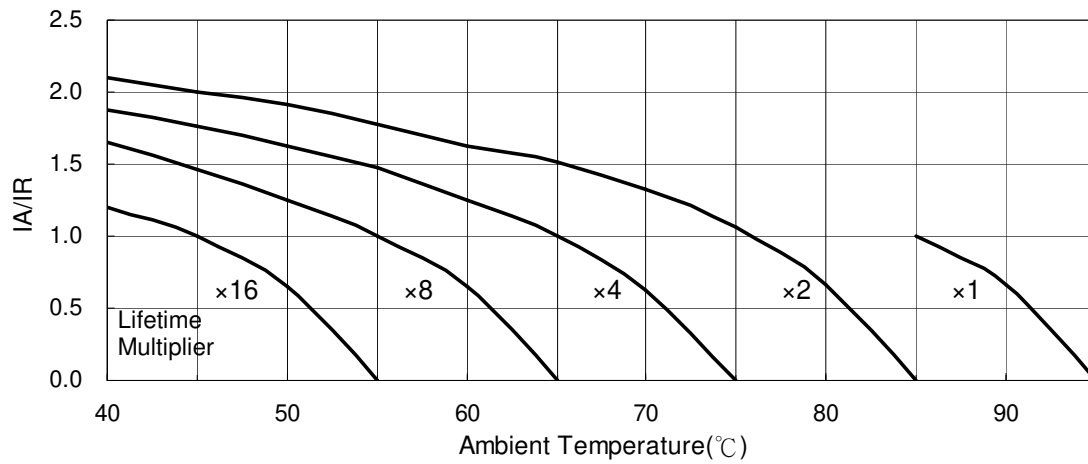
Note: For more details, please refer to "Part Numbering System (Snap-in Type)" on page 188.

Typical Endurance Curves

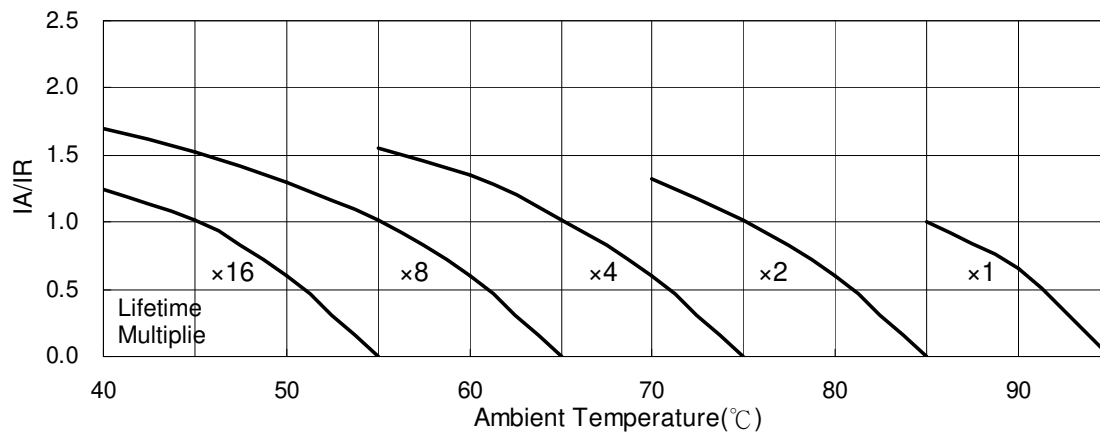


Useful Life Chart

Rated Voltage $\leq 100V$



Rated Voltage $\geq 160V$





LS2 Series

Features

- Snap-in terminal type
- 85°C, 2,000 hours assured
- Good safe characteristics which shall be failed with open mode without sparking and catching fire, when it is applied excess voltage
- RoHS compliance

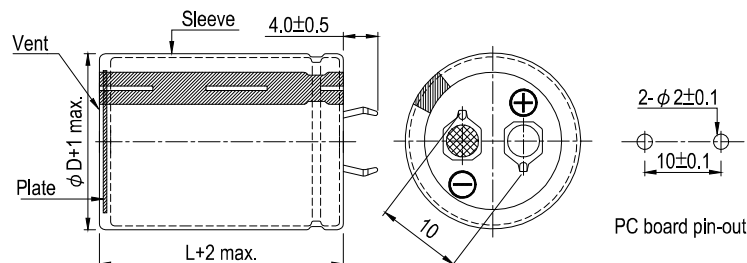


Specifications

Items	Performance																					
Category Temperature Range	200 ~ 400V			450V																		
	-40℃ ~ +85℃			-25℃ ~ +85℃																		
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																					
Leakage Current (at 20℃)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																					
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>200</td><td>250</td><td>400</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.20</td></tr></table>					Rated Voltage	200	250	400	450	Tanδ (max)	0.15	0.15	0.20	0.20							
Rated Voltage	200	250	400	450																		
Tanδ (max)	0.15	0.15	0.20	0.20																		
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td>Rated Voltage</td><td>200</td><td>250</td><td>400</td><td>450</td></tr><tr><td>Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>4</td><td>8</td><td>8</td></tr><tr><td></td><td>Z(-40℃)/Z(+20℃)</td><td>8</td><td>10</td><td>18</td><td>-</td></tr></table>					Rated Voltage	200	250	400	450	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	4	8	8		Z(-40℃)/Z(+20℃)	8	10	18	-
Rated Voltage	200	250	400	450																		
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	4	8	8																	
	Z(-40℃)/Z(+20℃)	8	10	18	-																	
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 85℃.					Test Time	2,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value									
Test Time	2,000 Hrs																					
Capacitance Change	Within ±20% of initial value																					
Tanδ	Less than 200% of specified value																					
Leakage Current	Within specified value																					
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).					Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 150% of specified value	Leakage Current	Within specified value									
Test Time	1,000 Hrs																					
Capacitance Change	Within ±20% of initial value																					
Tanδ	Less than 150% of specified value																					
Leakage Current	Within specified value																					
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>					Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4					
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																	
Multiplier	0.8	1.0	1.1	1.3	1.4																	
Safety Function Test Conditions	1. DC reverse voltage test: The capacitor is shall be connected in reverse polarity, and applied under specified Rated Voltage. 2. DC over voltage test: The voltage of 1.2 times shall be applied to the capacitor.																					
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																					

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

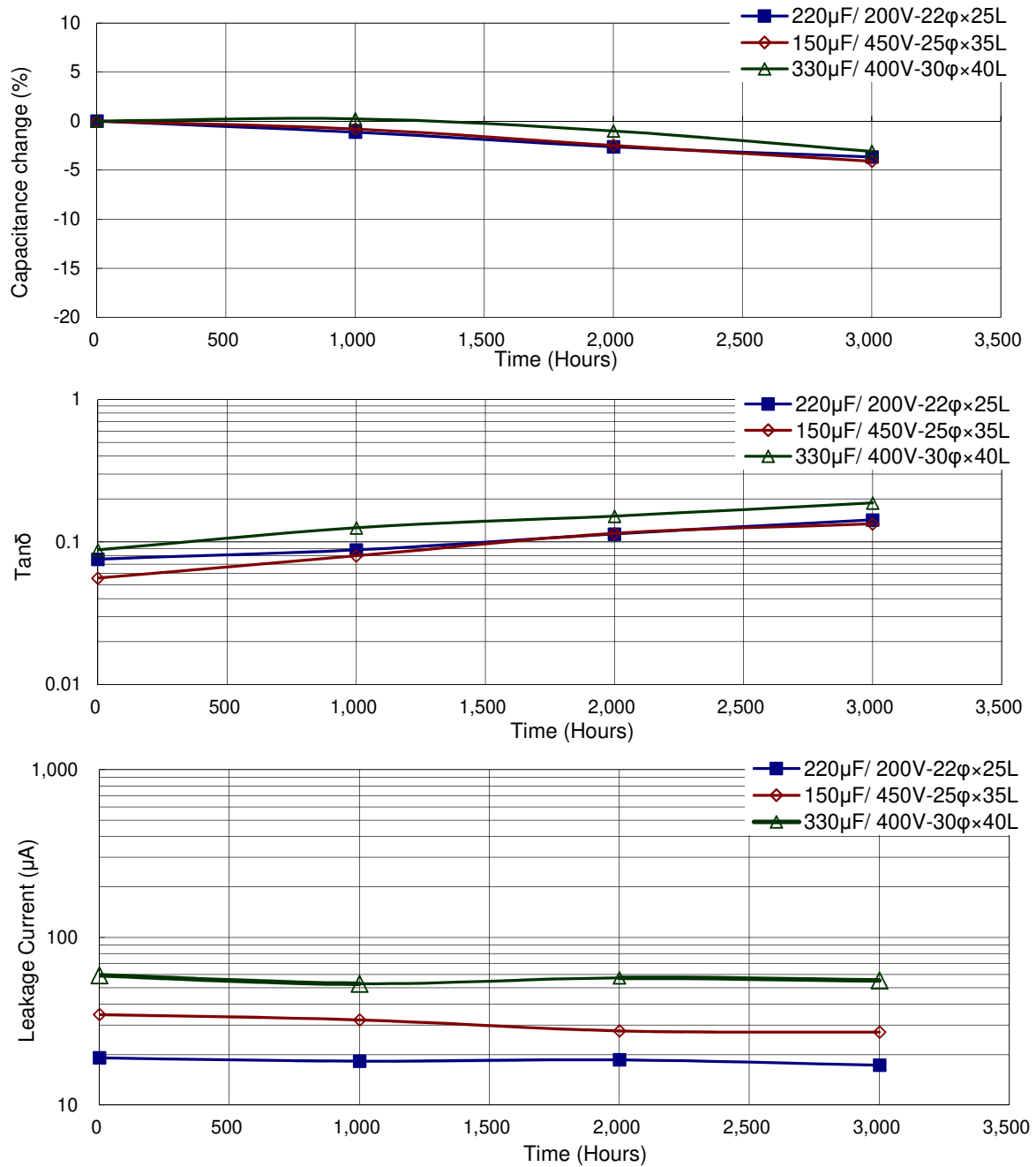
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
200	560	35 × 20	2.08	0.15	0.355	1.00	LS2561M2D--A3520
	680	35 × 20	2.23	0.15	0.293	1.11	LS2681M2D--A3520
	680	35 × 25	2.30	0.15	0.293	1.11	LS2681M2D--A3525
	820	35 × 25	2.53	0.15	0.243	1.21	LS2821M2D--A3525
	1,000	35 × 30	2.96	0.15	0.199	1.34	LS2102M2D--A3530
	1,200	35 × 35	3.40	0.15	0.166	1.47	LS2122M2D--A3535
	1,500	35 × 40	3.87	0.15	0.133	1.50	LS2152M2D--A3540
	1,800	35 × 45	4.37	0.15	0.111	1.50	LS2182M2D--A3545
250	390	35 × 20	1.68	0.15	0.510	0.94	LS2391M2E--A3520
	470	35 × 20	1.85	0.15	0.423	1.03	LS2471M2E--A3520
	470	35 × 25	2.01	0.15	0.423	1.03	LS2471M2E--A3525
	560	35 × 25	2.21	0.15	0.355	1.12	LS2561M2E--A3525
	680	35 × 30	2.54	0.15	0.293	1.24	LS2681M2E--A3530
	820	35 × 35	2.90	0.15	0.243	1.36	LS2821M2E--A3535
	1,000	35 × 35	3.21	0.15	0.199	1.50	LS2102M2E--A3535
	1,200	35 × 40	3.56	0.15	0.166	1.50	LS2122M2E--A3540
	1,500	35 × 50	4.26	0.15	0.133	1.50	LS2152M2E--A3550
400	220	35 × 25	1.60	0.20	1.206	0.89	LS2221M2G--A3525
	270	35 × 30	1.75	0.20	0.983	0.99	LS2271M2G--A3530
	330	35 × 30	1.95	0.20	0.804	1.09	LS2331M2G--A3530
	390	35 × 35	2.17	0.20	0.680	1.18	LS2391M2G--A3535
	470	35 × 40	2.42	0.20	0.565	1.30	LS2471M2G--A3540
	560	35 × 45	2.71	0.20	0.474	1.42	LS2561M2G--A3545
450	120	35 × 20	1.11	0.20	2.212	0.70	LS2121M2W--A3520
	150	35 × 20	1.24	0.20	1.769	0.78	LS2151M2W--A3520
	150	35 × 25	1.35	0.20	1.769	0.78	LS2151M2W--A3525
	180	35 × 25	1.39	0.20	1.474	0.85	LS2181M2W--A3525
	220	35 × 30	1.61	0.20	1.206	0.94	LS2221M2W--A3530
	270	35 × 35	1.86	0.20	0.983	1.05	LS2271M2W--A3535
	330	35 × 35	2.06	0.20	0.804	1.16	LS2331M2W--A3535
	390	35 × 45	2.34	0.20	0.680	1.26	LS2391M2W--A3545
	470	35 × 50	2.63	0.20	0.565	1.38	LS2471M2W--A3550

Part Numbering System

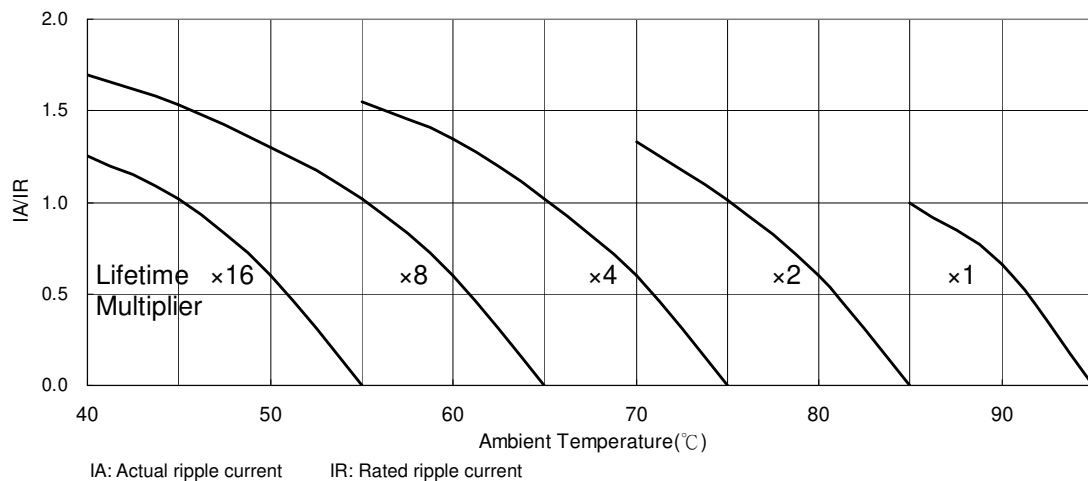
LS2 Series	220μF	±20%	400V		4.0±0.5mm	35 φ ×25L	Pb-free Terminal + PET Sleeve
LS2	221	M	2G	--	A	3525	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:		Example: 6.3±1.0 mm	Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
56	560		400	2G		22×30	2230
220	221		450	2W		25×25	2525
470	471					30×40	3040

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



Useful Life Chart





LSL Series

Features

- Snap-in terminal type
- 105°C, 2,000 hours assured
- Low profile size
- RoHS compliance

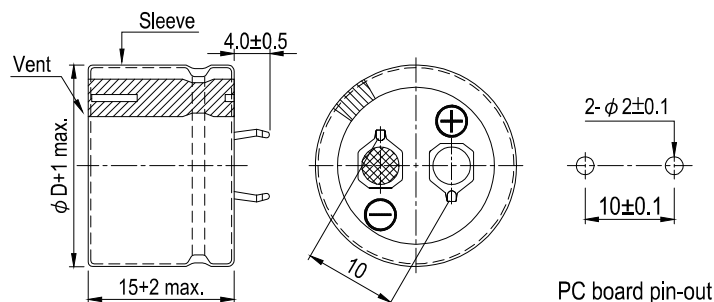


Specifications

Items	Performance																														
Category Temperature Range	160 ~ 400V																														
	-25°C ~ +105°C																														
Capacitance Tolerance	± 20% (at 120 Hz, 20°C)																														
Leakage Current (at 20°C)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																														
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>160</td><td>180</td><td>200</td><td>250</td><td>315</td><td>400</td></tr><tr><td>Tanδ(max)</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td></tr></table>							Rated Voltage	160	180	200	250	315	400	Tanδ(max)	0.15	0.15	0.15	0.15	0.15	0.15										
Rated Voltage	160	180	200	250	315	400																									
Tanδ(max)	0.15	0.15	0.15	0.15	0.15	0.15																									
Low Temperature Characteristics (at 120 Hz)	<table><tr><td colspan="8">Impedance ratio shall not exceed the values given in the table below.</td></tr><tr><td colspan="2">Rated Voltage</td><td>160</td><td>180</td><td>200</td><td>250</td><td>315</td><td>400</td></tr><tr><td>Impedance Ratio</td><td>Z(-25°C)/ Z(+20°C)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>8</td><td>8</td></tr></table>							Impedance ratio shall not exceed the values given in the table below.								Rated Voltage		160	180	200	250	315	400	Impedance Ratio	Z(-25°C)/ Z(+20°C)	4	4	4	4	8	8
Impedance ratio shall not exceed the values given in the table below.																															
Rated Voltage		160	180	200	250	315	400																								
Impedance Ratio	Z(-25°C)/ Z(+20°C)	4	4	4	4	8	8																								
Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 105°C.							Test Time	2,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																
Test Time	2,000 Hrs																														
Capacitance Change	Within ±20% of initial value																														
Tanδ	Less than 200% of specified value																														
Leakage Current	Within specified value																														
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105 °C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).							Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 150% of specified value	Leakage Current	Within specified value																
Test Time	1,000 Hrs																														
Capacitance Change	Within ±20% of initial value																														
Tanδ	Less than 150% of specified value																														
Leakage Current	Within specified value																														
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>							Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																										
Multiplier	0.8	1.0	1.1	1.3	1.4																										
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																														

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

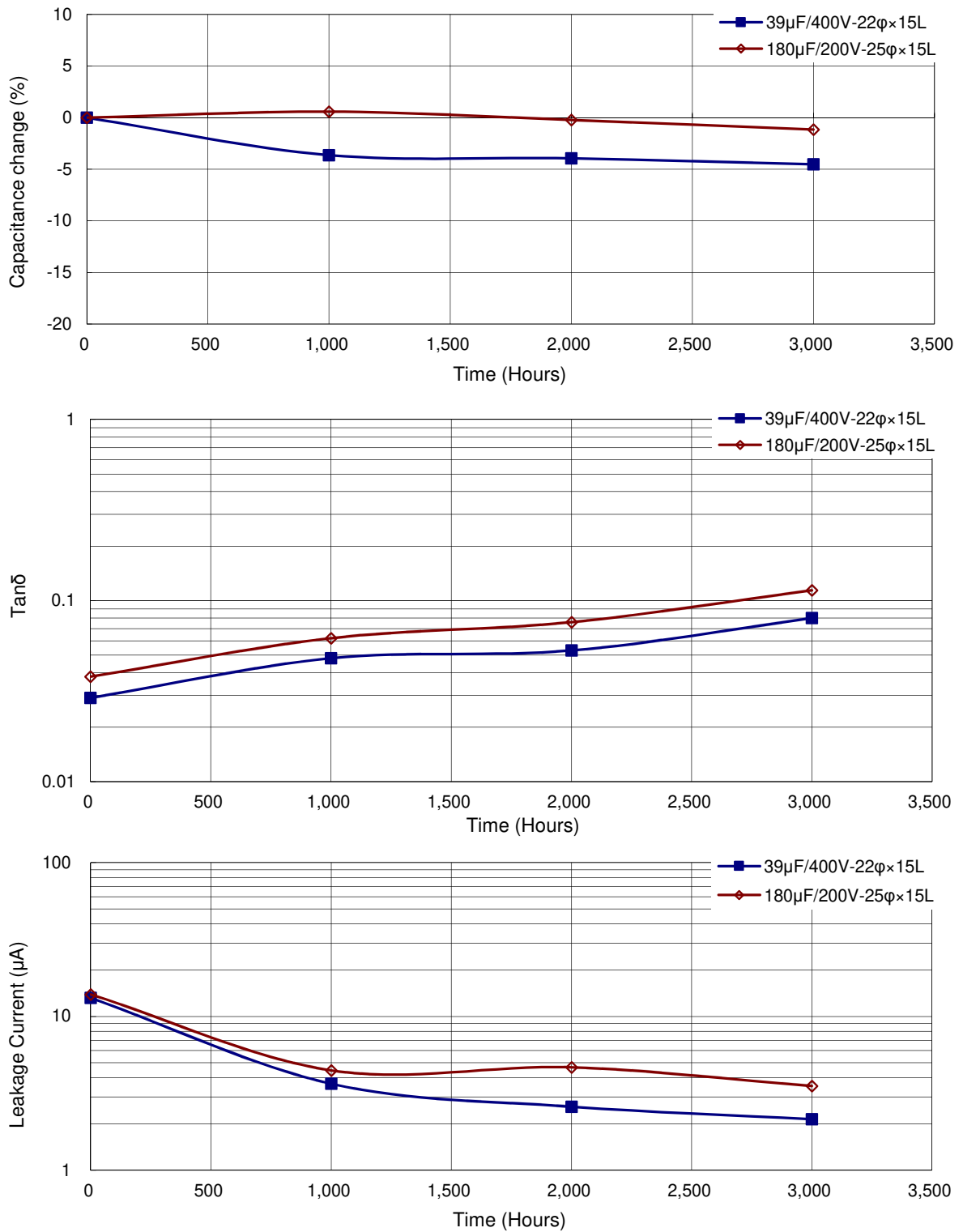
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
160	150	20 × 15	0.55	0.15	1.327	0.46	LSL151M2C--A2015N
	180	22 × 15	0.65	0.15	1.106	0.50	LSL181M2C--A2215N
	220	25 × 15	0.80	0.15	0.905	0.56	LSL221M2C--A2515N
	270	30 × 15	0.95	0.15	0.737	0.62	LSL271M2C--A3015N
	330	30 × 15	1.00	0.15	0.603	0.68	LSL331M2C--A3015N
	390	35 × 15	1.20	0.15	0.510	0.74	LSL391M2C--A3515N
180	120	20 × 15	0.50	0.15	1.659	0.44	LSL121M2S--A2015N
	150	22 × 15	0.60	0.15	1.327	0.49	LSL151M2S--A2215N
	180	25 × 15	0.75	0.15	1.106	0.54	LSL181M2S--A2515N
	220	30 × 15	0.85	0.15	0.905	0.59	LSL221M2S--A3015N
	270	30 × 15	1.00	0.15	0.737	0.66	LSL271M2S--A3015N
	330	35 × 15	1.10	0.15	0.603	0.73	LSL331M2S--A3515N
	390	35 × 15	1.20	0.15	0.510	0.79	LSL391M2S--A3515N
200	100	20 × 15	0.45	0.15	1.990	0.42	LSL101M2D--A2015N
	120	22 × 15	0.55	0.15	1.659	0.46	LSL121M2D--A2215N
	150	25 × 15	0.65	0.15	1.327	0.51	LSL151M2D--A2515N
	180	25 × 15	0.75	0.15	1.106	0.56	LSL181M2D--A2515N
	220	30 × 15	0.90	0.15	0.905	0.62	LSL221M2D--A3015N
	270	30 × 15	1.00	0.15	0.737	0.69	LSL271M2D--A3015N
	330	35 × 15	1.10	0.15	0.603	0.77	LSL331M2D--A3515N
250	100	22 × 15	0.50	0.15	1.990	0.47	LSL101M2E--A2215N
	120	25 × 15	0.60	0.15	1.659	0.51	LSL121M2E--A2515N
	150	30 × 15	0.70	0.15	1.327	0.58	LSL151M2E--A3015N
	180	30 × 15	0.75	0.15	1.106	0.63	LSL181M2E--A3015N
	220	35 × 15	0.90	0.15	0.905	0.70	LSL221M2E--A3515N
	270	35 × 15	1.00	0.15	0.737	0.77	LSL271M2E--A3515N
315	56	22 × 15	0.35	0.15	3.554	0.39	LSL560M2F--A2215N
	68	25 × 15	0.40	0.15	2.927	0.43	LSL680M2F--A2515N
	82	30 × 15	0.45	0.15	2.427	0.48	LSL820M2F--A3015N
	100	30 × 15	0.50	0.15	1.990	0.53	LSL101M2F--A3015N
	120	35 × 15	0.55	0.15	1.659	0.58	LSL121M2F--A3515N
	150	35 × 15	0.60	0.15	1.327	0.65	LSL151M2F--A3515N
400	39	22 × 15	0.30	0.15	5.104	0.37	LSL390M2G--A2215N
	47	25 × 15	0.35	0.15	4.235	0.41	LSL470M2G--A2515N
	56	30 × 15	0.40	0.15	3.554	0.44	LSL560M2G--A3015N
	68	30 × 15	0.45	0.15	2.927	0.49	LSL680M2G--A3015N
	82	35 × 15	0.50	0.15	2.427	0.54	LSL820M2G--A3515N
	100	35 × 15	0.55	0.15	1.990	0.60	LSL101M2G--A3515N

Part Numbering System

LSL Series	100μF	±20%	400V		4.0±0.5mm	35 ϕ ×15L	Pb-free Terminal + PET Sleeve
<u>LSL</u>	<u>101</u>	<u>M</u>	<u>2G</u>	- -	<u>A</u>	<u>3515</u>	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:	Example:	Example:	Example:	
Cap.	Symbol		Voltage	Type	“-”:	ϕ D×L	Code
56	560		315	2 pins	6.3±1.0 mm	20×15	2015
220	221		400	5 pins		25×15	2515
390	391					35×15	3515

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



LSG Series

Features

- Snap-in terminal type
- 105°C, 2,000 hours assured
- RoHS compliance

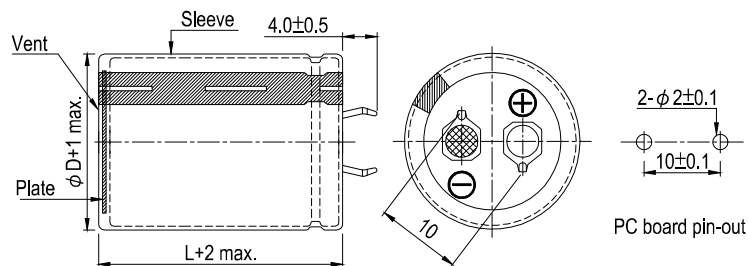


Specifications

Items	Performance																
Category Temperature Range	16 ~ 100V								160 ~ 500V								
	-40℃ ~ +105℃								-25℃ ~ +105℃								
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																
Leakage Current (at 20℃)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																
Tanδ (at 120 Hz, 20℃)	Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500	
	Tanδ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																
	Rated Voltage		16	25	35	50	63	80	100	160	200	250	350	400	420	450	500
	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	3	3	2	2	2	4	4	4	4	8	8	8	8	8
Z(-40℃)/Z(+20℃)		15	10	8	6	5	5	4	-	-	-	-	-	-	-	-	
Endurance	Test Time		2,000 Hrs														
	Capacitance Change		Within ±20% of initial value														
	Tanδ		Less than 200% of specified value														
	Leakage Current		Within specified value														
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 105℃.																
Shelf Life Test	Test Time		1,000 Hrs														
	Capacitance Change		Within ±20% of initial value														
	Tanδ		Less than 150% of specified value														
	Leakage Current		Within specified value														
	* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																
Ripple Current and Frequency Multipliers	Case size	Freq.(Hz) Rated Volt. (V)		50 / 60		100 / 120		500		1k		10k up					
		≤ 100		0.92		1.00		1.13		1.19		1.20					
	Length ≤ 55L	160 ~ 250		0.81		1.00		1.32		1.45		1.50					
		350 ≤		0.77		1.00		1.30		1.41		1.43					
	Length ≥ 60L	160 ~ 500		0.88		1.00		1.20		1.25		1.40					
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
16	10,000	20 × 25	1.61	0.50	0.066	1.20	LSG103M1C--A2025
	10,000	22 × 25	1.78	0.50	0.066	1.20	LSG103M1C--A2225
	12,000	22 × 25	1.92	0.50	0.055	1.31	LSG123M1C--A2225
	15,000	22 × 30	2.20	0.50	0.044	1.47	LSG153M1C--A2230
	15,000	25 × 25	2.25	0.50	0.044	1.47	LSG153M1C--A2525
	18,000	22 × 35	2.49	0.50	0.037	1.50	LSG183M1C--A2235
	18,000	25 × 30	2.52	0.50	0.037	1.50	LSG183M1C--A2530
	18,000	30 × 25	2.61	0.50	0.037	1.50	LSG183M1C--A3025
	22,000	22 × 40	2.90	0.50	0.030	1.50	LSG223M1C--A2240
	22,000	25 × 30	2.77	0.50	0.030	1.50	LSG223M1C--A2530
	22,000	30 × 25	2.88	0.50	0.030	1.50	LSG223M1C--A3025
	27,000	25 × 35	3.02	0.50	0.025	1.50	LSG273M1C--A2535
	27,000	30 × 30	3.15	0.50	0.025	1.50	LSG273M1C--A3030
	33,000	30 × 30	3.48	0.50	0.020	1.50	LSG333M1C--A3030
	33,000	35 × 25	3.57	0.50	0.020	1.50	LSG333M1C--A3525
	39,000	30 × 35	4.03	0.50	0.017	1.50	LSG393M1C--A3035
	39,000	35 × 30	4.16	0.50	0.017	1.50	LSG393M1C--A3530
	47,000	35 × 35	4.85	0.50	0.014	1.50	LSG473M1C--A3535
25	8,200	22 × 25	1.73	0.45	0.073	1.36	LSG822M1E--A2225
	10,000	22 × 30	2.05	0.45	0.060	1.50	LSG103M1E--A2230
	10,000	25 × 25	2.05	0.45	0.060	1.50	LSG103M1E--A2525
	12,000	22 × 35	2.23	0.45	0.050	1.50	LSG123M1E--A2235
	12,000	25 × 25	2.09	0.45	0.050	1.50	LSG123M1E--A2525
	12,000	30 × 25	2.45	0.45	0.050	1.50	LSG123M1E--A3025
	12,000	35 × 25	2.74	0.45	0.050	1.50	LSG123M1E--A3525
	15,000	22 × 40	2.65	0.45	0.040	1.50	LSG153M1E--A2240
	15,000	25 × 35	2.80	0.45	0.040	1.50	LSG153M1E--A2535
	15,000	30 × 25	2.72	0.45	0.040	1.50	LSG153M1E--A3025
	15,000	35 × 25	3.00	0.45	0.040	1.50	LSG153M1E--A3525
	18,000	22 × 45	2.93	0.45	0.033	1.50	LSG183M1E--A2245
	18,000	25 × 35	2.83	0.45	0.033	1.50	LSG183M1E--A2535
	18,000	30 × 30	3.07	0.45	0.033	1.50	LSG183M1E--A3030
	18,000	35 × 25	3.02	0.45	0.033	1.50	LSG183M1E--A3525
	22,000	22 × 50	3.31	0.45	0.027	1.50	LSG223M1E--A2250
	22,000	25 × 40	3.22	0.45	0.027	1.50	LSG223M1E--A2540
	22,000	30 × 30	3.18	0.45	0.027	1.50	LSG223M1E--A3030
	22,000	35 × 25	3.07	0.45	0.027	1.50	LSG223M1E--A3525
	27,000	30 × 35	3.35	0.45	0.022	1.50	LSG273M1E--A3035
	27,000	35 × 30	3.46	0.45	0.022	1.50	LSG273M1E--A3530
35	3,300	22 × 25	1.31	0.40	0.161	1.02	LSG332M1V--A2225
	3,900	22 × 30	1.54	0.40	0.136	1.11	LSG392M1V--A2230
	4,700	22 × 25	1.63	0.40	0.113	1.22	LSG472M1V--A2225
	4,700	25 × 25	1.70	0.40	0.113	1.22	LSG472M1V--A2525
	5,600	22 × 25	1.63	0.40	0.095	1.33	LSG562M1V--A2225
	5,600	25 × 25	1.77	0.40	0.095	1.33	LSG562M1V--A2525
	5,600	30 × 25	1.99	0.40	0.095	1.33	LSG562M1V--A3025
	6,800	22 × 30	1.86	0.40	0.078	1.46	LSG682M1V--A2230
	6,800	25 × 30	2.04	0.40	0.078	1.46	LSG682M1V--A2530
	6,800	30 × 30	2.24	0.40	0.078	1.46	LSG682M1V--A3030
	8,200	22 × 35	2.10	0.40	0.065	1.50	LSG822M1V--A2235
	8,200	25 × 35	2.60	0.40	0.065	1.50	LSG822M1V--A2535
	8,200	30 × 25	2.49	0.40	0.065	1.50	LSG822M1V--A3025
	8,200	35 × 25	2.69	0.40	0.065	1.50	LSG822M1V--A3525
	10,000	22 × 40	2.42	0.40	0.053	1.50	LSG103M1V--A2240
	10,000	25 × 40	2.83	0.40	0.053	1.50	LSG103M1V--A2540
	10,000	30 × 30	2.75	0.40	0.053	1.50	LSG103M1V--A3030
	12,000	22 × 45	2.79	0.40	0.044	1.50	LSG123M1V--A2245
	12,000	25 × 45	3.00	0.40	0.044	1.50	LSG123M1V--A2545
	12,000	30 × 35	2.96	0.40	0.044	1.50	LSG123M1V--A3035
	12,000	35 × 25	2.75	0.40	0.044	1.50	LSG123M1V--A3525

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
35	15,000	25 × 45	3.24	0.40	0.035	1.50	LSG153M1V--A2545
	15,000	30 × 35	3.24	0.40	0.035	1.50	LSG153M1V--A3035
	15,000	35 × 25	3.12	0.40	0.035	1.50	LSG153M1V--A3525
	18,000	25 × 50	3.71	0.40	0.029	1.50	LSG183M1V--A2550
	18,000	30 × 45	4.07	0.40	0.029	1.50	LSG183M1V--A3045
	18,000	35 × 35	4.02	0.40	0.029	1.50	LSG183M1V--A3535
	22,000	30 × 45	4.34	0.40	0.024	1.50	LSG223M1V--A3045
	22,000	35 × 40	4.69	0.40	0.024	1.50	LSG223M1V--A3540
50	1,800	22 × 25	1.33	0.35	0.258	0.90	LSG182M1H--A2225
	2,200	22 × 25	1.48	0.35	0.211	0.99	LSG222M1H--A2225
	2,700	22 × 25	1.53	0.35	0.172	1.10	LSG272M1H--A2225
	2,700	25 × 25	1.57	0.35	0.172	1.10	LSG272M1H--A2525
	3,300	22 × 30	1.76	0.35	0.141	1.22	LSG332M1H--A2230
	3,300	25 × 25	1.70	0.35	0.141	1.22	LSG332M1H--A2525
	3,900	22 × 35	1.97	0.35	0.119	1.32	LSG392M1H--A2235
	3,900	25 × 25	1.82	0.35	0.119	1.32	LSG392M1H--A2525
	3,900	30 × 25	1.95	0.35	0.119	1.32	LSG392M1H--A3025
	4,700	22 × 35	2.01	0.35	0.099	1.45	LSG472M1H--A2235
	4,700	25 × 30	2.18	0.35	0.099	1.45	LSG472M1H--A2530
	4,700	30 × 25	2.04	0.35	0.099	1.45	LSG472M1H--A3025
	4,700	35 × 25	2.48	0.35	0.099	1.45	LSG472M1H--A3525
	5,600	22 × 40	2.32	0.35	0.083	1.50	LSG562M1H--A2240
	5,600	25 × 35	2.47	0.35	0.083	1.50	LSG562M1H--A2535
	5,600	30 × 25	2.33	0.35	0.083	1.50	LSG562M1H--A3025
	6,800	22 × 45	2.70	0.35	0.068	1.50	LSG682M1H--A2245
	6,800	25 × 40	2.92	0.35	0.068	1.50	LSG682M1H--A2540
	6,800	30 × 30	2.84	0.35	0.068	1.50	LSG682M1H--A3030
	6,800	35 × 25	2.91	0.35	0.068	1.50	LSG682M1H--A3525
	8,200	25 × 45	3.13	0.35	0.057	1.50	LSG822M1H--A2545
	8,200	30 × 35	3.13	0.35	0.057	1.50	LSG822M1H--A3035
	8,200	35 × 30	3.23	0.35	0.057	1.50	LSG822M1H--A3530
	10,000	25 × 50	3.39	0.35	0.046	1.50	LSG103M1H--A2550
	10,000	30 × 40	3.55	0.35	0.046	1.50	LSG103M1H--A3040
	10,000	35 × 30	3.47	0.35	0.046	1.50	LSG103M1H--A3530
	12,000	30 × 45	4.04	0.35	0.039	1.50	LSG123M1H--A3045
	12,000	35 × 35	3.98	0.35	0.039	1.50	LSG123M1H--A3535
	15,000	30 × 50	4.60	0.35	0.031	1.50	LSG153M1H--A3050
	15,000	35 × 45	4.80	0.35	0.031	1.50	LSG153M1H--A3545
63	1,200	22 × 25	1.19	0.30	0.332	0.82	LSG122M1J--A2225
	1,500	22 × 25	1.30	0.30	0.265	0.92	LSG152M1J--A2225
	1,500	25 × 25	1.38	0.30	0.265	0.92	LSG152M1J--A2525
	1,800	22 × 25	1.36	0.30	0.221	1.01	LSG182M1J--A2225
	1,800	25 × 25	1.52	0.30	0.221	1.01	LSG182M1J--A2525
	2,200	22 × 30	1.55	0.30	0.181	1.12	LSG222M1J--A2230
	2,200	25 × 25	1.60	0.30	0.181	1.12	LSG222M1J--A2525
	2,700	22 × 35	1.89	0.30	0.147	1.24	LSG272M1J--A2235
	2,700	25 × 30	1.90	0.30	0.147	1.24	LSG272M1J--A2530
	2,700	30 × 25	1.97	0.30	0.147	1.24	LSG272M1J--A3025
	3,300	22 × 40	1.99	0.30	0.121	1.37	LSG332M1J--A2240
	3,300	25 × 35	2.06	0.30	0.121	1.37	LSG332M1J--A2535
	3,300	30 × 25	2.00	0.30	0.121	1.37	LSG332M1J--A3025
	3,300	35 × 25	2.22	0.30	0.121	1.37	LSG332M1J--A3525
	3,900	22 × 45	2.34	0.30	0.102	1.49	LSG392M1J--A2245
	3,900	25 × 35	2.20	0.30	0.102	1.49	LSG392M1J--A2535
	3,900	30 × 25	2.18	0.30	0.102	1.49	LSG392M1J--A3025
	3,900	35 × 25	2.40	0.30	0.102	1.49	LSG392M1J--A3525
	4,700	22 × 50	2.58	0.30	0.085	1.50	LSG472M1J--A2250
	4,700	25 × 40	2.51	0.30	0.085	1.50	LSG472M1J--A2540
	4,700	30 × 30	2.48	0.30	0.085	1.50	LSG472M1J--A3030
	4,700	35 × 25	2.54	0.30	0.085	1.50	LSG472M1J--A3525
	5,600	25 × 45	2.92	0.30	0.071	1.50	LSG562M1J--A2545
	5,600	30 × 35	2.91	0.30	0.071	1.50	LSG562M1J--A3035
	5,600	35 × 30	3.00	0.30	0.071	1.50	LSG562M1J--A3530
	6,800	30 × 50	3.65	0.30	0.059	1.50	LSG682M1J--A3050
	6,800	35 × 30	3.30	0.30	0.059	1.50	LSG682M1J--A3530



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
63	8,200	30 × 45	3.57	0.30	0.049	1.50	LSG822M1J--A3045
	8,200	35 × 35	3.52	0.30	0.049	1.50	LSG822M1J--A3535
	10,000	35 × 40	3.90	0.30	0.040	1.50	LSG103M1J--A3540
	12,000	35 × 45	4.50	0.30	0.033	1.50	LSG123M1J--A3545
80	1,000	22 × 25	1.05	0.25	0.332	0.85	LSG102M1K--A2225
	1,200	22 × 30	1.24	0.25	0.276	0.93	LSG122M1K--A2230
	1,500	22 × 35	1.48	0.25	0.221	1.04	LSG152M1K--A2235
	1,500	25 × 25	1.38	0.25	0.221	1.04	LSG152M1K--A2525
	1,800	22 × 40	1.72	0.25	0.184	1.14	LSG182M1K--A2240
	1,800	25 × 30	1.63	0.25	0.184	1.14	LSG182M1K--A2530
	2,200	22 × 45	1.82	0.25	0.151	1.26	LSG222M1K--A2245
	2,200	25 × 30	1.65	0.25	0.151	1.26	LSG222M1K--A2530
	2,700	25 × 45	2.17	0.25	0.123	1.39	LSG272M1K--A2545
	2,700	30 × 30	2.03	0.25	0.123	1.39	LSG272M1K--A3030
	3,300	25 × 50	2.51	0.25	0.101	1.50	LSG332M1K--A2550
	3,300	35 × 25	2.30	0.25	0.101	1.50	LSG332M1K--A3525
	3,900	30 × 45	2.89	0.25	0.085	1.50	LSG392M1K--A3045
	3,900	35 × 30	2.68	0.25	0.085	1.50	LSG392M1K--A3530
	4,700	30 × 50	2.97	0.25	0.071	1.50	LSG472M1K--A3050
	4,700	35 × 30	2.64	0.25	0.071	1.50	LSG472M1K--A3530
	5,600	30 × 45	3.10	0.25	0.059	1.50	LSG562M1K--A3045
	5,600	35 × 45	3.39	0.25	0.059	1.50	LSG562M1K--A3545
	6,800	35 × 40	3.56	0.25	0.049	1.50	LSG682M1K--A3540
	6,800	35 × 50	3.90	0.25	0.049	1.50	LSG682M1K--A3550
100	820	22 × 30	1.14	0.20	0.324	0.86	LSG821M2A--A2230
	1,000	22 × 30	1.26	0.20	0.265	0.95	LSG102M2A--A2230
	1,200	22 × 35	1.55	0.20	0.221	1.04	LSG122M2A--A2235
	1,200	25 × 30	1.56	0.20	0.221	1.04	LSG122M2A--A2530
	1,200	30 × 25	1.68	0.20	0.221	1.04	LSG122M2A--A3025
	1,500	22 × 40	1.78	0.20	0.177	1.16	LSG152M2A--A2240
	1,500	25 × 35	1.80	0.20	0.177	1.16	LSG152M2A--A2535
	1,500	30 × 25	1.76	0.20	0.177	1.16	LSG152M2A--A3025
	1,500	35 × 25	1.98	0.20	0.177	1.16	LSG152M2A--A3525
	1,800	22 × 45	1.99	0.20	0.147	1.27	LSG182M2A--A2245
	1,800	25 × 35	1.95	0.20	0.147	1.27	LSG182M2A--A2535
	1,800	30 × 30	2.29	0.20	0.147	1.27	LSG182M2A--A3030
	1,800	35 × 25	2.34	0.20	0.147	1.27	LSG182M2A--A3525
	2,200	22 × 50	2.21	0.20	0.121	1.41	LSG222M2A--A2250
	2,200	25 × 40	2.15	0.20	0.121	1.41	LSG222M2A--A2540
	2,200	30 × 30	2.12	0.20	0.121	1.41	LSG222M2A--A3030
	2,200	35 × 25	2.27	0.20	0.121	1.41	LSG222M2A--A3525
	2,700	25 × 50	2.59	0.20	0.098	1.50	LSG272M2A--A2550
	2,700	30 × 35	2.37	0.20	0.098	1.50	LSG272M2A--A3035
	2,700	35 × 30	2.62	0.20	0.098	1.50	LSG272M2A--A3530
	3,300	30 × 40	2.77	0.20	0.080	1.50	LSG332M2A--A3040
	3,300	35 × 35	2.99	0.20	0.080	1.50	LSG332M2A--A3535
	3,900	30 × 45	3.02	0.20	0.068	1.50	LSG392M2A--A3045
	3,900	35 × 40	3.35	0.20	0.068	1.50	LSG392M2A--A3540
	4,700	35 × 40	3.30	0.20	0.056	1.50	LSG472M2A--A3540
	5,600	35 × 45	3.51	0.20	0.047	1.50	LSG562M2A--A3545
160	270	22 × 25	0.86	0.15	0.737	0.62	LSG271M2C--A2225
	330	22 × 25	1.10	0.15	0.603	0.69	LSG331M2C--A2225
	390	22 × 30	1.22	0.15	0.510	0.75	LSG391M2C--A2230
	390	25 × 25	1.15	0.15	0.510	0.75	LSG391M2C--A2525
	470	22 × 35	1.35	0.15	0.423	0.82	LSG471M2C--A2235
	470	25 × 25	1.33	0.15	0.423	0.82	LSG471M2C--A2525
	560	22 × 40	1.50	0.15	0.355	0.90	LSG561M2C--A2240
	560	25 × 30	1.45	0.15	0.355	0.90	LSG561M2C--A2530
	560	30 × 25	1.40	0.15	0.355	0.90	LSG561M2C--A3025
	680	22 × 45	1.65	0.15	0.293	0.99	LSG681M2C--A2245
	680	25 × 35	1.65	0.15	0.293	0.99	LSG681M2C--A2535
	680	30 × 25	1.65	0.15	0.293	0.99	LSG681M2C--A3025
	820	22 × 50	1.93	0.15	0.243	1.09	LSG821M2C--A2250
	820	25 × 40	1.85	0.15	0.243	1.09	LSG821M2C--A2540



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
160	820	30 × 30	1.76	0.15	0.243	1.09	LSG821M2C--A3030
	820	35 × 25	1.91	0.15	0.243	1.09	LSG821M2C--A3525
	1,000	25 × 45	2.20	0.15	0.199	1.20	LSG102M2C--A2545
	1,000	30 × 35	2.02	0.15	0.199	1.20	LSG102M2C--A3035
	1,000	35 × 30	2.44	0.15	0.199	1.20	LSG102M2C--A3530
	1,200	25 × 50	2.45	0.15	0.166	1.31	LSG122M2C--A2550
	1,200	30 × 40	2.35	0.15	0.166	1.31	LSG122M2C--A3040
	1,200	35 × 35	2.50	0.15	0.166	1.31	LSG122M2C--A3535
	1,500	30 × 45	2.82	0.15	0.133	1.47	LSG152M2C--A3045
	1,500	35 × 40	2.70	0.15	0.133	1.47	LSG152M2C--A3540
	1,800	30 × 50	3.31	0.15	0.111	1.50	LSG182M2C--A3050
	1,800	35 × 45	2.85	0.15	0.111	1.50	LSG182M2C--A3545
200	270	22 × 25	0.95	0.15	0.737	0.70	LSG271M2D--A2225
	330	22 × 30	1.13	0.15	0.603	0.77	LSG331M2D--A2230
	330	25 × 25	1.13	0.15	0.603	0.77	LSG331M2D--A2525
	390	22 × 35	1.25	0.15	0.510	0.84	LSG391M2D--A2235
	390	25 × 30	1.21	0.15	0.510	0.84	LSG391M2D--A2530
	390	30 × 25	1.20	0.15	0.510	0.84	LSG391M2D--A3025
	470	22 × 35	1.23	0.15	0.423	0.92	LSG471M2D--A2235
	470	25 × 30	1.32	0.15	0.423	0.92	LSG471M2D--A2530
	470	30 × 25	1.50	0.15	0.423	0.92	LSG471M2D--A3025
	560	22 × 40	1.43	0.15	0.355	1.00	LSG561M2D--A2240
	560	25 × 35	1.50	0.15	0.355	1.00	LSG561M2D--A2535
	560	30 × 30	1.52	0.15	0.355	1.00	LSG561M2D--A3030
	560	35 × 25	1.49	0.15	0.355	1.00	LSG561M2D--A3525
	680	22 × 50	1.74	0.15	0.293	1.11	LSG681M2D--A2250
	680	25 × 40	1.70	0.15	0.293	1.11	LSG681M2D--A2540
	680	30 × 30	1.58	0.15	0.293	1.11	LSG681M2D--A3030
	680	35 × 25	1.72	0.15	0.293	1.11	LSG681M2D--A3525
	820	25 × 45	1.85	0.15	0.243	1.21	LSG821M2D--A2545
	820	30 × 35	1.85	0.15	0.243	1.21	LSG821M2D--A3035
	820	35 × 30	1.90	0.15	0.243	1.21	LSG821M2D--A3530
	1,000	25 × 55	2.13	0.15	0.199	1.34	LSG102M2D--A2555
	1,000	30 × 40	2.06	0.15	0.199	1.34	LSG102M2D--A3040
	1,000	35 × 30	2.01	0.15	0.199	1.34	LSG102M2D--A3530
	1,200	30 × 45	2.37	0.15	0.166	1.47	LSG122M2D--A3045
	1,200	35 × 35	2.34	0.15	0.166	1.47	LSG122M2D--A3535
	1,500	30 × 50	2.77	0.15	0.133	1.50	LSG152M2D--A3050
	1,500	35 × 40	2.76	0.15	0.133	1.50	LSG152M2D--A3540
	1,800	35 × 45	3.17	0.15	0.111	1.50	LSG182M2D--A3545
	2,200	35 × 55	3.82	0.15	0.090	1.50	LSG222M2D--A3555
	2,700	40 × 50	4.39	0.15	0.074	1.50	LSG272M2D--A4050
250	180	22 × 25	0.78	0.15	1.106	0.64	LSG181M2E--A2225
	220	22 × 30	0.85	0.15	0.905	0.70	LSG221M2E--A2230
	220	25 × 25	0.90	0.15	0.905	0.70	LSG221M2E--A2525
	270	22 × 30	0.91	0.15	0.737	0.78	LSG271M2E--A2230
	270	25 × 25	0.91	0.15	0.737	0.78	LSG271M2E--A2525
	270	30 × 25	1.01	0.15	0.737	0.78	LSG271M2E--A3025
	330	22 × 35	1.03	0.15	0.603	0.86	LSG331M2E--A2235
	330	25 × 30	1.13	0.15	0.603	0.86	LSG331M2E--A2530
	330	30 × 25	1.05	0.15	0.603	0.86	LSG331M2E--A3025
	390	22 × 40	1.13	0.15	0.510	0.94	LSG391M2E--A2240
	390	25 × 35	1.27	0.15	0.510	0.94	LSG391M2E--A2535
	390	30 × 25	1.11	0.15	0.510	0.94	LSG391M2E--A3025
	470	22 × 45	1.31	0.15	0.423	1.03	LSG471M2E--A2245
	470	25 × 40	1.49	0.15	0.423	1.03	LSG471M2E--A2540
	470	30 × 30	1.37	0.15	0.423	1.03	LSG471M2E--A3030
	470	35 × 25	1.17	0.15	0.423	1.03	LSG471M2E--A3525
	560	25 × 45	1.79	0.15	0.355	1.12	LSG561M2E--A2545
	560	30 × 35	1.58	0.15	0.355	1.12	LSG561M2E--A3035
	560	35 × 25	1.61	0.15	0.355	1.12	LSG561M2E--A3525
	680	25 × 50	1.77	0.15	0.293	1.24	LSG681M2E--A2550
	680	30 × 40	2.00	0.15	0.293	1.24	LSG681M2E--A3040
	680	35 × 30	1.95	0.15	0.293	1.24	LSG681M2E--A3530



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
250	820	30 × 45	2.30	0.15	0.243	1.36	LSG821M2E--A3045
	820	35 × 35	2.27	0.15	0.243	1.36	LSG821M2E--A3535
	1,000	30 × 50	2.37	0.15	0.199	1.50	LSG102M2E--A3050
	1,000	35 × 40	2.65	0.15	0.199	1.50	LSG102M2E--A3540
	1,200	30 × 55	2.71	0.15	0.166	1.50	LSG122M2E--A3055
	1,200	35 × 45	3.05	0.15	0.166	1.50	LSG122M2E--A3545
	1,500	35 × 50	3.18	0.15	0.133	1.50	LSG152M2E--A3550
	1,800	35 × 60	3.76	0.15	0.111	1.50	LSG182M2E--A3560
350	2,200	35 × 70	4.45	0.15	0.090	1.50	LSG222M2E--A3570
	100	22 × 25	0.58	0.15	1.990	0.46	LSG101M2V--A2225
	120	22 × 30	0.69	0.15	1.659	0.56	LSG121M2V--A2230
	120	25 × 25	0.69	0.15	1.659	0.56	LSG121M2V--A2525
	150	22 × 35	0.80	0.15	1.327	0.69	LSG151M2V--A2235
	180	25 × 30	0.82	0.15	1.106	0.75	LSG181M2V--A2530
	180	30 × 25	0.85	0.15	1.106	0.75	LSG181M2V--A3025
	220	22 × 40	0.95	0.15	0.905	0.83	LSG221M2V--A2240
	220	25 × 40	1.04	0.15	0.905	0.83	LSG221M2V--A2540
	220	30 × 30	1.02	0.15	0.905	0.83	LSG221M2V--A3030
	220	35 × 25	1.04	0.15	0.905	0.83	LSG221M2V--A3525
	270	25 × 45	1.17	0.15	0.737	0.92	LSG271M2V--A2545
	270	30 × 35	1.17	0.15	0.737	0.92	LSG271M2V--A3035
	270	35 × 25	1.12	0.15	0.737	0.92	LSG271M2V--A3525
	330	25 × 50	1.20	0.15	0.603	1.02	LSG331M2V--A2550
	330	30 × 35	1.12	0.15	0.603	1.02	LSG331M2V--A3035
	330	35 × 30	1.21	0.15	0.603	1.02	LSG331M2V--A3530
	390	30 × 40	1.29	0.15	0.510	1.11	LSG391M2V--A3040
	470	30 × 45	1.48	0.15	0.423	1.22	LSG471M2V--A3045
	470	35 × 40	1.63	0.15	0.423	1.22	LSG471M2V--A3540
	560	35 × 40	1.69	0.15	0.355	1.33	LSG561M2V--A3540
	560	40 × 30	1.63	0.15	0.355	1.33	LSG561M2V--A4030
	680	35 × 35	1.52	0.15	0.293	1.46	LSG681M2V--A3535
	680	40 × 35	1.58	0.15	0.293	1.46	LSG681M2V--A4035
	820	35 × 50	1.86	0.15	0.243	1.50	LSG821M2V--A3550
	820	40 × 50	2.01	0.15	0.243	1.50	LSG821M2V--A4050
	1,000	35 × 60	2.22	0.15	0.199	1.50	LSG102M2V--A3560
	1,000	40 × 50	2.21	0.15	0.199	1.50	LSG102M2V--A4050
	1,200	40 × 55	2.52	0.15	0.166	1.50	LSG122M2V--A4055
	1,500	40 × 65	3.03	0.15	0.133	1.50	LSG152M2V--A4065
400	100	22 × 25	0.52	0.15	1.990	0.60	LSG101M2G--A2225
	120	22 × 30	0.62	0.15	1.659	0.66	LSG121M2G--A2230
	120	25 × 25	0.61	0.15	1.659	0.66	LSG121M2G--A2525
	150	22 × 35	0.70	0.15	1.327	0.73	LSG151M2G--A2235
	150	25 × 30	0.73	0.15	1.327	0.73	LSG151M2G--A2530
	180	22 × 40	0.81	0.15	1.106	0.80	LSG181M2G--A2240
	180	25 × 35	0.85	0.15	1.106	0.80	LSG181M2G--A2535
	180	30 × 25	0.83	0.15	1.106	0.80	LSG181M2G--A3025
	220	22 × 45	0.94	0.15	0.905	0.89	LSG221M2G--A2245
	220	25 × 40	1.00	0.15	0.905	0.89	LSG221M2G--A2540
	220	30 × 30	0.99	0.15	0.905	0.89	LSG221M2G--A3030
	270	22 × 55	1.14	0.15	0.737	0.99	LSG271M2G--A2255
	270	25 × 45	1.17	0.15	0.737	0.99	LSG271M2G--A2545
	270	30 × 35	1.16	0.15	0.737	0.99	LSG271M2G--A3035
	270	35 × 25	1.08	0.15	0.737	0.99	LSG271M2G--A3525
	330	25 × 50	1.30	0.15	0.603	1.09	LSG331M2G--A2550
	330	30 × 40	1.36	0.15	0.603	1.09	LSG331M2G--A3040
	390	30 × 45	1.56	0.15	0.510	1.18	LSG391M2G--A3045
	390	35 × 30	1.44	0.15	0.510	1.18	LSG391M2G--A3530
	470	30 × 50	1.72	0.15	0.423	1.30	LSG471M2G--A3050
	470	35 × 40	1.78	0.15	0.423	1.30	LSG471M2G--A3540
	560	30 × 55	1.95	0.15	0.355	1.42	LSG561M2G--A3055
	560	35 × 40	1.86	0.15	0.355	1.42	LSG561M2G--A3540
	560	40 × 35	1.91	0.15	0.355	1.42	LSG561M2G--A4035

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
400	680	35 × 50	2.25	0.15	0.293	1.50	LSG681M2G--A3550
	680	40 × 40	2.22	0.15	0.293	1.50	LSG681M2G--A4040
	820	35 × 55	2.58	0.15	0.243	1.50	LSG821M2G--A3555
	820	40 × 50	2.67	0.15	0.243	1.50	LSG821M2G--A4050
	1,000	35 × 65	2.90	0.15	0.243	1.50	LSG102M2G--A3565
	1,000	40 × 55	2.92	0.15	0.199	1.50	LSG102M2G--A4055
	1,200	35 × 75	3.39	0.15	0.199	1.50	LSG122M2G--A3575
	1,200	40 × 60	3.31	0.15	0.166	1.50	LSG122M2G--A4060
	1,500	45 × 70	4.23	0.15	0.133	1.50	LSG152M2G--A4570
	1,800	45 × 80	4.92	0.15	0.111	1.50	LSG182M2G--A4580
420	82	22 × 25	0.45	0.15	2.427	0.56	LSG820M2P--A2225
	100	22 × 30	0.53	0.15	1.990	0.61	LSG101M2P--A2230
	120	22 × 35	0.62	0.15	1.659	0.67	LSG121M2P--A2235
	120	25 × 25	0.58	0.15	1.659	0.67	LSG121M2P--A2525
	150	22 × 40	0.74	0.15	1.327	0.75	LSG151M2P--A2240
	180	22 × 45	0.85	0.15	1.106	0.82	LSG181M2P--A2245
	180	25 × 30	0.77	0.15	1.106	0.82	LSG181M2P--A2530
	220	22 × 50	1.00	0.15	0.905	0.91	LSG221M2P--A2250
	220	25 × 40	0.96	0.15	0.905	0.91	LSG221M2P--A2540
	220	30 × 30	0.95	0.15	0.905	0.91	LSG221M2P--A3030
	270	22 × 60	1.20	0.15	0.737	1.01	LSG271M2P--A2260
	270	25 × 50	1.10	0.15	0.737	1.01	LSG271M2P--A2550
	270	30 × 35	1.06	0.15	0.737	1.01	LSG271M2P--A3035
	270	35 × 30	1.09	0.15	0.737	1.01	LSG271M2P--A3530
	330	25 × 55	1.36	0.15	0.603	1.12	LSG331M2P--A2555
	330	30 × 40	1.24	0.15	0.603	1.12	LSG331M2P--A3040
	330	35 × 30	1.21	0.15	0.603	1.12	LSG331M2P--A3530
	390	30 × 45	1.42	0.15	0.510	1.21	LSG391M2P--A3045
	390	35 × 35	1.40	0.15	0.510	1.21	LSG391M2P--A3535
	390	40 × 40	1.60	0.15	0.510	1.21	LSG391M2P--A4040
	470	35 × 40	1.62	0.15	0.423	1.33	LSG471M2P--A3540
	470	40 × 35	1.66	0.15	0.423	1.33	LSG471M2P--A4035
	560	35 × 45	1.77	0.15	0.355	1.45	LSG561M2P--A3545
	560	40 × 40	1.82	0.15	0.355	1.45	LSG561M2P--A4040
	680	35 × 50	2.12	0.15	0.293	1.50	LSG681M2P--A3550
	680	40 × 45	2.11	0.15	0.293	1.50	LSG681M2P--A4045
	820	35 × 60	2.42	0.15	0.243	1.50	LSG821M2P--A3560
	820	40 × 55	2.52	0.15	0.243	1.50	LSG821M2P--A4055
	1,000	35 × 70	3.08	0.15	0.199	1.50	LSG102M2P--A3570
	1,000	40 × 60	2.88	0.15	0.199	1.50	LSG102M2P--A4060
	1,200	35 × 90	3.51	0.15	0.166	1.50	LSG122M2P--A3590
	1,200	40 × 70	3.38	0.15	0.166	1.50	LSG122M2P--A4070
450	82	22 × 25	0.45	0.15	2.427	0.58	LSG820M2W--A2225
	100	22 × 30	0.53	0.15	1.990	0.64	LSG101M2W--A2230
	100	25 × 25	0.51	0.15	1.990	0.64	LSG101M2W--A2525
	120	22 × 35	0.62	0.15	1.659	0.70	LSG121M2W--A2235
	150	22 × 40	0.74	0.15	1.327	0.78	LSG151M2W--A2240
	150	25 × 30	0.70	0.15	1.327	0.78	LSG151M2W--A2530
	150	35 × 25	0.83	0.15	1.327	0.78	LSG151M2W--A3525
	180	22 × 45	0.88	0.15	1.106	0.85	LSG181M2W--A2245
	180	25 × 35	0.82	0.15	1.106	0.85	LSG181M2W--A2535
	180	30 × 25	0.80	0.15	1.106	0.85	LSG181M2W--A3025
	220	25 × 40	0.96	0.15	0.905	0.94	LSG221M2W--A2540
	220	30 × 30	0.95	0.15	0.905	0.94	LSG221M2W--A3030
	270	25 × 50	1.21	0.15	0.737	1.05	LSG271M2W--A2550
	270	30 × 35	1.12	0.15	0.737	1.05	LSG271M2W--A3035
	330	25 × 55	1.35	0.15	0.603	1.16	LSG331M2W--A2555
	330	30 × 40	1.31	0.15	0.603	1.16	LSG331M2W--A3040
	330	35 × 30	1.27	0.15	0.603	1.16	LSG331M2W--A3530
	390	30 × 45	1.49	0.15	0.510	1.26	LSG391M2W--A3045
	390	35 × 35	1.47	0.15	0.510	1.26	LSG391M2W--A3535
	390	40 × 30	1.51	0.15	0.510	1.26	LSG391M2W--A4030



Dimension and Permissible Ripple Current

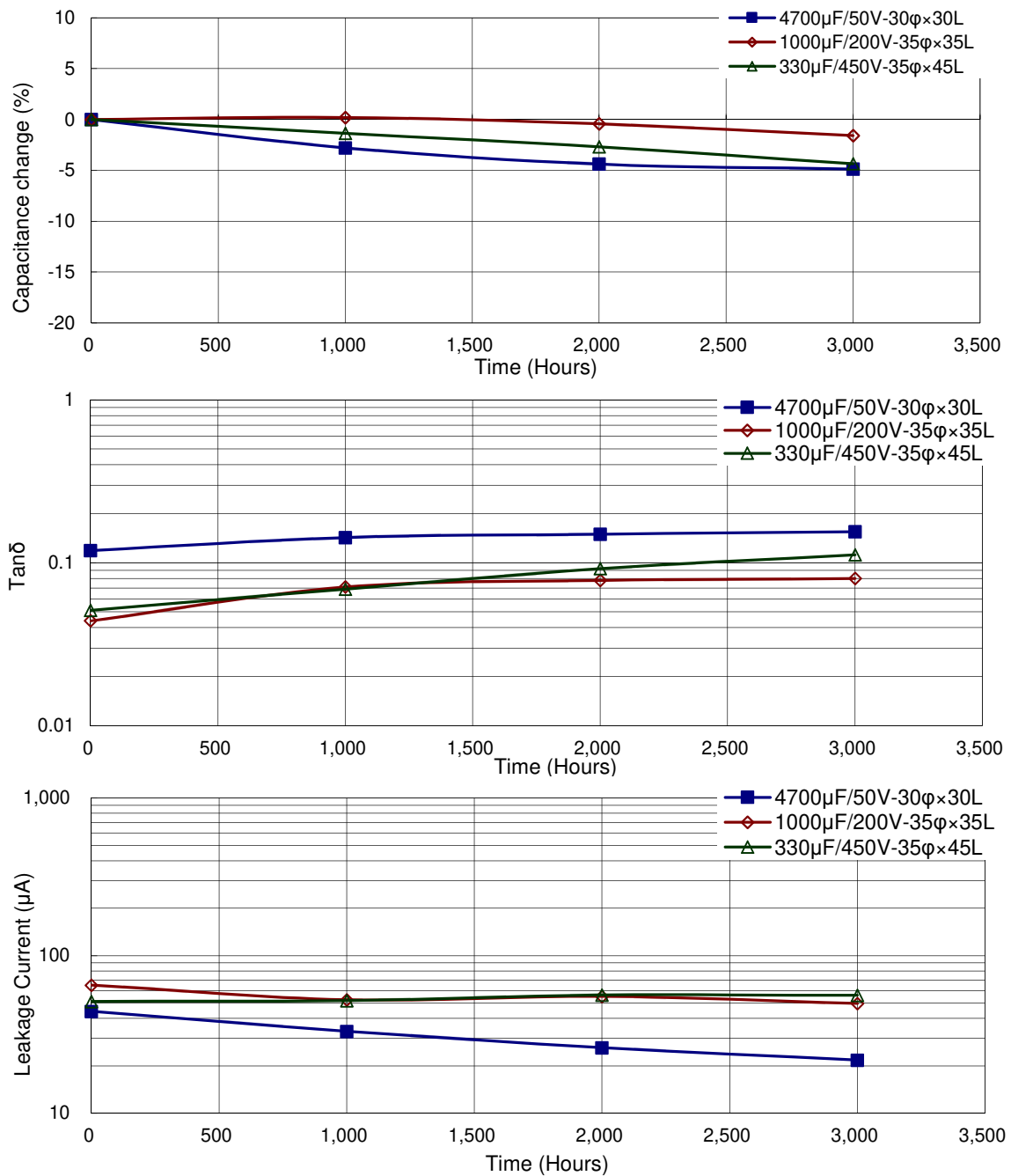
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
450	470	30 × 55	1.79	0.15	0.423	1.38	LSG471M2W--A3055
	470	35 × 40	1.71	0.15	0.423	1.38	LSG471M2W--A3540
	470	40 × 35	1.75	0.15	0.423	1.38	LSG471M2W--A4035
	560	35 × 45	1.96	0.15	0.355	1.50	LSG561M2W--A3545
	560	40 × 40	2.02	0.15	0.355	1.50	LSG561M2W--A4040
	680	35 × 55	2.35	0.15	0.293	1.50	LSG681M2W--A3555
	680	40 × 45	2.33	0.15	0.293	1.50	LSG681M2W--A4045
	820	40 × 50	2.68	0.15	0.243	1.50	LSG821M2W--A4050
	1,000	40 × 60	3.03	0.15	0.199	1.50	LSG102M2W--A4060
	1,200	35 × 90	3.68	0.15	0.166	1.50	LSG122M2W--A3590
500	1,200	40 × 70	3.54	0.15	0.166	1.50	LSG122M2W--A4070
	1,500	45 × 80	4.49	0.15	0.133	1.50	LSG152M2W--A4580
	82	22 × 30	0.75	0.15	2.427	0.61	LSG820M2H--A2230
	82	25 × 30	0.81	0.15	2.427	0.61	LSG820M2H--A2530
	100	22 × 40	0.94	0.15	1.990	0.67	LSG101M2H--A2240
	100	25 × 40	1.00	0.15	1.990	0.67	LSG101M2H--A2540
	120	22 × 50	1.14	0.15	1.659	0.73	LSG121M2H--A2250
	120	25 × 50	1.22	0.15	1.659	0.73	LSG121M2H--A2550
	150	22 × 50	1.27	0.15	1.327	0.82	LSG151M2H--A2250
	150	25 × 55	1.42	0.15	1.327	0.82	LSG151M2H--A2555
	180	30 × 35	1.42	0.15	1.106	0.90	LSG181M2H--A3035
	220	30 × 35	1.57	0.15	0.905	0.99	LSG221M2H--A3035
	220	35 × 40	1.74	0.15	0.905	0.99	LSG221M2H--A3540
	270	35 × 45	2.02	0.15	0.737	1.10	LSG271M2H--A3545
	330	35 × 50	2.45	0.15	0.603	1.22	LSG331M2H--A3550
	470	35 × 60	2.62	0.15	0.423	1.45	LSG471M2H--A3560
	680	35 × 70	3.38	0.15	0.293	1.50	LSG681M2H--A3570
	820	40 × 70	4.00	0.15	0.243	1.50	LSG821M2H--A4070
	1,000	40 × 80	4.68	0.15	0.199	1.50	LSG102M2H--A4080

Part Numbering System

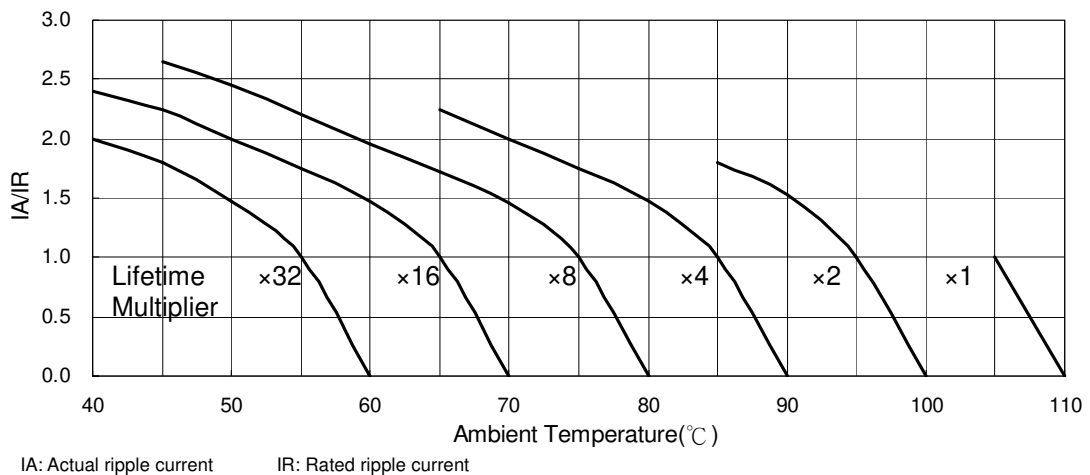
LSG Series	100μF	±20%	400V		4.0±0.5mm	22 φ ×30L	Pb-free Terminal + PET Sleeve
LSG	101	M	2G	- -	A	2230	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:	Example:	"A": 6.3±1.0 mm	Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
56	560		400	2G	2 pins	22×30	2230
220	221		450	2W	5 pins	25×25	2525
470	471					30×40	3040

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



Useful Life Chart





LSM Series

Features

- Snap-in terminal type
- 105°C, 3,000 hours assured
- RoHS compliance

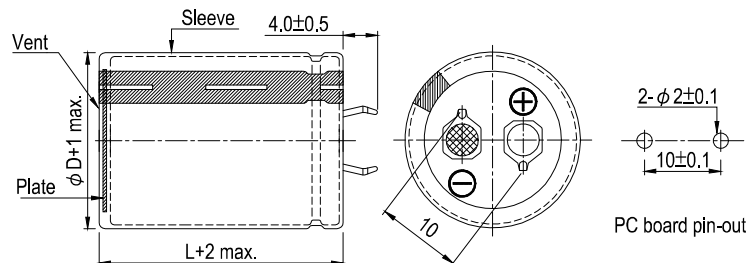


Specifications

Items	Performance																																																																															
Category Temperature Range	16 ~ 100V								160 ~ 500V																																																																							
	-40℃ ~ +105℃								-25℃ ~ +105℃																																																																							
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																																																															
Leakage Current (at 20℃)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																																																																															
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>420</td><td>450</td><td>500</td></tr><tr><td>Tanδ (max)</td><td>0.50</td><td>0.45</td><td>0.40</td><td>0.35</td><td>0.30</td><td>0.25</td><td>0.20</td><td>0.10*</td><td>0.10*</td><td>0.10*</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td></tr></table>																Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500	Tanδ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.10*	0.10*	0.10*	0.15	0.15	0.15	0.15	0.15																																
	Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500																																																																
	Tanδ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.10*	0.10*	0.10*	0.15	0.15	0.15	0.15	0.15																																																																
*: 0.15 for ϕ D = 35mm																																																																																
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																																																															
	Rated Voltage		16	25	35	50	63	80	100	160	200	250	350	400	420	450	500																																																															
	Impedance Ratio	Z(-25℃)/ Z(+20℃)	4	3	3	2	2	2	2	4	4	4	4	8	8	8	8																																																															
Z(-40℃)/ Z(+20℃)		15	10	8	6	6	6	5	-	-	-	-	-	-	-	-																																																																
Endurance	<table><tr><td>Test Time</td><td colspan="15">3,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="15">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="15">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="15">Within specified value</td></tr></table>																Test Time	3,000 Hrs															Capacitance Change	Within ±20% of initial value															Tanδ	Less than 200% of specified value															Leakage Current	Within specified value														
	Test Time	3,000 Hrs																																																																														
	Capacitance Change	Within ±20% of initial value																																																																														
	Tanδ	Less than 200% of specified value																																																																														
	Leakage Current	Within specified value																																																																														
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 3,000 hours at 105℃.																																																																																
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="15">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="15">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="15">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="15">Within specified value</td></tr></table>																Test Time	1,000 Hrs															Capacitance Change	Within ±20% of initial value															Tanδ	Less than 150% of specified value															Leakage Current	Within specified value														
	Test Time	1,000 Hrs																																																																														
	Capacitance Change	Within ±20% of initial value																																																																														
	Tanδ	Less than 150% of specified value																																																																														
	Leakage Current	Within specified value																																																																														
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																																																																																
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>																Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4																																																				
	Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																																																																										
Multiplier	0.8	1.0	1.1	1.3	1.4																																																																											
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																																																																															

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
16	4,700	22 × 25	1.30	0.50	0.141	0.82	LSM472M1C--A2225
	6,800	22 × 35	1.80	0.50	0.098	0.99	LSM682M1C--A2235
	6,800	25 × 30	1.80	0.50	0.098	0.99	LSM682M1C--A2530
	10,000	22 × 45	2.34	0.50	0.066	1.20	LSM103M1C--A2245
	10,000	25 × 35	2.25	0.50	0.066	1.20	LSM103M1C--A2535
	10,000	30 × 25	2.19	0.50	0.066	1.20	LSM103M1C--A3025
	15,000	25 × 45	2.83	0.50	0.044	1.47	LSM153M1C--A2545
	15,000	30 × 35	2.82	0.50	0.044	1.47	LSM153M1C--A3035
	15,000	35 × 30	2.82	0.50	0.044	1.47	LSM153M1C--A3530
	22,000	30 × 45	3.13	0.50	0.030	1.50	LSM223M1C--A3045
	22,000	35 × 35	3.09	0.50	0.030	1.50	LSM223M1C--A3535
25	3,300	22 × 25	1.25	0.45	0.181	0.86	LSM332M1E--A2225
	4,700	22 × 30	1.61	0.45	0.127	1.03	LSM472M1E--A2230
	4,700	25 × 25	1.61	0.45	0.127	1.03	LSM472M1E--A2525
	6,800	22 × 35	1.91	0.45	0.088	1.24	LSM682M1E--A2235
	6,800	25 × 30	1.91	0.45	0.088	1.24	LSM682M1E--A2530
	6,800	30 × 25	1.91	0.45	0.088	1.24	LSM682M1E--A3025
	10,000	22 × 45	2.51	0.45	0.060	1.50	LSM103M1E--A2245
	10,000	25 × 40	2.42	0.45	0.060	1.50	LSM103M1E--A2540
	10,000	30 × 30	2.42	0.45	0.060	1.50	LSM103M1E--A3030
	10,000	35 × 25	2.42	0.45	0.060	1.50	LSM103M1E--A3525
	15,000	25 × 45	3.12	0.45	0.040	1.50	LSM153M1E--A2545
	15,000	30 × 35	3.11	0.45	0.040	1.50	LSM153M1E--A3035
	15,000	35 × 30	3.11	0.45	0.040	1.50	LSM153M1E--A3530
	22,000	30 × 45	3.85	0.45	0.027	1.50	LSM223M1E--A3045
	22,000	35 × 40	3.85	0.45	0.027	1.50	LSM223M1E--A3540
35	2,200	22 × 25	1.14	0.40	0.241	0.83	LSM222M1V--A2225
	2,200	25 × 25	1.51	0.40	0.241	0.83	LSM222M1V--A2525
	3,300	22 × 30	1.51	0.40	0.161	1.02	LSM332M1V--A2230
	3,300	25 × 30	1.92	0.40	0.161	1.02	LSM332M1V--A2530
	4,700	22 × 35	1.92	0.40	0.113	1.22	LSM472M1V--A2235
	4,700	25 × 40	2.31	0.40	0.113	1.22	LSM472M1V--A2540
	4,700	30 × 25	1.92	0.40	0.113	1.22	LSM472M1V--A3025
	6,800	22 × 45	2.31	0.40	0.078	1.46	LSM682M1V--A2245
	6,800	25 × 45	2.87	0.40	0.078	1.46	LSM682M1V--A2545
	6,800	30 × 30	2.33	0.40	0.078	1.46	LSM682M1V--A3030
	6,800	35 × 25	2.33	0.40	0.078	1.46	LSM682M1V--A3525
	10,000	30 × 35	2.87	0.40	0.053	1.50	LSM103M1V--A3035
	10,000	35 × 30	2.87	0.40	0.053	1.50	LSM103M1V--A3530
	15,000	30 × 45	3.66	0.40	0.035	1.50	LSM153M1V--A3045
	15,000	35 × 40	3.66	0.40	0.035	1.50	LSM153M1V--A3540
	22,000	35 × 45	4.53	0.40	0.024	1.50	LSM223M1V--A3545
50	1,500	22 × 25	1.22	0.35	0.310	0.82	LSM152M1H--A2225
	2,200	22 × 30	1.59	0.35	0.211	0.99	LSM222M1H--A2230
	2,200	25 × 25	1.59	0.35	0.211	0.99	LSM222M1H--A2525
	3,300	22 × 35	1.93	0.35	0.141	1.22	LSM332M1H--A2235
	3,300	25 × 30	1.88	0.35	0.141	1.22	LSM332M1H--A2530
	3,300	30 × 25	1.88	0.35	0.141	1.22	LSM332M1H--A3025
	4,700	22 × 45	2.43	0.35	0.099	1.45	LSM472M1H--A2245
	4,700	25 × 35	2.34	0.35	0.099	1.45	LSM472M1H--A2535
	4,700	30 × 30	2.42	0.35	0.099	1.45	LSM472M1H--A3030
	4,700	35 × 25	2.42	0.35	0.099	1.45	LSM472M1H--A3525
	6,800	25 × 45	3.10	0.35	0.068	1.50	LSM682M1H--A2545
	6,800	30 × 35	3.10	0.35	0.068	1.50	LSM682M1H--A3035
	6,800	35 × 30	3.10	0.35	0.068	1.50	LSM682M1H--A3530
	10,000	30 × 45	4.18	0.35	0.046	1.50	LSM103M1H--A3045
	10,000	35 × 40	4.20	0.35	0.046	1.50	LSM103M1H--A3540
63	1,000	20 × 20	0.90	0.30	0.398	0.75	LSM102M1J--A2020
	1,000	22 × 20	0.90	0.30	0.398	0.75	LSM102M1J--A2220
	1,200	20 × 25	1.08	0.30	0.332	0.82	LSM122M1J--A2025
	1,200	22 × 20	1.05	0.30	0.332	0.82	LSM122M1J--A2220
	1,500	20 × 30	1.31	0.30	0.265	0.92	LSM152M1J--A2030
	1,500	22 × 25	1.28	0.30	0.265	0.92	LSM152M1J--A2225



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
63	1,500	25 × 20	1.27	0.30	0.265	0.92	LSM152M1J--A2520
	2,200	20 × 35	1.70	0.30	0.181	1.12	LSM222M1J--A2035
	2,200	22 × 35	1.78	0.30	0.181	1.12	LSM222M1J--A2235
	2,200	25 × 25	1.60	0.30	0.181	1.12	LSM222M1J--A2525
	2,200	30 × 25	1.78	0.30	0.181	1.12	LSM222M1J--A3025
	2,700	20 × 40	1.82	0.30	0.147	1.24	LSM272M1J--A2040
	2,700	22 × 35	1.81	0.30	0.147	1.24	LSM272M1J--A2235
	2,700	25 × 30	1.83	0.30	0.147	1.24	LSM272M1J--A2530
	2,700	30 × 25	1.89	0.30	0.147	1.24	LSM272M1J--A3025
	3,300	20 × 45	2.00	0.30	0.121	1.37	LSM332M1J--A2045
	3,300	22 × 40	2.00	0.30	0.121	1.37	LSM332M1J--A2240
	3,300	25 × 35	2.03	0.30	0.121	1.37	LSM332M1J--A2535
	3,300	30 × 25	1.81	0.30	0.121	1.37	LSM332M1J--A3025
	3,300	35 × 25	2.03	0.30	0.121	1.37	LSM332M1J--A3525
	3,900	20 × 50	2.16	0.30	0.102	1.49	LSM392M1J--A2050
	3,900	22 × 50	2.37	0.30	0.102	1.49	LSM392M1J--A2250
	3,900	25 × 40	2.22	0.30	0.102	1.49	LSM392M1J--A2540
	3,900	30 × 30	2.19	0.30	0.102	1.49	LSM392M1J--A3030
	3,900	35 × 25	2.24	0.30	0.102	1.49	LSM392M1J--A3525
	4,700	25 × 45	2.56	0.30	0.085	1.50	LSM472M1J--A2545
	4,700	30 × 35	2.66	0.30	0.085	1.50	LSM472M1J--A3035
	4,700	35 × 25	2.46	0.30	0.085	1.50	LSM472M1J--A3525
	5,600	25 × 50	2.93	0.30	0.071	1.50	LSM562M1J--A2550
	5,600	30 × 35	2.79	0.30	0.071	1.50	LSM562M1J--A3035
	5,600	35 × 30	2.88	0.30	0.071	1.50	LSM562M1J--A3530
	6,800	30 × 40	3.25	0.30	0.059	1.50	LSM682M1J--A3040
	6,800	35 × 35	3.26	0.30	0.059	1.50	LSM682M1J--A3535
	6,800	35 × 40	3.49	0.30	0.059	1.50	LSM682M1J--A3540
	8,200	35 × 40	3.52	0.30	0.049	1.50	LSM822M1J--A3540
80	1,000	22 × 25	1.05	0.25	0.332	0.85	LSM102M1K--A2225
	1,000	25 × 20	1.04	0.25	0.332	0.85	LSM102M1K--A2520
	1,200	20 × 30	1.17	0.25	0.276	0.93	LSM122M1K--A2030
	1,200	22 × 30	1.24	0.25	0.276	0.93	LSM122M1K--A2230
	1,200	25 × 25	1.24	0.25	0.276	0.93	LSM122M1K--A2525
	1,500	20 × 40	1.49	0.25	0.221	1.04	LSM152M1K--A2040
	1,500	22 × 35	1.54	0.25	0.221	1.04	LSM152M1K--A2235
	1,500	25 × 30	1.54	0.25	0.221	1.04	LSM152M1K--A2530
	1,500	30 × 25	1.61	0.25	0.221	1.04	LSM152M1K--A3025
	2,200	20 × 50	1.94	0.25	0.151	1.26	LSM222M1K--A2050
	2,200	22 × 45	1.95	0.25	0.151	1.26	LSM222M1K--A2245
	2,200	25 × 35	1.94	0.25	0.151	1.26	LSM222M1K--A2535
	2,200	30 × 30	2.05	0.25	0.151	1.26	LSM222M1K--A3030
	2,200	35 × 25	2.10	0.25	0.151	1.26	LSM222M1K--A3525
	3,300	25 × 50	2.25	0.25	0.101	1.50	LSM332M1K--A2550
	3,300	30 × 35	2.24	0.25	0.101	1.50	LSM332M1K--A3035
	3,300	35 × 30	2.30	0.25	0.101	1.50	LSM332M1K--A3530
	4,700	30 × 45	2.84	0.25	0.071	1.50	LSM472M1K--A3045
	4,700	35 × 35	2.80	0.25	0.071	1.50	LSM472M1K--A3535
100	1,000	20 × 35	1.28	0.20	0.265	0.95	LSM102M2A--A2035
	1,000	22 × 30	1.36	0.20	0.265	0.95	LSM102M2A--A2230
	1,000	25 × 25	1.36	0.20	0.265	0.95	LSM102M2A--A2525
	1,200	20 × 40	1.49	0.20	0.221	1.04	LSM122M2A--A2040
	1,200	22 × 35	1.48	0.20	0.221	1.04	LSM122M2A--A2235
	1,200	25 × 30	1.49	0.20	0.221	1.04	LSM122M2A--A2530
	1,500	20 × 45	1.75	0.20	0.177	1.16	LSM152M2A--A2045
	1,500	22 × 40	1.82	0.20	0.177	1.16	LSM152M2A--A2240
	1,500	25 × 35	1.85	0.20	0.177	1.16	LSM152M2A--A2535
	1,500	30 × 25	1.80	0.20	0.177	1.16	LSM152M2A--A3025
	2,200	25 × 45	2.50	0.20	0.121	1.41	LSM222M2A--A2545
	2,200	30 × 35	2.50	0.20	0.121	1.41	LSM222M2A--A3035
	2,200	35 × 30	2.50	0.20	0.121	1.41	LSM222M2A--A3530
	2,700	25 × 50	2.70	0.20	0.098	1.50	LSM272M2A--A2550
	2,700	30 × 40	2.72	0.20	0.098	1.50	LSM272M2A--A3040
	2,700	35 × 35	2.82	0.20	0.098	1.50	LSM272M2A--A3535
	3,300	30 × 45	3.11	0.20	0.080	1.50	LSM332M2A--A3045



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
100	3,300	35 × 35	3.07	0.20	0.080	1.50	LSM332M2A--A3535
	3,900	30 × 50	3.40	0.20	0.068	1.50	LSM392M2A--A3050
	3,900	35 × 40	3.38	0.20	0.068	1.50	LSM392M2A--A3540
	4,700	35 × 45	3.90	0.20	0.056	1.50	LSM472M2A--A3545
160	180	20 × 20	0.61	0.10	0.737	0.51	LSM181M2C--A2020
	220	20 × 25	0.73	0.10	0.603	0.56	LSM221M2C--A2025
	220	22 × 20	0.71	0.10	0.603	0.56	LSM221M2C--A2220
	270	20 × 25	0.81	0.10	0.491	0.62	LSM271M2C--A2025
	270	25 × 20	0.85	0.10	0.491	0.62	LSM271M2C--A2520
	330	20 × 30	0.97	0.10	0.402	0.69	LSM331M2C--A2030
	330	22 × 25	0.98	0.10	0.402	0.69	LSM331M2C--A2225
	330	25 × 20	0.94	0.10	0.402	0.69	LSM331M2C--A2520
	390	20 × 30	1.06	0.10	0.340	0.75	LSM391M2C--A2030
	390	22 × 25	1.03	0.10	0.340	0.75	LSM391M2C--A2225
	390	25 × 25	1.09	0.10	0.340	0.75	LSM391M2C--A2525
	470	20 × 35	1.17	0.10	0.282	0.82	LSM471M2C--A2035
	470	22 × 30	1.21	0.10	0.282	0.82	LSM471M2C--A2230
	470	25 × 25	1.19	0.10	0.282	0.82	LSM471M2C--A2525
	560	20 × 40	1.35	0.10	0.237	0.90	LSM561M2C--A2040
	560	22 × 35	1.40	0.10	0.237	0.90	LSM561M2C--A2235
	560	25 × 30	1.40	0.10	0.237	0.90	LSM561M2C--A2530
	560	30 × 25	1.40	0.10	0.237	0.90	LSM561M2C--A3025
	680	20 × 45	1.57	0.10	0.195	0.99	LSM681M2C--A2045
	680	22 × 40	1.62	0.10	0.195	0.99	LSM681M2C--A2240
	680	25 × 35	1.61	0.10	0.195	0.99	LSM681M2C--A2535
	680	30 × 25	1.54	0.10	0.195	0.99	LSM681M2C--A3025
	820	22 × 45	1.86	0.10	0.162	1.09	LSM821M2C--A2245
	820	25 × 40	1.86	0.10	0.162	1.09	LSM821M2C--A2540
	820	30 × 30	1.79	0.10	0.162	1.09	LSM821M2C--A3030
	820	35 × 25	1.79	0.15	0.243	1.09	LSM821M2C--A3525
	1,000	22 × 50	2.18	0.10	0.133	1.20	LSM102M2C--A2250
	1,000	25 × 45	2.15	0.10	0.133	1.20	LSM102M2C--A2545
	1,000	30 × 35	2.09	0.10	0.133	1.20	LSM102M2C--A3035
	1,000	35 × 25	1.98	0.15	0.199	1.20	LSM102M2C--A3525
	1,200	25 × 50	2.35	0.10	0.111	1.31	LSM122M2C--A2550
	1,200	30 × 40	2.35	0.10	0.111	1.31	LSM122M2C--A3040
	1,200	35 × 30	2.29	0.15	0.166	1.31	LSM122M2C--A3530
	1,500	30 × 35	2.56	0.10	0.088	1.47	LSM152M2C--A3035
	1,500	35 × 35	2.72	0.15	0.133	1.47	LSM152M2C--A3535
	1,800	30 × 45	2.97	0.10	0.074	1.50	LSM182M2C--A3045
	1,800	35 × 40	3.09	0.15	0.111	1.50	LSM182M2C--A3540
	2,200	30 × 60	3.48	0.10	0.060	1.50	LSM222M2C--A3060
	2,200	35 × 50	3.51	0.15	0.090	1.50	LSM222M2C--A3550
	2,700	35 × 55	4.05	0.15	0.074	1.50	LSM272M2C--A3555
200	180	22 × 20	0.70	0.10	0.737	0.57	LSM181M2D--A2220
	220	20 × 25	0.80	0.10	0.603	0.63	LSM221M2D--A2025
	220	25 × 20	0.84	0.10	0.603	0.63	LSM221M2D--A2520
	270	20 × 30	0.96	0.10	0.491	0.70	LSM271M2D--A2030
	270	22 × 25	1.03	0.10	0.491	0.70	LSM271M2D--A2225
	330	22 × 30	1.21	0.10	0.402	0.77	LSM331M2D--A2230
	390	20 × 35	1.24	0.10	0.340	0.84	LSM391M2D--A2035
	390	22 × 35	1.39	0.10	0.340	0.84	LSM391M2D--A2235
	390	25 × 25	1.31	0.10	0.340	0.84	LSM391M2D--A2525
	470	20 × 40	1.44	0.10	0.282	0.92	LSM471M2D--A2040
	470	22 × 35	1.52	0.10	0.282	0.92	LSM471M2D--A2235
	470	25 × 30	1.52	0.10	0.282	0.92	LSM471M2D--A2530
	560	20 × 50	1.74	0.10	0.237	1.00	LSM561M2D--A2050
	560	22 × 40	1.66	0.10	0.237	1.00	LSM561M2D--A2240
	560	25 × 35	1.75	0.10	0.237	1.00	LSM561M2D--A2535
	560	30 × 25	1.64	0.10	0.237	1.00	LSM561M2D--A3025
	680	22 × 45	2.04	0.10	0.195	1.11	LSM681M2D--A2245
	680	25 × 40	2.04	0.10	0.195	1.11	LSM681M2D--A2540
	680	30 × 30	1.96	0.10	0.195	1.11	LSM681M2D--A3030
	820	25 × 45	2.34	0.10	0.162	1.21	LSM821M2D--A2545
	820	30 × 35	2.27	0.10	0.162	1.21	LSM821M2D--A3035



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
200	820	35 × 25	1.99	0.15	0.243	1.21	LSM821M2D--A3525
	1,000	25 × 50	2.26	0.10	0.133	1.34	LSM102M2D--A2550
	1,000	30 × 40	2.63	0.10	0.133	1.34	LSM102M2D--A3040
	1,000	35 × 30	2.51	0.15	0.199	1.34	LSM102M2D--A3530
	1,200	30 × 45	3.00	0.10	0.111	1.47	LSM122M2D--A3045
	1,200	35 × 35	2.92	0.15	0.166	1.47	LSM122M2D--A3535
	1,500	30 × 50	3.36	0.10	0.088	1.50	LSM152M2D--A3050
	1,500	35 × 40	3.34	0.15	0.133	1.50	LSM152M2D--A3540
	1,800	30 × 60	3.64	0.10	0.074	1.50	LSM182M2D--A3060
	1,800	35 × 45	3.51	0.15	0.111	1.50	LSM182M2D--A3545
	2,200	35 × 55	4.01	0.15	0.090	1.50	LSM222M2D--A3555
250	180	22 × 25	0.77	0.10	0.737	0.64	LSM181M2E--A2225
	220	20 × 30	0.87	0.10	0.603	0.70	LSM221M2E--A2030
	270	20 × 35	1.03	0.10	0.491	0.78	LSM271M2E--A2035
	270	22 × 30	1.02	0.10	0.491	0.78	LSM271M2E--A2230
	270	25 × 25	1.08	0.10	0.491	0.78	LSM271M2E--A2525
	330	20 × 40	1.21	0.10	0.402	0.86	LSM331M2E--A2040
	330	22 × 35	1.20	0.10	0.402	0.86	LSM331M2E--A2235
	330	25 × 30	1.27	0.10	0.402	0.86	LSM331M2E--A2530
	390	20 × 50	1.45	0.10	0.340	0.94	LSM391M2E--A2050
	390	22 × 40	1.38	0.10	0.340	0.94	LSM391M2E--A2240
	390	25 × 35	1.46	0.10	0.340	0.94	LSM391M2E--A2535
	390	30 × 25	1.39	0.10	0.340	0.94	LSM391M2E--A3025
	470	22 × 45	1.46	0.10	0.282	1.03	LSM471M2E--A2245
	470	25 × 40	1.69	0.10	0.282	1.03	LSM471M2E--A2540
	470	30 × 30	1.63	0.10	0.282	1.03	LSM471M2E--A3030
	560	25 × 45	1.93	0.10	0.237	1.12	LSM561M2E--A2545
	560	35 × 25	1.78	0.15	0.355	1.12	LSM561M2E--A3525
	680	25 × 50	2.04	0.10	0.195	1.24	LSM681M2E--A2550
	680	30 × 35	2.06	0.10	0.195	1.24	LSM681M2E--A3035
	680	35 × 30	2.06	0.15	0.293	1.24	LSM681M2E--A3530
	820	30 × 45	2.48	0.10	0.162	1.36	LSM821M2E--A3045
	820	35 × 35	2.41	0.15	0.243	1.36	LSM821M2E--A3535
	1,000	30 × 50	2.65	0.10	0.133	1.50	LSM102M2E--A3050
	1,000	35 × 40	2.76	0.15	0.199	1.50	LSM102M2E--A3540
	1,200	30 × 60	3.15	0.10	0.111	1.50	LSM122M2E--A3060
	1,200	35 × 45	3.14	0.15	0.166	1.50	LSM122M2E--A3545
	1,800	35 × 60	3.97	0.15	0.111	1.50	LSM182M2E--A3560
350	100	20 × 30	0.53	0.15	1.990	0.56	LSM101M2V--A2030
	100	22 × 25	0.52	0.15	1.990	0.56	LSM101M2V--A2225
	100	25 × 20	0.52	0.15	1.990	0.56	LSM101M2V--A2520
	120	20 × 35	0.63	0.15	1.659	0.61	LSM121M2V--A2035
	120	22 × 30	0.62	0.15	1.659	0.61	LSM121M2V--A2230
	120	25 × 25	0.65	0.15	1.659	0.61	LSM121M2V--A2525
	150	20 × 40	0.74	0.15	1.327	0.69	LSM151M2V--A2040
	150	22 × 35	0.74	0.15	1.327	0.69	LSM151M2V--A2235
	180	20 × 45	0.81	0.15	1.106	0.75	LSM181M2V--A2045
	180	22 × 40	0.81	0.15	1.106	0.75	LSM181M2V--A2240
	180	25 × 30	0.77	0.15	1.106	0.75	LSM181M2V--A2530
	180	30 × 25	0.80	0.15	1.106	0.75	LSM181M2V--A3025
	220	20 × 50	0.94	0.15	0.905	0.83	LSM221M2V--A2050
	220	22 × 45	0.94	0.15	0.905	0.83	LSM221M2V--A2245
	220	25 × 35	0.91	0.15	0.905	0.83	LSM221M2V--A2535
	270	22 × 50	1.09	0.15	0.737	0.92	LSM271M2V--A2250
	270	25 × 40	1.06	0.15	0.737	0.92	LSM271M2V--A2540
	270	30 × 30	1.05	0.15	0.737	0.92	LSM271M2V--A3030
	270	35 × 25	1.08	0.15	0.737	0.92	LSM271M2V--A3525
	330	25 × 45	1.24	0.15	0.603	1.02	LSM331M2V--A2545
	330	30 × 35	1.24	0.15	0.603	1.02	LSM331M2V--A3035
	330	35 × 30	1.33	0.15	0.603	1.02	LSM331M2V--A3530
	390	30 × 40	1.42	0.15	0.510	1.11	LSM391M2V--A3040
	390	35 × 30	1.39	0.15	0.510	1.11	LSM391M2V--A3530
	470	30 × 45	1.56	0.15	0.423	1.22	LSM471M2V--A3045
	470	35 × 35	1.53	0.15	0.423	1.22	LSM471M2V--A3535
	560	30 × 50	1.78	0.15	0.355	1.33	LSM561M2V--A3050



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
350	560	35 × 40	1.77	0.15	0.355	1.33	LSM561M2V--A3540
	680	30 × 60	1.94	0.15	0.293	1.46	LSM681M2V--A3060
	680	35 × 50	1.95	0.15	0.293	1.46	LSM681M2V--A3550
	820	35 × 55	2.23	0.15	0.243	1.50	LSM821M2V--A3555
400	56	22 × 20	0.41	0.15	3.554	0.45	LSM560M2G--A2220
	68	22 × 25	0.52	0.15	2.927	0.49	LSM680M2G--A2225
	68	25 × 20	0.49	0.15	2.927	0.49	LSM680M2G--A2520
	82	20 × 30	0.54	0.15	2.427	0.54	LSM820M2G--A2030
	100	20 × 35	0.64	0.15	1.990	0.60	LSM101M2G--A2035
	100	22 × 30	0.67	0.15	1.990	0.60	LSM101M2G--A2230
	120	20 × 40	0.74	0.15	1.659	0.66	LSM121M2G--A2040
	120	22 × 35	0.78	0.15	1.659	0.66	LSM121M2G--A2235
	120	25 × 25	0.69	0.15	1.659	0.66	LSM121M2G--A2525
	150	20 × 45	0.87	0.15	1.327	0.73	LSM151M2G--A2045
	150	22 × 40	0.91	0.15	1.327	0.73	LSM151M2G--A2240
	150	25 × 30	0.83	0.15	1.327	0.73	LSM151M2G--A2530
	150	30 × 25	0.86	0.15	1.327	0.73	LSM151M2G--A3025
	180	22 × 45	1.04	0.15	1.106	0.80	LSM181M2G--A2245
	180	25 × 35	0.97	0.15	1.106	0.80	LSM181M2G--A2535
	220	22 × 50	1.17	0.15	0.905	0.89	LSM221M2G--A2250
	220	25 × 40	1.14	0.15	0.905	0.89	LSM221M2G--A2540
	220	30 × 30	1.12	0.15	0.905	0.89	LSM221M2G--A3030
	220	35 × 25	1.15	0.15	0.905	0.89	LSM221M2G--A3525
	270	25 × 50	1.40	0.15	0.737	0.99	LSM271M2G--A2550
	270	30 × 35	1.31	0.15	0.737	0.99	LSM271M2G--A3035
	270	35 × 30	1.31	0.15	0.737	0.99	LSM271M2G--A3530
	330	30 × 40	1.39	0.15	0.603	1.09	LSM331M2G--A3040
	330	35 × 30	1.34	0.15	0.603	1.09	LSM331M2G--A3530
	390	30 × 45	1.49	0.15	0.510	1.18	LSM391M2G--A3045
	390	35 × 35	1.47	0.15	0.510	1.18	LSM391M2G--A3535
	470	30 × 50	1.72	0.15	0.423	1.30	LSM471M2G--A3050
	470	35 × 40	1.71	0.15	0.423	1.30	LSM471M2G--A3540
	560	30 × 60	2.03	0.15	0.355	1.42	LSM561M2G--A3060
	560	35 × 45	2.23	0.15	0.355	1.42	LSM561M2G--A3545
	680	35 × 55	2.31	0.15	0.293	1.50	LSM681M2G--A3555
	820	35 × 60	2.54	0.15	0.243	1.50	LSM821M2G--A3560
420	56	20 × 25	0.41	0.15	3.554	0.46	LSM560M2P--A2025
	56	22 × 20	0.40	0.15	3.554	0.46	LSM560M2P--A2220
	68	20 × 30	0.49	0.15	2.927	0.51	LSM680M2P--A2030
	68	22 × 25	0.48	0.15	2.927	0.51	LSM680M2P--A2225
	82	20 × 30	0.54	0.15	2.427	0.56	LSM820M2P--A2030
	82	22 × 25	0.53	0.15	2.427	0.56	LSM820M2P--A2225
	100	20 × 35	0.64	0.15	1.990	0.61	LSM101M2P--A2035
	100	22 × 30	0.63	0.15	1.990	0.61	LSM101M2P--A2230
	100	25 × 25	0.63	0.15	1.990	0.61	LSM101M2P--A2525
	120	20 × 40	0.74	0.15	1.659	0.67	LSM121M2P--A2040
	120	22 × 35	0.74	0.15	1.659	0.67	LSM121M2P--A2235
	120	25 × 30	0.78	0.15	1.659	0.67	LSM121M2P--A2530
	150	20 × 50	0.92	0.15	1.327	0.75	LSM151M2P--A2050
	150	22 × 40	0.87	0.15	1.327	0.75	LSM151M2P--A2240
	150	30 × 25	0.80	0.15	1.327	0.75	LSM151M2P--A3025
	180	22 × 45	0.93	0.15	1.106	0.82	LSM181M2P--A2245
	180	25 × 35	0.90	0.15	1.106	0.82	LSM181M2P--A2535
	180	30 × 30	0.98	0.15	1.106	0.82	LSM181M2P--A3030
	220	25 × 45	1.01	0.15	0.905	0.91	LSM221M2P--A2545
	220	30 × 35	1.05	0.15	0.905	0.91	LSM221M2P--A3035
	220	35 × 25	0.97	0.15	0.905	0.91	LSM221M2P--A3525
	270	25 × 50	1.17	0.15	0.737	1.01	LSM271M2P--A2550
	270	30 × 40	1.22	0.15	0.737	1.01	LSM271M2P--A3040
	270	35 × 30	1.15	0.15	0.737	1.01	LSM271M2P--A3530
	330	30 × 45	1.37	0.15	0.603	1.12	LSM331M2P--A3045
	330	35 × 35	1.35	0.15	0.603	1.12	LSM331M2P--A3535
	390	30 × 50	1.56	0.15	0.510	1.21	LSM391M2P--A3050
	390	35 × 40	1.55	0.15	0.510	1.21	LSM391M2P--A3540
	470	30 × 60	1.76	0.15	0.423	1.33	LSM471M2P--A3060



Dimension and Permissible Ripple Current

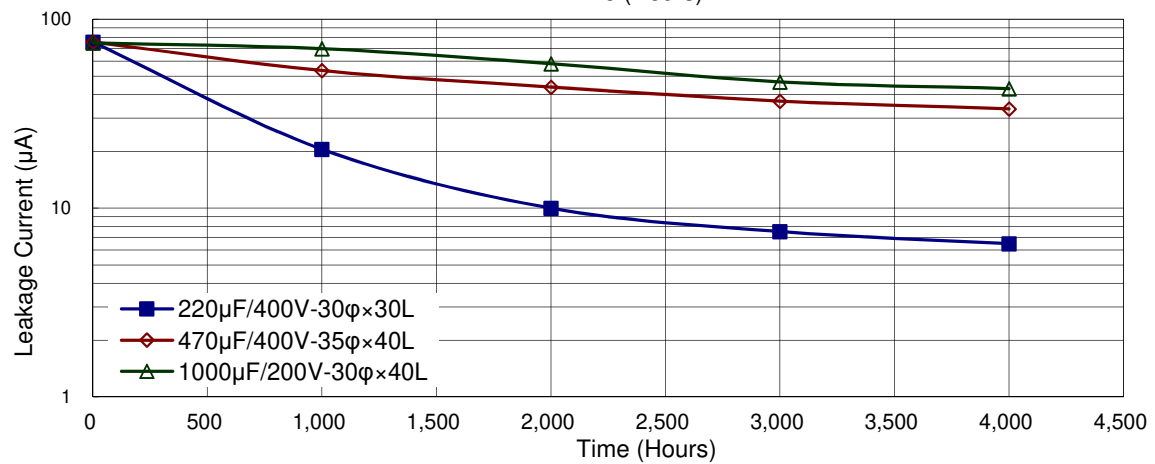
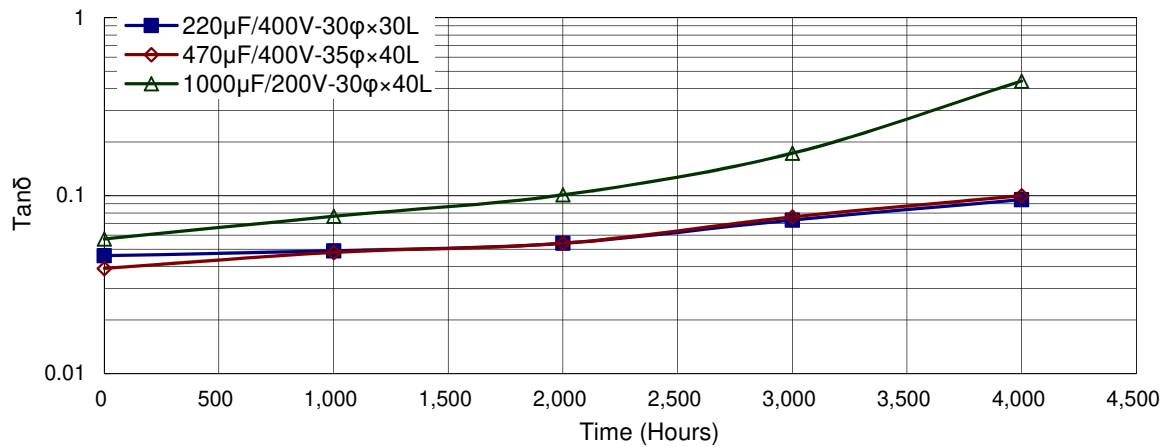
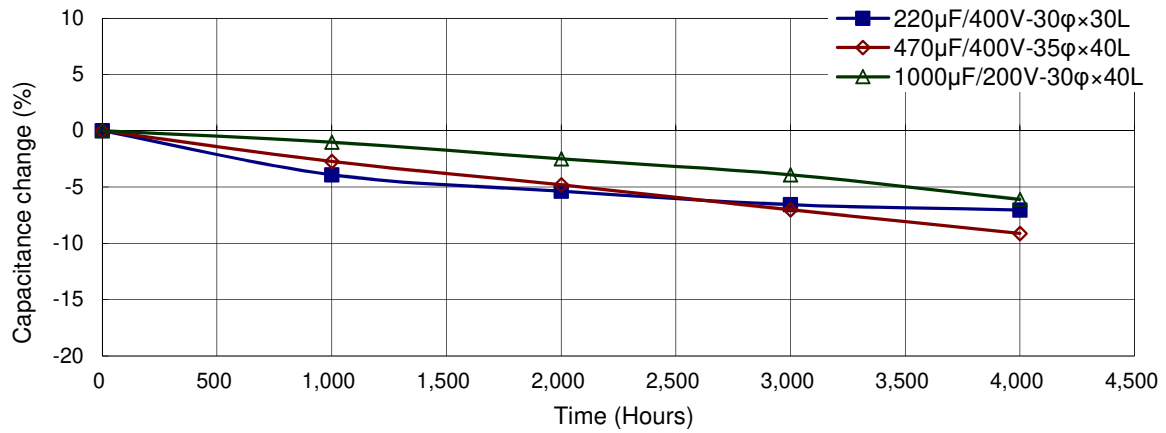
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
420	470	35 × 45	1.70	0.15	0.423	1.33	LSM471M2P--A3545
	560	35 × 50	1.94	0.15	0.355	1.45	LSM561M2P--A3550
	680	35 × 60	2.31	0.15	0.293	1.50	LSM681M2P--A3560
450	56	20 × 25	0.41	0.15	3.554	0.48	LSM560M2W--A2025
	82	20 × 30	0.54	0.15	2.427	0.58	LSM820M2W--A2030
	82	25 × 25	0.57	0.15	2.427	0.58	LSM820M2W--A2525
	100	20 × 45	0.71	0.15	1.990	0.64	LSM101M2W--A2045
	100	22 × 35	0.67	0.15	1.990	0.64	LSM101M2W--A2235
	120	20 × 50	0.82	0.15	1.659	0.70	LSM121M2W--A2050
	120	22 × 40	0.78	0.15	1.659	0.70	LSM121M2W--A2240
	120	25 × 30	0.74	0.15	1.659	0.70	LSM121M2W--A2530
	120	30 × 25	0.77	0.15	1.659	0.70	LSM121M2W--A3025
	150	22 × 45	0.92	0.15	1.327	0.78	LSM151M2W--A2245
	150	25 × 35	0.89	0.15	1.327	0.78	LSM151M2W--A2535
	150	30 × 30	0.93	0.15	1.327	0.78	LSM151M2W--A3030
	150	35 × 25	0.95	0.15	1.327	0.78	LSM151M2W--A3525
	180	22 × 50	1.06	0.15	1.106	0.85	LSM181M2W--A2250
	180	25 × 40	1.03	0.15	1.106	0.85	LSM181M2W--A2540
	180	30 × 30	1.01	0.15	1.106	0.85	LSM181M2W--A3030
	180	35 × 25	1.04	0.15	1.106	0.85	LSM181M2W--A3525
	220	25 × 45	1.18	0.15	0.905	0.94	LSM221M2W--A2545
	220	30 × 35	1.18	0.15	0.905	0.94	LSM221M2W--A3035
	220	35 × 30	1.22	0.15	0.905	0.94	LSM221M2W--A3530
	270	30 × 40	1.17	0.15	0.737	1.05	LSM271M2W--A3040
	330	30 × 50	1.42	0.15	0.603	1.16	LSM331M2W--A3050
	330	35 × 35	1.64	0.15	0.603	1.16	LSM331M2W--A3535
	390	35 × 40	1.74	0.15	0.510	1.26	LSM391M2W--A3540
	470	35 × 50	1.85	0.15	0.423	1.38	LSM471M2W--A3550
	560	35 × 50	2.02	0.15	0.355	1.50	LSM561M2W--A3550
500	82	22 × 35	0.68	0.15	2.427	0.61	LSM820M2H--A2235
	82	25 × 35	0.73	0.15	2.427	0.61	LSM820M2H--A2535
	100	22 × 40	0.79	0.15	1.990	0.67	LSM101M2H--A2240
	100	25 × 40	0.85	0.15	1.990	0.67	LSM101M2H--A2540
	100	30 × 35	1.20	0.15	1.990	0.67	LSM101M2H--A3035
	120	22 × 45	0.91	0.15	1.659	0.73	LSM121M2H--A2245
	120	25 × 45	0.98	0.15	1.659	0.73	LSM121M2H--A2545
	150	22 × 50	1.07	0.15	1.327	0.82	LSM151M2H--A2250
	150	25 × 55	1.20	0.15	1.327	0.82	LSM151M2H--A2555
	220	30 × 40	1.40	0.15	0.905	0.99	LSM221M2H--A3040
	270	35 × 35	1.61	0.15	0.737	1.10	LSM271M2H--A3535
	330	35 × 40	1.88	0.15	0.603	1.22	LSM331M2H--A3540
	390	35 × 45	2.15	0.15	0.510	1.32	LSM391M2H--A3545

Part Numbering System

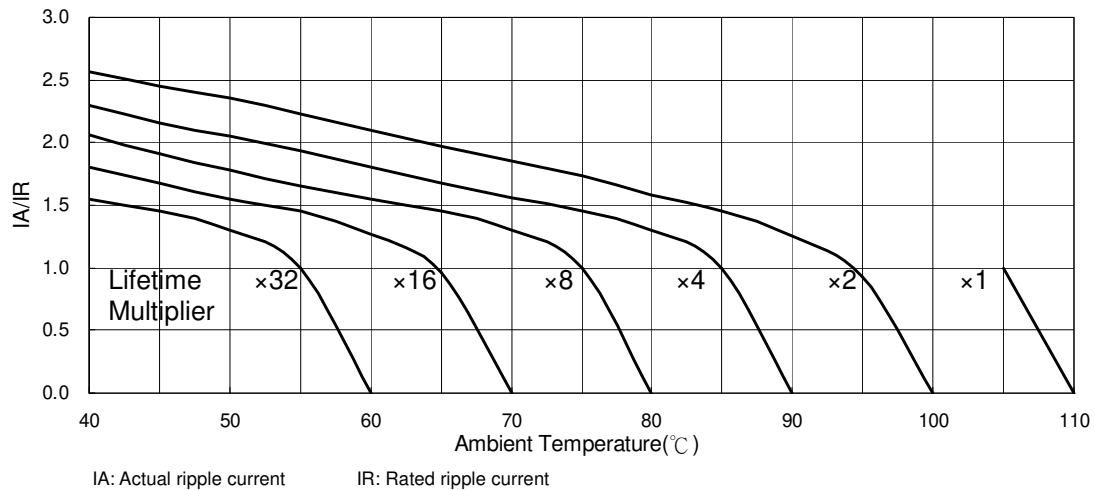
LSM Series	100μF	±20%	400V		4.0±0.5mm	22 φ ×30L	Pb-free Terminal + PET Sleeve
LSM	101	M	2G	--	A	2230	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:	Example:	Example:	Example:	
Cap.	Symbol		Voltage	Symbol	mm	φ D×L	Code
56	560		400	2G	6.3±1.0 mm	22×30	2230
220	221		450	2W		25×25	2525
470	471					30×40	3040

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



Useful Life Chart





LSR Series

Features

- Snap-in terminal type
- 105°C, 3,000 hours assured
- High Ripple current.
- RoHS compliance

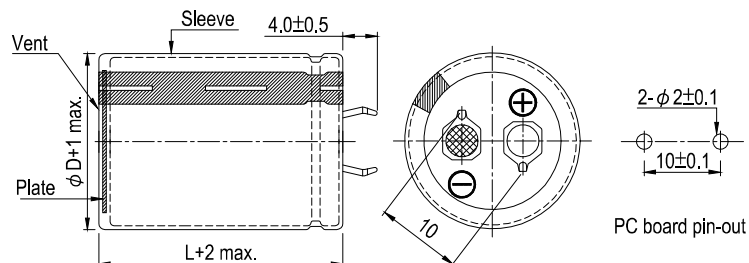


Specifications

Items	Performance																													
Category Temperature Range	400 ~ 450V																													
	-25℃ ~ +105℃																													
Capacitance Tolerance	± 20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = $3\sqrt{CV}$ or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																													
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>400</td><td>450</td></tr><tr><td>Tanδ(max)</td><td>0.15</td><td>0.15</td></tr></table>						Rated Voltage	400	450	Tanδ(max)	0.15	0.15																		
Rated Voltage	400	450																												
Tanδ(max)	0.15	0.15																												
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>400</td><td>450</td></tr><tr><td>Impedance Ratio</td><td>Z(-25℃)/ Z(+20℃)</td><td>8</td><td>8</td></tr></table>						Rated Voltage		400	450	Impedance Ratio	Z(-25℃)/ Z(+20℃)	8	8																
Rated Voltage		400	450																											
Impedance Ratio	Z(-25℃)/ Z(+20℃)	8	8																											
Endurance	<table><tr><td>Test Time</td><td colspan="5">3,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 3,000 hours at 105℃.						Test Time	3,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
Test Time	3,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±15% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).						Test Time	1,000 Hrs					Capacitance Change	Within ±15% of initial value					Tanδ	Less than 150% of specified value					Leakage Current	Within specified value				
Test Time	1,000 Hrs																													
Capacitance Change	Within ±15% of initial value																													
Tanδ	Less than 150% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>						Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																									
Multiplier	0.8	1.0	1.1	1.3	1.4																									
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																													

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

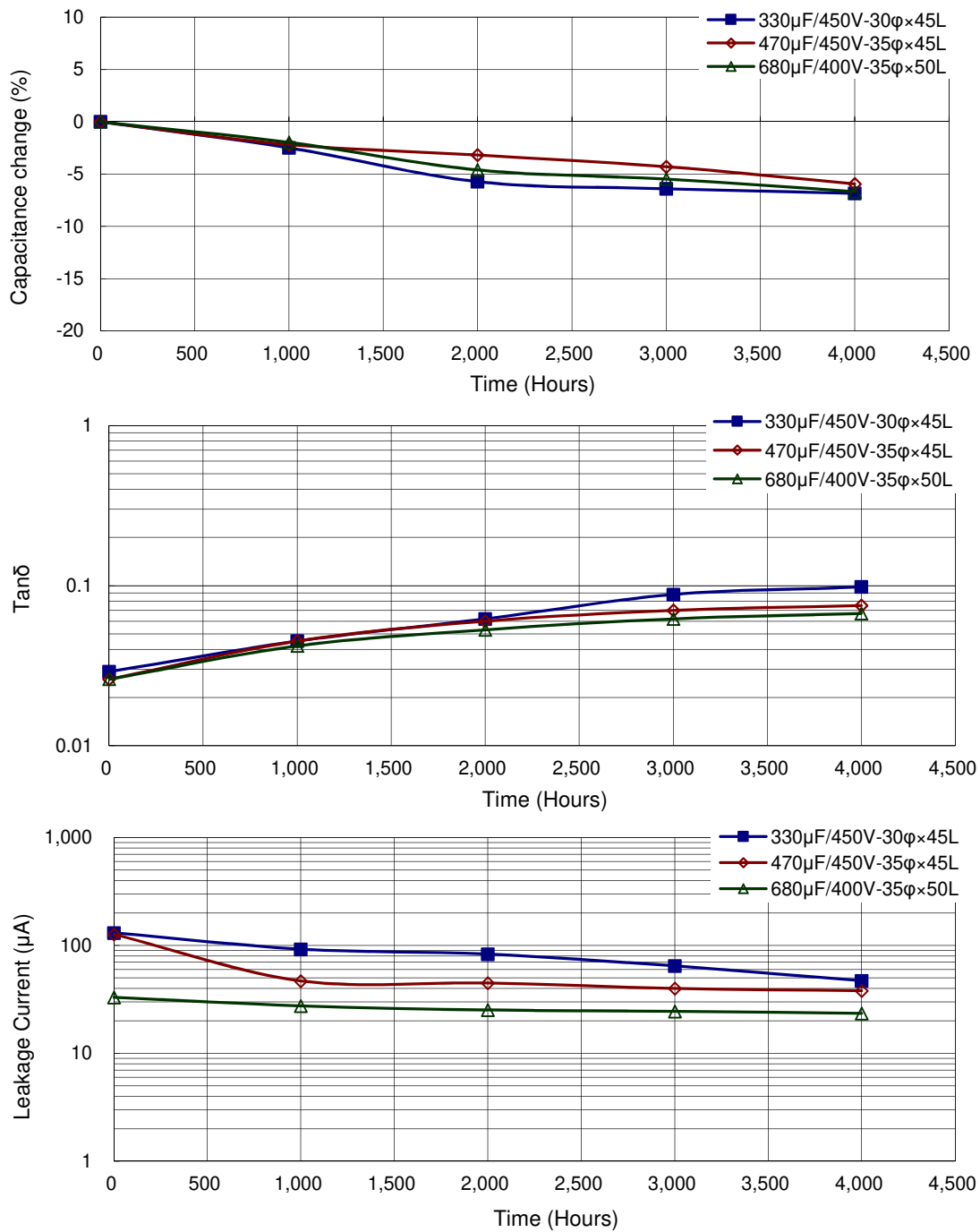
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
400	100	22 × 25	1.02	0.15	1.194	0.60	LSR101M2G--A2225
	120	22 × 30	1.22	0.15	0.995	0.66	LSR121M2G--A2230
	120	25 × 25	1.22	0.15	0.995	0.66	LSR121M2G--A2525
	150	22 × 35	1.33	0.15	0.796	0.73	LSR151M2G--A2235
	180	22 × 40	1.43	0.15	0.664	0.80	LSR181M2G--A2240
	180	25 × 30	1.43	0.15	0.664	0.80	LSR181M2G--A2530
	180	30 × 25	1.68	0.15	0.664	0.80	LSR181M2G--A3025
	220	22 × 45	1.55	0.15	0.543	0.89	LSR221M2G--A2245
	220	25 × 35	1.65	0.15	0.543	0.89	LSR221M2G--A2535
	220	30 × 30	1.79	0.15	0.543	0.89	LSR221M2G--A3030
	270	22 × 50	1.68	0.15	0.442	0.99	LSR271M2G--A2250
	270	25 × 40	1.83	0.15	0.442	0.99	LSR271M2G--A2540
	270	30 × 35	2.12	0.15	0.442	0.99	LSR271M2G--A3035
	270	35 × 25	2.12	0.15	0.442	0.99	LSR271M2G--A3525
	330	25 × 50	2.12	0.15	0.362	1.09	LSR331M2G--A2550
	330	30 × 40	2.33	0.15	0.362	1.09	LSR331M2G--A3040
	330	35 × 30	2.33	0.15	0.362	1.09	LSR331M2G--A3530
	390	30 × 45	2.52	0.15	0.306	1.18	LSR391M2G--A3045
	390	35 × 35	2.52	0.15	0.306	1.18	LSR391M2G--A3535
	470	30 × 50	2.85	0.15	0.254	1.30	LSR471M2G--A3050
	470	35 × 40	2.85	0.15	0.254	1.30	LSR471M2G--A3540
450	560	35 × 45	3.18	0.15	0.213	1.42	LSR561M2G--A3545
	680	35 × 50	3.21	0.15	0.176	1.50	LSR681M2G--A3550
	82	22 × 25	0.96	0.15	1.456	0.58	LSR820M2W--A2225
	100	22 × 30	1.04	0.15	1.194	0.64	LSR101M2W--A2230
	100	25 × 25	1.04	0.15	1.194	0.64	LSR101M2W--A2525
	120	22 × 35	1.15	0.15	0.995	0.70	LSR121M2W--A2235
	120	25 × 30	1.22	0.15	0.995	0.70	LSR121M2W--A2530
	150	22 × 40	1.22	0.15	0.796	0.78	LSR151M2W--A2240
	150	25 × 35	1.31	0.15	0.796	0.78	LSR151M2W--A2535
	150	30 × 25	1.31	0.15	0.796	0.78	LSR151M2W--A3025
	180	22 × 45	1.35	0.15	0.664	0.85	LSR181M2W--A2245
	180	25 × 40	1.35	0.15	0.664	0.85	LSR181M2W--A2540
	180	30 × 30	1.60	0.15	0.664	0.85	LSR181M2W--A3030
	180	35 × 25	1.60	0.15	0.664	0.85	LSR181M2W--A3525
	220	25 × 45	1.55	0.15	0.543	0.94	LSR221M2W--A2545
	220	30 × 35	1.71	0.15	0.543	0.94	LSR221M2W--A3035
	270	25 × 50	1.74	0.15	0.442	1.05	LSR271M2W--A2550
	270	30 × 40	1.90	0.15	0.442	1.05	LSR271M2W--A3040
	270	35 × 30	1.90	0.15	0.442	1.05	LSR271M2W--A3530
	330	30 × 45	2.20	0.15	0.362	1.16	LSR331M2W--A3045
	330	35 × 35	2.20	0.15	0.362	1.16	LSR331M2W--A3535
	390	30 × 50	2.40	0.15	0.306	1.26	LSR391M2W--A3050
	390	35 × 40	2.42	0.15	0.306	1.26	LSR391M2W--A3540
	470	35 × 45	2.67	0.15	0.254	1.38	LSR471M2W--A3545
	560	35 × 50	2.85	0.15	0.213	1.50	LSR561M2W--A3550

Part Numbering System

LSR Series	220μF	±20%	400V	4.0±0.5mm	30 φ × 30L	Pb-free Terminal + PET Sleeve
LSR	221	M	2G	- -	A	3030
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size
Example:	Example:	Example:	Example:	Example:	Example:	Example:
Cap.	Symbol	M = ±20% K = ±10%	Voltage	Type	Symbol	φ D×L
56	560		400	2 pins	- -	22×30
220	221		450	5 pins	L5	25×25
470	471					30×40
						Code
						2230
						2525
						3040

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



LSK Series

Features

- Snap-in terminal type
- 105°C, 5,000 hours assured
- Suitable for medium to high voltage circuits
- RoHS compliance

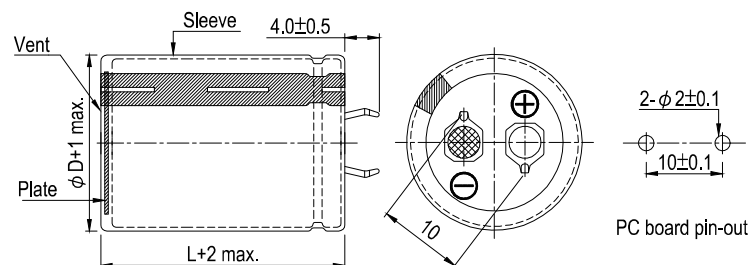


Specifications

Items	Performance																						
Category Temperature Range	-25℃ ~ +105℃																						
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																						
Leakage Current (at 20℃)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																						
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>315</td><td>350</td><td>400</td><td>420</td><td>450</td><td>500</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td></tr></table>	Rated Voltage	160	200	250	315	350	400	420	450	500	Tanδ (max)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Rated Voltage	160	200	250	315	350	400	420	450	500														
Tanδ (max)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15														
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>160</td><td>200</td><td>250</td><td>315</td><td>350</td><td>400</td><td>420</td><td>450</td><td>500</td></tr><tr><td>Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>8</td><td>8</td><td>8</td><td>8</td></tr></table>	Rated Voltage		160	200	250	315	350	400	420	450	500	Impedance Ratio	Z(-25℃)/Z(+20℃)	4	4	4	4	4	8	8	8	8
Rated Voltage		160	200	250	315	350	400	420	450	500													
Impedance Ratio	Z(-25℃)/Z(+20℃)	4	4	4	4	4	8	8	8	8													
Endurance	<table><tr><td>Test Time</td><td>5,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±25% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 250% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 5,000 hours at 105℃.	Test Time	5,000 Hrs	Capacitance Change	Within ±25% of initial value	Tanδ	Less than 250% of specified value	Leakage Current	Within specified value														
Test Time	5,000 Hrs																						
Capacitance Change	Within ±25% of initial value																						
Tanδ	Less than 250% of specified value																						
Leakage Current	Within specified value																						
Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 150% of specified value	Leakage Current	Within specified value														
Test Time	1,000 Hrs																						
Capacitance Change	Within ±20% of initial value																						
Tanδ	Less than 150% of specified value																						
Leakage Current	Within specified value																						
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>	Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4										
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																		
Multiplier	0.8	1.0	1.1	1.3	1.4																		
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																						

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
160	390	22 × 35	1.05	0.15	0.510	0.75	LSK391M2C--A2235
	470	20 × 40	1.16	0.15	0.423	0.82	LSK471M2C--A2040
	470	22 × 40	1.23	0.15	0.423	0.82	LSK471M2C--A2240
	470	25 × 30	1.17	0.15	0.423	0.82	LSK471M2C--A2530
	560	22 × 45	1.41	0.15	0.355	0.90	LSK561M2C--A2245
	560	25 × 35	1.36	0.15	0.355	0.90	LSK561M2C--A2535
	560	30 × 25	1.32	0.15	0.355	0.90	LSK561M2C--A3025
	680	22 × 50	1.63	0.15	0.293	0.99	LSK681M2C--A2250
	680	25 × 40	1.59	0.15	0.293	0.99	LSK681M2C--A2540
	680	30 × 30	1.56	0.15	0.293	0.99	LSK681M2C--A3030
	820	25 × 45	1.83	0.15	0.243	1.09	LSK821M2C--A2545
	820	30 × 35	1.83	0.15	0.243	1.09	LSK821M2C--A3035
	820	35 × 30	1.89	0.15	0.243	1.09	LSK821M2C--A3530
	1,000	25 × 50	2.12	0.15	0.199	1.20	LSK102M2C--A2550
	1,000	30 × 40	2.13	0.15	0.199	1.20	LSK102M2C--A3040
	1,000	35 × 30	2.08	0.15	0.199	1.20	LSK102M2C--A3530
	1,200	30 × 45	2.46	0.15	0.166	1.31	LSK122M2C--A3045
	1,200	35 × 35	2.42	0.15	0.166	1.31	LSK122M2C--A3535
	1,500	30 × 50	2.88	0.15	0.133	1.47	LSK152M2C--A3050
	1,500	35 × 40	2.86	0.15	0.133	1.47	LSK152M2C--A3540
	1,800	35 × 45	3.29	0.15	0.111	1.50	LSK182M2C--A3545
200	180	22 × 20	0.59	0.15	1.106	0.57	LSK181M2D--A2220
	220	22 × 25	0.72	0.15	0.905	0.63	LSK221M2D--A2225
	220	25 × 20	0.71	0.15	0.905	0.63	LSK221M2D--A2520
	270	22 × 30	0.81	0.15	0.737	0.70	LSK271M2D--A2230
	270	25 × 25	0.81	0.15	0.737	0.70	LSK271M2D--A2525
	330	22 × 35	0.92	0.15	0.603	0.77	LSK331M2D--A2235
	330	30 × 20	0.87	0.15	0.603	0.77	LSK331M2D--A3020
	390	22 × 40	1.02	0.15	0.510	0.84	LSK391M2D--A2240
	390	25 × 30	1.01	0.15	0.510	0.84	LSK391M2D--A2530
	390	30 × 25	1.01	0.15	0.510	0.84	LSK391M2D--A3025
	390	35 × 20	1.02	0.15	0.510	0.84	LSK391M2D--A3520
	470	22 × 45	1.10	0.15	0.423	0.92	LSK471M2D--A2245
	470	25 × 35	1.15	0.15	0.423	0.92	LSK471M2D--A2535
	470	35 × 20	1.12	0.15	0.423	0.92	LSK471M2D--A3520
	560	22 × 50	1.22	0.15	0.355	1.00	LSK561M2D--A2250
	560	25 × 40	1.19	0.15	0.355	1.00	LSK561M2D--A2540
	560	30 × 30	1.17	0.15	0.355	1.00	LSK561M2D--A3030
	560	35 × 25	1.31	0.15	0.355	1.00	LSK561M2D--A3525
	680	25 × 45	1.38	0.15	0.293	1.11	LSK681M2D--A2545
	680	30 × 35	1.37	0.15	0.293	1.11	LSK681M2D--A3035
	820	30 × 40	1.50	0.15	0.243	1.21	LSK821M2D--A3040
	820	35 × 30	1.46	0.15	0.243	1.21	LSK821M2D--A3530
	1,000	30 × 50	1.91	0.15	0.199	1.34	LSK102M2D--A3050
	1,000	35 × 35	1.72	0.15	0.199	1.34	LSK102M2D--A3535
	1,200	35 × 40	1.93	0.15	0.166	1.47	LSK122M2D--A3540
	1,500	35 × 50	2.37	0.15	0.133	1.50	LSK152M2D--A3550
	1,800	35 × 55	2.70	0.15	0.111	1.50	LSK182M2D--A3555
250	150	22 × 25	0.57	0.15	1.327	0.58	LSK151M2E--A2225
	180	25 × 20	0.61	0.15	1.106	0.64	LSK181M2E--A2520
	220	22 × 30	0.68	0.15	0.905	0.70	LSK221M2E--A2230
	220	25 × 25	0.75	0.15	0.905	0.70	LSK221M2E--A2525
	220	30 × 20	0.77	0.15	0.905	0.70	LSK221M2E--A3020
	270	22 × 35	0.78	0.15	0.737	0.78	LSK271M2E--A2235
	270	25 × 30	0.83	0.15	0.737	0.78	LSK271M2E--A2530
	270	30 × 20	0.79	0.15	0.737	0.78	LSK271M2E--A3020
	270	35 × 20	0.86	0.15	0.737	0.78	LSK271M2E--A3520
	330	22 × 40	0.91	0.15	0.603	0.86	LSK331M2E--A2240
	330	25 × 35	0.96	0.15	0.603	0.86	LSK331M2E--A2535
	390	22 × 50	1.08	0.15	0.510	0.94	LSK391M2E--A2250
	390	25 × 40	1.07	0.15	0.510	0.94	LSK391M2E--A2540
	390	30 × 30	1.07	0.15	0.510	0.94	LSK391M2E--A3030
	470	22 × 50	1.12	0.15	0.423	1.03	LSK471M2E--A2250
	470	25 × 45	1.15	0.15	0.423	1.03	LSK471M2E--A2545
	470	30 × 35	1.19	0.15	0.423	1.03	LSK471M2E--A3035

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
250	470	35 × 25	1.10	0.15	0.423	1.03	LSK471M2E--A3525
	560	25 × 50	1.31	0.15	0.355	1.12	LSK561M2E--A2550
	560	30 × 35	1.25	0.15	0.355	1.12	LSK561M2E--A3035
	560	35 × 30	1.29	0.15	0.355	1.12	LSK561M2E--A3530
	680	30 × 40	1.36	0.15	0.293	1.24	LSK681M2E--A3040
	680	35 × 40	1.57	0.15	0.293	1.24	LSK681M2E--A3540
	820	30 × 50	1.65	0.15	0.243	1.36	LSK821M2E--A3050
	1,000	35 × 40	1.76	0.15	0.199	1.50	LSK102M2E--A3540
315	120	22 × 25	0.51	0.15	1.659	0.58	LSK121M2F--A2225
	150	22 × 30	0.62	0.15	1.327	0.65	LSK151M2F--A2230
	180	22 × 35	0.72	0.15	1.106	0.71	LSK181M2F--A2235
	180	25 × 30	0.73	0.15	1.106	0.71	LSK181M2F--A2530
	220	22 × 40	0.85	0.15	0.905	0.79	LSK221M2F--A2240
	220	25 × 35	0.86	0.15	0.905	0.79	LSK221M2F--A2535
	220	30 × 25	0.84	0.15	0.905	0.79	LSK221M2F--A3025
	270	22 × 45	0.99	0.15	0.737	0.87	LSK271M2F--A2245
	270	25 × 40	1.01	0.15	0.737	0.87	LSK271M2F--A2540
	270	30 × 30	1.00	0.15	0.737	0.87	LSK271M2F--A3030
	330	22 × 55	1.20	0.15	0.603	0.97	LSK331M2F--A2255
	330	25 × 45	1.18	0.15	0.603	0.97	LSK331M2F--A2545
	330	30 × 35	1.17	0.15	0.603	0.97	LSK331M2F--A3035
	330	35 × 25	1.13	0.15	0.603	0.97	LSK331M2F--A3525
	390	25 × 50	1.34	0.15	0.510	1.05	LSK391M2F--A2550
	390	30 × 40	1.35	0.15	0.510	1.05	LSK391M2F--A3040
	390	35 × 30	1.31	0.15	0.510	1.05	LSK391M2F--A3530
	470	30 × 45	1.56	0.15	0.423	1.15	LSK471M2F--A3045
	470	35 × 35	1.53	0.15	0.423	1.15	LSK471M2F--A3535
	560	30 × 50	1.78	0.15	0.355	1.26	LSK561M2F--A3050
	560	35 × 40	1.77	0.15	0.355	1.26	LSK561M2F--A3540
	680	35 × 45	2.04	0.15	0.293	1.39	LSK681M2F--A3545
	820	35 × 50	2.35	0.15	0.243	1.50	LSK821M2F--A3550
350	56	22 × 20	0.32	0.15	3.554	0.42	LSK560M2V--A2220
	68	22 × 25	0.39	0.15	2.927	0.46	LSK680M2V--A2225
	82	22 × 30	0.49	0.15	2.427	0.51	LSK820M2V--A2230
	82	25 × 20	0.44	0.15	2.427	0.51	LSK820M2V--A2520
	100	22 × 25	0.45	0.15	1.990	0.56	LSK101M2V--A2225
	100	25 × 25	0.49	0.15	1.990	0.56	LSK101M2V--A2525
	120	22 × 30	0.53	0.15	1.659	0.61	LSK121M2V--A2230
	120	25 × 30	0.55	0.15	1.659	0.61	LSK121M2V--A2530
	120	30 × 20	0.52	0.15	1.659	0.61	LSK121M2V--A3020
	150	22 × 35	0.58	0.15	1.327	0.69	LSK151M2V--A2235
	150	25 × 25	0.54	0.15	1.327	0.69	LSK151M2V--A2525
	150	30 × 25	0.63	0.15	1.327	0.69	LSK151M2V--A3025
	150	35 × 20	0.64	0.15	1.327	0.69	LSK151M2V--A3520
	180	22 × 40	0.67	0.15	1.106	0.75	LSK181M2V--A2240
	180	25 × 30	0.64	0.15	1.106	0.75	LSK181M2V--A2530
	220	22 × 45	0.78	0.15	0.905	0.83	LSK221M2V--A2245
	220	25 × 35	0.76	0.15	0.905	0.83	LSK221M2V--A2535
	220	30 × 25	0.73	0.15	0.905	0.83	LSK221M2V--A3025
	220	35 × 30	0.87	0.15	0.905	0.83	LSK221M2V--A3530
	270	22 × 50	0.88	0.15	0.737	0.92	LSK271M2V--A2250
	270	25 × 40	0.85	0.15	0.737	0.92	LSK271M2V--A2540
	270	30 × 30	0.84	0.15	0.737	0.92	LSK271M2V--A3030
	270	35 × 25	0.86	0.15	0.737	0.92	LSK271M2V--A3525
	330	25 × 45	0.99	0.15	0.603	1.02	LSK331M2V--A2545
	330	30 × 35	0.99	0.15	0.603	1.02	LSK331M2V--A3035
	390	30 × 40	1.14	0.15	0.510	1.11	LSK391M2V--A3040
	390	35 × 30	1.11	0.15	0.510	1.11	LSK391M2V--A3530
	470	30 × 45	1.19	0.15	0.423	1.22	LSK471M2V--A3045
	470	35 × 35	1.18	0.15	0.423	1.22	LSK471M2V--A3535
	560	30 × 50	1.32	0.15	0.355	1.33	LSK561M2V--A3050
	560	35 × 40	1.32	0.15	0.355	1.33	LSK561M2V--A3540
	680	35 × 45	1.52	0.15	0.293	1.46	LSK681M2V--A3545
	820	35 × 50	1.75	0.15	0.243	1.50	LSK821M2V--A3550



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
400	56	22 × 25	0.34	0.15	3.554	0.45	LSK560M2G--A2225
	68	25 × 20	0.37	0.15	2.927	0.49	LSK680M2G--A2520
	82	22 × 35	0.50	0.15	2.427	0.54	LSK820M2G--A2235
	82	30 × 20	0.50	0.15	2.427	0.54	LSK820M2G--A3020
	100	22 × 30	0.51	0.15	1.990	0.60	LSK101M2G--A2230
	100	25 × 25	0.51	0.15	1.990	0.60	LSK101M2G--A2525
	100	30 × 25	0.58	0.15	1.990	0.60	LSK101M2G--A3025
	120	22 × 35	0.59	0.15	1.659	0.66	LSK121M2G--A2235
	120	25 × 25	0.55	0.15	1.659	0.66	LSK121M2G--A2525
	120	35 × 20	0.65	0.15	1.659	0.66	LSK121M2G--A3520
	150	22 × 40	0.70	0.15	1.327	0.73	LSK151M2G--A2240
	150	25 × 30	0.67	0.15	1.327	0.73	LSK151M2G--A2530
	180	22 × 45	0.81	0.15	1.106	0.80	LSK181M2G--A2245
	180	25 × 35	0.78	0.15	1.106	0.80	LSK181M2G--A2535
	180	30 × 25	0.76	0.15	1.106	0.80	LSK181M2G--A3025
	220	22 × 50	0.94	0.15	0.905	0.89	LSK221M2G--A2250
	220	25 × 40	0.91	0.15	0.905	0.89	LSK221M2G--A2540
	220	30 × 30	0.90	0.15	0.905	0.89	LSK221M2G--A3030
	270	25 × 45	1.06	0.15	0.737	0.99	LSK271M2G--A2545
	270	30 × 35	1.06	0.15	0.737	0.99	LSK271M2G--A3035
	270	35 × 25	1.02	0.15	0.737	0.99	LSK271M2G--A3525
	330	25 × 50	1.23	0.15	0.603	1.09	LSK331M2G--A2550
	330	30 × 40	1.24	0.15	0.603	1.09	LSK331M2G--A3040
	330	35 × 30	1.21	0.15	0.603	1.09	LSK331M2G--A3530
	390	30 × 45	1.42	0.15	0.510	1.18	LSK391M2G--A3045
	390	35 × 35	1.40	0.15	0.510	1.18	LSK391M2G--A3535
	470	30 × 50	1.63	0.15	0.423	1.30	LSK471M2G--A3050
	470	35 × 40	1.62	0.15	0.423	1.30	LSK471M2G--A3540
	560	35 × 45	1.86	0.15	0.355	1.42	LSK561M2G--A3545
420	39	22 × 25	0.25	0.15	5.104	0.38	LSK390M2P--A2225
	68	25 × 25	0.36	0.15	2.927	0.51	LSK680M2P--A2525
	100	22 × 30	0.43	0.15	1.990	0.61	LSK101M2P--A2230
	100	25 × 25	0.43	0.15	1.990	0.61	LSK101M2P--A2525
	120	22 × 35	0.50	0.15	1.659	0.67	LSK121M2P--A2235
	120	35 × 25	0.59	0.15	1.659	0.67	LSK121M2P--A3525
	150	22 × 40	0.61	0.15	1.327	0.75	LSK151M2P--A2240
	150	25 × 30	0.58	0.15	1.327	0.75	LSK151M2P--A2530
	150	30 × 25	0.58	0.15	1.327	0.75	LSK151M2P--A3025
	180	22 × 45	0.70	0.15	1.106	0.82	LSK181M2P--A2245
	180	25 × 35	0.68	0.15	1.106	0.82	LSK181M2P--A2535
	180	30 × 30	0.71	0.15	1.106	0.82	LSK181M2P--A3030
	220	22 × 50	0.82	0.15	0.905	0.91	LSK221M2P--A2250
	220	25 × 40	0.80	0.15	0.905	0.91	LSK221M2P--A2540
	220	30 × 35	0.84	0.15	0.905	0.91	LSK221M2P--A3035
	220	35 × 25	0.78	0.15	0.905	0.91	LSK221M2P--A3525
	270	25 × 45	0.93	0.15	0.737	1.01	LSK271M2P--A2545
	270	30 × 40	0.98	0.15	0.737	1.01	LSK271M2P--A3040
	270	35 × 30	0.92	0.15	0.737	1.01	LSK271M2P--A3530
	330	25 × 55	1.12	0.15	0.603	1.12	LSK331M2P--A2555
	330	30 × 45	1.14	0.15	0.603	1.12	LSK331M2P--A3045
	330	35 × 35	1.09	0.15	0.603	1.12	LSK331M2P--A3535
	390	30 × 50	1.25	0.15	0.510	1.21	LSK391M2P--A3050
	390	35 × 40	1.25	0.15	0.510	1.21	LSK391M2P--A3540
	470	35 × 45	1.44	0.15	0.423	1.33	LSK471M2P--A3545
	560	35 × 50	1.64	0.15	0.355	1.45	LSK561M2P--A3550
450	39	22 × 25	0.37	0.15	5.104	0.40	LSK390M2W--A2225
	68	25 × 25	0.47	0.15	2.927	0.52	LSK680M2W--A2525
	82	22 × 30	0.61	0.15	2.427	0.58	LSK820M2W--A2230
	100	22 × 45	0.64	0.15	1.990	0.64	LSK101M2W--A2245
	100	25 × 25	0.67	0.15	1.990	0.64	LSK101M2W--A2525
	100	30 × 25	0.57	0.15	1.990	0.64	LSK101M2W--A3025
	120	22 × 35	0.72	0.15	1.659	0.70	LSK121M2W--A2235
	120	25 × 30	0.73	0.15	1.659	0.70	LSK121M2W--A2530
	150	25 × 35	0.87	0.15	1.327	0.78	LSK151M2W--A2535
	150	30 × 30	0.71	0.15	1.327	0.78	LSK151M2W--A3030



Dimension and Permissible Ripple Current

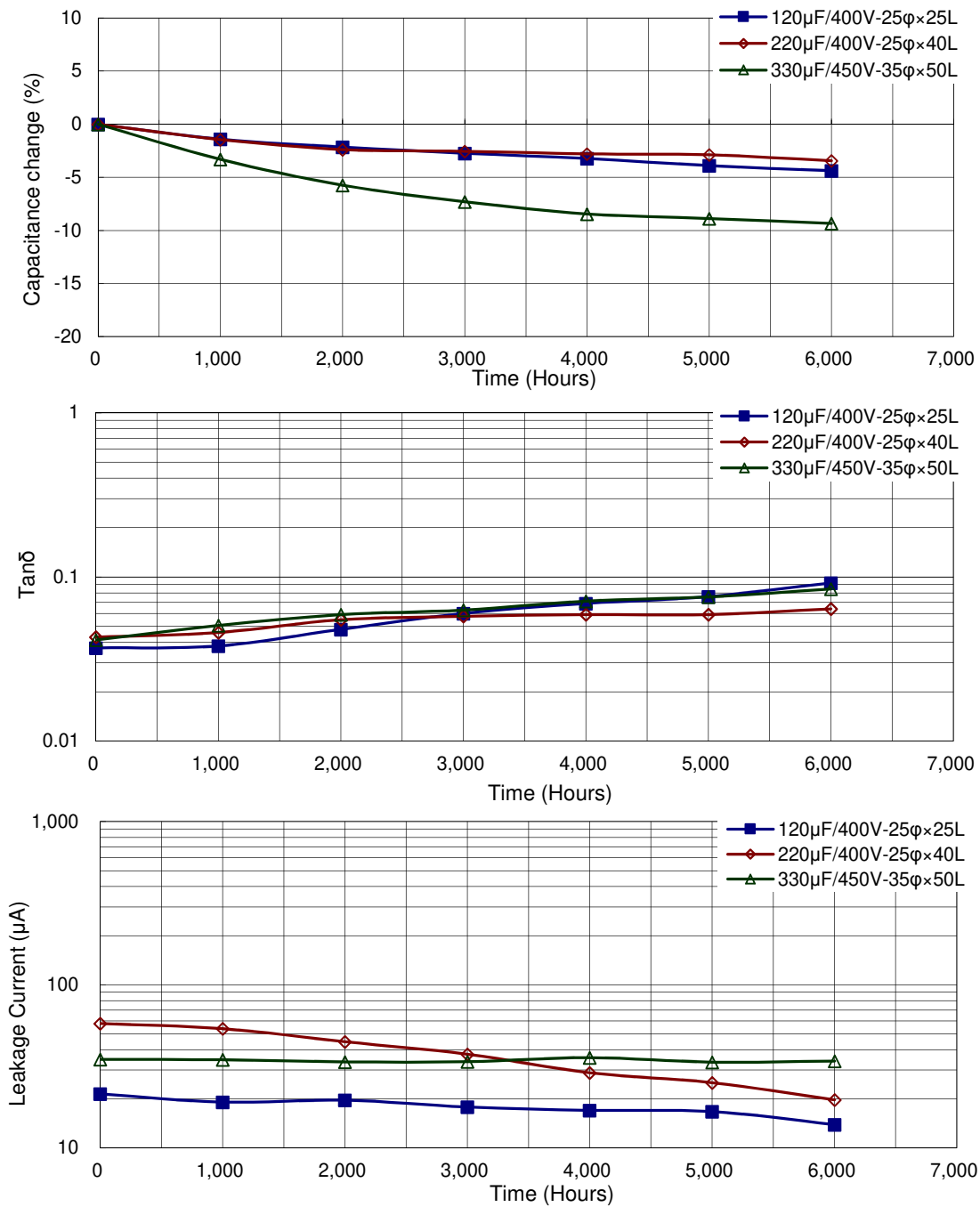
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
450	180	22 × 50	0.98	0.15	1.106	0.85	LSK181M2W--A2250
	180	25 × 40	1.01	0.15	1.106	0.85	LSK181M2W--A2540
	180	30 × 30	1.00	0.15	1.106	0.85	LSK181M2W--A3030
	220	25 × 45	1.07	0.15	0.905	0.94	LSK221M2W--A2545
	220	30 × 35	1.07	0.15	0.905	0.94	LSK221M2W--A3035
	220	35 × 25	1.03	0.15	0.905	0.94	LSK221M2W--A3525
	270	30 × 40	1.25	0.15	0.737	1.05	LSK271M2W--A3040
	270	35 × 30	1.30	0.15	0.737	1.05	LSK271M2W--A3530
	330	30 × 45	1.46	0.15	0.603	1.16	LSK331M2W--A3045
	330	35 × 35	1.44	0.15	0.603	1.16	LSK331M2W--A3535
	390	35 × 45	1.69	0.15	0.510	1.26	LSK391M2W--A3545
	470	35 × 50	1.87	0.15	0.423	1.38	LSK471M2W--A3550
500	47	22 × 25	0.30	0.15	4.235	0.46	LSK470M2H--A2225
	56	22 × 30	0.35	0.15	3.554	0.50	LSK560M2H--A2230
	56	25 × 25	0.35	0.15	3.554	0.50	LSK560M2H--A2525
	68	22 × 30	0.39	0.15	2.927	0.55	LSK680M2H--A2230
	68	25 × 30	0.42	0.15	2.927	0.55	LSK680M2H--A2530
	82	22 × 35	0.46	0.15	2.427	0.61	LSK820M2H--A2235
	82	25 × 30	0.46	0.15	2.427	0.61	LSK820M2H--A2530
	100	22 × 40	0.54	0.15	1.990	0.67	LSK101M2H--A2240
	100	25 × 35	0.54	0.15	1.990	0.67	LSK101M2H--A2535
	120	22 × 45	0.62	0.15	1.659	0.73	LSK121M2H--A2245
	120	25 × 40	0.63	0.15	1.659	0.73	LSK121M2H--A2540
	150	22 × 50	0.73	0.15	1.327	0.82	LSK151M2H--A2250
	150	25 × 45	0.75	0.15	1.327	0.82	LSK151M2H--A2545
	150	30 × 30	0.70	0.15	1.327	0.82	LSK151M2H--A3030
	180	25 × 50	0.86	0.15	1.106	0.90	LSK181M2H--A2550
	180	30 × 35	0.81	0.15	1.106	0.90	LSK181M2H--A3035
	220	25 × 50	0.95	0.15	0.905	0.99	LSK221M2H--A2550
	220	30 × 45	1.00	0.15	0.905	0.99	LSK221M2H--A3045
	220	35 × 30	0.93	0.15	0.905	0.99	LSK221M2H--A3530
	270	35 × 35	1.09	0.15	0.737	1.10	LSK271M2H--A3535
	330	35 × 40	1.28	0.15	0.603	1.22	LSK331M2H--A3540

Part Numbering System

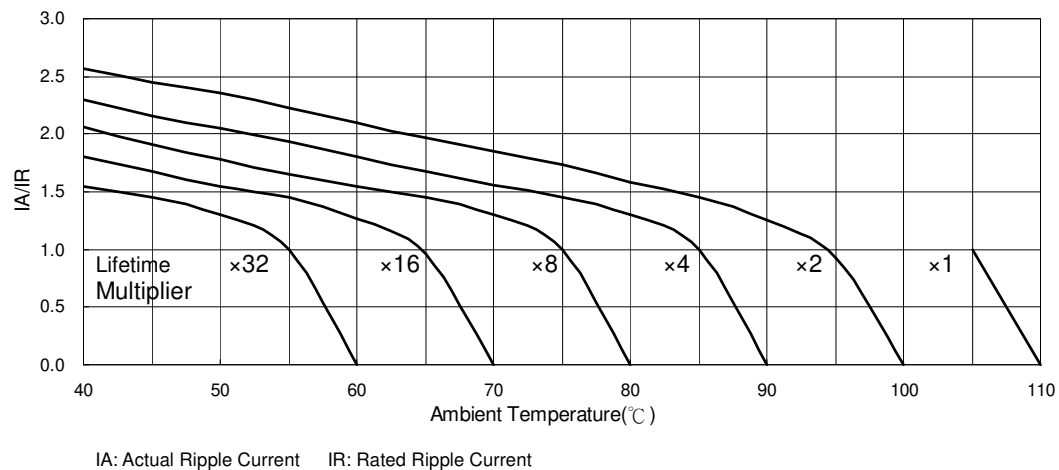
LSK Series	100μF	±20%	400V		4.0±0.5mm	22 φ ×30L	Pb-free Terminal + PET Sleeve
LSK	101	M	2G	- -	A	2230	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:	Example:	Example:	Example:	Example:	Example:	Example:	
Cap. Symbol	Symbol	M = ±20% K = ±10%	Voltage Symbol	Type Symbol	6.3±1.0 mm	φ D×L Code	
56	560		400 2G	2 pins - -		22×30 2230	
220	221		450 2W	5 pins L5		25×25 2525	
470	471					30×40 3040	

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



Useful Life Chart





LSP Series

Features

- Snap-in terminal type
- 105°C, 7,000 hours assured
- Suitable for high voltage circuits
- RoHS compliance

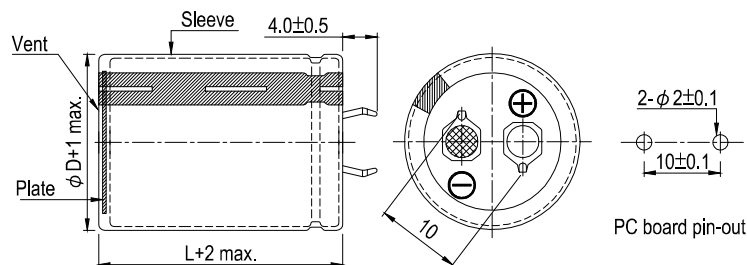


Specifications

Items	Performance																													
Category Temperature Range	-25°C ~ +105°C																													
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																													
Leakage Current (at 20°C)	I = 3√CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																													
Tanδ (at 120 Hz, 20°C)	<table><tr><td>Rated Voltage</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Tanδ(max)</td><td>0.105</td><td>0.105</td><td>0.105</td></tr></table>						Rated Voltage	350	400	450	Tanδ(max)	0.105	0.105	0.105																
Rated Voltage	350	400	450																											
Tanδ(max)	0.105	0.105	0.105																											
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Impedance Ratio</td><td>Z(-25°C)/ Z(+20°C)</td><td>4</td><td>8</td><td>8</td></tr></table>						Rated Voltage		350	400	450	Impedance Ratio	Z(-25°C)/ Z(+20°C)	4	8	8														
Rated Voltage		350	400	450																										
Impedance Ratio	Z(-25°C)/ Z(+20°C)	4	8	8																										
Endurance	<table><tr><td>Test Time</td><td colspan="5">7,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 250% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 7,000 hours at 105°C.						Test Time	7,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 250% of specified value					Leakage Current	Within specified value				
Test Time	7,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 250% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±15% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 150% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).						Test Time	1,000 Hrs					Capacitance Change	Within ±15% of initial value					Tanδ	Less than 150% of specified value					Leakage Current	Within specified value				
Test Time	1,000 Hrs																													
Capacitance Change	Within ±15% of initial value																													
Tanδ	Less than 150% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>						Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																									
Multiplier	0.8	1.0	1.1	1.3	1.4																									
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																													

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
350V	100	22 × 25	0.67	0.105	1.474	0.56	LSP101M2V--A2225
	120	22 × 30	0.77	0.105	1.228	0.61	LSP121M2V--A2230
	120	25 × 25	0.76	0.105	1.228	0.61	LSP121M2V--A2525
	150	22 × 35	0.88	0.105	0.982	0.69	LSP151M2V--A2235
	150	25 × 30	0.88	0.105	0.982	0.69	LSP151M2V--A2530
	180	22 × 40	0.99	0.105	0.819	0.75	LSP181M2V--A2240
	180	25 × 30	0.96	0.105	0.819	0.75	LSP181M2V--A2530
	180	30 × 25	0.98	0.105	0.819	0.75	LSP181M2V--A3025
	220	22 × 45	1.12	0.105	0.737	0.83	LSP221M2V--A2245
	220	25 × 35	1.11	0.105	0.737	0.83	LSP221M2V--A2535
	220	30 × 30	1.11	0.105	0.737	0.83	LSP221M2V--A3030
	270	25 × 40	1.26	0.105	0.600	0.92	LSP271M2V--A2540
	270	30 × 35	1.28	0.105	0.600	0.92	LSP271M2V--A3035
	330	25 × 45	1.40	0.105	0.491	1.02	LSP331M2V--A2545
	330	30 × 35	1.42	0.105	0.491	1.02	LSP331M2V--A3035
	330	35 × 30	1.45	0.105	0.491	1.02	LSP331M2V--A3530
	390	30 × 40	1.60	0.105	0.453	1.11	LSP391M2V--A3040
	390	35 × 35	1.61	0.105	0.453	1.11	LSP391M2V--A3535
	470	30 × 50	1.86	0.105	0.376	1.22	LSP471M2V--A3050
	470	35 × 40	1.85	0.105	0.376	1.22	LSP471M2V--A3540
	560	35 × 40	2.02	0.105	0.316	1.33	LSP561M2V--A3540
	680	35 × 50	2.36	0.105	0.260	1.39	LSP681M2V--A3550
400V	68	22 × 25	0.55	0.105	2.167	0.49	LSP680M2G--A2225
	82	22 × 30	0.63	0.105	1.797	0.54	LSP820M2G--A2230
	100	22 × 30	0.70	0.105	1.474	0.60	LSP101M2G--A2230
	100	25 × 25	0.70	0.105	1.474	0.60	LSP101M2G--A2525
	120	22 × 35	0.79	0.105	1.228	0.66	LSP121M2G--A2235
	120	25 × 30	0.79	0.105	1.228	0.66	LSP121M2G--A2530
	150	22 × 40	0.90	0.105	0.982	0.73	LSP151M2G--A2240
	150	25 × 30	0.88	0.105	0.982	0.73	LSP151M2G--A2530
	150	30 × 25	0.90	0.105	0.982	0.73	LSP151M2G--A3025
	180	22 × 45	0.99	0.105	0.819	0.80	LSP181M2G--A2245
	180	25 × 35	1.01	0.105	0.819	0.80	LSP181M2G--A2535
	180	30 × 30	1.01	0.105	0.819	0.80	LSP181M2G--A3030
	220	25 × 40	1.14	0.105	0.670	0.89	LSP221M2G--A2540
	220	30 × 35	1.16	0.105	0.670	0.89	LSP221M2G--A3035
	270	25 × 50	1.32	0.105	0.546	0.99	LSP271M2G--A2550
	270	30 × 40	1.33	0.105	0.546	0.99	LSP271M2G--A3040
	270	35 × 30	1.31	0.105	0.546	0.99	LSP271M2G--A3530
	330	30 × 45	1.52	0.105	0.447	1.09	LSP331M2G--A3045
	330	35 × 35	1.48	0.105	0.447	1.09	LSP331M2G--A3535
	390	30 × 50	1.69	0.105	0.378	1.18	LSP391M2G--A3050
	390	35 × 40	1.68	0.105	0.378	1.18	LSP391M2G--A3540
	470	35 × 45	1.91	0.105	0.314	1.30	LSP471M2G--A3545
	560	35 × 50	2.14	0.105	0.263	1.42	LSP561M2G--A3550
450V	47	22 × 25	0.46	0.105	3.135	0.44	LSP470M2W--A2225
	56	22 × 30	0.52	0.105	2.843	0.48	LSP560M2W--A2230
	68	22 × 30	0.58	0.105	2.631	0.52	LSP680M2W--A2230
	68	25 × 25	0.58	0.105	2.631	0.52	LSP680M2W--A2525
	82	22 × 35	0.65	0.105	1.797	0.58	LSP820M2W--A2235
	82	25 × 30	0.65	0.105	1.797	0.58	LSP820M2W--A2530
	100	22 × 40	0.74	0.105	1.474	0.64	LSP101M2W--A2240
	100	25 × 30	0.72	0.105	1.474	0.64	LSP101M2W--A2530
	100	30 × 25	0.73	0.105	1.474	0.64	LSP101M2W--A3025
	120	22 × 45	0.83	0.105	1.228	0.70	LSP121M2W--A2245
	120	25 × 35	0.82	0.105	1.228	0.70	LSP121M2W--A2535
	120	30 × 30	0.82	0.105	1.228	0.70	LSP121M2W--A3030
	150	25 × 40	0.94	0.105	0.982	0.78	LSP151M2W--A2540
	150	30 × 35	0.96	0.105	0.982	0.78	LSP151M2W--A3035
	180	30 × 35	1.05	0.105	0.819	0.85	LSP181M2W--A3035
	180	35 × 30	1.07	0.105	0.819	0.85	LSP181M2W--A3530
	220	30 × 40	1.20	0.105	0.670	0.94	LSP221M2W--A3040
	220	35 × 35	1.21	0.105	0.670	0.94	LSP221M2W--A3535



Dimension and Permissible Ripple Current

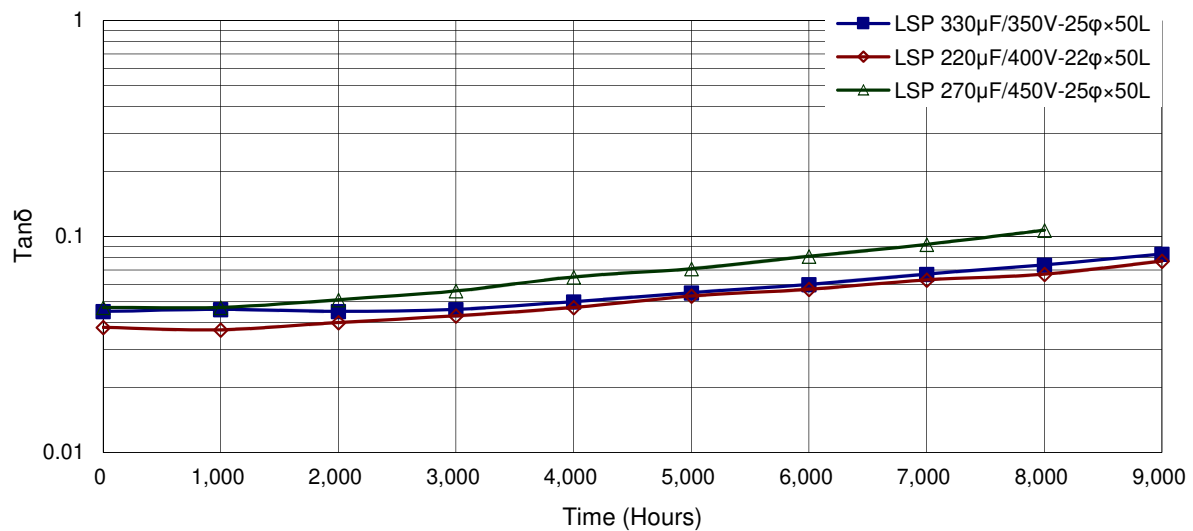
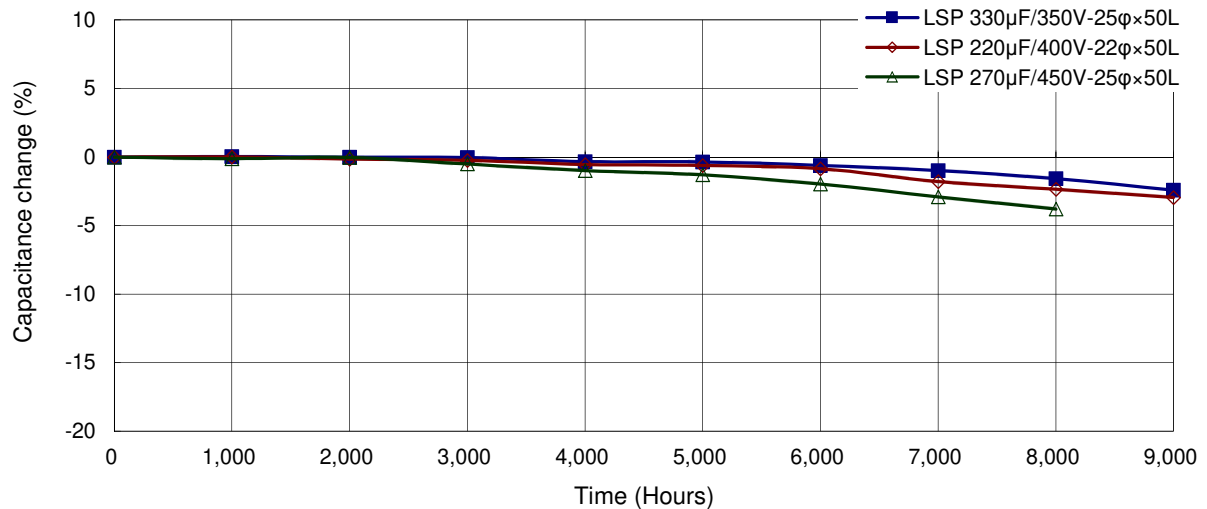
Rated Voltage V_{DC}	Capacitance 120 Hz, 20°C μF	$\phi D \times L$ mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
450V	270	30 × 50	1.41	0.105	0.546	1.05	LSP271M2W--A3050
	270	35 × 40	1.40	0.105	0.546	1.05	LSP271M2W--A3540
	330	35 × 45	1.60	0.105	0.447	1.16	LSP331M2W--A3545
	390	35 × 50	1.79	0.105	0.378	1.26	LSP391M2W--A3550

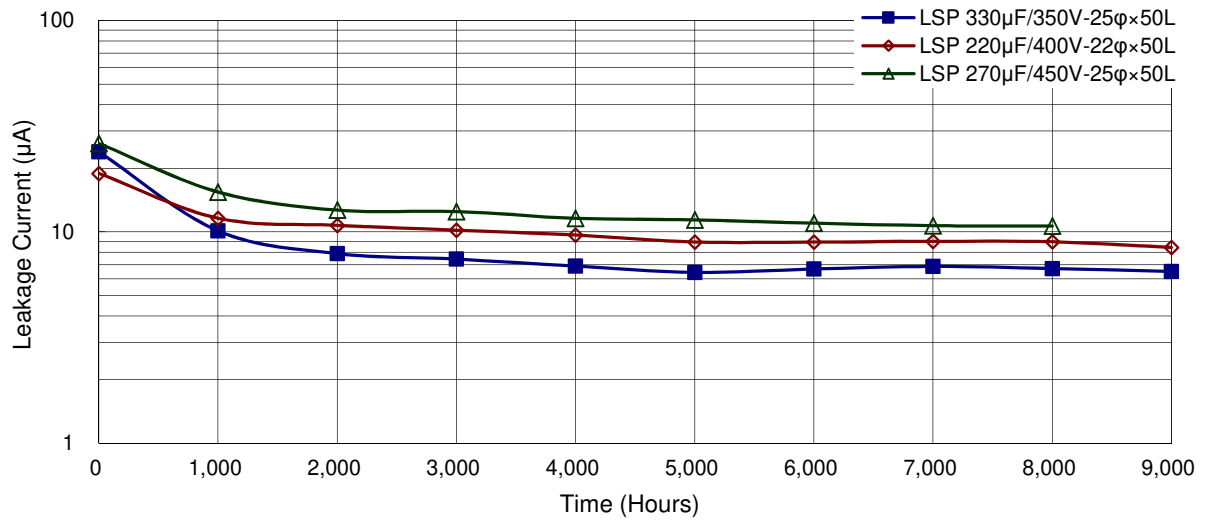
Part Numbering System

LSP Series	100 μF	$\pm 20\%$	400V		4.0 ± 0.5 mm	30 $\phi \times 35L$	Pb-free Terminal + PET Sleeve
LSP	221	M	2G	--	A	3035	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type
Example:		M = $\pm 20\%$ K = $\pm 10\%$	Example:		Example: 6.3 ± 1.0 mm	Example:	
Cap.	Symbol		V	Symbol		$\phi D \times L$	Code
56	560		400	2G		22×30	2230
220	221		450	2W		25×25	2525
470	471					30×40	3040
			Example:				
Type	Symbol						
2 pins	--						
5 pins	L5						

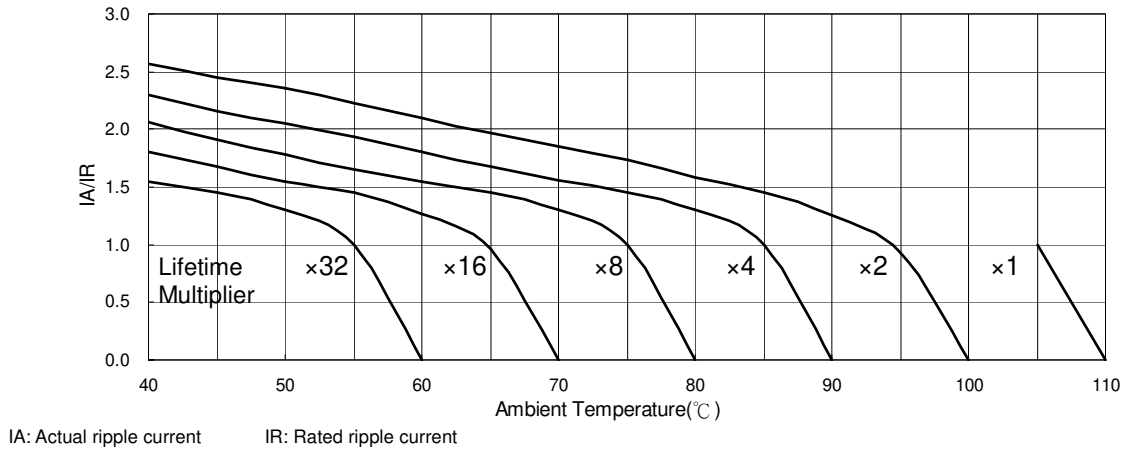
Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves





Useful Life Chart



LHM Series

Features

- Snap-in terminal type
- Suitable for high freq. regenerative volt. for AC servomotor, general inverter
- Suitable for equipment used at volt. Fluctuating area & rectifier circuit of volt. doubler
- Application of charge-discharge DC volt. for 50 million times
- RoHS compliance

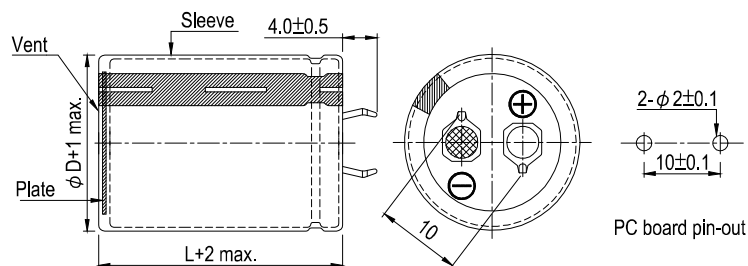


Specifications

Items	Performance																	
Category Temperature Range	-25℃ ~ +105℃																	
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																	
Leakage Current (at 20℃)	I = $3\sqrt{CV}$ or 3.0 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																	
Tanδ (at 120 Hz, 20℃)	<table><tr><td>Rated Voltage</td><td>350</td><td>400</td><td>420</td><td>450</td></tr><tr><td>Tanδ (max)</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.15</td></tr></table>						Rated Voltage	350	400	420	450	Tanδ (max)	0.15	0.15	0.15	0.15		
Rated Voltage	350	400	420	450														
Tanδ (max)	0.15	0.15	0.15	0.15														
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>350</td><td>400</td><td>420</td><td>450</td></tr><tr><td>Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>8</td><td>8</td><td>8</td><td>8</td></tr></table>						Rated Voltage		350	400	420	450	Impedance Ratio	Z(-25℃)/Z(+20℃)	8	8	8	8
Rated Voltage		350	400	420	450													
Impedance Ratio	Z(-25℃)/Z(+20℃)	8	8	8	8													
Endurance of Charge/ Discharge Behavior	After an application of charge-discharge voltage for 50 million times, capacitor shall meet the characteristics requirement listed below: Charge discharge voltage(ΔV) = Rated voltage × 0.35 Frequency: 6 Hz																	

Diagram of Dimensions

Unit: mm





Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
350	120	22 × 25	0.75	0.15	1.659	0.61	LHM121M2V--A2225
	150	22 × 30	0.82	0.15	1.327	0.69	LHM151M2V--A2230
	180	22 × 30	0.90	0.15	1.106	0.75	LHM181M2V--A2230
	180	25 × 25	0.90	0.15	1.106	0.75	LHM181M2V--A2525
	220	22 × 35	1.00	0.15	0.905	0.83	LHM221M2V--A2235
	220	25 × 30	1.00	0.15	0.905	0.83	LHM221M2V--A2530
	270	22 × 40	1.10	0.15	0.737	0.92	LHM271M2V--A2240
	270	25 × 35	1.10	0.15	0.737	0.92	LHM271M2V--A2535
	270	30 × 25	1.10	0.15	0.737	0.92	LHM271M2V--A3025
	330	22 × 45	1.20	0.15	0.603	1.02	LHM331M2V--A2245
	330	25 × 40	1.20	0.15	0.603	1.02	LHM331M2V--A2540
	330	30 × 30	1.20	0.15	0.603	1.02	LHM331M2V--A3030
	390	25 × 45	1.30	0.15	0.510	1.11	LHM391M2V--A2545
	390	30 × 35	1.30	0.15	0.510	1.11	LHM391M2V--A3035
	470	25 × 50	1.40	0.15	0.423	1.22	LHM471M2V--A2550
	470	30 × 40	1.40	0.15	0.423	1.22	LHM471M2V--A3040
	470	35 × 30	1.40	0.15	0.423	1.22	LHM471M2V--A3530
	560	30 × 45	1.50	0.15	0.355	1.33	LHM561M2V--A3045
	560	35 × 35	1.50	0.15	0.355	1.33	LHM561M2V--A3535
	680	30 × 50	1.70	0.15	0.293	1.46	LHM681M2V--A3050
	680	35 × 40	1.70	0.15	0.293	1.46	LHM681M2V--A3540
	820	35 × 45	1.90	0.15	0.243	1.50	LHM821M2V--A3545
400	100	22 × 25	0.68	0.15	1.990	0.60	LHM101M2G--A2225
	120	22 × 30	0.73	0.15	1.659	0.66	LHM121M2G--A2230
	150	22 × 35	0.85	0.15	1.327	0.73	LHM151M2G--A2235
	180	22 × 35	0.95	0.15	1.106	0.80	LHM181M2G--A2235
	180	25 × 30	0.95	0.15	1.106	0.80	LHM181M2G--A2530
	180	30 × 25	0.95	0.15	1.106	0.80	LHM181M2G--A3025
	220	22 × 45	1.10	0.15	0.905	0.89	LHM221M2G--A2245
	220	25 × 35	1.10	0.15	0.905	0.89	LHM221M2G--A2535
	220	30 × 25	1.10	0.15	0.905	0.89	LHM221M2G--A3025
	270	22 × 50	1.22	0.15	0.737	0.99	LHM271M2G--A2250
	270	25 × 40	1.22	0.15	0.737	0.99	LHM271M2G--A2540
	270	30 × 30	1.22	0.15	0.737	0.99	LHM271M2G--A3030
	270	35 × 25	1.22	0.15	0.737	0.99	LHM271M2G--A3525
	330	25 × 45	1.44	0.15	0.603	1.09	LHM331M2G--A2545
	330	30 × 35	1.44	0.15	0.603	1.09	LHM331M2G--A3035
	390	25 × 50	1.55	0.15	0.510	1.18	LHM391M2G--A2550
	390	30 × 40	1.55	0.15	0.510	1.18	LHM391M2G--A3040
	390	35 × 30	1.55	0.15	0.510	1.18	LHM391M2G--A3530
	470	30 × 45	1.68	0.15	0.423	1.30	LHM471M2G--A3045
	470	35 × 35	1.68	0.15	0.423	1.30	LHM471M2G--A3535
	560	30 × 50	1.90	0.15	0.355	1.42	LHM561M2G--A3050
	560	35 × 40	1.90	0.15	0.355	1.42	LHM561M2G--A3540
	680	35 × 50	2.12	0.15	0.293	1.50	LHM681M2G--A3550
420	100	22 × 25	0.66	0.15	1.990	0.61	LHM101M2P--A2225
	120	22 × 30	0.81	0.15	1.659	0.67	LHM121M2P--A2230
	120	25 × 25	0.81	0.15	1.659	0.67	LHM121M2P--A2525
	150	22 × 35	0.84	0.15	1.327	0.75	LHM151M2P--A2235
	150	25 × 30	0.84	0.15	1.327	0.75	LHM151M2P--A2530
	180	22 × 40	0.91	0.15	1.106	0.82	LHM181M2P--A2240
	180	25 × 30	0.91	0.15	1.106	0.82	LHM181M2P--A2530
	180	30 × 25	0.91	0.15	1.106	0.82	LHM181M2P--A3025
	220	22 × 45	1.05	0.15	0.905	0.91	LHM221M2P--A2245
	220	25 × 35	1.05	0.15	0.905	0.91	LHM221M2P--A2535
	220	30 × 30	1.05	0.15	0.905	0.91	LHM221M2P--A3030
	270	25 × 40	1.25	0.15	0.737	1.01	LHM271M2P--A2540
	270	30 × 30	1.25	0.15	0.737	1.01	LHM271M2P--A3030
	270	35 × 25	1.25	0.15	0.737	1.01	LHM271M2P--A3525
	330	25 × 50	1.42	0.15	0.603	1.12	LHM331M2P--A2550
	330	30 × 35	1.42	0.15	0.603	1.12	LHM331M2P--A3035
	330	35 × 30	1.42	0.15	0.603	1.12	LHM331M2P--A3530
	390	30 × 40	1.61	0.15	0.510	1.21	LHM391M2P--A3040
	390	35 × 35	1.61	0.15	0.510	1.21	LHM391M2P--A3535
	470	30 × 50	1.86	0.15	0.423	1.33	LHM471M2P--A3050



Dimension and Permissible Ripple Current

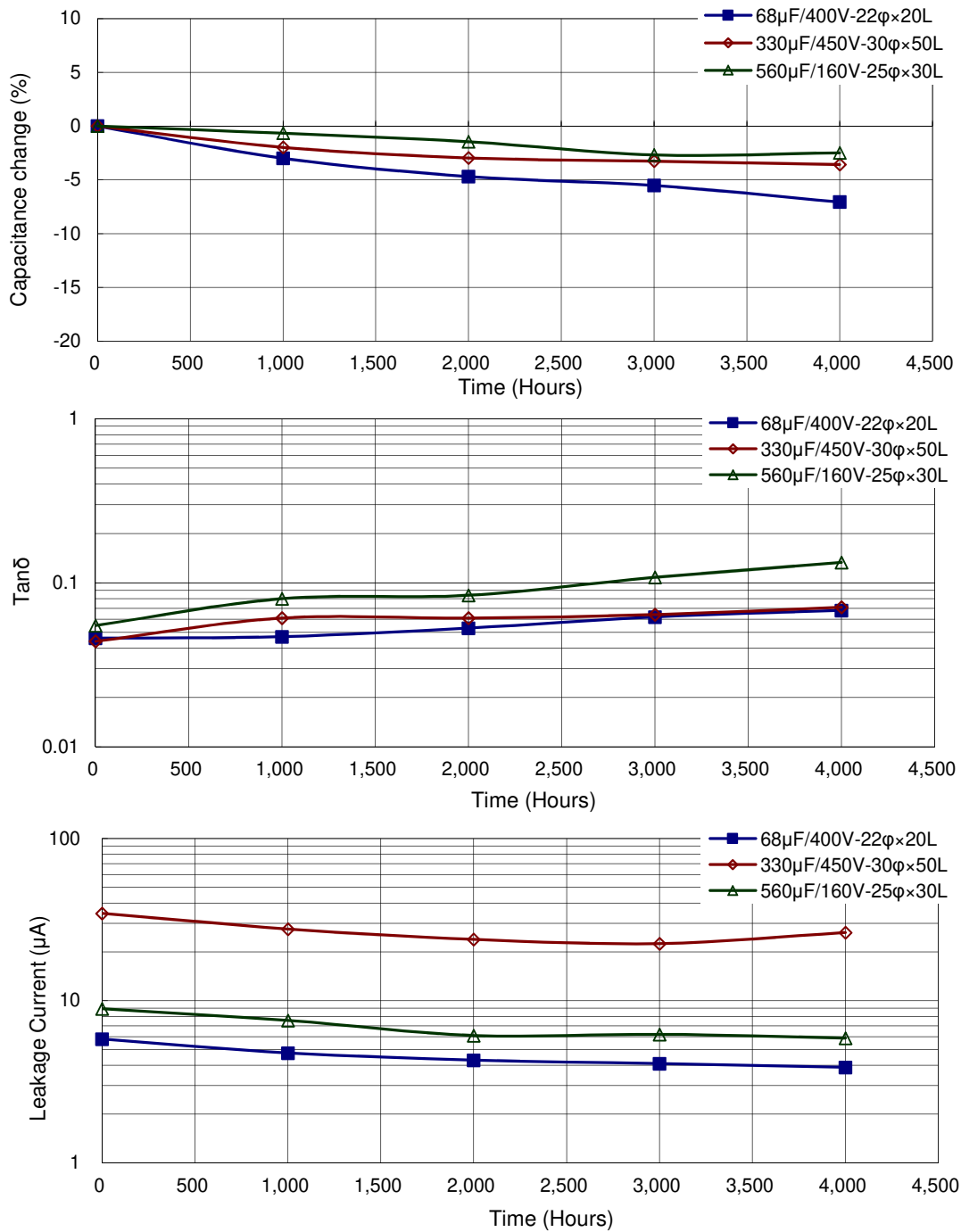
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C Ω	LC 5 minutes mA	Part Number
420	470	35 × 40	1.86	0.15	0.423	1.33	LHM471M2P--A3540
	560	35 × 45	2.10	0.15	0.355	1.45	LHM561M2P--A3545
	680	35 × 50	2.20	0.15	0.293	1.50	LHM681M2P--A3550
450	82	22 × 25	0.64	0.15	2.427	0.58	LHM820M2W--A2225
	100	22 × 30	0.69	0.15	1.990	0.64	LHM101M2W--A2230
	100	25 × 25	0.69	0.15	1.990	0.64	LHM101M2W--A2525
	120	22 × 35	0.72	0.15	1.659	0.70	LHM121M2W--A2235
	120	25 × 30	0.72	0.15	1.659	0.70	LHM121M2W--A2530
	150	22 × 40	0.79	0.15	1.327	0.78	LHM151M2W--A2240
	150	25 × 30	0.79	0.15	1.327	0.78	LHM151M2W--A2530
	150	30 × 25	0.79	0.15	1.327	0.78	LHM151M2W--A3025
	180	22 × 45	0.87	0.15	1.106	0.85	LHM181M2W--A2245
	180	25 × 35	0.87	0.15	1.106	0.85	LHM181M2W--A2535
	180	30 × 30	0.87	0.15	1.106	0.85	LHM181M2W--A3030
	220	25 × 40	1.05	0.15	0.905	0.94	LHM221M2W--A2540
	220	30 × 30	1.05	0.15	0.905	0.94	LHM221M2W--A3030
	220	35 × 25	1.05	0.15	0.905	0.94	LHM221M2W--A3525
	270	25 × 50	1.23	0.15	0.737	1.05	LHM271M2W--A2550
	270	30 × 35	1.23	0.15	0.737	1.05	LHM271M2W--A3035
	270	35 × 30	1.23	0.15	0.737	1.05	LHM271M2W--A3530
	330	30 × 40	1.38	0.15	0.603	1.16	LHM331M2W--A3040
	330	35 × 35	1.38	0.15	0.603	1.16	LHM331M2W--A3535
	390	30 × 50	1.61	0.15	0.510	1.26	LHM391M2W--A3050
	390	35 × 40	1.61	0.15	0.510	1.26	LHM391M2W--A3540
	470	35 × 45	1.78	0.15	0.423	1.38	LHM471M2W--A3545
	560	35 × 50	1.99	0.15	0.355	1.50	LHM561M2W--A3550

Part Numbering System

LHM Series	100μF	±20%	400V		4.0±0.5mm	22 ϕ ×30L	Pb-free Terminal + PET Sleeve																											
<u>LHM</u>	<u>101</u>	<u>M</u>	<u>2G</u>	- -	<u>A</u>	<u>2230</u>																												
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type																											
Example:			Example:	Example:		Example:																												
<table><tr><td>Cap.</td><td>Symbol</td></tr><tr><td>56</td><td>560</td></tr><tr><td>220</td><td>221</td></tr><tr><td>470</td><td>471</td></tr></table>	Cap.	Symbol	56	560	220	221	470	471	M = ±20% K = ±10%	<table><tr><td>Voltage</td><td>Symbol</td></tr><tr><td>400</td><td>2G</td></tr><tr><td>450</td><td>2W</td></tr></table>	Voltage	Symbol	400	2G	450	2W	<table><tr><td>Type</td><td>Symbol</td></tr><tr><td>2 pins</td><td>- -</td></tr><tr><td>5 pins</td><td>L5</td></tr></table>	Type	Symbol	2 pins	- -	5 pins	L5	"A": 6.3±1.0 mm	<table><tr><td>ϕ D×L</td><td>Code</td></tr><tr><td>22×30</td><td>2230</td></tr><tr><td>25×25</td><td>2525</td></tr><tr><td>30×40</td><td>3040</td></tr></table>	ϕ D×L	Code	22×30	2230	25×25	2525	30×40	3040	
Cap.	Symbol																																	
56	560																																	
220	221																																	
470	471																																	
Voltage	Symbol																																	
400	2G																																	
450	2W																																	
Type	Symbol																																	
2 pins	- -																																	
5 pins	L5																																	
ϕ D×L	Code																																	
22×30	2230																																	
25×25	2525																																	
30×40	3040																																	

Note: For more details, please refer to "Part Numbering System - Snap-in Type" on page 188.

Typical Endurance Curves



Part Numbering System - Screw Type

Product Code Guide

MEA series	3300μF	±20%	400V	Rills +Stud Bottom Case	M5 Post	63.5 φ × 115L	Pb-free Terminal + PVC Sleeve	
MEA	332	M	2G	H	-	C115		
□ □ □	□ □ □	□	□ □	□	□	□ □ □ □	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Case Type	Terminal Type	Case Size	Terminal and Sleeve Type	Supplement Code

① **Series:** Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank.

② **Capacitance:** Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. "R" represents the decimal point for capacitance under 10μF.

Example:

Capacitance	100	470	820	1,000	4,700	6,800	10,000	15,000	47,000
Part number	101	471	821	102	472	682	103	153	473

③ **Tolerance:**

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
-----------------	-----------------	-----------------

④ **Rated voltage:**

Rated voltage in volts (V) is represented by a two-digit code.

Rated Voltage (V)	10	16	20	25	35	50	63	80	100
Code	1A	1C	1D	1E	1V	1H	1J	1K	2A

Rated Voltage (V)	160	200	250	315	350	400	420	450	500	525
Code	2C	2D	2E	2F	2V	2G	2P	2W	2H	2Y

⑤ **Case type:**

- = Plain Case + Mounting clamp	N = Rilled Case + Mounting clamp
X = Plain Case	R = Rilled Case
S = Plain + Stud Bottom Case	H = Rilled + Stud Bottom Case
I = Plain Case + Mounting clamp (2 footed mounting clamp)	

⑥ **Terminal type:**

Terminal Type	Post Diameter (mm)	Height (±1 mm)	For Case Diameters	Code
M5 Post, Small	8	6.5	35	A
M5 Post	10	6.5	51 ~ 89	-
M5 Post, High Current	17.4	6.5	76.2 ~ 89	C
M6 Post, High Current	17.4	6.5	76.2 ~ 89	D

⑦ **Case size:** The first one digit indicates case diameter and the last three digits indicate case length in mm.

φ D×L	35×53	35×65	35×75	35×83	35×100	35×121	51×75	51×83	51×96	51×100	51×115
Code	A053	A065	A075	A083	A100	A121	B075	B083	B096	B100	B115

φ D×L	51×121	51×130	63.5×96	63.5×100	63.5×115	63.5×121	63.5×130	63.5×144	76.2×96	76.2×115	76.2×121
Code	B121	B130	C096	C100	C115	C121	C130	C144	D096	D115	D121

φ D×L	76.2×130	76.2×144	76.2×155	89×130	89×157	89×196	89×236
Code	D130	D144	D155	E130	E157	E196	E236

Note: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ **Terminal and sleeve type**

None = Pb-free terminal + PVC sleeve (Standard design)

* When a supplement code following a blank digit code of terminal and sleeve type (standard design), use a hyphen, "-", to fill the blank digit.

⑨ **Supplement code (Optional):** For special control purposes

MEA Series

Features

- Endurance with ripple current: 85°C, 2,000 hours
- RoHS compliance



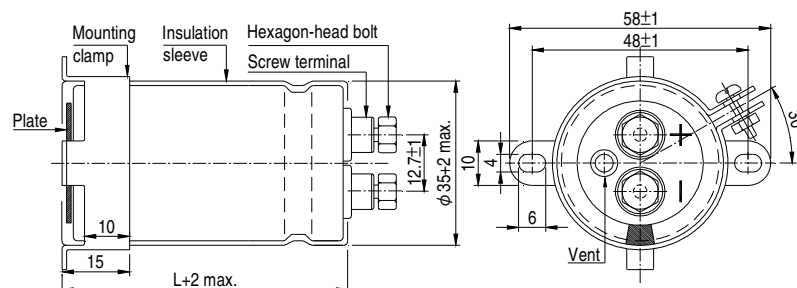
Specifications

Items	Performance	
Category Temperature Range	-40°C ~ +85°C	-25°C ~ +85°C
	10 ~ 100V	160 ~ 450V
Capacitance Tolerance	±20% (at 120 Hz, 20°C)	
Leakage Current (at 20°C)	$I = 3\sqrt{CV}$ or 5 (mA) whichever is smaller (after 5 minutes) Where, C = rated capacitance in μ F, V = rated DC Rated Voltage in V	
Tan δ (at 120 Hz, 20°C)	See the Dimensions & Permissible Ripple Current	
Low Temperature Characteristics (at 120 Hz)	Capacitance change : $C(-25^{\circ}\text{C}) / C(+20^{\circ}\text{C}) \geq 0.7$	
Endurance	Test Time	2,000 Hrs
	Capacitance Change	Within ±15% of initial value
	Tan δ	Less than 175% of specified value
	Leakage Current	Within specified value
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with rated ripple current applied for 2,000 hours at 85°C.	
Shelf Life Test	Test Time	500 Hrs
	Capacitance Change	Within ±20% of initial value
	Tan δ	Less than 200% of specified value
	Leakage Current	Within specified value
	* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).	
Ripple Current and Frequency Multipliers	Frequency (Hz)	50 / 60 100 / 120 300 1k 10k up
	Multiplier	0.7 1.0 1.1 1.3 1.4
Ripple Current and Temperature Multipliers	Temperature (°C)	40 60 70 85
	Multiplier	2.7 2.0 1.7 1.0
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.	

Diagram of Dimensions

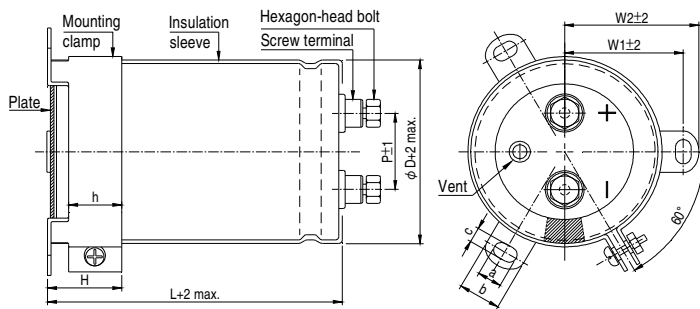
1. 35 ϕ

Unit: mm



Screw Specifications:
Plug hexagon-head screw: M5×0.8×10
Max. screw tightening torque: 3.23Nm

2. 51 ~ 89 φ



Unit: mm

φ D	P	W1	W2	H	h	a	b	c
51	22.0	31.8	36.5	30	24	7	14.0	4.5
63.5	28.6	38.1	42.6	30	24	7	14.0	4.5
76.2	32.0	44.5	49.2	30	24	7	14.0	5.0
89	32.0	50.8	55.6	30	24	7	14.0	5.0

Screw Specifications:

Plug hexagon-head screw: M5×0.8×10

Max. screw tightening torque: 3.23Nm

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
10	33,000	35 × 53	4.4	0.60	24.1	1.72	MEA333M1A-AA053
	39,000	35 × 50	4.6	0.60	20.4	1.87	MEA393M1A-AA050
	39,000	35 × 53	4.7	0.60	20.4	1.87	MEA393M1A-AA053
	47,000	35 × 65	5.6	0.60	16.9	2.06	MEA473M1A-AA065
	56,000	35 × 65	5.9	0.60	14.2	2.24	MEA563M1A-AA065
	68,000	35 × 83	7.5	0.60	11.7	2.47	MEA683M1A-AA083
	82,000	35 × 80	7.6	0.60	9.7	2.72	MEA823M1A-AA080
	82,000	35 × 83	7.7	0.60	9.7	2.72	MEA823M1A-AA083
	82,000	35 × 100	8.3	0.60	9.7	2.72	MEA823M1A-AA100
	100,000	35 × 100	8.4	0.70	9.3	3.00	MEA104M1A-AA100
	100,000	35 × 121	9.2	0.70	9.3	3.00	MEA104M1A-AA121
	120,000	35 × 121	9.4	0.70	7.7	3.29	MEA124M1A-AA121
	150,000	35 × 121	10.5	0.90	8.0	3.67	MEA154M1A-AA121
	150,000	51 × 80	10.0	0.90	8.0	3.67	MEA154M1A--B080
	150,000	51 × 83	10.2	0.90	8.0	3.67	MEA154M1A--B083
	180,000	51 × 83	10.7	0.90	6.6	4.02	MEA184M1A--B083
	220,000	51 × 100	12.8	1.00	6.0	4.45	MEA224M1A--B100
	220,000	51 × 121	13.9	1.00	6.0	4.45	MEA224M1A--B121
	270,000	51 × 121	15.2	1.20	5.9	4.93	MEA274M1A--B121
	330,000	63.5 × 96	15.5	1.40	5.6	5.00	MEA334M1A--C096
	330,000	63.5 × 121	17.2	1.40	5.6	5.00	MEA334M1A--C121
	390,000	63.5 × 100	16.7	1.50	5.1	5.00	MEA394M1A--C100
	390,000	63.5 × 115	17.7	1.50	5.1	5.00	MEA394M1A--C115
	390,000	63.5 × 121	18.1	1.50	5.1	5.00	MEA394M1A--C121
	470,000	63.5 × 121	18.3	2.00	5.6	5.00	MEA474M1A--C121
	470,000	63.5 × 130	18.5	2.00	5.6	5.00	MEA474M1A--C130
	470,000	76.2 × 121	19.2	2.00	5.6	5.00	MEA474M1A--D121
	560,000	76.2 × 100	18.3	2.50	5.9	5.00	MEA564M1A--D100
	560,000	76.2 × 115	19.4	2.50	5.9	5.00	MEA564M1A--D115
	560,000	76.2 × 121	19.8	2.50	5.9	5.00	MEA564M1A--D121
	680,000	76.2 × 121	21.0	3.00	5.9	5.00	MEA684M1A--D121
	820,000	76.2 × 155	23.8	3.50	5.7	5.00	MEA824M1A--D155
16	22,000	35 × 53	3.7	0.40	24.1	1.78	MEA223M1C-AA053
	27,000	35 × 50	4.1	0.45	22.1	1.97	MEA273M1C-AA050
	27,000	35 × 53	4.2	0.45	22.1	1.97	MEA273M1C-AA053
	33,000	35 × 53	5.0	0.50	20.1	2.18	MEA333M1C-AA053
	33,000	35 × 55	5.1	0.50	20.1	2.18	MEA333M1C-AA055
	33,000	35 × 65	5.5	0.50	20.1	2.18	MEA333M1C-AA065
	39,000	35 × 65	5.8	0.50	17.0	2.37	MEA393M1C-AA065
	47,000	35 × 80	7.1	0.55	15.5	2.60	MEA473M1C-AA080
	47,000	35 × 83	7.2	0.55	15.5	2.60	MEA473M1C-AA083
	56,000	35 × 80	7.4	0.60	14.2	2.84	MEA563M1C-AA080
	56,000	35 × 83	7.5	0.60	14.2	2.84	MEA563M1C-AA083
	68,000	35 × 100	9.3	0.60	11.7	3.13	MEA683M1C-AA100
	68,000	35 × 105	9.6	0.60	11.7	3.13	MEA683M1C-AA105
	68,000	35 × 121	10.2	0.60	11.7	3.13	MEA683M1C-AA121
	82,000	35 × 100	9.5	0.70	11.3	3.44	MEA823M1C-AA100
	82,000	35 × 121	10.4	0.70	11.3	3.44	MEA823M1C-AA121
	100,000	35 × 121	11.5	0.70	9.3	3.79	MEA104M1C-AA121



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
16	100,000	51 × 80	10.7	0.70	9.3	3.79	MEA104M1C--B080
	100,000	51 × 83	10.9	0.70	9.3	3.79	MEA104M1C--B083
	120,000	35 × 121	11.5	0.80	8.8	4.16	MEA124M1C-AA121
	120,000	51 × 80	11.1	0.80	8.8	4.16	MEA124M1C--B080
	120,000	51 × 83	11.3	0.80	8.8	4.16	MEA124M1C--B083
	150,000	51 × 80	11.4	0.90	8.0	4.65	MEA154M1C--B080
	150,000	51 × 96	11.6	0.90	8.0	4.65	MEA154M1C--B096
	150,000	51 × 100	11.7	0.90	8.0	4.65	MEA154M1C--B100
	150,000	51 × 121	12.6	0.90	8.0	4.65	MEA154M1C--B121
	180,000	51 × 115	12.7	0.90	6.6	5.00	MEA184M1C--B115
	180,000	51 × 121	13.0	0.90	6.6	5.00	MEA184M1C--B121
	220,000	51 × 121	14.4	1.00	6.0	5.00	MEA224M1C--B121
	220,000	51 × 130	14.8	1.00	6.0	5.00	MEA224M1C--B130
	220,000	63.5 × 100	14.7	1.00	6.0	5.00	MEA224M1C--C100
	270,000	63.5 × 96	15.0	1.20	5.9	5.00	MEA274M1C--C096
	270,000	63.5 × 100	15.3	1.20	5.9	5.00	MEA274M1C--C100
	330,000	63.5 × 105	15.8	1.30	5.2	5.00	MEA334M1C--C105
	330,000	63.5 × 115	16.4	1.30	5.2	5.00	MEA334M1C--C115
	330,000	63.5 × 121	16.7	1.30	5.2	5.00	MEA334M1C--C121
	330,000	76.2 × 121	18.2	1.30	5.2	5.00	MEA334M1C--D121
	390,000	63.5 × 130	17.3	1.60	5.4	5.00	MEA394M1C--C130
	390,000	76.2 × 100	17.2	1.60	5.4	5.00	MEA394M1C--D100
	390,000	76.2 × 121	18.6	1.60	5.4	5.00	MEA394M1C--D121
	470,000	76.2 × 115	18.9	1.80	5.1	5.00	MEA474M1C--D115
	470,000	76.2 × 121	19.3	1.80	5.1	5.00	MEA474M1C--D121
	560,000	76.2 × 130	19.9	2.00	4.7	5.00	MEA564M1C--D130
	560,000	76.2 × 140	20.5	2.00	4.7	5.00	MEA564M1C--D140
	560,000	76.2 × 144	20.7	2.00	4.7	5.00	MEA564M1C--D144
	680,000	76.2 × 144	21.8	2.40	4.7	5.00	MEA684M1C--D144
	680,000	76.2 × 155	22.3	2.40	4.7	5.00	MEA684M1C--D155
	820,000	89 × 157	24.1	2.80	4.5	5.00	MEA824M1C--E157
25	15,000	35 × 53	3.7	0.30	26.5	1.84	MEA153M1E-AA053
	18,000	35 × 50	3.9	0.30	22.1	2.01	MEA183M1E-AA050
	18,000	35 × 53	4.0	0.30	22.1	2.01	MEA183M1E-AA053
	22,000	35 × 53	4.1	0.35	21.1	2.22	MEA223M1E-AA053
	22,000	35 × 55	4.2	0.35	21.1	2.22	MEA223M1E-AA055
	22,000	35 × 65	4.5	0.35	21.1	2.22	MEA223M1E-AA065
	27,000	35 × 65	5.0	0.35	17.2	2.46	MEA273M1E-AA065
	33,000	35 × 80	5.4	0.40	16.1	2.72	MEA333M1E-AA080
	33,000	35 × 83	5.5	0.40	16.1	2.72	MEA333M1E-AA083
	39,000	35 × 80	6.1	0.40	13.6	2.96	MEA393M1E-AA080
	39,000	35 × 83	6.2	0.40	13.6	2.96	MEA393M1E-AA083
	47,000	35 × 100	6.8	0.40	11.3	3.25	MEA473M1E-AA100
	47,000	35 × 105	6.9	0.40	11.3	3.25	MEA473M1E-AA105
	47,000	35 × 121	7.4	0.40	11.3	3.25	MEA473M1E-AA121
	56,000	35 × 100	7.6	0.40	9.5	3.55	MEA563M1E-AA100
	56,000	35 × 121	8.3	0.40	9.5	3.55	MEA563M1E-AA121
	68,000	35 × 121	9.0	0.45	8.8	3.91	MEA683M1E-AA121
	68,000	51 × 80	8.4	0.45	8.8	3.91	MEA683M1E--B080
	68,000	51 × 100	9.3	0.45	8.8	3.91	MEA683M1E--B100
	82,000	35 × 121	7.9	0.50	8.1	4.30	MEA823M1E-AA121
	82,000	51 × 80	9.2	0.50	8.1	4.30	MEA823M1E--B080
	82,000	51 × 121	9.7	0.50	8.1	4.30	MEA823M1E--B121
	100,000	51 × 96	9.5	0.50	6.6	4.74	MEA104M1E--B096
	100,000	51 × 100	9.6	0.50	6.6	4.74	MEA104M1E--B100
	100,000	51 × 105	9.8	0.50	6.6	4.74	MEA104M1E--B105
	100,000	51 × 121	10.5	0.50	6.6	4.74	MEA104M1E--B121
	120,000	51 × 115	11.2	0.60	6.6	5.00	MEA124M1E--B115
	120,000	51 × 121	11.5	0.60	6.6	5.00	MEA124M1E--B121
	150,000	51 × 130	12.8	0.60	5.3	5.00	MEA154M1E--B130
	150,000	63.5 × 100	12.9	0.60	5.3	5.00	MEA154M1E--C100
	150,000	63.5 × 105	13.2	0.60	5.3	5.00	MEA154M1E--C105
	180,000	63.5 × 96	13.3	0.70	5.2	5.00	MEA184M1E--C096
	180,000	63.5 × 100	13.5	0.70	5.2	5.00	MEA184M1E--C100
	180,000	63.5 × 121	14.7	0.70	5.2	5.00	MEA184M1E--C121
	220,000	63.5 × 105	15.7	0.75	4.5	5.00	MEA224M1E--C105

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
25	220,000	63.5 × 115	16.3	0.75	4.5	5.00	MEA224M1E--C115
	220,000	63.5 × 121	16.7	0.75	4.5	5.00	MEA224M1E--C121
	220,000	63.5 × 144	18.0	0.75	4.5	5.00	MEA224M1E--C144
	270,000	63.5 × 130	17.5	0.80	3.9	5.00	MEA274M1E--C130
	270,000	63.5 × 144	18.3	0.80	3.9	5.00	MEA274M1E--C144
	270,000	76.2 × 100	16.8	0.80	3.9	5.00	MEA274M1E--D100
	330,000	63.5 × 155	20.3	0.90	3.6	5.00	MEA334M1E--C155
	330,000	76.2 × 121	18.1	0.90	3.6	5.00	MEA334M1E--D121
	330,000	76.2 × 144	19.5	0.90	3.6	5.00	MEA334M1E--D144
	390,000	76.2 × 115	18.9	1.00	3.4	5.00	MEA394M1E--D115
	390,000	76.2 × 140	20.5	1.00	3.4	5.00	MEA394M1E--D140
	390,000	76.2 × 144	20.8	1.00	3.4	5.00	MEA394M1E--D144
	470,000	76.2 × 155	21.5	1.20	3.4	5.00	MEA474M1E--D155
	470,000	76.2 × 220	25.2	1.20	3.4	5.00	MEA474M1E--D220
	560,000	89 × 130	22.4	1.40	3.3	5.00	MEA564M1E--E130
	560,000	89 × 140	23.0	1.40	3.3	5.00	MEA564M1E--E140
	680,000	89 × 157	25.0	1.60	3.1	5.00	MEA684M1E--E157
35	10,000	35 × 53	3.5	0.30	39.8	1.77	MEA103M1V-AA053
	12,000	35 × 53	3.7	0.30	33.2	1.94	MEA123M1V-AA053
	15,000	35 × 50	3.7	0.30	26.5	2.17	MEA153M1V-AA050
	15,000	35 × 65	3.9	0.30	26.5	2.17	MEA153M1V-AA065
	18,000	35 × 65	4.2	0.35	25.8	2.38	MEA183M1V-AA065
	18,000	35 × 83	4.7	0.35	25.8	2.38	MEA183M1V-AA083
	22,000	35 × 83	4.9	0.35	21.1	2.63	MEA223M1V-AA083
	27,000	35 × 100	5.7	0.40	19.7	2.92	MEA273M1V-AA100
	27,000	35 × 83	5.2	0.40	19.7	2.92	MEA273M1V-AA083
	33,000	35 × 80	5.9	0.40	16.1	3.22	MEA333M1V-AA080
	33,000	35 × 100	6.5	0.40	16.1	3.22	MEA333M1V-AA100
	33,000	35 × 121	7.1	0.40	16.1	3.22	MEA333M1V-AA121
	39,000	35 × 100	6.7	0.40	13.6	3.50	MEA393M1V-AA100
	39,000	35 × 121	7.3	0.40	13.6	3.50	MEA393M1V-AA121
	47,000	35 × 121	8.0	0.45	12.7	3.85	MEA473M1V-AA121
	47,000	51 × 83	8.3	0.45	12.7	3.85	MEA473M1V--B083
	47,000	51 × 96	8.8	0.45	12.7	3.85	MEA473M1V--B096
	56,000	51 × 83	8.7	0.50	11.8	4.20	MEA563M1V--B083
	56,000	51 × 96	9.3	0.50	11.8	4.20	MEA563M1V--B096
	68,000	51 × 80	9.3	0.50	9.8	4.63	MEA683M1V--B080
	68,000	51 × 100	10.2	0.50	9.8	4.63	MEA683M1V--B100
	68,000	51 × 115	10.9	0.50	9.8	4.63	MEA683M1V--B115
	82,000	51 × 100	10.5	0.55	8.9	5.00	MEA823M1V--B100
	82,000	63.5 × 96	10.7	0.55	8.9	5.00	MEA823M1V--C096
	100,000	63.5 × 100	10.9	0.60	8.0	5.00	MEA104M1V--C100
	100,000	63.5 × 115	11.6	0.60	8.0	5.00	MEA104M1V--C115
	120,000	51 × 121	12.4	0.60	6.6	5.00	MEA124M1V--B121
	120,000	63.5 × 121	12.8	0.60	6.6	5.00	MEA124M1V--C121
	150,000	63.5 × 100	13.0	0.70	6.2	5.00	MEA154M1V--C100
	150,000	63.5 × 130	14.6	0.70	6.2	5.00	MEA154M1V--C130
	150,000	63.5 × 144	15.3	0.70	6.2	5.00	MEA154M1V--C144
	180,000	63.5 × 121	14.6	0.70	5.2	5.00	MEA184M1V--C121
	180,000	63.5 × 144	15.8	0.70	5.2	5.00	MEA184M1V--C144
	180,000	76.2 × 115	14.2	0.70	5.2	5.00	MEA184M1V--D115
	220,000	76.2 × 100	14.8	0.75	4.5	5.00	MEA224M1V--D100
	220,000	76.2 × 130	16.5	0.75	4.5	5.00	MEA224M1V--D130
	220,000	76.2 × 144	17.3	0.75	4.5	5.00	MEA224M1V--D144
	270,000	76.2 × 121	17.1	0.80	3.9	5.00	MEA274M1V--D121
	270,000	76.2 × 155	19.2	0.80	3.9	5.00	MEA274M1V--D155
	330,000	76.2 × 140	19.6	0.85	3.4	5.00	MEA334M1V--D140
	330,000	89 × 130	20.9	0.85	3.4	5.00	MEA334M1V--E130
	390,000	89 × 157	23.8	0.90	3.1	5.00	MEA394M1V--E157
	470,000	89 × 140	24.3	0.95	2.7	5.00	MEA474M1V--E140
	470,000	89 × 157	25.5	0.95	2.7	5.00	MEA474M1V--E157



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
50	5,600	35 × 53	2.9	0.25	59.2	1.59	MEA562M1H-AA053
	6,800	35 × 53	3.2	0.25	48.8	1.75	MEA682M1H-AA053
	8,200	35 × 53	3.4	0.25	40.4	1.92	MEA822M1H-AA053
	10,000	35 × 50	3.8	0.25	33.2	2.12	MEA103M1H-AA050
	10,000	35 × 65	4.3	0.25	33.2	2.12	MEA103M1H-AA065
	12,000	35 × 65	4.5	0.25	27.6	2.32	MEA123M1H-AA065
	12,000	35 × 83	4.6	0.25	27.6	2.32	MEA123M1H-AA083
	15,000	35 × 83	4.7	0.25	22.1	2.60	MEA153M1H-AA083
	18,000	35 × 80	4.8	0.25	18.4	2.85	MEA183M1H-AA080
	18,000	35 × 83	4.9	0.25	18.4	2.85	MEA183M1H-AA083
	18,000	35 × 100	5.3	0.25	18.4	2.85	MEA183M1H-AA100
	22,000	35 × 100	5.8	0.30	18.1	3.15	MEA223M1H-AA100
	22,000	35 × 121	6.3	0.30	18.1	3.15	MEA223M1H-AA121
	27,000	35 × 121	6.6	0.35	17.2	3.49	MEA273M1H-AA121
	33,000	51 × 83	7.5	0.40	16.1	3.85	MEA333M1H--B083
	33,000	51 × 96	8.0	0.40	16.1	3.85	MEA333M1H--B096
	39,000	51 × 80	7.6	0.40	13.6	4.19	MEA393M1H--B080
	39,000	51 × 83	7.7	0.40	13.6	4.19	MEA393M1H--B083
	39,000	51 × 96	8.2	0.40	13.6	4.19	MEA393M1H--B096
	47,000	51 × 100	9.6	0.40	11.3	4.60	MEA473M1H--B100
	47,000	51 × 115	10.2	0.40	11.3	4.60	MEA473M1H--B115
	56,000	51 × 100	9.8	0.40	9.5	5.00	MEA563M1H--B100
	56,000	63.5 × 96	10.9	0.40	9.5	5.00	MEA563M1H--C096
	68,000	51 × 121	11.4	0.45	8.8	5.00	MEA683M1H--B121
	68,000	63.5 × 96	11.7	0.45	8.8	5.00	MEA683M1H--C096
	68,000	63.5 × 100	11.9	0.45	8.8	5.00	MEA683M1H--C100
	82,000	63.5 × 100	12.2	0.50	8.1	5.00	MEA823M1H--C100
	82,000	63.5 × 115	13.0	0.50	8.1	5.00	MEA823M1H--C115
	100,000	63.5 × 144	14.2	0.50	6.6	5.00	MEA104M1H--C144
	100,000	76.2 × 115	14.3	0.50	6.6	5.00	MEA104M1H--D115
	120,000	63.5 × 121	13.4	0.50	5.5	5.00	MEA124M1H--C121
	120,000	63.5 × 144	14.5	0.50	5.5	5.00	MEA124M1H--C144
	120,000	76.2 × 115	14.6	0.50	5.5	5.00	MEA124M1H--D115
	150,000	76.2 × 121	15.3	0.60	5.3	5.00	MEA154M1H--D121
	150,000	76.2 × 130	15.8	0.60	5.3	5.00	MEA154M1H--D130
	150,000	76.2 × 144	16.5	0.60	5.3	5.00	MEA154M1H--D144
	180,000	76.2 × 140	16.6	0.70	5.2	5.00	MEA184M1H--D140
	180,000	76.2 × 144	16.8	0.70	5.2	5.00	MEA184M1H--D144
	180,000	76.2 × 155	17.4	0.70	5.2	5.00	MEA184M1H--D155
	220,000	89 × 130	18.2	0.80	4.8	5.00	MEA224M1H--E130
	270,000	89 × 140	18.7	1.00	4.9	5.00	MEA274M1H--E140
	270,000	89 × 157	19.7	1.00	4.9	5.00	MEA274M1H--E157
63	3,900	35 × 53	2.5	0.20	68.0	1.49	MEA392M1J-AA053
	4,700	35 × 53	2.7	0.20	56.4	1.63	MEA472M1J-AA053
	4,700	35 × 55	2.8	0.20	56.4	1.63	MEA472M1J-AA055
	5,600	35 × 50	2.9	0.20	47.4	1.78	MEA562M1J-AA050
	5,600	35 × 53	3.0	0.20	47.4	1.78	MEA562M1J-AA053
	6,800	35 × 53	3.7	0.20	39.0	1.96	MEA682M1J-AA053
	6,800	35 × 55	3.8	0.20	39.0	1.96	MEA682M1J-AA055
	6,800	35 × 65	4.1	0.20	39.0	1.96	MEA682M1J-AA065
	8,200	35 × 65	4.4	0.25	40.4	2.16	MEA822M1J-AA065
	8,200	35 × 83	4.6	0.25	40.4	2.16	MEA822M1J-AA083
	10,000	35 × 80	4.6	0.25	33.2	2.38	MEA103M1J-AA080
	10,000	35 × 83	4.7	0.25	33.2	2.38	MEA103M1J-AA083
	12,000	35 × 83	4.8	0.25	27.6	2.61	MEA123M1J-AA083
	12,000	35 × 100	5.1	0.25	27.6	2.61	MEA123M1J-AA100
	15,000	35 × 100	5.6	0.25	22.1	2.92	MEA153M1J-AA100
	15,000	35 × 105	5.7	0.25	22.1	2.92	MEA153M1J-AA105
	18,000	35 × 100	6.2	0.25	18.4	3.19	MEA183M1J-AA100
	18,000	35 × 121	6.8	0.25	18.4	3.19	MEA183M1J-AA121
	22,000	35 × 121	7.4	0.30	18.1	3.53	MEA223M1J-AA121
	22,000	51 × 80	7.6	0.30	18.1	3.53	MEA223M1J--B080
	22,000	51 × 83	7.7	0.30	18.1	3.53	MEA223M1J--B083
	27,000	51 × 83	8.2	0.30	14.7	3.91	MEA273M1J--B083
	27,000	51 × 96	8.5	0.30	14.7	3.91	MEA273M1J--B096
	33,000	51 × 96	8.6	0.35	14.1	4.33	MEA333M1J--B096

Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
63	33,000	51 × 100	8.7	0.35	14.1	4.33	MEA333M1J--B100
	33,000	51 × 105	8.9	0.35	14.1	4.33	MEA333M1J--B105
	39,000	51 × 100	9.6	0.35	11.9	4.70	MEA393M1J--B100
	39,000	51 × 115	10.2	0.35	11.9	4.70	MEA393M1J--B115
	39,000	51 × 121	10.5	0.35	11.9	4.70	MEA393M1J--B121
	47,000	51 × 130	11.4	0.40	11.3	5.00	MEA473M1J--B130
	47,000	63.5 × 100	11.5	0.40	11.3	5.00	MEA473M1J--C100
	47,000	63.5 × 105	11.8	0.40	11.3	5.00	MEA473M1J--C105
	56,000	63.5 × 100	11.8	0.40	9.5	5.00	MEA563M1J--C100
	56,000	63.5 × 115	12.5	0.40	9.5	5.00	MEA563M1J--C115
	68,000	63.5 × 121	12.7	0.40	7.8	5.00	MEA683M1J--C121
	68,000	63.5 × 144	13.7	0.40	7.8	5.00	MEA683M1J--C144
	68,000	76.2 × 105	13.3	0.40	7.8	5.00	MEA683M1J--D105
	82,000	63.5 × 130	13.6	0.45	7.3	5.00	MEA823M1J--C130
	82,000	63.5 × 144	14.2	0.45	7.3	5.00	MEA823M1J--C144
	100,000	76.2 × 115	13.8	0.45	6.0	5.00	MEA104M1J--D115
	100,000	76.2 × 121	14.1	0.45	6.0	5.00	MEA104M1J--D121
	100,000	76.2 × 144	15.2	0.45	6.0	5.00	MEA104M1J--D144
	120,000	76.2 × 130	15.1	0.50	5.5	5.00	MEA124M1J--D130
	120,000	76.2 × 140	15.6	0.50	5.5	5.00	MEA124M1J--D140
	120,000	76.2 × 144	15.8	0.50	5.5	5.00	MEA124M1J--D144
	150,000	76.2 × 155	17.4	0.55	4.9	5.00	MEA154M1J--D155
	150,000	76.2 × 220	20.4	0.55	4.9	5.00	MEA154M1J--D220
	150,000	89 × 140	18.2	0.55	4.9	5.00	MEA154M1J--E140
	180,000	89 × 130	18.6	0.60	4.4	5.00	MEA184M1J--E130
	220,000	89 × 157	21.4	0.65	3.9	5.00	MEA224M1J--E157
80	3,300	35 × 50	2.4	0.15	60.3	1.54	MEA332M1K-AA050
	3,300	35 × 53	2.5	0.15	60.3	1.54	MEA332M1K-AA053
	3,900	35 × 53	2.7	0.15	51.0	1.68	MEA392M1K-AA053
	4,700	35 × 65	2.9	0.15	42.3	1.84	MEA472M1K-AA065
	5,600	35 × 65	3.7	0.20	47.4	2.01	MEA562M1K-AA065
	5,600	35 × 83	4.1	0.20	47.4	2.01	MEA562M1K-AA083
	6,800	35 × 80	4.2	0.20	39.0	2.21	MEA682M1K-AA080
	6,800	35 × 83	4.3	0.20	39.0	2.21	MEA682M1K-AA083
	8,200	35 × 83	4.5	0.20	32.3	2.43	MEA822M1K-AA083
	10,000	35 × 100	5.4	0.20	26.5	2.68	MEA103M1K-AA100
	12,000	35 × 100	5.6	0.20	22.1	2.94	MEA123M1K-AA100
	12,000	35 × 121	6.1	0.20	22.1	2.94	MEA123M1K-AA121
	15,000	35 × 121	7.1	0.25	22.1	3.29	MEA153M1K-AA121
	15,000	51 × 80	7.2	0.25	22.1	3.29	MEA153M1K--B080
	15,000	51 × 83	7.3	0.25	22.1	3.29	MEA153M1K--B083
	18,000	35 × 121	7.4	0.25	18.4	3.60	MEA183M1K-AA121
	18,000	51 × 83	7.7	0.25	18.4	3.60	MEA183M1K--B083
	22,000	51 × 96	8.2	0.30	18.1	3.98	MEA223M1K--B096
	22,000	51 × 100	8.5	0.30	18.1	3.98	MEA223M1K--B100
	27,000	51 × 96	8.4	0.30	14.7	4.41	MEA273M1K--B096
	27,000	51 × 121	8.6	0.30	14.7	4.41	MEA273M1K--B121
	27,000	63.5 × 100	8.6	0.30	14.7	4.41	MEA273M1K--C100
	33,000	51 × 115	9.8	0.35	14.1	4.87	MEA333M1K--B115
	33,000	63.5 × 100	10.5	0.35	14.1	4.87	MEA333M1K--C100
	39,000	51 × 130	10.8	0.35	11.9	5.00	MEA393M1K--B130
	39,000	63.5 × 121	11.8	0.35	11.9	5.00	MEA393M1K--C121
	47,000	63.5 × 115	12.7	0.35	9.9	5.00	MEA473M1K--C115
	47,000	63.5 × 121	13.0	0.35	9.9	5.00	MEA473M1K--C121
	47,000	63.5 × 144	14.0	0.35	9.9	5.00	MEA473M1K--C144
	56,000	63.5 × 130	13.6	0.35	8.3	5.00	MEA563M1K--C130
	56,000	63.5 × 144	14.2	0.35	8.3	5.00	MEA563M1K--C144
	68,000	76.2 × 115	15.2	0.35	6.8	5.00	MEA683M1K--D115
	68,000	76.2 × 121	15.5	0.35	6.8	5.00	MEA683M1K--D121
	68,000	76.2 × 144	16.7	0.35	6.8	5.00	MEA683M1K--D144
	82,000	76.2 × 130	16.4	0.35	5.7	5.00	MEA823M1K--D130
	82,000	76.2 × 140	16.9	0.35	5.7	5.00	MEA823M1K--D140
	82,000	76.2 × 144	17.1	0.35	5.7	5.00	MEA823M1K--D144
	100,000	76.2 × 155	18.3	0.40	5.3	5.00	MEA104M1K--D155
	100,000	89 × 140	19.1	0.40	5.3	5.00	MEA104M1K--E140
	120,000	89 × 130	20.3	0.40	4.4	5.00	MEA124M1K--E130
	150,000	89 × 157	24.6	0.40	3.5	5.00	MEA154M1K--E157



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
100	1,800	35 × 53	2.3	0.15	111	1.27	MEA182M2A-AA053
	2,200	35 × 50	2.4	0.15	90.4	1.41	MEA222M2A-AA050
	2,200	35 × 53	2.5	0.15	90.4	1.41	MEA222M2A-AA053
	2,700	35 × 53	2.7	0.15	73.7	1.56	MEA272M2A-AA053
	3,300	35 × 65	2.9	0.15	60.3	1.72	MEA332M2A-AA065
	3,300	35 × 80	3.2	0.15	60.3	1.72	MEA332M2A-AA080
	3,900	35 × 83	3.5	0.15	51.0	1.87	MEA392M2A-AA083
	4,700	35 × 80	3.6	0.15	42.3	2.06	MEA472M2A-AA080
	4,700	35 × 83	3.7	0.15	42.3	2.06	MEA472M2A-AA083
	5,600	35 × 100	4.6	0.15	35.5	2.24	MEA562M2A-AA100
	6,800	35 × 100	4.9	0.20	39.0	2.47	MEA682M2A-AA100
	6,800	35 × 105	5.0	0.20	39.0	2.47	MEA682M2A-AA105
	8,200	35 × 121	5.6	0.20	32.3	2.72	MEA822M2A-AA121
	8,200	51 × 83	5.8	0.20	32.3	2.72	MEA822M2A--B083
	10,000	35 × 121	6.0	0.20	26.5	3.00	MEA103M2A-AA121
	10,000	51 × 80	6.1	0.20	26.5	3.00	MEA103M2A--B080
	10,000	51 × 83	6.2	0.20	26.5	3.00	MEA103M2A--B083
	12,000	51 × 75	6.6	0.20	22.1	3.29	MEA123M2A--B075
	12,000	51 × 100	7.5	0.20	22.1	3.29	MEA123M2A--B100
	15,000	51 × 96	7.7	0.20	17.7	3.67	MEA153M2A--B096
	15,000	51 × 105	8.0	0.20	17.7	3.67	MEA153M2A--B105
	15,000	51 × 121	8.5	0.20	17.7	3.67	MEA153M2A--B121
	18,000	51 × 115	8.2	0.20	14.7	4.02	MEA183M2A--B115
	18,000	51 × 121	8.6	0.20	14.7	4.02	MEA183M2A--B121
	18,000	63.5 × 100	8.8	0.20	14.7	4.02	MEA183M2A--C100
	22,000	51 × 130	9.5	0.25	15.1	4.45	MEA223M2A--B130
	22,000	63.5 × 100	9.6	0.25	15.1	4.45	MEA223M2A--C100
	22,000	63.5 × 105	9.8	0.25	15.1	4.45	MEA223M2A--C105
	27,000	63.5 × 115	10.1	0.25	12.3	4.93	MEA273M2A--C115
	27,000	63.5 × 121	10.3	0.25	12.3	4.93	MEA273M2A--C121
	33,000	63.5 × 130	11.6	0.25	10.0	5.00	MEA333M2A--C130
	33,000	63.5 × 144	12.1	0.25	10.0	5.00	MEA333M2A--C144
	33,000	76.2 × 100	11.5	0.25	10.0	5.00	MEA333M2A--D100
	33,000	76.2 × 105	11.7	0.25	10.0	5.00	MEA333M2A--D105
	39,000	76.2 × 115	13.8	0.25	8.5	5.00	MEA393M2A--D115
	39,000	76.2 × 121	14.1	0.25	8.5	5.00	MEA393M2A--D121
	39,000	76.2 × 144	12.4	0.25	8.5	5.00	MEA393M2A--D144
	47,000	76.2 × 130	13.3	0.25	7.1	5.00	MEA473M2A--D130
	47,000	76.2 × 140	13.7	0.25	7.1	5.00	MEA473M2A--D140
	47,000	76.2 × 144	13.9	0.25	7.1	5.00	MEA473M2A--D144
	56,000	76.2 × 144	15.3	0.30	7.1	5.00	MEA563M2A--D144
	56,000	76.2 × 155	15.8	0.30	7.1	5.00	MEA563M2A--D155
	68,000	89 × 130	16.4	0.35	6.8	5.00	MEA683M2A--E130
	68,000	89 × 140	16.9	0.35	6.8	5.00	MEA683M2A--E140
	82,000	89 × 157	19.5	0.35	5.7	5.00	MEA823M2A--E157
	100,000	89 × 170	22.3	0.35	4.6	5.00	MEA104M2A--E170
160	3,300	35 × 121	5.2	0.15	60.3	2.18	MEA332M2C-AA121
	3,900	51 × 75	5.3	0.15	51.0	2.37	MEA392M2C--B075
	4,700	51 × 75	5.8	0.15	42.3	2.60	MEA472M2C--B075
	5,600	51 × 96	7.0	0.15	35.5	2.84	MEA562M2C--B096
	6,800	51 × 96	7.7	0.15	29.3	3.13	MEA682M2C--B096
	8,200	51 × 115	9.1	0.15	24.3	3.44	MEA822M2C--B115
	10,000	63.5 × 96	10.3	0.15	19.9	3.79	MEA103M2C--C096
	12,000	63.5 × 96	11.3	0.15	16.6	4.16	MEA123M2C--C096
	15,000	63.5 × 130	14.3	0.15	13.3	4.65	MEA153M2C--C130
	18,000	63.5 × 130	15.6	0.15	11.1	5.00	MEA183M2C--C130
	22,000	76.2 × 130	18.2	0.15	9.0	5.00	MEA223M2C--D130
	27,000	76.2 × 130	20.2	0.15	7.4	5.00	MEA273M2C--D130
	33,000	89 × 130	23.7	0.15	6.0	5.00	MEA333M2C--E130
	39,000	89 × 157	27.8	0.15	5.1	5.00	MEA393M2C--E157
200	2,200	35 × 100	3.9	0.15	90.4	1.99	MEA222M2D-AA100
	2,700	35 × 121	4.7	0.15	73.7	2.20	MEA272M2D-AA121
	3,300	51 × 75	4.9	0.15	60.3	2.44	MEA332M2D--B075
	3,900	51 × 75	5.3	0.15	51.0	2.65	MEA392M2D--B075
	4,700	51 × 96	6.4	0.15	42.3	2.91	MEA472M2D--B096
	5,600	51 × 115	7.5	0.15	35.5	3.17	MEA562M2D--B115



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
200	6,800	51 × 130	8.7	0.15	29.3	3.50	MEA682M2D--B130
	8,200	63.5 × 96	9.4	0.15	24.3	3.84	MEA822M2D--C096
	10,000	63.5 × 96	10.3	0.15	19.9	4.24	MEA103M2D--C096
	12,000	76.2 × 96	12.0	0.15	16.6	4.65	MEA123M2D--D096
	15,000	76.2 × 96	14.4	0.15	13.3	5.00	MEA153M2D--D096
	18,000	76.2 × 130	16.5	0.15	11.1	5.00	MEA183M2D--D130
	22,000	76.2 × 155	19.6	0.15	9.0	5.00	MEA223M2D--D155
	27,000	89 × 130	21.5	0.15	7.4	5.00	MEA273M2D--E130
	33,000	89 × 157	25.5	0.15	6.0	5.00	MEA333M2D--E157
250	1,500	35 × 100	3.2	0.15	132.6	1.84	MEA152M2E-AA100
	1,800	35 × 100	3.5	0.15	110.5	2.01	MEA182M2E-AA100
	2,200	51 × 75	4.0	0.15	90.4	2.22	MEA222M2E--B075
	2,700	51 × 75	4.4	0.15	73.7	2.46	MEA272M2E--B075
	3,300	51 × 96	5.4	0.15	60.3	2.72	MEA332M2E--B096
	3,900	51 × 115	6.3	0.15	51.0	2.96	MEA392M2E--B115
	4,700	63.5 × 96	7.1	0.15	42.3	3.25	MEA472M2E--C096
	5,600	63.5 × 96	7.7	0.15	35.5	3.55	MEA562M2E--C096
	6,800	63.5 × 115	9.1	0.15	29.3	3.91	MEA682M2E--C115
	8,200	63.5 × 115	10.0	0.15	24.3	4.30	MEA822M2E--C115
	10,000	63.5 × 130	11.6	0.15	19.9	4.74	MEA103M2E--C130
	12,000	76.2 × 115	12.8	0.15	16.6	5.00	MEA123M2E--D115
	15,000	76.2 × 130	15.1	0.15	13.3	5.00	MEA153M2E--D130
	18,000	76.2 × 155	17.7	0.15	11.1	5.00	MEA183M2E--D155
	22,000	89 × 157	20.9	0.15	9.0	5.00	MEA223M2E--E157
350	390	35 × 50	1.5	0.15	510	1.11	MEA391M2V-AA050
	390	35 × 53	1.6	0.15	510	1.11	MEA391M2V-AA053
	470	35 × 60	2.0	0.15	423	1.22	MEA471M2V-AA060
	470	35 × 65	2.1	0.15	423	1.22	MEA471M2V-AA065
	470	35 × 83	2.3	0.15	423	1.22	MEA471M2V-AA083
	560	35 × 70	2.2	0.15	355	1.33	MEA561M2V-AA070
	560	35 × 83	2.3	0.15	355	1.33	MEA561M2V-AA083
	680	35 × 80	2.5	0.15	293	1.46	MEA681M2V-AA080
	680	35 × 83	2.6	0.15	293	1.46	MEA681M2V-AA083
	820	35 × 90	2.9	0.15	243	1.61	MEA821M2V-AA090
	820	35 × 100	3.0	0.15	243	1.61	MEA821M2V-AA100
	1,000	35 × 100	3.4	0.15	199	1.77	MEA102M2V-AA100
	1,200	35 × 121	4.1	0.15	166	1.94	MEA122M2V-AA121
	1,200	51 × 75	3.8	0.15	166	1.94	MEA122M2V--B075
	1,500	51 × 75	4.2	0.15	133	2.17	MEA152M2V--B075
	1,800	51 × 85	4.8	0.15	111	2.38	MEA182M2V--B085
	1,800	51 × 96	5.1	0.15	111	2.38	MEA182M2V--B096
	2,200	51 × 96	5.7	0.15	90.4	2.63	MEA222M2V--B096
	2,700	51 × 115	6.8	0.15	73.7	2.92	MEA272M2V--B115
	2,700	51 × 130	7.1	0.15	73.7	2.92	MEA272M2V--B130
	3,300	51 × 130	8.1	0.15	60.3	3.22	MEA332M2V--B130
	3,300	63.5 × 96	7.3	0.15	60.3	3.22	MEA332M2V--C096
	3,300	63.5 × 115	7.9	0.15	60.3	3.22	MEA332M2V--C115
	3,900	63.5 × 115	8.9	0.15	51.0	3.50	MEA392M2V--C115
	4,700	63.5 × 130	10.3	0.15	42.3	3.85	MEA472M2V--C130
	4,700	76.2 × 96	10.1	0.15	42.3	3.85	MEA472M2V--D096
	5,600	76.2 × 115	11.3	0.15	35.5	4.20	MEA562M2V--D115
	6,800	76.2 × 130	13.1	0.15	29.3	4.63	MEA682M2V--D130
	8,200	76.2 × 155	15.4	0.15	24.3	5.00	MEA822M2V--D155
	10,000	76.2 × 170	17.3	0.15	19.9	5.00	MEA103M2V--D170
	10,000	89 × 130	16.7	0.15	19.9	5.00	MEA103M2V--E130
	10,000	89 × 157	18.1	0.15	19.9	5.00	MEA103M2V--E157
	12,000	89 × 155	19.9	0.15	16.6	5.00	MEA123M2V--E155
	12,000	89 × 157	20.0	0.15	16.6	5.00	MEA123M2V--E157
	15,000	89 × 196	24.4	0.15	13.3	5.00	MEA153M2V--E196
	18,000	89 × 236	28.8	0.15	11.1	5.00	MEA183M2V--E236
400	330	35 × 50	1.5	0.15	603	1.09	MEA331M2G-AA050
	330	35 × 53	1.5	0.15	603	1.09	MEA331M2G-AA053
	390	35 × 60	1.9	0.15	510	1.18	MEA391M2G-AA060
	390	35 × 65	2.0	0.15	510	1.18	MEA391M2G-AA065



Dimension and Permissible Ripple Current

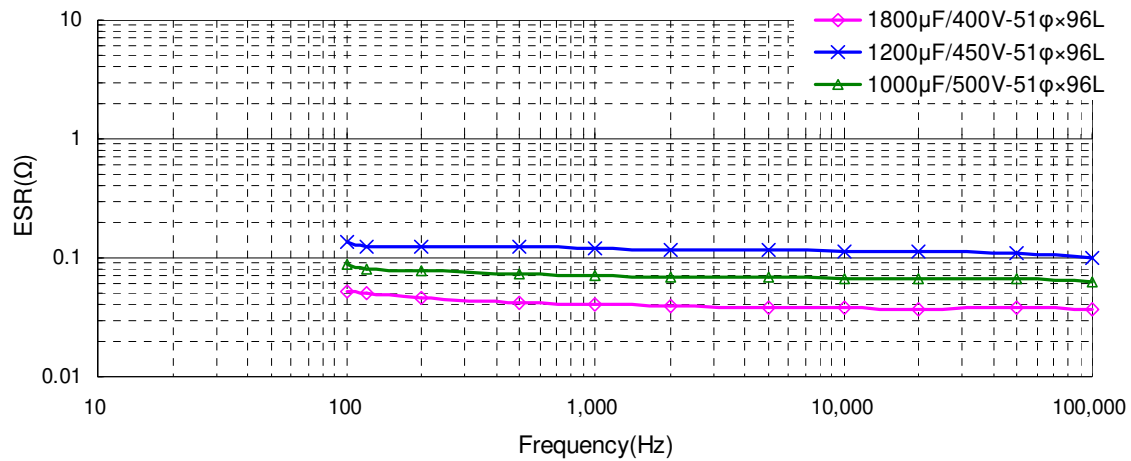
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
400	390	35 × 83	2.1	0.15	510	1.18	MEA391M2G-AA083
	470	35 × 70	2.0	0.15	423	1.30	MEA471M2G-AA070
	470	35 × 83	2.1	0.15	423	1.30	MEA471M2G-AA083
	560	35 × 80	2.2	0.15	355	1.42	MEA561M2G-AA080
	560	35 × 83	2.3	0.15	355	1.42	MEA561M2G-AA083
	680	35 × 90	2.7	0.15	293	1.56	MEA681M2G-AA090
	680	35 × 100	2.8	0.15	293	1.56	MEA681M2G-AA100
	820	35 × 100	3.1	0.15	243	1.72	MEA821M2G-AA100
	1,000	35 × 121	3.5	0.15	199	1.90	MEA102M2G-AA121
	1,000	51 × 75	3.5	0.15	199	1.90	MEA102M2G--B075
	1,200	51 × 75	3.8	0.15	166	2.08	MEA122M2G--B075
	1,500	51 × 85	4.4	0.15	133	2.32	MEA152M2G--B085
	1,500	51 × 96	4.7	0.15	133	2.32	MEA152M2G--B096
	1,800	51 × 96	5.1	0.15	111	2.55	MEA182M2G--B096
	2,200	51 × 121	6.2	0.15	90.4	2.81	MEA222M2G--B121
	2,200	51 × 130	6.4	0.15	90.4	2.81	MEA222M2G--B130
	2,200	63.5 × 96	6.3	0.15	90.4	2.81	MEA222M2G--C096
	2,700	63.5 × 96	6.9	0.15	73.7	3.12	MEA272M2G--C096
	3,300	63.5 × 115	8.2	0.15	60.3	3.45	MEA332M2G--C115
	3,900	63.5 × 130	9.4	0.15	51.0	3.75	MEA392M2G--C130
	3,900	76.2 × 96	9.1	0.15	51.0	3.75	MEA392M2G--D096
	4,700	76.2 × 115	10.4	0.15	42.3	4.11	MEA472M2G--D115
	5,600	76.2 × 130	11.9	0.15	35.5	4.49	MEA562M2G--D130
	6,800	76.2 × 155	14.0	0.15	29.3	4.95	MEA682M2G--D155
	6,800	89 × 157	14.9	0.15	29.3	4.95	MEA682M2G--E157
	8,200	76.2 × 170	15.6	0.15	24.3	5.00	MEA822M2G--D170
	8,200	89 × 130	15.1	0.15	24.3	5.00	MEA822M2G--E130
	8,200	89 × 157	16.4	0.15	24.3	5.00	MEA822M2G--E157
	10,000	89 × 155	18.1	0.15	19.9	5.00	MEA103M2G--E155
	10,000	89 × 157	18.2	0.15	19.9	5.00	MEA103M2G--E157
	12,000	89 × 196	21.8	0.15	16.6	5.00	MEA123M2G--E196
	15,000	89 × 220	25.4	0.15	13.3	5.00	MEA153M2G--E220
	15,000	89 × 236	26.3	0.15	13.3	5.00	MEA153M2G--E236
450	270	35 × 50	1.2	0.15	736	1.05	MEA271M2W-AA050
	270	35 × 53	1.3	0.15	736	1.05	MEA271M2W-AA053
	330	35 × 60	1.7	0.15	602	1.16	MEA331M2W-AA060
	330	35 × 65	1.8	0.15	602	1.16	MEA331M2W-AA065
	390	35 × 70	1.9	0.15	510	1.26	MEA391M2W-AA070
	390	35 × 83	2.0	0.15	510	1.26	MEA391M2W-AA083
	470	35 × 80	2.1	0.15	423	1.38	MEA471M2W-AA080
	470	35 × 83	2.1	0.15	423	1.38	MEA471M2W-AA083
	560	35 × 90	2.4	0.15	355	1.51	MEA561M2W-AA090
	560	35 × 100	2.5	0.15	355	1.51	MEA561M2W-AA100
	680	35 × 100	2.8	0.15	293	1.66	MEA681M2W-AA100
	820	35 × 121	3.2	0.15	243	1.82	MEA821M2W-AA121
	820	51 × 75	3.2	0.15	243	1.82	MEA821M2W--B075
	1,000	51 × 75	3.5	0.15	199	2.01	MEA102M2W--B075
	1,200	51 × 96	4.2	0.15	166	2.20	MEA122M2W--B096
	1,500	51 × 115	5.0	0.15	133	2.46	MEA152M2W--B115
	1,800	51 × 130	5.8	0.15	111	2.70	MEA182M2W--B130
	2,200	63.5 × 96	6.3	0.15	90.4	2.98	MEA222M2W--C096
	2,700	63.5 × 115	7.5	0.15	73.7	3.31	MEA272M2W--C115
	3,300	63.5 × 130	8.6	0.15	60.3	3.66	MEA332M2W--C130
	3,300	76.2 × 96	8.4	0.15	60.3	3.66	MEA332M2W--D096
	3,900	76.2 × 115	9.5	0.15	51.0	3.97	MEA392M2W--D115
	4,700	76.2 × 130	10.8	0.15	42.3	4.36	MEA472M2W--D130
	5,600	76.2 × 155	12.8	0.15	35.5	4.76	MEA562M2W--D155
	6,800	76.2 × 170	14.3	0.15	29.3	5.00	MEA682M2W--D170
	6,800	89 × 130	13.8	0.15	29.3	5.00	MEA682M2W--E130
	6,800	89 × 157	15.0	0.15	29.3	5.00	MEA682M2W--E157
	8,200	89 × 155	16.3	0.15	24.3	5.00	MEA822M2W--E155
	8,200	89 × 157	16.4	0.15	24.3	5.00	MEA822M2W--E157
	10,000	89 × 196	19.9	0.15	19.9	5.00	MEA103M2W--E196
	12,000	89 × 220	22.8	0.15	16.6	5.00	MEA123M2W--E220
	12,000	89 × 236	23.6	0.15	16.6	5.00	MEA123M2W--E236

Part Numbering System

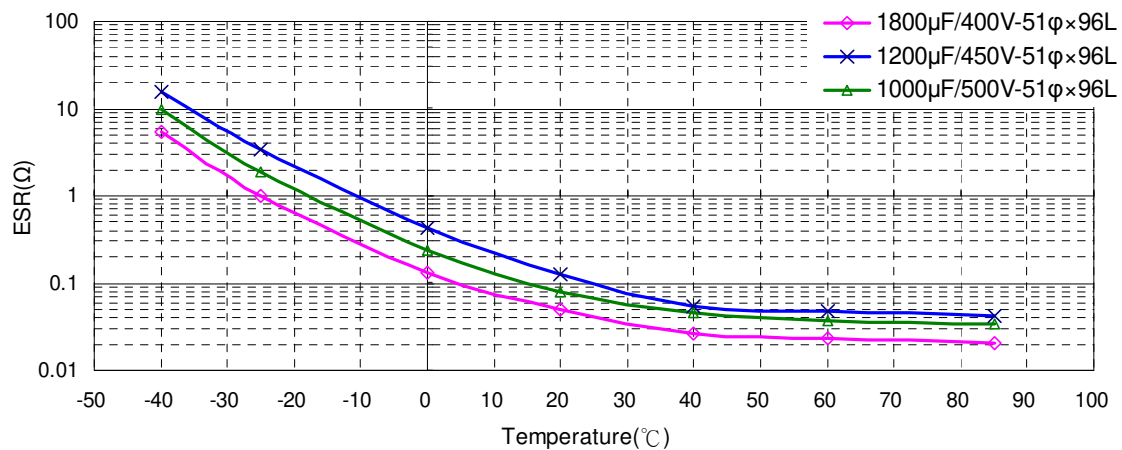
MEA Series	3300 μ F	$\pm 20\%$	400V	Plain case + Mounting clamp	M5 Post	63.5 ϕ × 115L	Pb-free Terminal + PVC Sleeve
MEA	332	M	2G	-	-	C115	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Case Type	Terminal type	Case size	Terminal and Sleeve Type
Example:			Example:			Example:	
Cap.	Symbol		Voltage	Symbol		ϕ D × L	Code
470	471	M = $\pm 20\%$	350	2V		35 × 83	A083
1,800	182	K = $\pm 10\%$	400	2G		51 × 96	B096
10,000	103		450	2W		89 × 157	E157

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

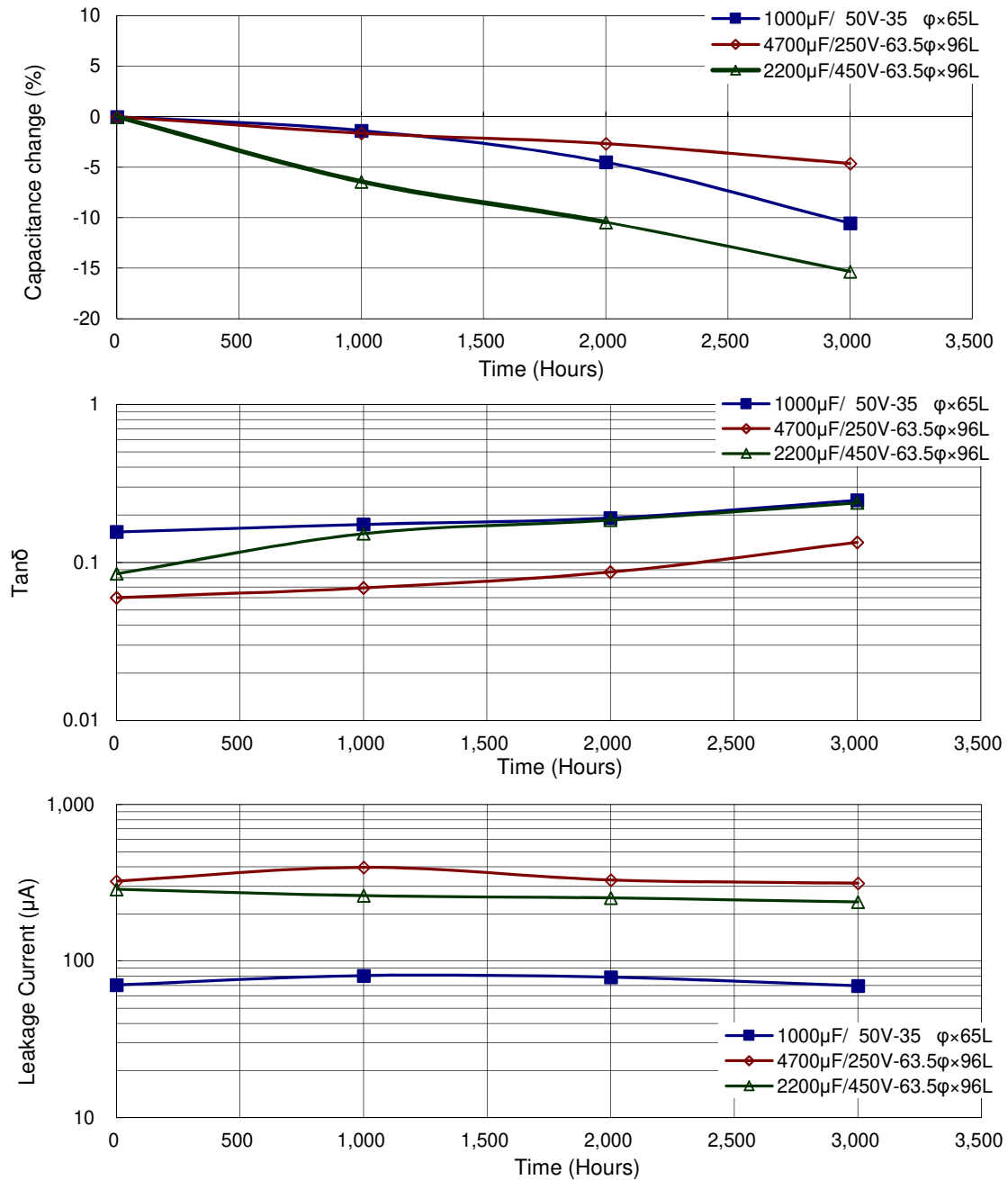
ESR-Frequency Characteristics



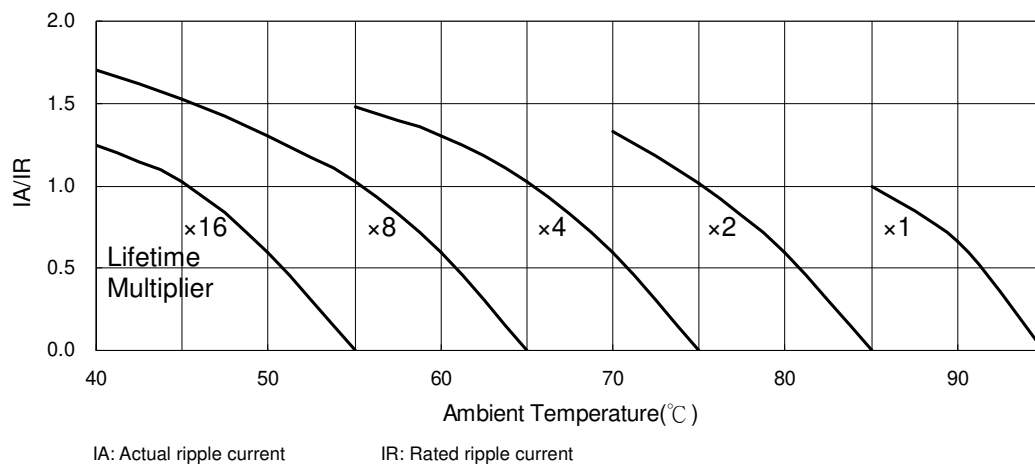
ESR-Temperature Characteristics



Typical Endurance Curves



Useful Life Chart



MEK Series

Features

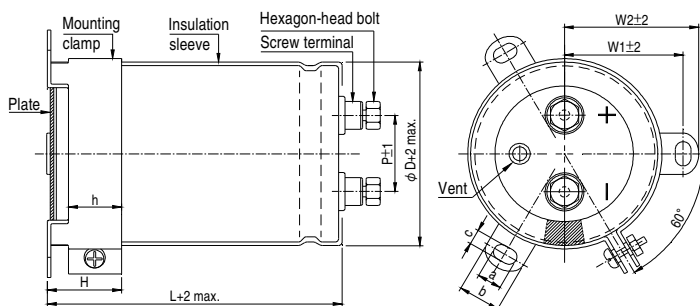
- Endurance with ripple current: 85°C, 5,000 hours
- RoHS compliance



Specifications

Items	Performance																								
Category Temperature Range	-25℃ ~ +85℃																								
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																								
Leakage Current (at 20℃)	I = 3√CV or 5 (mA) whichever is smaller (after 5 minutes) Where, C= rated capacitance in μF, V = rated DC Rated Voltage in V.																								
Tanδ (at 120 Hz, 20℃)	See the Dimensions & Permissible Ripple Current																								
Low Temperature Characteristics (at 120 Hz)	Capacitance change : C(-25℃) / C(+20℃) ≥ 0.7																								
Endurance	<table><tr><td>Test Time</td><td colspan="4">5,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±15% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 175% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	5,000 Hrs				Capacitance Change	Within ±15% of initial value				Tanδ	Less than 175% of specified value				Leakage Current	Within specified value			
	Test Time	5,000 Hrs																							
	Capacitance Change	Within ±15% of initial value																							
	Tanδ	Less than 175% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with rated ripple current applied for 5,000 hours at 85℃.																									
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="4">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="4">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="4">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="4">Within specified value</td></tr></table>					Test Time	1,000 Hrs				Capacitance Change	Within ±20% of initial value				Tanδ	Less than 200% of specified value				Leakage Current	Within specified value			
	Test Time	1,000 Hrs																							
	Capacitance Change	Within ±20% of initial value																							
	Tanδ	Less than 200% of specified value																							
	Leakage Current	Within specified value																							
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																									
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>					Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.7	1.0	1.1	1.3	1.4								
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																				
Multiplier	0.7	1.0	1.1	1.3	1.4																				
Ripple Current and Temperature Multipliers	<table><tr><td>Temperature (℃)</td><td>40</td><td>60</td><td>85</td></tr><tr><td>Multiplier</td><td>1.89</td><td>1.67</td><td>1.0</td></tr></table>					Temperature (℃)	40	60	85	Multiplier	1.89	1.67	1.0												
Temperature (℃)	40	60	85																						
Multiplier	1.89	1.67	1.0																						
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																								

Diagram of Dimensions



Unit: mm

φD	P	W1	W2	H	h	a	b	c
51	22.0	31.8	36.5	30	24	7	14.0	4.5
63.5	28.6	38.1	42.6	30	24	7	14.0	4.5
76.2	32.0	44.5	49.2	30	24	7	14.0	5.0
89	32.0	50.8	55.6	30	24	7	14.0	5.0

Screw Specifications:

Plug hexagon-head screw: M5×0.8×10

Max. screw tightening torque: 3.23Nm



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
350	1,000	51 × 60	4.5	0.15	199	1.77	MEK102M2V--B060
	1,200	51 × 70	5.3	0.15	166	1.94	MEK122M2V--B070
	1,200	51 × 75	5.5	0.15	166	1.94	MEK122M2V--B075
	1,200	51 × 83	5.7	0.15	166	1.94	MEK122M2V--B083
	1,500	51 × 75	6.1	0.15	133	2.17	MEK152M2V--B075
	1,500	51 × 83	6.3	0.15	133	2.17	MEK152M2V--B083
	1,800	51 × 96	7.4	0.15	111	2.38	MEK182M2V--B096
	2,200	51 × 96	8.2	0.15	90.4	2.63	MEK222M2V--B096
	2,700	51 × 115	9.8	0.15	73.7	2.92	MEK272M2V--B115
	2,700	51 × 130	10.2	0.15	73.7	2.92	MEK272M2V--B130
	2,700	63.5 × 85	9.3	0.15	73.7	2.92	MEK272M2V--C085
	3,300	51 × 130	11.3	0.15	60.3	3.22	MEK332M2V--B130
	3,300	63.5 × 96	10.8	0.15	60.3	3.22	MEK332M2V--C096
	3,900	63.5 × 115	12.8	0.15	51.0	3.50	MEK392M2V--C115
	3,900	76.2 × 85	12.0	0.15	51.0	3.50	MEK392M2V--D085
	4,700	63.5 × 115	14.0	0.15	42.3	3.85	MEK472M2V--C115
	4,700	63.5 × 130	14.8	0.15	42.3	3.85	MEK472M2V--C130
	4,700	76.2 × 90	13.5	0.15	42.3	3.85	MEK472M2V--D090
	5,600	63.5 × 155	17.3	0.15	35.5	4.20	MEK562M2V--C155
	5,600	76.2 × 100	15.4	0.15	35.5	4.20	MEK562M2V--D100
	5,600	76.2 × 115	16.3	0.15	35.5	4.20	MEK562M2V--D115
	6,800	76.2 × 130	18.8	0.15	29.3	4.63	MEK682M2V--D130
	8,200	63.5 × 190	22.1	0.15	24.3	5.00	MEK822M2V--C190
	8,200	76.2 × 155	22.1	0.15	24.3	5.00	MEK822M2V--D155
	8,200	89 × 121	20.2	0.15	24.3	5.00	MEK822M2V--E121
	10,000	76.2 × 170	25.7	0.15	19.9	5.00	MEK103M2V--D170
	10,000	89 × 140	24.7	0.15	19.9	5.00	MEK103M2V--E140
	10,000	89 × 157	25.9	0.15	19.9	5.00	MEK103M2V--E157
	12,000	89 × 150	27.6	0.15	16.6	5.00	MEK123M2V--E150
	12,000	89 × 155	28.0	0.15	16.6	5.00	MEK123M2V--E155
	12,000	89 × 157	28.4	0.15	16.6	5.00	MEK123M2V--E157
	15,000	89 × 190	34.2	0.15	13.3	5.00	MEK153M2V--E190
	15,000	89 × 196	34.6	0.15	13.3	5.00	MEK153M2V--E196
	18,000	89 × 236	41.4	0.15	11.1	5.00	MEK183M2V--E236
400	1,000	51 × 65	4.7	0.15	199	1.90	MEK102M2G--B065
	1,000	51 × 75	5.0	0.15	199	1.90	MEK102M2G--B075
	1,000	51 × 83	5.2	0.15	199	1.90	MEK102M2G--B083
	1,200	51 × 75	5.5	0.15	166	2.08	MEK122M2G--B075
	1,200	51 × 83	5.7	0.15	166	2.08	MEK122M2G--B083
	1,500	51 × 96	6.7	0.15	133	2.32	MEK152M2G--B096
	1,800	51 × 96	7.4	0.15	111	2.55	MEK182M2G--B096
	2,200	51 × 115	8.9	0.15	90.4	2.81	MEK222M2G--B115
	2,200	51 × 130	9.2	0.15	90.4	2.81	MEK222M2G--B130
	2,200	63.5 × 85	8.5	0.15	90.4	2.81	MEK222M2G--C085
	2,700	51 × 130	10.4	0.15	73.7	3.12	MEK272M2G--B130
	2,700	63.5 × 96	9.9	0.15	73.7	3.12	MEK272M2G--C096
	2,700	76.2 × 75	9.4	0.15	73.7	3.12	MEK272M2G--D075
	3,300	63.5 × 96	11.0	0.15	60.3	3.45	MEK332M2G--C096
	3,300	63.5 × 115	11.8	0.15	60.3	3.45	MEK332M2G--C115
	3,300	76.2 × 90	11.2	0.15	60.3	3.45	MEK332M2G--D090
	3,900	63.5 × 115	12.8	0.15	51.0	3.75	MEK392M2G--C115
	3,900	63.5 × 130	13.5	0.15	51.0	3.75	MEK392M2G--C130
	3,900	76.2 × 96	12.5	0.15	51.0	3.75	MEK392M2G--D096
	4,700	63.5 × 130	14.8	0.15	42.3	4.11	MEK472M2G--C130
	4,700	63.5 × 155	15.9	0.15	42.3	4.11	MEK472M2G--C155
	4,700	76.2 × 110	14.5	0.15	42.3	4.11	MEK472M2G--D110
	4,700	76.2 × 115	14.9	0.15	42.3	4.11	MEK472M2G--D115
	5,600	63.5 × 155	16.6	0.15	35.5	4.49	MEK562M2G--C155
	5,600	63.5 × 190	18.3	0.15	35.5	4.49	MEK562M2G--C190
	5,600	63.5 × 195	19.1	0.15	35.5	4.49	MEK562M2G--C195
	5,600	76.2 × 115	16.2	0.15	35.5	4.49	MEK562M2G--D115
	5,600	76.2 × 130	17.0	0.15	35.5	4.49	MEK562M2G--D130
	6,800	63.5 × 190	20.1	0.15	29.3	4.95	MEK682M2G--C190
	6,800	76.2 × 130	18.8	0.15	29.3	4.95	MEK682M2G--D130
	6,800	76.2 × 155	20.2	0.15	29.3	4.95	MEK682M2G--D155
	6,800	89 × 121	19.3	0.15	29.3	4.95	MEK682M2G--E121



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
400	8,200	76.2 × 155	22.3	0.15	24.3	5.00	MEK822M2G--D155
	8,200	76.2 × 170	23.2	0.15	24.3	5.00	MEK822M2G--D170
	8,200	89 × 157	23.5	0.15	24.3	5.00	MEK822M2G--E157
	10,000	76.2 × 195	27.3	0.15	19.9	5.00	MEK103M2G--D195
	10,000	89 × 155	25.8	0.15	19.9	5.00	MEK103M2G--E155
	10,000	89 × 157	25.9	0.15	19.9	5.00	MEK103M2G--E157
	12,000	89 × 155	28.0	0.15	16.6	5.00	MEK123M2G--E155
	12,000	89 × 157	28.2	0.15	16.6	5.00	MEK123M2G--E157
	12,000	89 × 170	29.2	0.15	16.6	5.00	MEK123M2G--E170
	12,000	89 × 196	31.0	0.15	16.6	5.00	MEK123M2G--E196
	15,000	89 × 190	34.0	0.15	13.3	5.00	MEK153M2G--E190
	15,000	89 × 196	34.4	0.15	13.3	5.00	MEK153M2G--E196
	15,000	89 × 236	37.5	0.15	13.3	5.00	MEK153M2G--E236
	18,000	89 × 236	41.0	0.15	11.1	5.00	MEK183M2G--E236
450	1,000	51 × 75	5.0	0.15	199	2.01	MEK102M2W--B075
	1,000	51 × 83	5.2	0.15	199	2.01	MEK102M2W--B083
	1,200	51 × 96	6.0	0.15	166	2.20	MEK122M2W--B096
	1,500	51 × 96	6.7	0.15	133	2.46	MEK152M2W--B096
	1,500	51 × 115	7.2	0.15	133	2.46	MEK152M2W--B115
	1,800	51 × 130	8.3	0.15	111	2.70	MEK182M2W--B130
	2,200	63.5 × 96	9.0	0.15	90.4	2.98	MEK222M2W--C096
	2,700	63.5 × 115	10.7	0.15	73.7	3.31	MEK272M2W--C115
	3,300	63.5 × 130	12.4	0.15	60.3	3.66	MEK332M2W--C130
	3,300	76.2 × 100	11.8	0.15	60.3	3.66	MEK332M2W--D100
	3,900	63.5 × 155	14.4	0.15	51.0	3.97	MEK392M2W--C155
	3,900	76.2 × 110	13.4	0.15	51.0	3.97	MEK392M2W--D110
	3,900	76.2 × 115	13.6	0.15	51.0	3.97	MEK392M2W--D115
	4,700	63.5 × 190	17.4	0.15	42.3	4.36	MEK472M2W--C190
	4,700	63.5 × 195	17.5	0.15	42.3	4.36	MEK472M2W--C195
	4,700	76.2 × 130	15.6	0.15	42.3	4.36	MEK472M2W--D130
	5,600	63.5 × 190	19.0	0.15	35.5	4.76	MEK562M2W--C190
	5,600	76.2 × 155	18.3	0.15	35.5	4.76	MEK562M2W--D155
	5,600	89 × 121	17.3	0.15	35.5	4.76	MEK562M2W--E121
	6,800	76.2 × 170	21.2	0.15	29.3	5.00	MEK682M2W--D170
	6,800	89 × 130	19.7	0.15	29.3	5.00	MEK682M2W--E130
	6,800	89 × 157	21.4	0.15	29.3	5.00	MEK682M2W--E157
	8,200	76.2 × 190	24.2	0.15	24.3	5.00	MEK822M2W--D190
	8,200	89 × 155	23.4	0.15	24.3	5.00	MEK822M2W--E155
	8,200	89 × 157	23.5	0.15	24.3	5.00	MEK822M2W--E157
	10,000	89 × 170	26.7	0.15	19.9	5.00	MEK103M2W--E170
	10,000	89 × 196	28.3	0.15	19.9	5.00	MEK103M2W--E196
	12,000	89 × 236	33.6	0.15	16.6	5.00	MEK123M2W--E236
500	1,000	51 × 96	5.5	0.20	265	2.12	MEK102M2H--B096
	1,000	51 × 100	5.6	0.20	265	2.12	MEK102M2H--B100
	1,000	63.5 × 80	5.8	0.20	265	2.12	MEK102M2H--C080
	1,200	51 × 115	6.6	0.20	221	2.32	MEK122M2H--B115
	1,200	63.5 × 85	6.5	0.20	221	2.32	MEK122M2H--C085
	1,200	63.5 × 96	6.9	0.20	221	2.32	MEK122M2H--C096
	1,500	51 × 130	7.8	0.20	177	2.60	MEK152M2H--B130
	1,500	63.5 × 90	7.5	0.20	177	2.60	MEK152M2H--C090
	1,500	63.5 × 96	7.7	0.20	177	2.60	MEK152M2H--C096
	1,800	63.5 × 105	8.3	0.20	147	2.85	MEK182M2H--C105
	1,800	63.5 × 115	8.6	0.20	147	2.85	MEK182M2H--C115
	2,200	63.5 × 115	8.9	0.20	121	3.15	MEK222M2H--C115
	2,200	63.5 × 121	9.1	0.20	121	3.15	MEK222M2H--C121
	2,200	63.5 × 130	9.4	0.20	121	3.15	MEK222M2H--C130
	2,700	76.2 × 110	9.8	0.20	98.2	3.49	MEK272M2H--D110
	2,700	76.2 × 115	9.9	0.20	98.2	3.49	MEK272M2H--D115
	3,300	76.2 × 115	10.1	0.20	80.4	3.85	MEK332M2H--D115
	3,300	76.2 × 130	10.4	0.20	80.4	3.85	MEK332M2H--D130
	3,900	76.2 × 150	10.9	0.20	68.0	4.19	MEK392M2H--D150
	3,900	76.2 × 155	11.0	0.20	68.0	4.19	MEK392M2H--D155
	3,900	89 × 121	11.9	0.20	68.0	4.19	MEK392M2H--E121
	4,700	76.2 × 170	12.7	0.20	56.4	4.60	MEK472M2H--D170
	4,700	89 × 130	13.5	0.20	56.4	4.60	MEK472M2H--E130



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
500	5,600	76.2 × 190	14.6	0.20	47.4	5.00	MEK562M2H--D190
	5,600	76.2 × 195	14.8	0.20	47.4	5.00	MEK562M2H--D195
	5,600	89 × 150	15.0	0.20	47.4	5.00	MEK562M2H--E150
	5,600	89 × 157	15.5	0.20	47.4	5.00	MEK562M2H--E157
	6,800	89 × 170	16.7	0.20	39.0	5.00	MEK682M2H--E170
	8,200	89 × 190	19.3	0.20	32.3	5.00	MEK822M2H--E190
	8,200	89 × 196	19.5	0.20	32.3	5.00	MEK822M2H--E196
525	1,000	51 × 115	6.7	0.20	265	2.17	MEK102M2Y--B115
	1,200	51 × 130	7.6	0.20	221	2.38	MEK122M2Y--B130
	1,200	63.5 × 96	7.5	0.20	221	2.38	MEK122M2Y--C096
	1,500	63.5 × 115	8.4	0.20	177	2.66	MEK152M2Y--C115
	1,800	63.5 × 130	9.1	0.20	147	2.92	MEK182M2Y--C130
	2,200	76.2 × 115	9.9	0.20	121	3.22	MEK222M2Y--D115
	2,700	76.2 × 130	10.5	0.20	98.2	3.57	MEK272M2Y--D130
	3,300	76.2 × 155	11.2	0.20	80.4	3.95	MEK332M2Y--D155
	3,900	89 × 157	12.1	0.20	68.0	4.29	MEK392M2Y--E157

Part Numbering System

MEK Series 3300μF

±20%

350V

Plain case +
Mounting clamp

M5 Post

51 φ × 130L

Pb-free Terminal +
PVC Sleeve

MEK
332
M
2V
=
=
B130

Series Name Capacitance

Capacitance
tolerance

Rated voltage

Case Type

Terminal
type

Case size

Terminal and Sleeve
Type

Example:

Cap.	Symbol
1,000	102
4,700	472
10,000	103

Example:

Voltage	Symbol
350	2V
400	2G
450	2W

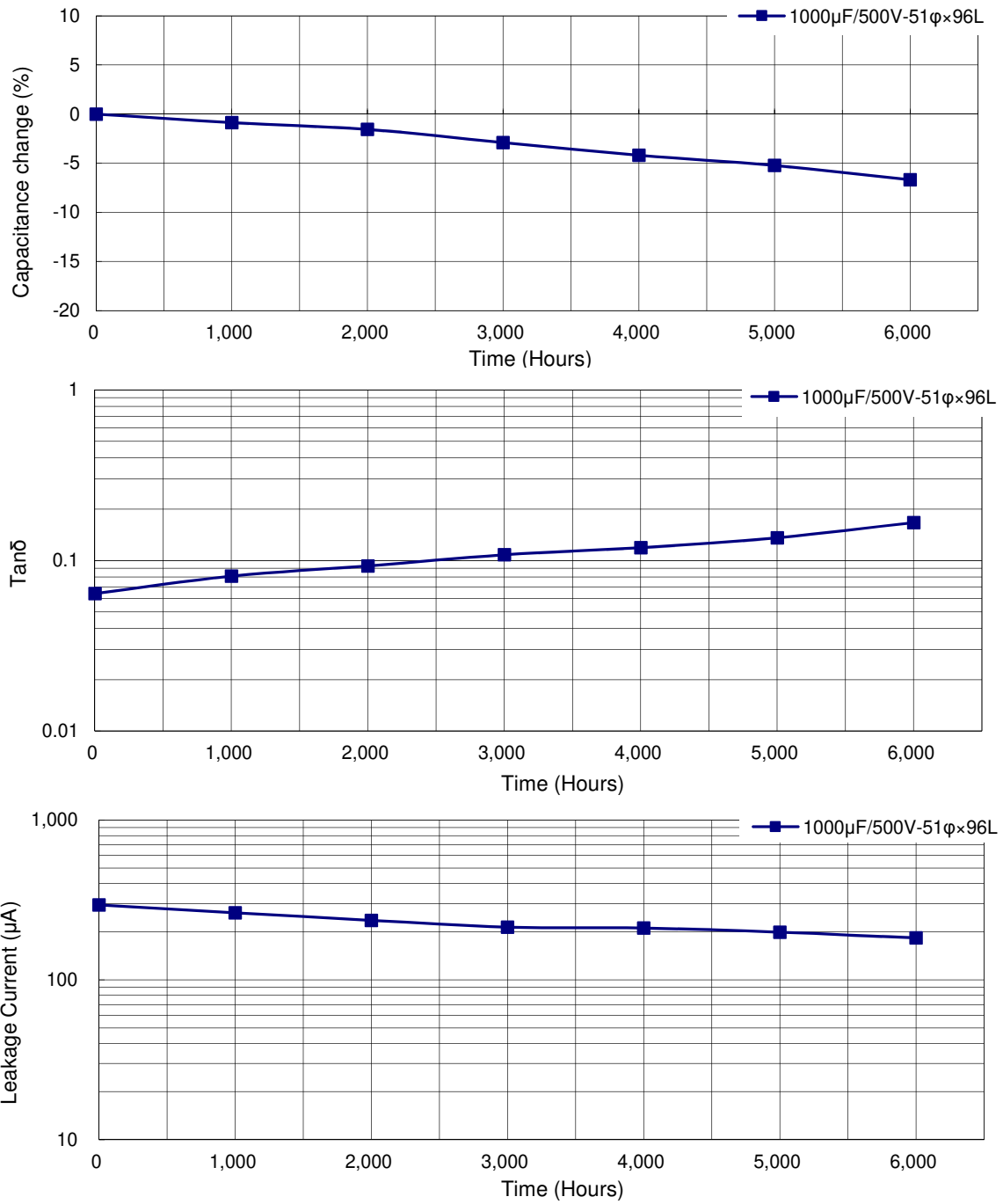
Example:

φ D×L	Code
63.5×130	C130
76.2×115	D115
89 ×157	E157

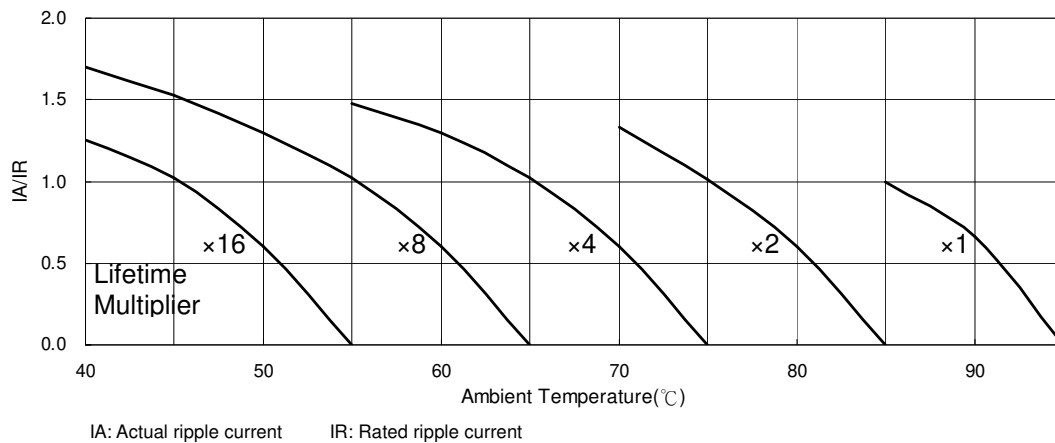
M = ±20%
K = ±10%

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

Typical Endurance Curves



Useful Life Chart



MEQ Series

Features

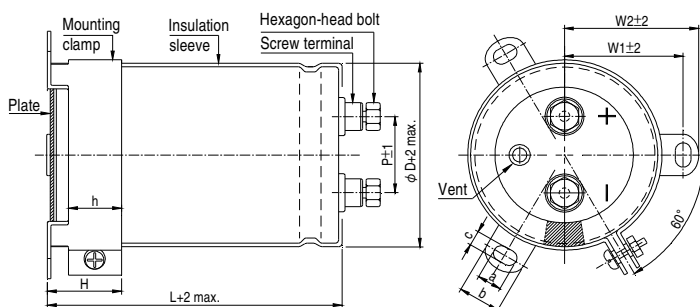
- Endurance with ripple current: 85°C, 20,000 hours
- RoHS compliance



Specifications

Items	Performance																													
Category Temperature Range	-25℃ ~ +85℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 3√CV or 5 (mA) whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																													
Tanδ (at 120 Hz, 20℃)	See the Dimensions & Permissible Ripple Current																													
Low Temperature Characteristics (at 120 Hz)	Capacitance change : C(-25℃) / C(+20℃) ≥ 0.7																													
Endurance	<table><tr><td>Test Time</td><td colspan="5">20,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with rated ripple current applied for 20,000 hours at 85℃.						Test Time	20,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
Test Time	20,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).						Test Time	1,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
Test Time	1,000 Hrs																													
Capacitance Change	Within ±20% of initial value																													
Tanδ	Less than 200% of specified value																													
Leakage Current	Within specified value																													
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>						Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.7	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																									
Multiplier	0.7	1.0	1.1	1.3	1.4																									
Ripple Current and Temperature Multipliers	<table><tr><td>Temperature (℃)</td><td>40</td><td>60</td><td>85</td></tr><tr><td>Multiplier</td><td>2.44</td><td>2.16</td><td>1.00</td></tr></table>						Temperature (℃)	40	60	85	Multiplier	2.44	2.16	1.00																
Temperature (℃)	40	60	85																											
Multiplier	2.44	2.16	1.00																											
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																													

Diagram of Dimensions



Unit: mm

φ D	P	W1	W2	H	h	a	b	c
51	22.0	31.8	36.5	30	24	7	14.0	4.5
63.5	28.6	38.1	42.6	30	24	7	14.0	4.5
76.2	32.0	44.5	49.2	30	24	7	14.0	5.0
89	32.0	50.8	55.6	30	24	7	14.0	5.0

Screw Specifications:
Plug hexagon-head screw: M5×0.8×10
Max. screw tightening torque: 3.23Nm



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
350	1,000	51 × 75	3.8	0.15	199	1.77	MEQ102M2V--B075
	1,200	51 × 75	4.2	0.15	166	1.94	MEQ122M2V--B075
	1,500	51 × 96	5.2	0.15	133	2.17	MEQ152M2V--B096
	1,800	51 × 96	5.6	0.15	111	2.38	MEQ182M2V--B096
	2,200	51 × 110	6.6	0.15	90.4	2.63	MEQ222M2V--B110
	2,200	51 × 130	7.1	0.15	90.4	2.63	MEQ222M2V--B130
	2,700	51 × 130	7.9	0.15	73.7	2.92	MEQ272M2V--B130
	2,700	63.5 × 90	7.3	0.15	73.7	2.92	MEQ272M2V--C090
	2,700	63.5 × 96	7.6	0.15	73.7	2.92	MEQ272M2V--C096
	3,300	51 × 150	9.4	0.15	60.3	3.22	MEQ332M2V--B150
	3,300	63.5 × 100	8.5	0.15	60.3	3.22	MEQ332M2V--C100
	3,300	63.5 × 115	9.0	0.15	60.3	3.22	MEQ332M2V--C115
	3,900	63.5 × 110	9.6	0.15	51.0	3.50	MEQ392M2V--C110
	3,900	63.5 × 130	10.3	0.15	51.0	3.50	MEQ392M2V--C130
	3,900	76.2 × 90	9.4	0.15	51.0	3.50	MEQ392M2V--D090
	4,700	63.5 × 130	11.4	0.15	42.3	3.85	MEQ472M2V--C130
	4,700	63.5 × 155	12.2	0.15	42.3	3.85	MEQ472M2V--C155
	4,700	76.2 × 100	10.8	0.15	42.3	3.85	MEQ472M2V--D100
	4,700	76.2 × 115	11.5	0.15	42.3	3.85	MEQ472M2V--D115
	5,600	63.5 × 150	13.3	0.15	35.5	4.20	MEQ562M2V--C150
	5,600	63.5 × 170	14.0	0.15	35.5	4.20	MEQ562M2V--C170
	5,600	63.5 × 195	15.0	0.15	35.5	4.20	MEQ562M2V--C195
	5,600	76.2 × 110	12.2	0.15	35.5	4.20	MEQ562M2V--D110
	5,600	76.2 × 130	13.1	0.15	35.5	4.20	MEQ562M2V--D130
	6,800	63.5 × 190	16.3	0.15	29.3	4.63	MEQ682M2V--C190
	6,800	76.2 × 130	14.3	0.15	29.3	4.63	MEQ682M2V--D130
	6,800	76.2 × 155	15.5	0.15	29.3	4.63	MEQ682M2V--D155
	8,200	76.2 × 150	16.7	0.15	24.3	5.00	MEQ822M2V--D150
	8,200	76.2 × 170	17.7	0.15	24.3	5.00	MEQ822M2V--D170
	8,200	89 × 130	16.6	0.15	24.3	5.00	MEQ822M2V--E130
	8,200	89 × 157	18.1	0.15	24.3	5.00	MEQ822M2V--E157
	10,000	89 × 150	19.5	0.15	19.9	5.00	MEQ103M2V--E150
	10,000	89 × 155	19.8	0.15	19.9	5.00	MEQ103M2V--E155
	10,000	89 × 157	19.9	0.15	19.9	5.00	MEQ103M2V--E157
	12,000	89 × 150	21.4	0.15	16.6	5.00	MEQ123M2V--E150
	12,000	89 × 190	23.7	0.15	16.6	5.00	MEQ123M2V--E190
	12,000	89 × 196	24.0	0.15	16.6	5.00	MEQ123M2V--E196
	15,000	89 × 190	26.5	0.15	13.3	5.00	MEQ153M2V--E190
	15,000	89 × 236	29.2	0.15	13.3	5.00	MEQ153M2V--E236
	18,000	89 × 220	31.0	0.15	11.1	5.00	MEQ183M2V--E220
400	1,000	51 × 75	3.8	0.15	199	1.90	MEQ102M2G--B075
	1,200	51 × 96	4.6	0.15	166	2.08	MEQ122M2G--B096
	1,500	51 × 100	5.2	0.15	133	2.32	MEQ152M2G--B100
	1,500	51 × 115	5.5	0.15	133	2.32	MEQ152M2G--B115
	1,800	51 × 110	6.0	0.15	111	2.55	MEQ182M2G--B110
	1,800	51 × 130	6.4	0.15	111	2.55	MEQ182M2G--B130
	2,200	63.5 × 90	6.6	0.15	90.4	2.81	MEQ222M2G--C090
	2,200	51 × 130	7.1	0.15	90.4	2.81	MEQ222M2G--B130
	2,200	63.5 × 96	6.9	0.15	90.4	2.81	MEQ222M2G--C096
	2,700	63.5 × 110	8.0	0.15	73.7	3.12	MEQ272M2G--C110
	2,700	63.5 × 115	8.2	0.15	73.7	3.12	MEQ272M2G--C115
	2,700	76.2 × 90	7.7	0.15	73.7	3.12	MEQ272M2G--D090
	3,300	63.5 × 130	9.5	0.15	60.3	3.45	MEQ332M2G--C130
	3,300	76.2 × 100	9.0	0.15	60.3	3.45	MEQ332M2G--D100
	3,900	63.5 × 150	11.0	0.15	51.0	3.75	MEQ392M2G--C150
	3,900	63.5 × 155	11.1	0.15	51.0	3.75	MEQ392M2G--C155
	3,900	76.2 × 100	9.7	0.15	51.0	3.75	MEQ392M2G--D100
	3,900	76.2 × 115	10.4	0.15	51.0	3.75	MEQ392M2G--D115
	4,700	63.5 × 170	12.8	0.15	42.3	4.11	MEQ472M2G--C170
	4,700	63.5 × 195	13.6	0.15	42.3	4.11	MEQ472M2G--C195
	4,700	76.2 × 130	12.0	0.15	42.3	4.11	MEQ472M2G--D130
	5,600	63.5 × 190	14.7	0.15	35.5	4.49	MEQ562M2G--C190
	5,600	63.5 × 195	14.8	0.15	35.5	4.49	MEQ562M2G--C195
	5,600	76.2 × 150	14.2	0.15	35.5	4.49	MEQ562M2G--D150
	5,600	76.2 × 155	14.4	0.15	35.5	4.49	MEQ562M2G--D155
	6,800	76.2 × 170	16.5	0.15	29.3	4.95	MEQ682M2G--D170



Dimension and Permissible Ripple Current

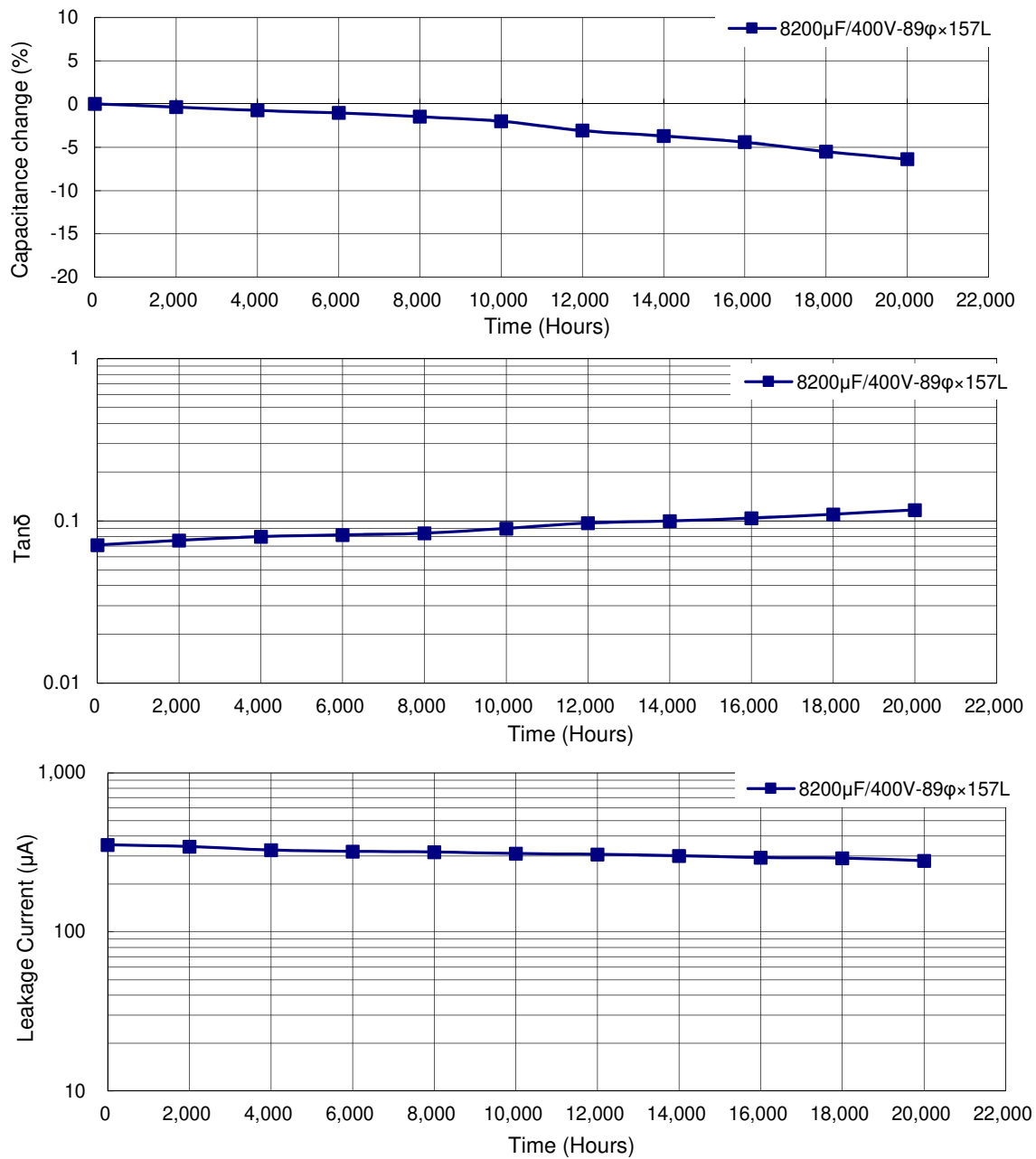
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
400	6,800	89 × 130	15.3	0.15	29.3	4.95	MEQ682M2G--E130
	6,800	89 × 157	16.5	0.15	29.3	4.95	MEQ682M2G--E157
	8,200	76.2 × 190	19.1	0.15	24.3	5.00	MEQ822M2G--D190
	8,200	89 × 150	17.8	0.15	24.3	5.00	MEQ822M2G--E150
	8,200	89 × 155	18.1	0.15	24.3	5.00	MEQ822M2G--E155
	8,200	89 × 157	18.1	0.15	24.3	5.00	MEQ822M2G--E157
	10,000	76.2 × 220	22.5	0.15	19.9	5.00	MEQ103M2G--D220
	10,000	89 × 170	20.8	0.15	19.9	5.00	MEQ103M2G--E170
	10,000	89 × 190	21.8	0.15	19.9	5.00	MEQ103M2G--E190
	10,000	89 × 196	22.1	0.15	19.9	5.00	MEQ103M2G--E196
	12,000	89 × 190	23.9	0.15	16.6	5.00	MEQ123M2G--E190
	12,000	89 × 236	26.4	0.15	16.6	5.00	MEQ123M2G--E236
450	1,000	51 × 96	4.2	0.15	199	2.01	MEQ102M2W--B096
	1,200	51 × 100	4.7	0.15	166	2.20	MEQ122M2W--B100
	1,200	51 × 115	5.0	0.15	166	2.20	MEQ122M2W--B115
	1,500	51 × 130	5.8	0.15	133	2.46	MEQ152M2W--B130
	1,800	63.5 × 96	6.2	0.15	111	2.70	MEQ182M2W--C096
	2,200	63.5 × 110	7.2	0.15	90.4	2.98	MEQ222M2W--C110
	2,200	63.5 × 115	7.4	0.15	90.4	2.98	MEQ222M2W--C115
	2,200	76.2 × 90	7.0	0.15	90.4	2.98	MEQ222M2W--D090
	2,700	63.5 × 130	8.6	0.15	73.7	3.31	MEQ272M2W--C130
	2,700	76.2 × 100	8.2	0.15	73.7	3.31	MEQ272M2W--D100
	2,700	76.2 × 115	8.7	0.15	73.7	3.31	MEQ272M2W--D115
	3,300	63.5 × 150	10.1	0.15	60.3	3.66	MEQ332M2W--C150
	3,300	63.5 × 155	10.2	0.15	60.3	3.66	MEQ332M2W--C155
	3,300	76.2 × 100	9.0	0.15	60.3	3.66	MEQ332M2W--D100
	3,300	76.2 × 130	10.0	0.15	60.3	3.66	MEQ332M2W--D130
	3,900	63.5 × 170	11.6	0.15	51.0	3.97	MEQ392M2W--C170
	3,900	63.5 × 195	12.4	0.15	51.0	3.97	MEQ392M2W--C195
	3,900	76.2 × 130	10.8	0.15	51.0	3.97	MEQ392M2W--D130
	3,900	76.2 × 155	11.7	0.15	51.0	3.97	MEQ392M2W--D155
	4,700	63.5 × 190	13.4	0.15	42.3	4.36	MEQ472M2W--C190
	4,700	76.2 × 150	12.7	0.15	42.3	4.36	MEQ472M2W--D150
	4,700	76.2 × 155	12.9	0.15	42.3	4.36	MEQ472M2W--D155
	5,600	76.2 × 170	14.6	0.15	35.5	4.76	MEQ562M2W--D170
	5,600	76.2 × 190	15.4	0.15	35.5	4.76	MEQ562M2W--D190
	5,600	76.2 × 195	15.6	0.15	35.5	4.76	MEQ562M2W--D195
	5,600	89 × 150	14.6	0.15	35.5	4.76	MEQ562M2W--E150
	5,600	89 × 155	14.8	0.15	35.5	4.76	MEQ562M2W--E155
	5,600	89 × 157	14.9	0.15	35.5	4.76	MEQ562M2W--E157
	6,800	76.2 × 190	16.9	0.15	29.3	5.00	MEQ682M2W--D190
	6,800	89 × 150	16.1	0.15	29.3	5.00	MEQ682M2W--E150
	6,800	89 × 170	17.0	0.15	29.3	5.00	MEQ682M2W--E170
	6,800	89 × 196	18.1	0.15	29.3	5.00	MEQ682M2W--E196
	8,200	76.2 × 220	19.9	0.15	24.3	5.00	MEQ822M2W--D220
	8,200	89 × 170	18.7	0.15	24.3	5.00	MEQ822M2W--E170
	8,200	89 × 190	19.6	0.15	24.3	5.00	MEQ822M2W--E190
	8,200	89 × 196	19.9	0.15	24.3	5.00	MEQ822M2W--E196
	10,000	89 × 190	21.6	0.15	19.9	5.00	MEQ103M2W--E190
	10,000	89 × 236	23.9	0.15	19.9	5.00	MEQ103M2W--E236

Part Numbering System

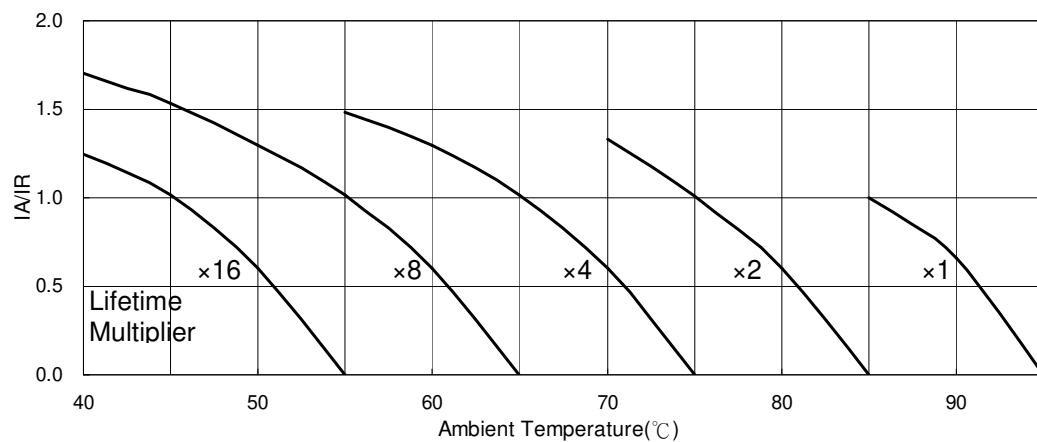
MEQ Series	1000μF	±20%	350V	Plain case + Mounting clamp	M5 Post	51 φ × 75L	Pb-free Terminal + PVC Sleeve
MEQ	102	M	2V	-	-	B075	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Case Type	Terminal type	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:			Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
1,000	102		350	2V		63.5×115	C115
6,800	682		400	2G		76.2×130	D130
10,000	103		450	2W		89 × 157	E157

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

Typical Endurance Curves



Useful Life Chart



IA: Actual ripple current IR: Rated ripple current



MGA Series

Features

- Endurance with ripple current: 105°C, 2,000 hours
- RoHS compliance



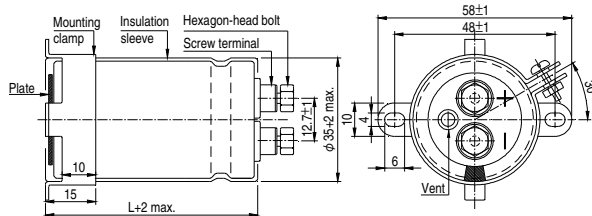
Specifications

Items	Performance																													
Category Temperature Range	16 ~ 100V			160 ~ 400V																										
	-40°C ~ +105°C			-25°C ~ +105°C																										
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																													
Leakage Current (at 20°C)	I = 3√C $\overline{V}$ or 5 (mA) whichever is smaller (after 5 minutes) Where, C = rated capacitance in μ F, V = rated DC Rated Voltage in V																													
Tan δ (at 120 Hz, 20°C)	See the Dimensions & Permissible Ripple Current																													
Low Temperature Characteristics (at 120 Hz)	Capacitance change : C(-25°C) / C(+20°C) $\geq$ 0.7																													
Endurance	<table><tr><td>Test Time</td><td colspan="5">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within $\pm$20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table>						Test Time	2,000 Hrs					Capacitance Change	Within $\pm$ 20% of initial value					Tan δ	Less than 200% of specified value					Leakage Current	Within specified value				
	Test Time	2,000 Hrs																												
	Capacitance Change	Within $\pm$ 20% of initial value																												
	Tan δ	Less than 200% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with rated ripple current applied for 2,000 hours at 105°C.																														
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within $\pm$20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table>						Test Time	1,000 Hrs					Capacitance Change	Within $\pm$ 20% of initial value					Tan δ	Less than 200% of specified value					Leakage Current	Within specified value				
	Test Time	1,000 Hrs																												
	Capacitance Change	Within $\pm$ 20% of initial value																												
	Tan δ	Less than 200% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																														
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.8</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>						Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																									
Multiplier	0.8	1.0	1.1	1.3	1.4																									
Ripple Current and Temperature Multipliers	<table><tr><td colspan="2">Temperature (°C)</td><td>40</td><td>55</td><td>70</td><td>85</td><td>105</td></tr><tr><td rowspan="2">Multiplier</td><td>$\leq$ 250V</td><td>4.9</td><td>3.9</td><td>3.0</td><td>1.8</td><td>1.0</td></tr><tr><td>$\geq$ 350V</td><td>3.8</td><td>3.3</td><td>2.5</td><td>2.0</td><td>1.0</td></tr></table>						Temperature (°C)		40	55	70	85	105	Multiplier	$\leq$ 250V	4.9	3.9	3.0	1.8	1.0	$\geq$ 350V	3.8	3.3	2.5	2.0	1.0				
Temperature (°C)		40	55	70	85	105																								
Multiplier	$\leq$ 250V	4.9	3.9	3.0	1.8	1.0																								
	$\geq$ 350V	3.8	3.3	2.5	2.0	1.0																								
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																													

Diagram of Dimensions

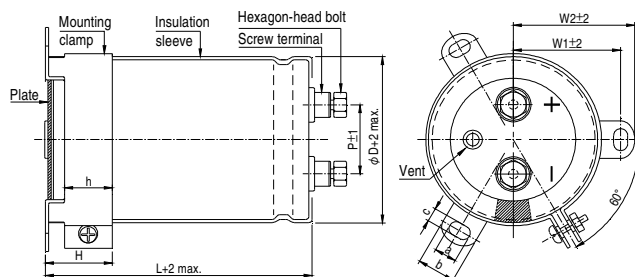
1. 35 ϕ

Unit: mm



Screw Specifications:
Plug hexagon-head screw: M5×0.8×10
Max. screw tightening torque: 3.23Nm

2. 51 ~ 90 ϕ



ϕD	P	W1	W2	H	h	a	b	c
51	22.0	31.8	36.5	30	24	7	14.0	4.5
63.5	28.6	38.1	42.6	30	24	7	14.0	4.5
76.2	32.0	44.5	49.2	30	24	7	14.0	5.0
89	32.0	50.8	55.6	30	24	7	14.0	5.0



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
16	18,000	35 × 53	4.2	0.40	29.5	1.61	MGA183M1C-AA053
	22,000	35 × 53	4.7	0.40	24.1	1.78	MGA223M1C-AA053
	27,000	35 × 53	5.5	0.40	19.7	1.97	MGA273M1C-AA053
	33,000	35 × 65	5.7	0.45	18.1	2.18	MGA333M1C-AA065
	39,000	35 × 65	6.8	0.45	15.3	2.37	MGA393M1C-AA065
	47,000	35 × 83	7.1	0.50	14.1	2.60	MGA473M1C-AA083
	56,000	35 × 100	8.4	0.50	11.8	2.84	MGA563M1C-AA100
	68,000	35 × 121	8.8	0.55	10.7	3.13	MGA683M1C-AA121
	82,000	51 × 83	10.7	0.55	8.9	3.44	MGA823M1C-B083
	100,000	51 × 83	10.8	0.65	8.6	3.79	MGA104M1C-B083
	120,000	51 × 100	13.1	0.65	7.2	4.16	MGA124M1C-B100
	150,000	51 × 121	15.3	0.70	6.2	4.65	MGA154M1C-B121
	180,000	51 × 121	15.7	0.80	5.9	5.00	MGA184M1C-B121
	220,000	63.5 × 121	19.2	0.85	5.1	5.00	MGA224M1C-C121
	270,000	63.5 × 121	19.6	1.00	4.9	5.00	MGA274M1C-C121
	330,000	76.2 × 121	21.1	1.30	5.2	5.00	MGA334M1C-D121
	390,000	76.2 × 121	21.3	1.50	5.1	5.00	MGA394M1C-D121
	470,000	76.2 × 144	24.2	1.60	4.5	5.00	MGA474M1C-D144
25	12,000	35 × 53	3.7	0.35	38.7	1.64	MGA123M1E-AA053
	15,000	35 × 53	4.1	0.35	31.0	1.84	MGA153M1E-AA053
	18,000	35 × 65	4.8	0.35	25.8	2.01	MGA183M1E-AA065
	22,000	35 × 65	5.3	0.35	21.1	2.22	MGA223M1E-AA065
	27,000	35 × 83	6.4	0.40	19.7	2.46	MGA273M1E-AA083
	33,000	35 × 83	6.7	0.40	16.1	2.72	MGA333M1E-AA083
	39,000	35 × 100	7.8	0.40	13.6	2.96	MGA393M1E-AA100
	47,000	35 × 121	9.3	0.40	11.3	3.25	MGA473M1E-AA121
	56,000	51 × 75	9.7	0.50	11.8	3.55	MGA563M1E-B075
	68,000	51 × 100	11.2	0.50	9.8	3.91	MGA683M1E-B100
	82,000	51 × 100	11.2	0.60	9.7	4.30	MGA823M1E-B100
	100,000	51 × 121	14.8	0.60	8.0	4.74	MGA104M1E-B121
	120,000	63.5 × 100	14.9	0.80	8.8	5.00	MGA124M1E-C100
	150,000	63.5 × 121	17.9	0.80	7.1	5.00	MGA154M1E-C121
	180,000	64 × 121	17.9	1.00	7.4	5.00	MGA184M1E-C121
	220,000	76.2 × 121	21.3	1.00	6.0	5.00	MGA224M1E-D121
	270,000	76.2 × 121	21.7	1.00	4.9	5.00	MGA274M1E-D121
	330,000	76.2 × 144	23.4	1.00	4.0	5.00	MGA334M1E-D144
	390,000	89 × 130	24.9	1.00	3.4	5.00	MGA394M1E-E130
35	8,200	35 × 53	3.3	0.30	48.5	1.61	MGA822M1V-AA053
	10,000	35 × 53	3.6	0.30	39.8	1.77	MGA103M1V-AA053
	12,000	35 × 65	4.2	0.30	33.2	1.94	MGA123M1V-AA065
	15,000	35 × 65	4.7	0.30	26.5	2.17	MGA153M1V-AA065
	18,000	35 × 83	5.7	0.35	25.8	2.38	MGA183M1V-AA083
	22,000	35 × 83	6.3	0.35	21.1	2.63	MGA223M1V-AA083
	27,000	35 × 100	7.5	0.40	19.7	2.92	MGA273M1V-AA100
	33,000	35 × 121	9.0	0.40	16.1	3.22	MGA333M1V-AA121
	39,000	51 × 75	9.2	0.45	15.3	3.50	MGA393M1V-B075
	47,000	51 × 100	11.2	0.45	12.7	3.85	MGA473M1V-B100
	56,000	51 × 100	11.4	0.50	11.8	4.20	MGA563M1V-B100
	68,000	51 × 121	13.6	0.50	9.8	4.63	MGA683M1V-B121
	82,000	63.5 × 100	14.8	0.60	9.7	5.00	MGA823M1V-C100
	100,000	63.5 × 121	17.6	0.60	8.0	5.00	MGA104M1V-C121
	120,000	63.5 × 121	17.6	0.70	7.7	5.00	MGA124M1V-C121
	150,000	76.2 × 121	19.8	0.70	6.2	5.00	MGA154M1V-D121
	180,000	76.2 × 121	19.8	0.70	5.2	5.00	MGA184M1V-D121
	220,000	76.2 × 144	23.4	0.70	4.2	5.00	MGA224M1V-D144
	270,000	89 × 157	25.5	0.70	3.4	5.00	MGA274M1V-E157
50	3,900	35 × 53	2.8	0.25	85.1	1.32	MGA392M1H-AA053
	4,700	35 × 53	3.1	0.25	70.6	1.45	MGA472M1H-AA053
	5,600	35 × 53	3.3	0.25	59.2	1.59	MGA562M1H-AA053
	6,800	35 × 53	3.3	0.25	48.8	1.75	MGA682M1H-AA053
	8,200	35 × 65	3.8	0.25	40.5	1.92	MGA822M1H-AA065
	10,000	35 × 83	4.6	0.25	33.2	2.12	MGA103M1H-AA083
	12,000	35 × 83	5.1	0.30	33.2	2.32	MGA123M1H-AA083
	15,000	35 × 83	5.7	0.30	26.5	2.60	MGA153M1H-AA083



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
50	18,000	35 × 100	6.7	0.35	25.8	2.85	MGA183M1H-AA100
	22,000	35 × 121	8.1	0.35	21.1	3.15	MGA223M1H-AA121
	27,000	51 × 75	9.1	0.40	19.7	3.49	MGA273M1H--B075
	33,000	51 × 100	11.1	0.40	16.1	3.85	MGA333M1H--B100
	39,000	51 × 121	13.1	0.40	13.6	4.19	MGA393M1H--B121
	47,000	51 × 121	13.9	0.40	11.3	4.60	MGA473M1H--B121
	56,000	63.5 × 100	13.9	0.45	10.7	5.00	MGA563M1H--C100
	68,000	63.5 × 121	16.6	0.45	8.8	5.00	MGA683M1H--C121
	82,000	76.2 × 121	18.9	0.50	8.1	5.00	MGA823M1H--D121
	100,000	76.2 × 121	19.5	0.50	6.6	5.00	MGA104M1H--D121
	120,000	76.2 × 121	19.5	0.50	5.5	5.00	MGA124M1H--D121
	150,000	89 × 130	22.5	0.50	4.4	5.00	MGA154M1H--E130
	180,000	89 × 157	23.9	0.50	3.7	5.00	MGA184M1H--E157
63	2,700	35 × 53	2.3	0.20	98.3	1.24	MGA272M1J-AA053
	3,300	35 × 53	2.5	0.20	80.4	1.37	MGA332M1J-AA053
	3,900	35 × 53	2.8	0.20	68.0	1.49	MGA392M1J-AA053
	4,700	35 × 53	3.1	0.20	56.5	1.63	MGA472M1J-AA053
	5,600	35 × 65	3.5	0.20	47.4	1.78	MGA562M1J-AA065
	6,800	35 × 65	3.9	0.20	39.0	1.96	MGA682M1J-AA065
	8,200	35 × 83	4.4	0.25	40.5	2.16	MGA822M1J-AA083
	10,000	35 × 83	4.7	0.25	33.2	2.38	MGA103M1J-AA083
	12,000	35 × 100	5.5	0.25	27.6	2.61	MGA123M1J-AA100
	15,000	35 × 121	6.6	0.25	22.1	2.92	MGA153M1J-AA121
	18,000	51 × 75	7.4	0.30	22.1	3.19	MGA183M1J--B075
	22,000	51 × 100	9.0	0.30	18.1	3.53	MGA223M1J--B100
	27,000	51 × 121	10.9	0.30	14.7	3.91	MGA273M1J--B121
	33,000	51 × 121	12.0	0.30	12.1	4.33	MGA333M1J--B121
	39,000	63.5 × 100	12.5	0.35	11.9	4.70	MGA393M1J--C100
	47,000	63.5 × 121	14.9	0.35	9.9	5.00	MGA473M1J--C121
	56,000	63.5 × 121	16.3	0.40	9.5	5.00	MGA563M1J--C121
	68,000	76.2 × 121	18.4	0.40	7.8	5.00	MGA683M1J--D121
	82,000	76.2 × 144	20.0	0.40	6.5	5.00	MGA823M1J--D144
	100,000	76.2 × 144	20.0	0.40	5.3	5.00	MGA104M1J--D144
	120,000	89 × 157	21.8	0.40	4.4	5.00	MGA124M1J--E157
80	2,200	35 × 53	2.4	0.15	90.5	1.26	MGA222M1K-AA053
	2,700	35 × 53	2.7	0.15	73.7	1.39	MGA272M1K-AA053
	3,300	35 × 53	3.0	0.15	60.3	1.54	MGA332M1K-AA053
	3,900	35 × 65	3.4	0.15	51.0	1.68	MGA392M1K-AA065
	4,700	35 × 65	3.7	0.15	42.3	1.84	MGA472M1K-AA065
	5,600	35 × 83	4.5	0.20	47.4	2.01	MGA562M1K-AA083
	6,800	35 × 83	4.9	0.20	39.0	2.21	MGA682M1K-AA083
	8,200	35 × 100	5.1	0.20	32.4	2.43	MGA822M1K-AA100
	10,000	35 × 121	6.1	0.20	26.5	2.68	MGA103M1K-AA121
	12,000	51 × 75	6.7	0.25	27.6	2.94	MGA123M1K--B075
	15,000	51 × 100	8.3	0.25	22.1	3.29	MGA153M1K--B100
	18,000	51 × 121	9.9	0.25	18.4	3.60	MGA183M1K--B121
	22,000	51 × 121	11.0	0.25	15.1	3.98	MGA223M1K--B121
	27,000	63.5 × 100	11.4	0.30	14.7	4.41	MGA273M1K--C100
	33,000	76.2 × 100	13.9	0.30	12.1	4.87	MGA333M1K--D100
	39,000	76.2 × 100	13.9	0.30	10.2	5.00	MGA393M1K--D100
	47,000	76.2 × 121	16.5	0.30	8.5	5.00	MGA473M1K--D121
	56,000	76.2 × 121	18.1	0.30	7.1	5.00	MGA563M1K--D121
	68,000	76.2 × 144	19.7	0.30	5.9	5.00	MGA683M1K--D144
	82,000	89 × 130	22.1	0.30	4.9	5.00	MGA823M1K--E130
100	1,800	35 × 53	2.7	0.15	111	1.27	MGA182M2A-AA053
	2,200	35 × 53	3.0	0.15	90.5	1.41	MGA222M2A-AA053
	2,700	35 × 65	3.5	0.15	73.7	1.56	MGA272M2A-AA065
	3,300	35 × 83	4.2	0.15	60.3	1.72	MGA332M2A-AA083
	3,900	35 × 83	4.2	0.15	51.0	1.87	MGA392M2A-AA083
	4,700	35 × 100	5.0	0.15	42.3	2.06	MGA472M2A-AA100
	5,600	35 × 100	5.4	0.15	35.5	2.24	MGA562M2A-AA100
	6,800	35 × 121	5.8	0.15	29.3	2.47	MGA682M2A-AA121
	8,200	51 × 75	6.4	0.15	24.3	2.72	MGA822M2A--B075
	10,000	51 × 100	7.8	0.15	19.9	3.00	MGA103M2A--B100



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
100	12,000	51 × 121	9.3	0.20	22.1	3.29	MGA123M2A--B121
	15,000	51 × 121	10.4	0.20	17.7	3.67	MGA153M2A--B121
	18,000	63.5 × 100	10.4	0.20	14.7	4.02	MGA183M2A--C100
	22,000	63.5 × 121	12.5	0.20	12.1	4.45	MGA223M2A--C121
	27,000	76.2 × 121	13.7	0.25	12.3	4.93	MGA273M2A--D121
	33,000	76.2 × 121	15.2	0.25	10.1	5.00	MGA333M2A--D121
	39,000	76.2 × 144	16.1	0.25	8.5	5.00	MGA393M2A--D144
	47,000	89 × 130	19.3	0.25	7.1	5.00	MGA473M2A--E130
	56,000	89 × 157	21.1	0.25	5.9	5.00	MGA563M2A--E157
160	560	35 × 53	1.2	0.15	355	0.90	MGA561M2C-AA053
	680	35 × 53	1.3	0.15	293	0.99	MGA681M2C-AA053
	820	35 × 65	1.4	0.15	243	1.09	MGA821M2C-AA065
	1,000	35 × 83	1.8	0.15	199	1.20	MGA102M2C-AA083
	1,200	35 × 83	1.9	0.15	166	1.31	MGA122M2C-AA083
	1,500	35 × 83	2.1	0.15	133	1.47	MGA152M2C-AA083
	1,800	35 × 83	2.5	0.15	111	1.61	MGA182M2C-AA083
	2,200	35 × 100	2.8	0.15	90.5	1.78	MGA222M2C-AA100
	2,700	35 × 100	3.3	0.15	73.7	1.97	MGA272M2C-AA100
	3,300	51 × 75	3.8	0.15	60.3	2.18	MGA332M2C--B075
	3,900	51 × 75	3.8	0.15	51.0	2.37	MGA392M2C--B075
	4,700	51 × 96	4.6	0.15	42.3	2.60	MGA472M2C--B096
	5,600	51 × 96	5.1	0.15	35.5	2.84	MGA562M2C--B096
	6,800	63.5 × 96	6.1	0.15	29.3	3.13	MGA682M2C--C096
	8,200	63.5 × 96	7.0	0.15	24.3	3.44	MGA822M2C--C096
	10,000	76.2 × 96	8.4	0.15	19.9	3.79	MGA103M2C--D096
	12,000	76.2 × 115	9.4	0.15	16.6	4.16	MGA123M2C--D115
	15,000	76.2 × 130	11.4	0.15	13.3	4.65	MGA153M2C--D130
	18,000	76.2 × 144	13.4	0.15	11.1	5.00	MGA183M2C--D144
	22,000	89 × 130	14.5	0.15	9.0	5.00	MGA223M2C--E130
	27,000	89 × 157	16.0	0.15	7.4	5.00	MGA273M2C--E157
200	330	35 × 53	0.9	0.15	603	0.77	MGA331M2D-AA053
	390	35 × 53	1.0	0.15	510	0.84	MGA391M2D-AA053
	470	35 × 53	1.1	0.15	423	0.92	MGA471M2D-AA053
	560	35 × 53	1.2	0.15	355	1.00	MGA561M2D-AA053
	680	35 × 53	1.3	0.15	293	1.11	MGA681M2D-AA053
	820	35 × 65	1.5	0.15	243	1.21	MGA821M2D-AA065
	1,000	35 × 83	1.7	0.15	199	1.34	MGA102M2D-AA083
	1,200	35 × 83	1.9	0.15	166	1.47	MGA122M2D-AA083
	1,500	35 × 100	2.3	0.15	133	1.64	MGA152M2D-AA100
	1,800	35 × 100	2.5	0.15	111	1.80	MGA182M2D-AA100
	2,200	51 × 75	3.0	0.15	90.5	1.99	MGA222M2D--B075
	2,700	51 × 96	3.6	0.15	73.7	2.20	MGA272M2D--B096
	3,300	51 × 96	4.1	0.15	60.3	2.44	MGA332M2D--B096
	3,900	51 × 115	4.9	0.15	51.0	2.65	MGA392M2D--B115
	4,700	63.5 × 96	5.3	0.15	42.3	2.91	MGA472M2D--C096
	5,600	63.5 × 96	5.8	0.15	35.5	3.17	MGA562M2D--C096
	6,800	63.5 × 115	6.9	0.15	29.3	3.50	MGA682M2D--C115
	8,200	63.5 × 130	7.6	0.15	24.3	3.84	MGA822M2D--C130
	10,000	76.2 × 115	9.6	0.15	19.9	4.24	MGA103M2D--D115
	12,000	76.2 × 130	10.2	0.15	16.6	4.65	MGA123M2D--D130
	15,000	89 × 130	12.2	0.15	13.3	5.00	MGA153M2D--E130
	18,000	89 × 157	13.1	0.15	11.1	5.00	MGA183M2D--E157
250	270	35 × 53	0.8	0.15	737	0.78	MGA271M2E-AA053
	330	35 × 53	0.9	0.15	603	0.86	MGA331M2E-AA053
	390	35 × 53	1.0	0.15	510	0.94	MGA391M2E-AA053
	470	35 × 53	1.1	0.15	423	1.03	MGA471M2E-AA053
	560	35 × 65	1.4	0.15	355	1.12	MGA561M2E-AA065
	680	35 × 83	1.5	0.15	293	1.24	MGA681M2E-AA083
	820	35 × 83	1.6	0.15	243	1.36	MGA821M2E-AA083
	1,000	35 × 100	1.8	0.15	199	1.50	MGA102M2E-AA100
	1,200	35 × 100	1.9	0.15	166	1.64	MGA122M2E-AA100
	1,500	51 × 75	2.3	0.15	133	1.84	MGA152M2E--B075
	1,800	51 × 75	2.5	0.15	111	2.01	MGA182M2E--B075
	2,200	51 × 96	3.0	0.15	90.5	2.22	MGA222M2E--B096



Dimension and Permissible Ripple Current

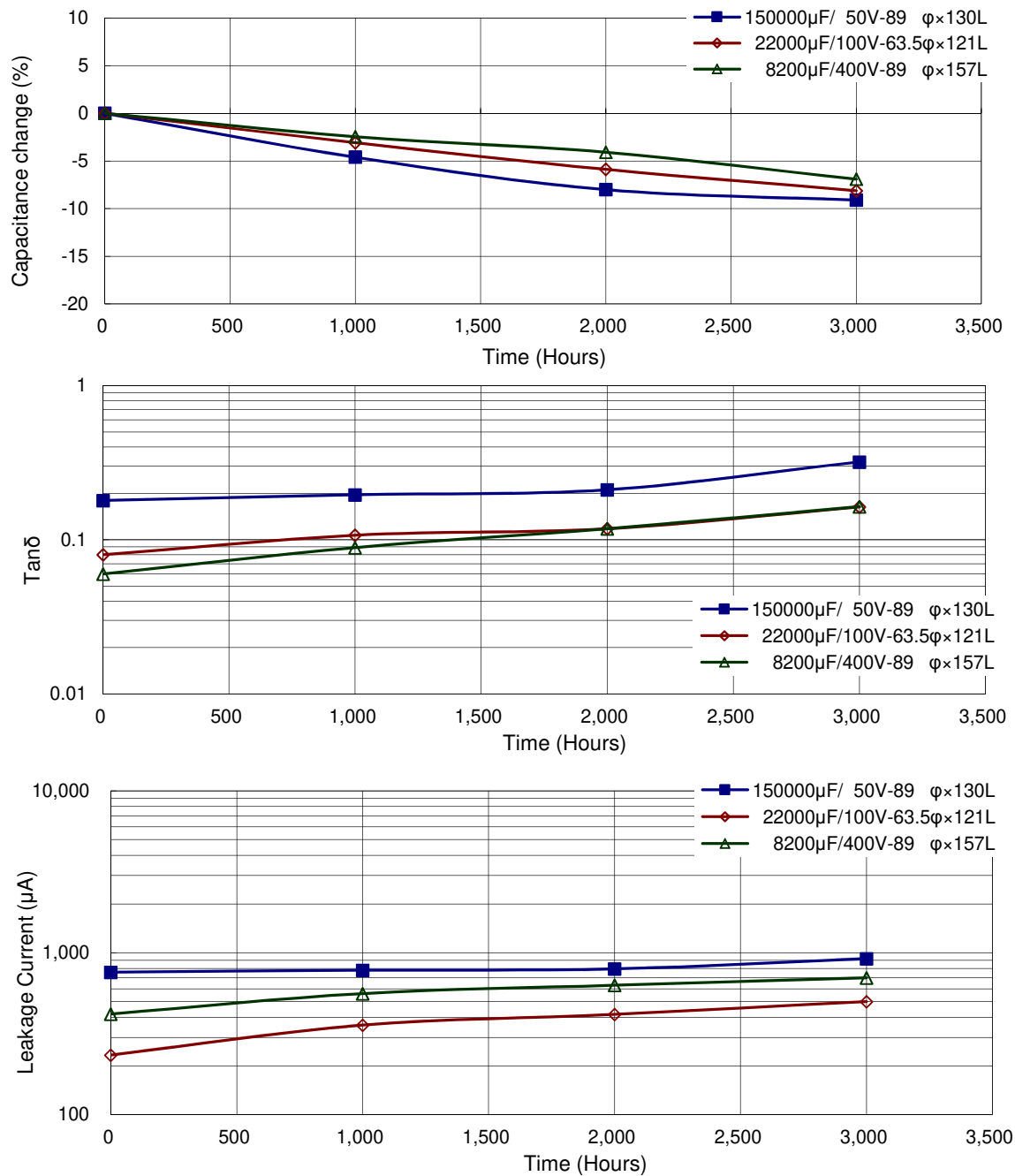
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
250	2,700	51 × 115	3.5	0.15	73.7	2.46	MGA272M2E--B115
	3,300	63.5 × 96	4.2	0.15	60.3	2.72	MGA332M2E--C096
	3,900	63.5 × 96	4.6	0.15	51.0	2.96	MGA392M2E--C096
	4,700	63.5 × 115	5.7	0.15	42.3	3.25	MGA472M2E--C115
	5,600	63.5 × 130	6.3	0.15	35.5	3.55	MGA562M2E--C130
	6,800	76.2 × 115	7.7	0.15	29.3	3.91	MGA682M2E--D115
	8,200	76.2 × 130	8.4	0.15	24.3	4.30	MGA822M2E--D130
	10,000	76.2 × 155	10.0	0.15	19.9	4.74	MGA103M2E--D155
	12,000	89 × 140	11.9	0.15	16.6	5.00	MGA123M2E--E140
	15,000	89 × 157	12.5	0.15	13.3	5.00	MGA153M2E--E157
350	180	35 × 53	0.8	0.15	1106	0.75	MGA181M2V-AA053
	220	35 × 53	0.9	0.15	905	0.83	MGA221M2V-AA053
	270	35 × 53	1.0	0.15	737	0.92	MGA271M2V-AA053
	330	35 × 65	1.2	0.15	603	1.02	MGA331M2V-AA065
	390	35 × 65	1.3	0.15	510	1.11	MGA391M2V-AA065
	470	35 × 83	1.5	0.15	423	1.22	MGA471M2V-AA083
	560	35 × 83	1.6	0.15	355	1.33	MGA561M2V-AA083
	680	35 × 100	1.7	0.15	293	1.46	MGA681M2V-AA100
	820	35 × 100	1.8	0.15	243	1.61	MGA821M2V-AA100
	1,000	51 × 75	2.2	0.15	199	1.77	MGA102M2V--B075
	1,200	51 × 75	2.3	0.15	166	1.94	MGA122M2V--B075
	1,500	51 × 96	3.0	0.15	133	2.17	MGA152M2V--B096
	1,800	51 × 115	3.6	0.15	111	2.38	MGA182M2V--B115
	2,200	51 × 130	4.0	0.15	90.5	2.63	MGA222M2V--B130
	2,700	63.5 × 96	4.6	0.15	73.7	2.92	MGA272M2V--C096
	3,300	63.5 × 115	5.6	0.15	60.3	3.22	MGA332M2V--C115
	3,900	63.5 × 130	6.7	0.15	51.0	3.50	MGA392M2V--C130
	4,700	76.2 × 121	7.5	0.15	42.3	3.85	MGA472M2V--D121
	5,600	76.2 × 130	8.3	0.15	35.5	4.20	MGA562M2V--D130
	6,800	76.2 × 155	9.4	0.15	29.3	4.63	MGA682M2V--D155
	8,200	89 × 157	11.4	0.15	24.3	5.00	MGA822M2V--E157
400	180	35 × 53	0.8	0.15	1106	0.80	MGA181M2G-AA053
	220	35 × 53	0.9	0.15	905	0.89	MGA221M2G-AA053
	270	35 × 65	1.1	0.15	737	0.99	MGA271M2G-AA065
	330	35 × 65	1.2	0.15	603	1.09	MGA331M2G-AA065
	390	35 × 83	1.3	0.15	510	1.18	MGA391M2G-AA083
	470	35 × 83	1.4	0.15	423	1.30	MGA471M2G-AA083
	560	35 × 100	1.6	0.15	355	1.42	MGA561M2G-AA100
	680	35 × 100	1.7	0.15	293	1.56	MGA681M2G-AA100
	820	35 × 121	2.0	0.15	243	1.72	MGA821M2G-AA121
	1,000	51 × 75	2.2	0.15	199	1.90	MGA102M2G--B075
	1,200	51 × 96	2.7	0.15	166	2.08	MGA122M2G--B096
	1,500	51 × 115	3.3	0.15	133	2.32	MGA152M2G--B115
	1,800	51 × 130	3.7	0.15	111	2.55	MGA182M2G--B130
	2,200	63.5 × 96	4.2	0.15	90.5	2.81	MGA222M2G--C096
	2,700	63.5 × 115	4.8	0.15	73.7	3.12	MGA272M2G--C115
	3,300	63.5 × 130	5.5	0.15	60.3	3.45	MGA332M2G--C130
	3,900	76.2 × 115	6.5	0.15	51.0	3.75	MGA392M2G--D115
	4,700	76.2 × 130	7.6	0.15	42.3	4.11	MGA472M2G--D130
	5,600	76.2 × 155	9.4	0.15	35.5	4.49	MGA562M2G--D155
	6,800	89 × 157	10.4	0.15	29.3	4.95	MGA682M2G--E157
	8,200	89 × 157	11.8	0.15	24.3	5.00	MGA822M2G--E157

Part Numbering System

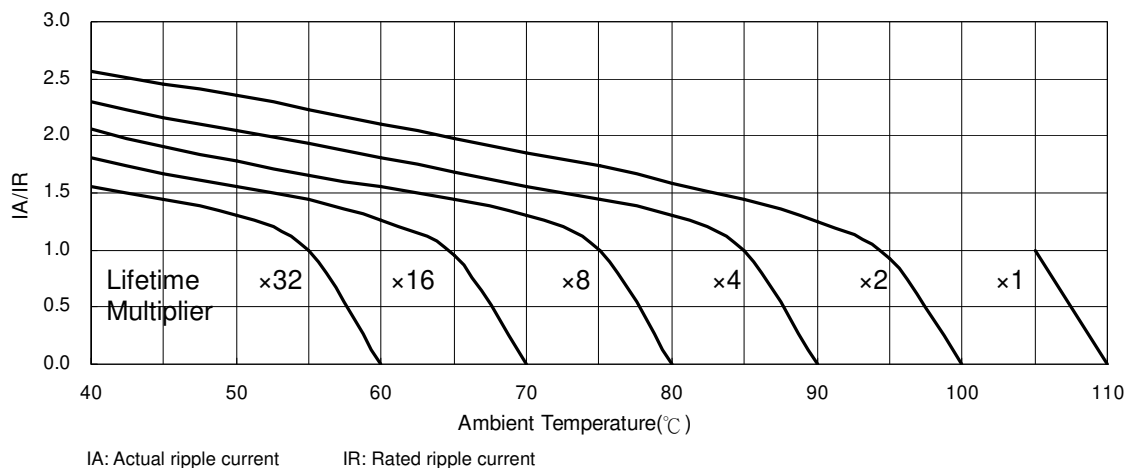
MGA Series	1000μF	±20%	350V	Plain case + Mounting clamp	M5 Post	51 φ × 75L	Pb-free Terminal + PVC Sleeve
MGA	102	M	2V	-	-	B075	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Case Type	Terminal type	Case size	Terminal and Sleeve Type
Example:		M = ±20% K = ±10%	Example:			Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
3,300	332		400	2G		63.5×130	C130
10,000	103		450	2W		89 × 157	E157

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

Typical Endurance Curves



Useful Life Chart



MGK Series

Features

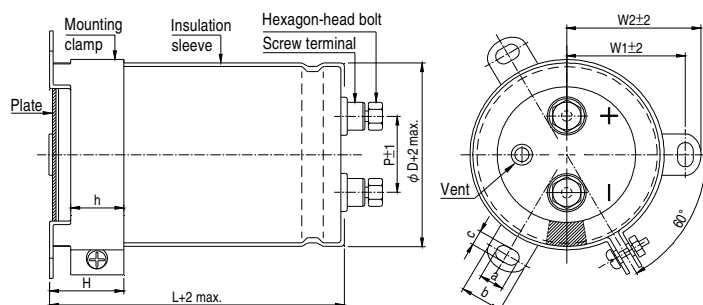
- Endurance with ripple current: 105°C, 5,000 hours
- RoHS compliance



Specifications

Items	Performance																													
Category Temperature Range	-25℃ ~ +105℃																													
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																													
Leakage Current (at 20℃)	I = 3√CV or 5 (mA) whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF, V = rated DC Rated Voltage in V																													
Tanδ (at 120 Hz, 20℃)	See the Dimensions & Permissible Ripple Current																													
Low Temperature Characteristics (at 120 Hz)	Capacitance change : C(-25℃) / C(+20℃) ≥ 0.7																													
Endurance	<table><tr><td>Test Time</td><td colspan="5">5,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table>						Test Time	5,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
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	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with rated ripple current applied for 5,000 hours at 105℃.																														
Shelf Life Test	<table><tr><td>Test Time</td><td colspan="5">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="5">Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td colspan="5">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="5">Within specified value</td></tr></table>						Test Time	1,000 Hrs					Capacitance Change	Within ±20% of initial value					Tanδ	Less than 200% of specified value					Leakage Current	Within specified value				
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	Tanδ	Less than 200% of specified value																												
	Leakage Current	Within specified value																												
* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).																														
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50 / 60</td><td>100 / 120</td><td>300</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.4</td></tr></table>						Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up	Multiplier	0.7	1.0	1.1	1.3	1.4												
Frequency (Hz)	50 / 60	100 / 120	300	1k	10k up																									
Multiplier	0.7	1.0	1.1	1.3	1.4																									
Ripple Current and Temperature Multipliers	<table><tr><td>Temperature (℃)</td><td>40</td><td>60</td><td>85</td><td>105</td></tr><tr><td>Multiplier</td><td>2.44</td><td>2.16</td><td>2.00</td><td>1.00</td></tr></table>						Temperature (℃)	40	60	85	105	Multiplier	2.44	2.16	2.00	1.00														
Temperature (℃)	40	60	85	105																										
Multiplier	2.44	2.16	2.00	1.00																										
Failure percentage Failure rate	When the failure percentage / failure rate is required, please contact with us for further discussion.																													

Diagram of Dimensions



Unit: mm

φ D	P	W1	W2	H	h	a	b	c
51	22.0	31.8	36.5	30	24	7	14.0	4.5
63.5	28.6	38.1	42.6	30	24	7	14.0	4.5
76.2	32.0	44.5	49.2	30	24	7	14.0	5.0
89	32.0	50.8	55.6	30	24	7	14.0	5.0

Screw Specifications:

Plug hexagon-head screw: M5×0.8×10

Max. screw tightening torque: 3.23Nm



Dimension and Permissible Ripple Current

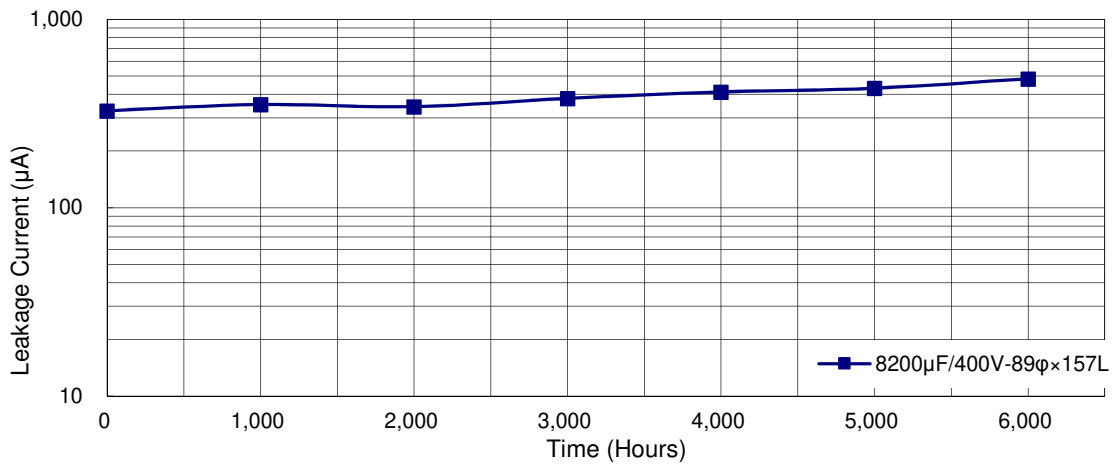
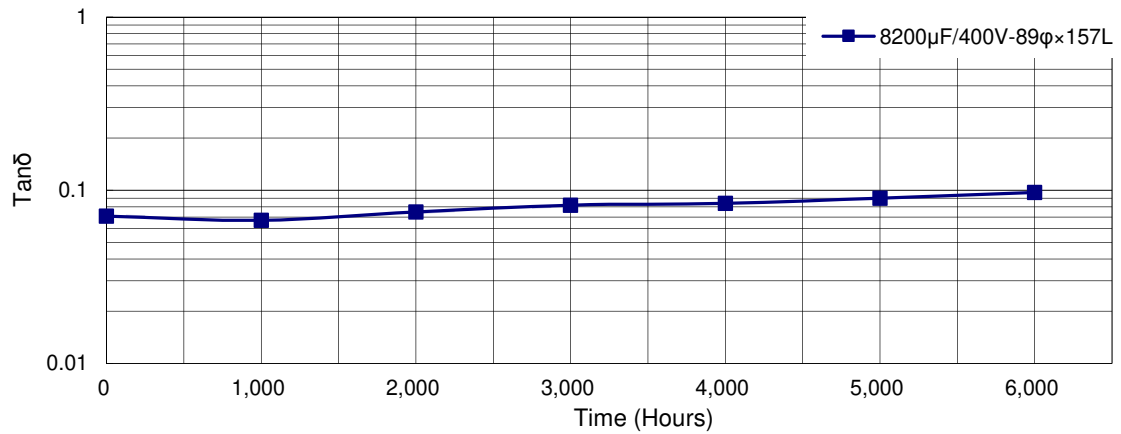
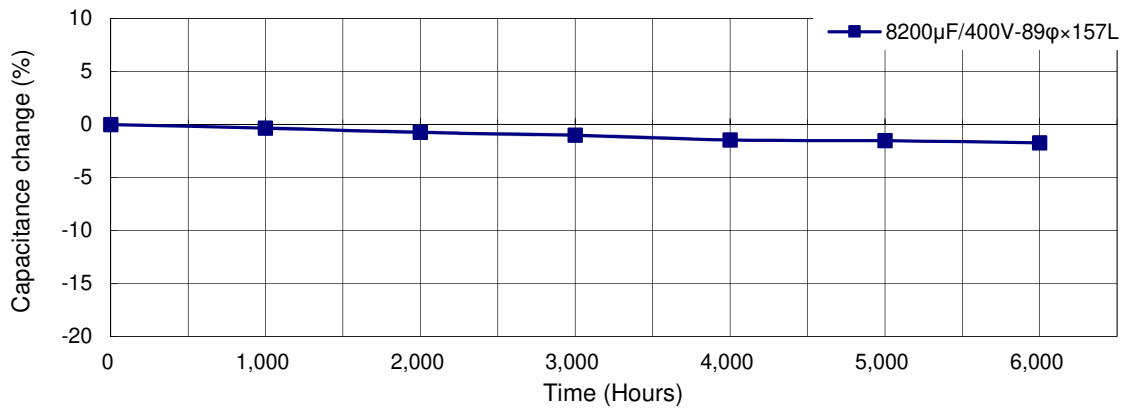
Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
350	1,000	51 × 75	3.9	0.15	199	1.77	MGK102M2V--B075
	1,200	51 × 75	4.2	0.15	166	1.94	MGK122M2V--B075
	1,500	51 × 96	5.2	0.15	133	2.17	MGK152M2V--B096
	1,800	51 × 96	5.7	0.15	111	2.38	MGK182M2V--B096
	2,200	51 × 130	7.1	0.15	90.5	2.63	MGK222M2V--B130
	2,700	63.5 × 96	7.7	0.15	73.7	2.92	MGK272M2V--C096
	3,300	63.5 × 115	9.1	0.15	60.3	3.22	MGK332M2V--C115
	3,900	63.5 × 130	10.4	0.15	51.0	3.50	MGK392M2V--C130
	4,700	63.5 × 155	12.2	0.15	42.3	3.85	MGK472M2V--C155
	4,700	76.2 × 115	11.5	0.15	42.3	3.85	MGK472M2V--D115
	5,600	76.2 × 130	13.1	0.15	35.5	4.20	MGK562M2V--D130
	6,800	76.2 × 155	15.5	0.15	29.3	4.63	MGK682M2V--D155
400	8,200	89 × 157	18.1	0.15	24.3	5.00	MGK822M2V--E157
	10,000	89 × 157	19.9	0.15	19.9	5.00	MGK103M2V--E157
400	1,000	51 × 75	3.9	0.15	199	1.90	MGK102M2G--B075
	1,200	51 × 96	4.6	0.15	166	2.08	MGK122M2G--B096
	1,500	51 × 115	5.6	0.15	133	2.32	MGK152M2G--B115
	1,800	51 × 130	6.4	0.15	111	2.55	MGK182M2G--B130
	2,200	63.5 × 96	6.9	0.15	90.5	2.81	MGK222M2G--C096
	2,700	63.5 × 115	8.2	0.15	73.7	3.12	MGK272M2G--C115
	3,300	63.5 × 130	9.5	0.15	60.3	3.45	MGK332M2G--C130
	3,900	63.5 × 155	11.1	0.15	51.0	3.75	MGK392M2G--C155
	3,900	76.2 × 115	10.4	0.15	51.0	3.75	MGK392M2G--D115
	4,700	76.2 × 130	12.0	0.15	42.3	4.11	MGK472M2G--D130
	5,600	76.2 × 155	14.0	0.15	35.5	4.49	MGK562M2G--D155
	6,800	89 × 157	16.5	0.15	29.3	4.95	MGK682M2G--E157
450	8,200	89 × 157	18.1	0.15	24.3	5.00	MGK822M2G--E157
	1,000	51 × 96	4.2	0.15	199	2.01	MGK102M2W--B096
	1,200	51 × 115	5.0	0.15	166	2.20	MGK122M2W--B115
	1,500	51 × 130	5.9	0.15	133	2.46	MGK152M2W--B130
	1,800	63.5 × 96	6.3	0.15	111	2.70	MGK182M2W--C096
	2,200	63.5 × 115	7.4	0.15	90.5	2.98	MGK222M2W--C115
	2,700	63.5 × 130	8.6	0.15	73.7	3.31	MGK272M2W--C130
	2,700	76.2 × 115	8.7	0.15	73.7	3.31	MGK272M2W--D115
	3,300	63.5 × 155	10.2	0.15	60.3	3.66	MGK332M2W--C155
	3,300	76.2 × 130	10.1	0.15	60.3	3.66	MGK332M2W--D130
	3,900	76.2 × 155	11.7	0.15	51.0	3.97	MGK392M2W--D155
	4,700	76.2 × 155	12.9	0.15	42.3	4.36	MGK472M2W--D155
450	5,600	89 × 157	14.9	0.15	35.5	4.76	MGK562M2W--E157

Part Numbering System

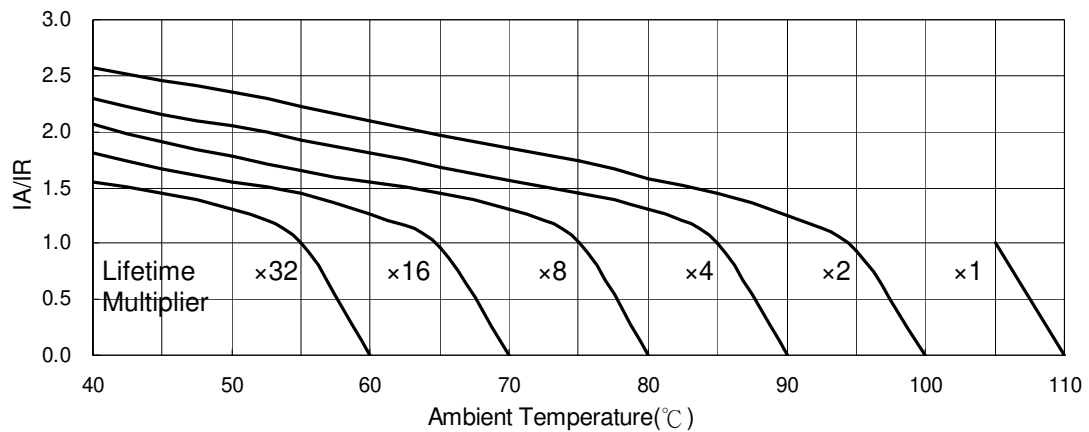
MGK Series	1000μF	±20%	350V	Plain case + Mounting clamp	M5 Post	51 φ × 75L	Pb-free Terminal + PVC Sleeve
MGK	102	M	2V	-	-	B075	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Case Type	Terminal type	Case size	Terminal and Sleeve Type
Example:			Example:			Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
1,000	102	M = ±20%	350	2V		63.5×115	C115
3,300	332	K = ±10%	400	2G		76.2×130	D130
10,000	103		450	2W		89 × 157	E157

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

Typical Endurance Curves



Useful Life Chart



IA: Actual ripple current

IR: Rated ripple current



Dimension and Permissible Ripple Current

Rated Voltage V _{DC}	Capacitance 120 Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 85°C A/rms	Tan δ at 120 Hz, 20°C	ESR 120 Hz, 20°C mΩ	LC 5 minutes mA	Part Number
350	1,200	51 × 75	5.6	0.15	166	1.94	MKR122M2V--B075
	1,500	51 × 75	6.3	0.15	133	2.17	MKR152M2V--B075
	1,800	51 × 96	7.7	0.15	111	2.38	MKR182M2V--B096
	2,200	51 × 96	8.5	0.15	90.5	2.63	MKR222M2V--B096
	2,700	51 × 130	10.7	0.15	73.7	2.92	MKR272M2V--B130
	3,300	51 × 130	11.9	0.15	60.3	3.22	MKR332M2V--B130
	3,900	63.5 × 115	13.8	0.15	51.0	3.50	MKR392M2V--C115
	4,700	63.5 × 130	15.9	0.15	42.3	3.85	MKR472M2V--C130
	5,600	63.5 × 155	18.6	0.15	35.5	4.20	MKR562M2V--C155
	5,600	76.2 × 115	18.6	0.15	35.5	4.20	MKR562M2V--D115
	6,800	76.2 × 130	21.6	0.15	29.3	4.63	MKR682M2V--D130
	8,200	76.2 × 155	25.7	0.15	24.3	5.00	MKR822M2V--D155
	10,000	89 × 157	28.8	0.15	19.9	5.00	MKR103M2V--E157
	12,000	89 × 157	31.5	0.15	16.6	5.00	MKR123M2V--E157
	15,000	89 × 196	38.9	0.15	13.3	5.00	MKR153M2V--E196
	18,000	89 × 236	45.2	0.15	11.1	5.00	MKR183M2V--E236
400	1,000	51 × 75	5.2	0.15	199	1.90	MKR102M2G--B075
	1,200	51 × 75	5.7	0.15	166	2.08	MKR122M2G--B075
	1,500	51 × 96	7.1	0.15	133	2.32	MKR152M2G--B096
	1,800	51 × 96	7.7	0.15	111	2.55	MKR182M2G--B096
	2,200	51 × 130	9.9	0.15	90.5	2.81	MKR222M2G--B130
	2,700	63.5 × 96	10.7	0.15	73.7	3.12	MKR272M2G--C096
	3,300	63.5 × 115	12.7	0.15	60.3	3.45	MKR332M2G--C115
	3,900	63.5 × 130	14.7	0.15	51.0	3.75	MKR392M2G--C130
	3,900	76.2 × 100	15.3	0.15	51.0	3.75	MKR392M2G--D100
	4,700	63.5 × 155	17.5	0.15	42.3	4.11	MKR472M2G--C155
	4,700	76.2 × 110	18.3	0.15	42.3	4.11	MKR472M2G--D110
	5,600	63.5 × 195	21.1	0.15	35.5	4.49	MKR562M2G--C195
	5,600	76.2 × 130	19.9	0.15	35.5	4.49	MKR562M2G--D130
	6,800	76.2 × 155	23.0	0.15	29.3	4.95	MKR682M2G--D155
	8,200	89 × 157	26.3	0.15	24.3	5.00	MKR822M2G--E157
450	1,000	51 × 75	4.5	0.15	199	2.01	MKR102M2W--B075
	1,200	51 × 96	5.3	0.15	166	2.20	MKR122M2W--B096
	1,500	51 × 115	6.8	0.15	133	2.46	MKR152M2W--B115
	1,800	51 × 130	7.9	0.15	111	2.70	MKR182M2W--B130
	2,200	63.5 × 96	8.4	0.15	90.5	2.98	MKR222M2W--C096
	2,700	63.5 × 115	10.5	0.15	73.7	3.31	MKR272M2W--C115
	3,300	63.5 × 130	12.5	0.15	60.3	3.66	MKR332M2W--C130
	3,900	76.2 × 115	14.3	0.15	51.0	3.97	MKR392M2W--D115
	4,700	63.5 × 195	17.5	0.15	42.3	4.36	MKR472M2W--C195
	4,700	76.2 × 130	16.1	0.15	42.3	4.36	MKR472M2W--D130
	5,600	76.2 × 155	19.2	0.15	35.5	4.76	MKR562M2W--D155
	6,800	89 × 157	23.6	0.15	29.3	5.00	MKR682M2W--E157
	8,200	89 × 157	25.3	0.15	24.3	5.00	MKR822M2W--E157
	10,000	89 × 196	30.2	0.15	19.9	5.00	MKR103M2W--E196
	12,000	89 × 236	35.0	0.15	16.6	5.00	MKR123M2W--E236

Part Numbering System

MKR Series	3300μF	±20%	350V	Plain case + Mounting clamp	M5 Post	51 φ × 130L	Pb-free Terminal + PVC Sleeve
MKR	332	M	2V	-	-	B130	
Series Name	Capacitance	Capacitance tolerance	Rated voltage	Case Type	Terminal type	Case size	Terminal and Sleeve Type
Example:	Example:		Example:			Example:	
Cap.	Symbol		Voltage	Symbol		φ D×L	Code
1,000	102	M = ±20%	350	2V		63.5×130	C130
3,300	332	K = ±10%	400	2G		76.2×115	D115
10,000	103		450	2W		89 × 157	E157

Note: For more details, please refer to "Part Numbering System - Screw Type" on page 240.

