Selection Chart

TUR / TSR
-40 ~ +125℃
High Ripple Current
125℃, 3,000 Hrs

TUK / TSK
-40 ~ +125℃
Long Life Time
125℃, 5,000 Hrs
140℃, 2,000 Hrs

TUP / TSP
-40 ~ +150℃
High Temperature
125℃, 10,000 Hrs
150℃, 2,000 Hrs

Capacitor Series Table

Series	Highlights	Temperature	Rated Voltage Range (V, DC)	Capacitance Range (μF)	Page
TUR / TSR	High Ripple Current	-40 ~ 125℃	25 ~ 40	1,400 ~ 10,000	3 ~ 4
TUK / TSK	High Reliability, Long Lifetime	-40 ~ 125℃	25 ~ 100	220 ~ 10,000	5 ~ 6
TUP / TSP	High Temperature	-40 ~ 150℃	25 ~ 63	360 ~ 4,500	7 ~ 8

Part Numbering System

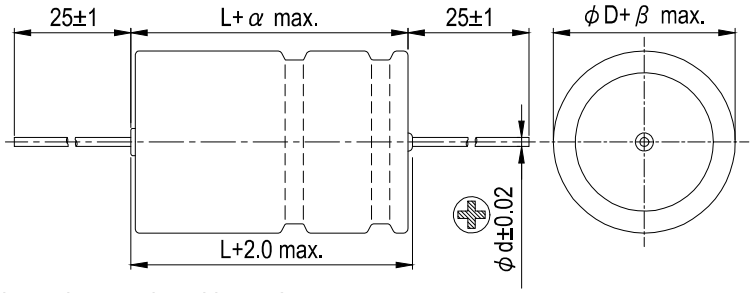
Product Code Guide

Digit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	T	U	R	1	7	2	Q	1	E	A	L	-	1	8	3	0		

Digit	Description
1 ~ 3	Series Name When the series name is represented by only two letters, a hyphen, "-", is used to fill the third space.
4 ~ 6	Capacitance Capacitance: 220, 300, 700, 1,000, 4,700, 5,600, 10,000 Code: 221, 301, 701, 102, 472, 562, 103
7	Capacitance Tolerance Tolerance: K, M, N, Q Code: ±10%, ±20%, ±30%, -10 ~ +30%
8 ~ 9	Rated Voltage Voltage (WV): 25, 35, 40, 50, 63, 75, 100 Code: 1E, 1V, 1G, 1H, 1J, 1R, 2A
10 ~ 11	Lead Forming AL: Axial-lead, SS: Soldering star, PP: Two plate
12	Sealing Type - : Standard
13 ~ 16	Case Size ϕDxL: 16x25, 16x30, 16x35, 16x39, 18x25, 18x30, 18x35, 18x39, 21x30, 21x35, 21x39, 21x49 Code: 1625, 1630, 1635, 1639, 1825, 1830, 1835, 1839, 2130, 2135, 2139, 2149
17	Lead Wire and Marking Type
18	Supplement Code: For special control purposes

Dimensional and Lead Forming Drawings

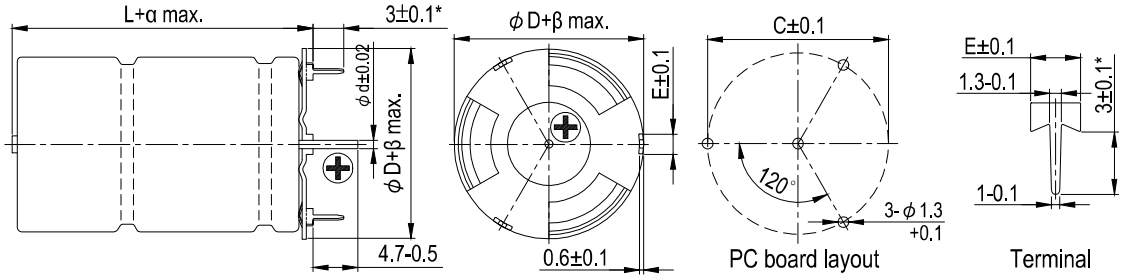
Axial-lead capacitors



Dimensions and packing units

φD × L mm	φD+β (max.) × L+α (max.) mm	φd mm	Q'ty / Tray pcs	Q'ty / Box pcs
16 × 25	16.5 × 25.5	1.0	45	315
16 × 30	16.5 × 30.5	1.0	45	315
16 × 35	16.5 × 35.5	1.0	45	315
16 × 39	16.5 × 39.5	1.0	45	315
18 × 25	18.5 × 25.5	1.0	45	315
18 × 30	18.5 × 30.5	1.0	45	315
18 × 35	18.5 × 35.5	1.0	45	315
18 × 39	18.5 × 39.5	1.0	45	315
21 × 30	21.5 × 30.5	1.0	45	270
21 × 35	21.5 × 35.5	1.0	45	270
21 × 39	21.5 × 39.5	1.0	45	270
21 × 49	21.5 × 49.5	1.0	35	210

Soldering star capacitors



Dimensions and packing units

φD × L mm	φD+β (max.) × L+α (max.) mm	φd mm	C ± 0.1 mm	E ± 0.1 mm	Q'ty / Tray pcs	Q'ty / Box pcs
16 × 25	17.2 × 27.5	1.0	16.5	3.1	45	315
16 × 30	17.2 × 32.5	1.0	16.5	3.1	45	315
16 × 35	17.2 × 37.5	1.0	16.5	3.1	45	315
16 × 39	17.2 × 41.5	1.0	16.5	3.1	35	245
18 × 25	19.2 × 27.5	1.0	18.5	3.1	45	315
18 × 30	19.2 × 32.5	1.0	18.5	3.1	45	315
18 × 35	19.2 × 37.5	1.0	18.5	3.1	45	315
18 × 39	19.2 × 41.5	1.0	18.5	3.1	35	245
21 × 30	22.2 × 32.5	1.0	21.5	3.6	45	270
21 × 35	22.2 × 37.5	1.0	21.5	3.6	45	270
21 × 39	22.2 × 41.5	1.0	21.5	3.6	35	210
21 × 49	22.2 × 51.5	1.0	21.5	3.6	35	210

TUR/TSR Series

Key Features

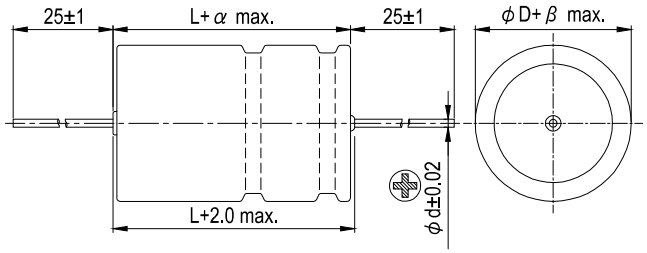
- High vibration resitance
- High ripple current capability
- Low ESR
- Useful life 3,000 hours at 125℃
- Shelf life up to 15 years at a storage temperature of 30℃
- RoHS compliance

Specifications

Rated Voltage V_R	25 ~ 40 V_{DC}	
Surge Voltage V_S	1.15 · V_R	
Rated Capacitance C_R	1,400 ~ 10,000 μF	at 100 Hz, 20℃
Capacitance Tolerance	-10% ~ +30%	
Leakage Current I_{leak} (at 20℃)	$I_{leak} \leq 0.006\ \mu A \cdot CV + 4\mu A$ C = Rated capacitance in μF, V = Rated DC working voltage in V	After 5 minutes
Useful Life 125℃: V_R , $I_{AC,R}$	3,000 Hrs	Requirements: Cap.: Within ± 30% of initial value ESR: Within 300% of specified value I_{leak} : Within initial specified limit
Voltage Endurance Test 125℃: V_R	2,000 Hrs	Requirements: Cap.: Within ± 10% of initial value ESR: Within 130% of specified value I_{leak} : Within initial specified limit
Vibration Resistance	The wires of the Axial-lead capacitor should be mounted at a distance of (6 ± 1) mm from its body, which is additionally clamped. Soldering star capacitors should be mounted in a upright position and its terminals should be firmly soldered to the PCB and body additionally clamped. Vibration test according to IEC 60068-2-6, test Fc: Frequency range 10 Hz ~ 2 KHz, max. displacement amplitude 1.5 mm, max. acceleration 20 g, in total 6 hours (3*2 hours).	
Detail Specification Sectional Specification	Similar to CECC 30301-802 IEC 60384-4	

Product Dimensions

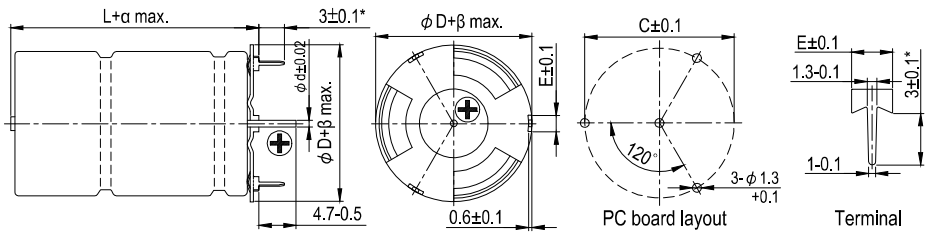
TUR Series



Unit: mm

ϕD	16	18	21
ϕd	1.0		
α	0.5		
β	0.5		

TSR Series



Unit: mm

ϕD	16	18	21
C	16.5	18.5	21.5
E	3.1		3.6
ϕd	1.0		
α	2.5		
β	1.2		

Characteristics and Permissible Ripple Current

Working Voltage (V_{DC})	*Capacitance* 100 Hz, 20℃ (μF)	ϕ D×L (mm)	ESR_{max} 100 Hz, 20℃ (Ω)	ESR_{max} 10k Hz, 20℃ (Ω)	$Imp._{max}$ 100k Hz, 20℃ (Ω)	$I_{AC,R}$ 10k Hz, 125℃ (A_{rms})	Axial-lead Part Number	Soldering star Part Number
25	2,400	18 × 25	0.052	0.032	0.031	3.1	TUR242Q1EAL-1825	TSR242Q1ESS-1825
	2,500	16 × 30	0.059	0.039	0.037	2.6	TUR252Q1EAL-1630	TSR252Q1ESS-1630
	3,300	18 × 30	0.039	0.024	0.023	3.8	TUR332Q1EAL-1830	TSR332Q1ESS-1830
	3,600	16 × 39	0.042	0.028	0.027	3.4	TUR362Q1EAL-1639	TSR362Q1ESS-1639
	4,700	18 × 39	0.028	0.017	0.017	5.1	TUR472Q1EAL-1839	TSR472Q1ESS-1839
	7,200	21 × 39	0.022	0.014	0.014	5.4	TUR722Q1EAL-2139	TSR722Q1ESS-2139
	10,000	21 × 49	0.016	0.011	0.011	6.8	TUR103Q1EAL-2149	TSR103Q1ESS-2149
40	1,400	16 × 30	0.072	0.038	0.037	2.6	TUR142Q1GAL-1630	TSR142Q1GSS-1630
	1,800	16 × 35	0.057	0.031	0.030	3.0	TUR182Q1GAL-1635	TSR182Q1GSS-1635
	1,800	18 × 30	0.050	0.024	0.023	3.8	TUR182Q1GAL-1830	TSR182Q1GSS-1830
	2,000	16 × 39	0.051	0.027	0.027	3.4	TUR202Q1GAL-1639	TSR202Q1GSS-1639
	2,600	18 × 39	0.035	0.017	0.017	5.1	TUR262Q1GAL-1839	TSR262Q1GSS-1839
	3,900	21 × 39	0.027	0.014	0.014	5.4	TUR392Q1GAL-2139	TSR392Q1GSS-2139
	5,100	21 × 49	0.021	0.011	0.011	6.8	TUR512Q1GAL-2149	TSR512Q1GSS-2149

Part Numbering System

TUR series	1,400 μF	-10% ~ +30%	40V	Axial-lead		16ϕ×30L	Pb-free Terminal
TUR	**142**	**Q**	**1G**	**AL**	**-**	**1630**	
Series name	Capacitance	Capacitance tolerance	Rated voltage	Lead forming	Sealing type	Case size	Lead wire and marking type

Note: Please refer to “Part Numbering System” section on page 1 for more details.

TUK/TSK Series

Key Features

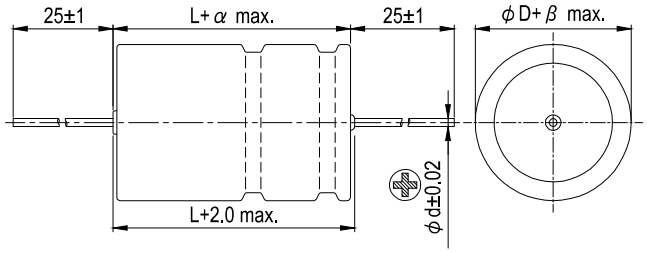
- High vibration resistance
- High ripple current capability
- Low ESR
- Useful life 5,000 hours at 125℃
- Shelf life up to 15 years at a storage temperature of 30℃
- RoHS compliance

Specifications

Rated Voltage V_R	25 ~ 100 V_{DC}	
Surge Voltage V_S	1.15 · V_R	
Rated Capacitance C_R	220 ~ 10,000 μF	at 100 Hz, 20℃
Capacitance Tolerance	-10% ~ +30%	
Leakage Current I_{leak} (at 20℃)	$I_{leak} \leq 0.006\mu A \cdot CV + 4\mu A$ C = Rated capacitance in μF, V = Rated DC working voltage in V	After 5 minutes
Useful Life 125℃: V_R , $I_{AC,R}$ 140℃: V_R , 0.6 · $I_{AC,R}$	5,000 Hrs 2,000 Hrs	Requirements: Cap.: Within ± 30% of initial value ESR: Within 300% of specified value I_{leak} : Within initial specified limit
Voltage Endurance Test 125℃: V_R	2,000 Hrs	Requirements: Cap.: Within ± 10% of initial value ESR: Within 130% of specified value I_{leak} : Within initial specified limit
Vibration Resistance	The wires of the Axial-Lead capacitor should be mounted at a distance of (6±1) mm from its body, which is additionally clamped. Soldering star capacitors should be mounted in a upright position and its terminals should be firmly soldered to the PCB and body additionally clamped. Vibration test according to IEC 60068-2-6, test Fc: Frequency range 10 Hz ~ 2 KHz, max. displacement amplitude 1.5 mm, max. acceleration 20 g, in total 6 hours(3*2 hours).	
Detail Specification Sectional Specification	Similar to CECC 30301-802 IEC 60384-4	

Product Dimensions

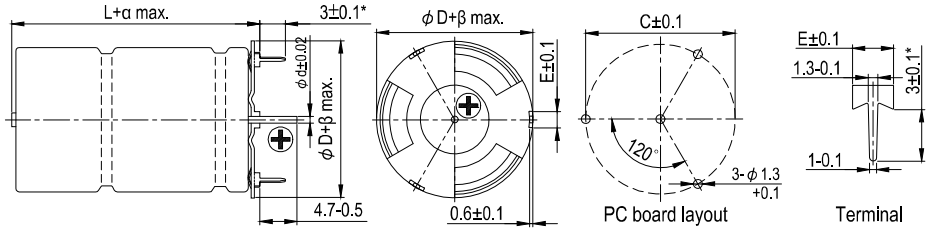
TUK Series



Unit: mm

ϕD	16	18	21
ϕd	1.0		
α	0.5		
β	0.5		

TSK Series



Unit: mm

ϕD	16	18	21
C	16.5	18.5	21.5
E	3.1		3.6
ϕd	1.0		
α	2.5		
β	1.2		

Characteristics and Permissible Ripple Current

Working Voltage (V_{DC})	*Capacitance* 100 Hz, 20℃ (μF)	ϕ D×L (mm)	ESR_{max} 100 Hz, 20℃ (Ω)	ESR_{max} 10k Hz, 20℃ (Ω)	$Imp._{max}$ 100k Hz, 20℃ (Ω)	$I_{AC, R}$ 10k Hz, 125℃ (A_{rms})	$I_{AC, R}$ 10k Hz, 140℃ (A_{rms})	Axial-lead Part Number	Soldering star Part Number
25	2,400	18 × 25	0.078	0.055	0.054	3.6	2.2	TUK242Q1EAL-1825	TSK242Q1ESS-1825
	2,500	16 × 30	0.084	0.061	0.059	3.2	1.9	TUK252Q1EAL-1630	TSK252Q1ESS-1630
	3,300	18 × 30	0.058	0.041	0.040	4.5	2.7	TUK332Q1EAL-1830	TSK332Q1ESS-1830
	3,600	16 × 39	0.059	0.043	0.042	4.3	2.6	TUK362Q1EAL-1639	TSK362Q1ESS-1639
	4,700	18 × 39	0.041	0.029	0.029	6.0	3.6	TUK472Q1EAL-1839	TSK472Q1ESS-1839
	7,200	21 × 39	0.030	0.022	0.022	6.8	4.1	TUK722Q1EAL-2139	TSK722Q1ESS-2139
	10,000	21 × 49	0.023	0.017	0.016	8.6	5.2	TUK103Q1EAL-2149	TSK103Q1ESS-2149
40	1,400	16 × 30	0.096	0.060	0.058	3.2	1.9	TUK142Q1GAL-1630	TSK142Q1GSS-1630
	1,800	16 × 35	0.076	0.048	0.046	3.8	2.3	TUK182Q1GAL-1635	TSK182Q1GSS-1635
	1,800	18 × 30	0.068	0.041	0.040	4.5	2.7	TUK182Q1GAL-1830	TSK182Q1GSS-1830
	2,000	16 × 39	0.068	0.043	0.041	4.3	2.6	TUK202Q1GAL-1639	TSK202Q1GSS-1639
	2,600	18 × 39	0.048	0.029	0.028	6.0	3.6	TUK262Q1GAL-1839	TSK262Q1GSS-1839
	3,900	21 × 39	0.035	0.022	0.022	6.8	4.1	TUK392Q1GAL-2139	TSK392Q1GSS-2139
	5,100	21 × 49	0.027	0.017	0.017	8.6	5.2	TUK512Q1GAL-2149	TSK512Q1GSS-2149
63	620	16 × 25	0.158	0.088	0.082	2.5	1.5	TUK621Q1JAL-1625	TSK621Q1JSS-1625
	750	18 × 25	0.120	0.058	0.056	3.5	2.1	TUK751Q1JAL-1825	TSK751Q1JSS-1825
	820	16 × 30	0.120	0.062	0.060	3.1	1.9	TUK821Q1JAL-1630	TSK821Q1JSS-1630
	1,000	16 × 35	0.098	0.051	0.049	3.7	2.2	TUK102Q1JAL-1635	TSK102Q1JSS-1635
	1,000	18 × 30	0.090	0.044	0.043	4.3	2.6	TUK102Q1JAL-1830	TSK102Q1JSS-1830
	1,200	16 × 39	0.082	0.043	0.042	4.2	2.5	TUK122Q1JAL-1639	TSK122Q1JSS-1639
	1,300	18 × 35	0.070	0.034	0.033	5.2	3.1	TUK132Q1JAL-1835	TSK132Q1JSS-1835
	1,400	21 × 30	0.068	0.034	0.033	4.9	2.9	TUK142Q1JAL-2130	TSK142Q1JSS-2130
	1,500	18 × 39	0.061	0.030	0.029	5.9	3.5	TUK152Q1JAL-1839	TSK152Q1JSS-1839
	1,800	21 × 35	0.053	0.037	0.026	5.9	3.5	TUK182Q1JAL-2135	TSK182Q1JSS-2135
	2,000	21 × 39	0.048	0.024	0.023	6.6	4.0	TUK202Q1JAL-2139	TSK202Q1JSS-2139
	2,700	21 × 49	0.036	0.019	0.018	8.4	5.0	TUK272Q1JAL-2149	TSK272Q1JSS-2149
75	500	16 × 30	0.180	0.088	0.085	2.6	1.6	TUK501Q1RAL-1630	TSK501Q1RSS-1630
	700	18 × 30	0.138	0.071	0.069	2.8	1.7	TUK701Q1RAL-1830	TSK701Q1RSS-1830
	750	16 × 39	0.122	0.060	0.058	3.5	2.1	TUK751Q1RAL-1639	TSK751Q1RSS-1639
	1,000	18 × 39	0.097	0.050	0.049	3.8	2.3	TUK102Q1RAL-1839	TSK102Q1RSS-1839
	1,500	21 × 39	0.062	0.031	0.030	5.6	3.4	TUK152Q1RAL-2139	TSK152Q1RSS-2139
	2,000	21 × 49	0.047	0.023	0.023	7.1	4.3	TUK202Q1RAL-2149	TSK202Q1RSS-2149
100	220	16 × 30	0.350	0.160	0.157	2.0	1.2	TUK221Q2AAL-1630	TSK221Q2ASS-1630
	470	18 × 39	0.170	0.075	0.073	3.7	2.2	TUK471Q2AAL-1839	TSK471Q2ASS-1839
	680	21 × 39	0.120	0.058	0.056	4.6	2.8	TUK681Q2AAL-2139	TSK681Q2ASS-2139
	1,000	21 × 49	0.085	0.044	0.043	6.1	3.7	TUK102Q2AAL-2149	TSK102Q2ASS-2149

Part Numbering System

TUK series	1,400 μF	-10% ~ +30%	40V	Axial-lead		16ϕ×30L	Pb-free Terminal
TUK	**142**	**Q**	**1G**	**AL**	**-**	**1630**	
Series name	Capacitance	Capacitance tolerance	Rated voltage	Lead forming	Sealing type	Case size	Terminal and Sleeve Type

Note: Please refer to “Part Numbering System” section on page 1 for more details.

TUP/TSP Series

Key Features

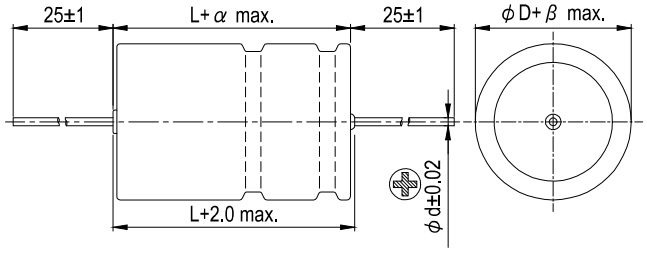
- High vibration resistance
- High ripple current capability
- Low ESR
- Useful Life 2,000 hours at 150℃
- Shelf life up to 15 years at a storage temperature of 30℃
- RoHS compliance

Specifications

Rated Voltage V_R	25 ~ 63 V_{DC}	
Surge Voltage V_S	1.15 · V_R	
Rated Capacitance C_R	360 ~ 4,500 μF	at 100 Hz, 20℃
Capacitance Tolerance	-10% ~ +30%	
Leakage Current I_{leak} (at 20℃)	$I_{leak} \leq 0.006\mu A \cdot CV + 4\mu A$ C = Rated capacitance in μF, V = Rated DC working voltage in V	After 5 minutes
Useful Life 125℃: V_R, $I_{AC,\,R}$ 150℃: V_R, 0.5 · $I_{AC,\,R}$	10,000 Hrs 2,000 Hrs	Requirements: Cap.: Within ± 30% of initial value ESR: Within 300% of specified value I_{leak} : Within initial specified limit
Voltage Endurance Test 125℃: V_R	4,000 Hrs for $V_R \leqq$ 40V DC 3,000 Hrs for V_R = 63V DC	Requirements: Cap.: Within ±10% of initial value ESR: Within 130% of specified value I_{leak} : Within initial specified limit
Vibration Resistance	The wires of the Axial-Lead capacitor should be mounted at a distance of (6±1) mm from its body, which is additionally clamped. Soldering star capacitors should be mounted in a upright position and its terminals should be firmly soldered to the PCB and body additionally clamped. Vibration test according to IEC 60068-2-6, test Fc: Frequency range 10 Hz ~ 2 KHz, max. displacement amplitude 1.5 mm, max. acceleration 20 g, in total 6 hours(3*2 hours).	
Detail Specification Sectional Specification	Similar to CECC 30301-802 IEC 60384-4	

Product Dimensions

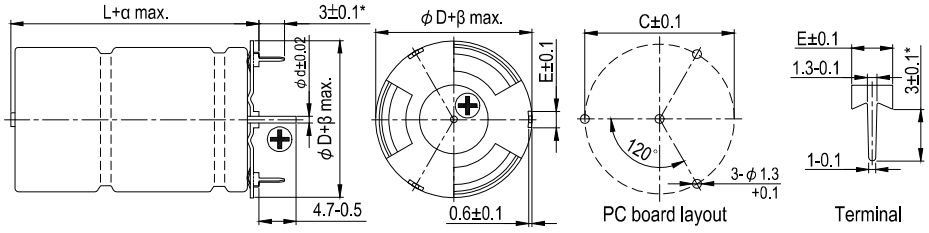
TUP Series



Unit: mm

ϕD	16	18	21
ϕd	1.0		
α	0.5		
β	0.5		

TSP Series



Unit: mm

ϕD	16	18	21
C	16.5	18.5	21.5
E	3.1		3.6
ϕd	1.0		
α	2.5		
β	1.2		

Characteristics and Permissible Ripple Current

Working Voltage (V_{DC})	*Capacitance* 100 Hz, 20℃ (μF)	ϕ D×L (mm)	ESR_{max} 100 Hz, 20℃ (Ω)	ESR_{max} 10k Hz, 20℃ (Ω)	$Imp._{max}$ 100k Hz, 20℃ (Ω)	$I_{AC, R}$ 10k Hz, 125℃ (A_{rms})	$I_{AC, max}$ 10k Hz, 150℃ (A_{rms})	Axial-lead Part Number	Soldering star Part Number
25	1,000	16 × 25	0.098	0.053	0.050	3.6	1.8	TUP102Q1EAL-1625	TSP102Q1ESS-1625
	1,200	18 × 25	0.080	0.043	0.041	4.4	2.2	TUP122Q1EAL-1825	TSP122Q1ESS-1825
	1,300	16 × 30	0.075	0.041	0.039	4.5	2.2	TUP132Q1EAL-1630	TSP132Q1ESS-1630
	1,500	16 × 35	0.065	0.035	0.034	5.2	2.6	TUP152Q1EAL-1635	TSP152Q1ESS-1635
	1,700	18 × 30	0.057	0.031	0.029	5.5	2.7	TUP172Q1EAL-1830	TSP172Q1ESS-1830
	1,800	16 × 39	0.055	0.030	0.028	5.9	2.9	TUP182Q1EAL-1639	TSP182Q1ESS-1639
	2,200	18 × 39	0.044	0.024	0.023	7.2	3.6	TUP222Q1EAL-1839	TSP222Q1ESS-1839
	3,300	21 × 39	0.031	0.017	0.016	8.3	4.1	TUP332Q1EAL-2139	TSP332Q1ESS-2139
	4,500	21 × 49	0.023	0.013	0.012	10.4	5.2	TUP452Q1EAL-2149	TSP452Q1ESS-2149
40	560	16 × 25	0.129	0.053	0.050	3.6	1.8	TUP561Q1GAL-1625	TSP561Q1GSS-1625
	680	18 × 25	0.105	0.043	0.041	4.4	2.2	TUP681Q1GAL-1825	TSP681Q1GSS-1825
	720	16 × 30	0.100	0.042	0.039	4.5	2.2	TUP721Q1GAL-1630	TSP721Q1GSS-1630
	820	16 × 35	0.088	0.036	0.034	5.2	2.6	TUP821Q1GAL-1635	TSP821Q1GSS-1635
	900	18 × 30	0.080	0.033	0.031	5.4	2.7	TUP901Q1GAL-1830	TSP901Q1GSS-1830
	1,000	16 × 39	0.073	0.030	0.029	5.9	2.9	TUP102Q1GAL-1639	TSP102Q1GSS-1639
	1,400	18 × 39	0.052	0.022	0.020	7.4	3.7	TUP142Q1GAL-1839	TSP142Q1GSS-1839
	2,000	21 × 39	0.038	0.016	0.016	8.4	4.2	TUP202Q1GAL-2139	TSP202Q1GSS-2139
	2,700	21 × 49	0.028	0.012	0.012	10.5	5.2	TUP272Q1GAL-2149	TSP272Q1GSS-2149
63	360	16 × 25	0.173	0.058	0.055	2.6	1.3	TUP361Q1JAL-1625	TSP361Q1JSS-1625
	470	18 × 25	0.132	0.043	0.041	3.3	1.6	TUP471Q1JAL-1825	TSP471Q1JSS-1825
	510	16 × 30	0.124	0.042	0.040	3.4	1.7	TUP511Q1JAL-1630	TSP511Q1JSS-1630
	620	16 × 35	0.102	0.034	0.033	4.0	2.0	TUP621Q1JAL-1635	TSP621Q1JSS-1635
	620	18 × 30	0.100	0.033	0.032	4.1	2.0	TUP621Q1JAL-1830	TSP621Q1JSS-1830
	750	16 × 39	0.084	0.029	0.027	4.5	2.2	TUP751Q1JAL-1639	TSP751Q1JSS-1639
	820	18 × 35	0.076	0.026	0.024	5.0	2.5	TUP821Q1JAL-1835	TSP821Q1JSS-1835
	910	18 × 39	0.069	0.023	0.022	5.5	2.7	TUP911Q1JAL-1839	TSP911Q1JSS-1839
	910	21 × 30	0.071	0.025	0.024	4.8	2.4	TUP911Q1JAL-2130	TSP911Q1JSS-2130
	1,100	21 × 35	0.058	0.021	0.020	5.6	2.8	TUP112Q1JAL-2135	TSP112Q1JSS-2135
	1,300	21 × 39	0.050	0.018	0.017	6.4	3.2	TUP132Q1JAL-2139	TSP132Q1JSS-2139
	1,800	21 × 49	0.036	0.013	0.013	8.0	4.0	TUP182Q1JAL-2149	TSP182Q1JSS-2149

Part Numbering System

TUP series	1,000 μF	-10% ~ +30%	40V	Axial-lead		16ϕ×39L	Pb-free Terminal
TUP	**102**	**Q**	**1G**	**AL**	**-**	**1639**	
Series name	Capacitance	Capacitance tolerance	Rated voltage	Lead forming	Sealing type	Case size	Lead wire and marking type

Note: Please refer to “Part Numbering System” section on page 1 for more details.