Multi-layer ceramic chip capacitors

MCH18 (1608 (0603) size, chip capacitor)

●Features

1) Miniture, light weight
2) Achieved high capacitance by thin and multi layer technology
3) Lead-free plating terminal
4) No polarity

●Quick Reference

The design and specifications are subject to change without prior notice. Please check the most recent technical specifications prior to placing orders or using the product. For more detail information regarding packaging style code, please check product designation.

●Thermal compensation

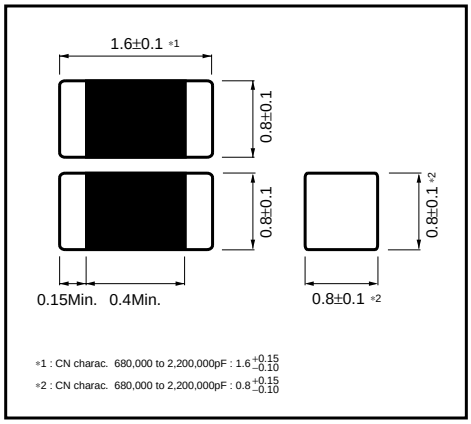
Part No.	Size code	Temperature characteristics (ppm/°C) code		Operating temp. range (°C)	Rated voltage (V)	Capacitance (pF)	Capacitance tolerance	Thickness (mm)
MCH18	1608 (0603)	A (AN)	0±120(CJ)	−55 to +125	50	0.5 to 3.9 (E24 Series) *	C(±0.25pF)	0.8 ± 0.1
			0±60(CH)			4 to 5 (E24 Series) *		
			0±30 (CG)(C0G)			5.1 to 9.1 (E24 Series) *	D(±0.5pF)	
						10 (E24 Series) *		
						11 to 820 (E24 Series)	J(±5%)	
						1,000 to 3,300 (E12 Series)		

* : 0.5pF/0.75pF/2pF/3pF/4pF/5pF/6pF/7pF/8pF/9pF available

●High dielectric constant

Part No.	Size code	code	Temperature characteristics	Operating temp. range (°C)	Rated voltage (V)	Capacitance (pF)	Capacitance tolerance	Thickness (mm)
MCH18	1608 (0603)	CN	0±10% (B)	−25 to +85	50	220 to 22,000 (E6 Series)	K(±10%)	0.8 ± 0.1
					25	33,000 to 100,000 (E6 Series)		
			0±15% (R) (X7R)	−55 to +125	50	220 to 100,000 (E6 Series)		
					25	33,000 to 100,000 (E6 Series)		
			0±15% (X5R)	−55 to +85	10	150,000 to 470,000 (E6 Series)		
						680,000 to 1,000,000 (E6 Series)		$0.8^{+0.15}_{-0.1}$
					6.3	2,200,000 (E6 Series)		
		FN	+30% , −80% (F)	−25 to +85	50	1,000 to 47,000 (E3 Series)	Z(+80% , −20%)	0.8 ± 0.1
					25	100,000 (E3 Series)		
					16	220,000 (E3 Series)		
					10	470,000 to 2,220,000 (E3 Series)		
					6.3	4,700,000 (E3 Series)		
			+22% , −82% (Y5V)	−30 to +85	50	1,000 to 47,000 (E3 Series)		
					25	100,000 (E3 Series)		
					16	220,000 (E3 Series)		
					10	470,000 to 2,200,000 (E3 Series)		
					6.3	4,700,000 (E3 Series)		

●**External dimensions** (Unit : mm)



●**Product designation**

Code	Prduct thickness	Packing specification	Reel	Basic ordering unit (pcs.)
K	**0.8mm**	Paper tape(width 8mm, pitch 4mm)	ϕ180mm (7in.)	4,000
L	**0.8mm**	Paper tape(width 8mm, pitch 4mm)	ϕ330mm (13in.)	16,000
C	**0.8mm**	Bulk case	–	15,000

Reel (ϕ180, ϕ330mm) : compatible with EIAJ ET-7200A
Bulk case : compatible with EIAJ ET-7201A

Part No. Packing Style

M	C	H	1	8	5	F	N	1	0	3	Z	K

Rated voltage

Code	Voltage
8	6.3V
4	10V
3	16V
2	25V
5	50V

Temperature characteristics code
: Refer to quick reference table.

Nominal capacitance	Capacitance tolerance	
	Code	Tolerance
3-digit designation according to IEC	**C**	±0.25pF (0.5 to 5pF)
	D	±0.5pF (5.1 to 10pF)
	J	±5% (11pF or more)
	K	±10%
	Z	+80%, −20%

●Product No. list

•Thermal compensation capacitors

Capacitance (pF)	Temperature		A・AN(CG) (COG) (CH) Characteristics
	Rated voltage (V)		50V
	Tolerance	Product thickness (mm)	Product No.
0.5	C (±0.25pF)	0.8 ± 0.1	MCH185A (AN) 0R5C∗
0.75			MCH185A (AN) R75C∗
1.0			MCH185A (AN) 010C∗
1.1			MCH185A (AN) 1R1C∗
1.2			MCH185A (AN) 1R2C∗
1.3			MCH185A (AN) 1R3C∗
1.5			MCH185A (AN) 1R5C∗
1.6			MCH185A (AN) 1R6C∗
1.8			MCH185A (AN) 1R8C∗
2.0			MCH185A (AN) 020C∗
2.2			MCH185A (AN) 2R2C∗
2.4			MCH185A (AN) 2R4C∗
2.7			MCH185A (AN) 2R7C∗
3.0			MCH185A (AN) 030C∗
3.3			MCH185A (AN) 3R3C∗
3.6			MCH185A (AN) 3R6C∗
3.9			MCH185A (AN) 3R9C∗
4.0			MCH185A (AN) 040C∗
4.3			MCH185A (AN) 4R3C∗
4.7			MCH185A (AN) 4R7C∗
5.0			MCH185A (AN) 050C∗
5.1	D (±0.5pF)		MCH185A (AN) 5R1D∗
5.6			MCH185A (AN) 5R6D∗
6			MCH185A (AN) 060D∗
6.2			MCH185A (AN) 6R2D∗
6.8			MCH185A (AN) 6R8D∗
7			MCH185A (AN) 070D∗
7.5			MCH185A (AN) 7R5D∗
8			MCH185A (AN) 080D∗
8.2			MCH185A (AN) 8R2D∗
9			MCH185A (AN) 090D∗
9.1			MCH185A (AN) 9R1D∗
10			MCH185A (AN) 100D∗
11	J (±5%)		MCH185A (AN) 110J∗
12			MCH185A (AN) 120J∗
13			MCH185A (AN) 130J∗
15			MCH185A (AN) 150J∗
16			MCH185A (AN) 160J∗
18			MCH185A (AN) 180J∗
20			MCH185A (AN) 200J∗
22			MCH185A (AN) 220J∗
24			MCH185A (AN) 240J∗
27			MCH185A (AN) 270J∗

Capacitance (pF)	Temperature		A・AN(CG) (COG) (CH) Characteristics
	Rated voltage (V)		50V
	Tolerance	Product thickness (mm)	Product No.
30	J (±5%)	0.8 ± 0.1	MCH185A (AN) 300J∗
33			MCH185A (AN) 330J∗
36			MCH185A (AN) 360J∗
39			MCH185A (AN) 390J∗
43			MCH185A (AN) 430J∗
47			MCH185A (AN) 470J∗
51			MCH185A (AN) 510J∗
56			MCH185A (AN) 560J∗
62			MCH185A (AN) 620J∗
68			MCH185A (AN) 680J∗
75			MCH185A (AN) 750J∗
82			MCH185A (AN) 820J∗
91			MCH185A (AN) 910J∗
100			MCH185A (AN) 101J∗
110			MCH185A (AN) 111J∗
120			MCH185A (AN) 121J∗
130			MCH185A (AN) 131J∗
150			MCH185A (AN) 151J∗
160			MCH185A (AN) 161J∗
180			MCH185A (AN) 181J∗
200			MCH185A (AN) 201J∗
220			MCH185A (AN) 221J∗
240			MCH185A (AN) 241J∗
270			MCH185A (AN) 271J∗
300			MCH185A (AN) 301J∗
330			MCH185A (AN) 331J∗
360			MCH185A (AN) 361J∗
390			MCH185A (AN) 391J∗
430			MCH185A (AN) 431J∗
470			MCH185A (AN) 471J∗
510			MCH185A (AN) 511J∗
560			MCH185A (AN) 561J∗
620			MCH185A (AN) 621J∗
680			MCH185A (AN) 681J∗
750			MCH185A (AN) 751J∗
820			MCH185A (AN) 821J∗
1,000			MCH185A (AN) 102J∗
1,200			MCH185A (AN) 122J∗
1,500			MCH185A (AN) 152J∗
1,800			MCH185A (AN) 182J∗
2,200			MCH185A (AN) 222J∗
2,700			MCH185A (AN) 272J∗
3,300			MCH185A (AN) 332J∗

∗ : Packaging Code

•High dielectric constant capacitors

Capacitance (pF)	Temperature		CN (R) (B) (X7R) Characteristics		CN (X5R) Characteristics	
	Rated voltage (V)		50V	25V	10V	6.3V
	Tolerance	Product thickness (mm)	Product No.	Product No.	Product No.	Product No.
220	K (±10%)	0.8 ± 0.1	MCH185CN221K∗			
330			MCH185CN331K∗			
470			MCH185CN471K∗			
680			MCH185CN681K∗			
1,000			MCH185CN102K∗			
1,500			MCH185CN152K∗			
2,200			MCH185CN222K∗			
3,300			MCH185CN332K∗			
4,700			MCH185CN472K∗			
6,800			MCH185CN682K∗			
10,000			MCH185CN103K∗			
15,000			MCH185CN153K∗			
22,000			MCH185CN223K∗			
33,000				MCH182CN333K∗		
47,000				MCH182CN473K∗		
68,000				MCH182CN683K∗		
100,000				MCH182CN104K∗		
150,000					MCH184CN154K∗	
220,000					MCH184CN224K∗	
330,000					MCH184CN334K∗	
470,000					MCH184CN474K∗	
680,000					MCH184CN684K∗	
1,000,000					MCH184CN105K∗	
2,200,000						MCH188CN225K∗

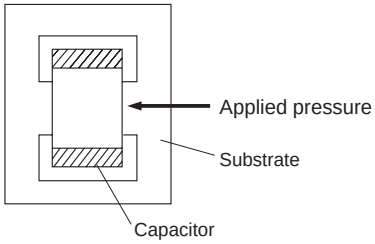
∗ : Packaging code

Capacitance (pF)	Temperature		FN (F) (Y5V) Characteristics				
	Rated voltage (V)		50V	25V	16V	10V	6.3V
	Tolerance	Product thickness (mm)	Product No.	Product No.	Product No.	Product No.	Product No.
1,000	Z (+80%, −20%)	0.8 ± 0.1	MCH185FN102Z∗				
2,200			MCH185FN222Z∗				
4,700			MCH185FN472Z∗				
10,000			MCH185FN103Z∗				
22,000			MCH185FN223Z∗				
47,000			MCH185FN473Z∗				
100,000			MCH185FN104Z∗	MCH182FN104Z∗			
220,000					MCH183FN224Z∗		
470,000						MCH184FN474Z∗	
1,000,000						MCH184FN105Z∗	
2,200,000						MCH184FN225Z∗	
4,700,000							MCH188FN475Z∗

∗ : Packaging code

●Performance and test method

<table>
<tr><th>No.</th><th>Items</th><th colspan="2">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td>1</td><td>Appearance and dimensions</td><td colspan="2">No marked defects shall be allowed for appearance.
Dimensions shall be as specified in the clause 4.</td><td>As per 4.4 of JIS C 5101-1.
As per 4.5 of JIS C 5101-10
Using a Magnifier.</td></tr>
<tr><td>2</td><td>Withstanding voltage</td><td colspan="2">No dielectrical breakdown or other damage shall be allowed.</td><td>As per 4.6 of JIS C 5101-1.
As per 4.6.4 of JIS C 5101-10
Voltage shall be applied as per Table1.
Table 1<table><tr><th>Charac-teristic</th><th>Voltage</th></tr><tr><td>A (AN)</td><td>300% Rated voltage</td></tr><tr><td>CN</td><td rowspan="2">250% Rated voltage</td></tr><tr><td>FN</td></tr></table>Voltage shall be applied for 1 to 5s with 50mA charging and discharging current.</td></tr>
<tr><td>3</td><td>Insulation resistance</td><td colspan="2">Not less than 10000MΩ or 500MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 10000MΩ or 100MΩ・μF, whichever is less.)</td><td>As per 4.5 of JIS C 5101-1.
As per 4.6.3 of JIS C 5101-10
Measurements shall be made after 60+/–5s period of the rated voltage applied.</td></tr>
<tr><td>4</td><td>Capacitance</td><td colspan="2">Capacitance shall be within specified tolerance range.</td><td>As per 4.7 of JIS C 5101-1.
As per 4.6.1 of JIS C 5101-10
Measurements shall be made under the conditions specified in Table 2.
Table 2<table><tr><th rowspan="2">Charac-teristic</th><th colspan="2">Frequency・Voltage</th></tr><tr><th>≤ 1000 pF</th><th>> 1000 pF</th></tr><tr><td>A (AN)</td><td>1+/–0.1MHz
1+/–0.1Vrms.</td><td>1+/–0.1kHz
1+/–0.1Vrms.</td></tr><tr><td>CN</td><td colspan="2" rowspan="2">1+/–0.1kHz
1+/–0.1Vrms.</td></tr><tr><td>FN</td></tr></table></td></tr>
<tr><td>5</td><td>Dielectric loss tangent</td><td>A (AN)</td><td>Capacitance < 30pF
tan δ ≤ 100/(400+20C)%
Capacitance ≥ 30pF
tan δ ≤ 0.1%</td><td>As per 4.8 of JIS C 5101-1.
As per 4.6.2 of JIS C 5101-10
Measurements shall be made under the conditions specified in Table 2.</td></tr>
<tr><td></td><td></td><td>C N</td><td>Rated voltage=25V
tan δ ≤ 3.0%
Rated voltage=16V
tan δ ≤ 5.0%</td><td></td></tr>
<tr><td></td><td></td><td>F N</td><td>Rated voltage=50V
tan δ ≤ 5.0%
Rated voltage=25V
tan δ ≤ 7.5%
Rated voltage=16V
tan δ ≤ 10.0%
Rated voltage=10V
tan δ ≤ 12.5%</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="3">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td rowspan="5">6</td><td colspan="2" rowspan="5">Temperature characteristic</td><td rowspan="3">A (AN)</td><td>CG・C0G</td><td>0+/–30ppm / °C
(–55°C to +125°C)</td><td rowspan="3">As per 4.24 of JIS C 5101-1.
As per 4.7 of JIS C 5101-10
Temperature coefficient shall be calculated at 20°C and 85°C.</td></tr>
<tr><td>CH</td><td>0+/–60ppm / °C
(–55°C to +125°C)</td></tr>
<tr><td>CJ</td><td>0+/–120ppm / °C
(–55°C to +125°C)</td></tr>
<tr><td rowspan="3">C N</td><td>X7R・R</td><td>+/–15%
(–55°C to +125°C)</td><td rowspan="3">As per 4.24 of JIS C 5101-1.
As per 4.7 of JIS C 5101-10
If required, measurements shall be made at a given temperature.</td></tr>
<tr><td>B</td><td>+/–10%
(–25°C to +85°C)</td></tr>
<tr><td>X5R</td><td>+/–15%
(–55°C to +85°C)</td></tr>
<tr><td>7</td><td colspan="2">Solderability</td><td colspan="3">More than 3/4 of each end termination shall be covered with new solder.</td><td>As per 4.15.2 of JIS C 5101-1.
As per 4.11 of JIS C 5101-10
The solder specified in JIS Z 3282 H63A shall be used. And the flux containing 25% rosin and ethanol solution shall be used.
The specimens shall be immersed into the solder at 235+/–5°C for 2+/–0.5s
So that both end terminations are completely under solder.</td></tr>
<tr><td rowspan="6">8</td><td rowspan="6">Resistance to solderin heat</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="6">As per 4.14 of JIS C 5101-1.
As per 4.10 of JIS C 5101-10
The solder specified in JIS Z 3282. H63A shall be used.
The specimens shall be immersed into the solder at 260+/–5°C for 5+/–0.5s so that both end terminations are completely under the solder.
Pre-heating at 150+/–10°C for 1 to 2min
Initial measurements prior to test shall be performed after the thermal
Pre-conditioning specified in Remarks (1).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.
Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A (AN)</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Within +/–2.5% or +/–0.25pF whichever is larger.</td></tr>
<tr><td>C N</td><td>Within +/–7.5%</td></tr>
<tr><td>F N</td><td>Within +/–20%</td></tr>
<tr><td>Dielectric loss tangent</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td>Withstanding voltage</td><td colspan="2">No defects shall be allowed.</td></tr>
<tr><td>9</td><td colspan="2">End termination adherence</td><td colspan="3">Without peeling or sign of peeling shall be allowed on the end terminations.</td><td>As per 4.13 of JIS C 5101-1.
As per 4.8 ofJIS C 5101-10
A 5N weight for 10+/–1s shall be applied to the soldered specimens as shown by the arrow mark in the below sketch.
 
</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="2">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td>10</td><td>Bending strength</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td>As per 4.35 of JIS C 5101-1.
As per 4.9 of JIS C 5101-10
Glass epoxy board with soldered specimens shall be bent till 1mm by 1.0mm/s.</td></tr>
<tr><td rowspan="5">11</td><td rowspan="5">Vibration</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td rowspan="5">As per 4.17 of JIS C 5101-1.
The specimens shall be soldered on the specified test jig.
Initial measurements shall be made after the thermal pre-conditioning specified in Remarks(1).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.
[Condition]
Directions : 2h each X, Y and Z directions
Total : 6h
Frequency range : 10 to 55 to 10Hz(1min)
Applitude : 1.5mm
(shall not exceed acceleration196m/s^2)
Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A (AN)</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Capacitance shall be within specified tolerance range.</td></tr>
<tr><td>C N</td><td>Within +/–7.5%</td></tr>
<tr><td>F N</td><td>Within +/–20%</td></tr>
<tr><td>Dielectric loss tangent</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td rowspan="8">12</td><td rowspan="8">Temperature cycling</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td rowspan="8">As per 4.16 of JIS C 5101-1
As per 4.12 of JIS C 5101-10
The specimens shall be soldered on the test jig shown in Remarks.
Temperature cycle : 100cycles Initial measurements prior to test shall be performed after the thermal per-conditioning specified in Remarks (1).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.
Test condition
<table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min operating temp.</td><td>30+/–3</td></tr><tr><td>2</td><td>Room temp.</td><td>≤ 3</td></tr><tr><td>3</td><td>Max operating temp.</td><td>30+/–3</td></tr><tr><td>4</td><td>Room temp.</td><td>≤ 3</td></tr></table>
Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A (AN)</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Within +/–2.5% or +/–0.25pF whichever is larger.</td></tr>
<tr><td>C N</td><td>Within +/–7.5%</td></tr>
<tr><td>F N</td><td>Within +/–20%</td></tr>
<tr><td>Dielectric loss tangent</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td>Withstanding voltage</td><td colspan="2">No defects shall be allowed.</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="2">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td rowspan="8">13</td><td rowspan="8">Humidity
(Steady)</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td rowspan="8">As per 4.22 of JIS C 5101-1
JIS C 5101-10
Test temperature : 60+/–2°C
Relative humidity : 90 to 95%
Test time : 500 +24/–0 h
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements have been left at room temperature as per Table3.

Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A (AN)</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Within +/–5.0% or +/–0.5pF whichever is larger.</td></tr>
<tr><td>C N</td><td>Within +/–12.5%</td></tr>
<tr><td>F N</td><td>Within +/–30%</td></tr>
<tr><td rowspan="3">Dielectric tangent</td><td>A (AN)</td><td>tan δ ≤ 0.3%</td></tr>
<tr><td>C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td>F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Not less than 1000MΩ or 50MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 1000MΩ or 10MΩ・μF, whichever is less.)</td></tr>
<tr><td rowspan="8">14</td><td rowspan="8">Humidity life test</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td rowspan="8">As per 4.22 of JIS C 5101-1
As per 4.14 of JIS C 5101-10
Test temperature : 60+/–2°C
Relative humidity : 90 to 95%
Voltage : Rated voltage
Test time : 500 +24/–0 h
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.

Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A (AN)</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Within +/–7.5% or +/–7.5pF whichever is larger.</td></tr>
<tr><td>C N</td><td>Within +/–12.5%</td></tr>
<tr><td>F N</td><td>Within +/–30%</td></tr>
<tr><td rowspan="3">Dielectric loss tangent</td><td>A (AN)</td><td>tan δ ≤ 0.5%</td></tr>
<tr><td>C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td>F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Not less than 500MΩ or 25MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 500mΩ or 5MΩ・μF, whichever is less.)</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="2">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td rowspan="8">15</td><td rowspan="8">Heat life test</td><td>Appearance</td><td colspan="2">Without mechanical damage.</td><td rowspan="8">As per 4.23 of JIS C 5101-1.
As per 4.15 of JIS C 5101-10

<table>
<tr><th></th><th>Test temperature(°C)</th><th>Voltage</th><th>Test time (h)</th></tr>
<tr><td>A (AN)</td><td>125</td><td>200% Rated voltage</td><td>1000 +48/–0</td></tr>
<tr><td rowspan="2">CN</td><td>85</td><td>200% Rated voltage</td><td rowspan="2">1000 +48/–0</td></tr>
<tr><td>125</td><td>200% Rated voltage</td></tr>
<tr><td>FN</td><td>85</td><td>200% Rated voltage</td><td>1000 +48/–0</td></tr>
</table>
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements shall be made after the specimens have been left at room temperature

Table3
<table>
<tr><th>Charac-teristic</th><th>Time</th></tr>
<tr><td>A (AN)</td><td>24+/–2 h</td></tr>
<tr><td>CN, FN</td><td>48+/–4 h</td></tr>
</table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A (AN)</td><td>Within +/–3.0% or +/–0.3pF whichever is larger.</td></tr>
<tr><td>C N</td><td>Within +/–15%</td></tr>
<tr><td>F N</td><td>Within +/–30%</td></tr>
<tr><td rowspan="3">Dielectric loss tangent</td><td>A (AN)</td><td>tan δ ≤ 0.3%</td></tr>
<tr><td>C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td>F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="2">Not less than 1000MΩ or 50MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 1000mΩ or 10MΩ・μF, whichever is less.)</td></tr>
</table>

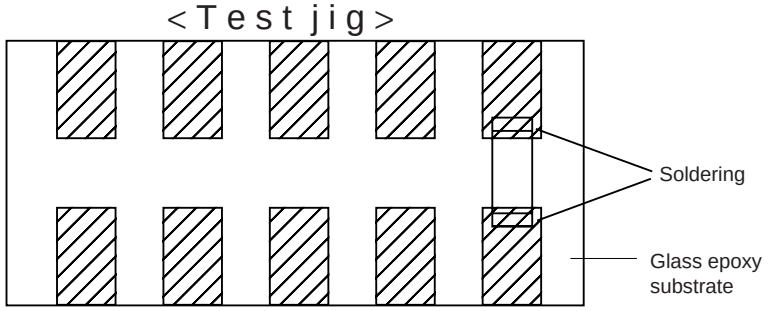
[Remarks]

Pre-conditioning

If specified in test method of as per 3(Performance and test method), capacitors of CN, FN characteristics shall be pre-conditionded as follows.

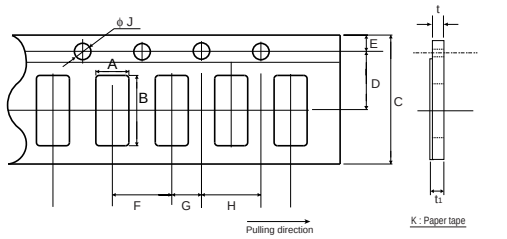
(1) Thermal pre-conditioning
Prior to initial measurements, specimens shall be conditioned at a temperature of 150 0/–10°C for a period of 1hr., and shall be allowed to stabilize at room temperature for 48+/–4h

(2) Voltage pre-conditioning
Prior to initial measurements, voltage specified as a test condition shall be applied to specimens for a period of 1hr., and the specimens shall be allowed to stabilize at room temperature for 48+/–4h



●Packaging specifications

Taping dimensions



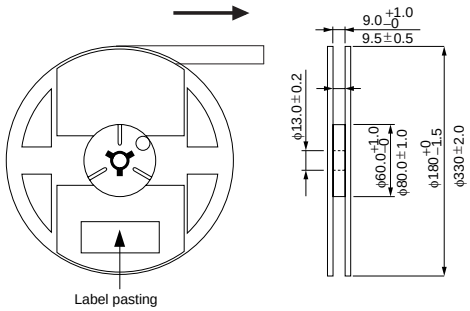
Symbol	C	D	E	F	G	H	J	t	t1
Dimensions	8.0 +/ −0.2	3.5 +/ −0.05	1.75 +/ −0.1	4.0 +/ −0.1	2.0 +/ −0.05	4.0 +/ −0.1	ϕ1.5 +0.1/ −0	1.05 MAX.	1.2 MAX.

(Unit : mm)

Style \ Symbol	A	B
MCH18	1.0 +/ −0.05	1.8 +/ −0.05

(Unit : mm)

Reel dimensions



As per EIAJ ET−7200A

(1) The quantity for one reel is as bellows.

Kind of reel	Series	Paper tape	
		Quantity	Symbol
ϕ180 reel	MCH18	4,000 pcs.	K
ϕ330 reel	MCH18	16,000 pcs.	L

(2) When the tape is pulled out towards the operator with the cover tape facing upward, the feeding holes shall be found on the right portion of the tape.
(3) Specification of beginning and ending of the tape are as follows.

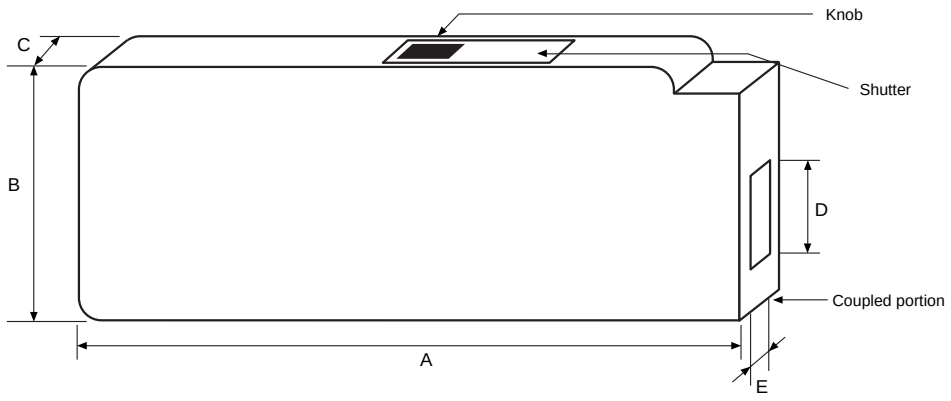
Ending(reel's center) : Approx. Over 300mm (no chips)
Beginning(reel's round) : Approx. Over 270mm (no chips)
: Approx. 30mm (no pasted tape)
: Approx. 260mm (cover tape only)

(4) No juncture of tape shall be allowed.
(5) The share strength of tape shall be more than 5N at the break down strength.
(6) The peel strength of the cover tape shall be 0.1 to 0.7(N) when the cover tape are peeled 0 to 15° degree from the surface.
(7) The number of missing components shall not exceed 0.1% of the total number of components (marked number) or one whichever is the larger, and no consecutive missing exceeding two is allowed.
(8) The reels made from resin shall be used, as per EIAJ ET-7200A.

●**Bulk case**

Bulk case

Bulk case dimensions (As per EIAJ ET - 7201A)



Symbol	A	B	C	D	E
Dimensions	110	36	12	19	5

(Unit : mm)

(a)Quantity of package

Style	T dimensions(mm)	Quantity (pcs)
MCH18	0.8	15,000 +10/–0

●**Marking**

No marking shall be performed on the chip.

Trademark, parts number, quantity, lot No. , and country of origin shall be labeled on each reel, bulk case.

●**Numbering system for LOT No.**

Example $\frac{04}{(1)}$ $\frac{01}{(2)}$ $\frac{A0001}{(3)}$ $\frac{J}{(4)}$

(1) The end of the Christian Era < two digits> of production finish.
(2) Week in completing part of production finish.
(3) Manufacture continuity number.
(4) The symbol of manufacturing plant.

●**Label expression**

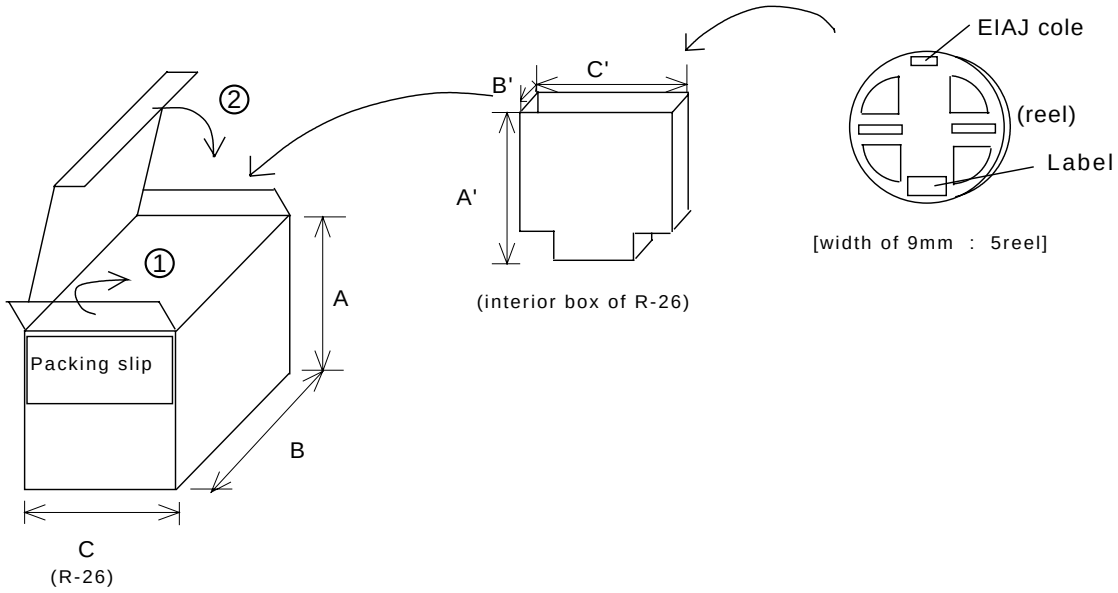
The Figure below is label expression

< Label Example > Part Number : MCH185A101JK

① Part Number
② Division cord
③ Quantity
④ Lot No.
⑤ The Country of origin
⑥ Inspector
⑦ QR code
⑧ Trademark

●**Packing method**

1) ϕ180mm Reel



< Packaging unit >

Symbol	K
Quantity of reel in interior box	5
Quantity of reel in box of R-26	20

Dimensions	Packaging	
	R-26	interior box of R-26
A (A')	195	185
B (B')	255	60
C (C')	190	185

(Unit : mm)

< Appearance >

Carton

< Accumulation >

You must do accumulation by ten boxes

< Packaging slip >

1. Customer
2. Parts number
3. Quantity
4. Box quantity
5. Trade mark

●Weight / Piece

(Unit : mg)

Size	Item	Thickness	Characteristics	Weight / Piece
1608	MCH18	0.8mm	A	5.5
			AN	4.5
			CN	5.5
			FN	5.5

Note) The measured values in the table are for reference only.
Actual weight of these chips may vary slightly lot by lot.

●Electrical characteristics

■ A (C0G) Characteristics

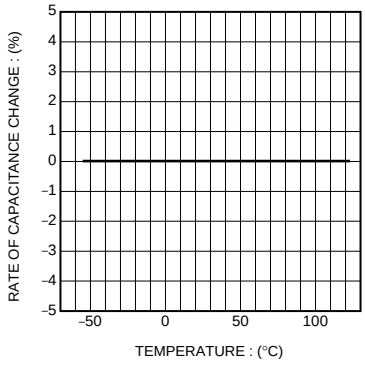


Fig.1 Capacitance - temperature characteristics

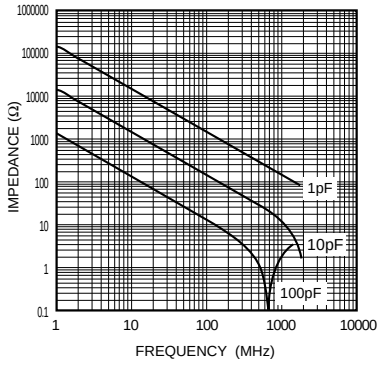


Fig.2 Impedance - frequency characteristics

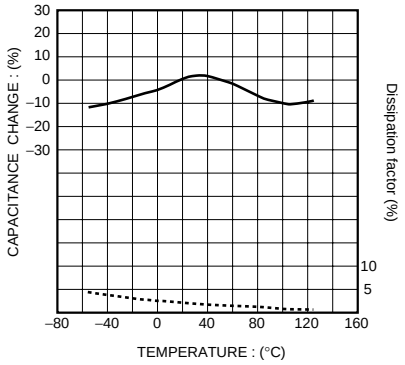


Fig.3 Capacitance - temperature characteristics

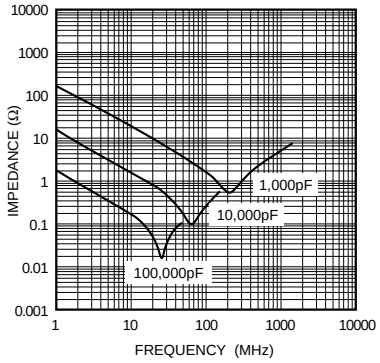


Fig.4 Impedance - frequency characteristics

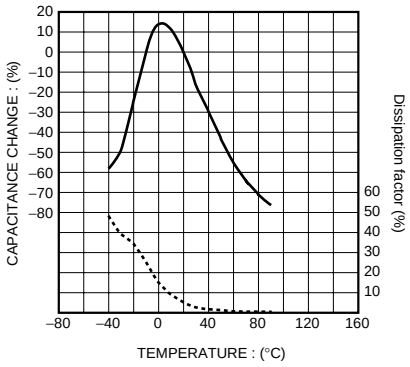


Fig.5 Capacitance - temperature characteristics

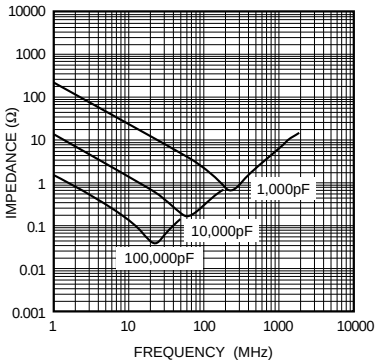


Fig.6 Impedance - frequency characteristics

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