

Performance and Test Methods

■ Performance and Test Methods

Item	Performance	Test Methods and Conditions																
Withstanding Voltage	No damage	Class 1(SL,YN) : 300% of rated voltage applied for 1-5 sec. Class 2(YE,X7R,YF) : 250% of rated voltage applied for 1-5sec. Charging and discharging current : 50 mA max.																
Insulation Resistance	5,000 MΩ or more	Rated voltage applied for 60±5sec. Charging and Discharging Current : 50 mA max.																
Capacitance Temperature Characteristics	Class 1 (Temperature coefficient) SL : +350~-1,000ppm/ °C YN : -800~-5,800ppm/ °C Class 2 (Rate of capacitance change) X7R : Within 15% YE : Within +20~-55% YF : Within +30~-80%	Preconditioning #: Carry out heat treatment. Obtain the rate of change and the temperature coefficient from the capacitance at Step 3. <table border="1" style="float: right; margin-top: 10px;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 ±2</td> </tr> <tr> <td>2</td> <td>Minimum Operating Temp±3.</td> </tr> <tr> <td>3</td> <td>20 ±2</td> </tr> <tr> <td>4</td> <td>Maximum Operating Temp±2.</td> </tr> </tbody> </table>	Step	Temperature (°C)	1	20 ±2	2	Minimum Operating Temp±3.	3	20 ±2	4	Maximum Operating Temp±2.						
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1	20 ±2																	
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3	20 ±2																	
4	Maximum Operating Temp±2.																	
Solderability	90% or more the immersed area shall be covered with new solder.	Flux : Rosin/IPA (25wt%) Depth of immersion into flux: Immerse whole of capacitor. Preheating before immersion into solder : Temperature ; 130 to 150° C for 1 min. Temperature of Solder : 245±3°C Duration of immersion into solder : 3±0.5sec.																
Tensile Strength of Termination	No disconnection of terminals or damage of capacitors	The body of specimen shall be fixed as followed, the tension P1-P4 shall be applied for 5 sec. <div style="display: flex; align-items: center; margin-top: 10px;"> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th>Hole Size</th> <th>P1, P2</th> <th>P3</th> <th>P4</th> </tr> </thead> <tbody> <tr> <td>Φ0.65</td> <td>2kg</td> <td>1kg</td> <td>0.75kg</td> </tr> <tr> <td>Φ0.80</td> <td>2kg</td> <td>1kg</td> <td>0.75kg</td> </tr> <tr> <td>Φ1.30</td> <td>5kg</td> <td>3kg</td> <td>2kg</td> </tr> </tbody> </table> </div>	Hole Size	P1, P2	P3	P4	Φ0.65	2kg	1kg	0.75kg	Φ0.80	2kg	1kg	0.75kg	Φ1.30	5kg	3kg	2kg
Hole Size	P1, P2	P3	P4															
Φ0.65	2kg	1kg	0.75kg															
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Φ1.30	5kg	3kg	2kg															
Resistance to Soldering Heat	Visual	No particular issue																
	Rate Change in Capacitance	Change in pretest value Class1: No more than ±10% or ±0.25pF whichever is larger. Class2: YE, X7R→±15%, YF→±20%																
	Dissipation Factor	Class1: SL→1% or less, YN→1% or less Class2: YE, X7R→5% or less, YF→5% or less																
	Insulation Resistance	5,000 MΩ or more																
	Withstanding Voltage	No particular issue																
Temp. Cycle	Visual	No particular issue																
	Capacitance Change	Change in pretest value Class1: No more than ±10% or ±0.25pF whichever is larger. Class2: YE, X7R→±20%, YF→±30%																
	Dissipation Factor	Class1: SL→1% or less, YN→1% or less Class2: YE, X7R→5% or less, YF→7.5% or less																
	Insulation Resistance	1,000 MΩ or more																
Humidity Load Test	Visual	No particular issue																
	Capacitance Change	Change in pretest value Class1: No more than ±10% or ±0.25pF whichever is larger. Class2: YE, X7R→±20%, YF→±30%																
	Dissipation factor	Class1: SL→1% or less, N→1% or less Class2: YE, X7R→5% or less, YF→7.5% or less																
	Insulation resistance	1,000 MΩ or more																
Life Test (at High Temp. Load)	Visual	No abnormality																
	Capacitance change	Change in pretest value Class1: No more than 10% or ±0.25pF whichever is larger. Class2: YE, X7R→2±0%, YF→±30%																
	Dissipation factor	Class1: SL→1% or less, YN→1% or less Class2: YE, X7R→5% or less, YF→7.5% or less																
	Insulation resistance	1,000 MΩ or more																

#: The following preconditioning shall be carried out prior to the test when there is a provision of heat treatment in the table above.
Heat Treatment : The capacitor shall be allowed to stand in air at 150 +0, -10 °C for 1 hours, then the initial value is measured after leaving under room temperature for 24±2 hours.
Unless particularly specified in this table, the test methods shall be as specified in JIS C 5101-1.

Handling Precautions

Dielectric ceramics of the capacitors may be damaged by excessive mechanical and heat stress. Please be careful not to drop and give the mechanical and heat shock to feed through ceramic capacitors.

■ Soldering

1. reflow soldering

- Recommended Solder

Solder should be a ring type of which melting temperature is 185 °C max.

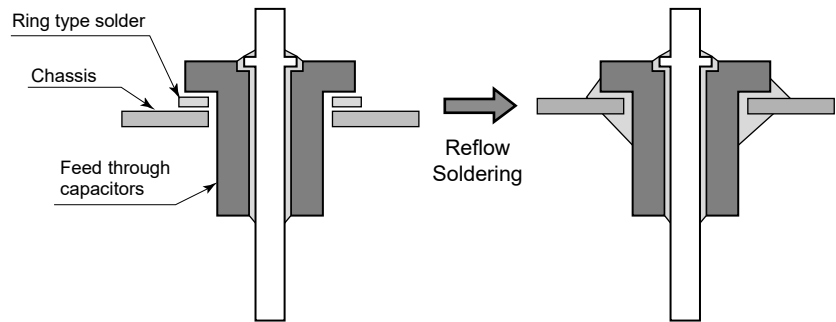
- Recommended Method

Avoid rapid heating/cooling.

Preheat to around 130 °C, and then process at 250 °C max. in the reflow zone for 10 sec. max.

2. Recommended the hole size of chassis

Type	Hole size
PLE123	Φ1.6±0.05
PLE12, 22, 32	Φ2.1±0.05
PLE255	Φ2.6±0.05
PLE23, 33	Φ3.2±0.05
PLE335	Φ3.7±0.05



■ Soldering to Lead Wire

1. Recommended Methods

Please use a soldering iron with as large heat capacity as possible.

Temperature of soldering iron should be 300 °C max., applied for a maximum of 10 seconds.

Do not let the solder get within 3mm of the body of the part.

2. Note

Do not bend a lead wire. Please be careful that mechanical stress is not applied to the EMI filter itself when you unavoidably bend a lead wire.

■ Minimum packaging quantity

1. No pin type

Type	Quantity (pcs/bag)	Max. quantity (pcs/bag)
PLE123	1,000	5,000
PLE12, 22, 32, 255, 23	1,000	15,000
PLE 33,335	1,000	10,000

2. With pin type

500 pcs/bag (All size)