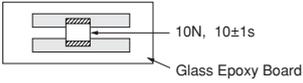
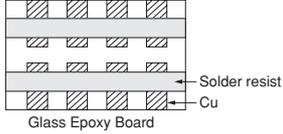


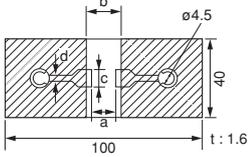
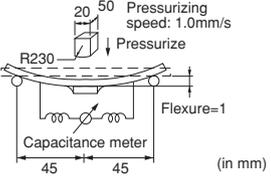
Medium Voltage Low Dissipation Factor Specifications and Test Methods

No.	Item	Specifications	Test Method												
1	Operating Temperature Range	-55 to +125°C	-												
2	Appearance	No defects or abnormalities	Visual inspection												
3	Dimensions	Within the specified dimension	Using calipers and micrometers												
4	Dielectric Strength	No defects or abnormalities	<p>No failure should be observed when voltage in the Table is applied between the terminations for 1 to 5 sec., provided the charge/discharge current is less than 50mA.</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Test Voltage</th> </tr> </thead> <tbody> <tr> <td>DC200V, DC250V</td> <td>200% of the rated voltage</td> </tr> <tr> <td>DC500V, DC630V</td> <td>150% of the rated voltage</td> </tr> <tr> <td>DC1kV, DC2kV, DC3.15kV</td> <td>130% of the rated voltage</td> </tr> </tbody> </table>	Rated Voltage	Test Voltage	DC200V, DC250V	200% of the rated voltage	DC500V, DC630V	150% of the rated voltage	DC1kV, DC2kV, DC3.15kV	130% of the rated voltage				
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5	Insulation Resistance (I.R.)	More than 10,000MΩ	The insulation resistance should be measured with rated voltage (DC500±50V in case of rated voltage: DC630V, DC1kV, DC2kV, DC3.15kV) and within 60±5 sec. of charging.												
6	Capacitance	Within the specified tolerance	The capacitance/Q should be measured at the frequency and voltage shown as follows.												
7	Q	1,000 min.													
8	Capacitance Temperature Characteristics	Temp. Coefficient C0G char. : 0±30ppm/°C (Temp. Range : +25 to +125°C) 0+30, -72ppm/°C (Temp. Range : -55 to +25°C) U2J char. : -750±120ppm/°C (Temp. Range : +25 to +125°C) -750+120, -347ppm/°C (Temp. Range : -55 to +25°C)	The capacitance measurement should be made at each step specified in the Table. <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25±2</td> </tr> <tr> <td>2</td> <td>Min. Operating Temp.±3</td> </tr> <tr> <td>3</td> <td>25±2</td> </tr> <tr> <td>4</td> <td>Max. Operating Temp.±2</td> </tr> <tr> <td>5</td> <td>25±2</td> </tr> </tbody> </table>	Step	Temperature (°C)	1	25±2	2	Min. Operating Temp.±3	3	25±2	4	Max. Operating Temp.±2	5	25±2
Step	Temperature (°C)														
1	25±2														
2	Min. Operating Temp.±3														
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5	25±2														
9	Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 1. Then apply 10N force in the direction of the arrow. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.  <p style="text-align: center;">Fig. 1</p>												
10	Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 min. This motion should be applied for a period of 2 hrs. in each of 3 mutually perpendicular directions (total of 6 hrs.). 												
	Capacitance	Within the specified tolerance													
	Q	1,000 min.													

Continued on the following page. 

Medium Voltage Low Dissipation Factor Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																															
11	Deflection	No marking defects	<p>Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2.</p> <p>Then apply a force in the direction shown in Fig. 3.</p> <p>The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.</p>																															
		 <p>Fig. 2</p> <table border="1"> <thead> <tr> <th rowspan="2">L×W (mm)</th> <th colspan="4">Dimension (mm)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>2.0×1.25</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> <td rowspan="6">1.0</td> </tr> <tr> <td>3.2×1.6</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>3.2×2.5</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> <tr> <td>4.5×2.0</td> <td>3.5</td> <td>7.0</td> <td>2.4</td> </tr> <tr> <td>4.5×3.2</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> </tr> <tr> <td>5.7×5.0</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> </tr> </tbody> </table>		L×W (mm)	Dimension (mm)				a	b	c	d	2.0×1.25	1.2	4.0	1.65	1.0	3.2×1.6	2.2	5.0	2.0	3.2×2.5	2.2	5.0	2.9	4.5×2.0	3.5	7.0	2.4	4.5×3.2	3.5	7.0	3.7	5.7×5.0
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			 <p>Fig. 3</p>																															
12	Solderability of Termination	75% of the terminations are to be soldered evenly and continuously.	<p>Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec.</p> <p>Immersing speed: 25±2.5mm/s</p> <p>Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder</p>																															
13	Resistance to Soldering Heat	Appearance	No marking defects	<p>Preheat the capacitor at 120 to 150°C* for 1 min.</p> <p>Immerse the capacitor in solder solution at 260±5°C for 10±1 sec. Let sit at room condition* for 24±2 hrs., then measure.</p> <p>•Immersing speed: 25±2.5mm/s</p> <p>*Preheating for more than 3.2×2.5mm</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>100 to 120°C</td> <td>1 min.</td> </tr> <tr> <td>2</td> <td>170 to 200°C</td> <td>1 min.</td> </tr> </tbody> </table>	Step	Temperature	Time	1	100 to 120°C	1 min.	2	170 to 200°C	1 min.																					
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Q	1,000 min.																																	
I.R.	More than 10,000MΩ																																	
Dielectric Strength	In accordance with item No.4																																	
14	Temperature Cycle	Appearance	No marking defects	<p>Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4.</p> <p>Perform the 5 cycles according to the 4 heat treatments listed in the following table.</p> <p>Let sit for 24±2 hrs. at room condition,* then measure.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. Operating Temp.±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temp.</td> <td>2 to 3</td> </tr> <tr> <td>3</td> <td>Max. Operating Temp.±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temp.</td> <td>2 to 3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Time (min.)	1	Min. Operating Temp.±3	30±3	2	Room Temp.	2 to 3	3	Max. Operating Temp.±2	30±3	4	Room Temp.	2 to 3															
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Capacitance Change	Within ±2.5%																																	
Q	500 min.																																	
I.R.	More than 10,000MΩ																																	
Dielectric Strength	In accordance with item No.4																																	
15	Humidity (Steady State)	Appearance	No marking defects	<p>Let the capacitor sit at 40±2°C and relative humidity of 90 to 95% for 500^{±24} hrs.</p> <p>Remove and let sit for 24±2 hrs. at room condition,* then measure.</p>																														
		Capacitance Change	Within ±5.0%																															
		Q	350 min.																															
		I.R.	More than 1,000MΩ																															
		Dielectric Strength	In accordance with item No.4																															
16	Life	Appearance	No marking defects	<p>Apply voltage as in Table for 1,000^{±48} hrs. at maximum operating temperature ±3°C.</p> <p>Remove and let sit for 24±2 hrs. at room condition,* then measure.</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Applied Voltage</th> </tr> </thead> <tbody> <tr> <td>DC200V, DC250V</td> <td>150% of the rated voltage</td> </tr> <tr> <td>DC500V, DC630V, DC1kV, DC2kV, DC3.15kV</td> <td>120% of the rated voltage</td> </tr> </tbody> </table> <p>The charge/discharge current is less than 50mA.</p>	Rated Voltage	Applied Voltage	DC200V, DC250V	150% of the rated voltage	DC500V, DC630V, DC1kV, DC2kV, DC3.15kV	120% of the rated voltage																								
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* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa