

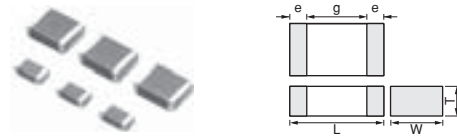
Chip Monolithic Ceramic Capacitors (Medium Voltage)

Large Capacitance and High Allowable Ripple Current GR3 Series

Anti-noise

■ Features

1. This series can provide higher capacitance value under DC-Bias condition, compare with previous X7R char.
2. Improve the performance of ripple-resistance compared with X7R char.
3. Reduce acoustic noise.
4. High reliability for board bending stress
5. Sn-plated external electrodes provide good soldering, and other types with reflow soldering only.
6. Use the GR321/331 types with flow or reflow soldering, and other types with reflow soldering only.



Part Number	Dimensions (mm)					
	L	W	T	e	g min.	
GR321A	2.0±0.2	1.25±0.2	1.0+0,-0.3	0.3 min.	0.7	
GR321B			1.25±0.2			
GR331A	3.2±0.2	1.6±0.2	1.0+0,-0.3		1.2	
GR331B			1.25+0,-0.3			
GR331C			1.6±0.2			
GR332Q	3.2±0.3	2.5±0.2	1.5+0,-0.3			2.2
GR332D			2.0+0,-0.3			
GR343Q	4.5±0.4	3.2±0.3	1.5+0,-0.3			
GR343D			2.0+0,-0.3			
GR355D	5.7±0.4	5.0±0.4	2.0+0,-0.3		3.2	
GR355X			2.7+0,-0.3			

■ Applications

1. DC smoothing & EMI filter for LED Lighting.
2. For PFC circuit in the switching power supplies, AC adaptor.
3. DC-DC converter for general electronic equipment.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

Part Number	Rated Voltage	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T max. (mm)	Electrode g min.	Electrode e
GR321AD72E103KW01D	250Vdc	X7T (EIA)	10000pF±10%	2	1.25	1	0.7mm	0.3mm min.
GR321AD72E153KW01D	250Vdc	X7T (EIA)	15000pF±10%	2	1.25	1	0.7mm	0.3mm min.
GR321BD72E223KW03L	250Vdc	X7T (EIA)	22000pF±10%	2	1.25	1.45	0.7mm	0.3mm min.
GR331AD72E333KW01D	250Vdc	X7T (EIA)	33000pF±10%	3.2	1.6	1	1.2mm	0.3mm min.
GR331BD72E473KW01L	250Vdc	X7T (EIA)	47000pF±10%	3.2	1.6	1.25	1.2mm	0.3mm min.
GR331CD72E683KW03L	250Vdc	X7T (EIA)	68000pF±10%	3.2	1.6	1.8	1.2mm	0.3mm min.
GR332QD72E104KW01L	250Vdc	X7T (EIA)	0.10µF±10%	3.2	2.5	1.5	1.2mm	0.3mm min.
GR332DD72E154KW01L	250Vdc	X7T (EIA)	0.15µF±10%	3.2	2.5	2	1.2mm	0.3mm min.
GR343QD72E224KW01L	250Vdc	X7T (EIA)	0.22µF±10%	4.5	3.2	1.5	2.2mm	0.3mm min.
GR343DD72E334KW01L	250Vdc	X7T (EIA)	0.33µF±10%	4.5	3.2	2	2.2mm	0.3mm min.
GR355DD72E474KW01L	250Vdc	X7T (EIA)	0.47µF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355DD72E684KW01L	250Vdc	X7T (EIA)	0.68µF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355XD72E105KW05L	250Vdc	X7T (EIA)	1.0µF±10%	5.7	5.0	2.7	3.2mm	0.3mm min.
GR331AD72W103KW01D	450Vdc	X7T (EIA)	10000pF±10%	3.2	1.6	1	1.2mm	0.3mm min.
GR331AD72W153KW01D	450Vdc	X7T (EIA)	15000pF±10%	3.2	1.6	1	1.2mm	0.3mm min.
GR331BD72W223KW01L	450Vdc	X7T (EIA)	22000pF±10%	3.2	1.6	1.25	1.2mm	0.3mm min.
GR331BD72W333KW01L	450Vdc	X7T (EIA)	33000pF±10%	3.2	1.6	1.25	1.2mm	0.3mm min.
GR331CD72W473KW03L	450Vdc	X7T (EIA)	47000pF±10%	3.2	1.6	1.8	1.2mm	0.3mm min.
GR332DD72W683KW01L	450Vdc	X7T (EIA)	68000pF±10%	3.2	2.5	2	1.2mm	0.3mm min.
GR332DD72W104KW01L	450Vdc	X7T (EIA)	0.10µF±10%	3.2	2.5	2	1.2mm	0.3mm min.
GR343DD72W154KW01L	450Vdc	X7T (EIA)	0.15µF±10%	4.5	3.2	2	2.2mm	0.3mm min.
GR355DD72W224KW01L	450Vdc	X7T (EIA)	0.22µF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355DD72W334KW01L	450Vdc	X7T (EIA)	0.33µF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355DD72W474KW01L	450Vdc	X7T (EIA)	0.47µF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355XD72W564KW05L	450Vdc	X7T (EIA)	0.56µF±10%	5.7	5.0	2.7	3.2mm	0.3mm min.

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Part Number	Rated Voltage	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T max. (mm)	Electrode g min.	Electrode e
GR331BD72J103KW01L	630Vdc	X7T (EIA)	10000pF±10%	3.2	1.6	1.25	1.2mm	0.3mm min.
GR331CD72J153KW03L	630Vdc	X7T (EIA)	15000pF±10%	3.2	1.6	1.8	1.2mm	0.3mm min.
GR332QD72J223KW01L	630Vdc	X7T (EIA)	22000pF±10%	3.2	2.5	1.5	1.2mm	0.3mm min.
GR332DD72J333KW01L	630Vdc	X7T (EIA)	33000pF±10%	3.2	2.5	2	1.2mm	0.3mm min.
GR332DD72J473KW01L	630Vdc	X7T (EIA)	47000pF±10%	3.2	2.5	2	1.2mm	0.3mm min.
GR343DD72J683KW01L	630Vdc	X7T (EIA)	68000pF±10%	4.5	3.2	2	2.2mm	0.3mm min.
GR355DD72J104KW01L	630Vdc	X7T (EIA)	0.1μF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355DD72J154KW01L	630Vdc	X7T (EIA)	0.15μF±10%	5.7	5.0	2	3.2mm	0.3mm min.
GR355XD72J224KW05L	630Vdc	X7T (EIA)	0.22μF±10%	5.7	5.0	2.7	3.2mm	0.3mm min.
GR355XD72J274KW05L	630Vdc	X7T (EIA)	0.27μF±10%	5.7	5.0	2.7	3.2mm	0.3mm min.

For General Purpose GRM/GRU/GFR3 Series

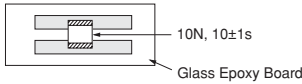
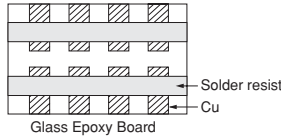
Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GR3 Series 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 dimensions	Using calipers and micrometers												
4	Dielectric Strength	No defects or abnormalities	<p>No failure should be observed when voltage in 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>DC250V</td> <td>200% of the rated voltage</td> </tr> <tr> <td>DC450V</td> <td>150% of the rated voltage</td> </tr> <tr> <td>DC630V</td> <td>120% of the rated voltage</td> </tr> </tbody> </table>	Rated Voltage	Test Voltage	DC250V	200% of the rated voltage	DC450V	150% of the rated voltage	DC630V	120% of the rated voltage				
Rated Voltage	Test Voltage														
DC250V	200% of the rated voltage														
DC450V	150% of the rated voltage														
DC630V	120% of the rated voltage														
5	Insulation Resistance (I.R.)	More than 10,000MΩ or 100MΩ • μF (Whichever is smaller)	The insulation resistance should be measured with DC500±50V (DC250±25V in case of rated voltage: DC250V, DC450V) and within 60±5 sec. of charging.												
6	Capacitance	Within the specified tolerance	The capacitance/D.F. should be measured at a frequency of 1±0.2kHz and a voltage of AC1±0.2V(r.m.s.).												
7	Dissipation Factor (D.F.)	0.01 max.													
8	Capacitance Temperature Characteristics	Cap. Change Within ±3% (Temp. Range: -55 to +125°C)	<p>The capacitance measurement should be made at each step specified in the Table.</p> <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> <p>•Pretreatment Perform a heat treatment at 150±9°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*</p>	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														
3	25±2														
4	Max. Operating Temp.±2														
5	25±2														
9	Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	<p>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>  <p style="text-align: center;">Fig. 1</p>												
10	Vibration Resistance	Appearance	No defects or abnormalities												
		Capacitance	Within the specified tolerance												
		D.F.	0.01 max.												
			<p>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.).</p> 												

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.

For General Purpose GRM/GRJ/GR3 Series

Only for Applications

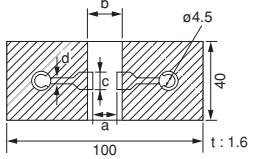
AC250V Type GA2 Series

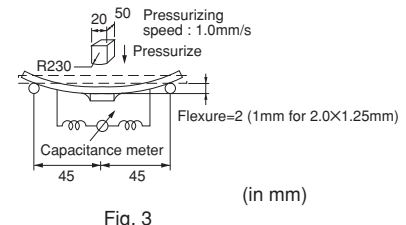
Safety Standard Certified GA3 Series

Product Information

GR3 Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																												
11	Deflection	No marking defects	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2. Then apply a force in the direction shown in Fig. 3. 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>Fig. 2</p> <table border="1"> <thead> <tr> <th>L×W (mm)</th> <th colspan="4">Dimension (mm)</th> </tr> <tr> <th></th> <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="5">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>4.5×3.2</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	4.5×3.2	3.5	7.0	3.7	5.7×5.0
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																												
4.5×3.2	3.5	7.0	3.7																												
5.7×5.0	4.5	8.0	5.6																												
12	Solderability of Termination	75% of the terminations are to be soldered evenly and continuously.	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. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder																												
13	Resistance to Soldering Heat	Appearance	No marking defects	Preheat the capacitor at 120 to 150°C* for 1 min. 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. •Immersing speed: 25±2.5mm/s •Pretreatment Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.* *Preheating for more than 3.2×2.5mm																											
		Capacitance Change	Within ±10%																												
		D.F.	0.01 max.																												
		I.R.	More than 10,000MΩ or 100MΩ • μF (Whichever is smaller)																												
		Dielectric Strength	In accordance with item No.4																												
14	Temperature Cycle	Appearance	No marking defects	Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4. Perform the 5 cycles according to the 4 heat treatments listed in the following table. Let sit for 24±2 hrs. at room condition,* then measure.																											
		Capacitance Change	Within ±7.5%																												
		D.F.	0.01 max.																												
		I.R.	More than 10,000MΩ or 100MΩ • μF (Whichever is smaller)																												
		Dielectric Strength	In accordance with item No.4																												
15	Humidity (Steady State)	Appearance	No marking defects	Let the capacitor sit at 40±2°C and relative humidity of 90 to 95% for 500±24hrs. Remove and let sit for 24±2 hrs. at room condition,* then measure. •Pretreatment Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*																											
		Capacitance Change	Within ±12.5%																												
		D.F.	0.02 max.																												
		I.R.	More than 1,000MΩ or 10MΩ • μF (Whichever is smaller)																												
		Dielectric Strength	In accordance with item No.4																												



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.
 Immersing speed: 25±2.5mm/s
 Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu)
 235±5°C H60A or H63A Eutectic Solder

Preheat the capacitor at 120 to 150°C* for 1 min.
 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.
 •Immersing speed: 25±2.5mm/s
 •Pretreatment
 Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*

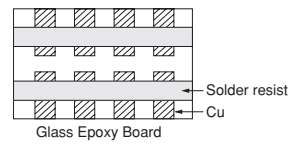
*Preheating for more than 3.2×2.5mm

Step	Temperature	Time
1	100 to 120°C	1 min.
2	170 to 200°C	1 min.

Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4.
 Perform the 5 cycles according to the 4 heat treatments listed in the following table.
 Let sit for 24±2 hrs. at room condition,* then measure.

Step	Temperature (°C)	Time (min.)
1	Min. Operating Temp. ±5	30±3
2	Room Temp.	2 to 3
3	Max. Operating Temp. ±5	30±3
4	Room Temp.	2 to 3

•Pretreatment
 Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*



* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. ↗

For General Purpose GRM/GRU/GR3 Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GR3 Series Specifications and Test Methods

↳ Continued from the preceding page.

No.	Item	Specifications	Test Method									
16	Life	Appearance	No marking defects	Apply voltage as Table for 1,000 ^{±4} hrs. at maximum operating temperature ±3°C. Remove and let sit for 24±2hrs. at room condition,* then measure. <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr style="background-color: #f2f2f2;"> <th style="font-size: small;">Rated Voltage</th> <th style="font-size: small;">Applied Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">DC250V</td> <td style="text-align: center;">150% of the rated voltage</td> </tr> <tr> <td style="text-align: center;">DC450V</td> <td style="text-align: center;">130% of the rated voltage</td> </tr> <tr> <td style="text-align: center;">DC630V</td> <td style="text-align: center;">120% of the rated voltage</td> </tr> </tbody> </table>	Rated Voltage	Applied Voltage	DC250V	150% of the rated voltage	DC450V	130% of the rated voltage	DC630V	120% of the rated voltage
		Rated Voltage	Applied Voltage									
		DC250V	150% of the rated voltage									
		DC450V	130% of the rated voltage									
		DC630V	120% of the rated voltage									
Capacitance Change	Within ±12.5%											
D.F.	0.02 max.											
I.R.	More than 1,000MΩ or 10MΩ • μF (Whichever is smaller)											
	Dielectric Strength	In accordance with item No.4	The charge/discharge current is less than 50mA. •Pretreatment Apply test voltage for 60±5 min. at test temperature. Remove and let sit for 24±2 hrs. at room condition.*									
17	Humidity Loading	Appearance	No marking defects	Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500 ^{±2} hrs. Remove and let sit for 24±2 hrs. at room condition,* then measure. •Pretreatment Apply test voltage for 60±5 min. at test temperature. Remove and let sit for 24±2 hrs. at room condition.*								
		Capacitance Change	Within ±12.5%									
		D.F.	0.02 max.									
		I.R.	More than 1,000MΩ or 10MΩ • μF (Whichever is smaller)									
			Dielectric Strength		In accordance with item No.4							

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

For General Purpose GRM/GRJ/GR3 Series

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