

Chip Monolithic Ceramic Capacitors (Medium Voltage)



Soft Termination Type GRJ series

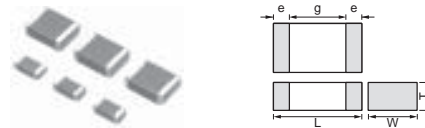
■ Features

1. Improves endurance against Board Bending Stress.
2. Reduces the board bending stress by the conductive polymer termination.
3. Use the GRJ21/31 types with flow or reflow soldering, and other types with reflow soldering only.

■ Applications

1. Ideal for use on diode-snubber circuits for switching power supplies.
2. Ideal for use as primary-secondary coupling for DC-DC converters.
3. Ideal for use on line filters and ringer detectors for telephones, facsimiles and modems.

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	Dimensions (mm)				
	L	W	T	e	g min.
GRJ21A	2.0 ±0.2	1.25 ±0.2	1.0 +0,-0.3	0.3 min.	0.7
GRJ21B			1.25 ±0.2		
GRJ31B	3.2 ±0.2	1.6 ±0.2	1.25 +0,-0.3		
GRJ31C			1.6 ±0.2		
GRJ32Q			1.5 +0,-0.3		
GRJ32D	3.2 ±0.3	2.5 ±0.2	2.0 +0,-0.3		
GRJ43Q	4.5 ±0.4	3.2 ±0.3	1.5 +0,-0.3		2.2
GRJ43D			2.0 +0,-0.3		
GRJ55D			5.7 ±0.4		5.0 ±0.4

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRJ21AR72E102KWJ1D	DC250	X7R (EIA)	1000pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21AR72E152KWJ1D	DC250	X7R (EIA)	1500pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21AR72E222KWJ1D	DC250	X7R (EIA)	2200pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21AR72E332KWJ1D	DC250	X7R (EIA)	3300pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21AR72E472KWJ1D	DC250	X7R (EIA)	4700pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21AR72E682KWJ1D	DC250	X7R (EIA)	6800pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRJ21BR72E103KWJ3L	DC250	X7R (EIA)	10000pF ±10%	2.0	1.25	1.25	0.7	0.3 min.
GRJ31BR72E153KWJ1L	DC250	X7R (EIA)	15000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRJ31BR72E223KWJ1L	DC250	X7R (EIA)	22000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRJ31CR72E333KWJ3L	DC250	X7R (EIA)	33000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRJ31CR72E473KWJ3L	DC250	X7R (EIA)	47000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRJ31BR72E683KWJ1L	DC250	X7R (EIA)	68000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRJ32QR72E683KWJ1L	DC250	X7R (EIA)	68000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
GRJ31CR72E104KWJ3L	DC250	X7R (EIA)	0.10µF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRJ32DR72E104KWJ1L	DC250	X7R (EIA)	0.10µF ±10%	3.2	2.5	2.0	1.2	0.3 min.
GRJ32QR72E154KWJ1L	DC250	X7R (EIA)	0.15µF ±10%	3.2	2.5	1.5	1.2	0.3 min.
GRJ43QR72E154KWJ1L	DC250	X7R (EIA)	0.15µF ±10%	4.5	3.2	1.5	2.2	0.3 min.
GRJ32DR72E224KWJ1L	DC250	X7R (EIA)	0.22µF ±10%	3.2	2.5	2.0	1.2	0.3 min.
GRJ43DR72E224KWJ1L	DC250	X7R (EIA)	0.22µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
GRJ43DR72E334KWJ1L	DC250	X7R (EIA)	0.33µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
GRJ55DR72E334KWJ1L	DC250	X7R (EIA)	0.33µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
GRJ43DR72E474KWJ1L	DC250	X7R (EIA)	0.47µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
GRJ55DR72E474KWJ1L	DC250	X7R (EIA)	0.47µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
GRJ55DR72E105KWJ1L	DC250	X7R (EIA)	1.0µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
GRJ31BR72J102KWJ1L	DC630	X7R (EIA)	1000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRJ31BR72J152KWJ1L	DC630	X7R (EIA)	1500pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRJ31BR72J222KWJ1L	DC630	X7R (EIA)	2200pF ±10%	3.2	1.6	1.25	1.2	0.3 min.

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For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

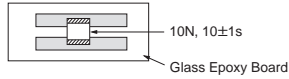
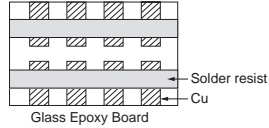
Safety Standard Certified GA3 Series

Product Information


Continued from the preceding page.

	Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
For General Purpose GRM/GRJ Series	GRJ31BR72J332KWJ1L	DC630	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR72J472KWJ1L	DC630	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR72J682KWJ1L	DC630	X7R (EIA)	6800pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR72J103KWJ1L	DC630	X7R (EIA)	10000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31CR72J153KWJ3L	DC630	X7R (EIA)	15000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
Only for Applications	GRJ32QR72J223KWJ1L	DC630	X7R (EIA)	22000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
	GRJ32DR72J333KWJ1L	DC630	X7R (EIA)	33000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
	GRJ32DR72J473KWJ1L	DC630	X7R (EIA)	47000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
	GRJ43QR72J683KWJ1L	DC630	X7R (EIA)	68000pF ±10%	4.5	3.2	1.5	2.2	0.3 min.
	GRJ43DR72J104KWJ1L	DC630	X7R (EIA)	0.10μF ±10%	4.5	3.2	2.0	2.2	0.3 min.
AC250V Type GA2 Series	GRJ55DR72J154KWJ1L	DC630	X7R (EIA)	0.15μF ±10%	5.7	5.0	2.0	3.2	0.3 min.
	GRJ55DR72J224KWJ1L	DC630	X7R (EIA)	0.22μF ±10%	5.7	5.0	2.0	3.2	0.3 min.
	GRJ31BR73A471KWJ1L	DC1000	X7R (EIA)	470pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A102KWJ1L	DC1000	X7R (EIA)	1000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A152KWJ1L	DC1000	X7R (EIA)	1500pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A222KWJ1L	DC1000	X7R (EIA)	2200pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A332KWJ1L	DC1000	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A472KWJ1L	DC1000	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ32QR73A682KWJ1L	DC1000	X7R (EIA)	6800pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
	GRJ32QR73A103KWJ1L	DC1000	X7R (EIA)	10000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
Safety Standard Certified GA3 Series	GRJ32DR73A153KWJ1L	DC1000	X7R (EIA)	15000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
	GRJ32DR73A223KWJ1L	DC1000	X7R (EIA)	22000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
	GRJ43DR73A333KWJ1L	DC1000	X7R (EIA)	33000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
	GRJ43DR73A473KWJ1L	DC1000	X7R (EIA)	47000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
	GRJ55DR73A104KWJ1L	DC1000	X7R (EIA)	0.10μF ±10%	5.7	5.0	2.0	3.2	0.3 min.
Product Information									

GRJ 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	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. <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>DC630V</td> <td>150% of the rated voltage</td> </tr> <tr> <td>DC1kV</td> <td>120% of the rated voltage</td> </tr> </tbody> </table>	Rated Voltage	Test Voltage	DC250V	200% of the rated voltage	DC630V	150% of the rated voltage	DC1kV	120% of the rated voltage				
Rated Voltage	Test Voltage														
DC250V	200% of the rated voltage														
DC630V	150% of the rated voltage														
DC1kV	120% of the rated voltage														
5	Insulation Resistance (I.R.)	$C \geq 0.01\mu\text{F}$: More than $100\text{M}\Omega \cdot \mu\text{F}$ $C < 0.01\mu\text{F}$: More than $10,000\text{M}\Omega$	The insulation resistance should be measured with DC500±50V (DC250±25V in case of rated voltage: DC250V) 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.)	0.025 max.													
8	Capacitance Temperature Characteristics	Cap. Change Within ±15% (Temp. Range: -55 to +125°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> <p>•Pretreatment Perform a heat treatment at 150±9₀°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.	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.  Fig. 1												
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													
	D.F.	0.025 max.													

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

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For General Purpose
GRM/GRJ Series

Only for Applications

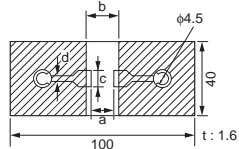
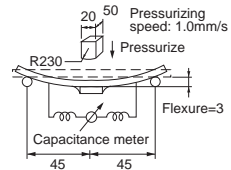
AC250V Type
GA2 Series

Safety Standard
Certified GA3 Series


Product Information

GRJ Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																														
11	Appearance	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.																														
	Capacitance Change	Within $\pm 12.5\%$																															
12	Deflection	 <p>Fig. 2</p> <table border="1"> <thead> <tr> <th rowspan="2">LxW (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>2.0x1.25</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> <td rowspan="5">1.0</td> </tr> <tr> <td>3.2x1.6</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>3.2x2.5</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> <tr> <td>4.5x3.2</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> </tr> <tr> <td>5.7x5.0</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> </tr> </tbody> </table>	LxW (mm)	Dimension (mm)				a	b	c	d	2.0x1.25	1.2	4.0	1.65	1.0	3.2x1.6	2.2	5.0	2.0	3.2x2.5	2.2	5.0	2.9	4.5x3.2	3.5	7.0	3.7	5.7x5.0	4.5	8.0	5.6	 <p>Fig. 3 (in mm)</p>
	LxW (mm)	Dimension (mm)																															
a		b	c	d																													
2.0x1.25	1.2	4.0	1.65	1.0																													
3.2x1.6	2.2	5.0	2.0																														
3.2x2.5	2.2	5.0	2.9																														
4.5x3.2	3.5	7.0	3.7																														
5.7x5.0	4.5	8.0	5.6																														
13	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 ± 2.5 mm/s Temp. of solder: $245\pm 5^\circ\text{C}$ Lead Free Solder (Sn-3.0Ag-0.5Cu) $235\pm 5^\circ\text{C}$ H60A or H63A Eutectic Solder																														
14	Resistance to Soldering Heat	Appearance	No marking defects																														
		Capacitance Change	Within $\pm 10\%$																														
15	Temperature Cycle	D.F.	0.025 max.																														
		I.R.	$C \geq 0.01\mu\text{F}$: More than $100\text{M}\Omega \cdot \mu\text{F}$ $C < 0.01\mu\text{F}$: More than $10,000\text{M}\Omega$																														
16	Humidity (Steady State)	Dielectric Strength	In accordance with item No. 4																														
		Dielectric Strength	In accordance with item No. 4																														
17	Humidity (Steady State)	Appearance	No marking defects																														
		Capacitance Change	Within $\pm 15\%$																														
18	Humidity (Steady State)	D.F.	0.05 max.																														
		I.R.	$C \geq 0.01\mu\text{F}$: More than $10\text{M}\Omega \cdot \mu\text{F}$ $C < 0.01\mu\text{F}$: More than $1,000\text{M}\Omega$																														
19	Humidity (Steady State)	Dielectric Strength	In accordance with item No. 4																														
		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

Continued on the following page. 

GRJ Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method								
16	Life	Appearance	No marking defects								
		Capacitance Change	Within $\pm 15\%$ (rated voltage: DC250V, DC630V) Within $\pm 20\%$ (rated voltage: DC1kV)								
		D.F.	0.05 max.								
		I.R.	$C \geq 0.01\mu\text{F}$: More than $10\text{M}\Omega \cdot \mu\text{F}$ $C < 0.01\mu\text{F}$: More than $1,000\text{M}\Omega$								
		Dielectric Strength	In accordance with item No.4								
			Apply voltage as in Table for $1,000 \pm 4$ hrs. at maximum operating temperature $\pm 3^\circ\text{C}$. Remove and let sit for 24 ± 2 hrs. at room condition,* then measure. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated Voltage</th> <th>Applied Voltage</th> </tr> </thead> <tbody> <tr> <td>DC250V</td> <td>150% of the rated voltage</td> </tr> <tr> <td>DC630V</td> <td>120% of the rated voltage</td> </tr> <tr> <td>DC1kV</td> <td>110% of the rated voltage</td> </tr> </tbody> </table>	Rated Voltage	Applied Voltage	DC250V	150% of the rated voltage	DC630V	120% of the rated voltage	DC1kV	110% of the rated voltage
Rated Voltage	Applied Voltage										
DC250V	150% of the rated voltage										
DC630V	120% of the rated voltage										
DC1kV	110% of the rated voltage										
			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 (Application: DC250V, DC630V item)	Appearance	No marking defects								
		Capacitance Change	Within $\pm 15\%$								
		D.F.	0.05 max.								
		I.R.	$C \geq 0.01\mu\text{F}$: More than $10\text{M}\Omega \cdot \mu\text{F}$ $C < 0.01\mu\text{F}$: More than $1,000\text{M}\Omega$								
		Dielectric Strength	In accordance with item No.4								
			Apply the rated voltage at $40 \pm 2^\circ\text{C}$ 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.*								

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

For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information