

Chip Monolithic Ceramic Capacitors (Medium Voltage)



Soft Termination Type GRJ series

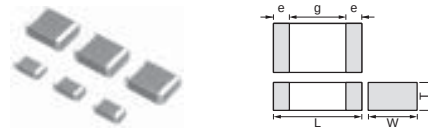
■ Features

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		1.2
GRJ31C			1.6 ±0.2		
GRJ32Q	3.2 ±0.3	2.5 ±0.2	1.5 +0,-0.3		
GRJ32D			2.0 +0,-0.3		
GRJ43Q	4.5 ±0.4	3.2 ±0.3	1.5 +0,-0.3	2.2	2.2
GRJ43D			2.0 +0,-0.3		
GRJ55D	5.7 ±0.4	5.0 ±0.4	2.0 +0,-0.3		3.2

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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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)
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.
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.
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.
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

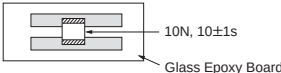
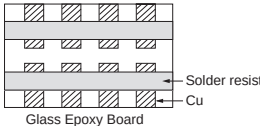
Safety Standard
Certified GA3 Series

AC250V Type
GA2 Series

Only for Applications

For General Purpose
GRM/GRJ Series

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><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><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></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≥0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ	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><tr><th>Step</th><th>Temperature (°C)</th></tr><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></table> •Pretreatment Perform a heat treatment at 150±5°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*	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	Vibration Resistance	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

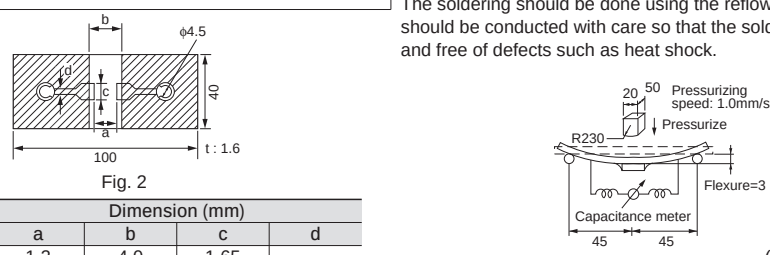
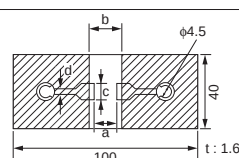
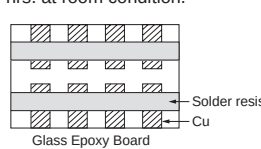
AC250V Type
GA2 Series

Safety Standard
Certified GA3 Series

Product Information

GRJ Series Specifications and Test Methods

Continued from the preceding page.

No.	Item		Specifications	Test Method																														
11	Deflection	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.  Fig. 3 (in mm)																														
		Capacitance Change	Within $\pm 12.5\%$																															
																																		
		Fig. 2 <table><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="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	4.5	8.0	5.6
		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																															
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L×W (mm)	Dimension (mm)																																	
	a	b	c	d																														
2.0×1.25	1.2	4.0	1.65	1.0																														
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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±18°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.* *Preheating for more than 3.2×2.5mm <table><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.																					
		Step	Temperature		Time																													
		1	100 to 120°C		1 min.																													
		2	170 to 200°C		1 min.																													
		Capacitance Change	Within $\pm 10\%$																															
D.F.	0.025 max.																																	
I.R.	C≥0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ																																	
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. <table><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> •Pretreatment Perform a heat treatment at 150±18°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*  Fig. 4	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															
		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																																
Capacitance Change	Within $\pm 7.5\%$																																	
D.F.	0.025 max.																																	
I.R.	C≥0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ																																	
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±18°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*																														
		Capacitance Change	Within $\pm 15\%$																															
		D.F.	0.05 max.																															
		I.R.	C≥0.01μF: More than 10MΩ • μF C<0.01μF: More than 1,000MΩ																															
		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	Apply voltage as in Table for 1,000⁺⁴₋₈hrs. at maximum operating temperature ±3°C. Remove and let sit for 24±2 hrs. at room condition,* then measure. <table><tr><th>Rated Voltage</th><th>Applied Voltage</th></tr><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></table> 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.*	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									
Capacitance Change	Within ±15% (rated voltage: DC250V, DC630V) Within ±20% (rated voltage: DC1kV)											
D.F.	0.05 max.											
I.R.	C≥0.01μF: More than 10MΩ • μF C<0.01μF: More than 1,000MΩ											
Dielectric Strength	In accordance with item No.4											
17	Humidity Loading (Application: DC250V, DC630V item)	Appearance	No marking defects	Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500⁺²₋₃hrs. 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 ±15%									
		D.F.	0.05 max.									
		I.R.	C≥0.01μF: More than 10MΩ • μF C<0.01μF: More than 1,000MΩ									
		Dielectric Strength	In accordance with item No.4									

* "Room condition" Temperature: 15 to 35 $^{\circ}\text{C}$, 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