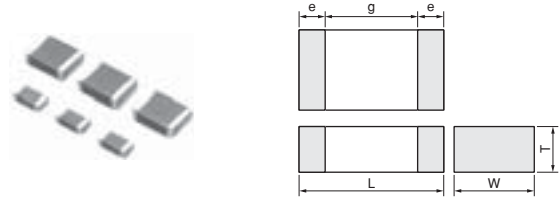


Chip Monolithic Ceramic Capacitors (Medium Voltage)

For Information Devices GR4 Series

■ Features

1. These items are designed specifically for telecommunications devices (IEEE802.3) in Ethernet LAN and primary-secondary coupling for DC-DC converters.
2. A new monolithic structure for small, high capacitance capable of operating at high voltage levels
3. Sn-plated external electrodes realize good solderability.
4. Only for reflow soldering



Part Number	Dimensions (mm)				
	L	W	T	e min.	g min.
GR442Q	4.5 ±0.3	2.0 ±0.2	1.5 +0, -0.3	0.3	2.5
GR443D	4.5 ±0.4	3.2 ±0.3	2.0 +0, -0.3		
GR443Q			1.5 +0, -0.3		
GR455D	5.7 ±0.4	5.0 ±0.4	2.0 +0, -0.3		3.2

■ Applications

1. Ideal for use on telecommunications devices in Ethernet LAN
2. Ideal for use as primary-secondary coupling for DC-DC converters

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. 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
GR442QR73D101KW01L	2000Vdc	X7R (EIA)	100pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D121KW01L	2000Vdc	X7R (EIA)	120pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D151KW01L	2000Vdc	X7R (EIA)	150pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D181KW01L	2000Vdc	X7R (EIA)	180pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D221KW01L	2000Vdc	X7R (EIA)	220pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D271KW01L	2000Vdc	X7R (EIA)	270pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D331KW01L	2000Vdc	X7R (EIA)	330pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D391KW01L	2000Vdc	X7R (EIA)	390pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D471KW01L	2000Vdc	X7R (EIA)	470pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D561KW01L	2000Vdc	X7R (EIA)	560pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D681KW01L	2000Vdc	X7R (EIA)	680pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D821KW01L	2000Vdc	X7R (EIA)	820pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D102KW01L	2000Vdc	X7R (EIA)	1000pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D122KW01L	2000Vdc	X7R (EIA)	1200pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR442QR73D152KW01L	2000Vdc	X7R (EIA)	1500pF±10%	4.5	2	1.5	2.5mm	0.3mm min.
GR443QR73D182KW01L	2000Vdc	X7R (EIA)	1800pF±10%	4.5	3.2	1.5	2.5mm	0.3mm min.
GR443QR73D222KW01L	2000Vdc	X7R (EIA)	2200pF±10%	4.5	3.2	1.5	2.5mm	0.3mm min.
GR443QR73D272KW01L	2000Vdc	X7R (EIA)	2700pF±10%	4.5	3.2	1.5	2.5mm	0.3mm min.
GR443QR73D332KW01L	2000Vdc	X7R (EIA)	3300pF±10%	4.5	3.2	1.5	2.5mm	0.3mm min.
GR443QR73D392KW01L	2000Vdc	X7R (EIA)	3900pF±10%	4.5	3.2	1.5	2.5mm	0.3mm min.
GR443DR73D472KW01L	2000Vdc	X7R (EIA)	4700pF±10%	4.5	3.2	2	2.5mm	0.3mm min.
GR455DR73D103KW01L	2000Vdc	X7R (EIA)	10000pF±10%	5.7	5	2	3.2mm	0.3mm min.

For General Purpose
GRW/GRJ/GR3 Series

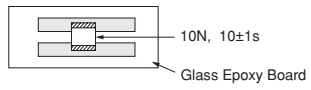
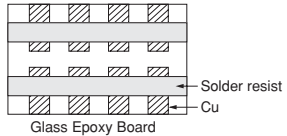
Only for Applications
GR4 Series

AC250V Type
GA2 Series


Safety Standard
Certified GA3 Series

Product Information

GR4 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, provided the charge/discharge current is less than 50mA.									
			<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Test Voltage</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td rowspan="2">DC2kV</td> <td>120% of the rated voltage</td> <td>60±1 sec.</td> </tr> <tr> <td>AC1500V(r.m.s.)</td> <td>60±1 sec.</td> </tr> </tbody> </table>	Rated Voltage	Test Voltage	Time	DC2kV	120% of the rated voltage	60±1 sec.	AC1500V(r.m.s.)	60±1 sec.	
Rated Voltage	Test Voltage	Time										
DC2kV	120% of the rated voltage	60±1 sec.										
	AC1500V(r.m.s.)	60±1 sec.										
5	Pulse Voltage	No self healing breakdowns or flash-overs have taken place in the capacitor.	10 impulses of alternating polarity are subjected. (5 impulses for each polarity) The interval between impulses is 60 sec. Applied Pulse: 1.2/50µs Applied Voltage: 2.5kVo-p									
6	Insulation Resistance (I.R.)	More than 6,000MΩ	The insulation resistance should be measured with DC500±50V and within 60±5 sec. of charging.									
7	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.).									
8	Dissipation Factor (D.F.)	0.025 max.										
9	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>	Step	Temperature (°C)	1	25±2	2	Min. Operating Temp.±3	3	25±2	4
Step	Temperature (°C)											
1	25±2											
2	Min. Operating Temp.±3											
3	25±2											
4	Max. Operating Temp.±2											
5	25±2											
			•Pretreatment Perform a heat treatment at 150±9°C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*									
10	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>Fig. 1</p>									
11	Vibration Resistance	Appearance	No defects or abnormalities									
		Capacitance	Within the specified tolerance									
		D.F.	0.025 max.									
			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.).									
												

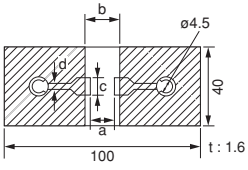
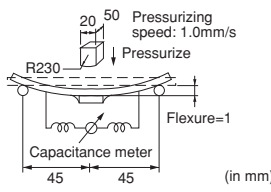
* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. 

For General Purpose GRM/GRU/GR3 Series
 Only for Applications GR4 Series
 AC250V Type GA2 Series
 Safety Standard Certified GA3 Series
 Product Information

GR4 Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																			
12	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 style="text-align: center;">Fig. 2</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <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>4.5×2.0</td> <td>3.5</td> <td>7.0</td> <td>2.4</td> <td rowspan="3" style="text-align: center;">1.0</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	4.5×2.0	3.5	7.0	2.4	1.0	4.5×3.2	3.5	7.0	3.7	5.7×5.0
L×W (mm)	Dimension (mm)																					
	a	b	c	d																		
4.5×2.0	3.5	7.0	2.4	1.0																		
4.5×3.2	3.5	7.0	3.7																			
5.7×5.0	4.5	8.0	5.6																			
			 <p style="text-align: center;">Fig. 3</p>																			
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±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder																			
14	Resistance to Soldering Heat	Appearance	No marking defects																			
		Capacitance Change	Within ±10%																			
		D.F.	0.025 max.																			
		I.R.	More than 1,000MΩ																			
		Dielectric Strength	In accordance with item No.4																			
15	Temperature Cycle	Appearance	No marking defects																			
		Capacitance Change	Within ±15%																			
		D.F.	0.05 max.																			
		I.R.	More than 3,000MΩ																			
		Dielectric Strength	In accordance with item No.4																			
16	Humidity (Steady State)	Appearance	No marking defects																			
		Capacitance Change	Within ±15%																			
		D.F.	0.05 max.																			
		I.R.	More than 1,000MΩ																			
		Dielectric Strength	In accordance with item No.4																			

Preheat the capacitor as in table.
 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.*

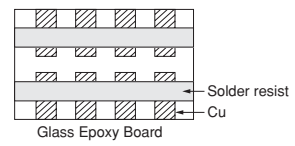
*Preheating

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

Let sit for 24±2 hrs. at room condition,* then measure.

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

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



Let the capacitor sit at 40±2°C and relative humidity of 90 to 95% for 500±20 hrs.
 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.*

* "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/GR4 Series

Only for Applications GR4 Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GR4 Series Specifications and Test Methods

↳ Continued from the preceding page.

No.	Item	Specifications	Test Method
17	Life	Appearance	Apply 110% of the rated voltage for $1,000 \pm 48$ hrs. at maximum operating temperature $\pm 3^\circ\text{C}$. Remove and let sit for 24 ± 2 hrs. at room condition,* then measure. 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.*
	Capacitance Change	Within $\pm 20\%$	
	D.F.	0.05 max.	
	I.R.	More than $2,000\text{M}\Omega$	
	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

Only for Applications
GR4 Series

AC250V Type
GA2 Series

Safety Standard
Certified GA3 Series

Product Information