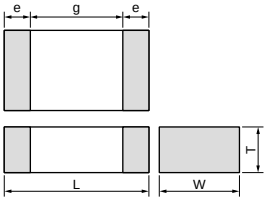
Chip Monolithic Ceramic Capacitors (Medium Voltage)

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

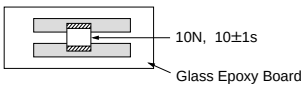
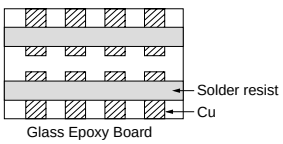
■ Applications

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 (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GR442QR73D101KW01L	DC2000	X7R (EIA)	100 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D121KW01L	DC2000	X7R (EIA)	120 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D151KW01L	DC2000	X7R (EIA)	150 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D181KW01L	DC2000	X7R (EIA)	180 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D221KW01L	DC2000	X7R (EIA)	220 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D271KW01L	DC2000	X7R (EIA)	270 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D331KW01L	DC2000	X7R (EIA)	330 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D391KW01L	DC2000	X7R (EIA)	390 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D471KW01L	DC2000	X7R (EIA)	470 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D561KW01L	DC2000	X7R (EIA)	560 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D681KW01L	DC2000	X7R (EIA)	680 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D821KW01L	DC2000	X7R (EIA)	820 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D102KW01L	DC2000	X7R (EIA)	1000 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D122KW01L	DC2000	X7R (EIA)	1200 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D152KW01L	DC2000	X7R (EIA)	1500 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR443QR73D182KW01L	DC2000	X7R (EIA)	1800 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D222KW01L	DC2000	X7R (EIA)	2200 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D272KW01L	DC2000	X7R (EIA)	2700 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D332KW01L	DC2000	X7R (EIA)	3300 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D392KW01L	DC2000	X7R (EIA)	3900 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443DR73D472KW01L	DC2000	X7R (EIA)	4700 ±10%	4.5	3.2	2.0	2.5	0.3 min.
GR455DR73D103KW01L	DC2000	X7R (EIA)	10000 ±10%	5.7	5.0	2.0	3.2	0.3 min.

GR4 Series Specifications and Test Methods

No.	Item	Specifications	Test Method
1	Operating Temperature Range	−55 to +125℃	−
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. Rated Voltage: DC2kV — Test Voltage: 120% of the rated voltage — Time: 60±1 sec. Test Voltage: AC1500V(r.m.s.) — Time: 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℃)	The capacitance measurement should be made at each step specified in the Table. Step 1: 25±2 Step 2: Min. Operating Temp.±3 Step 3: 25±2 Step 4: Max. Operating Temp.±2 Step 5: 25±2 •Pretreatment Perform a heat treatment at 150 $^{+0}_{-10}$℃ 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.  Fig. 1
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℃, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

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GR4 Series Specifications and Test Methods

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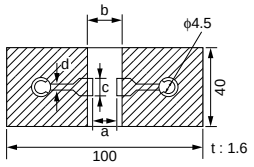
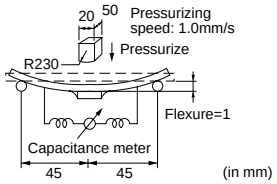
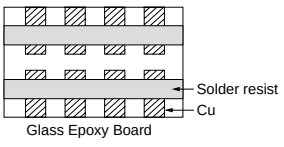
No.	Item		Specifications	Test Method
12	Deflection		No marking defects  Fig. 2 L×W (mm) / Dimension (mm): a 4.5×2.0: 3.5, 7.0, 2.4; 4.5×3.2: 3.5, 7.0, 3.7; 5.7×5.0: 4.5, 8.0, 5.6; d: 1.0	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2. Then apply a force in the direction shown 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
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	Preheat the capacitor as in table. Immerse the capacitor in solder solution at 260±5℃ 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^{+0}_{-10}℃ for 60±5 min. and then let sit for 24±2 hrs. at room condition.* ∗Preheating Step / Temperature / Time: 1: 100 to 120℃, 1 min.; 2: 170 to 200℃, 1 min.
		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	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 (℃) / 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^{+0}_{-10}℃ for 60±5 min. and then let sit for 24±2 hrs. at room condition.*  Fig. 4
		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	Let the capacitor sit at 40±2℃ and relative humidity of 90 to 95% for 500^{+24}_{-0}hrs. Remove and let sit for 24±2 hrs. at room condition,* then measure. •Pretreatment Perform a heat treatment at 150^{+0}_{-10}℃ for 60±5 min. and then let sit for 24±2 hrs. at room condition.*
		Capacitance Change	Within ±15%	
		D.F.	0.05 max.	
		I.R.	More than 1,000MΩ	
		Dielectric Strength	In accordance with item No.4	

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

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GR4 Series Specifications and Test Methods

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No.	Item		Specifications	Test Method
17	Life	Appearance	No marking defects	Apply 110% of the rated voltage for 1,000$^{+48}_{0}$hrs. at maximum operating temperature ±3℃. 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 ±20%	
		D.F.	0.05 max.	
		I.R.	More than 2,000MΩ	
		Dielectric Strength	In accordance with item No.4	

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