

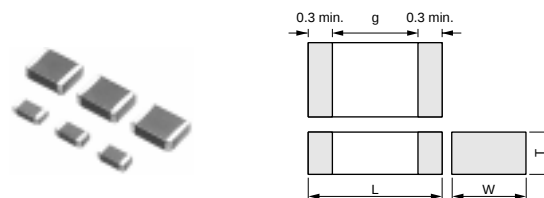
Chip Monolithic Ceramic Capacitors

muRata

Only for Information Devices/Tip & Ring

■ Features

1. These items are designed specifically for telecommunication devices (IEEE802.3) in Ethernet LAN.
2. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
3. Sn-plated external electrodes realizes good solderability.
4. Only for reflow soldering.
5. The low-profile type (thickness: 1.5mm max.) is available. Fit for use on thinner type equipment.



Part Number	Dimensions (mm)			
	L	W	T	g min.
GR442Q	4.5 ±0.3	2.0 ±0.2	1.5 +0, -0.3	2.5
GR443D	4.5 ±0.4	3.2 ±0.3	2.0 +0, -0.3	2.2*
GR443Q			1.5 +0, -0.3	2.5

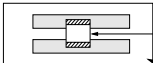
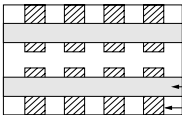
* GR443DR73D : 2.5mm min.

■ Applications

Ideal for use on telecommunication devices in Ethernet LAN.

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.

Specifications and Test Methods

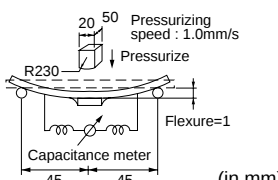
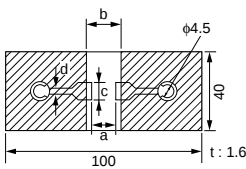
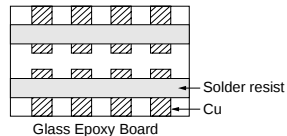
No.	Item		Specifications	Test Method								
1	Operating Temperature Range		−55 to +125℃	—								
2	Appearance		No defects or abnormalities	Visual inspection								
3	Dimensions		Within the specified dimensions	Using calipers								
4	Dielectric Strength		No defects or abnormalities	No failure should be observed when voltage in table is applied between the terminations, provided the charge/discharge current is less than 50mA. <table><tr><th>Rated voltage</th><th>Test Voltage</th><th>Time</th></tr><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></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 (Application : DC2kV item)		No self healing break downs or flash-overs have taken place in the capacitor.	10 impulse of alternating polarity is subjected. (5 impulse for each polarity) The interval between impulse is 60 sec. Applied Voltage : 2.5kV zero to peak								
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 25℃ 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.	•Pretreatment Perform a heat treatment at 150 ± 5 ℃ for 60±5 min. and then let sit for 24±2 hrs. at *room condition.								
9	Capacitance Temperature Characteristics		Cap. Change within ±15% (Temp. Range : −55 to +125℃)	The range of capacitance change compared with the 25℃ value within the specified range. •Pretreatment Perform a heat treatment at 150 ± 5 ℃ 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 using a eutectic solder. Then apply 10N force in the direction of the arrow. The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.  10N, 10±1s Speed : 1.0mm/s Glass Epoxy Board Fig. 1								
11	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 3 mutually perpendicular directions (total of 6 hrs.).  Solder resist Cu Glass Epoxy Board								
		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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Specifications and Test Methods

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No.	Item		Specifications	Test Method															
12	Deflection		No cracking or marking defects should occur.	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3. The soldering should be done either with an iron or 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															
			 <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>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="2">1.0</td></tr><tr><td>4.5×3.2</td><td>3.5</td><td>7.0</td><td>3.7</td></tr></tbody></table> Fig. 2		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
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																
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 eutectic solder solution for 2±0.5 sec. at 235±5°C. Immersing speed : 25±2.5mm/s															
14	Resistance to Soldering Heat	Appearance	No marking defects	Preheat the capacitor at 120 to 150°C* for 1 min. Immerse the capacitor in eutectic 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°C to 120°C</td><td>1 min.</td></tr><tr><td>2</td><td>170°C to 200°C</td><td>1 min.</td></tr></tbody></table>	Step	Temperature	Time	1	100°C to 120°C	1 min.	2	170°C to 200°C	1 min.						
		Step	Temperature		Time														
		1	100°C to 120°C		1 min.														
		2	170°C to 200°C		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 using a eutectic solder. 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 ±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°C and relative humidity of 90 to 95% for 500 ±24 hrs. 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 ±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°C, Relative humidity : 45 to 75%, Atmospheric pressure : 86 to 106kPa

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Specifications and Test Methods

Continued from the preceding page.

No.	Item		Specifications	Test Method
17	Life	Appearance	No marking defects	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	
18	Humidity Loading (Application : DC250V item)	Appearance	No marking defects	Apply the rated voltage at $40 \pm 2^\circ\text{C}$ and relative humidity of 90 to 95% for 500 ± 24 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 $\pm 15\%$	
		D.F.	0.05 max.	
		I.R.	More than $10\text{M}\Omega \cdot \mu\text{F}$	
		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