

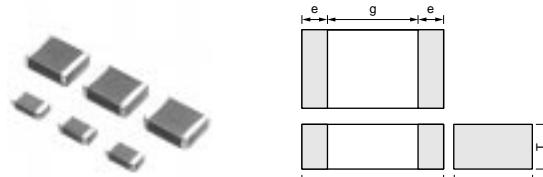
Chip Monolithic Ceramic Capacitors

muRata

AC250V Type (Which Meet Japanese Law)

■ Features

1. Chip monolithic ceramic capacitor for AC lines.
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. Capacitance 0.01 to 0.1 μ F for connecting lines and 470 to 4700 pF for connecting lines to earth.



Part Number	Dimensions (mm)				e min.	g min.
	L	W	T			
GA242Q	4.5 \pm 0.3	2.0 \pm 0.2	1.5 +0, -0.3			
GA243D	4.5 \pm 0.4	3.2 \pm 0.3	2.0 +0, -0.3		0.3	2.5
GA243Q			1.5 +0, -0.3			
GA255D	5.7 \pm 0.4	5.0 \pm 0.4	2.0 +0, -0.3			

■ Applications

Noise suppression filters for switching power supplies, telephones, facsimiles, modems.

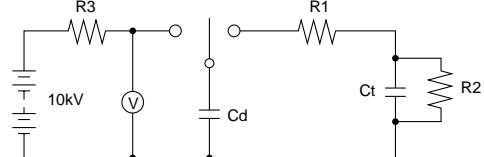
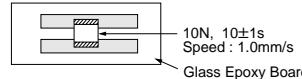
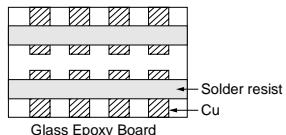
■ Reference Standard

GA2 series obtains no safety approval.

This series is based on JIS C 5102, JIS C 5150, and the standards of the electrical appliance and material safety law of Japan (separated table 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)
GA242QR7E2471MW01L	AC250 (r.m.s.)	X7R (EIA)	470pF \pm 20%	4.5	2.0	1.5	2.5	0.3 min.
GA242QR7E2102MW01L	AC250 (r.m.s.)	X7R (EIA)	1000pF \pm 20%	4.5	2.0	1.5	2.5	0.3 min.
GA243QR7E2222MW01L	AC250 (r.m.s.)	X7R (EIA)	2200pF \pm 20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2332MW01L	AC250 (r.m.s.)	X7R (EIA)	3300pF \pm 20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2472MW01L	AC250 (r.m.s.)	X7R (EIA)	4700pF \pm 20%	4.5	3.2	2.0	2.5	0.3 min.
GA243QR7E2103MW01L	AC250 (r.m.s.)	X7R (EIA)	10000pF \pm 20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2223MW01L	AC250 (r.m.s.)	X7R (EIA)	22000pF \pm 20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2473MW01L	AC250 (r.m.s.)	X7R (EIA)	47000pF \pm 20%	4.5	3.2	2.0	2.5	0.3 min.
GA255DR7E2104MW01L	AC250 (r.m.s.)	X7R (EIA)	0.10 μ F \pm 20%	5.7	5.0	2.0	2.5	0.3 min.

Specifications and Test Methods

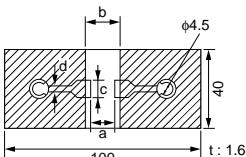
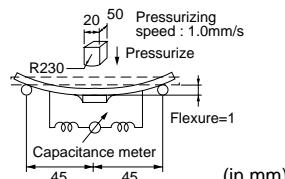
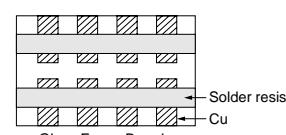
No.	Item	Specifications	Test Method						
1	Operating Temperature Range	−55 to +125°C	—						
2	Appearance	No defects or abnormalities	Visual inspection						
3	Dimensions	Within the specified dimensions	Using calipers						
4	Dielectric Strength	No defects or abnormalities	<p>No failure should be observed when voltage in table is applied between the terminations for 60 ± 1 sec., provided the charge/discharge current is less than 50mA.</p> <table border="1"> <tr> <th>Nominal Capacitance</th> <th>Test voltage</th> </tr> <tr> <td>$C \geq 10,000\text{pF}$</td> <td>AC575V (r.m.s.)</td> </tr> <tr> <td>$C < 10,000\text{pF}$</td> <td>AC1500V (r.m.s.)</td> </tr> </table>	Nominal Capacitance	Test voltage	$C \geq 10,000\text{pF}$	AC575V (r.m.s.)	$C < 10,000\text{pF}$	AC1500V (r.m.s.)
Nominal Capacitance	Test voltage								
$C \geq 10,000\text{pF}$	AC575V (r.m.s.)								
$C < 10,000\text{pF}$	AC1500V (r.m.s.)								
5	Insulation Resistance (I.R.)	More than $2,000\text{M}\Omega$	The insulation resistance should be measured with $\text{DC}500 \pm 50\text{V}$ and within 60 ± 5 sec. of charging.						
6	Capacitance	Within the specified tolerance	<p>The capacitance/D.F. should be measured at 25°C at a frequency of $1 \pm 0.2\text{kHz}$ and a voltage of $\text{AC}1 \pm 0.2\text{V}$ (r.m.s.)</p> <p>• Pretreatment</p> <p>Perform a heat treatment at $150 \pm 10^\circ\text{C}$ for 60 ± 5 min. and then let sit for 24 ± 2 hrs. at *room condition.</p>						
7	Dissipation Factor (D.F.)	0.025 max.							
8	Capacitance Temperature Characteristics	Cap. Change Within $\pm 15\%$ (Temp. Range : −55 to +125°C)	<p>The range of capacitance change compared with the 25°C value within −55 to +125°C should be within the specified range.</p> <p>• Pretreatment</p> <p>Perform a heat treatment at $150 \pm 10^\circ\text{C}$ for 60 ± 5 min. and then let sit for 24 ± 2 hrs. at *room condition.</p>						
9	Discharge Test (Application: Nominal Capacitance $C < 10,000\text{pF}$)	Appearance	<p>No defects or abnormalities</p> <p>As in Fig., discharge is made 50 times at 5 sec. intervals from the capacitor (C_d) charged at DC voltage of specified.</p>  <p>Ct : Capacitor under test Cd : $0.001\mu\text{F}$ R1 : $1,000\Omega$ R2 : $100\text{M}\Omega$ R3 : Surge resistance</p>						
10	Adhesive Strength of Termination	No removal of the terminations or other defects should occur.	<p>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.</p>  <p>Fig. 1</p>						
11	Vibration Resistance	<p>Appearance</p> <p>Capacitance</p> <p>D.F.</p>	<p>No defects or abnormalities</p> <p>Within the specified tolerance</p> <p>0.025 max.</p> <p>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.).</p> 						

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

Continued on the following page. 

Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																									
12	Deflection	<p>No cracking or marking defects should occur.</p> <p></p> <table border="1"> <thead> <tr> <th>L×W (mm)</th> <th colspan="4">Dimension (mm)</th> </tr> <tr> <th></th> <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>1.0</td> </tr> <tr> <td>4.5×3.2</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> <td></td> </tr> <tr> <td>5.7×5.0</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> <td></td> </tr> </tbody> </table> <p>Fig. 2</p>	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>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.</p> <p></p> <p>Fig. 3</p>
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																									
13	Solderability of Termination	75% of the terminations are to be soldered evenly and continuously.	<p>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 $235 \pm 5^\circ\text{C}$. Immersing speed : 25 ± 2.5 mm/s</p>																									
14	Humidity Insulation	<table border="1"> <tr> <td>Appearance</td> <td>No marking defects</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 15\%$</td> </tr> <tr> <td>D.F.</td> <td>0.05 max.</td> </tr> <tr> <td>I.R.</td> <td>More than $1,000\text{M}\Omega$</td> </tr> <tr> <td>Dielectric Strength</td> <td>In accordance with item No.4</td> </tr> </table>	Appearance	No marking defects	Capacitance Change	Within $\pm 15\%$	D.F.	0.05 max.	I.R.	More than $1,000\text{M}\Omega$	Dielectric Strength	In accordance with item No.4	<p>The capacitor should be subjected to $40 \pm 2^\circ\text{C}$, relative humidity of 90 to 98% for 8 hrs., and then removed in *room condition for 16 hrs. until 5 cycles.</p>															
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15	Resistance to Soldering Heat	<table border="1"> <tr> <td>Appearance</td> <td>No marking defects</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 10\%$</td> </tr> <tr> <td>D.F.</td> <td>0.025 max.</td> </tr> <tr> <td>I.R.</td> <td>More than $2,000\text{M}\Omega$</td> </tr> <tr> <td>Dielectric Strength</td> <td>In accordance with item No.4</td> </tr> </table>	Appearance	No marking defects	Capacitance Change	Within $\pm 10\%$	D.F.	0.025 max.	I.R.	More than $2,000\text{M}\Omega$	Dielectric Strength	In accordance with item No.4	<p>Preheat the capacitor as table. Immerse the capacitor in eutectic solder solution at $260 \pm 5^\circ\text{C}$ for 10 ± 1 sec. Let sit at *room condition for 24 ± 2 hrs., then measure.</p> <ul style="list-style-type: none"> •Immersing speed : 25 ± 2.5 mm/s •Pretreatment <p>Perform a heat treatment at $150 \pm 10^\circ\text{C}$ for 60 ± 5 min. and then let sit for 24 ± 2 hrs. at *room condition.</p> <p>*Preheating</p> <table border="1"> <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.						
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4	Room Temp.	2 to 3																										

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

Continued on the following page.

Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method									
17	Appearance	No marking defects	<p>Let the capacitor sit 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.</p> <p>•Pretreatment Perform a heat treatment at $150 \pm 8^\circ\text{C}$ for 60 ± 5 min. and then let sit for 24 ± 2 hrs. at *room condition.</p>									
	Capacitance Change	Within $\pm 15\%$										
	D.F.	0.05 max.										
	I.R.	More than $1,000\text{M}\Omega$										
	Dielectric Strength	In accordance with item No.4										
18	Appearance	No marking defects	<p>Apply voltage and time as Table at $85 \pm 2^\circ\text{C}$. Remove and let sit for 24 ± 2 hrs. at *room condition, then measure. The charge / discharge current is less than 50mA.</p> <table border="1"> <thead> <tr> <th>Nominal Capacitance</th> <th>Test Time</th> <th>Test voltage</th> </tr> </thead> <tbody> <tr> <td>$C \geq 10,000\text{pF}$</td> <td>$1,000 \pm 48$ hrs.</td> <td>AC300V (r.m.s.)</td> </tr> <tr> <td>$C < 10,000\text{pF}$</td> <td>$1,500 \pm 48$ hrs.</td> <td>AC500V (r.m.s.) *</td> </tr> </tbody> </table> <p>* Except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec.</p> <p>•Pretreatment Apply test voltage for 60 ± 5 min. at test temperature. Remove and let sit for 24 ± 2 hrs. at *room condition.</p>	Nominal Capacitance	Test Time	Test voltage	$C \geq 10,000\text{pF}$	$1,000 \pm 48$ hrs.	AC300V (r.m.s.)	$C < 10,000\text{pF}$	$1,500 \pm 48$ hrs.	AC500V (r.m.s.) *
Nominal Capacitance	Test Time	Test voltage										
$C \geq 10,000\text{pF}$	$1,000 \pm 48$ hrs.	AC300V (r.m.s.)										
$C < 10,000\text{pF}$	$1,500 \pm 48$ hrs.	AC500V (r.m.s.) *										
Capacitance Change	Within $\pm 20\%$											
D.F.	0.05 max.											
I.R.	More than $1,000\text{M}\Omega$											
Dielectric Strength	In accordance with item No.4											
19	Appearance	No marking defects	<p>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.</p> <p>•Pretreatment Apply test voltage for 60 ± 5 min. at test temperature. Remove and let sit for 24 ± 2 hrs. at *room condition.</p>									
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* "Room condition" Temperature : 15 to 35°C , Relative humidity : 45 to 75%, Atmospheric pressure : 86 to 106kPa