

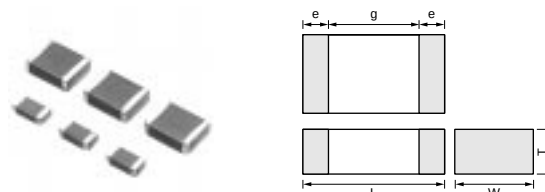
Chip Monolithic Ceramic Capacitors



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 uF for connecting lines and 470 to 4700 pF for connecting lines to earth.



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

■ Applications

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

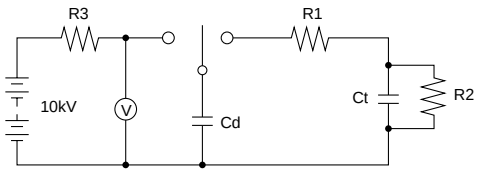
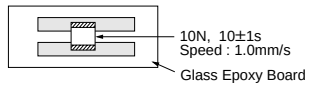
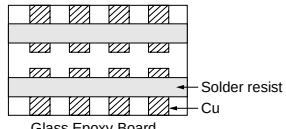
■ Reference Standard

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 ±20%	4.5	2.0	1.5	2.5	0.3 min.
GA242QR7E2102MW01L	AC250 (r.m.s.)	X7R (EIA)	1000pF ±20%	4.5	2.0	1.5	2.5	0.3 min.
GA243QR7E2222MW01L	AC250 (r.m.s.)	X7R (EIA)	2200pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2332MW01L	AC250 (r.m.s.)	X7R (EIA)	3300pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2472MW01L	AC250 (r.m.s.)	X7R (EIA)	4700pF ±20%	4.5	3.2	2.0	2.5	0.3 min.
GA243QR7E2103MW01L	AC250 (r.m.s.)	X7R (EIA)	10000pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2223MW01L	AC250 (r.m.s.)	X7R (EIA)	22000pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2473MW01L	AC250 (r.m.s.)	X7R (EIA)	47000pF ±20%	4.5	3.2	2.0	2.5	0.3 min.
GA255DR7E2104MW01L	AC250 (r.m.s.)	X7R (EIA)	0.10μF ±20%	5.7	5.0	2.0	2.5	0.3 min.

Specifications and Test Methods

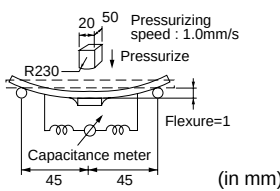
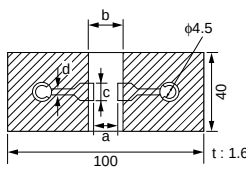
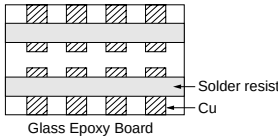
No.	Item		Specifications	Test Method						
1	Operating Temperature Range		−55 to +125℃	—						
2	Appearance		No defects or abnormalities	Visual inspection						
3	Dimensions		Within the specified dimensions	Using calipers						
4	Dielectric Strength		No defects or abnormalities	No failure should be observed when voltage in table is applied between the terminations for 60±1 sec., provided the charge/discharge current is less than 50mA. <table><tr><th>Nominal Capacitance</th><th>Test voltage</th></tr><tr><td>C≥10,000pF</td><td>AC575V (r.m.s.)</td></tr><tr><td>C<10,000pF</td><td>AC1500V (r.m.s.)</td></tr></table>	Nominal Capacitance	Test voltage	C≥10,000pF	AC575V (r.m.s.)	C<10,000pF	AC1500V (r.m.s.)
Nominal Capacitance	Test voltage									
C≥10,000pF	AC575V (r.m.s.)									
C<10,000pF	AC1500V (r.m.s.)									
5	Insulation Resistance (I.R.)		More than 2,000MΩ	The insulation resistance should be measured with DC500±50V and within 60±5 sec. of charging.						
6	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.)						
7	Dissipation Factor (D.F.)		0.025 max.	•Pretreatment Perform a heat treatment at 150 ± ₁ 8℃ for 60±5 min. and then let sit for 24±2 hrs. at *room condition.						
8	Capacitance Temperature Characteristics		Cap. Change Within ±15% (Temp. Range : −55 to +125℃)	The range of capacitance change compared with the 25℃ value within −55 to +125℃ should be within the specified range. •Pretreatment Perform a heat treatment at 150 ± ₁ 8℃ for 60±5 min. and then let sit for 24±2 hrs. at *room condition.						
9	Discharge Test (Application: Nominal Capacitance C<10,000pF)	Appearance	No defects or abnormalities	As in Fig., discharge is made 50 times at 5 sec. intervals from the capacitor (Cd) charged at DC voltage of specified.  Ct : Capacitor under test Cd : 0.001μF R1 : 1,000Ω R2 : 100MΩ R3 : Surge resistance						
10	Adhesive Strength of Termination		No removal of the terminations or other defects 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℃, 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><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><tr><td>4.5×2.0</td><td>3.5</td><td>7.0</td><td>2.4</td><td rowspan="3">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></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	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																				
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	Humidity Insulation	Appearance	No marking defects	The capacitor should be subjected to 40±2°C, relative humidity of 90 to 98% for 8 hrs., and then removed in *room condition for 16 hrs. until 5 cycles.																			
		Capacitance Change	Within ±15%																				
		D.F.	0.05 max.																				
		I.R.	More than 1,000MΩ																				
		Dielectric Strength	In accordance with item No.4																				
15	Resistance to Soldering Heat	Appearance	No marking defects	Preheat the capacitor as table. 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 <table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><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></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 2,000MΩ																						
Dielectric Strength	In accordance with item No.4																						
16	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><tr><th>Step</th><th>Temperature (°C)</th><th>Time (min.)</th></tr><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></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 2,000MΩ																						
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	Humidity (Steady State)	Appearance	No marking defects	Let the capacitor sit at 40±2℃ 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} ℃ 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										
18	Life	Appearance	No marking defects	Apply voltage and time as Table at 85±2℃. Remove and let sit for 24 ±2 hrs. at *room condition, then measure. The charge / discharge current is less than 50mA. <table><tr><th>Nominal Capacitance</th><th>Test Time</th><th>Test voltage</th></tr><tr><td>C≥10,000pF</td><td>1,000^{±48} hrs.</td><td>AC300V (r.m.s.)</td></tr><tr><td>C<10,000pF</td><td>1,500^{±48} hrs.</td><td>AC500V (r.m.s.) *</td></tr></table> * Except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec. •Pretreatment Apply test voltage for 60±5 min. at test temperature. Remove and let sit for 24±2 hrs. at *room condition.	Nominal Capacitance	Test Time	Test voltage	C≥10,000pF	1,000 ^{±48} hrs.	AC300V (r.m.s.)	C<10,000pF	1,500 ^{±48} hrs.	AC500V (r.m.s.) *
		Nominal Capacitance	Test Time		Test voltage								
		C≥10,000pF	1,000 ^{±48} hrs.		AC300V (r.m.s.)								
		C<10,000pF	1,500 ^{±48} hrs.		AC500V (r.m.s.) *								
		Capacitance Change	Within ±20%										
D.F.	0.05 max.												
I.R.	More than 1,000MΩ												
Dielectric Strength	In accordance with item No.4												
19	Humidity Loading	Appearance	No marking defects	Apply the rated voltage at 40±2℃ 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 ±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