

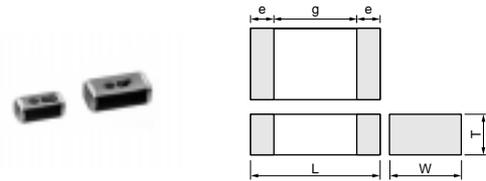
Chip Monolithic Ceramic Capacitors



Safety Standard Recognized Type GD (IEC60384-14 Class Y3)

■ Features

1. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
2. The type GD can be used as a Y3-class capacitor.
3. Available for equipment based on IEC/EN60950 and UL1950.
4. +125 degree C guaranteed.
5. Only for reflow soldering.
6. The low-profile type (thickness: 1.5mm max.) is available. Fit for use on thinner type equipment.



Part Number	Dimensions (mm)				
	L	W	T	e min.	g min.
GA342D	4.5 ±0.3	2.0 ±0.2	2.0 ±0.2*	0.3	2.5
GA342Q			1.5 +0, -0.3		
GA343D	4.5 ±0.4	3.2 ±0.3	2.0 +0, -0.3		
GA343Q			1.5 +0, -0.3		

* GA342D1X : 2.0±0.3

■ Applications

1. Ideal for use on line filters and couplings for DAA modems without transformers.
2. Ideal for use on line filters for information equipment.

■ Standard Recognition

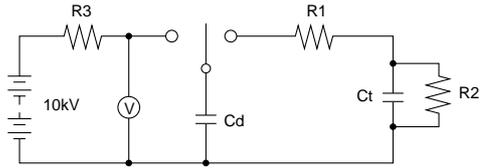
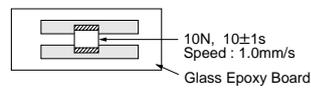
	Standard No.	Class	Status of Recognition	Rated Voltage
			Type GD	
SEMKO	EN132400	Y3	◎	AC250V (r.m.s.)

Applications

Size	Switching power supplies	Communication network devices such as a modem
4.5×3.2mm and under	—	◎

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)
GA342D1XGD100JY02L	AC250 (r.m.s.)	SL (JIS)	10 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD120JY02L	AC250 (r.m.s.)	SL (JIS)	12 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD150JY02L	AC250 (r.m.s.)	SL (JIS)	15 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD180JY02L	AC250 (r.m.s.)	SL (JIS)	18 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD220JY02L	AC250 (r.m.s.)	SL (JIS)	22 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD270JY02L	AC250 (r.m.s.)	SL (JIS)	27 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD330JY02L	AC250 (r.m.s.)	SL (JIS)	33 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD390JY02L	AC250 (r.m.s.)	SL (JIS)	39 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD470JY02L	AC250 (r.m.s.)	SL (JIS)	47 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD560JY02L	AC250 (r.m.s.)	SL (JIS)	56 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD680JY02L	AC250 (r.m.s.)	SL (JIS)	68 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD820JY02L	AC250 (r.m.s.)	SL (JIS)	82 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342QR7GD101KW01L	AC250 (r.m.s.)	X7R (EIA)	100 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD151KW01L	AC250 (r.m.s.)	X7R (EIA)	150 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD221KW01L	AC250 (r.m.s.)	X7R (EIA)	220 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD331KW01L	AC250 (r.m.s.)	X7R (EIA)	330 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD471KW01L	AC250 (r.m.s.)	X7R (EIA)	470 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD681KW01L	AC250 (r.m.s.)	X7R (EIA)	680 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD102KW01L	AC250 (r.m.s.)	X7R (EIA)	1000 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD152KW01L	AC250 (r.m.s.)	X7R (EIA)	1500 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA343QR7GD182KW01L	AC250 (r.m.s.)	X7R (EIA)	1800 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GA343QR7GD222KW01L	AC250 (r.m.s.)	X7R (EIA)	2200 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GA343DR7GD472KW01L	AC250 (r.m.s.)	X7R (EIA)	4700 ±10%	4.5	3.2	2.0	2.5	0.3 min.

GA3 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								
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" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Test voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Type GB</td> <td style="text-align: center;">DC1075V</td> </tr> <tr> <td style="text-align: center;">Type GC/GD/GF</td> <td style="text-align: center;">AC1500V (r.m.s.)</td> </tr> </tbody> </table>	Test voltage		Type GB	DC1075V	Type GC/GD/GF	AC1500V (r.m.s.)		
Test voltage											
Type GB	DC1075V										
Type GC/GD/GF	AC1500V (r.m.s.)										
5	Pulse Voltage (Application: Type GD/GF)	No self healing break downs or flash-overs have taken place in the capacitor.	<p>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</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/Q.D.F. should be measured at 20°C at a frequency of 1±0.2kHz (SL char. : 1±0.2MHz) and a voltage of AC1±0.2V (r.m.s.).								
8	Dissipation Factor (D.F.) Q	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Char.</th> <th style="text-align: center;">Specification</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">X7R</td> <td style="text-align: center;">D.F. ≤ 0.025</td> </tr> <tr> <td style="text-align: center;">SL</td> <td style="text-align: center;">Q ≥ 400+20C*2 (C < 30pF) Q ≥ 1000 (C ≥ 30pF)</td> </tr> </tbody> </table>	Char.	Specification	X7R	D.F. ≤ 0.025	SL	Q ≥ 400+20C*2 (C < 30pF) Q ≥ 1000 (C ≥ 30pF)	<p>•Pretreatment for X7R char. Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at *room condition.</p>		
Char.	Specification										
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9	Capacitance Temperature Characteristics	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Char.</th> <th style="text-align: center;">Capacitance Change</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">X7R</td> <td style="text-align: center;">Within ±15%</td> </tr> </tbody> </table> <p>Temperature characteristic guarantee is -55 to +125°C</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Char.</th> <th style="text-align: center;">Temperature Coefficient</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">SL</td> <td style="text-align: center;">+350 to -1000ppm/°C</td> </tr> </tbody> </table> <p>Temperature characteristic guarantee is +20 to +85°C</p>	Char.	Capacitance Change	X7R	Within ±15%	Char.	Temperature Coefficient	SL	+350 to -1000ppm/°C	<p>The range of capacitance change compared with the 25°C (SL char. : 20°C) value within -55 to +125°C should be within the specified range. •Pretreatment for X7R char. Perform a heat treatment at 150±10°C for 60±5 min. and then let sit for 24±2 hrs. at *room condition.</p>
Char.	Capacitance Change										
X7R	Within ±15%										
Char.	Temperature Coefficient										
SL	+350 to -1000ppm/°C										
10	Appearance	No defects or abnormalities	<p>As in Fig., discharge is made 50 times at 5 sec. intervals from the capacitor (Cd) charged at DC voltage of specified.</p>  <p style="text-align: center;">Ct : Capacitor under test Cd : 0.001μF R1 : 1,000Ω R2 : 100MΩ R3 : Surge resistance</p>								
	I.R.	More than 1,000MΩ									
	Dielectric Strength	In accordance with item No.4									
11	Adhesive Strength of Termination	No removal of the terminations or other defect 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 style="text-align: center;">10N, 10±1s Speed : 1.0mm/s Glass Epoxy Board</p> <p style="text-align: right;">Fig. 1</p>								

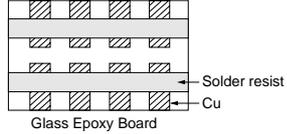
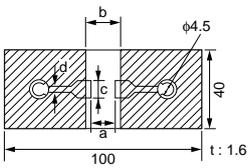
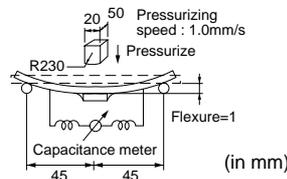
*1 "Room condition" Temperature : 15 to 35°C, Relative humidity : 45 to 75%, Atmospheric pressure : 86 to 106kPa

*2 "C" expresses nominal capacitance value (pF).

Continued on the following page.

GA3 Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Specifications	Test Method																							
12	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.).																							
	Capacitance	Within the specified tolerance																								
13	Vibration Resistance	D.F.																								
		Q																								
13	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.																							
		 <table border="1" data-bbox="367 884 877 1030"> <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="4">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>5.7×2.8</td> <td>4.5</td> <td>8.0</td> <td>3.2</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	5.7×2.8	4.5	8.0	3.2	5.7×5.0
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5.7×5.0	4.5	8.0	5.6																							
14	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																								
15	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 *1 room condition for 24±2 hrs., then measure. •Immersing speed : 25±2.5mm/s •Pretreatment for X7R char. Perform a heat treatment at 150±18°C for 60±5 min. and then let sit for 24±2 hrs. at *1 room condition. *Preheating <table border="1" data-bbox="933 1411 1452 1489"> <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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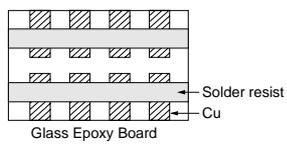
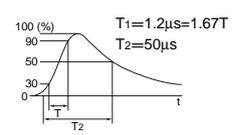
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Continued from the preceding page.

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16	Temperature Cycle	Appearance	No marking defects															
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	Dielectric Strength	In accordance with item No.4																
			<p>Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4 using a eutectic solder.</p> <p>Perform the 5 cycles according to the 4 heat treatments listed in the following table.</p> <p>Let sit for 24\pm2 hrs. at *room condition, then measure.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #f2f2f2;"> <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\pm3</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\pm3</td> </tr> <tr> <td>4</td> <td>Room Temp.</td> <td>2 to 3</td> </tr> </tbody> </table> <p>•Pretreatment for X7R char. Perform a heat treatment at 150\pm1.8°C for 60\pm5 min. and then let sit for 24\pm2 hrs. at *room condition.</p> <div style="text-align: center;">  <p style="font-size: small;">Solder resist Cu Glass Epoxy Board</p> </div> <p style="text-align: center;">Fig. 4</p>	Step	Temperature (°C)	Time (min.)	1	Min. Operating Temp. ± 3	30 \pm 3	2	Room Temp.	2 to 3	3	Max. Operating Temp. ± 2	30 \pm 3	4	Room Temp.	2 to 3
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17	Humidity (Steady State)	Appearance	No marking defects															
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			<p>Let the capacitor sit at 40\pm2°C and relative humidity of 90 to 95% for 500\pm12 hrs.</p> <p>Remove and let sit for 24\pm2 hrs. at *room condition, then measure.</p> <p>•Pretreatment for X7R char. Perform a heat treatment at 150\pm1.8°C for 60\pm5 min. and then let sit for 24\pm2 hrs. at *room condition.</p>															
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SL	$Q \geq 275 + 5/2C^{*2}$ ($C < 30\text{pF}$) $Q \geq 350$ ($C \geq 30\text{pF}$)																	
I.R.	More than 3,000M Ω																	
	Dielectric Strength	In accordance with item No.4																
			<p>Impulse Voltage</p> <p>Each individual capacitor should be subjected to a 2.5kV (Type GC/GF : 5kV) Impulses (the voltage value means zero to peak) for three times. Then the capacitors are applied to life test.</p> <div style="text-align: right;">  <p style="font-size: x-small;">T₁=1.2μs=1.67T T₂=50μs</p> </div> <p>Apply voltage as Table for 1,000 hrs. at 125\pm2°C, relative humidity 50% max.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #f2f2f2;"> <th>Type</th> <th>Applied voltage</th> </tr> </thead> <tbody> <tr> <td>GB</td> <td>AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec.</td> </tr> <tr> <td>GC</td> <td>AC425V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec.</td> </tr> <tr> <td>GD</td> <td></td> </tr> <tr> <td>GF</td> <td></td> </tr> </tbody> </table> <p>Let sit for 24\pm2 hrs. at *room condition, then measure.</p> <p>•Pretreatment for X7R char. Perform a heat treatment at 150\pm1.8°C for 60\pm5 min. and then let sit for 24\pm2 hrs. at *room condition.</p>	Type	Applied voltage	GB	AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec.	GC	AC425V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec.	GD		GF						
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*1 "Room condition" Temperature : 15 to 35°C, Relative humidity : 45 to 75%, Atmospheric pressure : 86 to 106kPa

*2 "C" expresses nominal capacitance value (pF).

Continued on the following page. ↗

GA3 Series Specifications and Test Methods

☐ Continued from the preceding page.

No.	Item	Specifications	Test Method						
19	Appearance	No marking defects	Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500 ^{±2} / ₄ hrs. Remove and let sit for 24±2 hrs. at *1room condition, then measure. •Pretreatment for X7R char. Perform a heat treatment at 150 ^{±1} / ₈ °C for 60±5 min. and then let sit for 24±2 hrs. at *1room condition.						
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