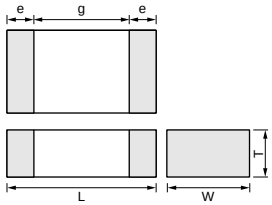
CHIP MONOLITHIC CERAMIC CAPACITOR

High-frequency for Flow/Reflow Soldering GRQ Series

■ Features

1.HiQ and low ESR at VHF, UHF, Microwave.
2.Feature improvement, low power consumption for mobile telecommunication (Base station, terminal, etc.)



■ Application

High-frequency circuit (Mobile telecommunication, etc.)

Part Number	Dimensions (mm)				
	L	W	T	e	g min.
GRQ706	1.6 ±0.1	0.8 ±0.1	0.8 ±0.1	0.2 to 0.5	0.5
GRQ708	2.0 ±0.1	1.25 ±0.1	0.85 ±0.1	0.2 to 0.7	0.7

Part Number	**GRQ706**		**GRQ708**	
L x W(mm)	1.60x0.80		2.00x1.25	
TC Code	C0G		C0G	
Rated Volt.(Vdc)	50	100	50	100
Capacitance and T(mm)				
0.5pF		0.80		0.85
0.75pF		0.80		0.85
1.0pF		0.80		0.85
1.1pF		0.80		0.85
1.2pF		0.80		0.85
1.3pF		0.80		0.85
1.5pF		0.80		0.85
1.6pF		0.80		0.85
1.8pF		0.80		0.85
2.0pF		0.80		0.85
2.2pF		0.80		0.85
2.4pF		0.80		0.85
2.7pF		0.80		0.85
3.0pF		0.80		0.85
3.3pF		0.80		0.85
3.6pF		0.80		0.85
3.9pF		0.80		0.85
4.0pF		0.80		0.85
4.3pF		0.80		0.85
4.7pF		0.80		0.85
5.0pF		0.80		0.85
5.1pF		0.80		0.85
5.6pF		0.80		0.85
6.0pF		0.80		0.85
6.2pF		0.80		0.85
6.8pF		0.80		0.85
7.0pF	0.80			0.85
7.5pF	0.80			0.85
8.0pF	0.80			0.85
8.2pF	0.80			0.85
9.0pF	0.80			0.85
9.1pF	0.80			0.85
10.0pF	0.80			0.85
11pF	0.80			0.85
12pF	0.80			0.85

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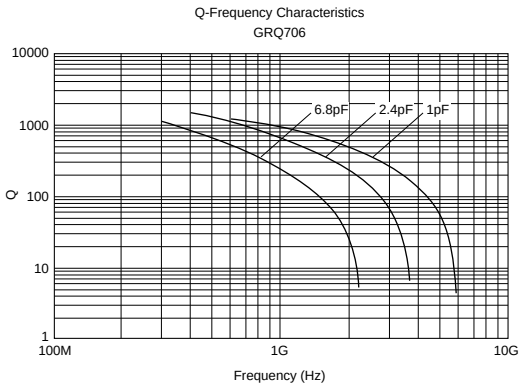
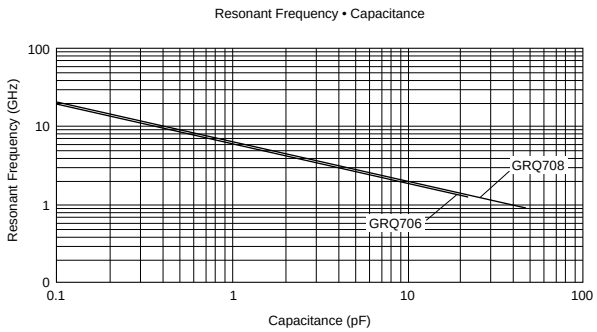
Part Number	GRQ706		GRQ708	
L x W(mm)	1.60x0.80		2.00x1.25	
TC Code	C0G		C0G	
Rated Volt.(Vdc)	50	100	50	100
Capacitance and T(mm)				
13pF	0.80			0.85
15pF	0.80			0.85
16pF	0.80			0.85
18pF	0.80			0.85
20pF	0.80		0.85	
22pF	0.80		0.85	
24pF	0.80		0.85	
27pF			0.85	
30pF			0.85	
33pF			0.85	
36pF			0.85	
39pF			0.85	
43pF			0.85	
47pF			0.85	

■ Q-Frequency Characteristics



■ Resonant Frequency-Capacitance



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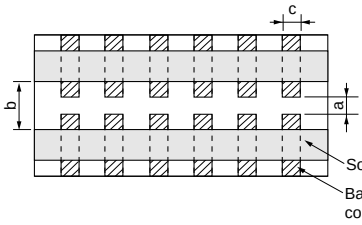
Specifications and Test Methods

No.	Item		Specification	Test Method
1	Operating Temperature Range		C0G : −55℃ to 125℃	
2	Rated Voltage		See the previous pages.	The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V^{P-P} or V^{O-P}, whichever is larger, shall be maintained within the rated voltage range.
3	Appearance		No defects or abnormalities.	Visual inspection.
4	Dimensions		Within the specified dimensions.	Using calipers.
5	Dielectric Strength		No defects or abnormalities.	No failure shall be observed when 300% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.
6	Insulation Resistance (I.R.)		More than 10,000MΩ or 500Ω • F. (Whichever is smaller)	The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25℃ and 75%RH max. and within 2 minutes of charging.
7	Capacitance		Within the specified tolerance.	The capacitance/Q shall be measured at 25℃ at the frequency and voltage shown in the table.
8	Q		Q≧1000	
9	Capacitance Temperature Characteristics	Capacitance Change	Within the specified tolerance. (Table A-1)	The temperature coefficient is determined using the capacitance measured in step 3 as a reference. When cycling the temperature sequentially from step 1 through 5, the capacitance shall be within the specified tolerance for the temperature coefficient and capacitance change as Table A. The capacitance drift is caluculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.
		Temperature Coefficent	Within the specified tolerance. (Table A-1)	
		Capacitance Drift	Within ±0.2% or ±0.05pF (Whichever is larger.)	
10	Adhesive Strength of Termination		No removal of the terminations or other defect shall occur.	Solder the capacitor to the test jig (glass epoxy board) shown in Fig.1 using a eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1sec. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock. *5N (GRQ706)
11	Vibration Resistance	Appearance	No defects or abnormalities.	Solder the capacitor to the test jig (glass epoxy board) in the same manner and under the same conditions as (10). The capacitor shall 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, shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).
		Capacitance	Within the specified tolerance.	
		Q	Q≧1000	

Item \ Char.	C0G(1000pF and below)
Frequency	1±0.1MHz
Voltage	0.5 to 5Vrms

Step	Temperature(℃)
1	25±2
2	−55±3
3	25±2
4	125±3
5	25±2



Type	a	b	c
GRQ706	1.0	3.0	1.2
GRQ708	1.2	4.0	1.65

(in mm)

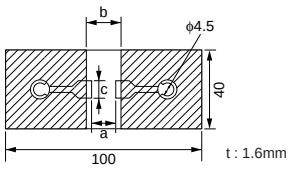
Fig.1

Continued on the following page.

Specifications and Test Methods

Continued from the preceding page.

No.	Item		Specification	Test Method
12	Deflection		No cracking or marking defects shall occur.	Solder the capacitor to the test 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 shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.
13	Solderability of Termination		75% of the terminations is 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). Preheat at 80 to 120℃ for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5℃.
14	Resistance to Soldering Heat		The measured and observed characteristics shall satisfy the specifications in the following table.	Preheat the capacitor at 120 to 150℃ for 1 minute. Immerse the capacitor in a eutectic solder solution at 270±5℃ for 10±0.5 seconds. Let sit at room temperature for 24±2 hours.
		Appearance	No marking defects.	
		Capacitance Change	Within ±2.5% or ±0.25pF (Whichever is larger)	
		Q	Q≧1000	
		I.R.	More than 10,000MΩ or 500Ω • F (Whichever is smaller)	
		Dielectric Strength	No failure	
15	Temperature Cycle		The measured and observed characteristics shall satisfy the specifications in the following table.	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the five cycles according to the four heat treatments listed in the following table. Let sit for 24±2 hours at room temperature, then measure.
		Appearance	No marking defects.	
		Capacitance Change	Within ±2.5% or ±0.25pF (Whichever is larger)	
		Q	Q≧1000	
		I.R.	More than 10,000MΩ or 500Ω • F (Whichever is smaller)	
		Dielectric Strength	No failure	
16	Humidity, Steady State		The measured and observed characteristics shall satisfy the specifications in the following table.	Sit the capacitor at 40±2℃ and 90 to 95% humidity for 500±12 hours. Remove and let sit for 24±2 hours (temperature compensating type) at room temperature, then measure.
		Appearance	No marking defects.	
		Capacitance Change	Within ±5% or ±0.5pF (Whichever is larger)	
		Q	Q≧350	
		I.R.	More than 1,000MΩ or 50Ω • F (Whichever is smaller)	
		Dielectric Strength	No failure	
17	Humidity Load		The measured and observed characteristics shall satisfy the specifications in the following table.	Apply the rated voltage at 40±2℃ and 90 to 95% humidity for 500±12 hours. Remove and let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.
		Appearance	No marking defects.	
		Capacitance Change	Within ±7.5% or ±0.75pF (Whichever is larger)	
		Q	Q≧200	
		I.R.	More than 500MΩ or 25Ω • F (Whichever is smaller)	
		Dielectric Strength	No failure	



Type	a	b	c
GRQ706	1.0	3.0	1.2
GRQ708	1.2	4.0	1.65

(in mm)

Fig.2

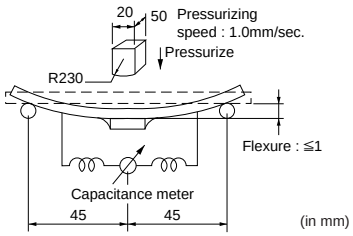


Fig.3

Step	1	2	3	4
Temp.(℃)	Min. Operating Temp.+0/−3	Room Temp.	Max. Operating Temp.+3/−0	Room Temp.
Time(min.)	30±3	2 to 3	30±3	2 to 3

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Specifications and Test Methods

Continued from the preceding page.

No.	Item		Specification	Test Method
18	High Temperature Load		The measured and observed characteristics shall satisfy the specifications in the following table.	Apply 200% of the rated voltage for 1,000±12 hours at the maximum operating temperature ±3℃. Let sit for 24±2 hours (temperature compensating type) at room temperature, then measure. The charge/discharge current is less than 50mA.
		Appearance	No marking defects.	
		Capacitance Change	Within ±3% or ±0.3pF (Whichever is larger)	
		Q	Q≧350	
		I.R.	More than 1,000MΩ or 50Ω • F (Whichever is smaller)	
		Dielectric Strength	No failure	

Table A

Char.	Nominal Values (ppm/℃) Note 1	Capacitance Change from 25℃ (%)					
		−55℃		−30℃		−10℃	
		Max.	Min.	Max.	Min.	Max.	Min.
C0G	0±30	0.58	−0.24	0.40	−0.17	0.25	−0.11

Note 1 : Nominal values denote the temperature coefficient within a range of 25℃ to 125℃. (for C0G)