

SPECIFICATIONS

Customer	
Product Name	Multi-layer Chip Ferrite Bead
Sunlord Part Number	GZ-C Series
Customer Part Number	

New Released, Revised]

SPEC No.: **GZ0502200000**

【This SPEC is total 12 pages including specifications and appendix.】

【ROHS, Halogen-Free and SVHC Compliant Parts】

Approved By	Checked By	Issued By

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【For Customer approval Only】

Date: _____

Qualification Status: Full Restricted Rejected

Approved By	Verified By	Re-checked By	Checked By

Comments:

【Version change history】

Rev.	Effective Date	Changed Contents	Change Reasons	Approved By
01	/	New release	/	Hai Guo

Caution

All products listed in this specification are developed, designed and intended for use in general electronics equipment. The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require especially high reliability, or whose failure, malfunction or trouble might directly cause damage to society, person, or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below. Please contact us for more details if you intend to use our products in the following applications.

1. Aircraft equipment
2. Aerospace equipment
3. Undersea equipment
4. nuclear control equipment
5. military equipment
6. Power plant equipment
7. Medical equipment
8. Transportation equipment (automobiles, trains, ships, etc.)
9. Traffic signal equipment
10. Disaster prevention / crime prevention equipment
11. Data-processing equipment
12. Applications of similar complexity or with reliability requirements comparable to the applications listed in the above

1. Scope

This specification applies to GZ-C Series of multi-layer ferrite chip bead.

2. Product Description and Identification (Part Number)

- 1) Description:
GZ-C Series of multi-layer ferrite chip bead.
- 2) Product Identification (Part Number)

GZ ※※※※ ○ XXX C ◎ F
 ① ② ③ ④ ⑤ ⑥ ⑦

①	Type
GZ	For General Use

③	Material Code
	D, U, E

⑤	Inner Code
	Feature Code

⑥	Packing
T	Tape Carrier Package

②	External Dimensions (L X W)[mm]	
1005 [0402]	1.0 X 0.5	
1608 [0603]	1.6 X 0.8	

④	Nominal Impedance	
Example	Nominal Value	
300	30Ω	
121	120Ω	

⑦	HSF Products
	Hazardous Substance Free Products

3. Electrical Characteristics

Please refer to **Appendix A** (Page 9~12).

- 1) Operating and storage temperature range (individual chip without packing): -55°C ~ +125°C.
- 2) Storage temperature range (packaging conditions):-10°C~+40°C and RH 70% (Max.)

4. Shape and Dimensions

- 1) Dimensions and recommended PCB pattern for reflow soldering: See **Fig.4-1**, **Fig.4-2** and **Table 4-1**.
- 2) Structure: See **Fig. 4-3** and **Fig. 4-4**.

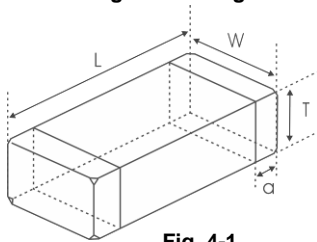


Fig. 4-1

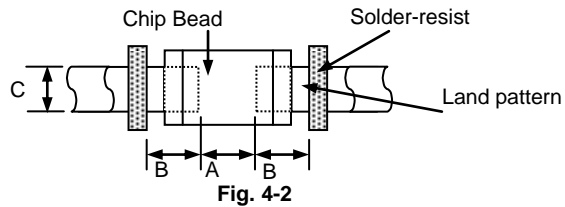


Fig. 4-2

[Table 4-1]

Unit: mm [inch]

Type	L	W	T	a	A	B	C
1005 [0402]	1.0±0.15 [0.039±0.006]	0.5±0.15 [0.020±0.006]	0.5±0.15 [0.020±0.006]	0.25±0.1 [0.010±0.004]	0.45~0.55	0.40~0.50	0.45~0.55
GZ1608 [0603]	1.6±0.15 [.063±.006]	0.8±0.15 [.031±.006]	0.8±0.15 [.031±.006]	0.3±0.2 [.012±.008]	0.60~0.80	0.60~0.80	0.60~0.80

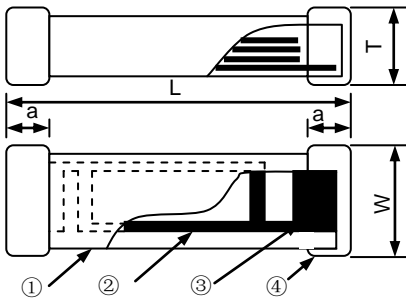


Fig. 4-3

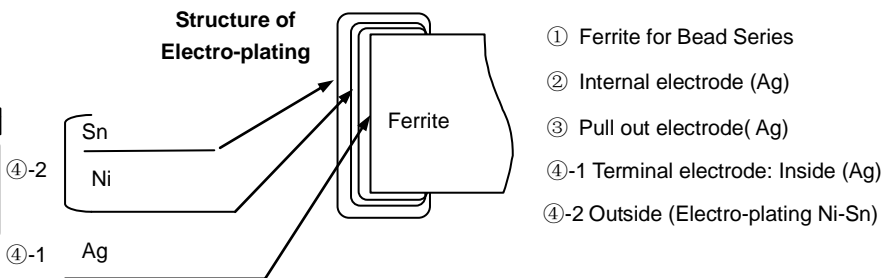


Fig. 4-4

- ① Ferrite for Bead Series
- ② Internal electrode (Ag)
- ③ Pull out electrode (Ag)
- ④-1 Terminal electrode: Inside (Ag)
- ④-2 Outside (Electro-plating Ni-Sn)

3) Material Information: See **Table 4-2**.

[Table 4-2]

Code	Part Name	Material Name
①	Ferrite Body	Ferrite Powder
②	Inner Coils	Silver Paste
③	Pull-out Electrode (Ag)	Silver Paste
④-1	Terminal Electrode: Inside Ag	Termination Silver Composition
④-2	Electro-Plating: Ni/Sn plating	Plating Chemicals

5. Test and Measurement Procedures

5.1 Test Conditions

5.1.1 Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- a. Ambient Temperature: $20 \pm 15^\circ\text{C}$
- b. Relative Humidity: $65 \pm 20\%$
- c. Air Pressure: 86kPa to 106kPa

5.1.2 If any doubt on the results, measurements/tests should be made within the following limits:

- a. Ambient Temperature: $20 \pm 2^\circ\text{C}$
- b. Relative Humidity: $65 \pm 5\%$
- c. Air Pressure: 86kPa to 106kPa

5.2 Visual Examination

- a. Inspection Equipment: 20x magnifier

5.3 Electrical Test

5.3.1 DC Resistance (DCR)

- a. Refer to **Appendix A**.
- b. Test equipment (Analyzer): High Accuracy Milliohmmeter-HP4338B or equivalent.

5.3.2 Impedance (Z)

- a. Refer to **Appendix A**.
- b. Test equipment: High Accuracy RF Impedance /Material Analyzer-E4991A or equivalent.
Test fixture: HP16192A
Test signal: -20dBm or 50mV
- c. Test frequency refers to **Appendix A**.

5.3.3 Rated Current

- a. Refer to **Appendix A**.
- b. Test equipment (see **Fig.5.3.3-1**): Electric Power, Electric current meter, Thermometer.
- c. Measurement method (see **Fig. 5.3.3-1**):
 1. Set test current to be 0 mA.
 2. Measure initial temperature of chip surface.
 3. Gradually increase voltage and measure chip temperature for corresponding current.
- d. Definition of Rated Current (Ir): Ir is direct electric current as chip surface temperature rose just 20°C against chip initial surface temperature (T_a) (see **Fig. 5.3.3-2**)

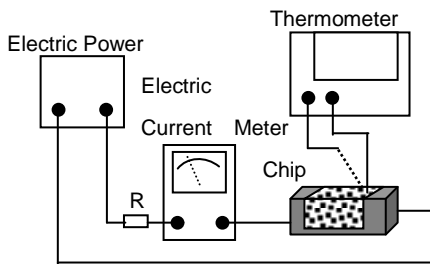


Fig. 5.3.3-1

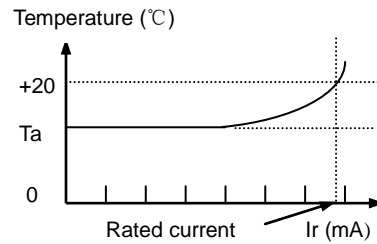
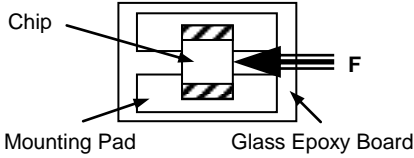
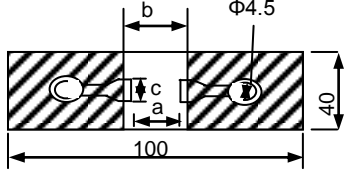
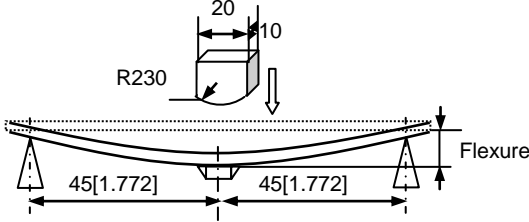
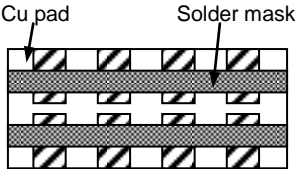
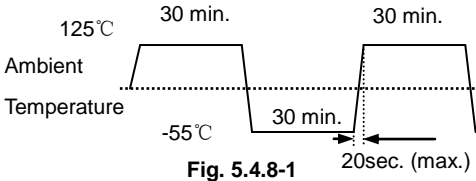


Fig. 5.3.3-2

5.4 Reliability Test

Items	Requirements	Test Methods and Remarks												
5.4.1 Terminal Strength	No removal or split of the termination or other defects shall occur.  <p>Chip Mounting Pad Glass Epoxy Board Fig.5.4.1-1</p>	① Solder the bead to the testing jig (glass epoxy board shown in Fig. 5.4.1-1) using leadfree solder. Then apply a force in the direction of the arrow. 5N force for GZ1005-C and GZ168-C series. ② Keep time: 10±1s. ③ Speed: 1.0mm/s.												
5.4.2 Resistance to Flexure	No visible mechanical damage. <table border="1" data-bbox="325 539 756 667"> <thead> <tr> <th>Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>1005[0402]</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>1608[0603]</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> </tbody> </table>  <p>Fig. 5.4.2-1</p>	Type	a	b	c	1005[0402]	0.4	1.5	0.5	1608[0603]	1.0	3.0	1.2	① Solder the bead to the test jig (glass epoxy board shown in Fig. 5.4.2-1) Using a leadfree solder. Then apply a force in the direction shown Fig. 5.4.2-2 . ② Flexure: 2mm. ③ Pressurizing Speed: 0.5mm/sec. ④ Keep time: 30 sec.  <p>Fig. 5.4.2-2</p>
Type	a	b	c											
1005[0402]	0.4	1.5	0.5											
1608[0603]	1.0	3.0	1.2											
5.4.3 Vibration	① No visible mechanical damage. ② Impedance change: within ±20%  <p>Cu pad Solder mask Glass Epoxy Board Fig. 5.4.3-1</p>	① Solder the bead to the testing jig (glass epoxy board shown in Fig. 5.4.3-1) using leadfree solder. ② The bead shall be subjected to a simple harmonic motion having total amplitude of 1.5 mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. ③ The frequency range from 10 to 55 Hz and return to 10 Hz 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).												
5.4.4 Dropping	① No visible mechanical damage. ② Impedance change: within ±20%.	Drop chip bead 10 times on a concrete floor from a height of 100 cm.												
5.4.5 Temperature	Impedance change should be within ±20% of initial value measuring at 20°C.	Temperature range: -55°C ~ 125°C. Reference temperature: +20°C.												
5.4.6 Solderability	① No visible mechanical damage. ② Wetting shall exceed 95%.	① Solder temperature: 240±2°C ② Duration: 3 sec. ③ Solder: Sn/3.0Ag/0.5Cu. ④ Flux: 25% Resin and 75% ethanol in weight.												
5.4.7 Resistance to Soldering Heat	① No visible mechanical damage. ② Wetting shall exceed 95%. ③ Impedance change: within ±20%.	① Solder temperature: 260±3°C ② Duration: 5 sec. ③ Solder: Sn/3.0Ag/0.5Cu. ④ Flux: 25% Resin and 75% ethanol in weight. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.												

<p>5.4.8 Thermal Shock</p>	<p>① No mechanical damage. ② Impedance change: Within $\pm 20\%$.</p>  <p style="text-align: center;">Fig. 5.4.8-1</p>	<p>① Temperature, Time: (See Fig.5.4.8-1) -55°C for 30±3 min→125°C for 30±3min. ② Transforming interval: Max. 20 sec. ③ Tested cycle: 100 cycles. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>5.4.9 Resistance to Low Temperature</p>	<p>① No mechanical damage. ② Impedance change: within $\pm 20\%$.</p>	<p>① Temperature: -55±2°C ② Duration: 1000⁺²⁴ hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>5.4.10 Resistance to High Temperature</p>	<p>① No mechanical damage. ② Impedance change: within $\pm 20\%$.</p>	<p>① Temperature: 125±2°C ② Duration: 1000⁺²⁴ hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>5.4.11 Damp Heat (Steady States)</p>	<p>① No mechanical damage. ② Impedance change: within $\pm 20\%$.</p>	<p>① Temperature: 60±2°C ② Humidity: 90% to 95% RH. ③ Duration: 1000⁺²⁴ hours. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>5.4.12 Loading Under Damp Heat</p>	<p>① No visible mechanical damage. ② Impedance change: within $\pm 20\%$.</p>	<p>① Temperature: 60±2°C ② Humidity: 90% to 95% RH. ③ Duration: 1000⁺²⁴ hours. ④ Applied current: Rated current. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>
<p>5.4.13 Loading at High Temperature (Life Test)</p>	<p>① No visible mechanical damage. ② Impedance change: within $\pm 20\%$.</p>	<p>① Temperature: 125±2°C ② Duration: 1000⁺²⁴ hours. ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</p>

6. Packaging and Storage

6.1 Packaging

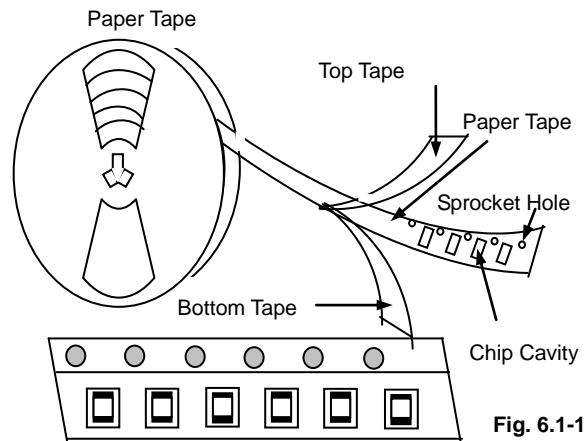
Tape Carrier Packaging:

Packaging code: T

- a. Tape carrier packaging are specified in attached figure **Fig.6.1-1~3**
- b. Tape carrier packaging quantity please see the following table:

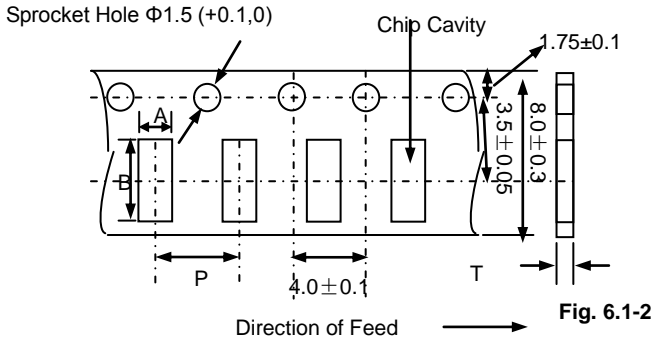
Type	T(mm)	Tape	Quantity
1005[0402]	0.5±0.15	Paper Tape	10K
1608[0603]	0.8±0.15	Paper Tape	4K

(1) Taping Drawings (Unit: mm)



Remark: The sprocket holes are to the right as the tape is pulled toward the user.

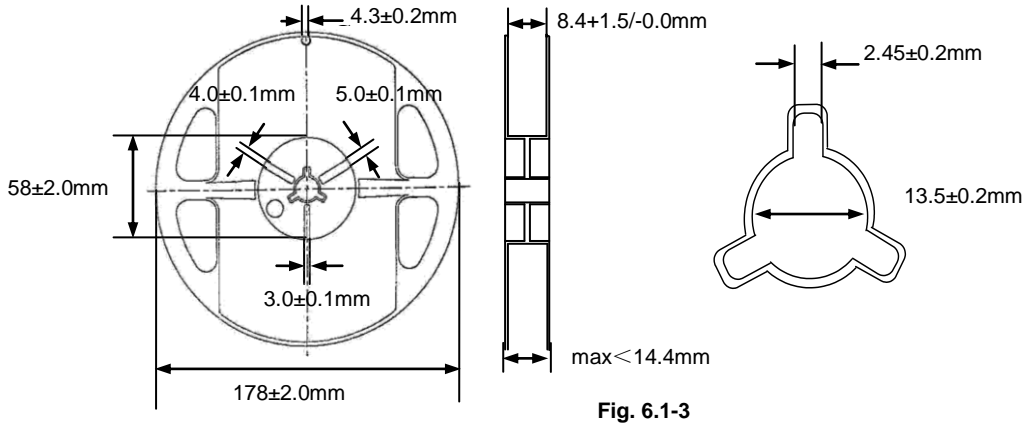
(2) Taping Dimensions (Unit: mm)



Paper Tape

Type	A	B	P	T max
1005[0402]	0.65 ± 0.1	1.15 ± 0.1	2.0 ± 0.05	0.8
1608[0603]	1.0 ± 0.2	1.8 ± 0.2	4.0 ± 0.1	1.1

(3) Reel Dimensions (Unit: mm)



6.2 Storage

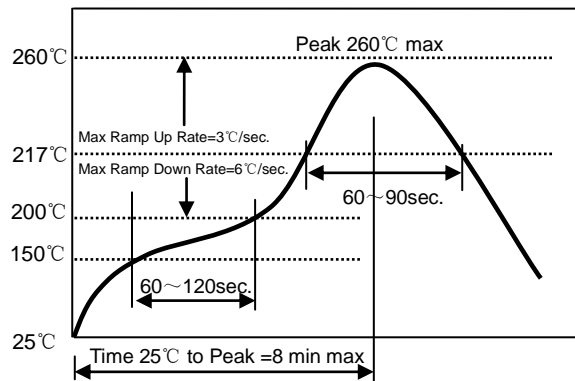
- a. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Package must be stored at 40°C or less and 70% RH or less.
- b. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust or harmful gas (e.g. HCl, sulfurous gas of H_2S).
- c. Packaging material may be deformed if package are stored where they are exposed to heat of direct sunlight.
- d. Solderability specified in **Clause 5.4.6** shall be guaranteed for 12 months from the date of delivery on condition that they are stored at the environment specified in Clause 3. For those parts, which passed more than 12 months shall be checked solder-ability before use.

7. Recommended Soldering Technologies

7.1 Re-flowing Profile

- △ Preheat condition: $150 \sim 200^\circ\text{C} / 60 \sim 120$ sec.
- △ Allowed time above 217°C : $60 \sim 90$ sec.
- △ Max temp: 260°C
- △ Max time at max temp: 10sec.
- △ Solder paste: Sn/3.0Ag/0.5Cu
- △ Allowed Reflow time: 2x max

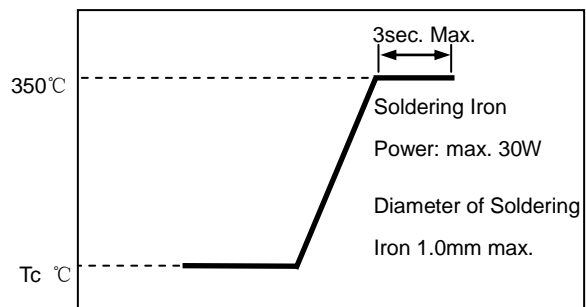
[Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.]



7.2 Iron Soldering Profile.

- △ Iron soldering power: Max.30W
- △ Pre-heating: $150^\circ\text{C} / 60$ sec.
- △ Soldering Tip temperature: 350°C Max.
- △ Soldering time: 3sec Max.
- △ Solder paste: Sn/3.0Ag/0.5Cu
- △ Max.1 times for iron soldering

[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]



Appendix A: Electrical Characteristics

I. GZ1005-C Series

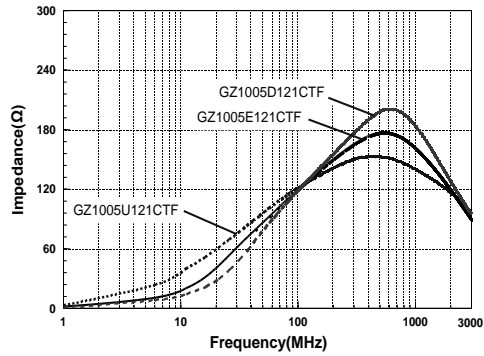
Part Number	Impedance (Ω)	Z Test Freq. (MHz)	DCR (Ω) Max.	I _r (mA) Max.	Thickness (mm) [inch]
GZ1005D400CTF	40±25%	100	0.12	550	0.5±0.15 [0.020±0.006]
GZ1005D800CTF	80±25%	100	0.16	450	
GZ1005D121CTF	120±25%	100	0.18	400	
GZ1005D241CTF	240±25%	100	0.30	300	
GZ1005D301CTF	300±25%	100	0.38	250	
GZ1005D421CTF	420±25%	100	0.45	250	
GZ1005D471CTF	470±25%	100	0.45	250	
GZ1005D501CTF	500±25%	100	0.50	250	
GZ1005D601CTF	600±25%	100	0.50	250	
GZ1005D751CTF	750±25%	100	0.65	150	
GZ1005D102CTF	1000±25%	100	0.70	150	
GZ1005D152CTF	1500±25%	100	1.15	100	
GZ1005E800CTF	80±25%	100	0.2	500	
GZ1005E121CTF	120±25%	100	0.25	500	
GZ1005E241CTF	240±25%	100	0.40	400	
GZ1005E601CTF	600±25%	100	0.60	300	
GZ1005U100CTF	0~15	100	0.03	1000	
GZ1005U300CTF	30±25%	100	0.06	700	
GZ1005U700CTF	70±25%	100	0.10	700	
GZ1005U121CTF	120±25%	100	0.20	500	
GZ1005U221CTF	220±25%	100	0.30	400	
GZ1005U301CTF	300±25%	100	0.50	300	
GZ1005U421CTF	420±25%	100	0.52	300	
GZ1005U601CTF	600±25%	100	0.55	300	
GZ1005U102CTF	1000±25%	100	0.58	300	

II. GZ1608-C Series

Part Number	Impedance (Ω)	Z Test Freq. (MHz)	DCR (Ω) Max.	I _r (mA) Max.	Thickness (mm) [inch]	
GZ1608D121CTF	120±25%	100	0.20	500		
GZ1608D241CTF	240±25%	100	0.30	500		
GZ1608D301CTF	300±25%	100	0.35	500		
GZ1608D471CTF	470±25%	100	0.40	500		
GZ1608D601CTF	600±25%	100	0.40	500		
GZ1608D102CTF	1000±25%	100	0.50	400		
GZ1608D152CTF	1500±25%	100	0.60	300		
GZ1608E121CTF	120±25%	100	0.20	500		
GZ1608E102CTF	1000±25%	100	0.50	400		
GZ1608U600CTF	60±25%	100	0.10	800		
Part Number	Impedance (Ω)	Z Test Freq. (MHz)	DCR (Ω) Max.	I _r (mA) Max.		
GZ1608U800CTF	80±25%	100	0.10	600		
GZ1608U121CTF	120±25%	100	0.18	500		
GZ1608U151CTF	150±25%	100	0.25	500		
GZ1608U221CTF	220±25%	100	0.25	500		

GZ1608U301CTF	300±25%	100	0.25	500	0.8±0.15 [.031±.006]
GZ1608U471CTF	470±25%	100	0.35	500	
GZ1608U601CTF	600±25%	100	0.38	500	
GZ1608U102CTF	1000±25%	100	0.50	400	

D, E, U Material Comparison



Impedance Frequency Characteristics

GZ1005-C Series

