

# Multi Layer Ferrite Chip Beads

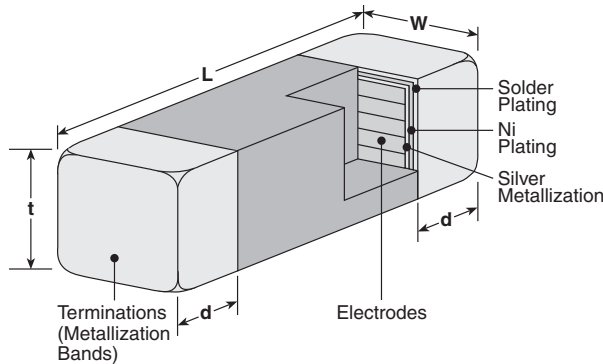
## Type CZB

ISO 9001:2008  
CERTIFIED  
TS-16949  
CERTIFIED

### 1. General

- Designed to reduce noise at high frequencies
- Standard EIA Packages: 1E, 1J, 2A, 2B
- Nickel barrier with solder overcoat for excellent solderability
- Magnetically shielded
- Products with lead-free terminations meet EU RoHS requirements

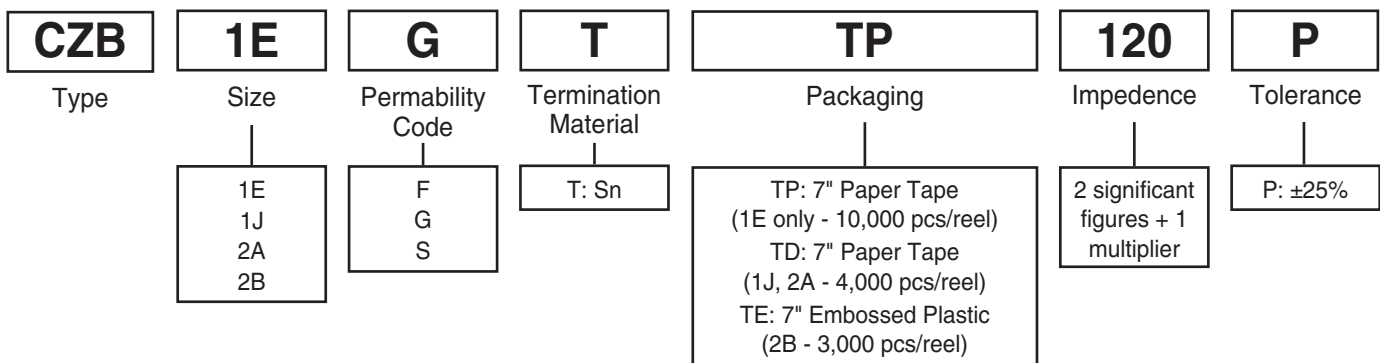
### 2. Dimensions



Type (Inch Size Code)	Dimensions inches (mm)			
	L	W	t	d
<b>1E</b> (0402)	.039±.004 (1.0±0.1)	.02±.004 (0.5±0.1)	.02±.004 (0.5±0.1)	.01±.004 (0.25±0.1)
<b>1J</b> (0603)	.063±.006 (1.6±0.15)	.031±.006 (0.8±0.15)	.031±.006 (0.8±0.15)	.014±.006 (0.36±0.15)
<b>2A</b> (0805)	.079±.008 (2.0±0.2)	.049±.008 (1.25±0.2)	.035±.008 (0.9±0.2)	.020±.012 (0.51±0.30)
<b>2B</b> (1206)	.126±.008 (3.2±0.2)	.063±.008 (1.6±0.2)	.043±.008 (1.1±0.2)	.020±.012 (0.51±0.30)

### 3. Type Designation

The type designation shall be in the following form:



## 4. Standard Applications

Part Designation	Impedance @ 100MHz <sup>†</sup> (Ω)	DC Resistance Maximum <sup>††</sup> (Ω)	Allowable DC Current Maximum (mA)	Operating Temperature Range	
CZB1EGTTP100P	10	0.05	600	-55°C to +125°C	
CZB1EGTTP300P	30	0.30	500		
CZB1EGTTP600P	60	0.40	350		
CZB1EGTTP700P	70				
CZB1EGTTP800P	80				
CZB1EGTTP121P	120	0.50	300		
CZB1EGTTP221P	220	0.70	200		
CZB1EGTTP301P	300	0.80			
CZB1EGTTP451P	450	0.90			
CZB1EGTTP601P	600	1.00			150
CZB1EGTTP102P	1000	1.50			100
CZB1ESTTP100P	10	0.20			400
CZB1ESTTP300P	30				
CZB1ESTTP600P	60		0.30		
CZB1ESTTP800P	80	0.40	300		
CZB1ESTTP121P	120				
CZB1ESTTP221P	220				0.60
CZB1ESTTP301P	300	1.00	200		
CZB1ESTTP601P	600	1.20			
CZB1JGTTD300P	30	0.10	600		
CZB1JGTTD600P	60	0.20			
CZB1JGTTD800P	80				
CZB1JGTTD101P	100		0.25	400	
CZB1JGTTD121P	120				
CZB1JGTTD141P	140	0.30			
CZB1JGTTD151P	150				
CZB1JGTTD181P	180				
CZB1JGTTD221P	220	0.35	300		
CZB1JGTTD301P	300			0.40	
CZB1JGTTD451P	450			0.45	
CZB1JGTTD601P	600			0.60	250
CZB1JGTTD102P	1000			0.70	150
CZB1JGTTD152P	1500			1.20	
CZB1JGTTD202P	2000	1.20	-55°C to +125°C		
CZB1JSTTD100P	10	0.10		600	
CZB1JSTTD300P	30	0.25		500	
CZB1JSTTD600P	60	0.30		400	
CZB1JSTTD800P	80				
CZB1JSTTD101P	100				
CZB1JSTTD121P	120	0.35		300	
CZB1JSTTD221P	220				
CZB1JSTTD301P	300				0.65
CZB1JSTTD601P	600	0.80			
CZB1JSTTD102P	1000	0.80			
CZB2AFTTD110P	11	0.10		800	-55°C to +125°C
CZB2AFTTD300P	30				
CZB2AFTTD500P	50				
CZB2AFTTD600P	60				
CZB2AFTTD800P	80	0.15	600		
CZB2AGTTD101P	100				

<sup>†</sup> Impedance test method: HP4291A

<sup>††</sup> DCR test method: Keithley 580

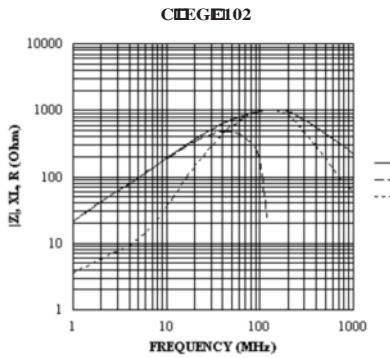
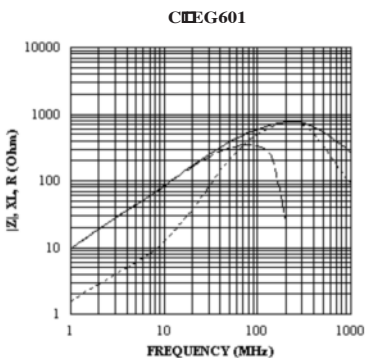
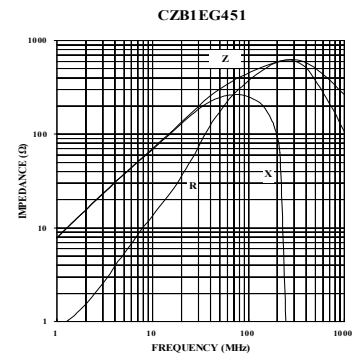
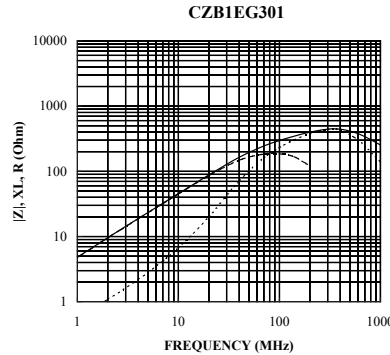
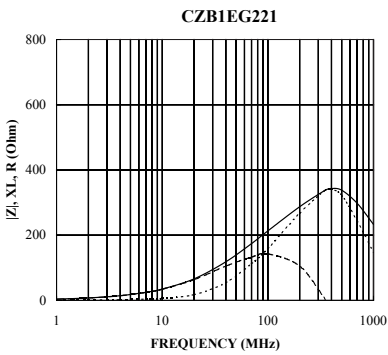
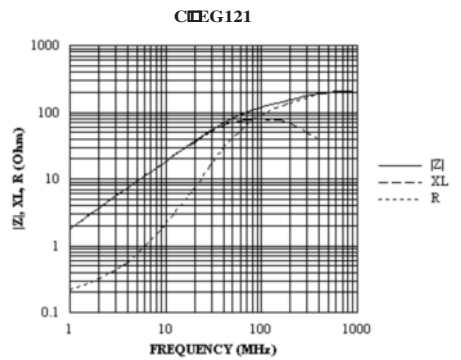
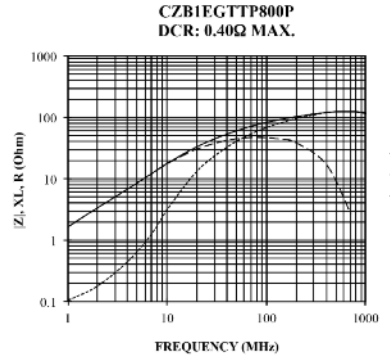
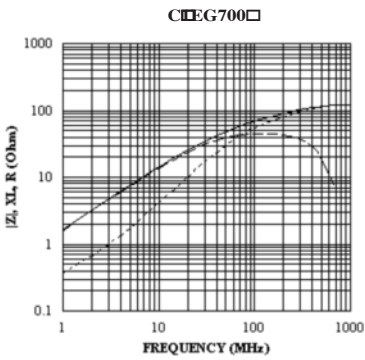
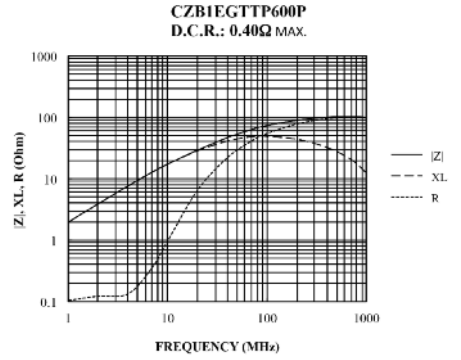
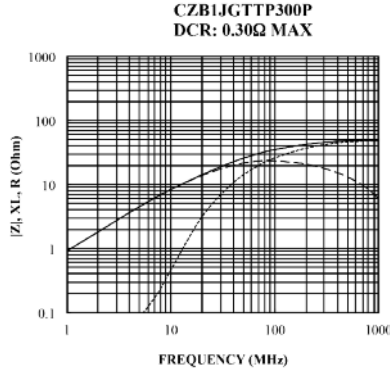
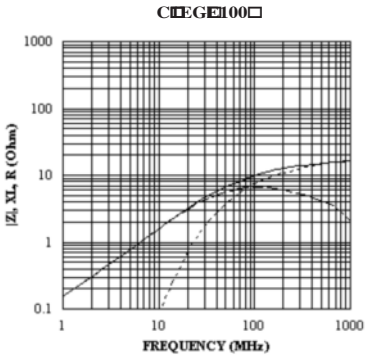
## 4. Standard Applications (continued)

Part Designation	Impedance @ 100MHz <sup>†</sup> (Ω)	DC Resistance Maximum <sup>††</sup> (Ω)	Allowable DC Current Maximum (mA)	Operating Temperature Range
CZB2AGTTD121P	120	0.25	600	-55°C to +125°C
CZB2AGTTD151P	150		500	
CZB2AGTTD201P	200	0.30	400	
CZB2AGTTD301P	300			
CZB2AGTTD601P	600			
CZB2AGTTD601PV	600	0.25	500	
CZB2AGTTD102P	1000	0.40	300	
CZB2ASTTD110P	11	0.10	800	
CZB2ASTTD300P	30	0.20	600	
CZB2ASTTD600P	60			
CZB2ASTTD800P	80			
CZB2ASTTD121P	120			
CZB2ASTTD221P	220	0.30	400	
CZB2ASTTD301P	300	0.35		
CZB2ASTTD601P	600	0.40	300	
CZB2BFTTE190P	19	0.05	800	
CZB2BFTTE300P	30	0.10		
CZB2BFTTE500P	50			
CZB2BFTTE600P	60			
CZB2BFTTE800P	80		0.20	600
CZB2BFTTE101P	100	0.15		
CZB2BFTTE121P	120	0.20		
CZB2BFTTE151P	150	0.15	500	
CZB2BFTTE201P	200	0.20		
CZB2BFTTE221P	220			
CZB2BFTTE301P	300	0.30		
CZB2BFTTE501P	500	0.20	400	
CZB2BFTTE601P	600	0.40		
CZB2BGTTE202P	2000 @ 50MHz	0.70	300	
CZB2BSTTE601P	600	0.35	300	

<sup>†</sup> Impedance test method: HP4291A

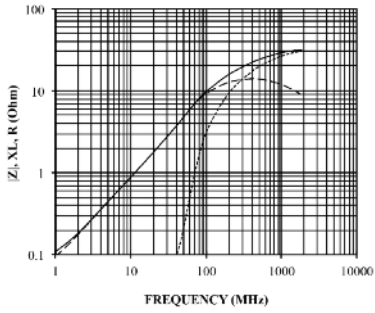
<sup>††</sup> DCR test method: Keithley 580

**5. 0402 Graphs**

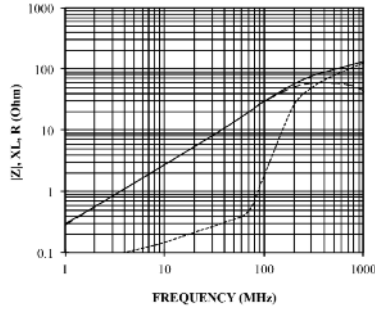


**5. 0402 Graphs (continued)**

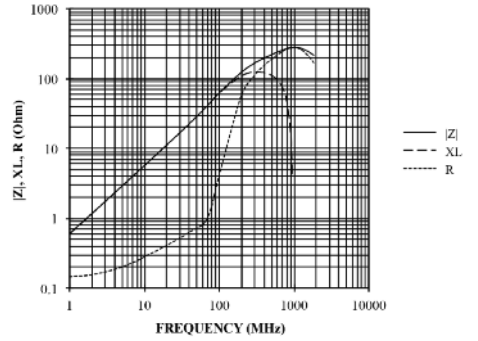
**CZB1EST100P**



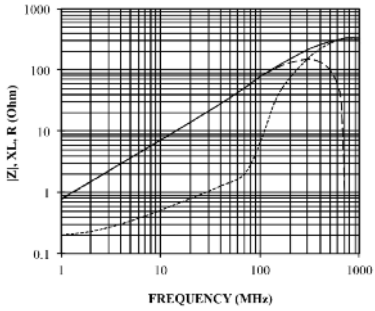
**CZB1ESTTP3009**  
 DCR: 0.20 $\Omega$  MAX



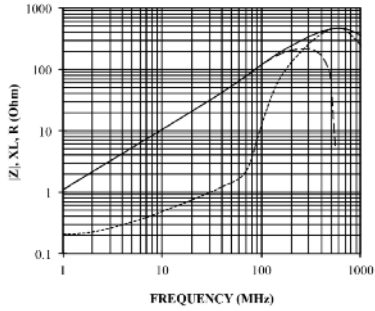
**MCB0402S600**



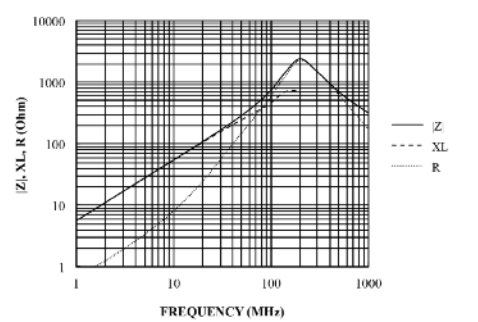
**CZB1ESTTP800P**  
 DCR: 0.40 $\Omega$  MAX



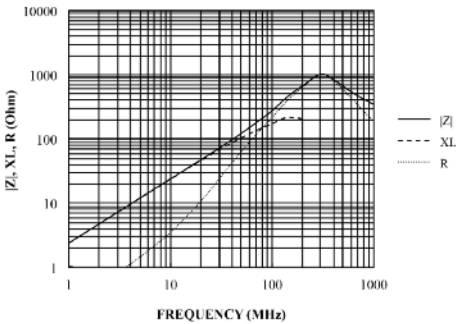
**CZB1ESTTP121P**  
 DCR: 0.40 $\Omega$  MAX



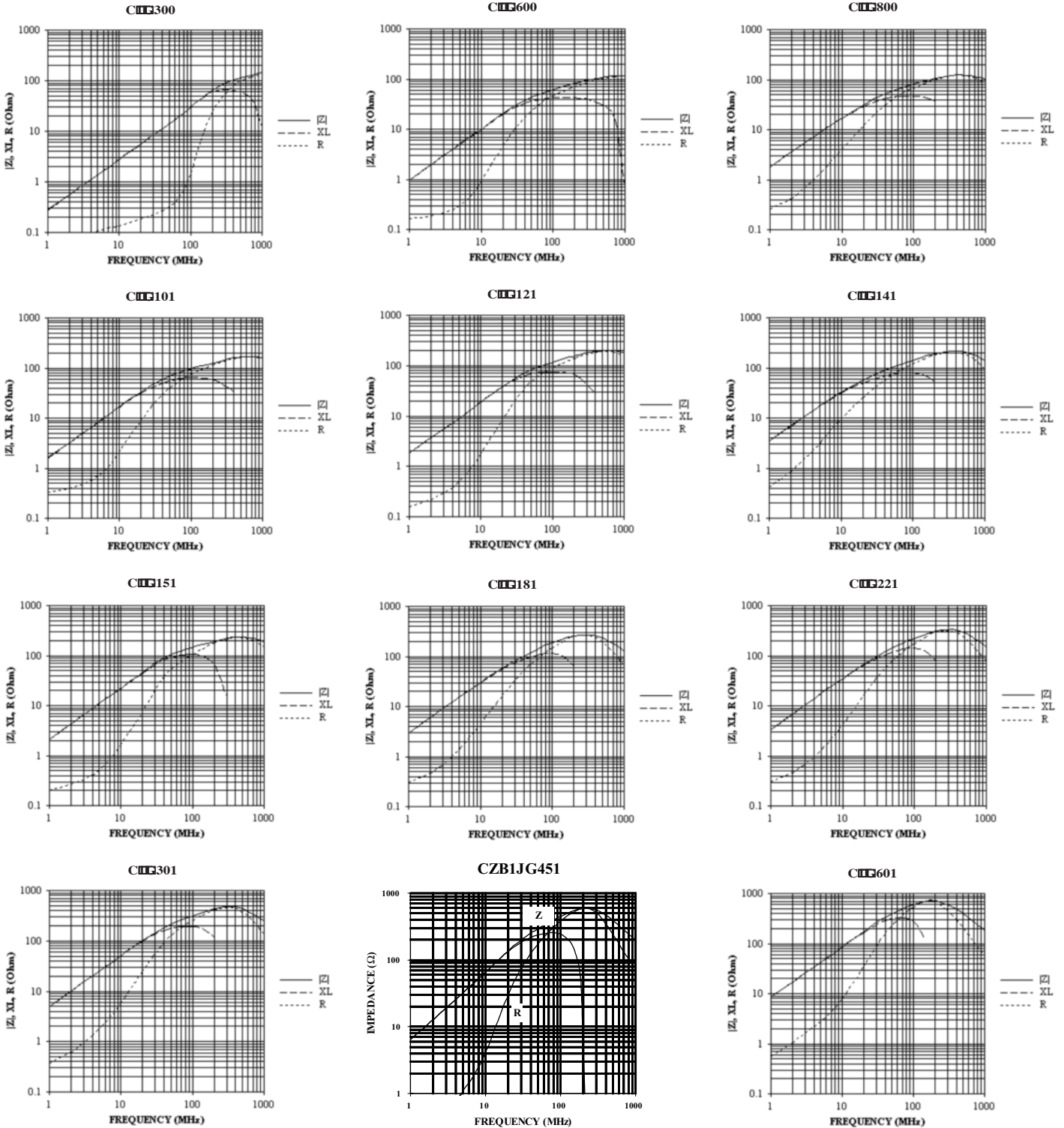
**CZB1EST600P**



**CZB1ESTTP301P**  
 DCR: 1.00 $\Omega$  MAX

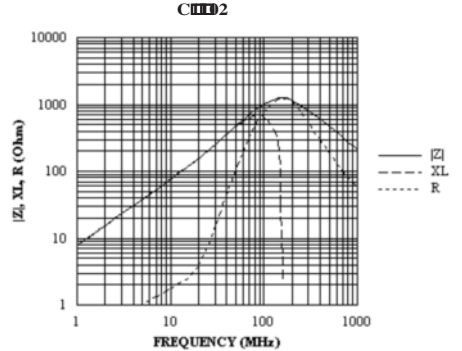
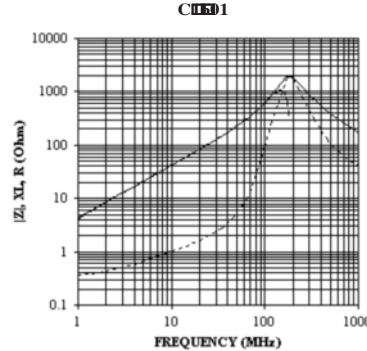
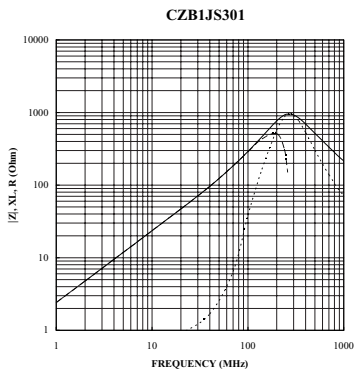
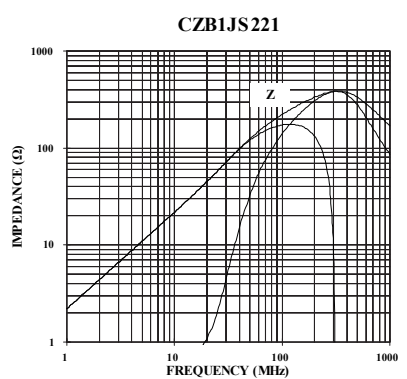
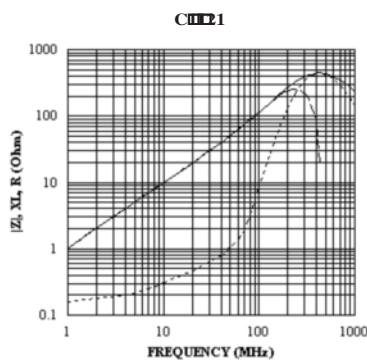
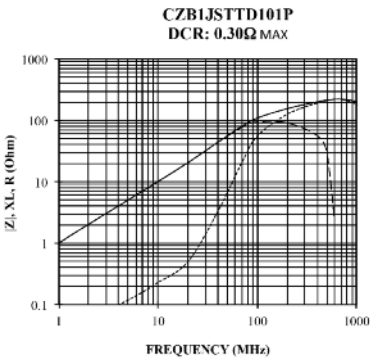
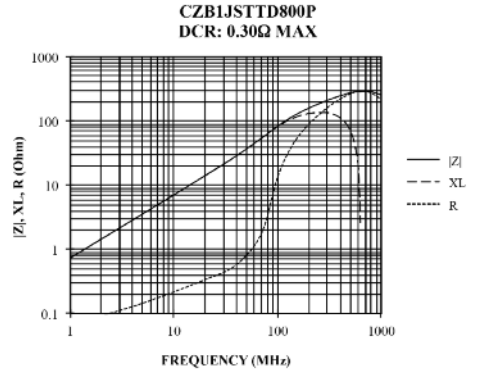
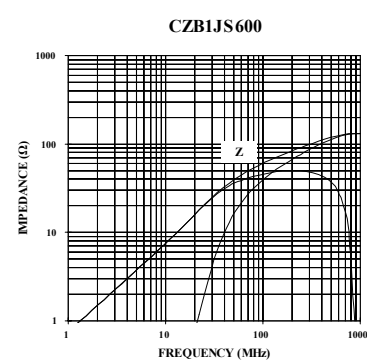
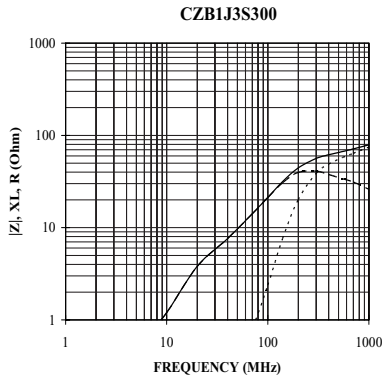
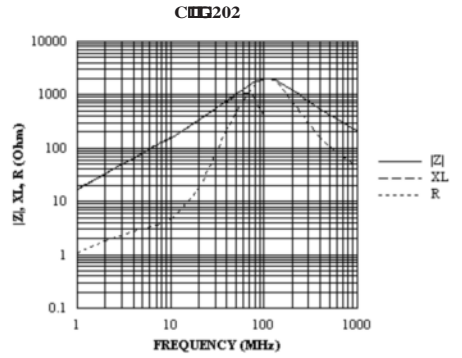
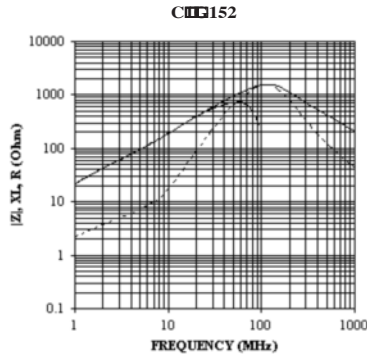
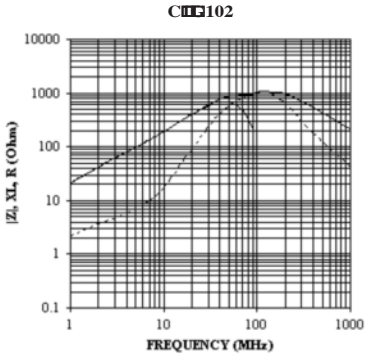


5. 0603 Graphs (continued)

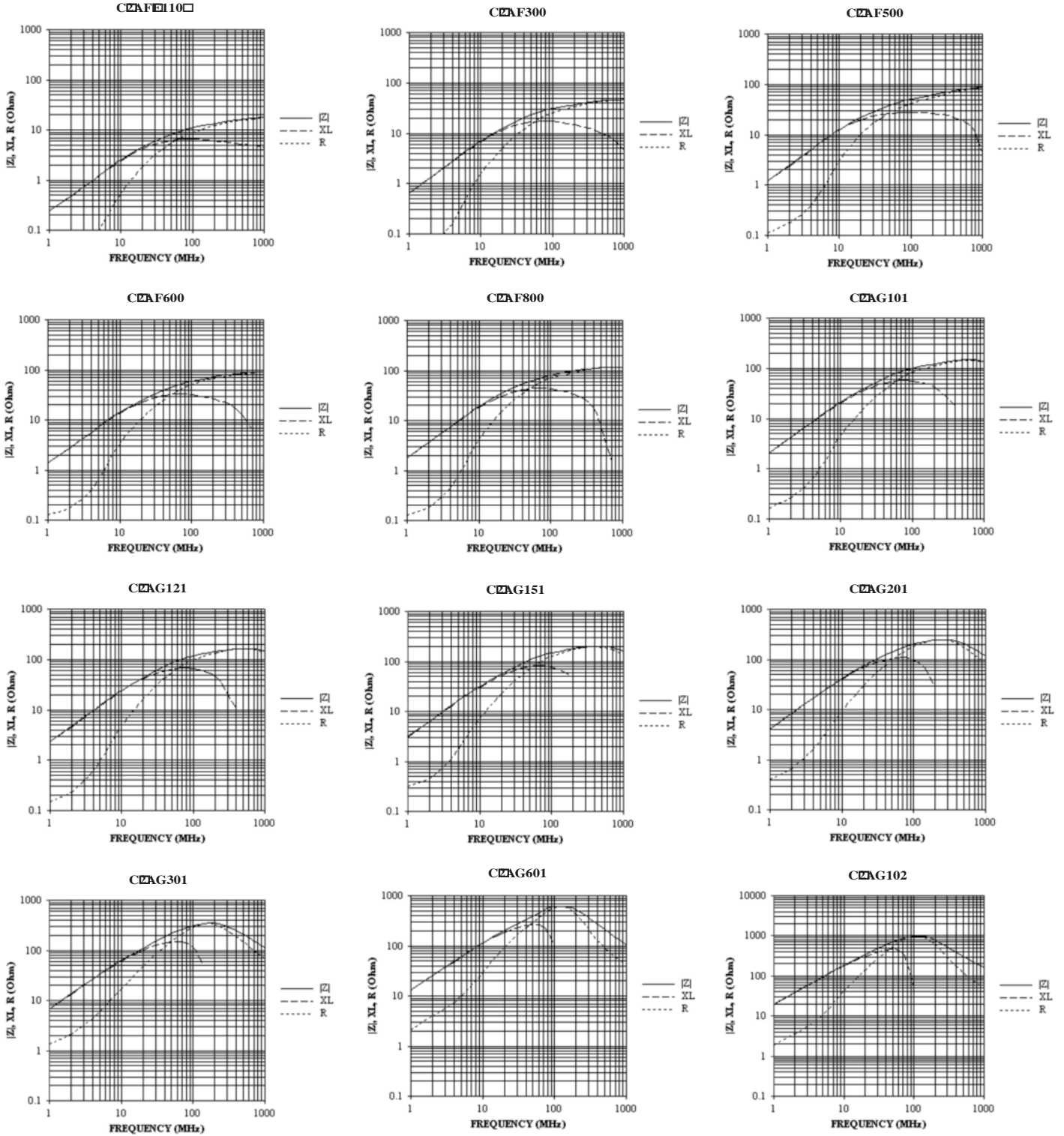




5. 0603 Graphs (continued)



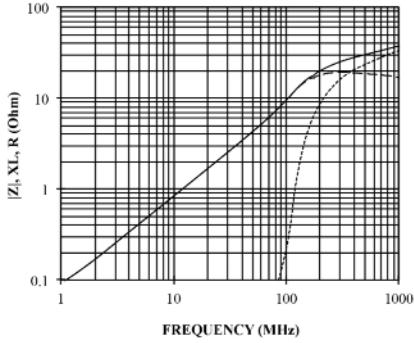
**5. 0805 Graphs**



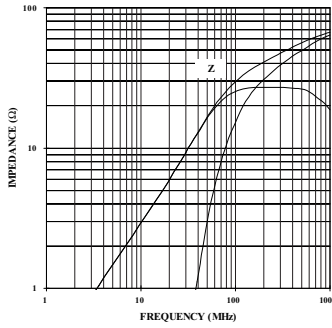


**5. 0805 Graphs (continued)**

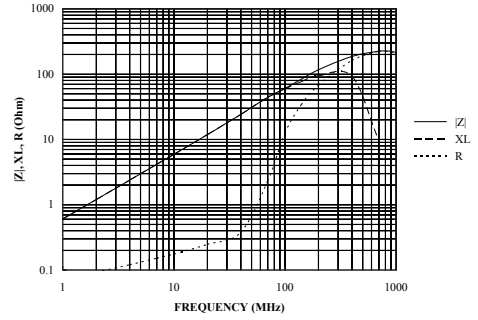
**CZB2ASTTD110P**  
 DCR: 0.10Ω MAX



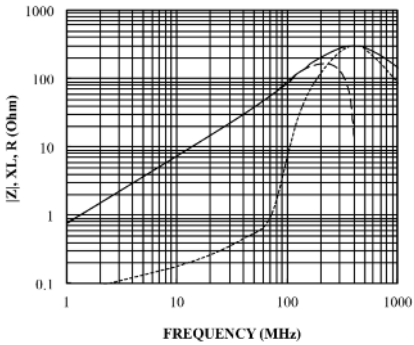
**CZB2AS300**



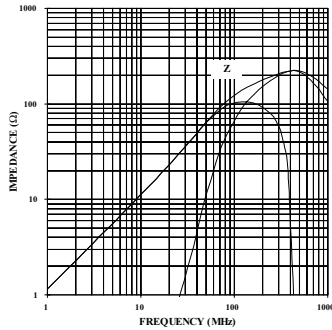
**CZB2AS600**



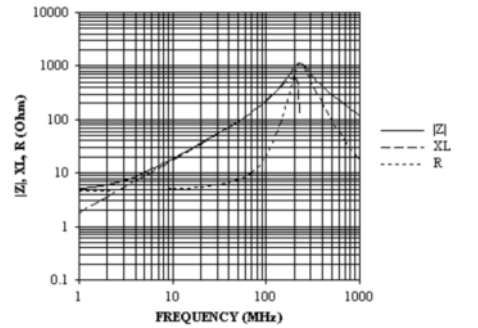
**CZB2ASTTD800P**  
 DCR: 0.20Ω MAX



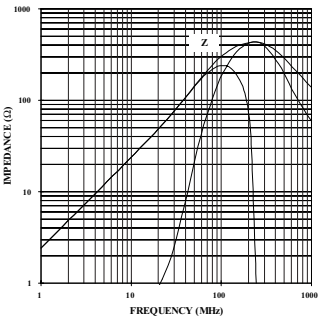
**CZB2AS121**



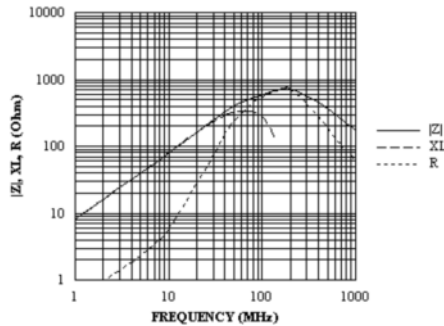
**CZB2Z1**



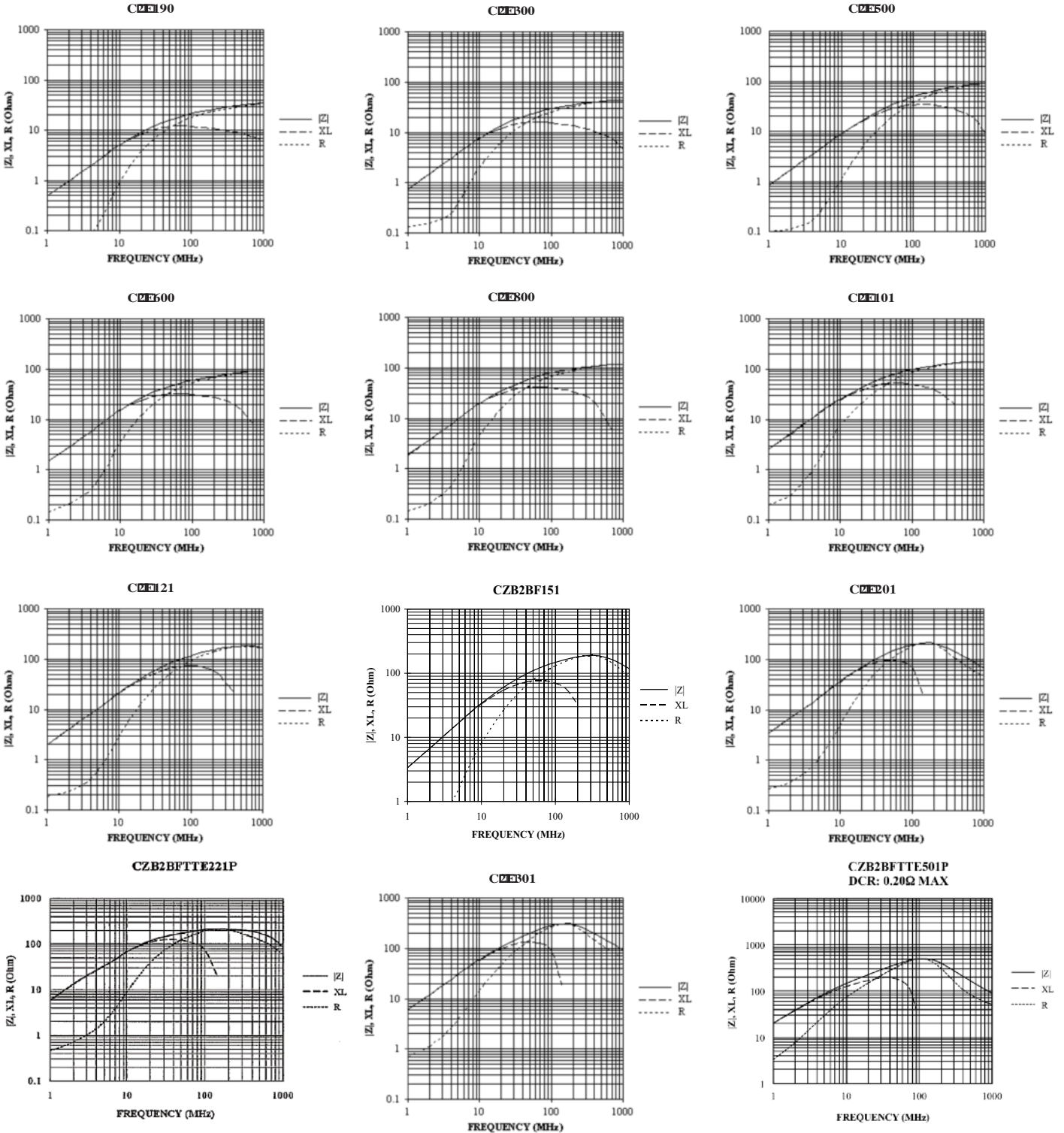
**CZB2AS301**



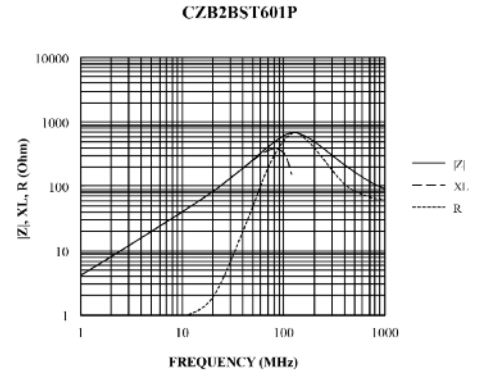
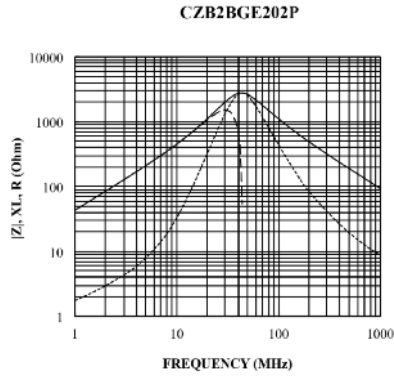
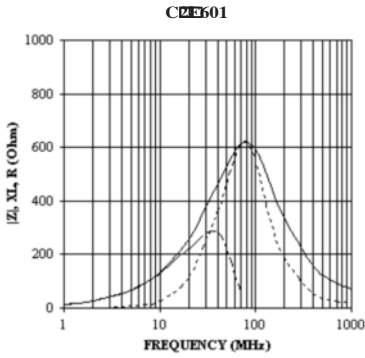
**CZB2G1**



**5. 1206 Graphs**



5. 1206 Graphs (continued)



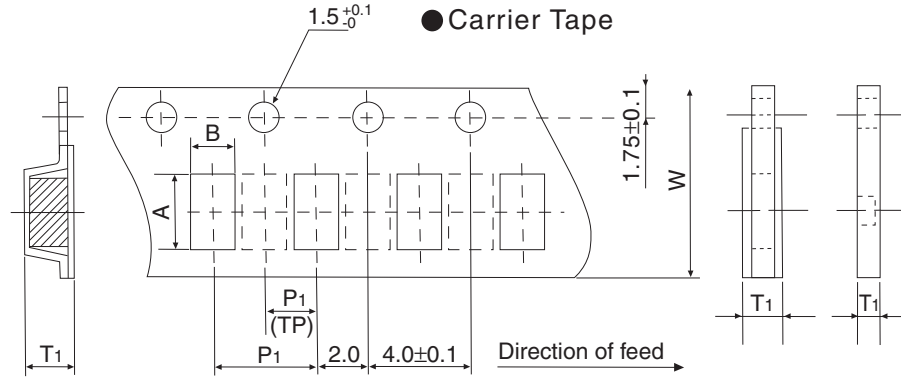
## 5. Characteristics

Item	Requirement	Conditions															
Operating Temperature	-55°C ~ +125°C																
Storage Temperature	40°C @ 70% Humidity	Sealed plastic bags with desiccant shall be used to reduce the potential of oxidation on the terminations during storage.															
Resistance to Solder Heat	<b>Change in Impedance:</b> Relative to value before test $\pm 20\%$ . <b>Appearance:</b> There shall be no cracking <b>Solder Coverage:</b> More than 75% of the terminal electrode shall be covered with solder.	<b>Flux:</b> 5-10 sec dip <b>After Flux:</b> Air dry for 15 sec <b>Preheat:</b> 150°C $\pm 10^\circ\text{C}$ <b>Preheat Time:</b> 60 sec <b>Solder Temp:</b> 260°C $\pm 5^\circ\text{C}$ <b>Dip Time:</b> 10 $\pm 1$ sec															
Solderability	<b>Solder Coverage:</b> More than 95% of the termination shall be covered with solder.	<b>Flux:</b> 5-10 sec dip <b>After Flux:</b> Air dry for 15 sec <b>Solder Temp:</b> 245°C $\pm 5^\circ\text{C}$ <b>Dip Time:</b> 5 $\pm 0.5$ sec															
Leach Resistance	<b>Appearance:</b> There shall be no visible signs of physical or mechanical damage (i.e. no cracks) <b>Terminations:</b> Termination must not be leached away for more than 5%.	The bead shall be subjected to the following 5 steps for the period of time shown below. The 5 steps constitute one (1) rotation. 4 rotations shall be carried out. 1) <b>Flux:</b> 5-10 sec 2) <b>After Flux:</b> Air dry for 15 sec 3) <b>Solder Temp:</b> 230°C $\pm 5^\circ\text{C}$ 4) <b>Dip Time:</b> 5 $\pm 0.5$ sec 5) <b>Cool:</b> Air cool for 60 seconds															
Insulation Resistance	<b>Insulation Resistance:</b> Min 1G ohms																
Solvent Resistance	<b>Change in Impedance:</b> Relative to value before test $\pm 10\%$ .	Cleaning by: <b>Washer:</b> Ultrasonic washer (100W) <b>Solvent:</b> Isopropyl alcohol <b>Time:</b> 3 minutes															
Terminal Strength (hanging test)	<b>Appearance:</b> The terminal electrode shall not break off, nor shall there be damage to the body.	<table border="1"> <thead> <tr> <th>Type</th> <th>W(kgf)</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1E</td> <td></td> <td>N/A</td> </tr> <tr> <td>1J</td> <td>0.5</td> <td>30 sec <math>\pm 2</math> sec</td> </tr> <tr> <td>2A</td> <td>1.0</td> <td>30 sec <math>\pm 2</math> sec</td> </tr> <tr> <td>2B</td> <td>1.5</td> <td>30 sec <math>\pm 2</math> sec</td> </tr> </tbody> </table>	Type	W(kgf)	Time	1E		N/A	1J	0.5	30 sec $\pm 2$ sec	2A	1.0	30 sec $\pm 2$ sec	2B	1.5	30 sec $\pm 2$ sec
Type	W(kgf)	Time															
1E		N/A															
1J	0.5	30 sec $\pm 2$ sec															
2A	1.0	30 sec $\pm 2$ sec															
2B	1.5	30 sec $\pm 2$ sec															
Terminal Strength (push test)	<b>Appearance:</b> There shall be no evidence of mechanical degradations to terminals or body.	<table border="1"> <thead> <tr> <th>Type</th> <th>W(kgf)</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1E</td> <td></td> <td>N/A</td> </tr> <tr> <td>1J</td> <td>1.4</td> <td>60 sec</td> </tr> <tr> <td>2A</td> <td>1.8</td> <td>60 sec</td> </tr> <tr> <td>2B</td> <td>2.3</td> <td>60 sec</td> </tr> </tbody> </table>	Type	W(kgf)	Time	1E		N/A	1J	1.4	60 sec	2A	1.8	60 sec	2B	2.3	60 sec
Type	W(kgf)	Time															
1E		N/A															
1J	1.4	60 sec															
2A	1.8	60 sec															
2B	2.3	60 sec															

## 5. Characteristics (continued)

Item	Requirement	Conditions																		
Bending Strength	<b>Appearance:</b> There shall be no physical or mechanical damage <b>Impedance:</b> Relative to initial value before test $\pm 10\%$	<b>Board:</b> 90x40x1.6mm <b>Bend:</b> 1mm <b>Time:</b> 5 sec																		
Mechanical Shock	<b>Appearance:</b> There shall be no physical or mechanical damage <b>Impedance:</b> Relative to initial value before test $\pm 10\%$	<b>Force:</b> 50G <b>Time:</b> 11 msec There shall be 3 shocks in each of 6 directions (18 shocks total).																		
Vibration	<b>Impedance:</b> Relative to initial value $\pm 10\%$	Only endurance conditioning by sweeping shall be made. The entire frequency range from 10-2,000Hz and return to 10Hz in 20 minutes (this shall constitute one cycle). Amplitude: 1.5mm The test shall have a 15G peak and shall be applied for a period of 4 hours (12 cycles) in each of 3 mutually perpendicular directions (a total of 36 cycles within a total of 12 hours).																		
Thermal Shock	<b>Appearance:</b> There shall be no physical or mechanical damage. <b>Impedance:</b> Relative to initial value $\pm 20\%$ . <b>DCR:</b> The DCR shall not exceed initial specified value.  Testing of the parts will be made at 0 hours, 250 hours and 500 hours. Before testing the parts shall be allowed to cool to room temperature for 24 hours.	<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1-start</td> <td>-40°C <math>\pm 2^\circ\text{C}</math></td> <td>_____</td> </tr> <tr> <td>2-hold</td> <td>-40°C <math>\pm 2^\circ\text{C}</math></td> <td>30 min <math>\pm 5</math> min</td> </tr> <tr> <td>3-transfer</td> <td>_____</td> <td>0.5 min max.</td> </tr> <tr> <td>4-hold</td> <td>+105°C <math>\pm 2^\circ\text{C}</math></td> <td>30 min <math>\pm 5</math> min</td> </tr> <tr> <td>5-transfer</td> <td>_____</td> <td>0.5 min max.</td> </tr> </tbody> </table> Steps 1 thru 5 constitute one complete cycle and the test shall consist of a total of 500 cycles.	Step	Temperature	Time	1-start	-40°C $\pm 2^\circ\text{C}$	_____	2-hold	-40°C $\pm 2^\circ\text{C}$	30 min $\pm 5$ min	3-transfer	_____	0.5 min max.	4-hold	+105°C $\pm 2^\circ\text{C}$	30 min $\pm 5$ min	5-transfer	_____	0.5 min max.
Step	Temperature	Time																		
1-start	-40°C $\pm 2^\circ\text{C}$	_____																		
2-hold	-40°C $\pm 2^\circ\text{C}$	30 min $\pm 5$ min																		
3-transfer	_____	0.5 min max.																		
4-hold	+105°C $\pm 2^\circ\text{C}$	30 min $\pm 5$ min																		
5-transfer	_____	0.5 min max.																		
Load Humidity	<b>Appearance:</b> There shall be no physical or mechanical damage <b>Impedance:</b> Relative to initial value $\pm 15\%$  Measurements shall be taken at 0 hours, 250 hours, 500 hours and 1,000 hours and shall meet the conditions stated above.	<b>Temperature:</b> 85°C $\pm 2^\circ\text{C}$ <b>Relative Humidity:</b> 85% <b>Time:</b> 1,000 hours total <b>Apply:</b> 100% rated current																		
Life Test	<b>Appearance:</b> There shall be no physical or mechanical damage <b>Impedance:</b> Relative to initial value $\pm 15\%$  Measurements shall be taken at 0 hours, 250 hours, 500 hours and 1,000 hours and shall meet the conditions stated above.	<b>Temperature:</b> 85°C $\pm 2^\circ\text{C}$ <b>Time:</b> 1,000 hours total <b>Apply:</b> 100% rated current																		

**6. Dimensions - inches (mm)**

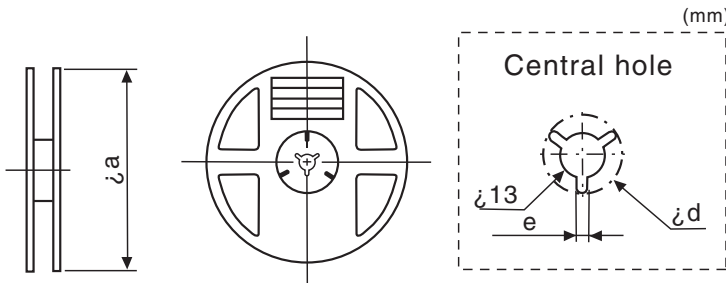


(Notes) Dotted lines are applicable to only "TP" and "TB."

Type	Component Size (mm)			Carrier Tape	Quantity/ Reel (Pieces)	Taping (mm)					Reel Size	
	L	W	T			A	B	W	P1	T1		
CZB	1E	1.0±0.1	0.5±0.1	0.5±0.1	TP	10000	1.17±0.1	0.65±0.1	8.0±0.22	2.0±0.23	0.63±0.1	178
	1J	1.6±0.15	0.8±0.15	0.8±0.15	TD	4000	1.8±0.1	1.1±0.1	8.1±0.1	4.0±0.1	1.1±0.1	178
	2A	2.0±0.2	1.25±0.2	0.9±0.2	TD	2000/4000*	2.4±0.1	1.6±0.1	8.1±0.1	4.0±0.1	1.2±0.1	178
	2B	3.2±0.2	1.6±0.2	0.51±0.25	TE	3000	3.5±0.1	1.8±0.1	8.1±0.1	4.0±0.1	1.8±0.1	178

\* CZB2A: <2200Ω=TD:4,000; 2200Ω=TD: 2,000 pcs/reel

Dimensions - inches (mm)

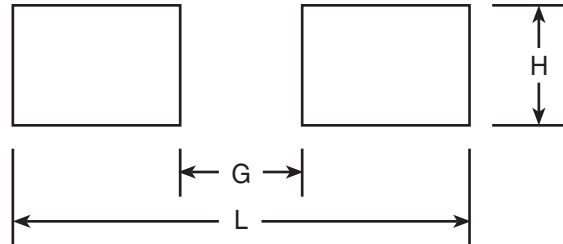


Tape	øa	ød	e
1E 0402	7 (178)	0.827 (21)	0.079 (2.0)
1J 0603			
2A 0805			
2B 1206			



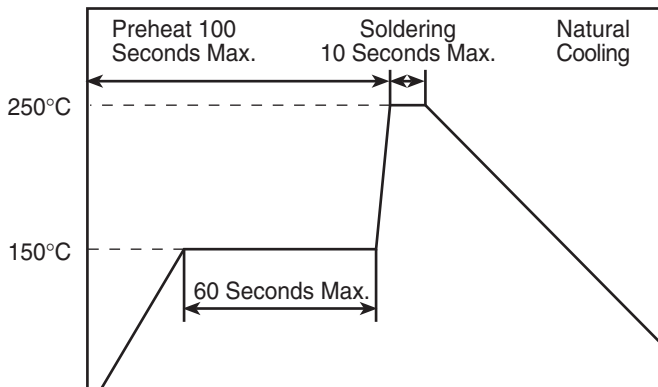
**7. Recommended PC Board Land Patterns - mm (inches)**

Chip Size	L	G	H
<b>1E (0402)</b>	1.6 (0.063)	0.4 (0.016)	0.6 (0.024)
<b>1J (0603)</b>	2.6 (0.102)	0.55 (0.022)	0.94 (0.037)
<b>2A (0805)</b>	3.0 (0.118)	0.66 (0.026)	1.45 (0.057)
<b>2B (1206)</b>	4.4 (0.173)	1.5 (0.059)	1.8 (0.071)



**8. Recommended Temperature Profiles for Soldering**

**Recommended Temperature Profile for Wave Soldering**



**Recommended Temperature Profile for Reflow Soldering**

