

Multi Layer Ferrite Chip Beads

ISO 9002 CERTIFIED

Type CZB

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

2. 2.1 Dimensions

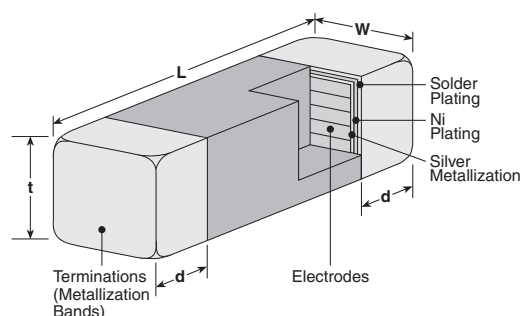


Table 1

Dimensions - inches (mm)				
Part	L	W	t	d
1E (0402)	0.039±0.004 (1.00±0.10)	0.020±0.004 (0.50±0.10)	0.020±0.004 (0.50±0.10)	0.010±0.004 (0.25±0.10)
1J (0603)	0.063±0.006 (1.60±0.15)	0.031±0.006 (0.80±0.15)	0.031±0.006 (0.80±0.15)	0.014±0.006 (0.36±0.15)
2A (0805)	0.079±0.008 (2.00±0.20)	0.049±0.008 (1.25±0.20)	0.035±0.008 (0.90±0.20)	0.020±0.010 (0.51±0.25)
2B (1206)	0.126±0.008 (3.20±0.20)	0.063±0.008 (1.60±0.20)	0.043±0.008 (1.10±0.20)	0.020±0.010 (0.51±0.25)

3. Type Designation

The type designation shall be in the following form:

New Type

CZB	1E	G	T	TP	120	P
Type	Size	Permeability Code	Termination Material	Packaging	Impedance	Tolerance
	1E 1J 2A 2B	F G S	T: Sn L: SnPb	TP: 7" Paper Tape (1E only - 10,000 pcs/reel) TE: 7" Embossed Plastic (1J, 2A - 4,000 pcs/reel) (2B - 3,000 pcs/reel)	2 significant figures + 1 multiplier	P: ±25%

4. Standard Applications

Ordering Code	Impedance @ 100MHz † Ω	Maximum DC Resistance †† Ω	Allowable DC Current (mA)	Operating Temperature
CZB1EG*TP100**	10	0.05	500	-55°C to 125°C
CZB1EG*TP150**	15	0.07	300	
CZB1EG*TP700**	70	0.4	200	
CZB1EG*TP121**	120	0.5	200	
CZB1EG*TP221**	220	0.7	100	
CZB1EG*TP601**	600	1.1	50	
CZB1EG*TP102**	1000	1.5	50	
CZB1JG*TE300**	30	0.1	400	
CZB1JG*TE400**	40	0.1	400	
CZB1JG*TE600**	60	0.2	300	
CZB1JG*TE750**	75	0.2	300	
CZB1JG*TE800**	80	0.2	300	
CZB1JG*TE900**	90	0.3	250	
CZB1JG*TE101**	100	0.3	250	
CZB1JG*TE121**	120	0.2	700	
CZB1JG*TE141**	140	0.3	250	
CZB1JG*TE151**	150	0.3	250	
CZB1JG*TE181**	180	0.3	250	
CZB1JG*TE221**	220	0.3	250	
CZB1JG*TE301**	300	0.35	230	
CZB1JG*TE421**	420	0.4	210	
CZB1JG*TE601**	600	0.45	210	
CZB1JG*TE102**	1,000	0.8	190	
CZB1JG*TE152**	1,500	0.7	100	
CZB1JG*TE182**	1,800	0.95	50	
CZB1JG*TE202**	2,000	0.8	50	
CZB1JS*TE050**	5	0.10	700	

*Add Termination Material Character (L,T)

† Impedance Test Method: HP4291A

** Add Tolerance Character (P)

†† DCR Test Method: Keithley 580

4. Standard Applications (continued)

Ordering Code	Impedance @ 100MHz † Ω	Maximum DC Resistance †† Ω	Allowable DC Current (mA)	Operating Temperature
CZB1JS*TE180**	18	0.1	400	-55°C to 125°C
CZB1JS*TE750**	75	0.35	200	
CZB1JS*TE121**	120	0.4	200	
CZB1JS*TE141**	140	0.3	200	
CZB1JS*TE421**	420	0.5	200	
CZB1JS*TE601**	600	0.65	200	
CZB1JS*TE721**	720	0.7	150	
CZB1JS*TE102**	1,000	0.6	150	
CZB2AF*TE050**	5	0.07	800	
CZB2AF*TE070**	7	0.1	800	
CZB2AF*TE100**	10	0.1	800	
CZB2AF*TE110**	11	0.1	800	
CZB2AF*TE120**	12	0.1	800	
CZB2AF*TE170**	17	0.1	800	
CZB2AF*TE300**	30	0.1	800	
CZB2AF*TE400**	40	0.1	800	
CZB2AF*TE500**	50	0.1	800	
CZB2AF*TE750**	75	0.1	800	
CZB2AF*TE800**	80	0.15	400	
CZB2AG*TE900**	90	0.15	400	
CZB2AG*TE101**	100	0.15	400	
CZB2AG*TE121**	120	0.15	400	
CZB2AG*TE151**	150	0.3	200	
CZB2AG*TE181**	180	0.3	200	
CZB2AG*TE201**	200	0.3	200	
CZB2AG*TE301**	300	0.3	200	

*Add Termination Material Character (L,T)

† Impedance Test Method: HP4291A

** Add Tolerance Character (P)

†† DCR Test Method: Keithley 580

4. Standard Applications (continued)

Ordering Code	Impedance @ 100MHz [†] Ω	Maximum DC Resistance ^{††} Ω	Allowable DC Current (mA)	Operating Temperature
CZB2AG*TE401**	400	0.3	200	-55°C to 125°C
CZB2AG*TE421**	420	0.3	200	
CZB2AG*TE601**	600	0.3	200	
CZB2AG*TE751**	750	0.4	200	
CZB2AG*TE102**	1,000	0.4	200	
CZB2AG*TE152**	1,500	0.55	200	
CZB2AG*TE182**	1,800	0.8	200	
CZB2AG*TE202**	2,000	0.7	200	
CZB2AG*TE222**	2,200	0.8	200	
CZB2AS*TE180**	18	0.1	600	
CZB2AS*TE201**	200	0.4	200	
CZB2AS*TE221**	220	0.25	200	
CZB2AS*TE601**	600	0.4	200	
CZB2AS*TE751**	750	0.7	200	
CZB2AS*TE102**	1,000	0.75	100	
CZB2AS*TE272**	2,700	0.8	200	
CZB2BF*TE190**	19	0.1	600	
CZB2BF*TE260**	26	0.1	600	
CZB2BF*TE300**	30	0.1	600	
CZB2BF*TE500**	50	0.1	600	
CZB2BF*TE600**	60	0.1	600	
CZB2BF*TE700**	70	0.1	600	
CZB2BF*TE800**	80	0.2	400	
CZB2BF*TE900**	90	0.2	400	

*Add Termination Material Character (L,T)

† Impedance Test Method: HP4291A

** Add Tolerance Character (P)

†† DCR Test Method: Keithley 580

4. Standard Applications (continued)

Ordering Code	Impedance @ 100MHz † Ω	Maximum DC Resistance †† Ω	Allowable DC Current (mA)	Operating Temperature
CZB2BF*TE101**	100	0.2	400	-55°C to 125°C
CZB2BF*TE121**	120	0.2	400	
CZB2BF*TE151**	150	0.15	300	
CZB2BF*TE201**	200	0.3	300	
CZB2BF*TE301**	300	0.3	300	
CZB2BF*TE601**	600	0.5	200	
CZB2BG*TE102**	1,000	0.7	150	
CZB2BG*TE152**	1,500 @ 50MHz	0.9	100	
CZB2BG*TE202**	2,000 @ 30MHz	0.6	100	
CZB2BG*TE222**	2,200 @ 50MHz	1.0	200	
CZB2BS*TE190**	19	0.1	600	
CZB2BS*TE300**	30	0.1	600	
CZB2BS*TE181**	180	0.3	300	
CZB2BS*TE601**	600	0.3	200	

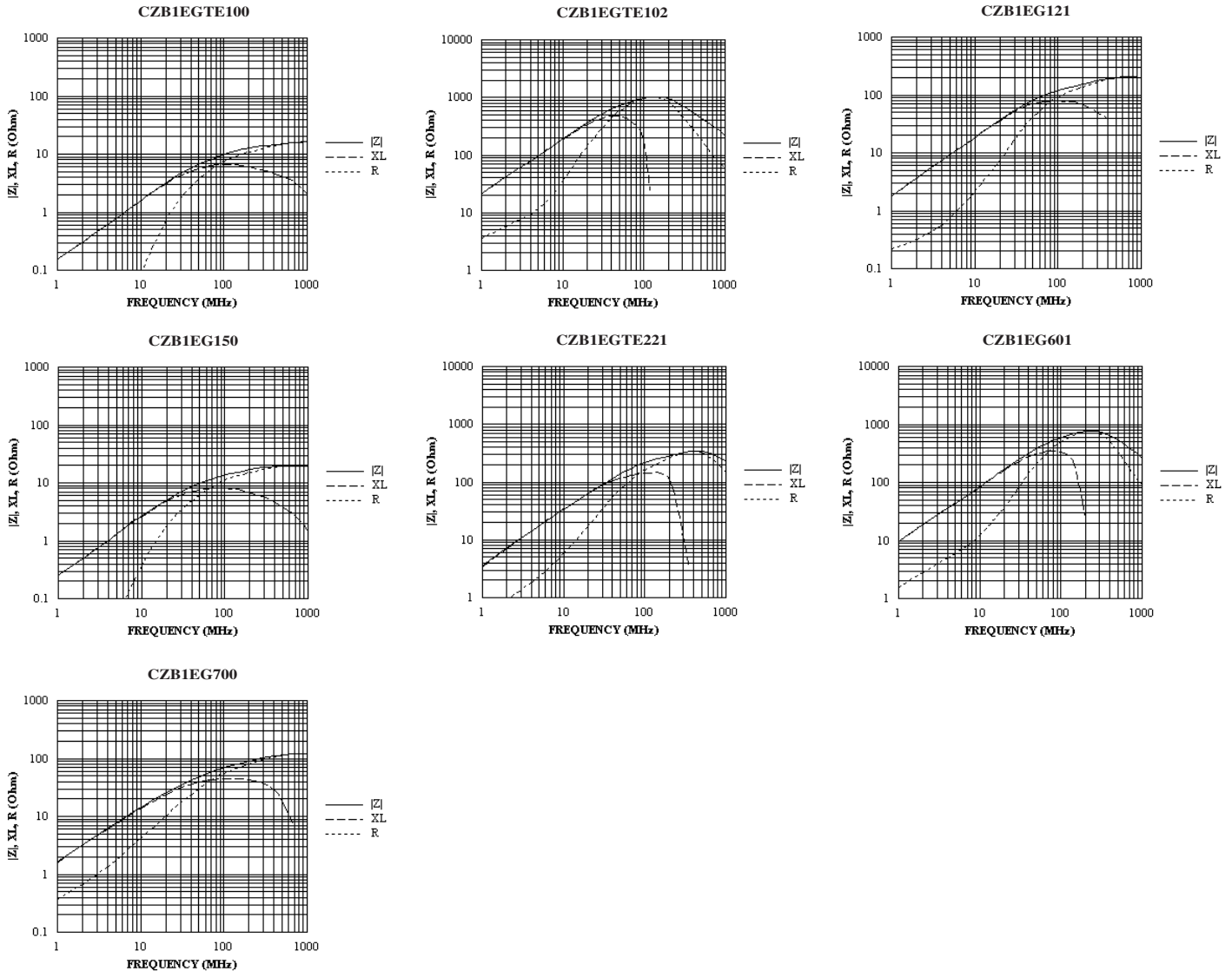
*Add Termination Material Character (L,T)

† Impedance Test Method: HP4291A

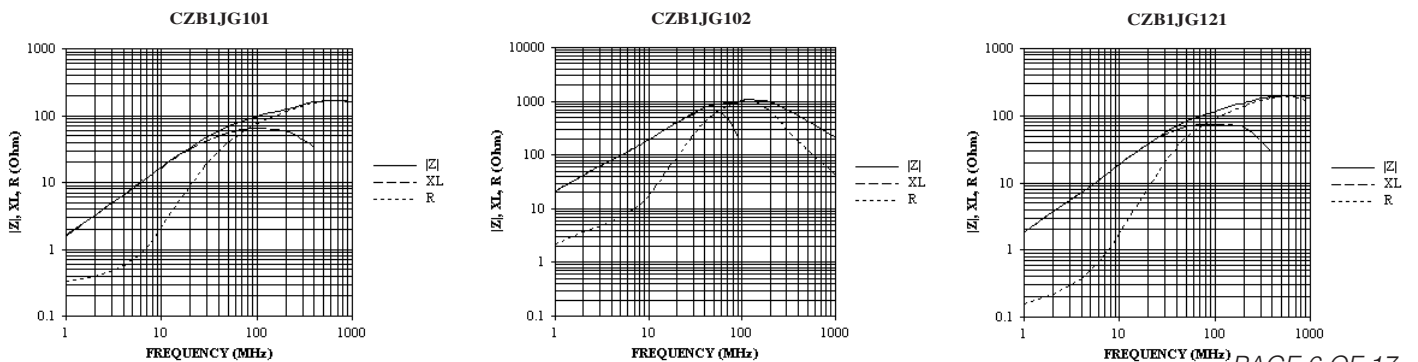
** Add Tolerance Character (P)

†† DCR Test Method: Keithley 580

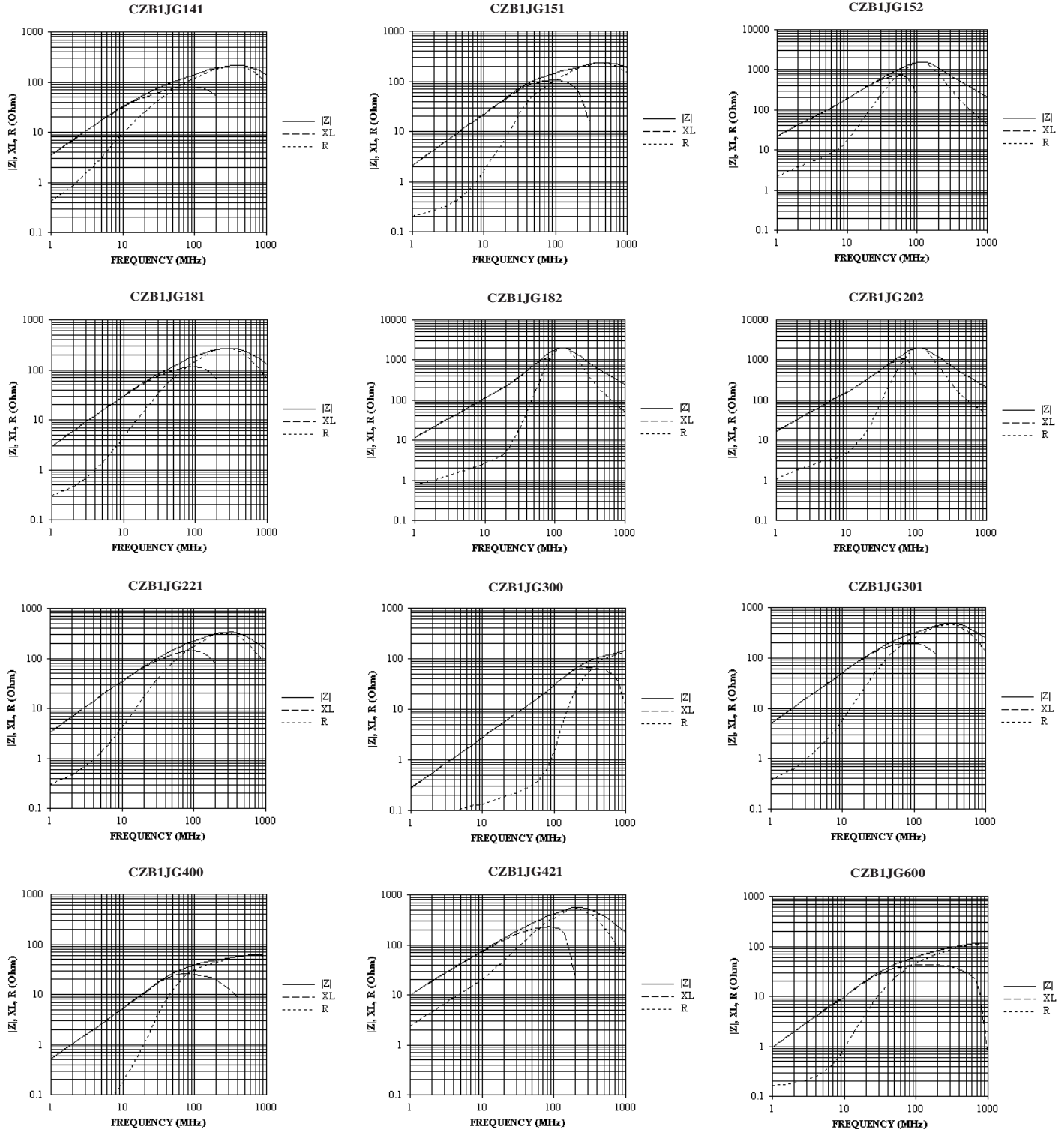
5. 0402 Graphs



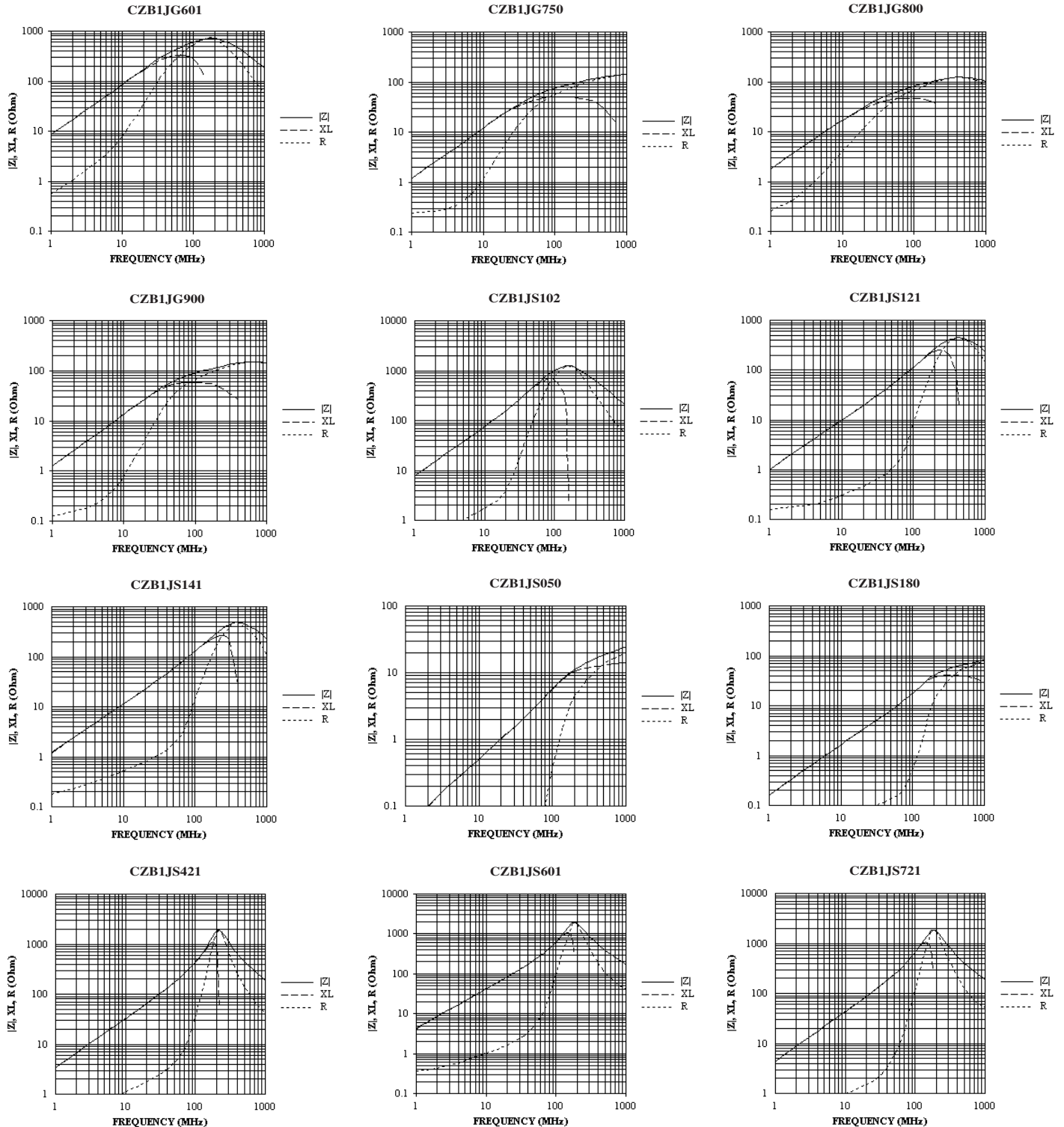
5. 0603 Graphs



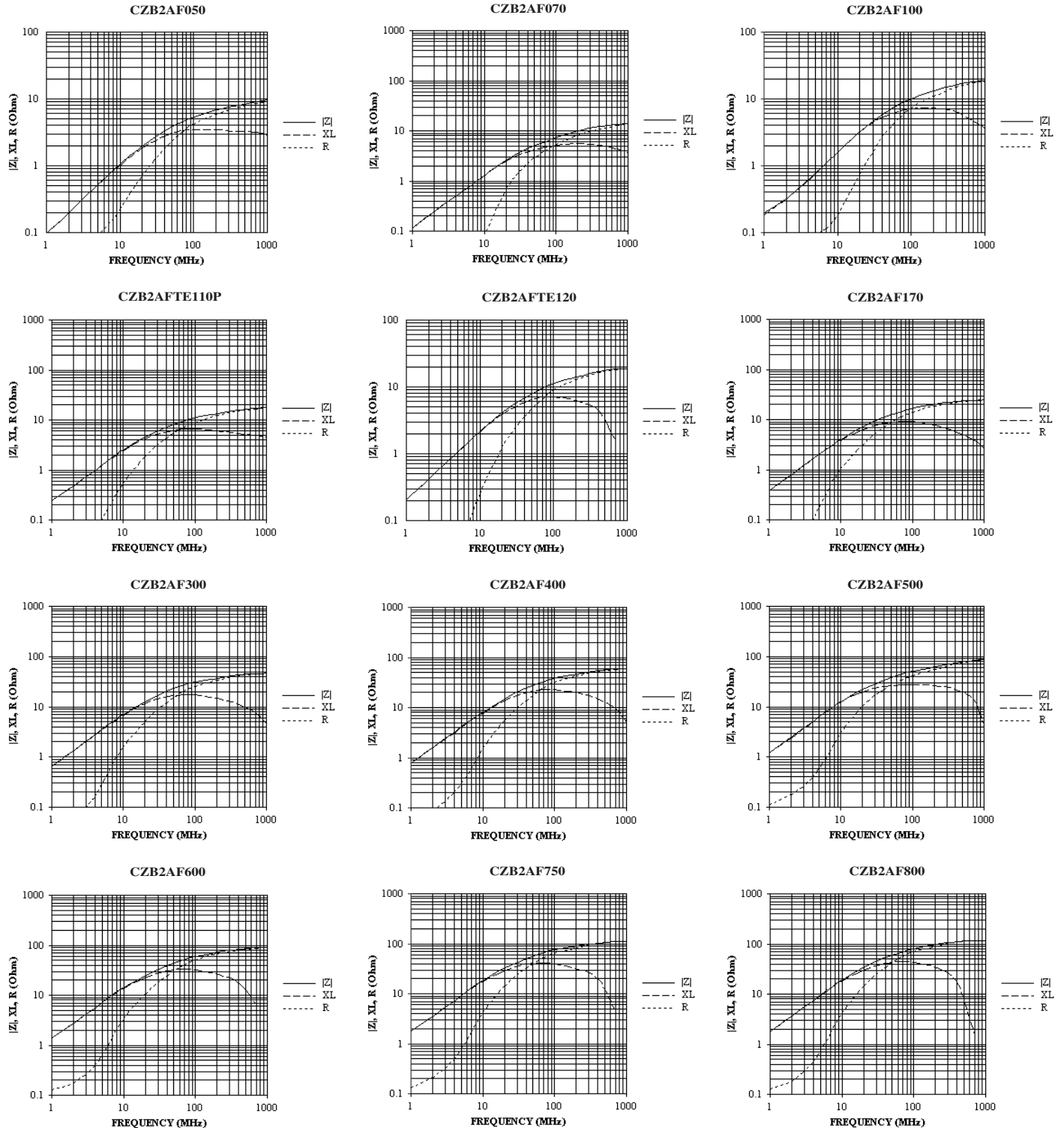
5. 0603 Graphs (continued)



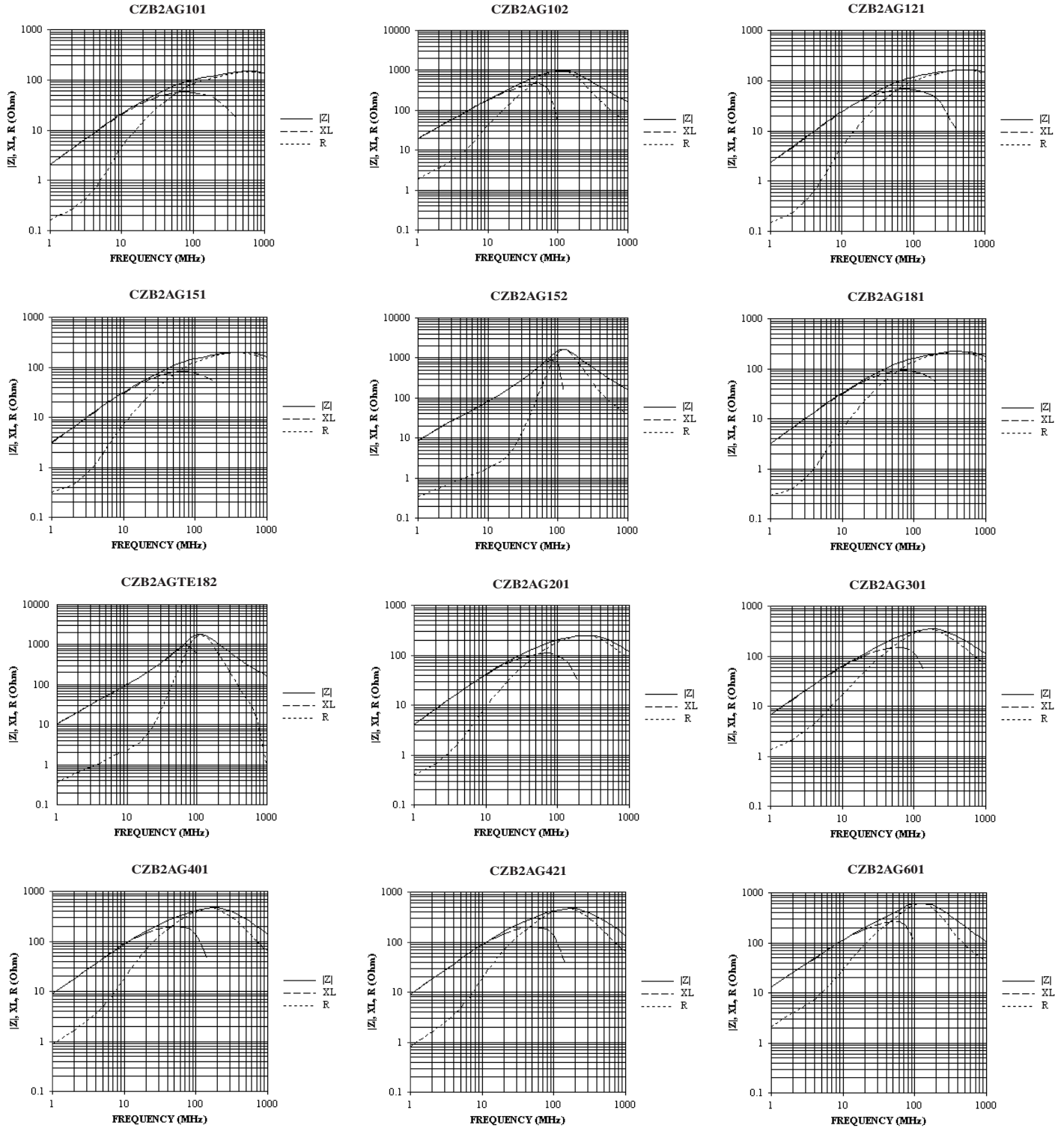
5. 0603 Graphs (continued)



5. 0805 Graphs

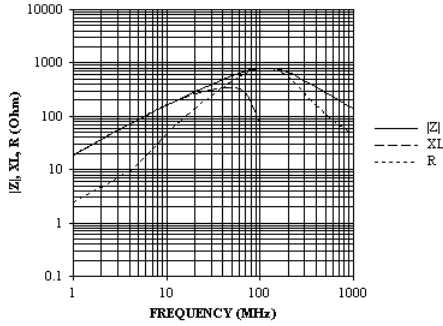


5. 0805 Graphs (continued)

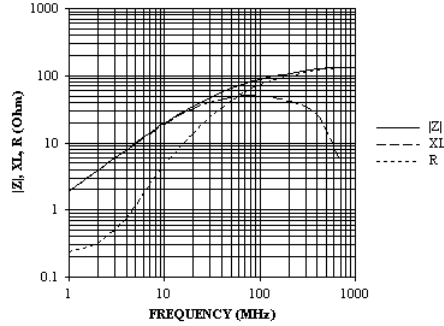


5. 0805 Graphs (continued)

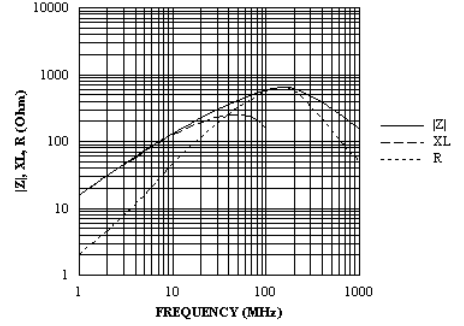
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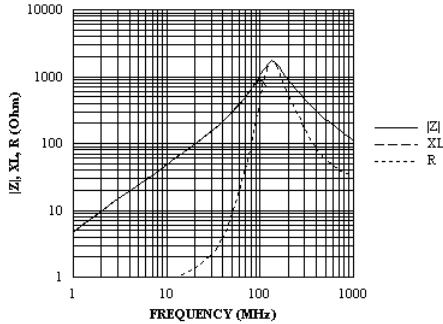
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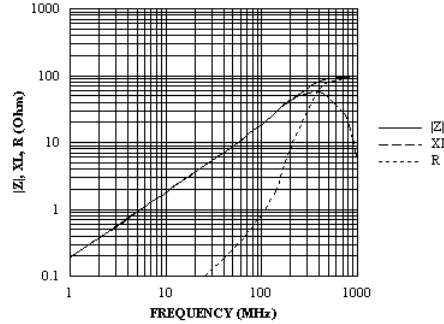
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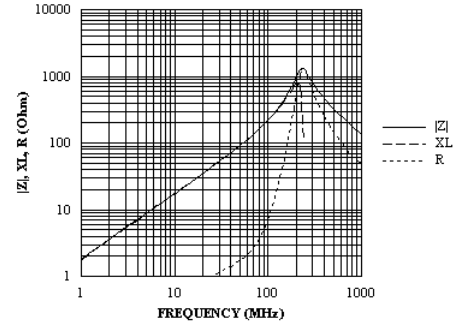
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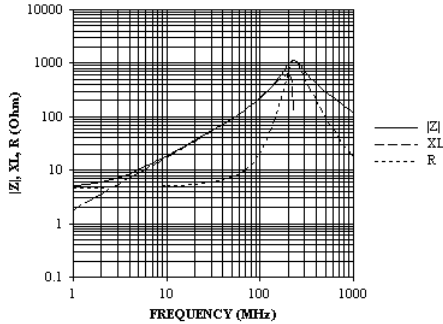
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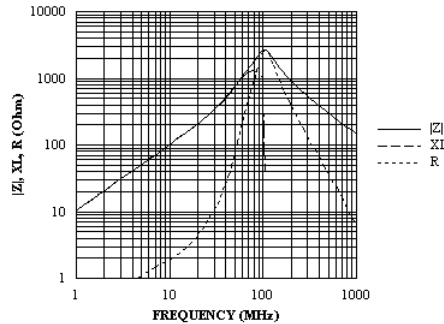
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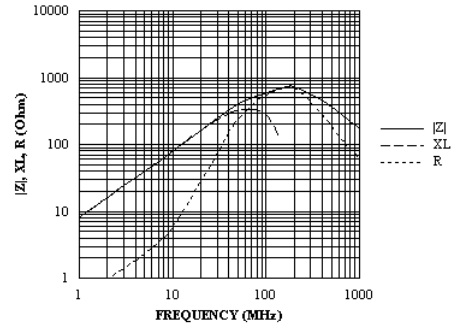
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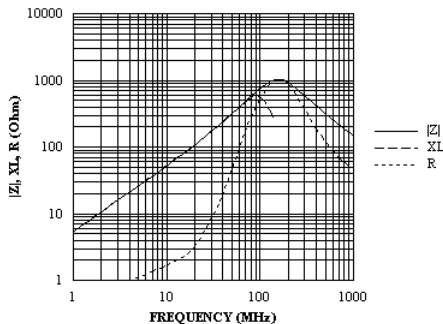
CZB2AS272



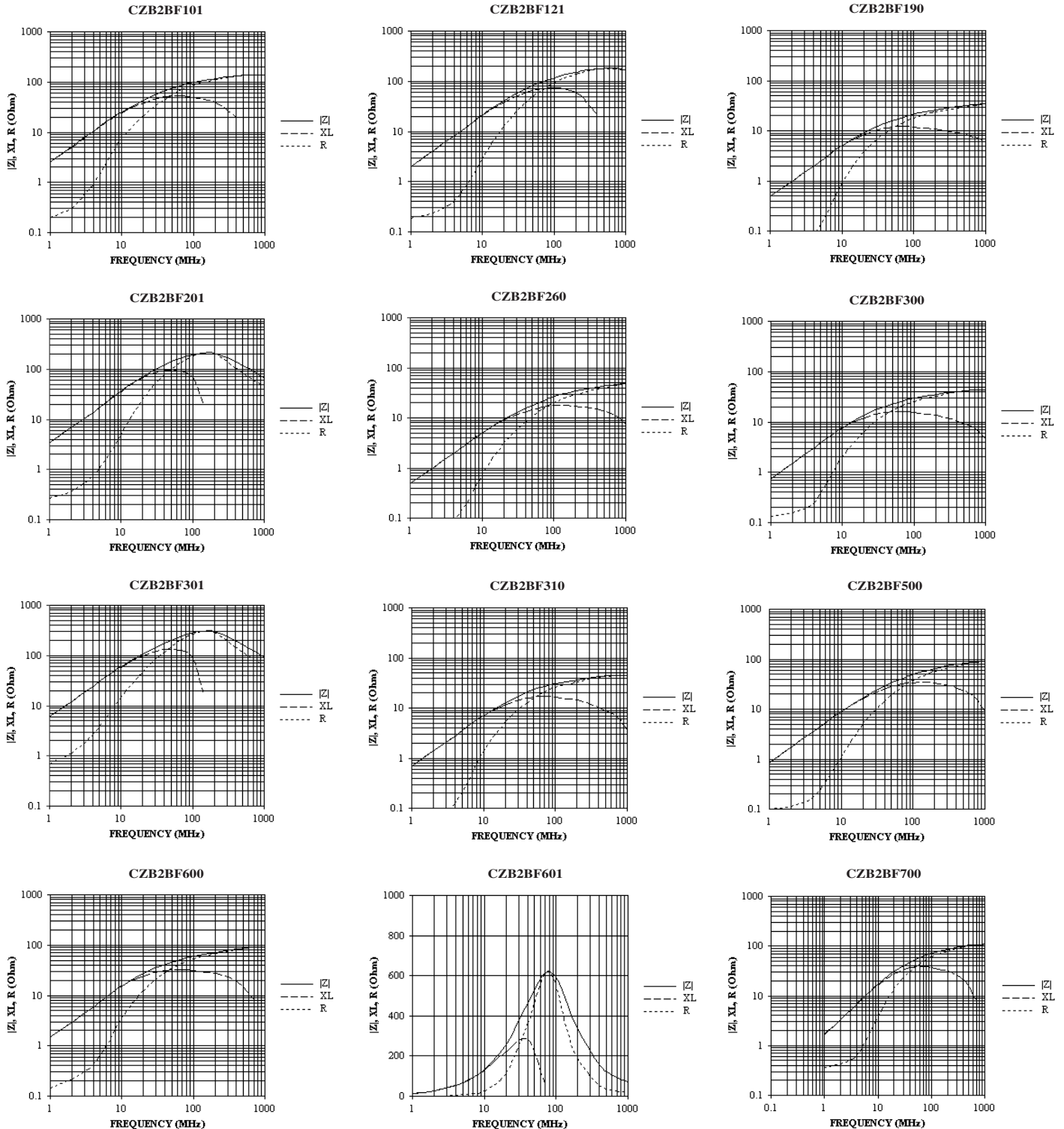
CZB2AS601



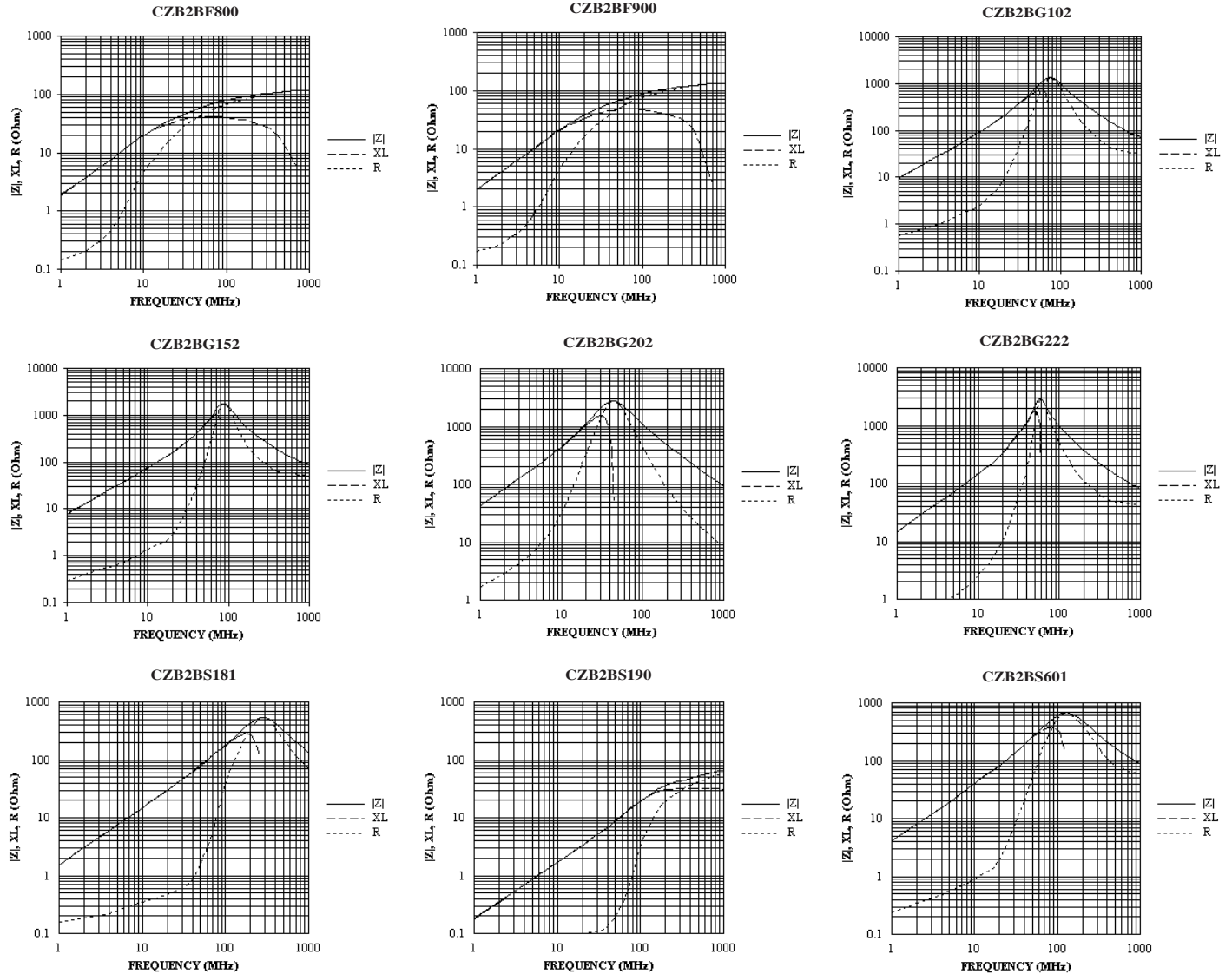
CZB2AS751



5. 1206 Graphs



5. 1206 Graphs (continued)



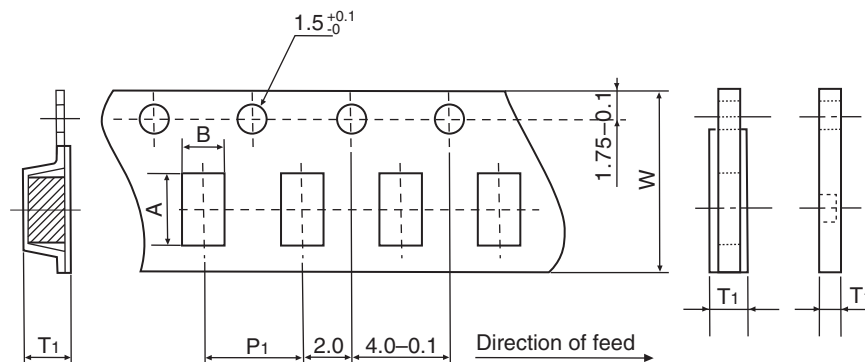
5. Characteristics

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	Change in Impedance: Relative to value before test $\pm 20\%$. Appearance: There shall be no cracking Solder Coverage: More than 75% of the terminal electrode shall be covered with solder.	Flux: 5-10 sec dip After Flux: Air dry for 15 sec Preheat: 150°C $\pm 10^\circ\text{C}$ Preheat Time: 60 sec Solder Temp: 260°C $\pm 5^\circ\text{C}$ Dip Time: 10 ± 1 sec															
Solderability	Solder Coverage: More than 95% of the termination shall be covered with solder.	Flux: 5-10 sec dip After Flux: Air dry for 15 sec Solder Temp: 245°C $\pm 5^\circ\text{C}$ Dip Time: 5 ± 0.5 sec															
Leach Resistance	Appearance: There shall be no visible signs of physical or mechanical damage (i.e. no cracks) Terminations: 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) Flux: 5-10 sec 2) After Flux: Air dry for 15 sec 3) Solder Temp: 230°C $\pm 5^\circ\text{C}$ 4) Dip Time: 5 ± 0.5 sec 5) Cool: Air cool for 60 seconds															
Insulation Resistance	Insulation Resistance: Min 1G ohms																
Solvent Resistance	Change in Impedance: Relative to value before test $\pm 10\%$.	Cleaning by: Washer: Ultrasonic washer (100W) Solvent: Isopropyl alcohol Time: 3 minutes															
Terminal Strength (hanging test)	Appearance: The terminal electrode shall not break off, nor shall there be damage to the body.	<table> <tr> <th>Type</th><th>W(kgf)</th><th>Time</th></tr> <tr> <td>1E</td><td></td><td>N/A</td></tr> <tr> <td>1J</td><td>0.5</td><td>30 sec ± 2 sec</td></tr> <tr> <td>2A</td><td>1.0</td><td>30 sec ± 2 sec</td></tr> <tr> <td>2B</td><td>1.5</td><td>30 sec ± 2 sec</td></tr> </table>	Type	W(kgf)	Time	1E		N/A	1J	0.5	30 sec ± 2 sec	2A	1.0	30 sec ± 2 sec	2B	1.5	30 sec ± 2 sec
Type	W(kgf)	Time															
1E		N/A															
1J	0.5	30 sec ± 2 sec															
2A	1.0	30 sec ± 2 sec															
2B	1.5	30 sec ± 2 sec															
Terminal Strength (push test)	Appearance: There shall be no evidence of mechanical degradations to terminals or body.	<table> <tr> <th>Type</th><th>W(kgf)</th><th>Time</th></tr> <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> </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	Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value before test $\pm 10\%$	Board: 90x40x1.6mm Bend: 1mm Time: 5 sec																		
Mechanical Shock	Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value before test $\pm 10\%$	Force: 50G Time: 11 msec There shall be 3 shocks in each of 6 directions (18 shocks total).																		
Vibration	Impedance: 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	Appearance: There shall be no physical or mechanical damage. Impedance: Relative to initial value $\pm 20\%$. DCR: 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 $\pm 2^\circ\text{C}$</td><td>_____</td></tr> <tr> <td>2-hold</td><td>-40°C $\pm 2^\circ\text{C}$</td><td>30 min ± 5 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 $\pm 2^\circ\text{C}$</td><td>30 min ± 5 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 ± 5 min	3-transfer	_____	0.5 min max.	4-hold	+105°C $\pm 2^\circ\text{C}$	30 min ± 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 ± 5 min																		
3-transfer	_____	0.5 min max.																		
4-hold	+105°C $\pm 2^\circ\text{C}$	30 min ± 5 min																		
5-transfer	_____	0.5 min max.																		
Load Humidity	Appearance: There shall be no physical or mechanical damage Impedance: 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.	Temperature: 85°C $\pm 2^\circ\text{C}$ Relative Humidity: 85% Time: 1,000 hours total Apply: 100% rated current																		
Life Test	Appearance: There shall be no physical or mechanical damage Impedance: 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.	Temperature: 85°C $\pm 2^\circ\text{C}$ Time: 1,000 hours total Apply: 100% rated current																		

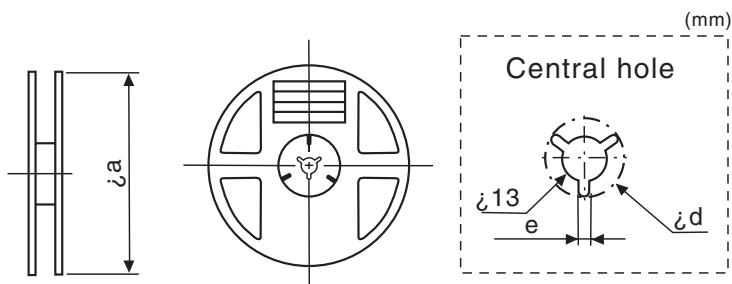
6. Dimensions - inches (mm)



Dimensions - inches (mm)

Tape	A	B	W	P ₁	T ₁
1E 0402	0.046±0.004 (1.17±0.1)	0.026±0.004 (0.65±0.1)	0.315±0.009 (8.0±0.22)	0.079±0.009 (2.0±0.23)	0.025±0.004 (0.63±0.1)
1J 0603	0.075±0.002 (1.9±0.1)	0.043±0.002 (1.1±0.1)	0.318±0.002 (8.1±0.1)	0.157±0.004 (4.0±0.1)	0.043±0.002 (1.1±0.1)
2A 0805	0.093±0.002 (2.4±0.1)	0.063±0.002 (1.6±0.1)	0.318±0.002 (8.1±0.1)	0.157±0.004 (4.0±0.1)	0.046±0.002 (1.2±0.1)
2B 1206	0.138±0.002 (3.5±0.1)	0.071±0.002 (1.8±0.1)	0.318±0.002 (8.1±0.1)	0.157±0.004 (4.0±0.1)	0.071±0.002 (1.8±0.1)

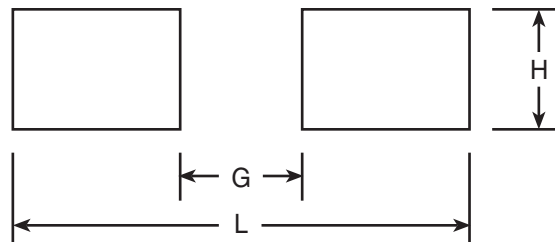
Dimensions - inches (mm)



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

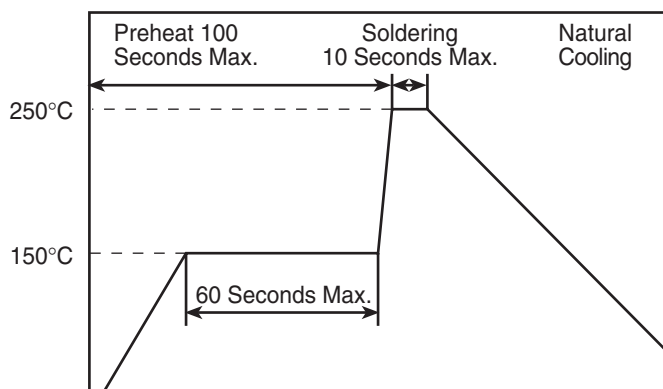
7. Recommended PC Board Land Patterns - mm (inches)

Chip Size	L	G	H
1E (0402)	1.3 (0.051)	0.4 (0.016)	0.5 (0.020)
1J (0603)	2.6 (0.102)	0.6 (0.023)	0.8 (0.031)
2A (0805)	3.0 (0.118)	1.0 (0.039)	1.0 (0.039)
2B (1206)	4.4 (0.173)	2.2 (0.087)	1.4 (0.055)



8. Recommended Temperature Profiles for Soldering

Recommended Temperature Profile for Wave Soldering



Recommended Temperature Profile for Reflow Soldering

