

Multi Layer Ferrite Chip Beads

Type CZB

ISO 9001:2000
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

2. Dimensions

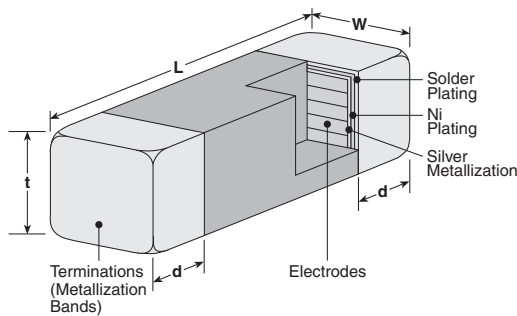
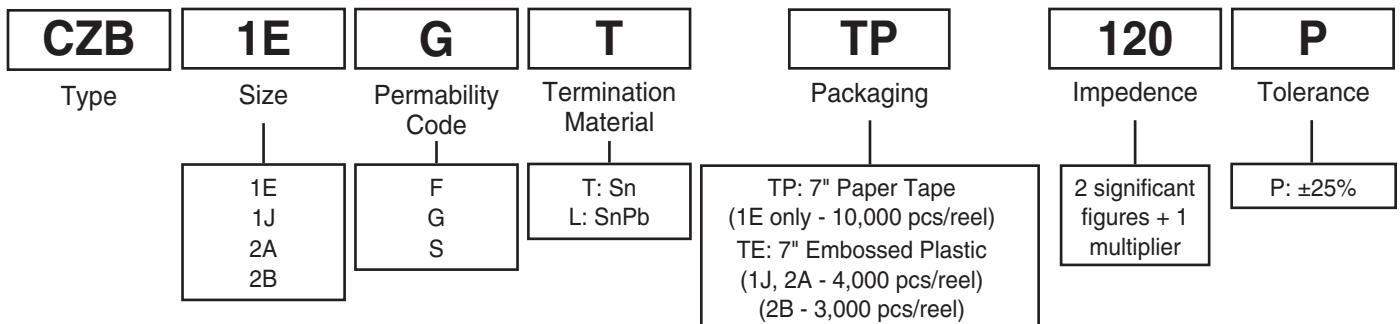


Table 1

| 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:



4. Standard Applications

| Ordering Code | Impedance @ 100MHz † Ω | Maximum DC Resistance †† Ω | Allowable DC Current (mA) | Operating Temperature |
|---------------|---------------------------|-------------------------------|---------------------------|-----------------------|
| CZB1EG*TP100P | 10 | 0.05 | 500 | -55°C to 125°C |
| CZB1EG*TP150P | 15 | 0.07 | 300 | |
| CZB1EG*TP700P | 70 | 0.4 | 200 | |
| CZB1EG*TP121P | 120 | 0.5 | 200 | |
| CZB1EG*TP221P | 220 | 0.7 | 100 | |
| CZB1EG*TP601P | 600 | 1.1 | 50 | |
| CZB1EG*TP102P | 1000 | 1.5 | 50 | |
| CZB1JG*TE300P | 30 | 0.1 | 400 | |
| CZB1JG*TE400P | 40 | 0.1 | 400 | |
| CZB1JG*TE600P | 60 | 0.2 | 300 | |
| CZB1JG*TE750P | 75 | 0.2 | 300 | |
| CZB1JG*TE800P | 80 | 0.2 | 300 | |
| CZB1JG*TE900P | 90 | 0.3 | 250 | |
| CZB1JG*TE101P | 100 | 0.3 | 250 | |
| CZB1JG*TE121P | 120 | 0.2 | 700 | |
| CZB1JG*TE141P | 140 | 0.3 | 250 | |
| CZB1JG*TE151P | 150 | 0.3 | 250 | |
| CZB1JG*TE181P | 180 | 0.3 | 250 | |
| CZB1JG*TE221P | 220 | 0.3 | 250 | |
| CZB1JG*TE301P | 300 | 0.35 | 230 | |
| CZB1JG*TE421P | 420 | 0.4 | 210 | |
| CZB1JG*TE601P | 600 | 0.45 | 210 | |
| CZB1JG*TE102P | 1,000 | 0.8 | 190 | |
| CZB1JG*TE152P | 1,500 | 0.7 | 100 | |
| CZB1JG*TE182P | 1,800 | 0.95 | 50 | |
| CZB1JG*TE202P | 2,000 | 0.8 | 50 | |
| CZB1JS*TE050P | 5 | 0.10 | 700 | |

*Add Termination Material Character (T, L)

† Impedance Test Method: HP4291A

†† 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*TE180P | 18 | 0.1 | 400 | -55°C to 125°C |
| CZB1JS*TE750P | 75 | 0.35 | 200 | |
| CZB1JS*TE121P | 120 | 0.4 | 200 | |
| CZB1JS*TE421P | 420 | 0.5 | 200 | |
| CZB1JS*TE601P | 600 | 0.65 | 200 | |
| CZB1JS*TE102P | 1,000 | 0.6 | 150 | |
| CZB2AF*TE110P | 11 | 0.1 | 800 | |
| CZB2AF*TE170P | 17 | 0.1 | 800 | |
| CZB2AF*TE300P | 30 | 0.1 | 800 | |
| CZB2AF*TE400P | 40 | 0.1 | 800 | |
| CZB2AF*TE500P | 50 | 0.1 | 800 | |
| CZB2AF*TE800P | 80 | 0.15 | 400 | |
| CZB2AG*TE101P | 100 | 0.15 | 400 | |
| CZB2AG*TE121P | 120 | 0.15 | 400 | |
| CZB2AG*TE151P | 150 | 0.3 | 200 | |
| CZB2AG*TE201P | 200 | 0.3 | 200 | |
| CZB2AG*TE301P | 300 | 0.3 | 200 | |
| CZB2AG*TE401P | 400 | 0.3 | 200 | |
| CZB2AG*TE601P | 600 | 0.3 | 200 | |
| CZB2AG*TE102P | 1,000 | 0.4 | 200 | |
| CZB2AG*TE152P | 1,500 | 0.55 | 200 | |
| CZB2AG*TE202P | 2,000 | 0.7 | 200 | |
| CZB2AG*TE222P | 2,200 | 0.8 | 200 | |
| CZB2AS*TE180P | 18 | 0.1 | 600 | |
| CZB2AS*TE201P | 200 | 0.4 | 200 | |
| CZB2AS*TE221P | 220 | 0.25 | 200 | |

*Add Termination Material Character (T, L)

† Impedance Test Method: HP4291A

†† DCR Test Method: Keithley 580

4. Standard Applications (continued)

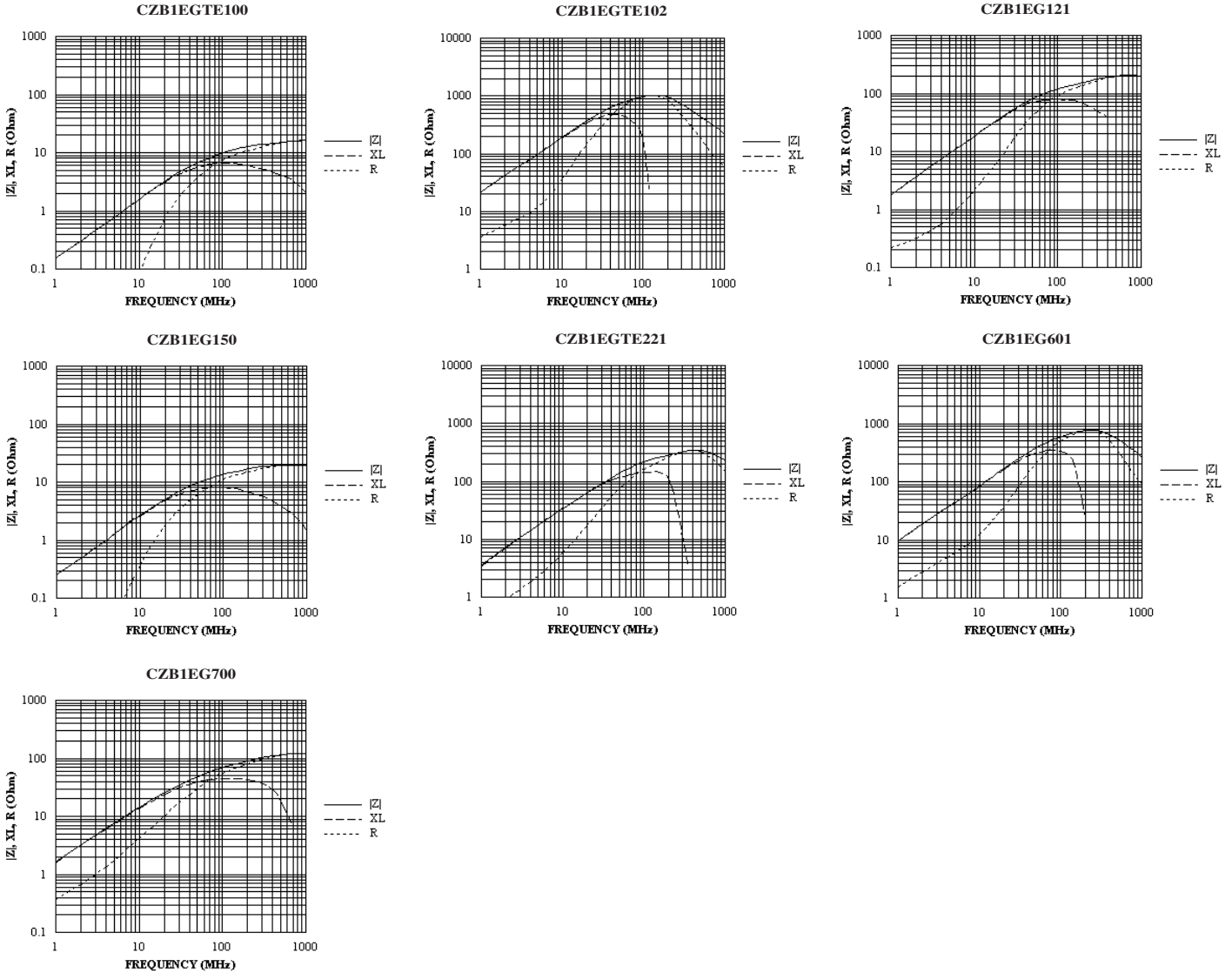
| Ordering Code | Impedance @ 100MHz † Ω | Maximum DC Resistance †† Ω | Allowable DC Current (mA) | Operating Temperature |
|---------------|---------------------------|-------------------------------|---------------------------|-----------------------|
| CZB2AS*TE601P | 600 | 0.4 | 200 | -55°C to 125°C |
| CZB2AS*TE102P | 1,000 | 0.75 | 100 | |
| CZB2AS*TE272P | 2,700 | 0.8 | 200 | |
| CZB2BF*TE190P | 19 | 0.1 | 600 | |
| CZB2BF*TE260P | 26 | 0.1 | 600 | |
| CZB2BF*TE300P | 30 | 0.1 | 600 | |
| CZB2BF*TE500P | 50 | 0.1 | 600 | |
| CZB2BF*TE600P | 60 | 0.1 | 600 | |
| CZB2BF*TE700P | 70 | 0.1 | 600 | |
| CZB2BF*TE800P | 80 | 0.2 | 400 | |
| CZB2BF*TE900P | 90 | 0.2 | 400 | |
| CZB2BF*TE101P | 100 | 0.2 | 400 | |
| CZB2BF*TE121P | 120 | 0.2 | 400 | |
| CZB2BF*TE151P | 150 | 0.15 | 300 | |
| CZB2BF*TE201P | 200 | 0.3 | 300 | |
| CZB2BF*TE301P | 300 | 0.3 | 300 | |
| CZB2BF*TE601P | 600 | 0.5 | 200 | |
| CZB2BG*TE102P | 1,000 | 0.7 | 150 | |
| CZB2BG*TE152P | 1,500 @ 50MHz | 0.9 | 100 | |
| CZB2BG*TE202P | 2,000 @ 30MHz | 0.6 | 100 | |
| CZB2BG*TE222P | 2,200 @ 50MHz | 1.0 | 200 | |
| CZB2BS*TE190P | 19 | 0.1 | 600 | |
| CZB2BS*TE300P | 30 | 0.1 | 600 | |
| CZB2BS*TE601P | 600 | 0.3 | 200 | |

*Add Termination Material Character (T, L)

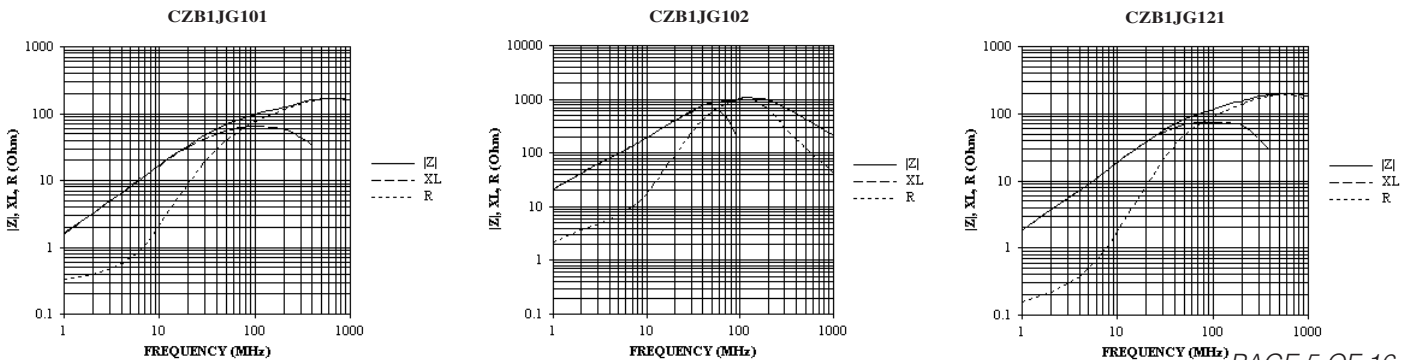
† Impedance Test Method: HP4291A

†† DCR Test Method: Keithley 580

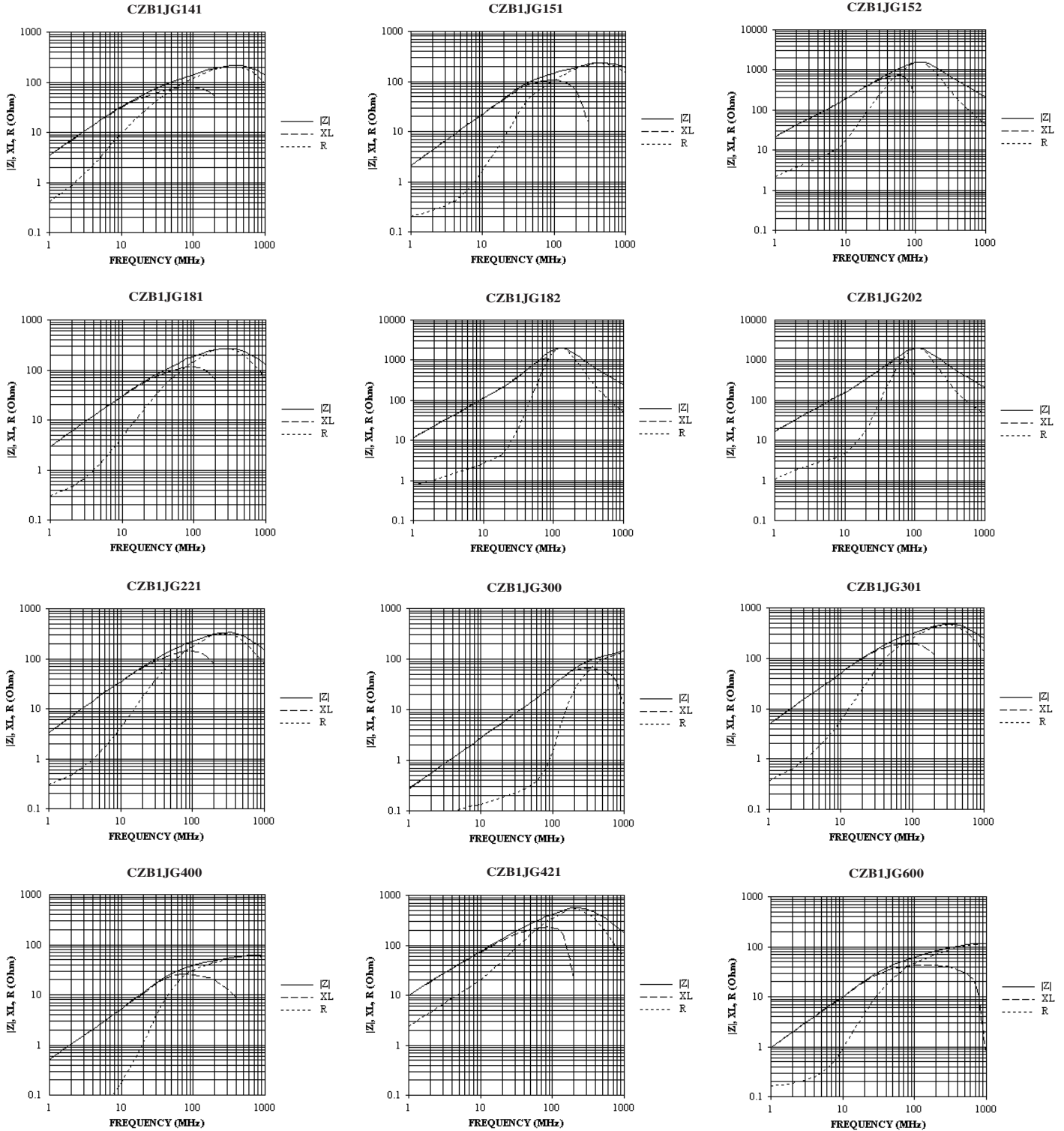
5. 0402 Graphs



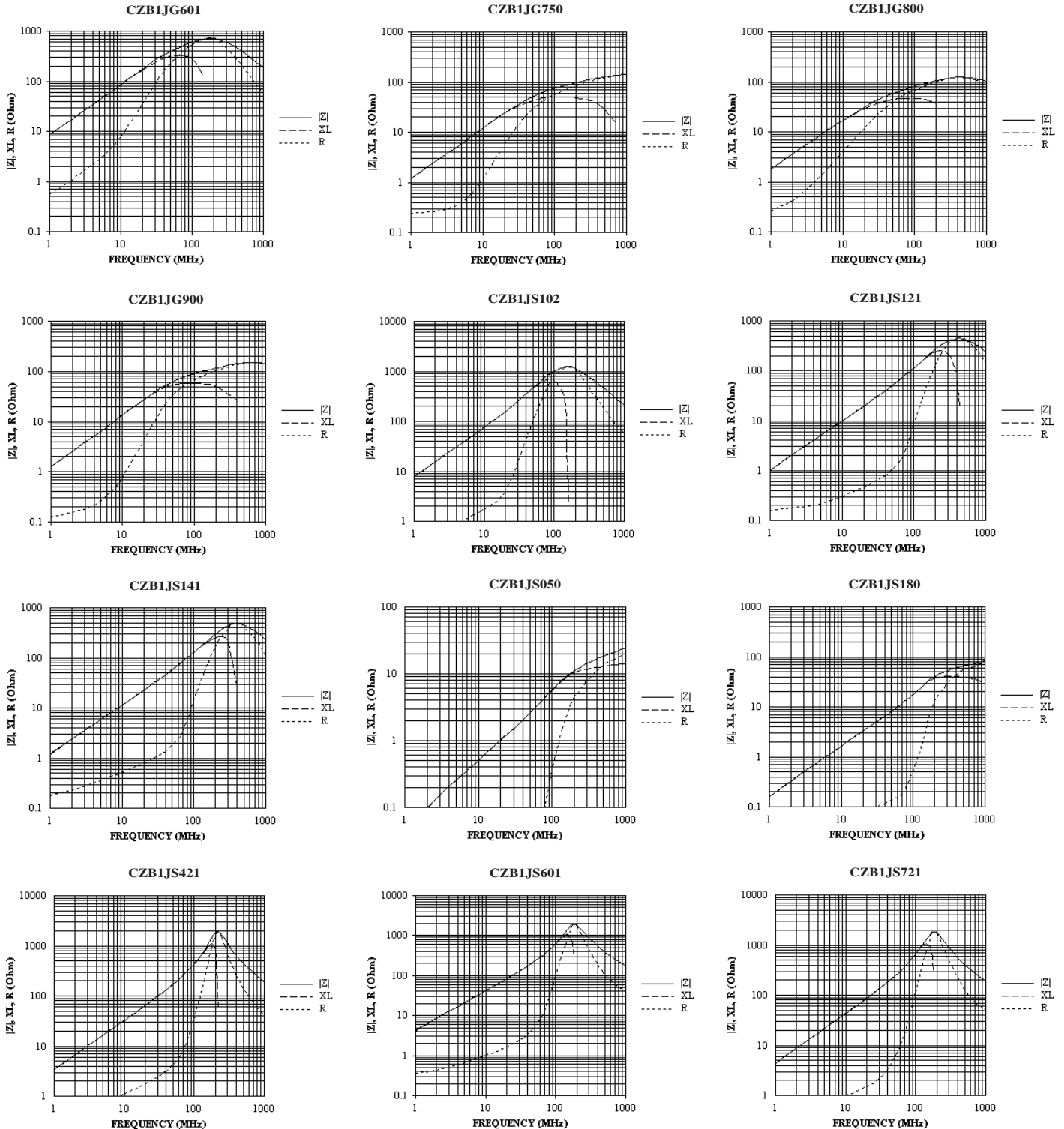
5. 0603 Graphs



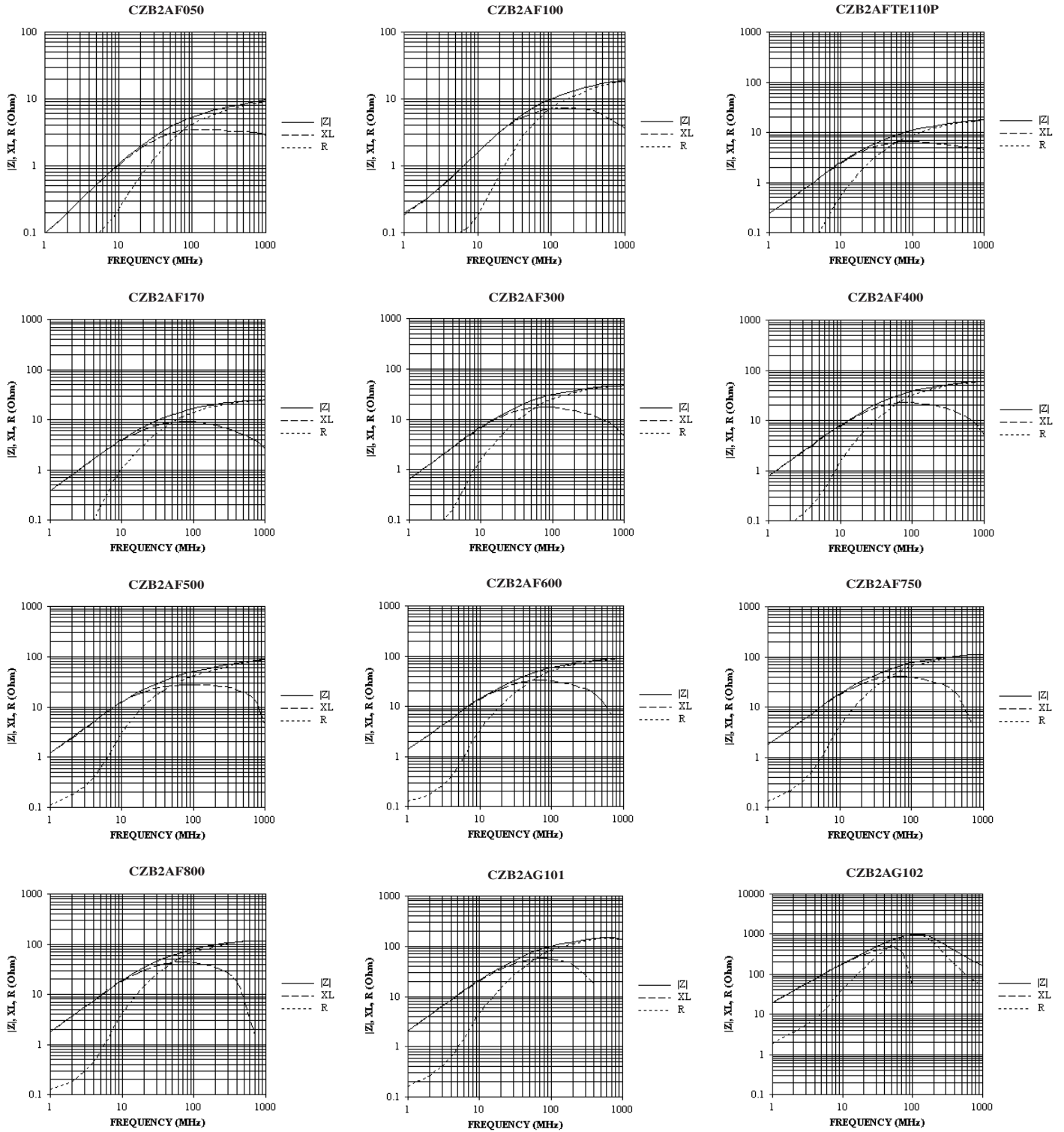
5. 0603 Graphs (continued)



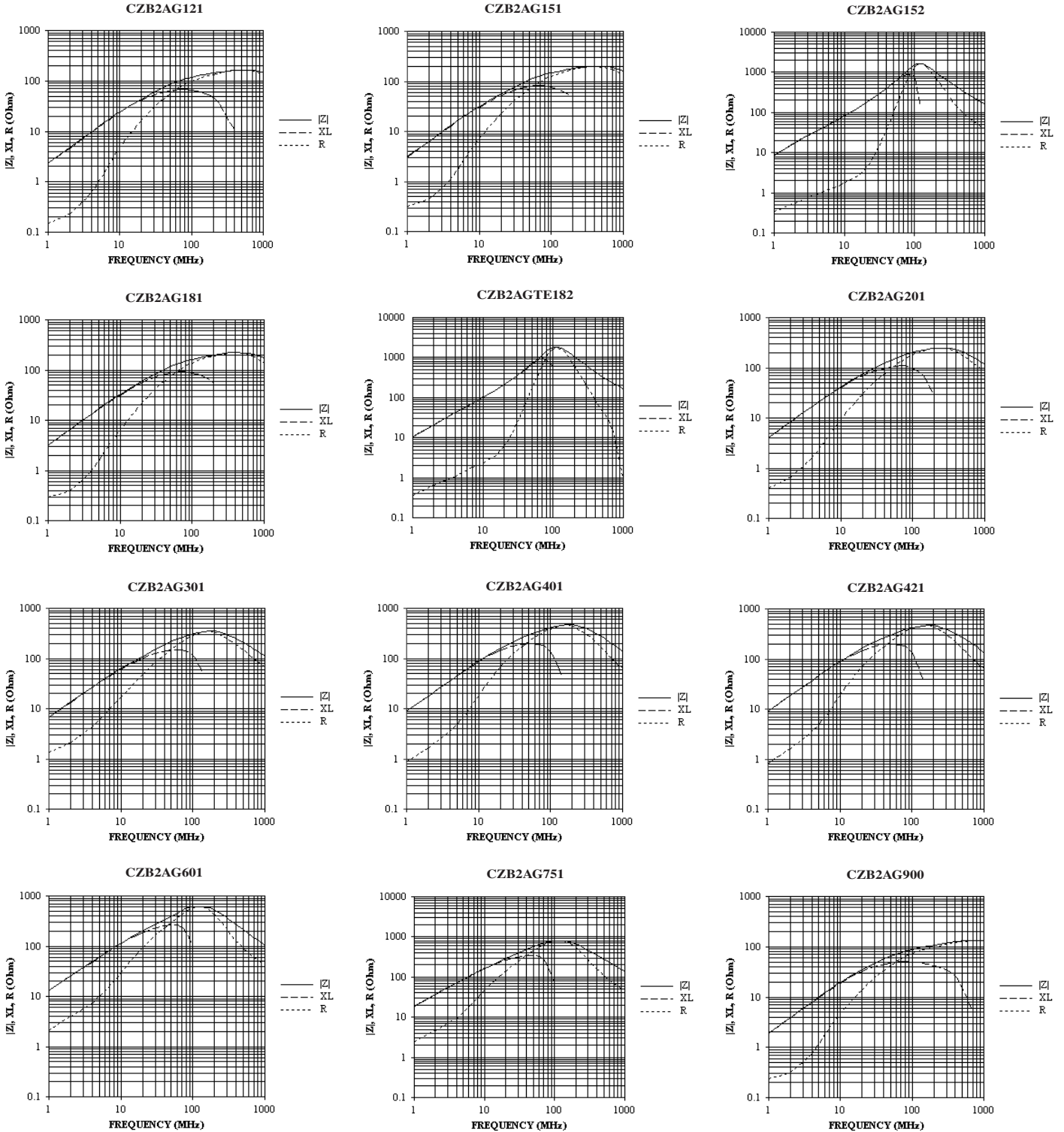
5. 0603 Graphs (continued)



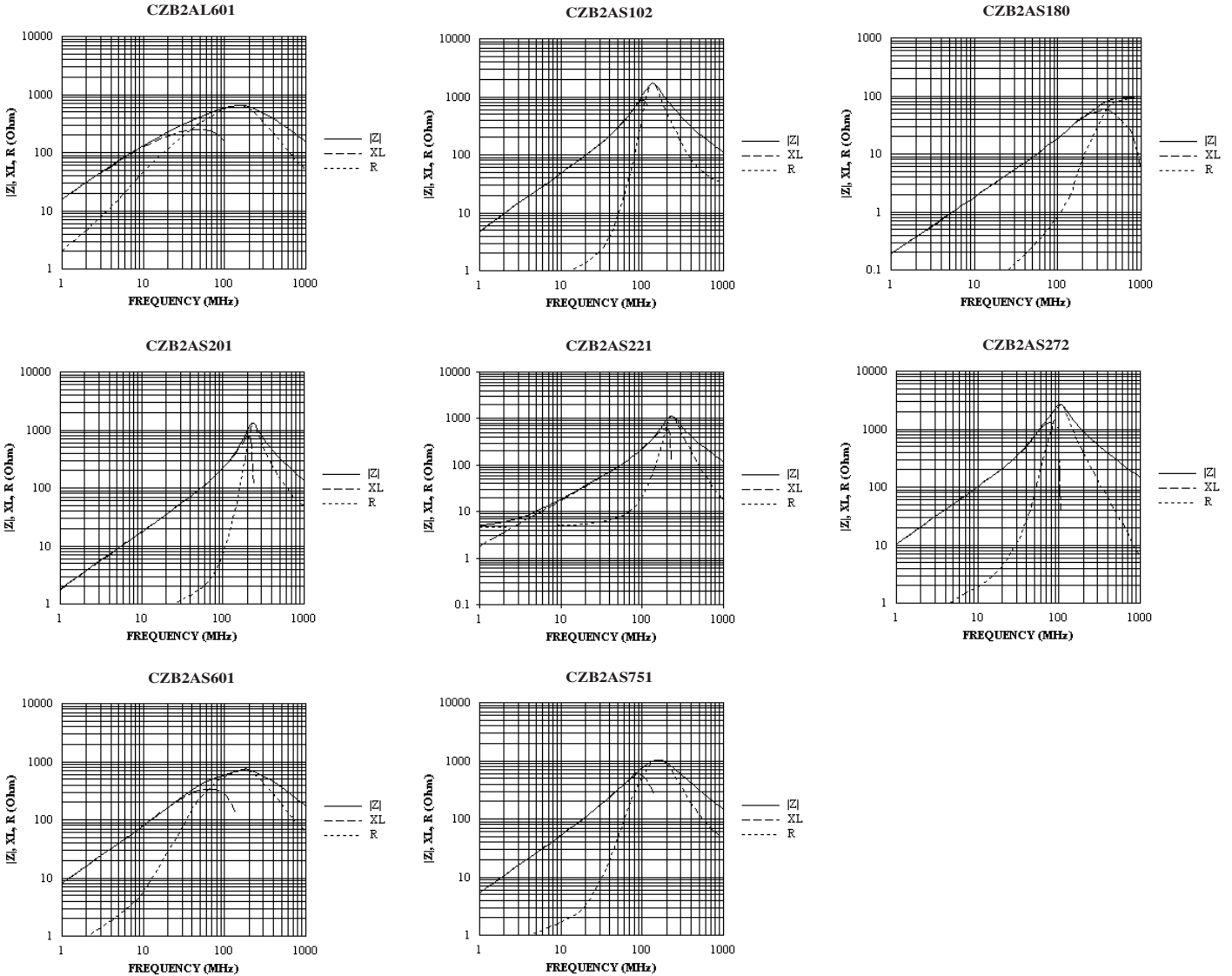
5. 0805 Graphs



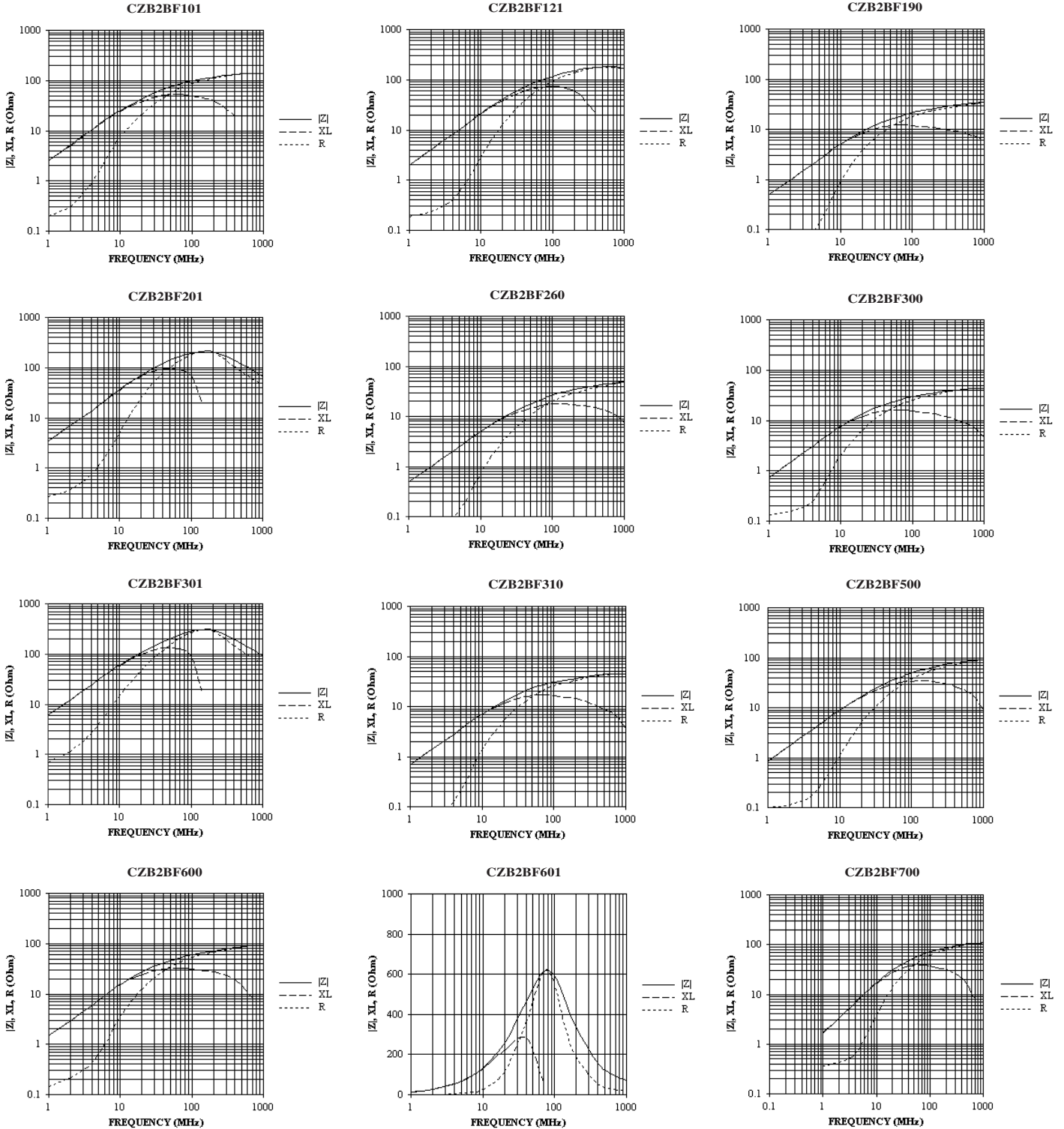
5. 0805 Graphs (continued)



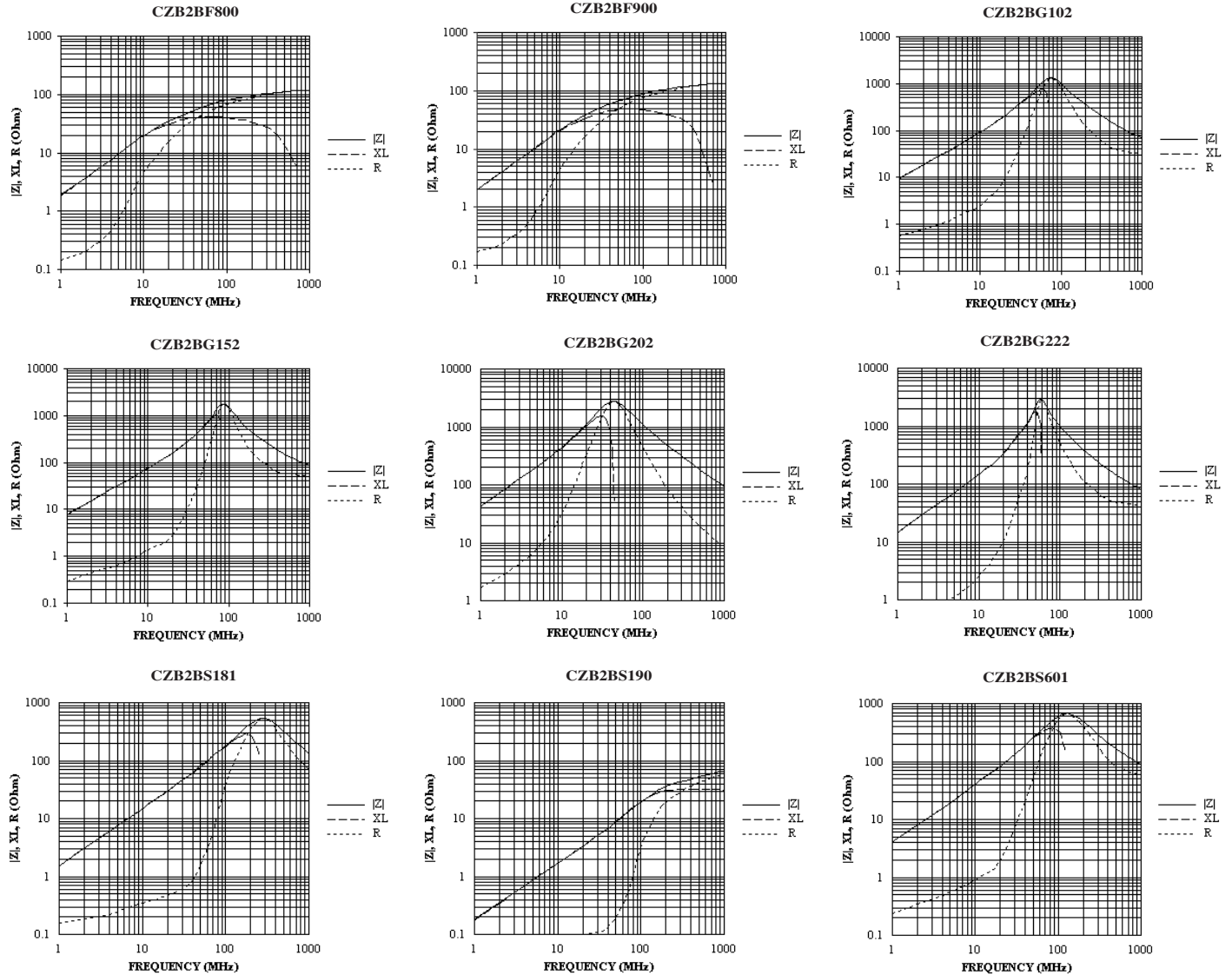
5. 0805 Graphs (continued)



5. 1206 Graphs



5. 1206 Graphs (continued)



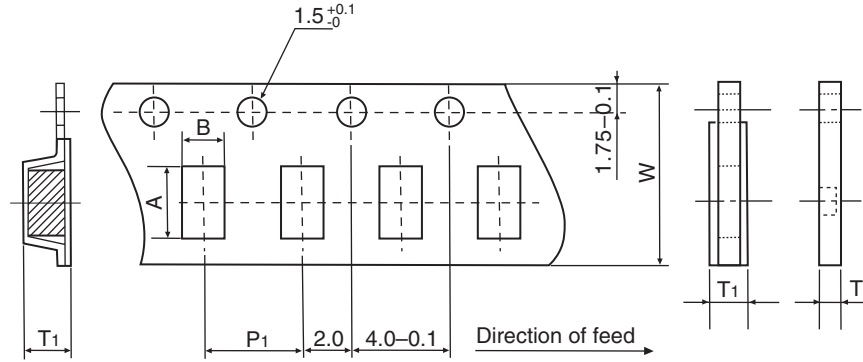
5. Characteristics

| 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 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 ± 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> </tbody> </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 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 | <p>Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value before test $\pm 10\%$</p> | <p>Board: 90x40x1.6mm Bend: 1mm Time: 5 sec</p> | | | | | | | | | | | | | | | | | | |
| Mechanical Shock | <p>Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value before test $\pm 10\%$</p> | <p>Force: 50G Time: 11 msec There shall be 3 shocks in each of 6 directions (18 shocks total).</p> | | | | | | | | | | | | | | | | | | |
| Vibration | <p>Impedance: Relative to initial value $\pm 10\%$</p> | <p>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).</p> | | | | | | | | | | | | | | | | | | |
| Thermal Shock | <p>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.</p> <p>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.</p> | <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> <p>Steps 1 thru 5 constitute one complete cycle and the test shall consist of a total of 500 cycles.</p> | 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 | <p>Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value $\pm 15\%$</p> <p>Measurements shall be taken at 0 hours, 250 hours, 500 hours and 1,000 hours and shall meet the conditions stated above.</p> | <p>Temperature: 85°C $\pm 2^\circ\text{C}$ Relative Humidity: 85% Time: 1,000 hours total Apply: 100% rated current</p> | | | | | | | | | | | | | | | | | | |
| Life Test | <p>Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value $\pm 15\%$</p> <p>Measurements shall be taken at 0 hours, 250 hours, 500 hours and 1,000 hours and shall meet the conditions stated above.</p> | <p>Temperature: 85°C $\pm 2^\circ\text{C}$ Time: 1,000 hours total Apply: 100% rated current</p> | | | | | | | | | | | | | | | | | | |

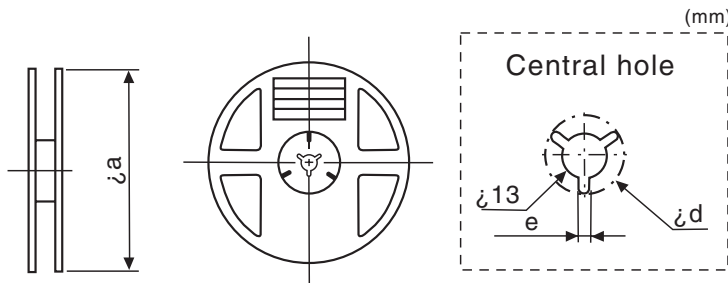
6. Dimensions - inches (mm)



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) |

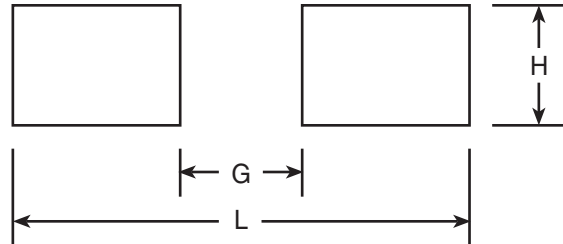
Dimensions - inches (mm)



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

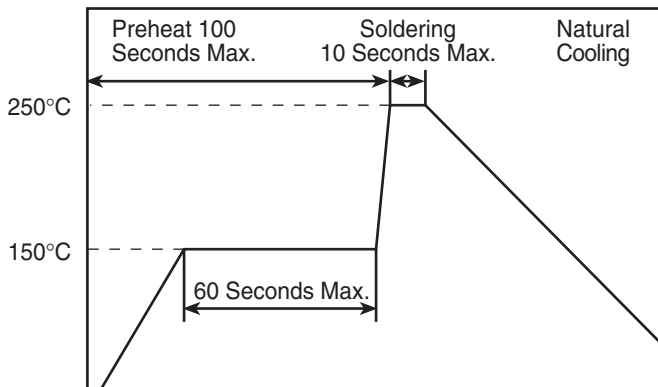
7. Recommended PC Board Land Patterns - mm (inches)

| 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

