

# Multi Layer Ferrite Power Beads

## Type CZP

ISO 9001:2000  
TS-16949

### 1. General

- Designed to reduce noise at high frequencies
- Standard EIA Packages: 1J, 2A, 2B
- Nickel barrier with solder overcoat for excellent solderability
- Magnetically shielded

### 2. Dimensions

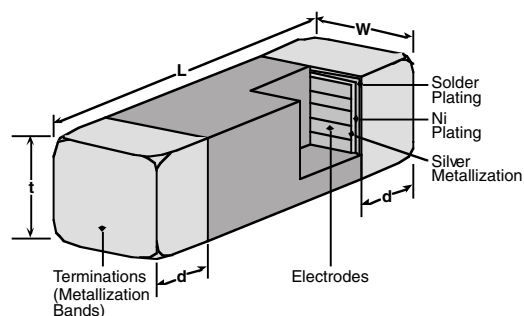


Table 1

| Dimensions - inches (mm)   |                            |                            |                            |                            |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Part                       | L                          | W                          | t                          | d                          |
| <b>1J</b><br><b>(0603)</b> | 0.063±0.006<br>(1.60±0.15) | 0.031±0.006<br>(0.80±0.15) | 0.031±0.006<br>(0.80±0.15) | 0.014±0.006<br>(0.36±0.15) |
| <b>2A</b><br><b>(0805)</b> | 0.079±0.008<br>(2.00±0.20) | 0.049±0.008<br>(1.25±0.20) | 0.035±0.008<br>(0.90±0.20) | 0.020±0.010<br>(0.51±0.25) |
| <b>2B</b><br><b>(1206)</b> | 0.126±0.008<br>(3.20±0.20) | 0.063±0.008<br>(1.60±0.20) | 0.043±0.008<br>(1.10±0.20) | 0.020±0.010<br>(0.51±0.25) |

### 3. Type Designation

The type designation shall be in the following form:

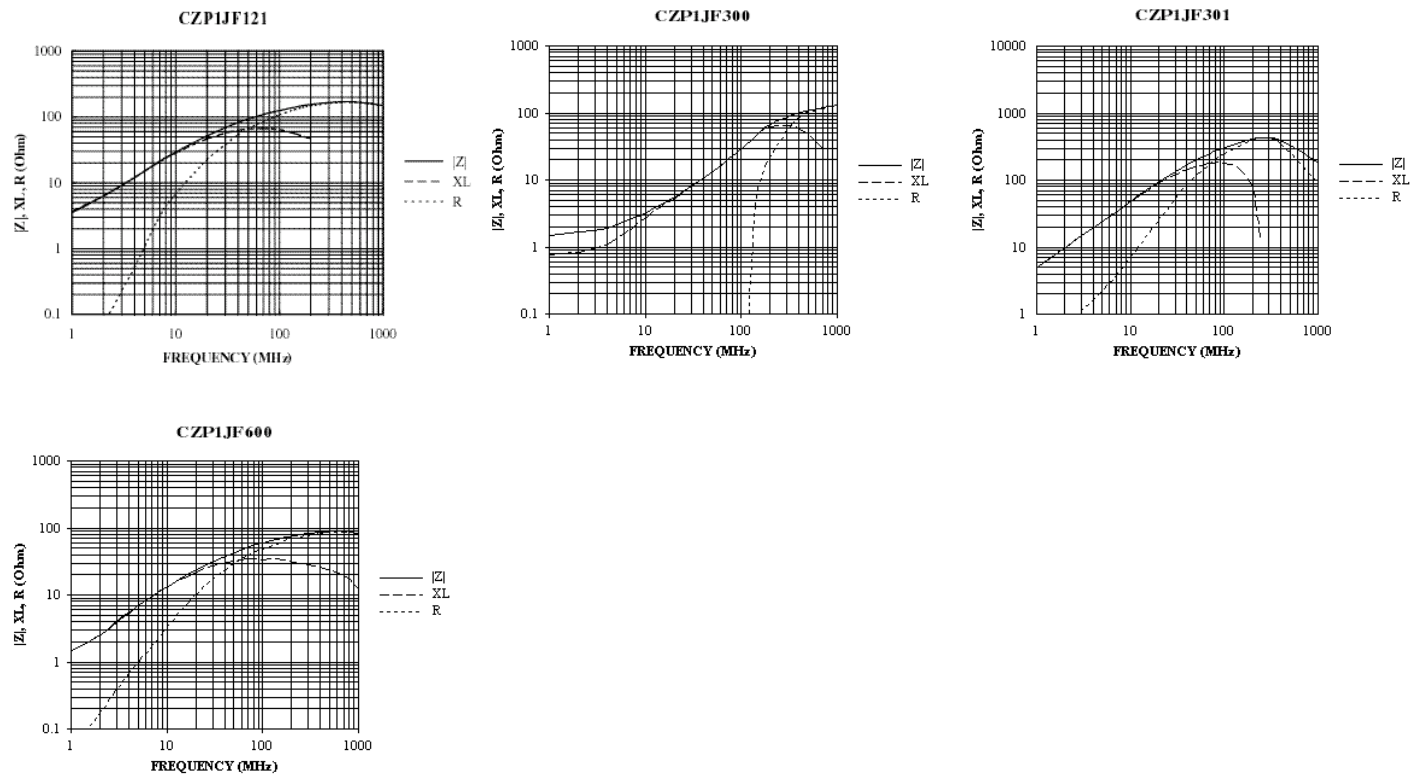
#### New Type

|            |                |                   |                                                                            |                                                                                                  |                                      |           |
|------------|----------------|-------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------|-----------|
| <b>CZP</b> | <b>2A</b>      | <b>F</b>          | <b>T</b>                                                                   | <b>TD</b>                                                                                        | <b>500</b>                           | <b>P</b>  |
| Type       | Size           | Permeability Code | Termination Material                                                       | Packaging                                                                                        | Impedence                            | Tolerance |
|            | 1J<br>2A<br>2B | F<br>P            | T: Sn<br>(Other termination styles available, contact factory for options) | TD: 7" Paper Tape<br>(1J, 2A: 4,000 pcs/reel)<br>TE: 7" Embossed Plastic<br>(2B: 3,000 pcs/reel) | 2 significant figures + 1 multiplier | P: ±25%   |

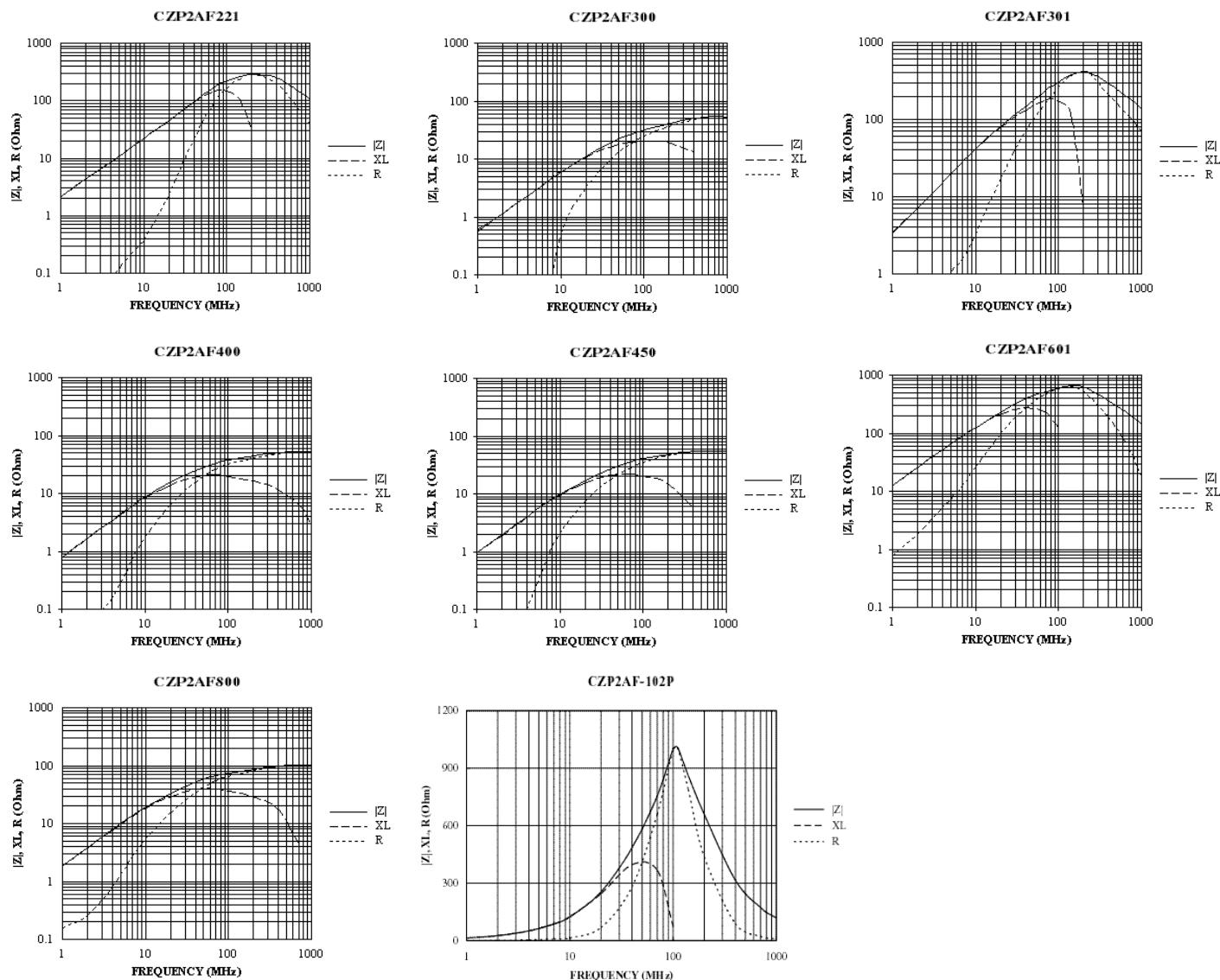
## 4. Standard Applications

| Part Designation | Impedance<br>@ 100MHz<br>( ) | DC Resistance<br>Maximum<br>( ) | Allowable<br>DC Current<br>Maximum<br>(mA) | Operating<br>Temperature<br>Range |
|------------------|------------------------------|---------------------------------|--------------------------------------------|-----------------------------------|
| CZP1JFTTD300P    | 30                           | 0.03                            | 3000                                       | -55°C to +125°C                   |
| CZP1JFTTD600P    | 60                           | 0.04                            |                                            |                                   |
| CZP1JFTTD121P    | 120                          | 0.10                            |                                            |                                   |
| CZP1JFTTD301P    | 300                          | 0.10                            |                                            |                                   |
| CZP2AFTTD300P    | 30                           | 0.015                           | 3000                                       | -55°C to +125°C                   |
| CZP2AFTTD400P    | 40                           | 0.03                            | 2000                                       |                                   |
| CZP2AFTTD450P    | 45                           |                                 |                                            |                                   |
| CZP2AFTTD600P    | 60                           | 0.025                           | 3000                                       |                                   |
| CZP2AFTTD800P    | 80                           | 0.04                            | 2000                                       |                                   |
| CZP2AFTTD221P    | 220                          | 0.05                            |                                            |                                   |
| CZP2AFTTD301P    | 300                          | 0.15                            | 1000                                       |                                   |
| CZP2AFTTD601P    | 600                          | 0.20                            |                                            |                                   |
| CZP2AFTTD102P    | 1000                         |                                 |                                            |                                   |
| CZP2BFTTE190P    | 19                           | 0.02                            | 3000                                       | -55°C to +125°C                   |
| CZP2BFTTE260P    | 26                           |                                 |                                            |                                   |
| CZP2BFTTE300P    | 30                           |                                 |                                            |                                   |
| CZP2BFTTE310P    | 31                           |                                 |                                            |                                   |
| CZP2BFTTE500P    | 50                           | 0.025                           |                                            |                                   |
| CZP2BFTTE650P    | 65                           | 0.03                            | 2000                                       |                                   |
| CZP2BFTTE700P    | 70                           |                                 |                                            |                                   |
| CZP2BFTTE800P    | 80                           |                                 |                                            |                                   |
| CZP2BFTTE900P    | 90                           | 0.10                            | 1000                                       |                                   |
| CZP2BFTTE101P    | 100                          |                                 |                                            |                                   |
| CZP2BFTTE121P    | 120                          |                                 |                                            |                                   |
| CZP2BPTTE700P    | 70                           | 0.20                            | 3000                                       |                                   |
| CZP2BFTTE601P    | 600                          |                                 | 1000                                       |                                   |
| CZP2BPTTE101P    | 100                          | 0.03                            | 3000                                       |                                   |
| CZP2BPTTE121P    | 120                          | 0.04                            |                                            |                                   |
| CZP2BPTTE601P    | 600                          | 0.10                            | 1500                                       |                                   |

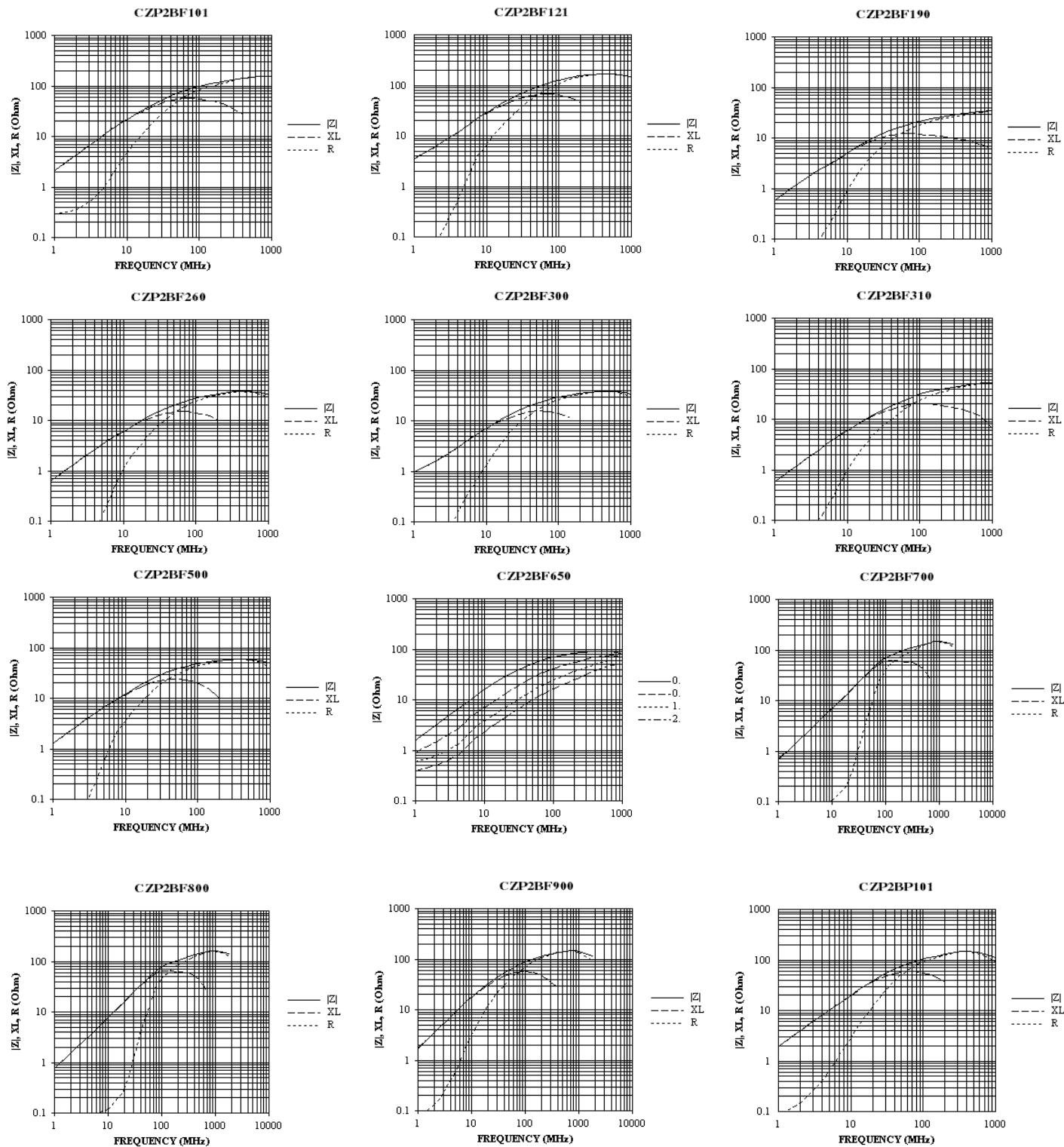
## 5. 0603 (1J) Graphs



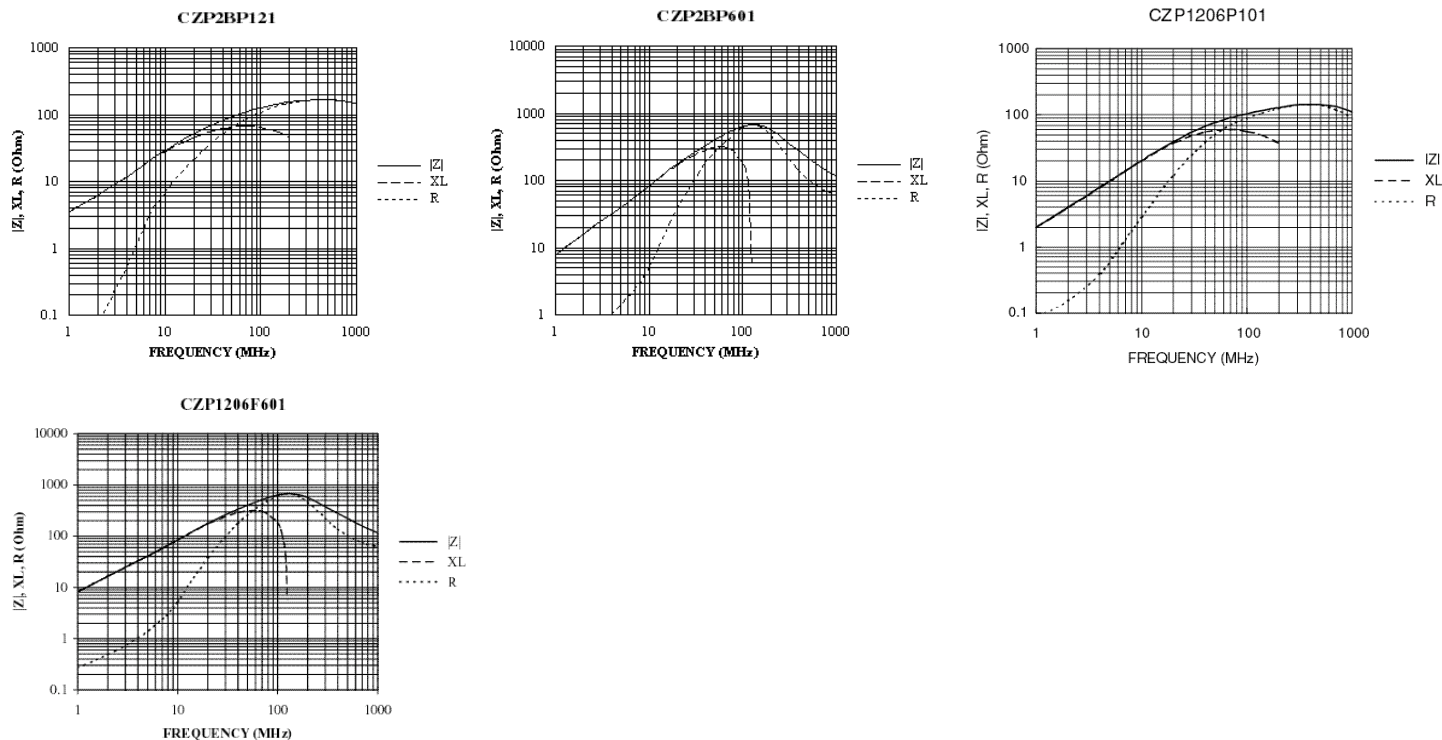
## 5. 0805 (2A) Graphs



## 5. 1206 (2B) Graphs



## 5. 1206 (2B)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 $\pm 20\%$ .<br><b>Appearance:</b> There shall be no cracking<br><b>Solder Coverage:</b> More than 75% of the terminal electrode shall be covered with solder. | <b>Flux:</b> 5-10 sec dip<br><b>After Flux:</b> Air dry for 15 sec<br><b>Preheat:</b> 150°C $\pm 10^\circ\text{C}$<br><b>Preheat Time:</b> 60 sec<br><b>Solder Temp:</b> 260°C $\pm 5^\circ\text{C}$<br><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<br><b>After Flux:</b> Air dry for 15 sec<br><b>Solder Temp:</b> 245°C $\pm 5^\circ\text{C}$<br><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).<br><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.<br><b>1) Flux:</b> 5-10 sec<br><b>2) After Flux:</b> Air dry for 15 sec<br><b>3) Solder Temp:</b> 230°C $\pm 5^\circ\text{C}$<br><b>4) Dip Time:</b> 5 $\pm 0.5$ sec<br><b>5) 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:<br><b>Washer:</b> Ultrasonic washer (100W)<br><b>Solvent:</b> Isopropyl alcohol<br><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> <tr> <th>Type</th><th>W(kgf)</th><th>Time</th></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> </table>                                                                                        | Type | W(kgf) | Time | 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                                                                                                                                                                                                                                                                                                                                                                                |      |        |      |    |     |                    |    |     |                    |    |     |                    |
| 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> <tr> <th>Type</th><th>W(kgf)</th><th>Time</th></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 | 1J | 1.4 | 60 sec             | 2A | 1.8 | 60 sec             | 2B | 2.3 | 60 sec             |
| Type                             | W(kgf)                                                                                                                                                                                                                   | Time                                                                                                                                                                                                                                                                                                                                                                                |      |        |      |    |     |                    |    |     |                    |    |     |                    |
| 1J                               | 1.4                                                                                                                                                                                                                      | 60 sec                                                                                                                                                                                                                                                                                                                                                                              |      |        |      |    |     |                    |    |     |                    |    |     |                    |
| 2A                               | 1.8                                                                                                                                                                                                                      | 60 sec                                                                                                                                                                                                                                                                                                                                                                              |      |        |      |    |     |                    |    |     |                    |    |     |                    |
| 2B                               | 2.3                                                                                                                                                                                                                      | 60 sec                                                                                                                                                                                                                                                                                                                                                                              |      |        |      |    |     |                    |    |     |                    |    |     |                    |
| Bending Strength                 | <b>Appearance:</b> There shall be no physical or mechanical damage.<br><b>Impedance:</b> Relative to initial value before test $\pm 10\%$ .                                                                              | <b>Board:</b> 90x40x1.6mm<br><b>Bend:</b> 1mm<br><b>Time:</b> 5 sec                                                                                                                                                                                                                                                                                                                 |      |        |      |    |     |                    |    |     |                    |    |     |                    |

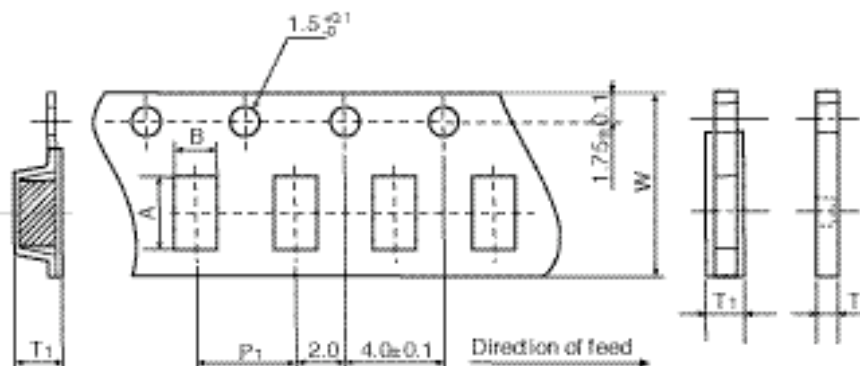
## 5. Characteristics (continued)

| Item             | Requirement                                                                                                                                                                                                                                                                                                                                                         | Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|------|---------|---------------------------------------------|-------|--------|---------------------------------------------|--------------------|------------|-------|--------------|--------|----------------------------------------------|--------------------|------------|-------|--------------|
| Mechanical Shock | <b>Appearance:</b> There shall be no physical or mechanical damage.<br><b>Impedance:</b> Relative to initial value before test $\pm 10\%$ .                                                                                                                                                                                                                         | <b>Force:</b> 50G<br><b>Time:</b> 11 msec<br>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).<br>Amplitude: 1.5mm<br>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.<br><b>Impedance:</b> Relative to initial value $\pm 20\%$ .<br><b>DCR:</b> The DCR shall not exceed initial specified value.<br><br>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><math>-40^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></td><td>_____</td></tr> <tr> <td>2-hold</td><td><math>-40^{\circ}\text{C} \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><math>+105^{\circ}\text{C} \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><br>Steps 1 thru 5 constitute one complete cycle and the test shall consist of a total of 500 cycles. | Step | Temperature | Time | 1-start | $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ | _____ | 2-hold | $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ | 30 min $\pm 5$ min | 3-transfer | _____ | 0.5 min max. | 4-hold | $+105^{\circ}\text{C} \pm 2^{\circ}\text{C}$ | 30 min $\pm 5$ min | 5-transfer | _____ | 0.5 min max. |
| Step             | Temperature                                                                                                                                                                                                                                                                                                                                                         | Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| 1-start          | $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                         | _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| 2-hold           | $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                         | 30 min $\pm 5$ min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| 3-transfer       | _____                                                                                                                                                                                                                                                                                                                                                               | 0.5 min max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| 4-hold           | $+105^{\circ}\text{C} \pm 2^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                        | 30 min $\pm 5$ min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| 5-transfer       | _____                                                                                                                                                                                                                                                                                                                                                               | 0.5 min max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| Load Humidity    | <b>Appearance:</b> There shall be no physical or mechanical damage.<br><b>Impedance:</b> Relative to initial value $\pm 15\%$ .<br><br>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> $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br><b>Relative Humidity:</b> 85%<br><b>Time:</b> 1,000 hours total<br><b>Apply:</b> 100% rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |
| Life Test        | <b>Appearance:</b> There shall be no physical or mechanical damage<br><b>Impedance:</b> Relative to initial value $\pm 15\%$<br><br>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> $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br><b>Time:</b> 1,000 hours total<br><b>Apply:</b> 100% rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |             |      |         |                                             |       |        |                                             |                    |            |       |              |        |                                              |                    |            |       |              |

## 6. Packaging Specifications

KOA's multilayer components are provided on tape-and-reel for use in pick-and-place machines. The reel size is 7 inch.

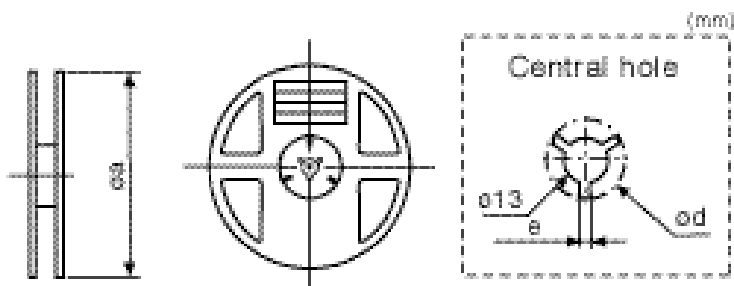
## 7. Dimensions - inches (mm)



Dimensions - inches (mm)

| Tape                     | A                        | B                        | W                        | P <sub>1</sub>           | T <sub>1</sub>           |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>1J</b><br><b>0603</b> | 0.075±0.002<br>(1.9±0.1) | 0.043±0.002<br>(1.1±0.1) | 0.318±0.002<br>(8.1±0.1) | 0.157±0.004<br>(4.0±0.1) | 0.043±0.002<br>(1.1±0.1) |
| <b>2A</b><br><b>0805</b> | 0.093±0.002<br>(2.4±0.1) | 0.063±0.002<br>(1.6±0.1) | 0.318±0.002<br>(8.1±0.1) | 0.157±0.004<br>(4.0±0.1) | 0.046±0.002<br>(1.2±0.1) |
| <b>2B</b><br><b>1206</b> | 0.138±0.002<br>(3.5±0.1) | 0.071±0.002<br>(1.8±0.1) | 0.318±0.002<br>(8.1±0.1) | 0.157±0.004<br>(4.0±0.1) | 0.071±0.002<br>(1.8±0.1) |

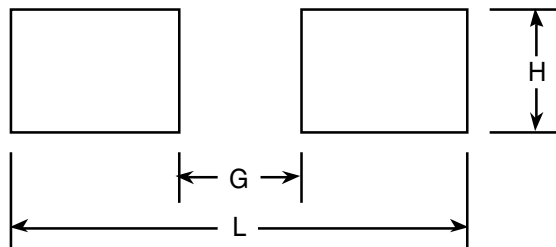
Dimensions - inches (mm)



| Tape                     | øa         | ød            | e              |
|--------------------------|------------|---------------|----------------|
| <b>1J</b><br><b>0603</b> | 7<br>(178) | 0.827<br>(21) | 0.079<br>(2.0) |
| <b>2A</b><br><b>0805</b> |            |               |                |
| <b>2B</b><br><b>1206</b> |            |               |                |

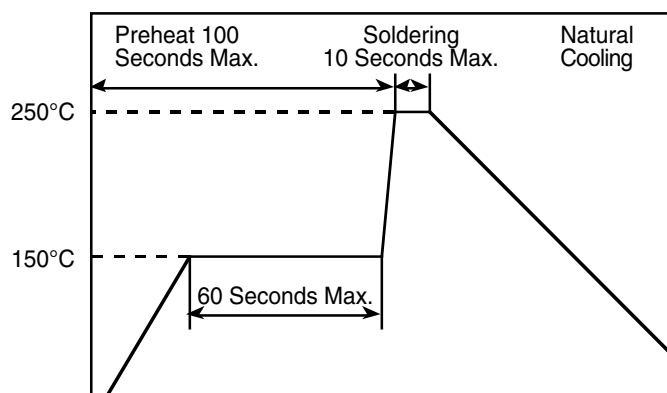
## 9. Recommended PC Board Land Patterns - mm (inches)

| Chip Size        | L           | G           | H           |
|------------------|-------------|-------------|-------------|
| <b>1J (0603)</b> | 2.6 (0.102) | 0.6 (0.023) | 0.8 (0.031) |
| <b>2A (0805)</b> | 3.0 (0.118) | 1.0 (0.039) | 1.0 (0.039) |
| <b>2B (1206)</b> | 4.4 (0.173) | 2.2 (0.087) | 1.4 (0.055) |



## 10. Recommended Temperature Profiles for Soldering

**Recommended Temperature Profile for Wave Soldering**



**Recommended Temperature Profile for Reflow Soldering**

