

Multilayer Ferrite Chip Bead Array Type FBA

ISO 9002 CERTIFIED

1. Scope of Application

Noise suppression in signal I/O lines and other circuits that require multiple chip beads for noise suppression.

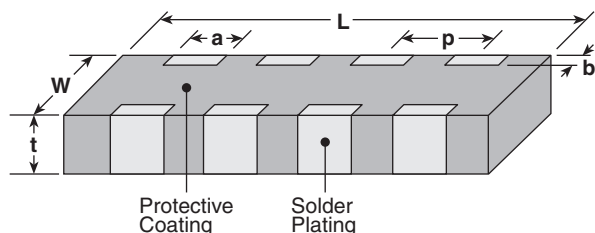
1.1 Applications

- Computers
- Telecommunications equipment
- Peripherals
- Data communications

2. Features

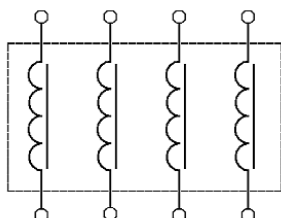
The Multilayer Ferrite Chip Bead Array retains all the features of Multilayer Ferrite Chip Beads. In addition, it provides multiple circuits in a single package, which reduce the required land space on PCB and reduce the cost for assembly.

3. Dimension and Structure

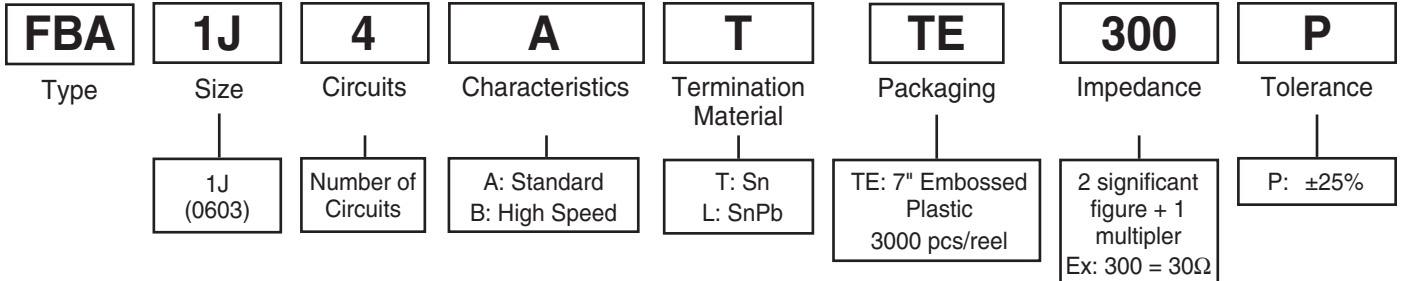


Type (Inch Size Code)	Dimensions inches (mm)					
	L	W	t	a	b	p
1J (0603)	.126±.008 (3.2±0.2)	.063±.008 (1.6±0.2)	.031±.008 (0.8±0.2)	.014±.008 (0.35±0.2)	.012±.008 (0.3±0.2)	.031±.008 (0.8±0.2)

3.1 Circuit



4. Ordering and Specifying Information*



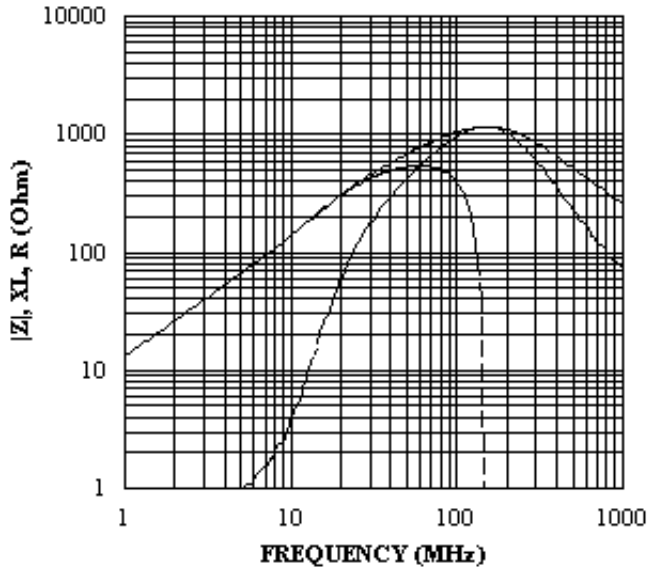
* Please note: KSE's part numbers do not contain any spaces or hyphens.

5. Standard Applications

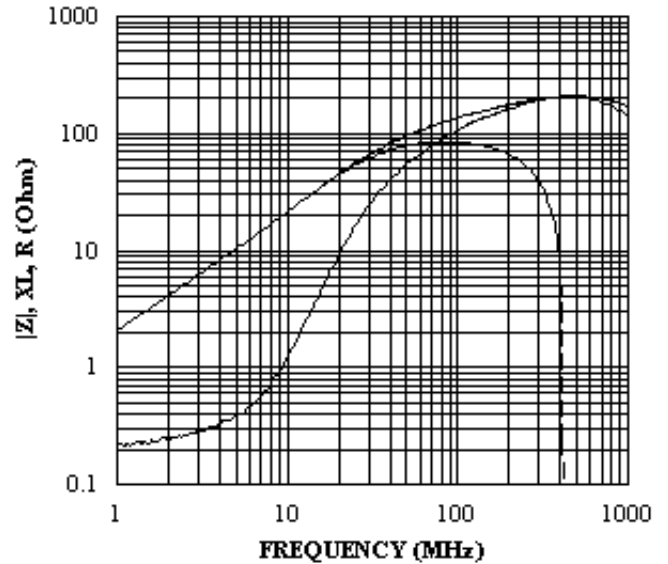
Ordering Code	Impedance @ 100MHz Ω	Maximum DC Resistance Ω	Allowable DC Current (mA)	Operating Temperature
FBA1J4ATE300P	30	0.1	200	-55°C to 125°C
FBA1J4ATE600P	60	0.25	400	
FBA1J4ATE121P	120	0.3	350	
FBA1J4ATE221P	220	0.3	250	
FBA1J4ATE301P	300	0.4	250	
FBA1J4ATE601P	600	0.5	100	
FBA1J4ATE102P	1,000	0.7	200	
FBA1J4BTE100P	10	0.15	200	
FBA1J4BTE220P	22	0.25	200	
FBA1J4BTE470P	47	0.3	150	
FBA1J4BTE600P	60	0.3	350	
FBA1J4BTE121P	120	0.5	100	
FBA1J4BTE221P	220	0.55	100	
FBA1J4BTE471P	470	0.55	100	
FBA1J4BTE601P	600	0.65	100	

6. Graphs*

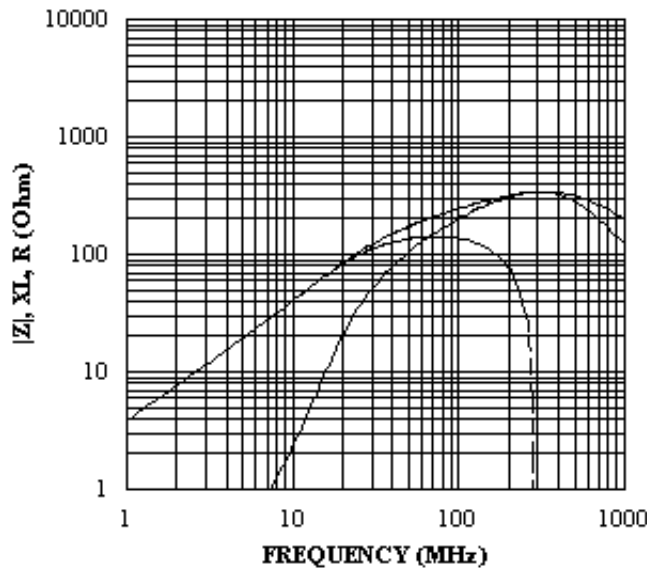
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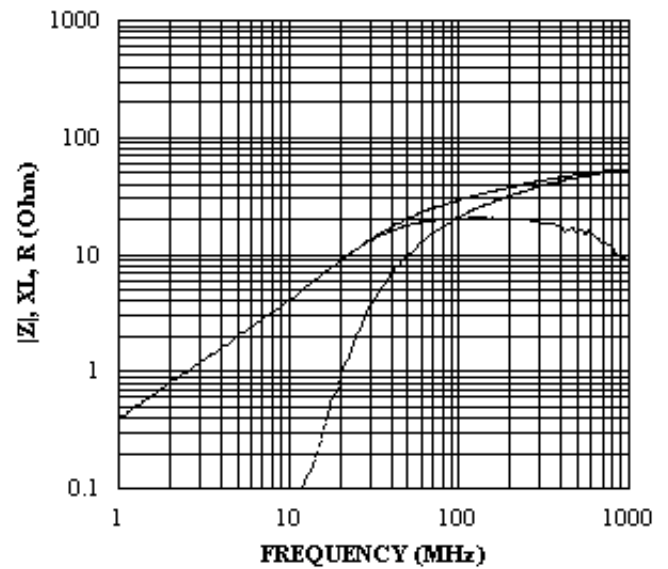
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FBA1J4A221P



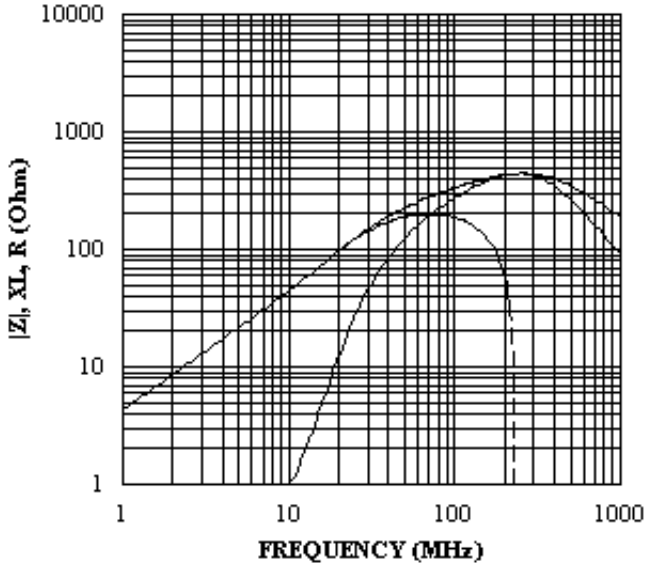
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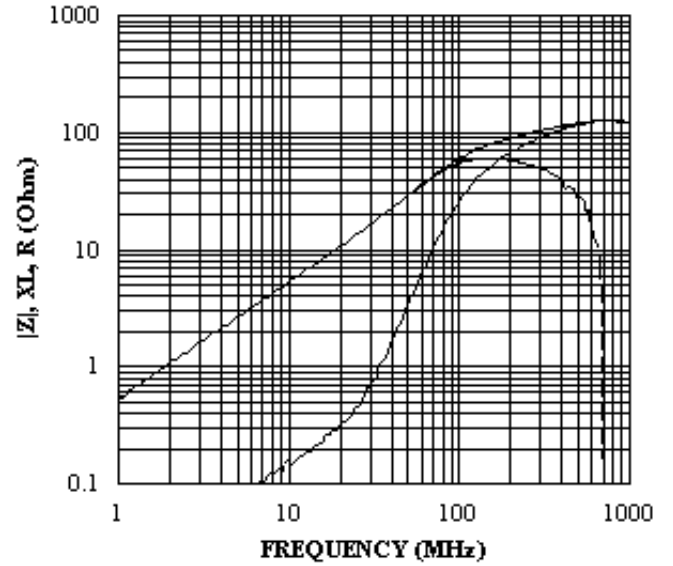
*
 — |Z|
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6. Graphs* (continued)

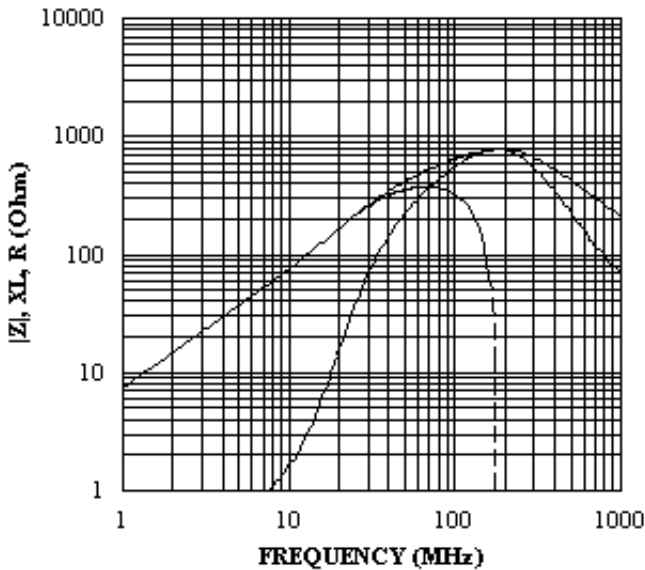
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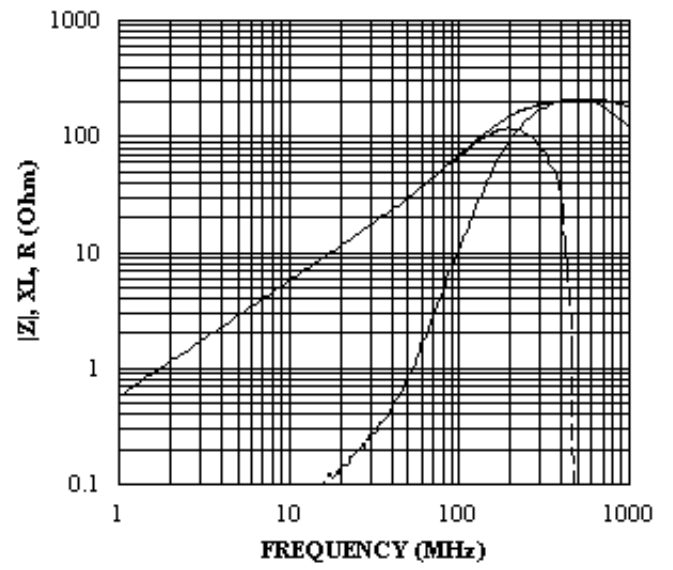
FBA1J4A600P



FBA1J4A601P



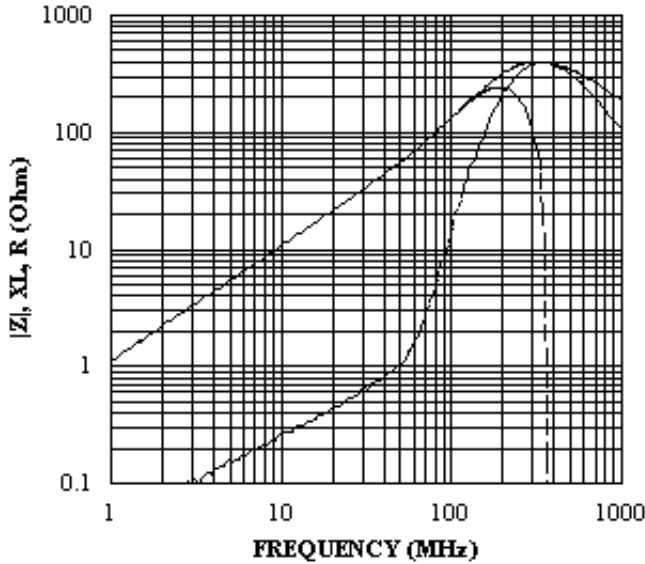
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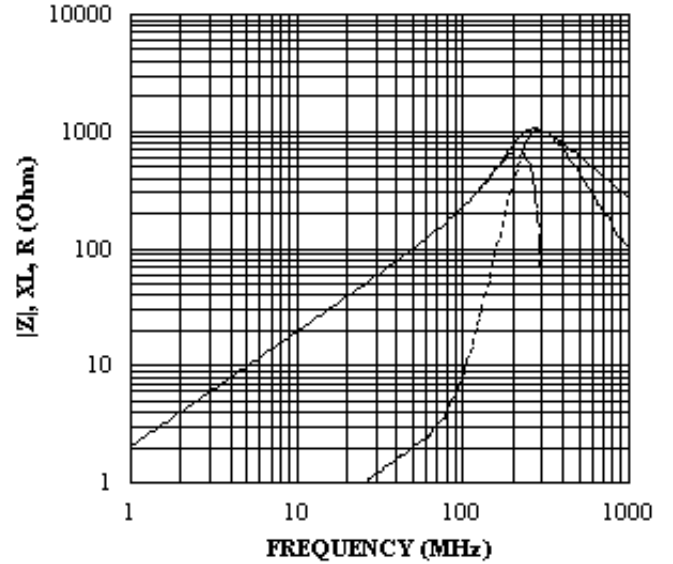
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6. Graphs* (continued)

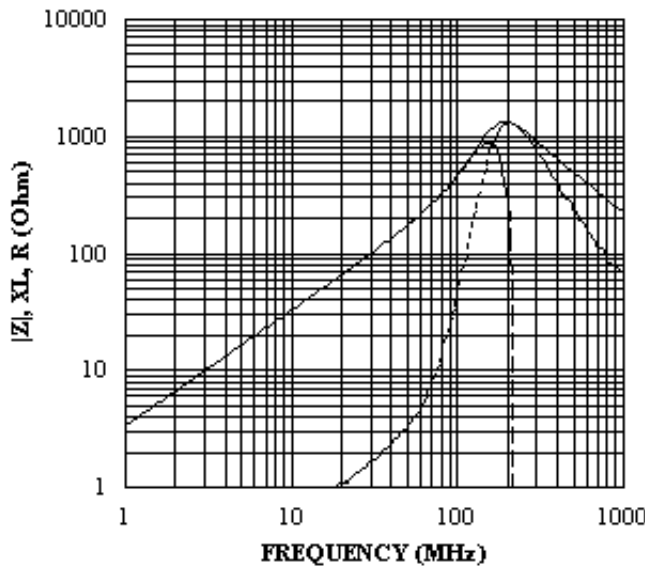
FBA1J4B121P



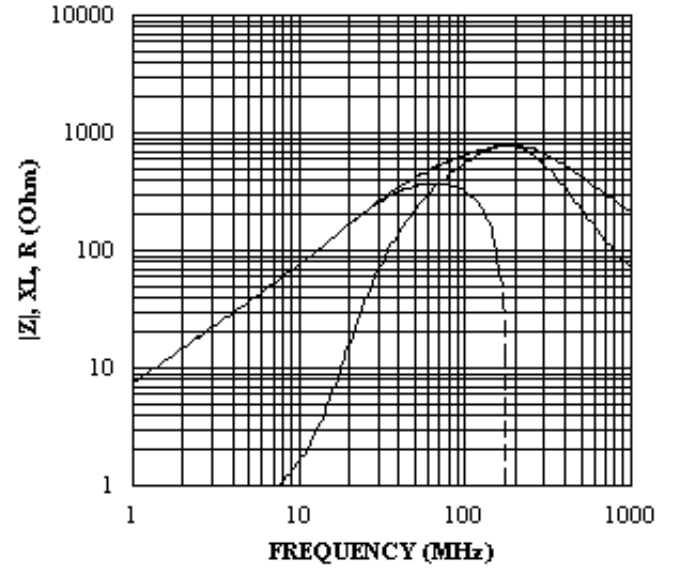
FBA1J4B221P



FBA1J4B471P



FBA1J4B601P



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6. Packaging Specifications

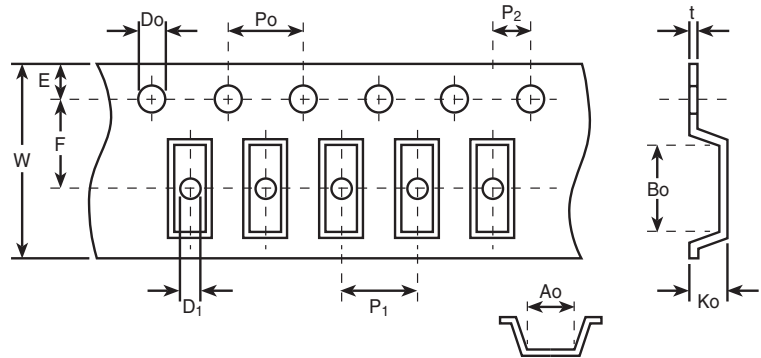
KOA's multilayer components are provided on tape-and-reel for use in pick-and-place machines. The reel size is 7 inch.

7. Dimensions - inches (mm)

Tape	Ao	Bo	Ko
1J4	0.071±0.002 (1.8±0.1)	0.138±0.002 (3.5±0.1)	0.048±0.002 (1.2±0.1)

Tape	E	F	W
1J4	0.069±0.004 (1.75±0.10)	0.138±0.002 (3.50±.005)	0.318±0.002 (8.1±0.1)

Tape	P ₁	P ₀	P ₂	Do	D ₁	t
1J4	0.157±0.004 (4.0±0.1)	0.157±0.004 (4.0±0.1)	0.079±0.002 (2.00±0.05)	0.059±0.004 (1.5+0.1/-0.0)	0.039 min. (1.0 min.)	0.009±0.001 (0.23±0.02)



8. Chip Quantities Per Reel

Chip Size	Parts on 7 inch (178mm) Reel
1J4	3,000

9. 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 ±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 ±10°C Preheat Time: 60 sec Solder Temp: 260°C ±5°C Dip Time: 10 ±1 sec

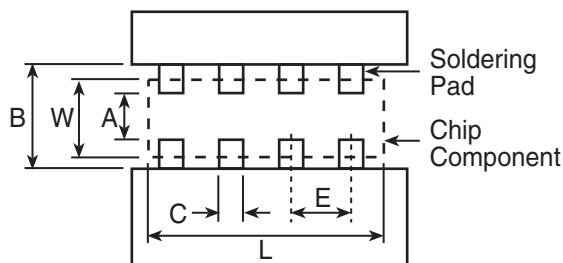
9. Characteristics (continued)

Item	Requirement	Conditions						
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 ±5°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 ±5°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 ±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>1206</td> <td>1.5</td> <td>30 sec ±2 sec</td> </tr> </tbody> </table>	Type	W(kgf)	Time	1206	1.5	30 sec ±2 sec
Type	W(kgf)	Time						
1206	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>1206</td> <td>2.3</td> <td>60 sec</td> </tr> </tbody> </table>	Type	W(kgf)	Time	1206	2.3	60 sec
Type	W(kgf)	Time						
1206	2.3	60 sec						
Bending Strength	Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value before test ±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 ±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 ±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).						

9. Characteristics (continued)

Item	Requirement	Conditions																		
Thermal Shock	<p>Appearance: There shall be no physical or mechanical damage.</p> <p>Impedance: Relative to initial value $\pm 20\%$.</p> <p>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>$-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td> <td>—</td> </tr> <tr> <td>2-hold</td> <td>$-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$</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>$+105^{\circ}\text{C} \pm 2^{\circ}\text{C}$</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	$-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$	—	2-hold	$-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 min ± 5 min	3-transfer	—	0.5 min max.	4-hold	$+105^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 min ± 5 min	5-transfer	—	0.5 min max.
Step	Temperature	Time																		
1-start	$-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$	—																		
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3-transfer	—	0.5 min max.																		
4-hold	$+105^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 min ± 5 min																		
5-transfer	—	0.5 min max.																		
Load Humidity	<p>Appearance: There shall be no physical or mechanical damage</p> <p>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: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$</p> <p>Relative Humidity: 85%</p> <p>Time: 1,000 hours total</p> <p>Apply: 100% rated current</p>																		
Life Test	<p>Appearance: There shall be no physical or mechanical damage</p> <p>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: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$</p> <p>Time: 1,000 hours total</p> <p>Apply: 100% rated current</p>																		

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



Chip Size	Component Size		A	B	C	E
	L	W				
1206 (3216)	.126 (3.2)	.063 (1.6)	.030 (0.762)	.120 (3.048)	.016 (0.406)	.031 (0.787)