

Multi Layer Ferrite Chip Beads

ISO 9002

Type MCB

1. General

- Designed to reduce noise at high frequencies
- Standard EIA Packages: 0402, 0603, 0805, 1206
- Nickel barrier with solder overcoat for excellent solderability
- Magnetically shielded

2. 2.1 Dimensions

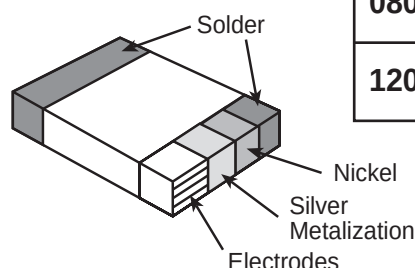
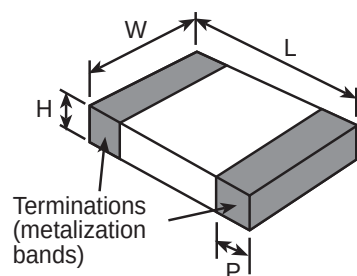


Table 1

Dimensions - inches (mm)				
Part	L	W	H	P
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)
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)
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)
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. Ordering and Specifying Information*

MCB	0603	G	TE	500	J
Type	Size	Material	Packaging	Impedance	Tolerance
	0402 0603 0805 1206	Permagility Code: F G S L P	TE: 7" Embossed Plastic TED: 13" Embossed Plastic None: Bulk	2 Significant Figure + 1 Multiplier Example: 500 = 50Ω	J:±5% K:±10% M:±20% P:±25%

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

PAGE 1 OF 8

4. Standard Applications

Ordering Code	Impedance @ 100MHz Ω	Maximum DC Resistance Ω	Allowable DC Current (mA)	Operating Temperature
MCB0402GTE100*	10	0.05	500	
MCB0402GTE150*	15	0.07	300	
MCB0402GTE700*	70	0.4	200	
MCB0402GTE121*	120	0.5	200	
MCB0402GTE221*	220	0.7	100	
MCB0402GTE601*	600	1.1	50	
MCB0402GTE102*	1000	1.5	50	
MCB0603GTE300*	30	0.1	400	-55°C to 125°C
MCB0603GTE400*	40	0.1	400	
MCB0603GTE600*	60	0.2	300	
MCB0603GTE750*	75	0.2	300	
MCB0603GTE800*	80	0.2	300	
MCB0603GTE900*	90	0.3	250	
MCB0603GTE101*	100	0.3	250	
MCB0603GTE121*	120	0.3	250	
MCB0603GTE141*	140	0.3	250	
MCB0603GTE151*	150	0.3	250	
MCB0603GTE181*	180	0.3	250	
MCB0603GTE221*	220	0.3	250	
MCB0603GTE301*	300	0.35	230	
MCB0603GTE421*	420	0.4	210	
MCB0603GTE601*	600	0.5	200	
MCB0603GTE102*	1,000	0.6	190	
MCB0603STE601*	600	0.65	200	
MCB0805FTE050*	5	0.07	600	
MCB0805FTE070*	7	0.1	600	
MCB0805FTE100*	10	0.1	600	
MCB0805FTE110*	11	0.1	600	
MCB0805FTE170*	17	0.1	600	

Under Development-Fall 2001 Release

TE: Embossed Plastic * Add Tolerance Character (J, K, M, P)

PAGE 2 OF 8

4. Standard Applications (continued)

Ordering Code	Impedance @ 100MHz Ω	Maximum DC Resistance Ω	Allowable DC Current (mA)	Operating Temperature
MCB0805FTE300*	30	0.1	600	-55°C to 125°C
MCB0805FTE400*	40	0.1	600	
MCB0805FTE500*	50	0.1	600	
MCB0805FTE600*	60	0.1	600	
MCB0805FTE750*	75	0.2	400	
MCB0805FTE800*	80	0.2	400	
MCB0805GTE900*	90	0.2	400	
MCB0805GTE101*	100	0.2	400	
MCB0805GTE121*	120	0.2	200	
MCB0805GTE151*	150	0.3	200	
MCB0805GTE181*	180	0.3	200	
MCB0805GTE201*	200	0.3	200	
MCB0805GTE301*	300	0.3	200	
MCB0805GTE401*	400	0.3	200	
MCB0805GTE421*	420	0.3	200	
MCB0805GTE601*	600	0.3	200	
MCB0805GTE751*	750	0.4	200	
MCB0805GTE102*	1,000	0.4	200	
MCB1206FTE190*	19	0.1	600	
MCB1206FTE260*	26	0.1	600	
MCB1206FTE300*	30	0.1	600	
MCB1206FTE310*	31	0.1	600	
MCB1206FTE500*	50	0.1	600	
MCB1206FTE600*	60	0.1	600	
MCB1206FTE700*	70	0.15	200	
MCB1206FTE800*	80	0.2	400	
MCB1206FTE900*	90	0.2	400	
MCB1206FTE101*	100	0.2	400	
MCB1206FTE121*	120	0.2	300	

TE: Embossed Plastic * Add Tolerance Character (J, K, M, P)

PAGE 3 OF 8

4. Standard Applications (continued)

Ordering Code	Impedance @ 100MHz Ω	Maximum DC Resistance Ω	Allowable DC Current (mA)	Operating Temperature
MCB1206FTE201*	200	0.3	300	-55°C to 125°C
MCB1206FTE301*	300	0.4	300	
MCB1206FTE601*	600	0.5	200	
MCB1206GTE102*	1,000	0.7	150	
MCB1206GTE152*	1,500	0.9	100	

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	

5. Characteristics (continued)

Item	Requirement	Conditions																		
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>0402</td><td></td><td>N/A</td></tr> <tr> <td>0603</td><td>0.5</td><td>30 sec ± 2 sec</td></tr> <tr> <td>0805</td><td>1.0</td><td>30 sec ± 2 sec</td></tr> <tr> <td>1206</td><td>1.5</td><td>30 sec ± 2 sec</td></tr> </table>	Type	W(kgf)	Time	0402		N/A	0603	0.5	30 sec ± 2 sec	0805	1.0	30 sec ± 2 sec	1206	1.5	30 sec ± 2 sec			
Type	W(kgf)	Time																		
0402		N/A																		
0603	0.5	30 sec ± 2 sec																		
0805	1.0	30 sec ± 2 sec																		
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> <tr> <th>Type</th><th>W(kgf)</th><th>Time</th></tr> <tr> <td>0402</td><td></td><td>N/A</td></tr> <tr> <td>0603</td><td>1.4</td><td>60 sec</td></tr> <tr> <td>0805</td><td>1.8</td><td>60 sec</td></tr> <tr> <td>1206</td><td>2.3</td><td>60 sec</td></tr> </table>	Type	W(kgf)	Time	0402		N/A	0603	1.4	60 sec	0805	1.8	60 sec	1206	2.3	60 sec			
Type	W(kgf)	Time																		
0402		N/A																		
0603	1.4	60 sec																		
0805	1.8	60 sec																		
1206	2.3	60 sec																		
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> <tr> <th>Step</th><th>Temperature</th><th>Time</th></tr> <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> </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.																		

5. Characteristics (continued)

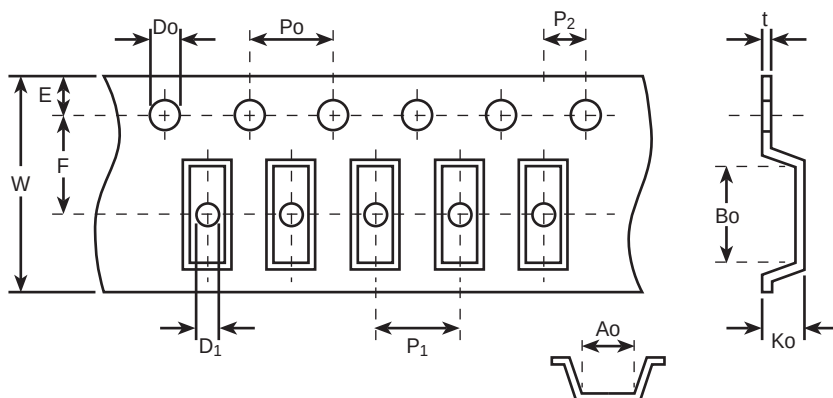
Item	Requirement	Conditions
Load Humidity	Appearance: There shall be no physical or mechanical damage Impedance: Relative to initial value $\pm 15\%$ Measurements shall be taken at 0 hours, 250 hours, 500 hours and 1,000 hours and shall meet the conditions stated above.	Temperature: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 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: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Time: 1,000 hours total Apply: 100% rated current

6. Packaging Specifications

KOA's multilayer components are provided on tape-and-reel for use in pick-and-place machines or in bulk for special applications. Both tape-and-reel and bulk products are sealed in plastic bags with desiccant. The reel size can be 7 inch or 13 inch, depending on customers' preference.

7. Dimensions - inches (mm)

Tape	Ao	Bo	Ko
0402 (1005)	0.026 $\pm$ 0.004 (0.65 $\pm$ 0.1)	0.045 $\pm$ 0.004 (1.15 $\pm$ 0.1)	0.031 $\pm$ 0.004 (0.8 $\pm$ 0.1)
0603 (1608)	0.043 $\pm$ 0.002 (1.1 $\pm$ 0.1)	0.075 $\pm$ 0.002 (1.9 $\pm$ 0.1)	0.043 $\pm$ 0.002 (1.1 $\pm$ 0.1)
0805 (2012)	0.063 $\pm$ 0.002 (1.6 $\pm$ 0.1)	0.093 $\pm$ 0.002 (2.4 $\pm$ 0.1)	0.046 $\pm$ 0.002 (1.2 $\pm$ 0.1)
1206 (3216)	0.071 $\pm$ 0.002 (1.8 $\pm$ 0.1)	0.138 $\pm$ 0.002 (3.5 $\pm$ 0.1)	0.048 $\pm$ 0.002 (1.2 $\pm$ 0.1)



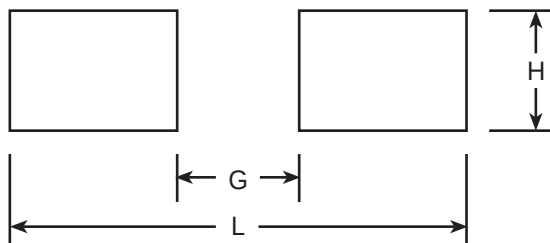
Tape	E	F	W	P ₁	P ₀	P ₂	Do	D ₁	t
0402 (1005)	0.069±0.004 (1.75±0.10)	0.138±0.002 (3.50±.005)	0.318±0.002 (8.1±0.1)	0.079±0.004 (2.0±0.1)	0.157±0.004 (4.0±0.1)	0.040±0.002 (1.0±0.05)	0.059±0.004 (1.5+0.1/-0.0)	N/A	0.009±0.001 (0.23±0.02)
0603 (1608)				0.157±0.004 (4.0±0.1)		0.079±0.002 (2.00±0.05)		0.039 min. (1.0 min.)	
0805 (2012)									
1206 (3216)									

8. Chip Quantities Per Reel

Chip Size	Parts on 7 inch (178mm) Reel	Parts on 13 inch (330mm) Reel
0402 (1005)	10,000	N/A
0603 (1608)	4,000	12,000
0805 (2012)	3,000	10,000
1206 (3216)	3,000	10,000

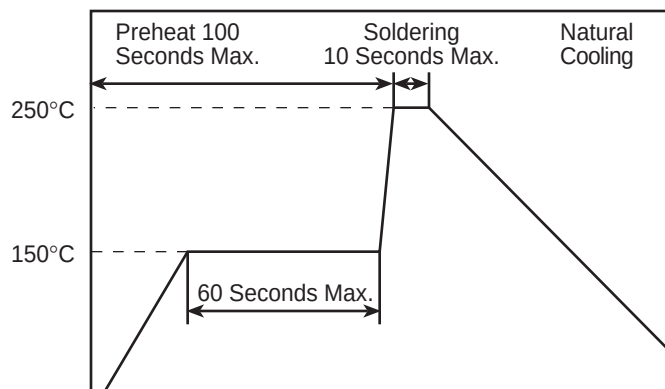
9. Recommended PC Board Land Patterns - mm (inches)

Chip Size	L	G	H
0402 (1005)	1.3 (0.051)	0.4 (0.016)	0.5 (0.020)
0603 (1608)	2.6 (0.102)	0.6 (0.023)	0.8 (0.031)
0805 (2012)	3.0 (0.118)	1.0 (0.039)	1.0 (0.039)
1206 (3216)	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**

