

MULTILAYER CERAMIC CAPACITORS

Low Inductance Series



1. DESCRIPTION

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used.

The total inductance of MLCC is determined by its length to width ratio and by the mutual inductance coupling between its electrodes. The positioning of end terminations is along the length of MLCC to reduce ESR and ESL characteristics of component over conventional products.

2. FEATURES

- Standard size with thin thickness.
- Small size with high capacitance.
- Capacitor with lead-free termination (pure Tin).
- MLCC with low ESL performance.

3. APPLICATIONS

- IC decoupling.
- High-speed microprocessors.
- High frequency digital equipments.

4. HOW TO ORDER

<u>0612</u>	<u>B</u>	<u>103</u>	<u>K</u>	<u>500</u>	<u>C</u>	<u>T</u>
<u>Size</u>	<u>Dielectric</u>	<u>Capacitance</u>	<u>Tolerance</u>	<u>Rated voltage</u>	<u>Termination</u>	<u>Packaging</u>
Inch (mm) 0612 (1632)	B=X7R	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 103=10x10 ³ =10nF	K=±10% M=±20%	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 500=50x10 ⁰ =50VDC	C=Cu/Ni/Sn	T=7" reeled

5. EXTERNAL DIMENSIONS

<u>Size</u> <u>Inch (mm)</u>	<u>L (mm)</u>	<u>W (mm)</u>	<u>T (mm)/Symbol</u>	<u>T_a min. (mm)</u>	<u>T_b min. (mm)</u>
0612 (1632)	3.20±0.15	1.60±0.15	0.80±0.10 B	0.5	0.13

* Reflow soldering process only is recommended.

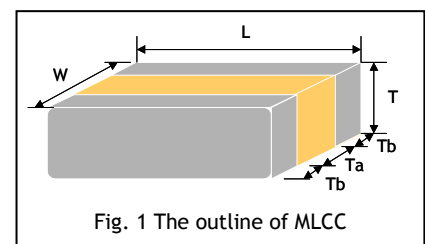


Fig. 1 The outline of MLCC

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6. GENERAL ELECTRICAL DATA

Dielectric	X7R
Size	0612
Capacitance range*	10nF to 150nF
Capacitance tolerance**	K ($\pm 10\%$), M ($\pm 20\%$)
Rated voltage (WVDC)	50V
Tan δ^*	$\leq 2.5\%$
Insulation resistance at Ur	$\geq 10G\Omega$ or $RxC \geq 500\Omega \times F$ whichever is less
Operating temperature	-55 to +125°C
Capacitance characteristic	$\pm 15\%$
Termination	Ni/Sn (lead-free termination)
ESL	500pH

* Measured at $1.0 \pm 0.2V_{rms}$, $1.0kHz \pm 10\%$, 30-70% related humidity, 25°C ambient temperature.

** Preconditioning for Class II MLCC: Perform a heat treatment at $150 \pm 10^\circ C$ for 1 hour, then leave in ambient condition for 24 ± 2 hours before measurement.

7. CAPACITANCE RANGE

DIELECTRIC		X7R
SIZE		0612
RATED VOLTAGE (VDC)		50
Capacitance	10nF (103)	B
	12nF (123)	B
	15nF (153)	B
	18nF (183)	B
	22nF (223)	B
	27nF (273)	B
	33nF (333)	B
	39nF (393)	B
	47nF (473)	B
	56nF (563)	B
	68nF (683)	B
	82nF (823)	B
	100nF (104)	B
	120nF (124)	B
	150nF (154)	B

1. The letter in cell is expressed the symbol of product thickness.

8. PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7" reel / Paper tape
0612 (1632)	0.80 \pm 0.10	B	4k

Unit: pieces

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9. APPENDIXES

■ Tape & reel dimensions

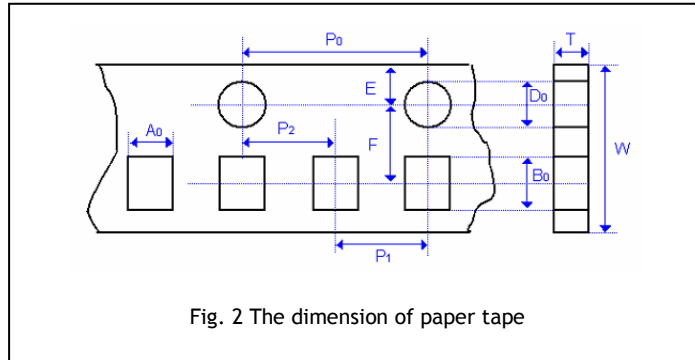


Fig. 2 The dimension of paper tape

Size	0612
Thickness	B
A ₀	2.00±0.10
B ₀	3.50±0.10
T	0.95±0.05
K ₀	-
W	8.00±0.10
P ₀	4.00±0.10
10xP ₀	40.0±0.10
P ₁	4.00±0.10
P ₂	2.00±0.05
D ₀	1.50±0.05
D ₁	-
E	1.75±0.10
F	3.50±0.05

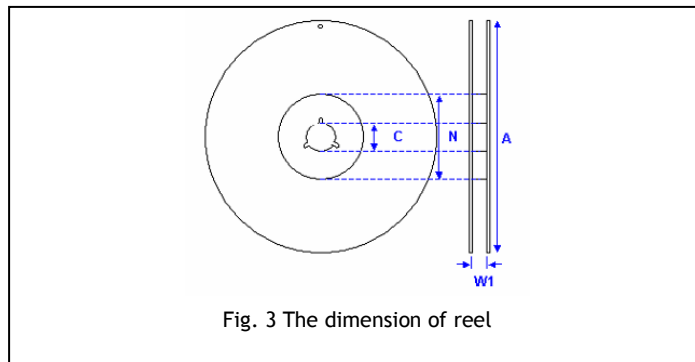
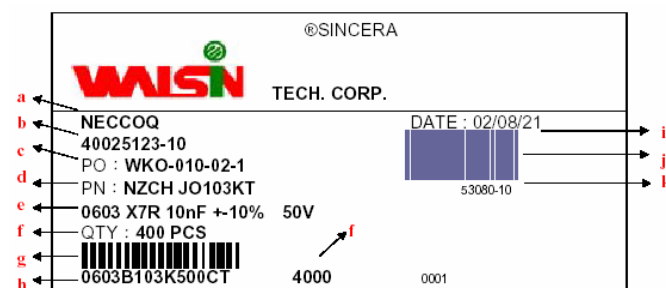


Fig. 3 The dimension of reel

Size	1206
Reel size	7"
C	13.0+0.5/-0.2
W ₁	8.4+1.5/-0
A	178.0±0.10
N	60.5±1.0

■ Description of customer label



- Customer name
- WTC order series and item number
- Customer P/O
- Customer P/N
- Description of product
- Quantity
- Bar code including quantity & WTC P/N or customer
- WTC P/N
- Shipping date
- Order bar code including series and item numbers
- Serial number of label

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Constructions

No.	Name		X7R
①	Ceramic material		BaTiO ₃ based
②	Inner electrode		AgPd alloy or Ni
③	Termination	Inner layer	Ag or Cu
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

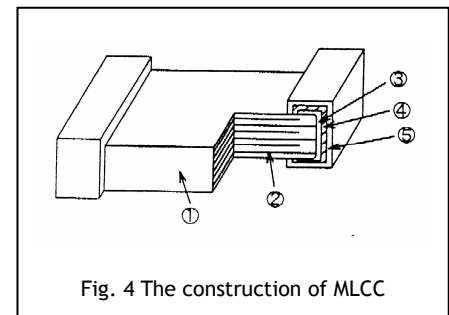


Fig. 4 The construction of MLCC

Storage and handling conditions

- (1) To store products at 5 to 40°C ambient temperature and 20 to 70% related humidity conditions.
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

- a. Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidation of electrode, which easily be resulted in poor soldering.
- b. To store products on the shelf and avoid exposure to moisture.
- c. Don't expose products to excessive shock, vibration, direct sunlight and so on.

Recommended soldering conditions

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N₂ within oven are recommended.

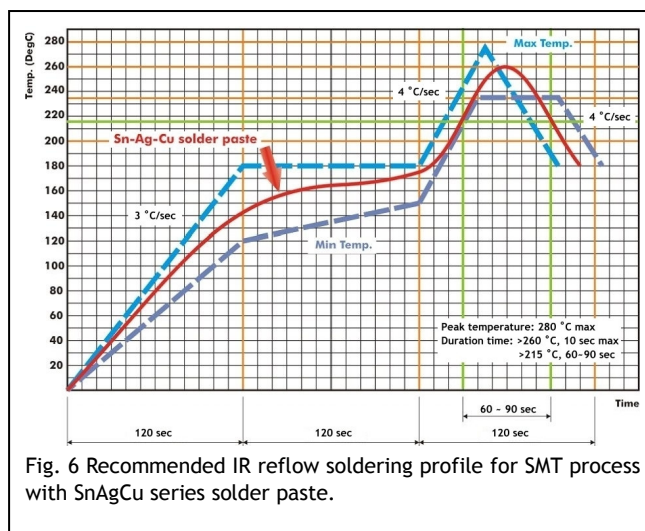


Fig. 6 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

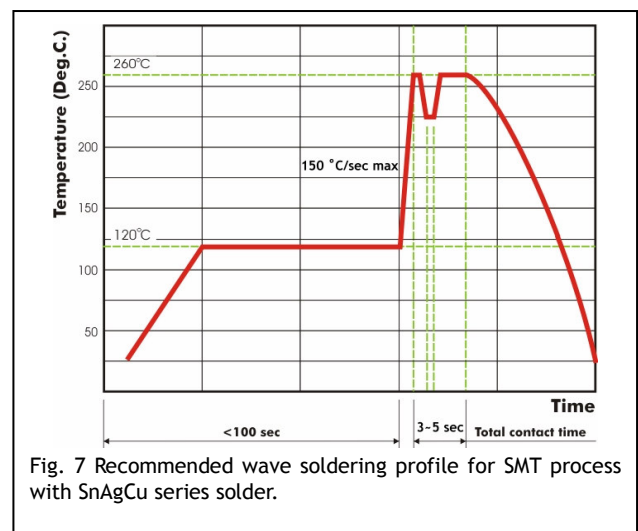


Fig. 7 Recommended wave soldering profile for SMT process with SnAgCu series solder.