MULTILAYER CERAMIC CAPACITORS

Safety Certified X2/Y3 Series (S3)

1. INTRODUCTION

WTC middle and high voltage series MLCC is designed by a special internal electrode pattern, which can reduce voltage concentrations by distributing voltage gradients throughout the entire capacitor. This special design also affords increased capacitance values in a given case size and voltage rating.

WTC S3 series MLCCs are designed for AC surge and lightning protection in line-to-ground interface. WTC's S3 (X2/Y3) series MLCC offering includes two standard case sizes and NP0 and X7R dielectric materials.

2. FEATURES

a. High voltage in a given case size.
b. High stability and reliability.
c. RoHS compliant.

3. APPLICATIONS

a. Computer networks.
b. Modems.
c. Facsimile.

4. HOW TO ORDER

S3	42	N	100	J	202	L	T
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
S3=X2/Y3	**42**=1808 (4520) **43**=1812 (4532)	**N**=NP0 (C0H) **B**=X7R	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: R47=0.47pF 0R5=0.5pF 1R0=1.0pF 100=10x10^0 =10pF	**J**=±5% **K**=±10% **M**=±20%	Two significant digits followed by no. of zeros. And R is in place of decimal point. **202**=2000 VDC **302**=3000 VDC	**L**=Ag/Ni/Sn	**T**=7" reeled

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		M_B (mm)
1808 (4520)	4.50+0.5/-0.3	2.03±0.25	1.25±0.10	D	0.50±0.25
			2.00±0.20	K	
1812 (4532)	4.50+0.5/-0.3	3.20±0.30	1.25±0.10	D	0.50±0.25
			2.00±0.20	K	

Remark: Reflow soldering only is recommended.

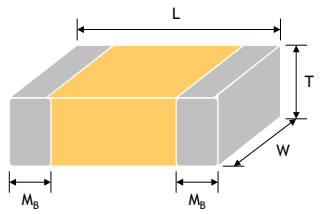

Fig. 1 The outline of MLCC

6. GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	1808, 1812	
Capacitance*	3.9pF to 1000pF	150pF to 4700pF
Capacitance tolerance	J (±5%), K (±10%)	K (±10%), M (±20%)
Rated voltage (WVDC)	2000V, 3000V	
Rated voltage (WVAC)	250Vrms	
Q/Tan δ*	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	Tan δ≤2.5%
Insulation resistance at Ur**	≥10GΩ	
Dielectric withstanding strength	1500VAC	
Peak impulse voltage (X2)	2500VAC	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±60ppm	±15%
Termination	Ni/Sn (lead-free termination)	
Certified number	TUV: R50021351 UL: E250427	
Test standard	EN 132400, 1994+A2+A3+A4; IEC 60384-14, 1993+A1, Class X2Y3 EN 60950, Third Edition (2000)	

* Measured at the conditions of 25°C ambient temperature and 30~70% related humidity. Apply 1.0±0.2Vrms, 1.0MHz±10% for NP0 and 1.0±0.2Vrms, 1.0kHz±10% for X7R.

** Measured at 500VDC for 60 sec. for Ur>500VDC.

7. CAPACITANCE RANGE

7-1 NP0 Dielectric

DIELECTRIC		NP0			
SIZE		1808		1812	
RATED VOLTAGE (VDC)		2000	3000	2000	3000
Capacitance	3.9pF (3R9)		D*		
	4.7pF (4R7)		D*		
	5.0pF (5R0)		D*		
	5.6pF (5R6)		D*		
	6.8pF (6R8)		D*		
	8.2pF (8R2)		D*		
	10pF (100)	D	D	D*	D*
	12pF (120)	D	D	D	D
	15pF (150)	D	D	D	D
	18pF (180)	D	D	D	D
	22pF (220)	D	D	D	D
	27pF (270)	D	D	D	D
	33pF (330)	D	D	D	D
	39pF (390)	D	D	D	D
	47pF (470)	D	D	D	D
	56pF (560)	D	D	D	D
	68pF (680)	D	D	D	D
	82pF (820)	D	D	D	D
	100pF (101)	D	D	D	D
	120pF (121)	D	D	D	D
	150pF (151)	D	D	D	D
	180pF (181)	D	K	D	D
	220pF (221)	D	K	D	D
	270pF (271)	D	K	D	K
	330pF (331)	D		D	K
	390pF (391)	K		D	K
	470pF (471)	K		D	K
	560pF (561)	K		D	
	680pF (681)	K		K	
	820pF (821)			K	
	1,000pF (102)			K	

"*" means it is only available for UL safety certificated.

Each product in cell without symbol is available for TUV & UL safety certificated.

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

7-2 X7R Dielectric

DIELECTRIC		X7R			
SIZE		1808		1812	
RATED VOLTAGE (VDC)		2000	3000	2000	3000
Capacitance	150pF (151)	D			
	180pF (181)	D			
	220pF (221)	D			
	270pF (271)	D		D	
	330pF (331)	D	K*	D	
	390pF (391)	D	K*	D	
	470pF (471)	D	K*	D	
	560pF (561)	D	K	D	
	680pF (681)	D	K	D	K
	820pF (821)	D	K	D	K
	1,000pF (102)	K	K	D	K
	1,200pF (122)	K		D	
	1,500pF (152)	K		D	
	1,800pF (182)	K		D	
	2,200pF (222)	K		D	
	2,700pF (272)			D	
	3,300pF (332)			K	
	3,900pF (392)			K	
	4,700pF (472)			K	

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Each product in cell without symbol is available for TUV & UL safety certificated.

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

8. PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7" Plastic tape
1808 (4520)	1.25±0.10	D	2k
	2.00±0.20	K	1k
1812 (4532)	1.25±0.10	D	1k
	2.00±0.20	K	1k

Unit: pieces

9. APPENDIXS

◙ Tape & reel dimensions

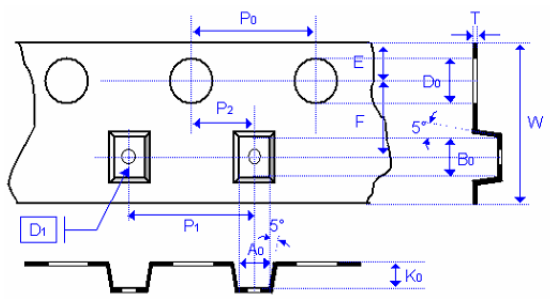


Fig. 2 The dimension of plastic tape

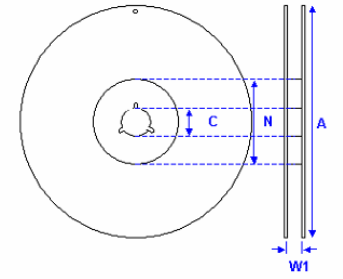
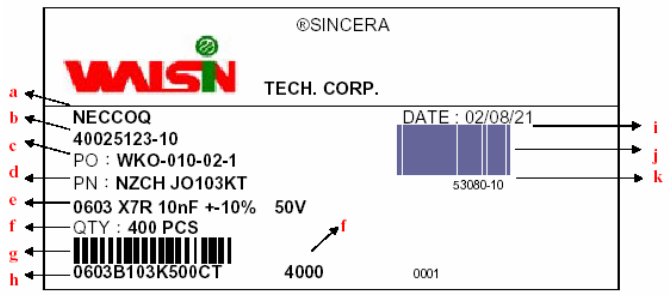


Fig. 3 The dimension of reel

Size	1808		1812
Thickness	D	K	D, K
A_0	<2.35	<2.35	<3.81
B_0	<4.98	<5.00	<5.30
T	0.25±0.05	0.25±0.05	0.25±0.05
K_0	<2.50	<2.50	<2.50
W	12.0±0.20	12.0±0.20	12.0±0.20
P_0	4.00±0.10	4.00±0.10	4.00±0.10
$10xP_0$	40.0±0.10	40.0±0.10	40.0±0.10
P_1	4.00±0.10	4.00±0.10	8.00±0.10
P_2	2.00±0.05	2.00±0.05	2.00±0.05
D_0	1.50±0.05	1.50±0.05	1.50±0.05
D_1	1.50±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05

Size	1808, 1812
Reel size	7”
C	13.0+0.5/-0.2
W_1	12.4+2.0/-0
A	178.0±0.10
N	60.5±1.0

◙ Description of customer label



a. Customer name
b. WTC order series and item number
c. Customer P/O
d. Customer P/N
e. Description of product
f. Quantity
g. Bar code including quantity & WTC P/N or customer
h. WTC P/N
i. Shipping date
j. Order bar code including series and item numbers
k. Serial number of label

◙ Constructions

No.	Name		NP0, X7R
①	Ceramic material		$BaTiO_3$ based
②	Inner electrode		AgPd alloy
③	Termination	Inner layer	Ag
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

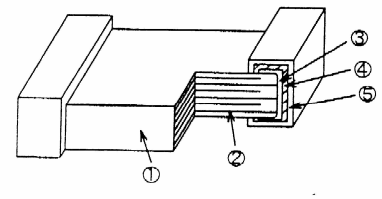


Fig. 4 The construction of MLCC

◙ RoHS compliance chart

Dielectric	Lead (Pb)	Cadmium (Cd)	Chromium VI (Cr^{+6})	Mercury (Hg)	PBBs	PBDEs
NP0	<100 ppm	nd	nd	nd	nd	nd
X7R	<100 ppm	nd	nd	nd	nd	nd

◙ 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 oxidization 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 N_2 within oven are recommended.

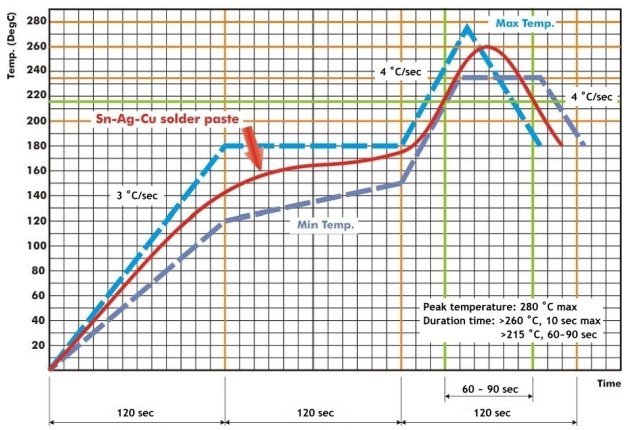


Fig. 5 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

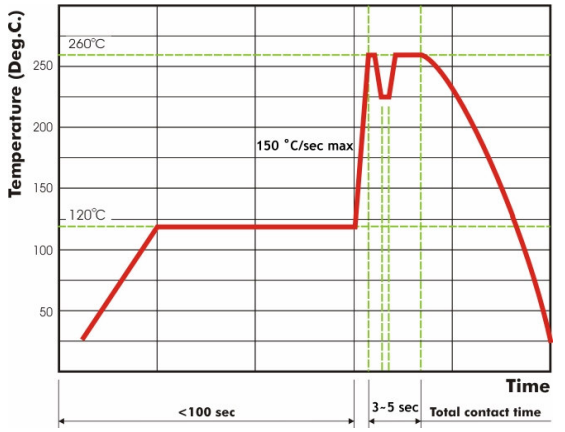


Fig. 6 Recommended wave soldering profile for SMT process with SnAgCu series solder.