

# APPROVAL SHEET

# MULTILAYER CERAMIC CAPACITORS

Microwave Capacitors Series (RT)

Qualified to AEC-Q200

0402 Size (25V to 50V)

**NP0 Dielectric** 

Halogen Free & RoHS Compliance

\*Contents in this sheet are subject to change without prior notice.



### 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.

WTC's RT series MLCC is used at high frequencies generally have a small temperature coefficient of capacitance, typical within the ±30ppm/C required for NP0 (C0G) classification and have excellent conductivity internal electrode. Thus, WTC RT series MLCC will be with the feature of low ESR and high Q characteristics, stability and reliability. Besides, RT series MLCC is tighten controlling in quality in line to assure quality performance in automotive applications. The RT series is AEC-Q200 compliant.

### 2. FEATURES

- a. High Q and low ESR performance at high frequency.
- b. High reliability: AEC-Q200.
- c. Ultra low capacitance to 0.1pF.
- d. Can offer high precision tolerance to ±0.05pF.
- e. Quality improvement of telephone calls for low power loss and better performance.

# 3. APPLICATIONS

- a. Automotive, power supply and related industries. .
- The other mechanical stress concerned products or the set having a high probability of fall.
- Prevention of ceramic body cracks by board bending.
- d. RF module: Power amplifier, VCO.
- e. Tuners.

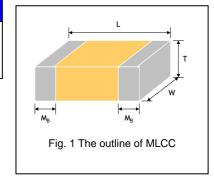
# 4. HOW TO ORDER

<u>RT</u>	<u>15</u>	<u>N</u>	<u>101</u>	J	<u>250</u>	<u>C</u>	I
<u>Series</u>	<u>Size</u>	Dielectric	<u>Capacitance</u>	Tolerance	Rated voltage	<u>Termination</u>	Packaging style
RT= Microwave MLCC (with AEC-Q200 qualification)	<b>15</b> =0402 (1005)	N=NP0	Two significant digits followed by no. of zeros. And R is in place of decimal point.  eg.:  0R5=0.5pF 1R0=1.0pF	A=±0.05pF B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5%	Two significant digits followed by no. of zeros. And R is in place of decimal point.  250=25 VDC 500=50 VDC		T=7" reeled G=13" reeled
			100=10x10 <sup>1</sup> =100pF	OGY CORPORA	100 00 000		

### 5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm) W (mm)		T (mm)/Symbol		Remark	M <sub>B</sub> (mm)
0402 (1005)	1.00±0.08	0.50±0.08	0.50±0.08	N	#	0.25 +0.05/-0.10

<sup>#</sup> Reflow soldering only is recommended.



# **Multilayer Ceramic Capacitors**

# **6. GENERAL ELECTRICAL DATA**

Dielectric	NP0		
Size	402		
Capacitance*	0.1pF to 56pF		
Capacitance tolerance	Cap≤5pF <sup>#1</sup> : A (±0.05pF), B (±0.1pF), C (±0.25pF)  5pF <cap<10pf: (±0.1pf),="" (±0.25pf),="" (±0.5pf)="" (±1%),="" (±2%),="" (±5%)<="" b="" c="" cap≥10pf:="" d="" f="" g="" j="" th=""></cap<10pf:>		
Rated voltage (WVDC)	25V, 50V		
Q*	Cap<30pF:Q≥400+20C; Cap≥30pF:Q≥1000		
Insulation resistance at Ur ≥10GΩ or RxC≥100Ω-F whichever is smaller.			
Operating temperature -55 to +125℃			
Capacitance change	±30ppm/℃		
Termination	Ni/Sn (lead-free termination)		

<sup>#1:</sup> Cap= 0.1pF product only provide B tolerance.

Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF.



<sup>\*</sup> Measured at the conditions of 25°C ambient temper ature and 30~70% related humidity.

# 7. CAPACITANCE RANGE

# **Multilayer Ceramic Capacitors**

	DIELECTRIC		NI	20	
	SIZE		04		
R	ATED VOLTAGE (VDC	,	25	50	Tolerance
10	0.1pF (0		N	N	В
	0.2pF (0		N	N	A, B
	0.3pF (0		N	N	A, B
	0.4pF (0 0.5pF (0		N N	N N	A, B A, B, C
	0.5pF (0 0.6pF (0		N N	N	A, B, C A, B, C
	0.7pF (0	R7)	N	N	A, B, C
	0.75pF (R		N	N	A, B, C
	0.8pF (0		N N	N N	A, B, C A, B, C
	0.9pF (0 1.0pF (1		N N	N N	A, B, C
	1.1pF (1		N	N	A, B, C
	1.2pF (1		N	N	A, B, C
	1.3pF (1 1.5pF (1		N N	N N	A, B, C A, B, C
	1.6pF (1		N N	N	A, B, C
	1.8pF (1		N	N	A, B, C
	2.0pF (2		N	N	A, B, C
	2.2pF (2 2.4pF (2		N N	N N	A, B, C A, B, C
	2.4pF (2 2.7pF (2		N N	N	A, B, C
	3.0pF (3	R0)	N	+ N	A, B, C
	3.3pF (3		N	H M	A, B, C
	3.6pF (3 3.9pF (3		N/	NA (A N	A, B, C A, B, C
	4.0pF (4	R0)	N - 8	LIXID AN A	A, B, C
	4.3pF (4		Z-N / T	N/S	A, B, C
	4.7pF (4		777 N 43	N	A, B, C
	5.0pF (5 5.1pF (5	R0)	N <sub>HH</sub>	N N	A, B, C B, C, D
	5.6pF (5	R6)	N	SAN PA	B, C, D
ce	6.0pF (6	R0)	N PASSIVE	SYSTEM ALLIANCE	_ B, C, D
itan	6.2pF (6		Q NZ	N S	B, C, D
Capacitance	6.7pF (6 6.8pF (6		N	N S	B, C, D B, C, D
Ca	7.0pF (7		N.	N N	B, C, D
	7.5pF (7	'R5)	N/	N <sub>2</sub> O <sub>2</sub> (X)	B, C, D
	8.0pF (8	R0)	N//c	Pology N	B, C, D
	8.2pF (8 9.0pF (9		N V// T-	OCH CODDOD MON.	B, C, D B, C, D
	9.1pF (9			OGY CORPORN	B, C, D
	10pF (1	100)	N	N	F, G, J
	11pF (1 12pF (1		N N	N 	F, G, J
	13pF (1		N N	N	F, G, J F, G, J
	15pF (1	150)	N	N	F, G, J
	16pF (1		N	N	F, G, J
	18pF (1 20pF (2	18U)	N N	N N	F, G, J F, G, J
	22pF (2		N	N N	F, G, J
	24pF (2	240)	N	N	F, G, J
	27pF (2		N N	N N	F, G, J
	30pF (3 33pF (3		N N	N	F, G, J F, G, J
	36pF (3		N	N	F, G, J
	39pF (3	390)	N	N	F, G, J
	43pF (4 47pF (4		N N	N N	F, G, J F, G, J
	47pF (4 51pF (5		N N	IN	F, G, J F, G, J
	56pF (5		N		F, G, J
	62pF (6	320)			
	68pF (6 75pF (7				
	82pF (8				
	91pF (9	910)			
	100pF (1	101)			
1 Th	e letter in cell is express	sed t	he symbol of product thickness	SS.	

<sup>1.</sup> The letter in cell is expressed the symbol of product thickness.

<sup>2.</sup> For more information about products with special capacitance or other data, please contact WTC local representative



# **8. PACKAGING STYLE AND QUANTITY**

Size	Thiskness (mm)/S	umb ol	Paper tape			
Size	Thickness (mm)/Symbol		7" reel	13" reel		
0402 (1005)	0.50±0.08	N	10,000	50,000		

Unit: pieces





# 9. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements	
1.	Pre-and Post-Stress Electrical Test			
2.	High Temperature Exposure (Storage) MIL-STD-202 Method 108	* Test temp.: 150±3°C  * Unpowered.  * Test time: 1000+24/-0 hrs.  * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage.  * Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger.  * Q. value: NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.  * I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.	
3.	Temperature Cycling JESD22 Method JA-104	Conduct 1000 cycles according to the temperatures * No remarkable damage.  * Cap change : NPO: within ±2.5% or 0.25pF whichever is larger.  * Cap change : NPO: within ±2.5% or 0.25pF whichever is larger.  * Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.  * I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.  * LR.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.		
4.	Destructive Physical Analysis EIA-469	Per EIA-469	No defects or abnormalities	
5.	Moisture Resistance MIL-STD-202 Method 106	* Test temp.: 25~65°C  * Humidity: 80~100% RH  * Test time: 10 cycles; t=24hrs/cycle.  * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage.  * Cap change : NPO: within ±3.0% or 0.30pF whichever is larger  * Q. value: NPO: More than 30pF Q≥350 ; 10pF≤C≤30pF, Q≥275+2.5C  Less than 10pF Q≥200+10C  * I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.	
6.	Biased Humidity MIL-STD-202 Method 103	* Test temp.: 85±3°C  * Humidity: 85%RH  * Test time: 1000+24/-0 hrs.  * To apply voltage: rated voltage and 1.3~1.5Vdc. (add 100k ohm resistor)  * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage.  * Cap change: NPO: within ±3.0% or 0.30pF whichever is larger.  * Q. value: NPO: C≥30pF , Q≥200 ; C<30pF , Q≥100+10/3C  * I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller.	
7.	Operational Life MIL-STD-202 Method 108	* Test temp.: 125±3°C  * To apply voltage: 200% of rated voltage.  * Test time: 1000+24/-0 hrs.  * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage.  * Cap change: NPO: within ±3.0% or ±0.3pF whichever is larger  * Q. value: NPO: More than 30pF, Q≥350; 10pF≤C<30pF, Q≥275+2.5C  Less than 10pF, Q≥200+10C  * I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller.	
8.	External Visual MIL-STD-883 Method 2009	Visual inspection	No remarkable defect.	
9.	Physical Dimension JESD22 Method JB-100	Using by calipers	Within the specified dimensions	

<sup>\* &</sup>quot;Room condition" Temperature: 15 to 35°C, Relative humidity: 25 to 75%, Atmospheric pressure: 86 to 106kPa.

# **Multilayer Ceramic Capacitors**

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements
10.	Resistance to	* Temperature: 25±5℃	* No remarkable damage.
	Solvents	* Time: 3+0.5/-0 min.	* Cap.: within the specified tolerance.
	MIL-STD-202	* Solvent: Iso-propyl alcohol.	* Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
	Method 215		* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.
11.	Mechanical Shock	* Peak value: 1500g's.	* No remarkable damage.
	MIL-STD-202	* Wave: 1/2 sine.	* Cap.: within the specified tolerance.
	Method 213	* Velocity: 15.4 ft/sec	* Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
		* Three shocks in each direction should be applied	* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.
		along	
		3 mutually perpendicular axes of the test specimen	
		(18 shocks)	
12.	Vibration	* Vibration frequency: 10~2000 Hz/min.	* No remarkable damage.
	MIL-STD-202	(5g's for 20 min)	* Cap.: within the specified tolerance.
	Method 204	* Total amplitude: 1.5mm	* Q. value: NPO:Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
		* 12 cycles each of 3 orientations (36 times)	* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.
13.	Resistance to	* Solder temperature: 270±5℃	* No remarkable damage.
	Soldering Heat	* Dipping time: 10±1 sec	* Cap change: NPO: within ±2.5% or 0.25pF whichever is larger
	MIL-STD-202	Measurement to be made after keeping at room * Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.	
	Method 210	temp. for 24±2 hrs.	* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.
14	Thermal Shock	* Conduct 300 cycles according to the temperatures	* No remarkable damage.
	MIL-STD-202	and time.	* Cap change: NPO: within ±2.5% or 0.25pF whichever is larger.
	Method 107	Step Temp. (℃) Time (min.)	* Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
		1 -55℃ +0/-3 15±3	* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.
		2 +125℃ +3/-0 / 15±3	
		* Max. transfer time: 20 sec.	
		* Measurement to be made after keeping at room	
		temp. for 24±2 hrs.	A
15.	ESD	Per AEC-Q200-002 PASSIVE SYSTEM	* No remarkable damage.
	AEC-Q200-002	95	* Cap.: within the specified tolerance.
	7.20 4200 002	黑息	* Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
			* I.R.; ≥10GΩ or RxC≥500Ω-F whichever is smaller.
16.	Solderability	* Condition A	All terminations shall exhibit a continuous solder coating free from
	J-STD-002	1/4/C 1/16	defects from a minimum of 95% of the critical surface area of any individual
	JESD22-B102E	immersed for 5±0.5 sec in solder bath at 235±5°C.	termination.
		* Condition B	KOUMILE
		Un-mounted chips steam 8 hrs then completely	
		immersed for 10±1sec in solder bath at 215+5/-0°C.	
		* Condition C	
		Un-mounted chips steam 8 hrs then completely	
		immersed for 10±1 sec. in solder bath at 260+0/-5°C.	

 $<sup>^{\</sup>star}$  "Room condition" Temperature: 15 to 35°C, Relative humidity: 25 to 75%, Atmospheric pressure: 86 to 106kPa.

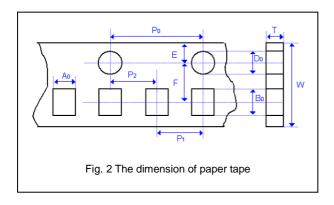
# **Multilayer Ceramic Capacitors**

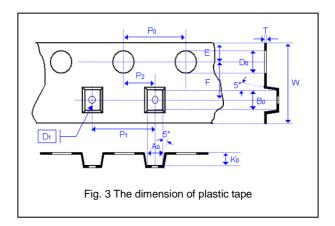
No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements
17.	Electrical Characterization	* Capacitance * Q. value Cap≤1000pF 1.0±0.2Vrms, 1MHz±10%	* Capacitance within the specified tolerance. * Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
		Cap>1000pF 1.0±0.2Vrms, 1KHz±10% * Test temp.: Room Temperature.	
		* Insulation Resistance To apply rated voltage(500V max.) for max. 120 sec * Test temp.: Room Temperature	* IR. ≥10GΩ or RxC≥500Ω-F whichever is smaller.
		* Dielectric Strength	* Dielectric strength
		To apply voltage: ≦100 ≥2.5 times VDC	No evidence of damage or flash over during test.
		, duration 1~5 sec, charge and discharge current less than 50mA.	
		* Temperature Coefficient (with no electrical load) Operation temperature: -55~125°C at 25°C	* Temperature Coefficient Capacitance Change: NPO: Within ±30ppm/℃
18.	Board Flex	* The middle part of substrate shall be pressurized by	* No remarkable damage.
	AEC-Q200-005	means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 5 mm	* Cap change: NPO: within ±5% or 0.5pF whichever is larger (This capacitance change means the change of capacitance under specified
		and then the pressure shall be maintained for 60±1 sec.  * Measurement to be made after keeping at room temp. for 24±2 hrs.	flexure of substrate from the capacitance measured before the test.)
19.	Terminal Strength AEC-Q200-006	* Pressurizing force : 2N (0201 & 0402), 10N(0603), 18N(≥0805).	* No remarkable damage or removal of the terminations.  * Capacitance within the specified tolerance.
		* Test time: 60±1 sec.	* Q. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.
20	Beam Load Test	* Break strength test	The chip endure following force
	AEC-Q200-003	* Beam speed: 2.5±0.25 mm/sec	* Chip length ≤2.5mm; Thickness >0.5mm (20N), ≤0.5mm (8N)  * Chip length ≥3.2mm; Thickness ≥1.25mm (54.5N), <1.25mm (15N)
			Only length 23.2mm, Thickness 21.25mm (34.5m), <1.25mm (15m)
21	ESR	The ESR should be measured at room temperature	0402
		and tested at frequency 1±0.1 GHz.	0.1pF≤Cap≤1pF:< 350mΩ/pF
		22001 601	1pF <cap≤5pf:< 300mω<br="">5pF<cap≤100pf:< 250mω<="" td=""></cap≤100pf:<></cap≤5pf:<>

 $<sup>^{\</sup>star}$  "Room condition" Temperature: 15 to 35°C, Relative humidity: 25 to 75%, Atmospheric pressure: 86 to 106kPa.

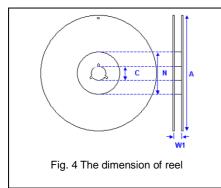
# **APPENDIXES**

# **■** Tape & reel dimensions



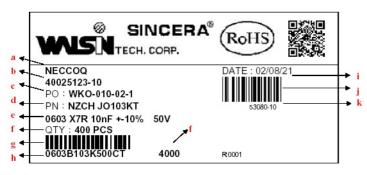


Size	0201	0402	0603		0805			1206			1210	
Thickness	L	N,E	S,H,X	A,H	В,Т	D,I	В,Т	C,J,D	G,P	Т	C,D,G,K	М
<b>A</b> <sub>0</sub>	0.40 +/-0.10	0.70 +/-0.20	1.05 +/-0.30	1.50 +/-0.20	1.50 +/-0.20	< 1.80	1.90 +/-0.50	< 2.00	<2.30	< 3.05	< 3.05	< 3.20
B <sub>0</sub>	0.70 +/-0.10	1.20 +/-0.20	1.80 +/-0.30	2.30 +/-0.20	-2.30 +/-0.20	< 2.70	3.50 +/-0.50	< 3.70	< 4.00	< 3.80	< 3.80	<4.00
Т	≦0.55	≦0.80	≦1.20	≤1.15	≦1.20	0.23 +/-0.1	≦1.20	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1
K <sub>0</sub>	-	-	-/14		を 版	< 2.50	754	< 2.50	< 2.50	< 1.50	< 2.50	< 3.20
W	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30	+/-0.30
P <sub>0</sub>	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10
10xP <sub>0</sub>	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	+/-0.10	+/-0.10	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20	+/-0.20
P <sub>1</sub>	2.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	+/-0.05	+/-0.05	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10
P <sub>2</sub>	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05
$D_0$	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0
D <sub>1</sub>	-	-		<b>%</b>	-	1.00 +/-0.10	( e )	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10
E	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10	+/-0.10
F	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05	+/-0.05



Size	0201, 0402, 0603, 0805, 1206, 1210					
Reel size	7"	10"	13"			
С	13.0±0.5	13.0±0.5	13.0±0.5			
W <sub>1</sub>	10.0±1.5	10.0±1.5	10.0±1.5			
Α	178.0±2.0	250.0±2.0	330.0±2.0			
N	60.0+1.0/-0	50 min	50 min			

#### **■** Example of customer label

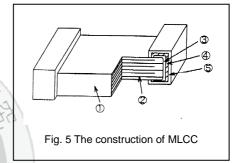


<sup>\*</sup>Customized label is available upon request

- a. Customer name
- b. WTC order series and item number
- c. Customer P/O
- d. Customer P/N
- e. Description of product
- 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.	Nam	ne	NP0
1	Ceramic r	material	Hi-Q dielectric ceramic
2	Inner ele	ctrode	Cu Cu
3		Inner layer	Cu + Conductive Resin
4	Termination	Middle layer	Ni Ni
(5)		Outer layer	Sn (Matt)



# Storage and handling conditions

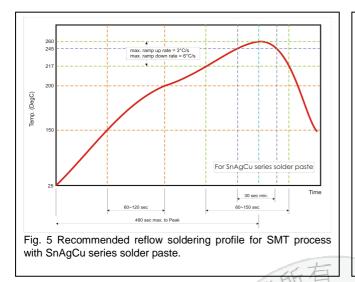
- (1) To store products at 5 to 40°C ambient temperature and 20 to 70%, related humidity conditions; MSL Level 1.
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

#### Cautions:

- a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
- b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
- c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight, the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.

# ■ 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.



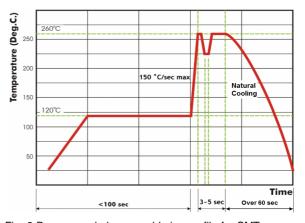


Fig. 6 Recommended wave soldering profile for SMT process with SnAgCu series solder.



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