

Data Sheet

Customer: _____

Product: Ultra High Q / Low ESR Multilayer Ceramic Chip Capacitors _____

Size : 01005/0201/0402/0505/0603/0805/1111 _____

Issued Date: 29-March-2023 _____

Edition: Ver. 2 _____

Record of change

Date	Ver.	Description	Page
29-Mar.-2023	2	Add Size/Dielectric/Capacitance/Rated Voltage	1 ~ 9

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29-Mar.-2023	29-Mar.-2023	29-Mar.-2023	
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1. INTRODUCTION

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.

Hitano RF series MLCC is used at high frequencies generally have a small temperature coefficient of capacitance, typical within the $\pm 30\text{ppm}/^\circ\text{C}$ required for NP0 (C0G) classification and have excellent conductivity internal electrode. Thus, our RF series MLCC will be with the feature of low ESR and high Q characteristics.

2. FEATURES

- High Q and low ESR performance at high frequency.
- Ultra low capacitance to 0.1pF.
- Can offer high precision tolerance to $\pm 0.05\text{pF}$.
- Quality improvement of telephone calls for low power loss and better performance.

3. APPLICATIONS

- Telecommunication products & equipments :
Mobile phone, WLAN, Base station.
- RF module : Power amplifier, VCO.
- Tuners.

4. HOW TO ORDER

<u>RF</u>	<u>0201</u>	<u>N</u>	<u>101</u>	<u>J</u>	<u>251</u>	<u>C</u>	<u>T</u>
<u>Series</u>	<u>Size</u>	<u>Dielectric</u>	<u>Capacitance</u>	<u>Tolerance</u>	<u>Rated voltage</u>	<u>Termination</u>	<u>Packaging</u>
RF= Ultra High Q & Low ESR	01R5 = 01005 (0402) 0201 (0603) 0402 (1005) 0505 (1414) 0603 (1608) 0805 (2012) 1111 (2828)	N=NP0 (C0G) G=X8G	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5=0.5pF 1R0=1.0pF 100=10x10 ⁰ =10pF	A= $\pm 0.05\text{pF}$ B= $\pm 0.1\text{pF}$ C= $\pm 0.25\text{pF}$ D= $\pm 0.5\text{pF}$ F= $\pm 1\%$ G= $\pm 2\%$ J= $\pm 5\%$	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3=6.3 VDC 100=10 VDC 250=25 VDC 500=50 VDC 101=100 VDC 201=200 VDC 251=250 VDC 501=500 VDC 152=1500 VDC	C=Cu/Ni/Sn	T=7" reeled G= 13" reeled

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol	Remark	M _B (mm)	
01005 (0402)	0.40 $\pm$ 0.02	0.20 $\pm$ 0.02	0.20 $\pm$ 0.02	V	#	0.10 $\pm$ 0.03
0201 (0603)	0.60 $\pm$ 0.03	0.30 $\pm$ 0.03	0.30 $\pm$ 0.03	L	#	0.15 $\pm$ 0.05
0402 (1005)	1.00 $\pm$ 0.05	0.50 $\pm$ 0.05	0.50 $\pm$ 0.05	N	#	0.25 $\pm$ 0.05/-0.10
0603 (1608)	1.60 $\pm$ 0.10	0.80 $\pm$ 0.10	0.80 $\pm$ 0.07	S		0.40 $\pm$ 0.15
	1.60 +0.15/-0.10	0.80 +0.15/-0.10	0.50 $\pm$ 0.10	H		
0805 (2012)	2.00 $\pm$ 0.15	1.25 $\pm$ 0.10	0.60 $\pm$ 0.10	A		0.50 $\pm$ 0.20
	2.00 $\pm$ 0.20	1.25 $\pm$ 0.20	0.85 $\pm$ 0.10	T		
0505 (1414)	1.40+0.38/-0.25	1.40 $\pm$ 0.38	1.15 $\pm$ 0.15	J	#	0.25+0.25/-0.13
1111 (2828)	2.79 +0.51/-0.25	2.79 $\pm$ 0.38	≤ 1.78	G	#	0.38 $\pm$ 0.25

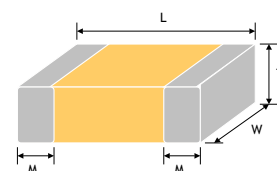


Fig. 5.1 The outline of MLCC

Reflow soldering only is recommended.

6. GENERAL ELECTRICAL DATA

Dielectric	NP0	X8G
Size	01005, 0201, 0402, 0505, 0603, 0805, 1111	0603, 0805
Capacitance*	0.1pF to 1000pF	0.2pF~82pF
Capacitance tolerance	Cap≤5pF: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: B (±0.1pF), C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)	
Rated voltage (WVDC)	6.3V, 10V, 25V, 50V, 100V, 200V, 250V, 500V, 1500V	250V, 500V
Q*	01005, 0201, 0402/25V~50V: Cap<30pF:Q≥400+20C; Cap≥30pF:Q≥1000 0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q≥800+20C; Cap≥30pF:Q≥1400	
Insulation resistance at Ur	≥10GΩ or RxC≥100Ω-F whichever is smaller.	
Operating temperature	-55 to +125°C	-55 to +150°C
Capacitance change	±30ppm/°C	
Termination	Ni/Sn (lead-free termination)	

* Measured at the conditions of 25°C ambient temperature and 30~70% related humidity.

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

7. CAPACITANCE RANGE

DIELECTRIC		NP0		
SIZE		01005		Tolerance
RATED VOLTAGE (VDC)		16	25	
Capacitance	0.2pF (0R2)	V	V	A, B
	0.3pF (0R3)	V	V	A, B
	0.4pF (0R4)	V	V	A, B
	0.5pF (0R5)	V	V	A, B, C
	0.6pF (0R6)	V	V	A, B, C
	0.7pF (0R7)	V	V	A, B, C
	0.75pF (R75)	V	V	A, B, C
	0.8pF (0R8)	V	V	A, B, C
	0.9pF (0R9)	V	V	A, B, C
	1.0pF (1R0)	V	V	A, B, C
	1.2pF (1R2)	V	V	A, B, C
	1.5pF (1R5)	V	V	A, B, C
	1.8pF (1R8)	V	V	A, B, C
	2.0pF (2R0)	V	V	A, B, C
	2.2pF (2R2)	V	V	A, B, C
	2.7pF (2R7)	V	V	A, B, C
	3.0pF (3R0)	V	V	A, B, C
	3.3pF (3R3)	V	V	A, B, C
	3.9pF (3R9)	V	V	A, B, C
	4.0pF (4R0)	V	V	A, B, C
	4.7pF (4R7)	V	V	A, B, C
	5.0pF (5R0)	V	V	A, B, C
	5.6pF (5R6)	V	V	B, C, D
	6.0pF (6R0)	V	V	B, C, D
	6.8pF (6R8)	V		B, C, D
	7.0pF (7R0)	V		B, C, D
	8.0pF (8R0)	V		B, C, D
	8.2pF (8R2)	V		B, C, D
	9.0pF (9R0)	V		B, C, D
	10pF (100)	V	V	C, D, G
	12pF (120)	V	V	J
	15pF (150)	V	V	J
	20pF (200)	V	V	J
	22pF (220)	V	V	J

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

7. CAPACITANCE RANGE(Con.)

DIELECTRIC		NP0									
SIZE		0201					0402				
RATED VOLTAGE (VDC)											Tolerance
Capacitance	0.1pF (0R1)	L	L	L	L	L	N	N	N	N	A, B
	0.2pF (0R2)	L	L	L	L	L	N	N	N	N	A, B
	0.3pF (0R3)	L	L	L	L	L	N	N	N	N	A, B
	0.4pF (0R4)	L	L	L	L	L	N	N	N	N	A, B
	0.5pF (0R5)	L	L	L	L	L	N	N	N	N	A, B, C
	0.6pF (0R6)	L	L	L	L	L	N	N	N	N	A, B, C
	0.7pF (0R7)	L	L	L	L	L	N	N	N	N	A, B, C
	0.75pF (0R75)	L	L	L	L	L	N	N	N	N	A, B, C
	0.8pF (0R8)	L	L	L	L	L	N	N	N	N	A, B, C
	0.9pF (0R9)	L	L	L	L	L	N	N	N	N	A, B, C
	1.0pF (1R0)	L	L	L	L	L	N	N	N	N	A, B, C
	1.1pF (1R1)	L	L	L	L	L	N	N	N	N	A, B, C
	1.2pF (1R2)	L	L	L	L	L	N	N	N	N	A, B, C
	1.3pF (1R3)	L	L	L	L	L	N	N	N	N	A, B, C
	1.4pF (1R4)	L	L	L	L	L	N	N	N	N	A, B, C
	1.5pF (1R5)	L	L	L	L	L	N	N	N	N	A, B, C
	1.6pF (1R6)	L	L	L	L	L	N	N	N	N	A, B, C
	1.7pF (1R7)	L	L	L	L	L	N	N	N	N	A, B, C
	1.8pF (1R8)	L	L	L	L	L	N	N	N	N	A, B, C
	1.9pF (1R9)	L	L	L	L	L	N	N	N	N	A, B, C
	2.0pF (2R0)	L	L	L	L	L	N	N	N	N	A, B, C
	2.1pF (2R1)	L	L	L	L	L	N	N	N	N	A, B, C
	2.2pF (2R2)	L	L	L	L	L	N	N	N	N	A, B, C
	2.3pF (2R3)	L	L	L	L	L	N	N	N	N	A, B, C
	2.4pF (2R4)	L	L	L	L	L	N	N	N	N	A, B, C
	2.5pF (2R5)	L	L	L	L	L	N	N	N	N	A, B, C
	2.6pF (2R6)	L	L	L	L	L	N	N	N	N	A, B, C
	2.7pF (2R7)	L	L	L	L	L	N	N	N	N	A, B, C
	2.8pF (2R8)	L	L	L	L	L	N	N	N	N	A, B, C
	2.9pF (2R9)	L	L	L	L	L	N	N	N	N	A, B, C
	3.0pF (3R0)	L	L	L	L	L	N	N	N	N	A, B, C
	3.1pF (3R1)	L	L	L	L	L	N	N	N	N	A, B, C
	3.2pF (3R2)	L	L	L	L	L	N	N	N	N	A, B, C
	3.3pF (3R3)	L	L	L	L	L	N	N	N	N	A, B, C
	3.4pF (3R4)	L	L	L	L	L	N	N	N	N	A, B, C
	3.5pF (3R5)	L	L	L	L	L	N	N	N	N	A, B, C
	3.6pF (3R6)	L	L	L	L	L	N	N	N	N	A, B, C
	3.7pF (3R7)	L	L	L	L	L	N	N	N	N	A, B, C
	3.8pF (3R8)	L	L	L	L	L	N	N	N	N	A, B, C
	3.9pF (3R9)	L	L	L	L	L	N	N	N	N	A, B, C
	4.0pF (4R0)	L	L	L	L	L	N	N	N	N	A, B, C
	4.1pF (4R1)	L	L	L	L	L	N	N	N	N	A, B, C
	4.2pF (4R2)	L	L	L	L	L	N	N	N	N	A, B, C
	4.3pF (4R3)	L	L	L	L	L	N	N	N	N	A, B, C
	4.4pF (4R4)	L	L	L	L	L	N	N	N	N	A, B, C
	4.5pF (4R5)	L	L	L	L	L	N	N	N	N	A, B, C
	4.6pF (4R6)	L	L	L	L	L	N	N	N	N	A, B, C
	4.7pF (4R7)	L	L	L	L	L	N	N	N	N	A, B, C
	4.8pF (4R8)	L	L	L	L	L	N	N	N	N	A, B, C
	4.9pF (4R9)	L	L	L	L	L	N	N	N	N	A, B, C
	5.0pF (5R0)	L	L	L	L	L	N	N	N	N	A, B, C
	5.1pF (5R1)	L	L	L	L	L	N	N	N	N	B, C, D
	5.2pF (5R2)	L	L	L	L	L	N	N	N	N	B, C, D
	5.3pF (5R3)	L	L	L	L	L	N	N	N	N	B, C, D
	5.4pF (5R4)	L	L	L	L	L	N	N	N	N	B, C, D
	5.5pF (5R5)	L	L	L	L	L	N	N	N	N	B, C, D
	5.6pF (5R6)	L	L	L	L	L	N	N	N	N	B, C, D
	5.7pF (5R7)	L	L	L	L	L	N	N	N	N	B, C, D
	5.8pF (5R8)	L	L	L	L	L	N	N	N	N	B, C, D
	5.9pF (5R9)	L	L	L	L	L	N	N	N	N	B, C, D
	6.0pF (6R0)	L	L	L	L	L	N	N	N	N	B, C, D

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

7. CAPACITANCE RANGE(Con.)

DIELECTRIC		NP0									
SIZE		0201					0402				Tolerance
RATED VOLTAGE (VDC)		6.3	10	25	50	100	25	50	100	200	
Capacitance	6.1pF (6R1)	L	L	L	L	L	N	N	N	N	B, C, D
	6.2pF (6R2)	L	L	L	L	L	N	N	N	N	B, C, D
	6.3pF (6R3)	L	L	L	L	L	N	N	N	N	B, C, D
	6.4pF (6R4)	L	L	L	L	L	N	N	N	N	B, C, D
	6.5pF (6R5)	L	L	L	L	L	N	N	N	N	B, C, D
	6.6pF (6R6)	L	L	L	L	L	N	N	N	N	B, C, D
	6.7pF (6R7)	L	L	L	L	L	N	N	N	N	B, C, D
	6.8pF (6R8)	L	L	L	L	L	N	N	N	N	B, C, D
	6.9pF (6R9)	L	L	L	L	L	N	N	N	N	B, C, D
	7.0pF (7R0)	L	L	L	L	L	N	N	N	N	B, C, D
	7.1pF (7R1)	L	L	L	L	L	N	N	N	N	B, C, D
	7.2pF (7R2)	L	L	L	L	L	N	N	N	N	B, C, D
	7.3pF (7R3)	L	L	L	L	L	N	N	N	N	B, C, D
	7.4pF (7R4)	L	L	L	L	L	N	N	N	N	B, C, D
	7.5pF (7R5)	L	L	L	L	L	N	N	N	N	B, C, D
	7.6pF (7R6)	L	L	L	L	L	N	N	N	N	B, C, D
	7.7pF (7R7)	L	L	L	L	L	N	N	N	N	B, C, D
	7.8pF (7R8)	L	L	L	L	L	N	N	N	N	B, C, D
	7.9pF (7R9)	L	L	L	L	L	N	N	N	N	B, C, D
	8.0pF (8R0)	L	L	L	L	L	N	N	N	N	B, C, D
	8.1pF (8R1)	L	L	L	L	L	N	N	N	N	B, C, D
	8.2pF (8R2)	L	L	L	L	L	N	N	N	N	B, C, D
	8.3pF (8R3)	L	L	L	L	L	N	N	N	N	B, C, D
	8.4pF (8R4)	L	L	L	L	L	N	N	N	N	B, C, D
	8.5pF (8R5)	L	L	L	L	L	N	N	N	N	B, C, D
	8.6pF (8R6)	L	L	L	L	L	N	N	N	N	B, C, D
	8.7pF (8R7)	L	L	L	L	L	N	N	N	N	B, C, D
	8.8pF (8R8)	L	L	L	L	L	N	N	N	N	B, C, D
	8.9pF (8R9)	L	L	L	L	L	N	N	N	N	B, C, D
	9.0pF (9R0)	L	L	L	L	L	N	N	N	N	B, C, D
	9.1pF (9R1)	L	L	L	L	L	N	N	N	N	B, C, D
	9.2pF (9R2)	L	L	L	L	L	N	N	N	N	B, C, D
	9.3pF (9R3)	L	L	L	L	L	N	N	N	N	B, C, D
	9.4pF (9R4)	L	L	L	L	L	N	N	N	N	B, C, D
	9.5pF (9R5)	L	L	L	L	L	N	N	N	N	B, C, D
	9.6pF (9R6)	L	L	L	L	L	N	N	N	N	B, C, D
	9.7pF (9R7)	L	L	L	L	L	N	N	N	N	B, C, D
	9.8pF (9R8)	L	L	L	L	L	N	N	N	N	B, C, D
	9.9pF (9R9)	L	L	L	L	L	N	N	N	N	B, C, D
	10pF (100)	L	L	L	L	L	N	N	N	N	F, G, J
11pF (110)	L	L	L	L		N	N	N	N	F, G, J	
12pF (120)	L	L	L	L		N	N	N	N	F, G, J	
13pF (130)	L	L	L	L		N	N	N	N	F, G, J	
15pF (150)	L	L	L	L		N	N	N	N	F, G, J	
16pF (160)	L	L	L	L		N	N	N	N	F, G, J	
18pF (180)	L	L	L	L		N	N	N	N	F, G, J	
20pF (200)	L	L	L	L		N	N	N	N	F, G, J	
22pF (220)	L	L	L			N	N	N	N	F, G, J	
24pF (240)	L	L	L			N	N	N	N	F, G, J	
27pF (270)	L	L	L			N	N	N	N	F, G, J	
30pF (300)	L	L	L			N	N	N	N	F, G, J	
33pF (330)	L	L	L			N	N	N	N	F, G, J	
36pF (360)						N	N	N		F, G, J	
39pF (390)						N	N	N		F, G, J	
43pF (430)						N	N	N		F, G, J	
47pF (470)						N	N	N		F, G, J	
56pF (560)						N	N	N		F, G, J	
68pF (680)						N	N			F, G, J	
82pF (820)						N	N			F, G, J	
100pF (101)						N	N			F, G, J	

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

7. CAPACITANCE RANGE(Con.)

DIELECTRIC		NP0										
SIZE		0505			0603			0805				Tolerance
RATED VOLTAGE (VDC)		50	100	250	50	100	250	50	100	250	500	
Capacitance	0.1pF (0R1)				H	H	H					A, B
	0.2pF (0R2)				H	H	H	A	A	A	A	A, B
	0.3pF (0R3)				S	S	S	T	T	T	T	A, B
	0.4pF (0R4)	J	J	J	S	S	S	T	T	T	T	A, B
	0.5pF (0R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.6pF (0R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.7pF (0R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.8pF (0R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.9pF (0R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.0pF (1R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.1pF (1R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.2pF (1R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.3pF (1R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.4pF (1R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.5pF (1R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.6pF (1R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.7pF (1R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.8pF (1R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.9pF (1R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.0pF (2R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.1pF (2R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.2pF (2R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.3pF (2R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.4pF (2R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.5pF (2R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.6pF (2R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.7pF (2R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.8pF (2R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.9pF (2R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.0pF (3R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.1pF (3R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.2pF (3R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.3pF (3R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.4pF (3R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.5pF (3R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.6pF (3R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.7pF (3R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.8pF (3R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.9pF (3R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.0pF (4R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
4.1pF (4R1)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.2pF (4R2)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.3pF (4R3)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.4pF (4R4)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.5pF (4R5)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.6pF (4R6)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.7pF (4R7)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.8pF (4R8)	J	J	J	S	S	S	T	T	T	T	A, B, C	
4.9pF (4R9)	J	J	J	S	S	S	T	T	T	T	A, B, C	
5.0pF (5R0)	J	J	J	S	S	S	T	T	T	T	A, B, C	
5.1pF (5R1)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.2pF (5R2)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.3pF (5R3)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.4pF (5R4)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.5pF (5R5)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.6pF (5R6)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.7pF (5R7)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.8pF (5R8)	J	J	J	S	S	S	T	T	T	T	B, C, D	
5.9pF (5R9)	J	J	J	S	S	S	T	T	T	T	B, C, D	
6.0pF (6R0)	J	J	J	S	S	S	T	T	T	T	B, C, D	

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

7. CAPACITANCE RANGE(Con.)

DIELECTRIC		NP0											
SIZE		0505			0603				0805				Tolerance
RATED VOLTAGE (VDC)		50	100	250	25	50	100	250	50	100	250	500	
Capacitance	6.1pF (6R1)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.2pF (6R2)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.3pF (6R3)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.4pF (6R4)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.5pF (6R5)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.6pF (6R6)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.7pF (6R7)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.8pF (6R8)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	6.9pF (6R9)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.0pF (7R0)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.1pF (7R1)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.2pF (7R2)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.3pF (7R3)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.4pF (7R4)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.5pF (7R5)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.6pF (7R6)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.7pF (7R7)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.8pF (7R8)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	7.9pF (7R9)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.0pF (8R0)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.1pF (8R1)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.2pF (8R2)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.3pF (8R3)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.4pF (8R4)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.5pF (8R5)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.6pF (8R6)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.7pF (8R7)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.8pF (8R8)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	8.9pF (8R9)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.0pF (9R0)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.1pF (9R1)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.2pF (9R2)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.3pF (9R3)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.4pF (9R4)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.5pF (9R5)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.6pF (9R6)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.7pF (9R7)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.8pF (9R8)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	9.9pF (9R9)	J	J	J	S	S	S	S	T	T	T	T	B, C, D
	10pF (100)	J	J	J	S	S	S	S	T	T	T	T	F, G, J
	11pF (110)	J	J	J	S	S	S	S	T	T	T	T	F, G, J
	12pF (120)	J	J	J	S	S	S	S	T	T	T	T	F, G, J
13pF (130)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
15pF (150)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
16pF (160)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
18pF (180)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
20pF (200)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
22pF (220)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
24pF (240)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
27pF (270)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
30pF (300)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
33pF (330)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
36pF (360)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
39pF (390)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
43pF (430)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
47pF (470)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
56pF (560)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
68pF (680)	J	J	J	S	S	S	S	T	T	T	T	F, G, J	
82pF (820)	J	J	J	S	S	S	S	T	T	T		F, G, J	
100pF (101)	J	J	J	S	S	S	S	T	T	T		F, G, J	
120pF (121)				S	S			T	T	T		F, G, J	
150pF (151)				S	S			T	T	T		F, G, J	
180pF (181)				S	S			T	T	T		F, G, J	
220pF (221)				S	S			T	T	T		F, G, J	

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

7. CAPACITANCE RANGE(Con.)

DIELECTRIC		NP0						
SIZE		1111						Tolerance
RATED VOLTAGE (VDC)		50	100	200	250	500	1500	
Capacitance	1.0pF (1R0)	G	G	G	G	G	G	A, B, C
	1.1pF (1R1)	G	G	G	G	G	G	A, B, C
	1.2pF (1R2)	G	G	G	G	G	G	A, B, C
	1.3pF (1R3)	G	G	G	G	G	G	A, B, C
	1.5pF (1R5)	G	G	G	G	G	G	A, B, C
	1.6pF (1R6)	G	G	G	G	G	G	A, B, C
	1.8pF (1R8)	G	G	G	G	G	G	A, B, C
	2.0pF (2R0)	G	G	G	G	G	G	A, B, C
	2.2pF (2R2)	G	G	G	G	G	G	A, B, C
	2.4pF (2R4)	G	G	G	G	G	G	A, B, C
	2.7pF (2R7)	G	G	G	G	G	G	A, B, C
	3.0pF (3R0)	G	G	G	G	G	G	A, B, C
	3.3pF (3R3)	G	G	G	G	G	G	A, B, C
	3.6pF (3R6)	G	G	G	G	G	G	A, B, C
	3.9pF (3R9)	G	G	G	G	G	G	A, B, C
	4.0pF (4R0)	G	G	G	G	G	G	A, B, C
	4.3pF (4R3)	G	G	G	G	G	G	A, B, C
	5.0pF (5R0)	G	G	G	G	G	G	A, B, C
	5.1pF (5R1)	G	G	G	G	G	G	B, C, D
	5.6pF (5R6)	G	G	G	G	G	G	B, C, D
	6.0pF (6R0)	G	G	G	G	G	G	B, C, D
	6.8pF (6R8)	G	G	G	G	G	G	B, C, D
	7.0pF (7R0)	G	G	G	G	G	G	B, C, D
	8.0pF (8R0)	G	G	G	G	G	G	B, C, D
	8.2pF (8R2)	G	G	G	G	G	G	B, C, D
	10pF (100)	G	G	G	G	G	G	F, G, J
	12pF (120)	G	G	G	G	G	G	F, G, J
	15pF (150)	G	G	G	G	G	G	F, G, J
	18pF (180)	G	G	G	G	G	G	F, G, J
	22pF (220)	G	G	G	G	G	G	F, G, J
	27pF (270)	G	G	G	G	G	G	F, G, J
	33pF (330)	G	G	G	G	G	G	F, G, J
	39pF (390)	G	G	G	G	G		F, G, J
	47pF (470)	G	G	G	G	G		F, G, J
	56pF (560)	G	G	G	G	G		F, G, J
	68pF (680)	G	G	G	G	G		F, G, J
	82pF (820)	G	G	G	G	G		F, G, J
	100pF (101)	G	G	G	G	G		F, G, J
	120pF (121)	G	G	G	G	G		F, G, J
	150pF (151)	G	G	G	G	G		F, G, J
	180pF (181)	G	G	G	G	G		F, G, J
	220pF (221)	G	G	G	G	G		F, G, J
	270pF (271)	G	G	G	G	G		F, G, J
	330pF (331)	G	G	G	G	G		F, G, J
	390pF (391)	G	G	G	G	G		F, G, J
	470pF (471)	G	G	G	G	G		F, G, J
	560pF (561)	G	G	G	G	G		F, G, J
	680pF (681)	G	G	G	G	G		F, G, J
	820pF (821)	G	G	G	G	G		F, G, J
	1000pF (102)	G	G	G	G	G		F, G, J

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

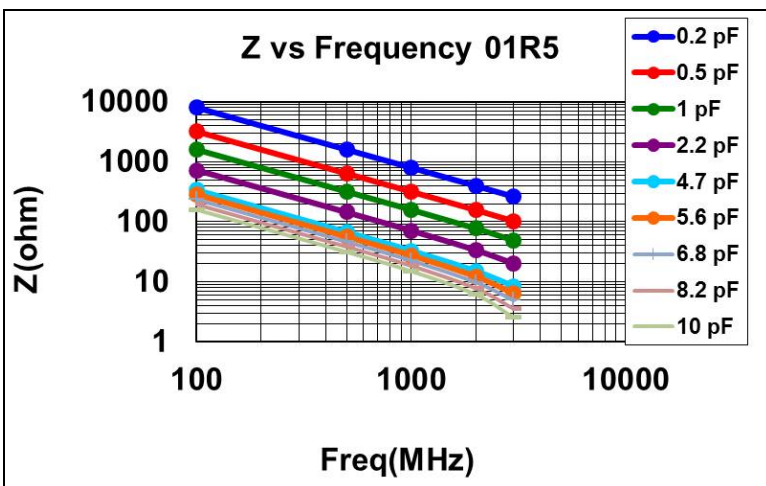
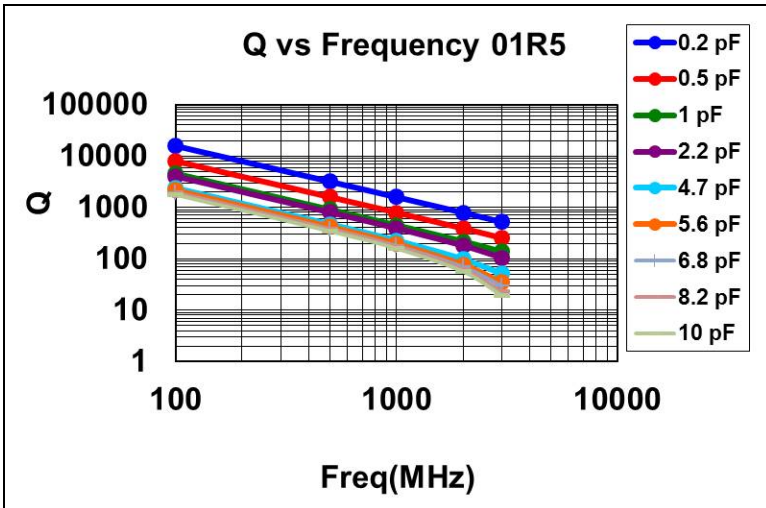
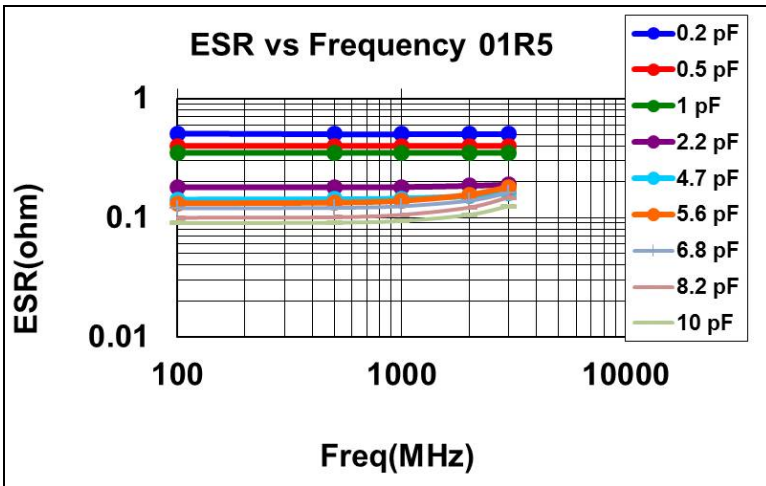
7. CAPACITANCE RANGE(Con.)(X8G)

DIELECTRIC		X8G			Tolerance
SIZE		0603	0805		
RATED VOLTAGE		250	250	500	
Capacitance	0.2pF (0R2)		A	A	A, B
	0.3pF (0R3)	S	T	T	A, B
	0.4pF (0R4)	S	T	T	A, B
	0.5pF (0R5)	S	T	T	A, B, C
	0.6pF (0R6)	S	T	T	A, B, C
	0.7pF (0R7)	S	T	T	A, B, C
	0.8pF (0R8)	S	T	T	A, B, C
	0.9pF (0R9)	S	T	T	A, B, C
	1.0pF (1R0)	S	T	T	A, B, C
	1.1pF (1R1)	S	T	T	A, B, C
	1.2pF (1R2)	S	T	T	A, B, C
	1.3pF (1R3)	S	T	T	A, B, C
	1.4pF (1R4)	S	T	T	A, B, C
	1.5pF (1R5)	S	T	T	A, B, C
	1.6pF (1R6)	S	T	T	A, B, C
	1.7pF (1R7)	S	T	T	A, B, C
	1.8pF (1R8)	S	T	T	A, B, C
	1.9pF (1R9)	S	T	T	A, B, C
	2.0pF (2R0)	S	T	T	A, B, C
	2.1pF (2R1)	S	T	T	A, B, C
	2.2pF (2R2)	S	T	T	A, B, C
	2.3pF (2R3)	S	T	T	A, B, C
	2.4pF (2R4)	S	T	T	A, B, C
	2.5pF (2R5)	S	T	T	A, B, C
	2.6pF (2R6)	S	T	T	A, B, C
	2.7pF (2R7)	S	T	T	A, B, C
	2.8pF (2R8)	S	T	T	A, B, C
	2.9pF (2R9)	S	T	T	A, B, C
	3.0pF (3R0)	S	T	T	A, B, C
	3.1pF (3R1)	S	T	T	A, B, C
	3.2pF (3R2)	S	T	T	A, B, C
	3.3pF (3R3)	S	T	T	A, B, C
	3.4pF (3R4)	S	T	T	A, B, C
	3.5pF (3R5)	S	T	T	A, B, C
	3.6pF (3R6)	S	T	T	A, B, C
	3.7pF (3R7)	S	T	T	A, B, C
	3.8pF (3R8)	S	T	T	A, B, C
	3.9pF (3R9)	S	T	T	A, B, C
	4.0pF (4R0)	S	T	T	A, B, C
	4.1pF (4R1)	S	T	T	A, B, C
	4.2pF (4R2)	S	T	T	A, B, C
	4.3pF (4R3)	S	T	T	A, B, C
	4.4pF (4R4)	S	T	T	A, B, C
	4.5pF (4R5)	S	T	T	A, B, C
	4.6pF (4R6)	S	T	T	A, B, C
	4.7pF (4R7)	S	T	T	A, B, C
	4.8pF (4R8)	S	T	T	A, B, C
	4.9pF (4R9)	S	T	T	A, B, C
	5.0pF (5R0)	S	T	T	A, B, C
	5.1pF (5R1)	S	T	T	B, C, D
	5.2pF (5R2)	S	T	T	B, C, D
	5.3pF (5R3)	S	T	T	B, C, D
	5.4pF (5R4)	S	T	T	B, C, D
	5.5pF (5R5)	S	T	T	B, C, D
	5.6pF (5R6)	S	T	T	B, C, D
	5.7pF (5R7)	S	T	T	B, C, D
	5.8pF (5R8)	S	T	T	B, C, D
	5.9pF (5R9)	S	T	T	B, C, D
	6.0pF (6R0)	S	T	T	B, C, D

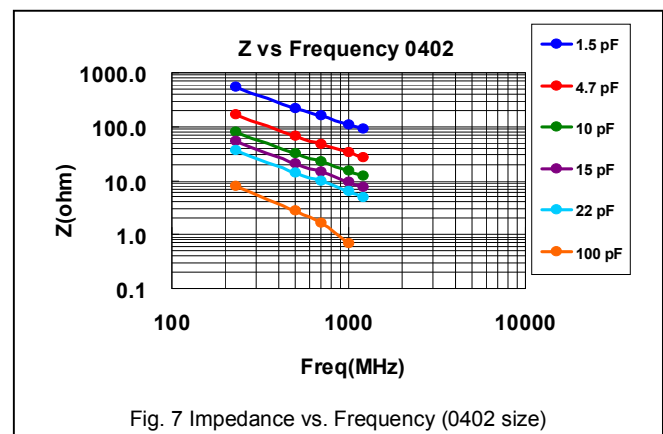
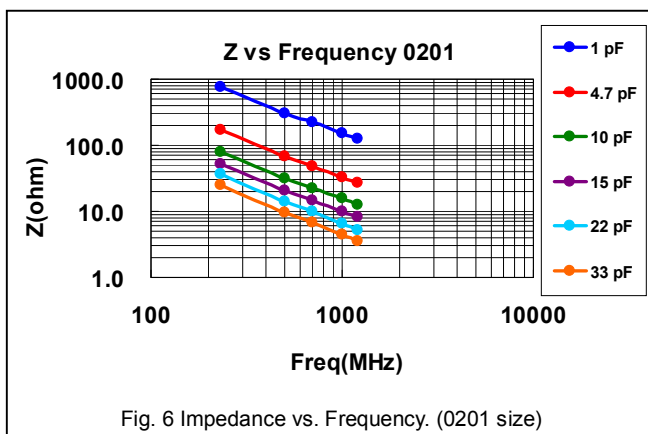
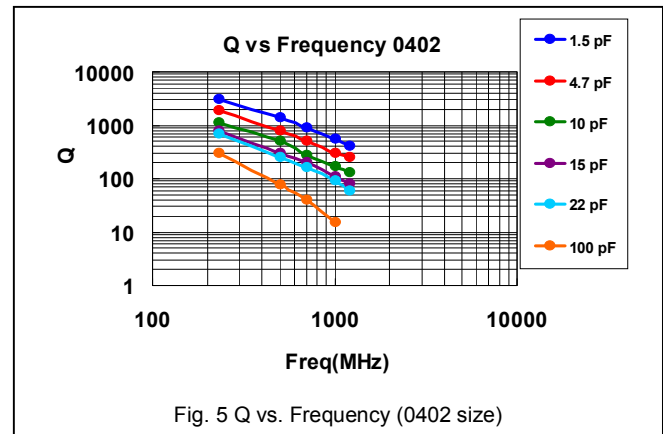
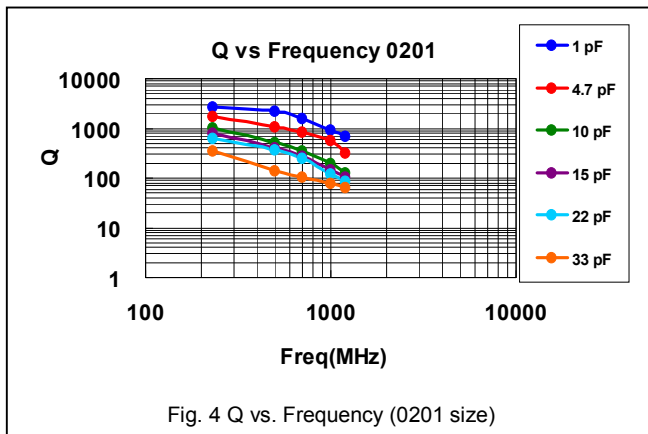
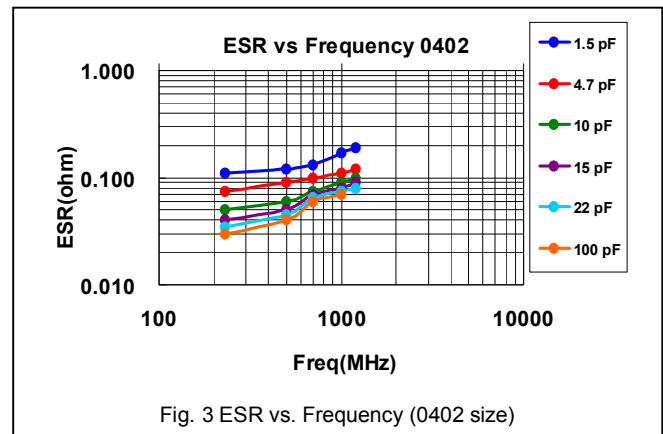
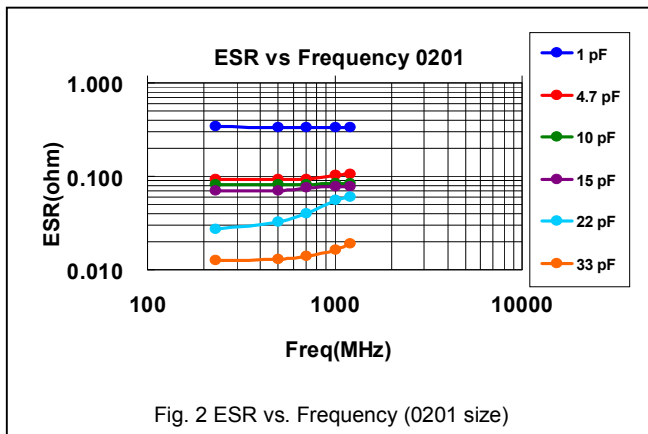
DIELECTRIC		X8G			Tolerance
SIZE	0603	0805			
RATED VOLTAGE	250	250	500		
Capacitance	6.1pF (6R1)	S	T	T	B, C, D
	6.2pF (6R2)	S	T	T	B, C, D
	6.3pF (6R3)	S	T	T	B, C, D
	6.4pF (6R4)	S	T	T	B, C, D
	6.5pF (6R5)	S	T	T	B, C, D
	6.6pF (6R6)	S	T	T	B, C, D
	6.7pF (6R7)	S	T	T	B, C, D
	6.8pF (6R8)	S	T	T	B, C, D
	6.9pF (6R9)	S	T	T	B, C, D
	7.0pF (7R0)	S	T	T	B, C, D
	7.1pF (7R1)	S	T	T	B, C, D
	7.2pF (7R2)	S	T	T	B, C, D
	7.3pF (7R3)	S	T	T	B, C, D
	7.4pF (7R4)	S	T	T	B, C, D
	7.5pF (7R5)	S	T	T	B, C, D
	7.6pF (7R6)	S	T	T	B, C, D
	7.7pF (7R7)	S	T	T	B, C, D
	7.8pF (7R8)	S	T	T	B, C, D
	7.9pF (7R9)	S	T	T	B, C, D
	8.0pF (8R0)	S	T	T	B, C, D
	8.1pF (8R1)	S	T	T	B, C, D
	8.2pF (8R2)	S	T	T	B, C, D
	8.3pF (8R3)	S	T	T	B, C, D
	8.4pF (8R4)	S	T	T	B, C, D
	8.5pF (8R5)	S	T	T	B, C, D
	8.6pF (8R6)	S	T	T	B, C, D
	8.7pF (8R7)	S	T	T	B, C, D
	8.8pF (8R8)	S	T	T	B, C, D
	8.9pF (8R9)	S	T	T	B, C, D
	9.0pF (9R0)	S	T	T	B, C, D
	9.1pF (9R1)	S	T	T	B, C, D
	9.2pF (9R2)	S	T	T	B, C, D
	9.3pF (9R3)	S	T	T	B, C, D
	9.4pF (9R4)	S	T	T	B, C, D
	9.5pF (9R5)	S	T	T	B, C, D
	9.6pF (9R6)	S	T	T	B, C, D
	9.7pF (9R7)	S	T	T	B, C, D
	9.8pF (9R8)	S	T	T	B, C, D
	9.9pF (9R9)	S	T	T	B, C, D
	10pF (100)	S	T	T	F, G, J
	11pF (110)	S	T	T	F, G, J
	12pF (120)	S	T	T	F, G, J
	13pF (130)	S	T	T	F, G, J
	15pF (150)	S	T	T	F, G, J
	16pF (160)	S	T	T	F, G, J
	18pF (180)	S	T	T	F, G, J
	20pF (200)	S	T	T	F, G, J
	22pF (220)	S	T	T	F, G, J
	24pF (240)	S	T		F, G, J
	27pF (270)	S	T		F, G, J
30pF (300)	S	T		F, G, J	
33pF (330)	S	T		F, G, J	
36pF (360)	S	T		F, G, J	
39pF (390)	S	T		F, G, J	
43pF (430)	S	T		F, G, J	
47pF (470)		T		F, G, J	
56pF (560)		T		F, G, J	
68pF (680)		T		F, G, J	
82pF (820)		T		F, G, J	

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

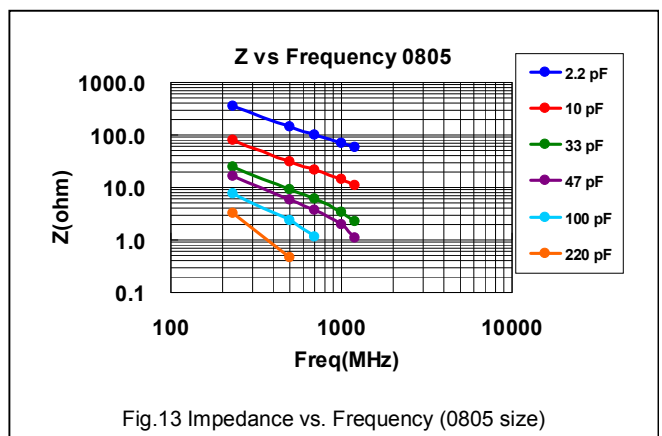
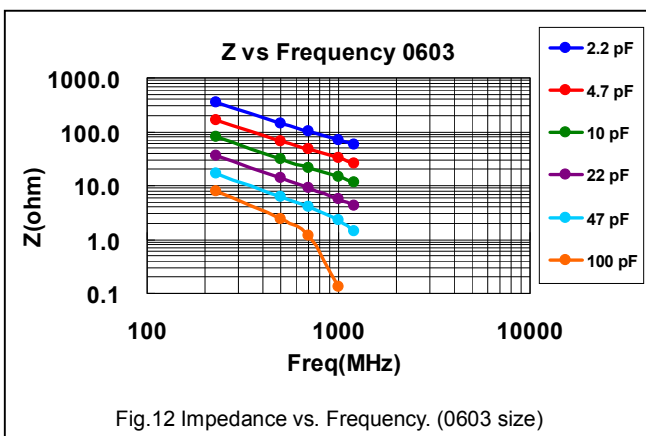
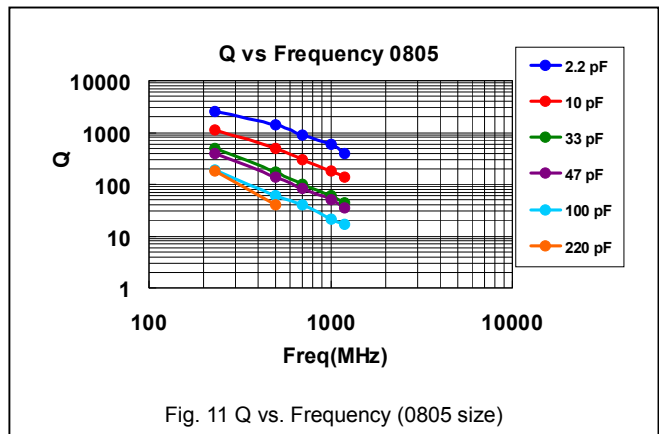
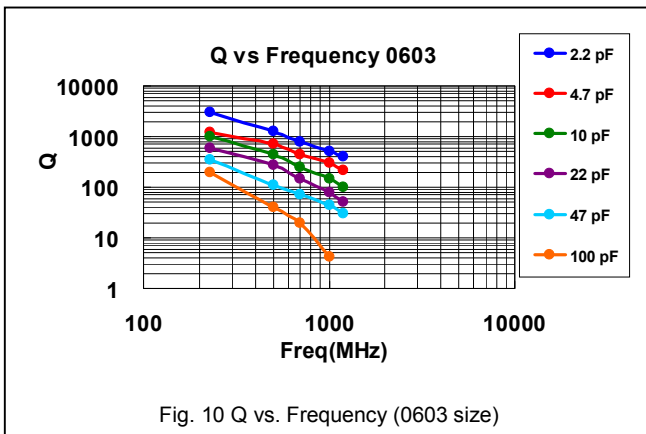
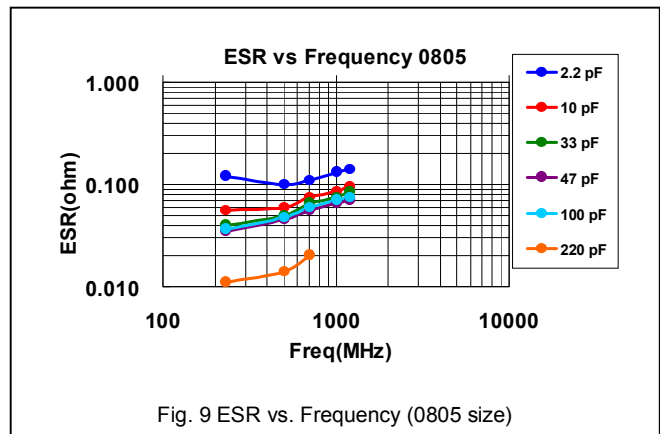
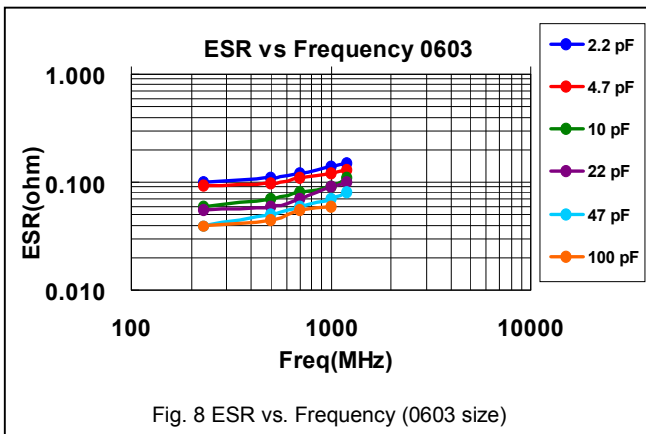
8. ELECTRICAL CHARACTERISTICS



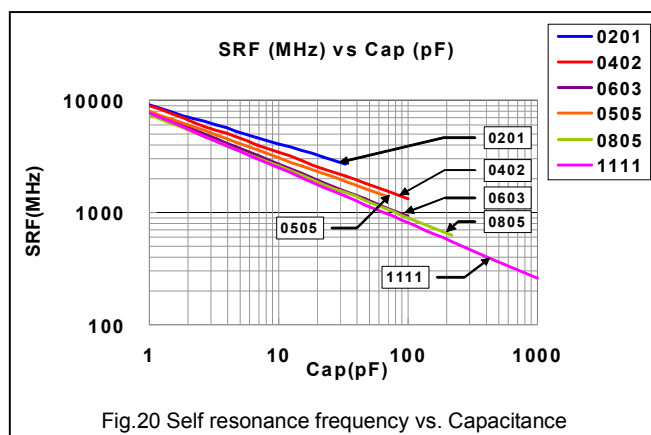
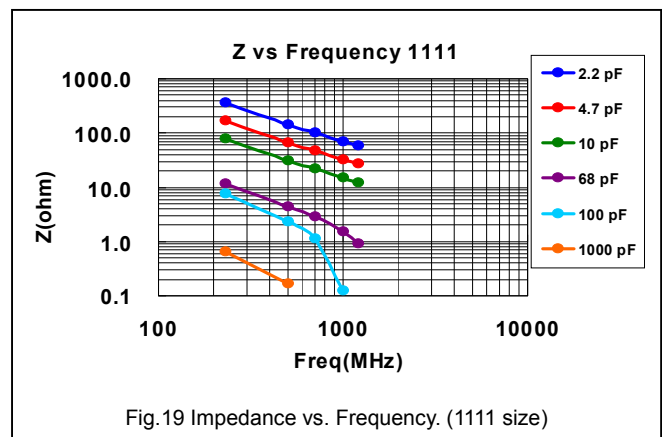
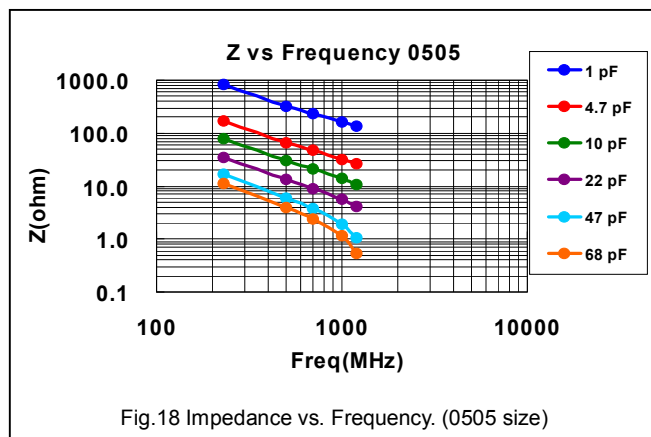
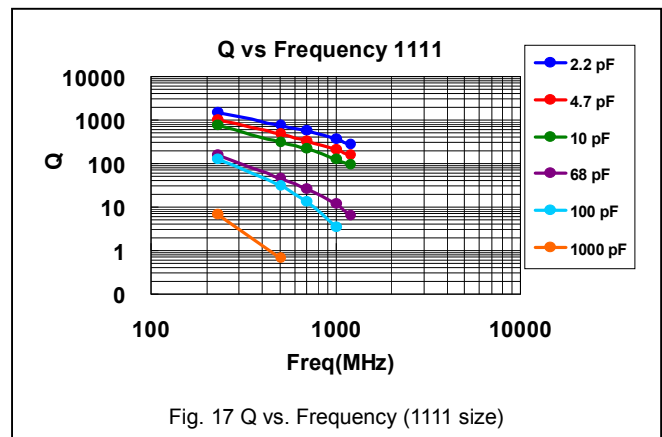
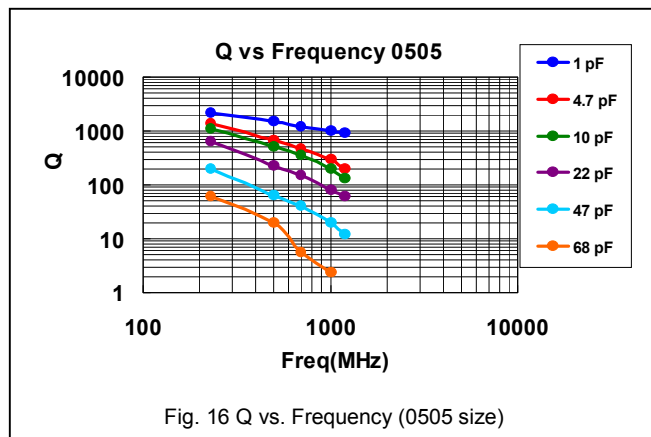
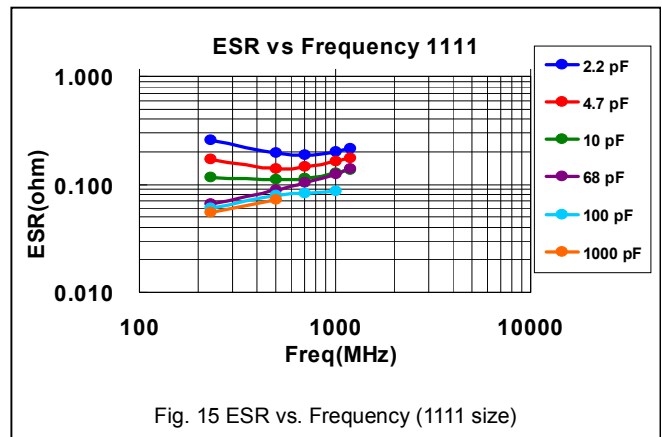
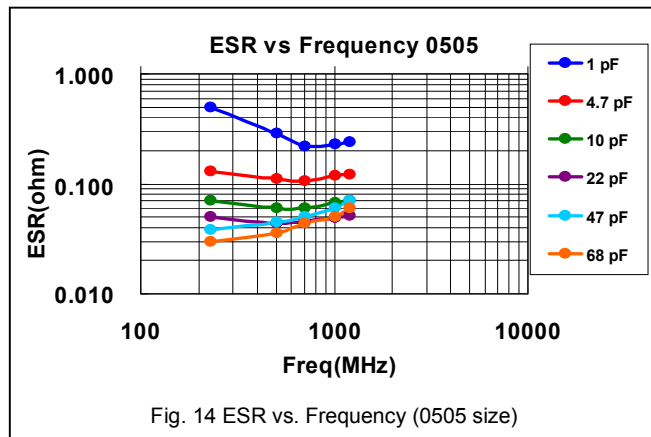
8. ELECTRICAL CHARACTERISTICS



8. ELECTRICAL CHARACTERISTICS



8. ELECTRICAL CHARACTERISTICS



9. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements															
1.	Visual and Dimensions	---	* No remarkable defect. * Dimensions to confirm to individual specification sheet.															
2.	Capacitance		* Shall not exceed the limits given in the detailed spec.															
3.	Q/D.F. (Dissipation Factor)	* Class I : (NP0) Cap.≤1000pF, 1.0±0.2Vrms, 1MHz±10%. Cap.>1000pF, 1.0±0.2Vrms, 1KHz±10%. At 25°C ambient temperature.	* 01005, 0201, 0402/25V~50V : Cap.<30pF, Q≥400+20C; Cap.≥30pF, Q≥1000 * 0402/100V~200V, 0603, 0805, 0505, 1111 : Cap.<30pF : Q≥800+20C; Cap.≥30pF : Q≥1400															
4.	Temperature Coefficient	* With no electrical load. <table><tr><td>T.C.</td><td>Operating Temp.</td></tr><tr><td>NP0</td><td>-55~125°C at 25°C</td></tr><tr><td>X8G</td><td>-55~150°C at 25°C</td></tr></table>	T.C.	Operating Temp.	NP0	-55~125°C at 25°C	X8G	-55~150°C at 25°C	* Capacitance change: within ±30ppm/°C;									
T.C.	Operating Temp.																	
NP0	-55~125°C at 25°C																	
X8G	-55~150°C at 25°C																	
5.	Insulation Resistance	* ≤100V : To apply rated voltage for max. 120 sec. * ≥200V :To apply rated voltage (500V max.) for 60 sec.	* ≥10GΩ or RxC≥100Ω-F, whichever is smaller.															
6.	Dielectric Strength	* To apply voltage : ≤100V : 250% of rated voltage. 200V ~ 300V : 200% of rated voltage. 500V ~ 999V : 150% of rated voltage. 1000V ~ 3000V : 120% of rated voltage. 4000V : 110% of rated voltage. * Duration : 1 to 5 sec. * Charge & discharge current less than 50mA.	* No evidence of damage or flash over during test.															
7.	Solderability	* Solder temperature : 235±5°C. * Dipping time : 2±0.5 sec.	* 95% min. coverage of all metalized area.															
8.	Resistance to Soldering Heat	* Solder temperature : 260±5°C. * Dipping time : 10±1 sec. * Preheating : 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then set for 24±2 hrs at room temp.	* No remarkable damage. * Cap. change : Within ±2.5% or ±0.25pF whichever is larger. * Q/D.F., I.R. and dielectric strength : To meet initial requirements. * 25% max. leaching on each edge.															
9.	Temperature Cycle	* Conduct the five cycles according to the temperatures and time. <table><tr><td>Step</td><td>Temp.(°C)</td><td>Time(min.)</td></tr><tr><td>1</td><td>Min. operating temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room temp.</td><td>2~3</td></tr><tr><td>3</td><td>Max. operating temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room temp.</td><td>2~3</td></tr></table> * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then set for 24±2 hrs at room temp.	Step	Temp.(°C)	Time(min.)	1	Min. operating temp. +0/-3	30±3	2	Room temp.	2~3	3	Max. operating temp. +3/-0	30±3	4	Room temp.	2~3	* No remarkable damage. * Cap. change : Within ±2.5% or ±0.25pF, whichever is larger. * Q/D.F., I.R. and dielectric strength : To meet initial requirements.
Step	Temp.(°C)	Time(min.)																
1	Min. operating temp. +0/-3	30±3																
2	Room temp.	2~3																
3	Max. operating temp. +3/-0	30±3																
4	Room temp.	2~3																
10.	Humidity (Damp Heat) Steady State	* Test temp. : 40±2°C. * Humidity : 90~95% RH. * Test time : 500 +24/-0hrs. * Cap./DF(Q) Measurement to be made after de-aging at 150°C for 1hr then set for 24±2 hrs at room temp.	* No remarkable damage. * Cap. change : Within ±5.0% or ±0.5pF, whichever is larger. * Q/D.F. value : Cap.>30pF, Q≥350. 10pF≤Cap.≤30pF, Q≥275+2.5C. Cap.<10pF, Q≥200+10C. * I.R. : ≥1GΩ.															

10. PACKAGE DIMENSION AND QUANTITY

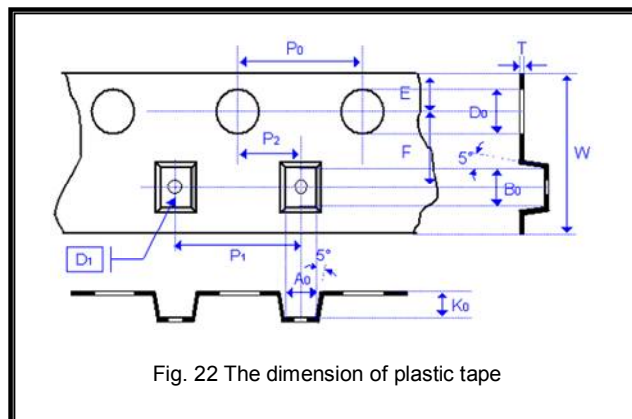
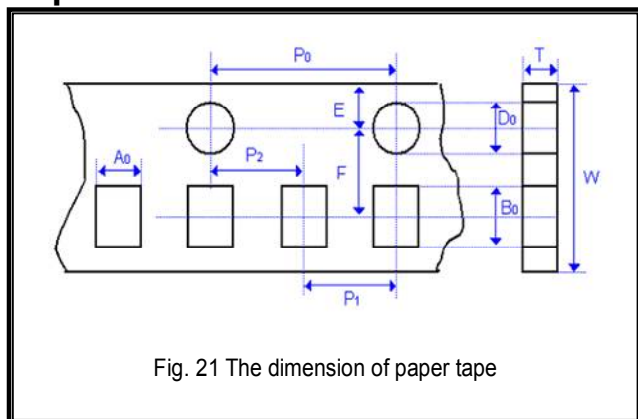
Paper Tape :

Size	Thickness (mm)/Symbol		Paper tape	
			7" reel	13" reel
01005 (0402)	0.20±0.02	V	20,000	-
0201 (0603)	0.30±0.03	L	15,000	70,000
0402 (1005)	0.50±0.05	N	10,000	50,000
0603 (1608)	0.80±0.07	S	4,000	15,000
	0.50±0.10	H	4,000	-
0805 (2012)	0.60±0.10	A	4,000	15,000
	0.85±0.10	T	4,000	15,000

Plastic Tape :

Size	Thickness (mm)/Symbol		Plastic tape	
			7" reel	13" reel
0505 (1414)	1.15±0.15	J	3,000	-
1111 (2828)	≤ 1.78	G	2,000	-

Tape & reel dimensions :



Size	01005	0201	0402	0505	0603	0805	1111
Thickness	V	L	N	J	S	T	G
A ₀	0.25±0.05	0.40±0.10	0.70±0.20	<1.90	1.05±0.30	1.50±0.20	<3.05
B ₀	0.45±0.05	0.70±0.10	1.20±0.20	<1.90	1.80±0.30	2.30±0.20	<3.80
T	≤0.50	≤0.55	≤0.80	0.23±0.10	≤1.20	≤1.20	0.23±0.10
K ₀	-	-	-	<1.50	-	-	< 2.50
W	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.10	40.00±0.10	40.00±0.10	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P ₁	2.00±0.05	2.00±0.05	2.00±0.05	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0
D ₁	-	-	-	1.00±0.10	-	-	1.00±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05

10. PACKAGE DIMENSION AND QUANTITY

Paper Tape :

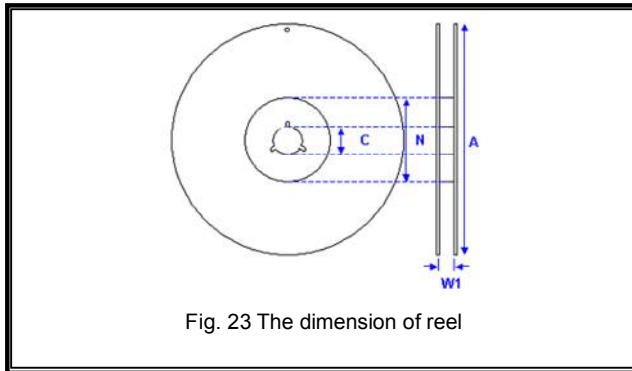


Fig. 23 The dimension of reel

Size	01005, 0201, 0402, 0505, 0603, 0805, 1111	
Reel size	7"	13"
C	13.0 +0.5/-0.2	13.0 +0.5/-0.2
W ₁	8.4 +1.5/-0	8.4 +1.5/-0
A	178.0±1.0	330.0±1.0
N	60.0 +1.0/-0	100.0±1.0

11. APPENDIXES

Constructions :

No.	Name		NP0
①	Ceramic material		BaTiO ₃ based
②	Inner electrode		Cu
③	Termination	Inner layer	Cu
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

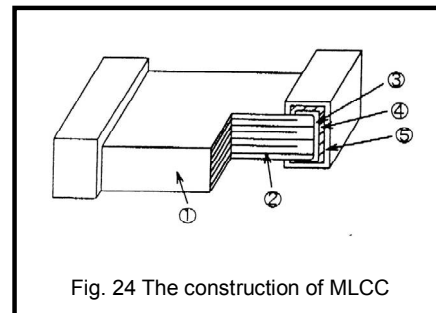


Fig. 24 The construction of MLCC

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. 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 N₂ within oven are recommended.

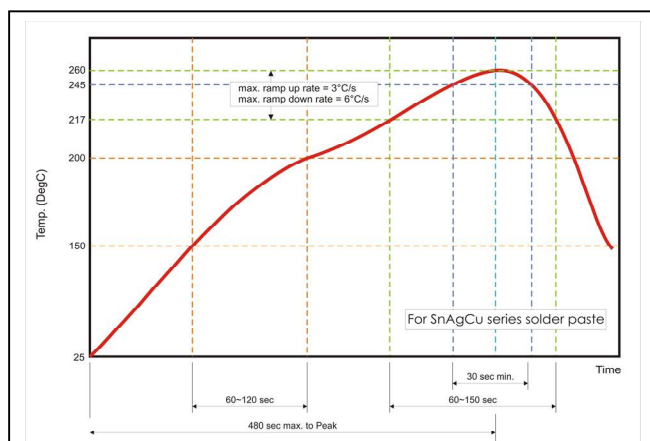


Fig. 25 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

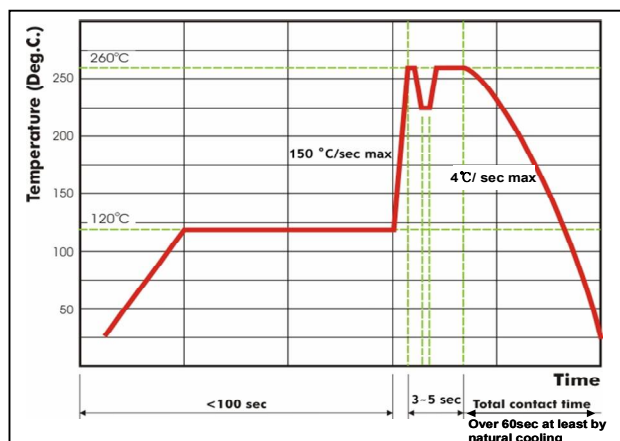


Fig. 26 Recommended wave soldering profile for SMT process with SnAgCu series solder.