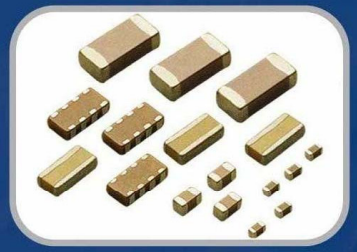
PSA ISO 9001, ISO 14001, ISO/TS 16949
PASSIVE SYSTEM ALLIANCE

POE INTERNATIONAL CORPORATION

MULTILAYER CERAMIC CHIP CAPACITORS

POElectronic



2008

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Nov. 2007

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Table of Contents

Subject	Page
Quick Product Information	1
The Outlines and External Dimensions of Capacitors	2
General Purpose Capacitors	3
High Capacitance Capacitors	7
Low Profile Capacitors	9
Ultra-small (0201) Capacitors	10
Middle and High Voltage Capacitors	11
Safety Certificated Capacitors (X1/Y2)	16
Safety Certificated Capacitors (X2/Y3)	17
High Q and Low ESR Capacitors	19
Microwave Capacitors	21
Open-mode Design Capacitors	23
Low Distortion Capacitors	25
Capacitor Arrays	27
Low Inductance Capacitors	28
Appendix I : Reliability Test Conditions and Requirements	29
Appendix II : General Information	32

■ Quick Product Information

Series	Dielectric	Size	Capacitance	Rated voltage	Page
General Purpose Caps	NPO	0402, 0603, 0805, 1206, 1210, 1812	0.5pF~0.039μF	16V, 25V, 50V, 100V	4
	X7R	0402, 0603, 0805, 1206, 1210, 1812	100pF~1μF	10V, 16V, 25V, 50V, 100V	5
	Y5V	0402, 0603, 0805, 1206, 1210, 1812	0.01μF~1μF	6.3V, 10V, 16V, 25V, 50V, 100V	6
High Capacitance Caps	X7R	0402, 0603, 0805, 1206, 1210, 1812	0.1μF~4.7μF	10V, 16V, 25V, 50V	8
	X5R	0402, 0603, 0805, 1206	0.027μF~10μF	6.3V, 10V, 16V	8
	Y5V	0402, 0603, 0805, 1206, 1210, 1812	0.15μF~47μF	6.3V, 10V, 16V, 25V, 35V, 50V	8
Low Profile Caps	X5R	0805, 1206, 1210	1μF~10μF	6.3V, 10V	9
	Y5V	0805, 1206, 1210	2.2μF~10μF	10V, 16V	9
Ultra-small Caps	NPO	0201	0.5pF~100pF	16V, 25V	10
	X7R	0201	100pF~4700pF	16V, 25V, 50V	10
	X5R	0201	1000pF~0.1μF	6.3V, 10V, 16V	10
Middle & High Voltage Caps	NPO	0603, 0805, 1206, 1210, 1808, 1812	0.5pF~6800pF	200V, 250V, 500V, 630V, 1kV, 2kV, 3kV	12
	X7R	0805, 1206, 1210, 1808, 1812	100pF~0.47μF	200V, 250V, 500V, 630V, 1kV, 2kV, 3kV	14
	Y5V	0805, 1206, 1210,1812	0.01μF~0.68μF	200V, 250V	15
Safety Certificated Caps (X1/Y2)	NPO	1808, 1812	10pF~470pF	250Vac	16
Safety Certificated Caps (X2/Y3)	NPO	1808, 1812	3.9pF~1000pF	250Vac	18
	X7R	1808, 1812	150pF~4700pF	250Vac	18
High Q & Low ESR Caps	NPO	0402, 0603	0.5pF~3300pF	16V, 50V, 100V	20
Microwave Caps	NPO	0402, 0603	0.1pF~22pF	50V	22
Open-mode Design Caps	X7R	0805, 1206, 1210, 1812	100pF~1μF	100V, 200V, 250V, 500V	24
Low Distortion Caps	X7R	1206	150pF~0.1μF	100V, 200V, 250V	25
Capacitor Arrays	NPO	0612 (4x0603)	10pF~470pF	50V	27
	X7R	0612 (4x0603)	180pF~0.1μF	16V, 50V	27
	Y5V	0612 (4x0603)	0.01μF~0.1μF	50V	27
Low Inductance Caps	X7R	0612	0.01μF~0.15μF	50V	28

The Outlines and External Dimensions of Capacitor

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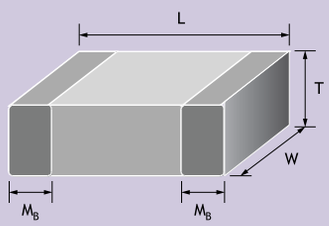
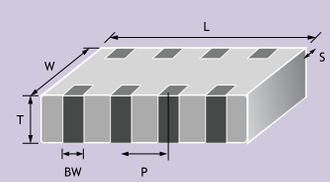
■ Single Chip Capacitors

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		Remark	M_B (mm)
	0201 (0603)	0.6±0.03	0.3±0.03	0.3±0.03	L	#	0.15±0.05
	0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N	#	0.25 +0.05/-0.10
	0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S		0.40±0.15
		1.60 +0.15/-0.10	0.80+0.15/-0.10	0.80+0.15/-0.10	X		
	0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	A		0.50±0.20
				0.80±0.10	B		
				1.25±0.10	D	#	
		2.00±0.20	1.25±0.20	1.25±0.20	I	#	
	1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	B		0.60±0.20
				0.95±0.10	C		
				1.25±0.10	D	#	
		3.20±0.20	1.60±0.15	1.15±0.15	J	#	
			1.60±0.20	1.60±0.20	G	#	
			1.60+0.30/-0.10	1.60+0.30/-0.10	P	#	
	1210 (3225)	3.20±0.30	2.50±0.20	0.95±0.10	C	#	0.75±0.25
				1.25±0.10	D	#	
		3.20±0.40	2.50±0.30	1.60±0.20	G	#	
				2.00±0.20	K	#	
				2.50±0.30	M	#	
	1808 (4520)	4.50±0.40	2.03±0.25	1.25±0.10	D	#	0.75±0.25*
				2.00±0.20	K	#	
	1812 (4532)	4.50±0.40	3.20±0.30	1.25±0.10	D	#	0.75±0.25*
				2.00±0.20	K	#	
				2.50±0.30	M	#	

Reflow soldering only is recommended.

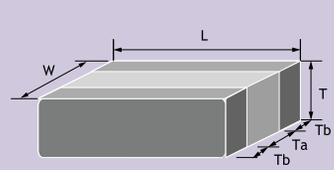
* For safety certiflcated products please refer to individual sheet for detail.

■ Capacitor Arrays

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		S (mm)	BW (mm)	P (mm)
	0612 (1632)	3.20±0.15	1.60±0.15	0.80±0.10	B	0.30±0.20	0.40±0.15	0.80±0.15

Reflow soldering only.

■ Low Inductance Capacitors

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

Reflow soldering only.

■ HOW TO ORDER

U	1206	F	104	Z	C	T
Rated voltage	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Termination**	**Packaging**
N=10 VCD B=16 VCD T=25 VCD U=50 VCD A=100 VCD	Inch (mm) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1812 (4532)	N=NP0 (C0G) B=X7R F=Y5V	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 104=10x10^4 =100nF	B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5% K=±10% M=±20% Z=-20/+80% (B,C,D for Cap<10pF; F,G,J,K,M,Z for Cap≥ 10pF)	C:Lead-Free	B=Bulk T=7” reeled

■ INTERNAL SAP SYSTEM PART NUMBER

1206	F	104	Z	500	C	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Inch (mm) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1812 (4532)	N=NP0 (C0G) B=X7R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: R47=47pF 0R5=0.5pF 1R0=1.0pF 104=10x10^4 =100nF	B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5% K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 100=10 VDC 160=16 VDC 250=25 VDC 500=50 VDC 101=100 VDC	L=Ag/Ni/Sn (for NP0 dielectric) C=Cu/Ni/Sn (for X7R, Y5V dielectric)	B=Bulk C=Bulk cassette T=7” reeled G=13” reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Plastic tape	
			7” reel	13” reel	7” reel	13” reel
0402 (1005)	0.50 ± 0.05	N	10k	50k	-	-
0603 (1608)	0.80 ± 0.07	S	4k	15k	-	-
	0.80 + 0.15 / -0.10	X	4k	15k	-	-
0805 (2012)	0.60 ± 0.10	A	4k	15k	-	-
	0.80 ± 0.10	B	4k	15k	-	-
	1.25 ± 0.10	D	-	-	3k	10k
1206 (3216)	0.80 ± 0.10	B	4k	15k	-	-
	0.95 ± 0.10	C	-	-	3k	10k
	1.15 ± 0.15	J	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	1.60 + 0.30 / -0.10	P	-	-	2k	-
1210 (3225)	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	2.50 ± 0.30	M	-	-	1k	-
1812 (4532)	1.25 ± 0.10	D	-	-	1k	-
	2.00 ± 0.20	K	-	-	1k	-

Unit: pieces

■ CAPACITANCE RANGE

NP0 Dielectric

Dielectric		NPO																	
Size		0402				0603			0805			1206			1210			1812	
Rated Voltage (VDC)		16	25	50	100	16	50	100	16	50	100	16	50	100	16	50	100	50	100
capacitance	0.5pF (0R5)			N	N		S	S		A	A								
	0.6pF (0R6)			N	N		S	S		A	A								
	0.7pF (0R7)			N	N		S	S		A	A								
	0.8pF (0R8)			N	N		S	S		A	A								
	0.9pF (0R9)			N	N		S	S		A	A								
	1.0pF (1R0)			N	N		S	S		A	A								
	1.2pF (1R2)			N	N		S	S		A	A								
	1.5pF (1R5)			N	N		S	S		A	A		B	B					
	1.8pF (1R8)			N	N		S	S		A	A		B	B					
	2.2pF (2R2)			N	N		S	S		A	A		B	B					
	2.7pF (2R7)			N	N		S	S		A	A		B	B					
	3.3pF (3R3)			N	N		S	S		A	A		B	B					
	3.9pF (3R9)			N	N		S	S		A	A		B	B					
	4.7pF (4R7)			N	N		S	S		A	A		B	B					
	5.6pF (5R6)			N	N		S	S		A	A		B	B					
	6.8pF (6R8)			N	N		S	S		A	A		B	B					
	8.2pF (8R2)			N	N		S	S		A	A		B	B					
	10pF (100)			N	N		S	S		A	A		B	B			C		D
	12pF (120)			N	N		S	S		A	A		B	B			C		D
	15pF (150)			N	N		S	S		A	A		B	B			C		D
	18pF (180)			N	N		S	S		A	A		B	B			C		D
	22pF (220)			N	N		S	S		A	A		B	B		C	C		D
	27pF (270)			N	N		S	S		A	A		B	B		C	C		D
	33pF (330)			N	N		S	S		A	A		B	B		C	C		D
	39pF (390)			N	N		S	S		A	A		B	B		C	C		D
	47pF (470)			N	N		S	S		A	A		B	B		C	C		D
	56pF (560)			N	N		S	S		A	A		B	B		C	C		D
	68pF (680)			N	N		S	S		A	A		B	B		C	C		D
	82pF (820)			N	N		S	S		A	A		B	B		C	C		D
	100pF (101)			N	N		S	S		A	A		B	B		C	C		D
	120pF (121)			N	N		S	S		A	A		B	B		C	C		D
	150pF (151)			N	N		S	S		A	A		B	B		C	C		D
	180pF (181)			N			S	S		A	A		B	B		C	C		D
	220pF (221)			N			S	S		A	A		B	B		C	C		D
	270pF (271)	N	N				S	S		A	A		B	B		C	C		D
	330pF (331)	N					S	S		A	A		B	B		C	C		D
	390pF (391)	N					S	S		B	B		B	B		C	C		D
	470pF (471)	N					S	S		B	B		B	B		C	C		D
	560pF (561)						S	S		B	B		B	B		C	C		D
	680pF (681)						S			B	B		B	B		C	C		D
	820pF (821)						S			B	B		B	B		C	C		D
	1,000pF (102)						S			B	B		B	B		C	C	D	D
	1,200pF (122)					S				B	B		B	B		C	C	D	D
	1,500pF (152)					S				B	B		B	B		C	C	D	D
	1,800pF (182)					S				B	B		B	B		C	C	D	D
	2,200pF (222)					S				B	B		B	B		C	C	D	D
	2,700pF (272)					S				D	D		B	B		C	C	D	D
	3,300pF (332)					S				D	D		B	B		C	C	D	D
	3,900pF (392)									D	D		B	B		C	C	D	D
	4,700pF (472)									D			B	B		C	C	D	D
	5,600pF (562)								D				B	B		C	C	D	D
	6,800pF (682)								D				C	C		C	C	D	D
	8,200pF (822)								D				D	D		C	C	D	D
	0.010μF (103)								D				D			C	C	D	D
	0.012μF (123)								D			D			C	D	D	D	D
	0.015μF (153)											D			C	D	D	D	D
	0.018μF (183)											D						D	D
	0.022μF (223)											D						D	D
	0.027μF (273)											D						D	D
	0.033μF (333)											D						D	D
	0.039μF (393)											G							

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

X7R Dielectric

Dielectric		X7R																							
Size		0402				0603					0805					1206				1210			1812		
Rated Voltage (VDC)		10	16	25	50	10	16	25	50	100	10	16	25	50	100	16	25	50	100	25	50	100	25	50	100
capacitance	100pF (101)				N				S	S				B	B										
	120pF (121)				N				S	S				B	B										
	150pF (151)				N				S	S				B	B			B	B						
	180pF (181)				N				S	S				B	B			B	B						
	220pF (221)				N				S	S				B	B			B	B						
	270pF (271)				N				S	S				B	B			B	B						
	330pF (331)				N				S	S				B	B			B	B						
	390pF (391)				N				S	S				B	B			B	B						
	470pF (471)				N				S	S				B	B			B	B						
	560pF (561)				N				S	S				B	B			B	B						
	680pF (681)				N				S	S				B	B			B	B						
	820pF (821)				N				S	S				B	B			B	B						
	1,000pF (102)				N				S	S				B	B			B	B		C	C		D	D
	1,200pF (122)				N				S	S				B	B			B	B		C	C		D	D
	1,500pF (152)				N				S	S				B	B			B	B		C	C		D	D
	1,800pF (182)				N				S	S				B	B			B	B		C	C		D	D
	2,200pF (222)				N				S	S				B	B			B	B		C	C		D	D
	2,700pF (272)				N				S	S				B	B			B	B		C	C		D	D
	3,300pF (332)				N				S	S				B	B			B	B		C	C		D	D
	3,900pF (392)				N				S	S				B	B			B	B		C	C		D	D
	4,700pF (472)				N				S	S				B	B			B	B		C	C		D	D
	5,600pF (562)			N	N				S	S				B	B			B	B		C	C		D	D
	6,800pF (682)			N	N				S	S				B	B			B	B		C	C		D	D
	8,200pF (822)			N	N				S	S				B	B			B	B		C	C		D	D
	0.010μF (103)			N	N				S	S				B	B			B	B		C	C		D	D
	0.012μF (123)		N	N					S					B	B			B	B		C	C		D	D
	0.015μF (153)		N	N					S					B	B			B	B		C	C		D	D
	0.018μF (183)		N	N					S					B	B			B	B		C	C		D	D
	0.022μF (223)		N	N					S					B	B			B	B		C	C		D	D
	0.027μF (273)	N	N						S					B	D			B	B		C	C		D	D
	0.033μF (333)	N	N					S	X					B	D			B	B		C	C		D	D
	0.039μF (393)	N	N					S	X					B	D			B	B		C	C		D	D
	0.047μF (473)	N	N					S	X					B	D			B	B		C	C		D	D
	0.056μF (563)	N						S	X					B	D			B	B		C	C		D	D
	0.068μF (683)	N						S	X					B	D			B	B		C	C		D	D
	0.082μF (823)	N					S	S	X				B	B	D			B	D		C	C		D	D
	0.10μF (104)	N					S	S	X				B	B	D			B	D		C	C		D	D
	0.12μF (124)					S	S						B	D				B	D		C	C		D	D
	0.15μF (154)					S	S						D	D				C	G		C	D		D	D
	0.18μF (184)					S	S						D	D				C	G		C	D		D	D
	0.22μF (224)					S	S						D	D				C	G		C	D		D	D
	0.27μF (274)					X							D				C	D			C	G		D	D
	0.33μF (334)					X							D				C	D		C	D	G		D	D
	0.39μF (394)					X						D	D			C	J	P		C	D	M		D	D
	0.47μF (474)					X						D	D			J	J	P		C	D	M		D	K
	0.56μF (564)											D	D			J	J	P		D	D	M		D	K
	0.68μF (684)										D	D	D			J	J	P		D	D		D	K	K
	0.82μF (824)										D	D	D			J	J	P		D	D		D	K	K
	1.0μF (105)										D	D	D			J	J	P		D	D		D	K	K

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ CAPACITANCE RANGE

Y5V Dielectric (0402,0603,0805,Sizes)

Dielectric		Y5V												
Size		0402					0603				0805			
Rated Voltage (VDC)		6.3	10	16	25	50	10	16	25	50	16	25	50	100
capacitance	0.010μF (103)					N				S			A	B
	0.015μF (153)					N				S			A	B
	0.022μF (223)					N				S			A	B
	0.033μF (333)					N				S			A	B
	0.047μF (473)				N					S			A	B
	0.068μF (683)			N	N					S			A	B
	0.10μF (104)			N	N					S			A	B
	0.15μF (154)		N							S			A	B
	0.22μF (224)		N						S				A	
	0.33μF (334)	N	N						S				B	
	0.47μF (474)	N	N					S				B	B	
	0.68μF (684)	N					S	X			B	D		
	1.0μF (105)	N					S	X			B	D		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

Y5V Dielectric (1206,1210,1812 Sizes)

Dielectric		Y5V						
Size		1206			1210		1812	
Rated Voltage (VDC)		25	50	100	50	100	50	100
capacitance	0.010μF (103)	B	B	B		C		D
	0.015μF (153)	B	B	B		C		D
	0.022μF (223)	B	B	B		C		D
	0.033μF (333)	B	B	B		C		D
	0.047μF (473)	B	B	B		C		D
	0.068μF (683)	B	B	B		C		D
	0.10μF (104)	B	B	B	C	C	D	D
	0.15μF (154)	B	B	C	C	C	D	D
	0.22μF (224)	B	B	C	C	C	D	D
	0.33μF (334)	B	B		C	C	D	D
	0.47μF (474)	B	B		C		D	D
	0.68μF (684)	B	B		C		D	D
	1.0μF (105)	C	C		C		D	D

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

N	1206	F	106	Z	C	T
Rated voltage	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Termination**	**Packaging**
K=6.3 VCD N=10 VCD B=16 VCD T=20 VCD U=50 VCD	Inch (mm) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1812 (4532)	B=X7R X=X5R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 106=10x10^6 =10μF	K=±10% M=±20% Z=-20/+80%	C=Lead-Free	B=Bulk T=7”reeled

■ INTERNAL SAP SYSTEM PART NUMBER

1206	F	106	Z	100	C	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Inch (mm) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1812 (4532)	B=X7R X=X5R S=X6S F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 106=10x10^6 =10μF	K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3=6.3 VDC 100=10 VDC 160=16 VDC 250=25 VDC 500=50 VDC	C=Cu/Ni/Sn	B=Bulk C=Bulk cassette T=7”reeled G=13”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Plastic tape	
			7” reel	13” reel	7” reel	13” reel
0402 (1005)	0.50 ± 0.05	N	10k	50k	-	-
0603 (1608)	0.80 ± 0.07	S	4k	15k	-	-
	0.80 + 0.15 / -0.10	X	4k	15k	-	-
0805 (2012)	0.80 ± 0.10	B	4k	15k	-	-
	1.25 ± 0.10	D	-	-	3k	10k
	1..25 ± 0.20	I	-	-	3k	10k
1206 (3216)	0.95 ± 0.10	C	-	-	3k	10k
	1.15 ± 0.15	J	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	1.60 + 0.30 / -0.10	P	-	-	2k	-
1210 (3225)	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	2.00 ± 0.20	K	-	-	1k	-
	2.50 ± 0.30	M	-	-	1k	-
1812 (4532)	1.25 ± 0.10	D	-	-	1k	-
	2.00 ± 0.20	K	-	-	1k	-
	2.50 ± 0.30	M	-	-	0.5k	-

Unit: pieces

■ CAPACITANCE RANGE

X7R Dielectric

Dielectric		X7R																
Size		0402	0603				0805				1206				1210		1812	
Rated Voltage (VDC)		10	10	16	25	50	6.3	10	16	25	10	16	25	50	25	50	25	50
capacitance	0.10μF (104)	N		S	S	X												
	0.15μF (154)		S	S														
	0.22μF (224)		S	S														
	0.33μF (334)		X	X														
	0.47μF (474)		X	X														
	0.68μF (684)		X															
	1.0μF (105)		X					D	D	D		J	J	P	D	D	D	K
	1.5μF (155)											J						
	2.2μF (225)						I				J	J	P		G			
	3.3μF (335)										P							
	4.7μF (475)										P	P						

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

X5R Dielectric

Dielectric		X5R													
Size		0402			0603			0805			1206			1210	
Rated Voltage (VDC)		6.3	10	16	6.3	10	16	6.3	10	16	6.3	10	16	10	16
capacitance	0.027μF (273)			N											
	0.033μF (333)			N											
	0.039μF (393)			N											
	0.047μF (473)			N											
	0.056μF (563)		N	N											
	0.068μF (683)		N	N											
	0.082μF (823)		N	N											
	0.10μF (104)		N	N											
	0.15μF (154)	N													
	0.22μF (224)	N													
	0.33μF (334)					X	X								
	0.47μF (474)					X	X								
	0.68μF (684)				X	X	X								
	1.0μF (105)				X	X	X								
	1.5μF (155)				X								J		
	2.2μF (225)				X			I	I	I		J	J	K	K
	3.3μF (335)											P	P		
	4.7μF (475)							I	I	I		P	P	K	K
	6.8μF (475)										P	P			
	10μF (106)							I			P	P		K	K
	22μF (226)										P				

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

Y5V Dielectric

Dielectric		Y5V																						
Size		0402		0603			0805				1206					1210						1812		
Rated Voltage (VDC)		6.3	10	6.3	10	16	10	16	25	50	10	16	25	35	50	6.3	10	16	25	35	50	16	25	50
capacitance	0.15μF (154)		N																					
	0.22μF (224)		N																					
	0.33μF (334)	N	N																					
	0.47μF (474)	N	N																					
	0.68μF (684)	N																						
	1.0μF (105)	N			S	X	B	B	D	D		C	C		C						C			D
	1.5μF (155)				S		D	D				C	C						C					D
	2.2μF (225)				S		D	D				C	C						C					D
	3.3μF (335)			X			D	D			J	J	J						C					D
	4.7μF (475)			X			D	D			J	J	J	J				C	D					D
	6.8μF (685)						I				J	J						C	G					D
	10μF (106)						I				J	J						D	G	K			D	
	22μF (226)										P						K	K						
	47μF (476)																K							
	100μF (107)															M						M		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capactitance or other date, please contact POEI local representative.

■ HOW TO ORDER

TT	31	X	225	M	100	C	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
TT=Low profile	18=0603 (1608) 21=0805 (2012) 31=1206 (3216) 32=1210 (3225)	X=X5R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 225=22x10^5 =2,200,000pF =2.2μF	K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3=6.3 VDC 100=10 VDC 160=16 VDC	C=Cu/Ni/Sn	B=Bulk T=7"reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7" reel	
			Paper tape	Plastic tape
0603 (1608)	0.60	H	4k	-
0805 (2012)	0.95	T	4k	-
1206 (3216)	0.95	T	4k	-
	1.25	J	-	3k
1210 (3225)	0.95	T	-	3k

Unit: pieces

■ CAPACITANCE RANGE

Dielectric	Size	Capacitance	Tolerance	Rated Voltage (VDC)	Thickness Max (mm)	Part Number
X5R	0603	0.22μF	±10%, ±20%	10	0.60	TT 18X224□100CT
	0805	1.0μF	±10%, ±20%	10	0.95	TT 21X105□100CT
		4.7μF	±10%, ±20%	6.3	0.95	TT 21X475□6R3CCT
	1206	2.2μF	±10%, ±20%	10	0.95	TT 31X225□100CT
		4.7μF	±10%, ±20%	10	0.95	TT 31X475□100CT
		10μF	±10%, ±20%	10	1.25	TT 31X106□100CT
	1210	3.3μF	±10%, ±20%	10	0.95	TT 32X335□100CT
		4.7μF	±10%, ±20%	10	0.95	TT 32X475□100CT
Y5V	0805	2.2μF	-20/ +80%	16	0.95	TT 21F225Z160CT
		3.3μF	-20/ +80%	10	0.95	TT 21F335Z100CT
		4.7μF	-20/ +80%	10	0.95	TT 21F475Z100CT
	1206	4.7μF	-20/ +80%	16	0.95	TT 31F475Z160CT
		10μF	-20/ +80%	10	0.95	TT 31F106Z100CT
		10μF	-20/ +80%	16	1.25	TT 31F106Z160CT
	1210	10μF	-20/ +80%	10	0.95	TT 32F106Z100CT

□ Please specify the capacitance tolerance code.

1. This series product is suited to reflow soldering process only.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

0201	N	100	J	250	L	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Inch (mm) 0201 (0603)	N=NP0 (C0G) B=X7R X=X5R	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	B=±0.1pF C=±0.25pF D=±0.5pF G=±2% J=±5% K=±10% M=±20% (B,C,D for Cap<10pF; G,J,K,M for Cap≥10pF)	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3=6.3 VDC 100=10 VDC 160=16 VDC 250=25 VDC 500=50 VDC	L=Ag/Ni/Sn (for NP0 dielectric) C=Cu/Ni/Sn (for X7R, X5R, dielectric)	T=7”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape	
			7” reel	13” reel
0201 (0603)	0.30±0.03	L	15k	-

Unit: pieces

■ CAPACITANCE RANGE

Size		0201	
Dielectric		NPO	
Rated Voltage (VDC)		16	25
capacitance	0.3pF (0R3)		L
	0.4pF (0R4)		L
	0.5pF (0R5)		L
	1.0pF (1R0)		L
	1.2pF (1R2)		L
	1.5pF (1R5)		L
	1.8pF (1R8)		L
	2.2pF (2R2)		L
	2.7pF (2R7)		L
	3.3pF (3R3)		L
	3.9pF (3R9)		L
	4.7pF (4R7)		L
	5.6pF (5R6)		L
	6.8pF (6R8)		L
	8.2pF (8R2)		L
	10pF (100)		L
	12pF (120)		L
	15pF (150)		L
	18pF (180)		L
	22pF (220)		L
	27pF (270)		L
	33pF (330)		L
	39pF (390)		L
	47pF (470)		L
	56pF (560)	L	L
	68pF (680)	L	L
	82pF (820)	L	L
	100pF (101)	L	L

Size		0201					
Dielectric		X7R			X5R		
Rated Voltage (VDC)		16V	25V	50V	6.3V	10V	16V
capacitance	100pF (101)	L	L	L			
	120pF (121)	L	L	L			
	150pF (151)	L	L	L			
	180pF (181)	L	L	L			
	220pF (221)	L	L	L			
	270pF (271)	L	L	L			
	330pF (331)	L	L	L			
	390pF (391)	L	L	L			
	470pF (471)	L	L	L			
	560pF (561)	L	L	L			
	680pF (681)	L	L	L			
	820pF (821)	L	L	L			
	1,000pF (102)	L	L	L			
	1,500pF (152)	L					L
	2,200pF (222)	L					L
	3,300pF (332)	L					L
	4,700pF (472)	L					L
	6,800pF (682)					L	
	0.010μF (103)					L	
	0.015μF (153)				L		
	0.022μF (223)				L		
	0.033μF (333)				L		
	0.047μF (473)				L		
	0.068μF (683)						
	0.10μF (104)				L		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local sales representative.

■ HOW TO ORDER

H	1808	C	100	G	C	T
Rated voltage	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Termination**	**Packaging**
G=200 VDC H=250 VDC C=500 VDC D=630 VDC M=1000 VDC O=2000 VDC P=3000 VDC	Inch (mm) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1808 (4520) 1812 (4532)	C=NP0 (C0G) R=X7R F=Y5V	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	B=±0.1pF C=±0.25pF D=±0.5pF G=±2% J=±5% K=±10% M=±20% Z=-20/+80%	C=Lead-Free	B=Bulk T=7”reeled

* Partial X7R items are with Ag/Ni/Sn terminations please ref to below product range of X7R dielectric for detail.

■ INTERNAL SAP SYSTEM PART NUMBER

1206	F	106	Z	100	C	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Inch (mm) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1812 (4532)	B=X7R X=X5R S=X6S F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 106=10x10^6 =10μF	K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 210=200 VDC 251=250 VDC 501=500 VDC 531=630 VDC 102=1000 VDC 152=1500 VDC 202=2000 VDC 302=3000 VDC	C=Cu/Ni/Sn	B=Bulk C=Bulk cassette T=7”reeled G=13”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Plastic tape	
			7” reel	13” reel	7” reel	13” reel
0603 (1608)	0.80 ± 0.07	S	4k	15k	-	-
0805 (2012)	0.60 ± 0.10	A	4k	15k	-	-
	0.80 ± 0.10	B	4k	15k	-	-
	1.25 ± 0.10	D	-	-	3k	10k
1206 (3216)	0.80 ± 0.10	B	4k	15k	-	-
	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
1210 (3225)	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	2.50 ± 0.30	M	-	-	1k	-
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

■ CAPACITANCE RANGE

NP0 Dielectric 200V to 630V

Dielectric		NP0																	
Size		0603		0805				1206				1210				1812			
Rated Voltage (VDC)		200	250	200	250	500	630	200	250	500	630	200	250	500	630	200	250	500	630
capacitance	0.5pF (0R5)			A	A	A	A												
	1.0pF (1R0)			A	A	A	A												
	1.2pF (1R2)			A	A	A	A												
	1.5pF (1R5)			A	A	A	A	B	B	B	B								
	1.8pF (1R8)			A	A	A	A	B	B	B	B								
	2.2pF (2R2)			A	A	A	A	B	B	B	B								
	2.7pF (2R7)			A	A	A	A	B	B	B	B								
	3.3pF (3R3)			A	A	A	A	B	B	B	B								
	3.9pF (3R9)			A	A	A	A	B	B	B	B								
	4.7pF (4R7)			A	A	A	A	B	B	B	B								
	5.6pF (5R6)			A	A	A	A	B	B	B	B								
	6.8pF (6R8)			A	A	A	A	B	B	B	B								
	8.2pF (8R2)			A	A	A	A	B	B	B	B								
	10pF (100)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	12pF (120)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	15pF (150)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	18pF (180)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	22pF (220)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	27pF (270)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	33pF (330)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	39pF (390)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	47pF (470)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	56pF (560)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	68pF (680)	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	82pF (820)	S	S	A	A	B	B	B	B	B	B	C	C	C	C	D	D	D	D
	100pF (101)	S	S	A	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
	120pF (121)			A	B	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	150pF (151)			B	D	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	180pF (181)			B	D	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	220pF (221)			D	D	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	270pF (271)			D	D	D	D	B	C	C	C	C	C	C	C	D	D	D	D
	330pF (331)			D	D	D	D	B	C	C	C	C	C	C	C	D	D	D	D
	390pF (391)			D	D	D	D	B	C	C	C	C	C	C	C	D	D	D	D
	470pF (471)			D				C	C	C	C	C	C	C	C	D	D	D	D
	560pF (561)			D				C	D	D	D	C	C	C	C	D	D	D	D
	680pF (681)			D				C	D	D	D	C	C	C	C	D	D	D	D
	820pF (821)			D				C	G	G	G	C	C	C	C	D	D	D	D
	1,000pF (102)							C	G	G	G	D	D	D	D	D	D	D	D
	1,200pF (122)							C				D	D	D	D	D	D	D	D
	1,500pF (152)							D				D	D	D	D	D	D	D	D
	1,800pF (182)							D				D	D	D	D	D	D	D	D
	2,200pF (222)							D				D	D			D	D	D	D
	2,700pF (272)											D	D			D	D	D	D
	3,300pF (332)											D				D	D	D	D
	3,900pF (392)											D				D			
	4,700pF (472)															D			
	5,600pF (562)															D			
	6,800pF (682)															D			

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

NP0 Dielectric 1KV to 3KV

Dielectric		NP0									
Size		1206		1210		1808			1812		
Rated Voltage (VDC)		1000	2000	1000	2000	1000	2000	3000	1000	2000	3000
capacitance	1.5pF (1R5)	B	B								
	1.8pF (1R8)	B	B								
	2.2pF (2R2)	B	B			D	D	D			
	2.7pF (2R7)	B	B			D	D	D			
	3.3pF (3R3)	B	B			D	D	D			
	3.9pF (3R9)	B	B			D	D	D			
	4.7pF (4R7)	B	B			D	D	D			
	5.6pF (5R6)	B	B			D	D	D			
	6.8pF (6R8)	B	B			D	D	D			
	8.2pF (8R2)	B	B			D	D	D			
	10pF (100)	B	B	C	C	D	D	D	D	D	D
	12pF (120)	B	B	C	C	D	D	D	D	D	D
	15pF (150)	B	B	C	C	D	D	D	D	D	D
	18pF (180)	B	B	C	C	D	D	D	D	D	D
	22pF (220)	B	B	C	C	D	D	D	D	D	D
	27pF (270)	B	B	C	C	D	D	D	D	D	D
	33pF (330)	B	B	C	C	D	D	D	D	D	D
	39pF (390)	B	B	C	C	D	D	D	D	D	D
	47pF (470)	B	B	C	C	D	D	D	D	D	D
	56pF (560)	B	B	C	D	D	D	D	D	D	D
	68pF (680)	B	C	C	D	D	D	D	D	D	D
	82pF (820)	B	C	C	D	D	D	D	D	D	D
	100pF (101)	B	C	C	D	D	D	D	D	D	D
	120pF (121)	B	D	C	D	D	D	D	D	D	D
	150pF (151)	C	D	C	D	D	D	D	D	D	D
	180pF (181)	C	G	C	D	D	D	K	D	D	D
	220pF (221)	D	G	C	D	D	D	K	D	D	D
	270pF (271)	D		C		D	D	K	D	D	K
	330pF (331)	G		D		D	D		D	D	K
	390pF (391)	G		D		D	K		D	D	K
	470pF (471)	G		D		D	K		D	D	K
	560pF (561)					K	K		D	D	
	680pF (681)					K	K		D	K	
	820pF (821)					K			D	K	
	1,000pF (102)					K			K	K	
	1,200pF (122)								K		
	1,500pF (152)								K		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

X7R Dielectric 200V to 630V

Dielectric		X7R															
Size		0805				1206				1210				1812			
Rated Voltage (VDC)		200	250	500	630	200	250	500	630	200	250	500	630	200	250	500	630
capacitance	100pF (101)	B	B	B^	B^												
	120pF (121)	B	B	B^	B^												
	150pF (151)	B	B	B^	B^	D	D	D^	D^								
	180pF (181)	B	B	B^	B^	D	D	D^	D^								
	220pF (221)	B	B	B^	B^	D	D	D^	D^								
	270pF (271)	B	B	B^	B^	D	D	D^	D^								
	330pF (331)	B	B	B^	B^	D	D	D^	D^								
	390pF (391)	B	B	B^	B^	D	D	D^	D^								
	470pF (471)	B	B	B^	B^	D	D	D^	D^								
	560pF (561)	B	B	B^	B^	D	D	D^	D^								
	680pF (681)	B	B	B^	B^	D	D	D^	D^								
	820pF (821)	B	B	B^	B^	D	D	D^	D^								
	1,000pF (102)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	1,200pF (122)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	1,500pF (152)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	1,800pF (182)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	2,200pF (222)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	2,700pF (272)	B	B	B^	B^	D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	3,300pF (332)	B	B			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	3,900pF (392)	B	B			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	4,700pF (472)	B	B			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	5,600pF (562)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	6,800pF (682)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	8,200pF (822)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.010μF (103)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.012μF (123)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.015μF (153)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.018μF (183)	D	D			D	D	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.022μF (223)	D	D			D	D	G^	G^	C	C	D^	D^	D	D	D^	D^
	0.027μF (273)					D	D	G^	G^	C	C	G^	G^	D	D	D^	D^
	0.033μF (333)					G	G	G^	G^	C	C	G^	G^	D	D	D^	D^
	0.039μF (393)					G	G			C	C	G^	G^	D	D	D^	D^
	0.047μF (473)					G	G			D	D	G^	G^	D	D	D^	D^
	0.056μF (563)					G	G			D	D	G^	G^	D	D	K^	K^
	0.068μF (683)					G	G			G	G			D	D	K^	K^
	0.082μF (823)					G	G			G	G			D	D	K^	K^
	0.10μF (104)					G	G			G	G			D	D	K^	K^
	0.12μF (124)									G	G			D	D		
	0.15μF (154)									M	M			K	K		
	0.18μF (184)									M	M			K	K		
	0.22μF (224)									M	M			K	K		
	0.27μF (274)													K	K		
	0.33μF (334)													K	K		
	0.39μF (394)													K	K		
	0.47μF (474)													K	K		

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with 〝^〞 mark is expressed product with Ag/Ni/Sn terminations.
3. For more information about products with special capacitance or other data, please contact POEI local representative.

X7R Dielectric 1KV to 3KV

Dielectric		X7R								
Size		1206		1210	1808			1812		
Rated Voltage (VDC)		1000	2000	1000	1000	2000	3000	1000	2000	3000
capacitance	150pF (151)	B^	B^		D^	D^	D^			
	180pF (181)	B^	B^		D^	D^	D^			
	220pF (221)	B^	B^		D^	D^	D^			
	270pF (271)	B^	B^		D^	D^	D^	D^	D^	
	330pF (331)	B^	B^		D^	D^	K^	D^	D^	
	390pF (391)	B^	C^		D^	D^	K^	D^	D^	
	470pF (471)	B^	C^		D^	D^	K^	D^	D^	
	560pF (561)	B^	C^		D^	D^	K^	D^	D^	
	680pF (681)	B^	C^		D^	D^	K^	D^	D^	K^
	820pF (821)	B^	G^		D^	D^	K^	D^	D^	K^
	1,000pF (102)	B^	G^	C^	D^	K^	K^	D^	D^	K^
	1,200pF (122)	B^		C^	D^	K^		D^	D^	
	1,500pF (152)	C^		C^	D^	K^		D^	D^	
	1,800pF (182)	C^		C^	D^	K^		D^	D^	
	2,200pF (222)	D^		C^	D^	K^		D^	D^	
	2,700pF (272)	G^		C^	D^			D^	D^	
	3,300pF (332)	G^		D^	D^			D^	K^	
	3,900pF (392)	G^			D^			D^	K^	
	4,700pF (472)				D^			D^	K^	
	5,600pF (562)				K^			D^		
	6,800pF (682)				K^			D^		
	8,200pF (822)				K^			D^		
	0.010μF (103)				K^			D^		
	0.012μF (123)							K^		
	0.015μF (153)							K^		

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with 〝^〞 mark is expressed product with Ag/Ni/Sn terminations.
3. For more information about products with special capacitance or other data, please contact POEI local representative.

Y5V Dielectric 200V to 250V

Dielectric		Y5V							
Size		0805		1206		1210		1812	
Rated Voltage (VDC)		200	250	200	250	200	250	200	250
capacitance	0.010μF (103)	B	B	B	B	C	C	D	D
	0.015μF (153)	B	B	B	B	C	C	D	D
	0.022μF (223)	B	B	B	B	C	C	D	D
	0.033μF (333)	B	B	B	B	C	C	D	D
	0.047μF (473)	B	B	B	B	C	C	D	D
	0.068μF (683)	B	B	B	B	C	C	D	D
	0.10μF (104)			B	B	C	C	D	D
	0.15μF (154)			C	C	C	C	D	D
	0.22μF (224)							D	D
	0.33μF (334)							D	D
	0.47μF (474)							D	D
	0.68μF (684)							D	D
	1.0μF (105)								

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

S2	42	N	100	J	302	L	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
S2=X1/Y2	42=1808 (4520) 43=1812 (4532)	N=NP0 (C0G)	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 100=10x10^0 =10pF	J=±5% K=±10%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 302=3000 VDC	L=Ag/Ni/Sn	B=Bulk T=7”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7” reel / Paper 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

■ CAPACITANCE RANGE

Dielectric		NPO	
Rated Voltage (VAC)		250	
Rated Voltage (VDC)		3000	
Size		1808	1812
capacitance	10pF (100)	D	
	12pF (120)	D	D
	15pF (150)	D	D
	18pF (180)	D	D
	22pF (220)	D	D
	27pF (270)	D	D
	33pF (330)	D	D
	39pF (390)	D	D
	47pF (470)	D	D
	56pF (560)	D	D
	68pF (680)	D	D
	82pF (820)	D	D
	100pF (101)	D	D
	120pF (121)	D	D
	150pF (151)	D	D
	180pF (181)	K	D
	220pF (221)	K	D
	270pF (271)	K	K
	330pF (331)		K
	390pF (391)		K
	470pF (471)		K

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local sales representative.

■ 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 (C0G) 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	C=±0.25pF D=±0.5pF J=±5% K=±10% (C,D for Cap<10pF; J,K for Cap≥ 10pF)	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	B=Bulk T=7”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7” reel / Paper 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

■ CAPACITANCE RANGE

NP0 Dielectric

Dielectric		NPO			
Size		1808		1812	
Rated Voltage (VAC)		250		250	
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.
1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

X7R Dielectric

Dielectric		X7R			
Size		1808		1812	
Rated Voltage (VAC)		250		250	
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	

“*”means it is only available for UL safety certificated.
1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

HH	15	N	100	G	500	L	T
Series HH= High Q/ Low ESR	**Size** 15=0402 (1005) 18=0603 (1608)	**Dielectric** N=NP0 (C0G)	**Capacitance** 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	**Tolerance** B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5% (B,C,D for Cap<10pF; F,G,J, for Cap≥10pF)	**Rated voltage** Two significant digits followed by no. of zeros. And R is in place of decimal point. 160=16 VDC 250=25 VDC 500=50 VDC 101=100 VDC	**Termination** L=Ag/Ni/Sn	**Packaging** B=Bulk C=Bulk cassette T=7”reeled G=13”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape	
			7” reel	13” reel
0402	0.50±0.05	N	10k	20k
0603	0.80±0.07	S	4k	10k

Unit: pieces

■ ELECTRICAL CHARACTERISTICS

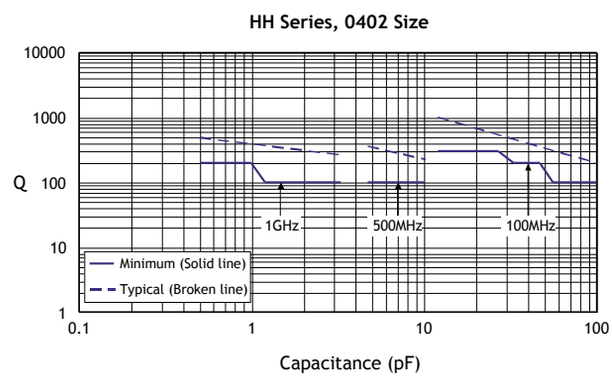


Fig. 2 Q factor specification vs. Specific frequency for 0402

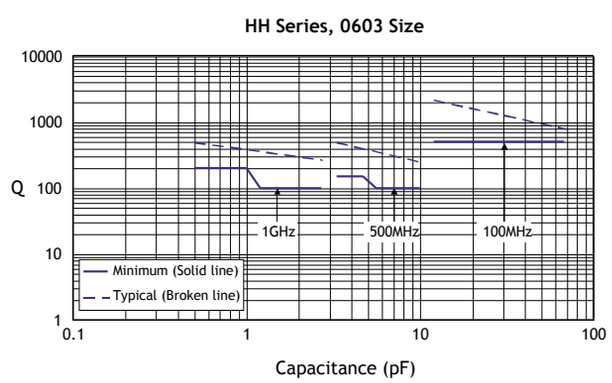


Fig. 3 Q factor specification vs. Specific frequency for 0603

■ CAPACITANCE RANGE

Dielectric		NPO				
Size		0402		0603		
Rated Voltage (VDC)		16	50	16	50	100
capacitance	0.5pF (0R5)		N		S	S
	0.6pF (0R6)		N		S	S
	0.7pF (0R7)		N		S	S
	0.8pF (0R8)		N		S	S
	0.9pF (0R9)		N		S	S
	1.0pF (1R0)		N		S	S
	1.2pF (1R2)		N		S	S
	1.5pF (1R5)		N		S	S
	1.8pF (1R8)		N		S	S
	2.2pF (2R2)		N		S	S
	2.7pF (2R7)		N		S	S
	3.3pF (3R3)		N		S	S
	3.9pF (3R9)		N		S	S
	4.7pF (4R7)		N		S	S
	5.6pF (5R6)		N		S	S
	6.8pF (6R8)		N		S	S
	8.2pF (8R2)		N		S	S
	10pF (100)		N		S	S
	12pF (120)		N		S	S
	15pF (150)		N		S	S
	18pF (180)		N		S	S
	22pF (220)		N		S	S
	27pF (270)		N		S	S
	33pF (330)		N		S	S
	39pF (390)		N		S	S
	47pF (470)		N		S	S
	56pF (560)		N		S	S
	68pF (680)		N		S	S
	82pF (820)		N		S	S
	100pF (101)		N		S	S
	120pF (121)		N		S	S
	150pF (151)		N		S	S
	180pF (181)		N		S	S
	220pF (221)		N		S	S
	270pF (271)	N			S	S
	330pF (331)	N			S	S
	390pF (391)	N			S	S
	470pF (471)	N			S	S
	560pF (561)				S	
	680pF (681)				S	
	820pF (821)				S	
	1,000pF (102)				S	
	1,200pF (122)			S		
	1,500pF (152)			S		
	1,800pF (182)			S		
	2,200pF (222)			S		
	2,700pF (272)			S		
	3,300pF (332)			S		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

MW	15	N	100	G	500	L	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
MW=Microwave	15=0402 (1005) 18=0603 (1608)	N=NP0 (C0J)	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	A=±0.05pF B=±0.1pF C=±0.25pF F=±1% G=±2% J=±5% A for Cap<5pF; B,C,D for Cap<10pF; F,G,J for Cap≥10pF)	Two significant digits followed byno. of zeros. And R is in place of decimal point. 500=50 VDC	L=Ag/Ni/Sn	B=Bulk C=Bulk cassette T=7"reeled G=13"reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape	
			7" reel	13" reel
0402	0.50±0.05	N	10k	20k
0603	0.80±0.07	S	4k	10k

Unit: pieces

■ ELECTRICAL CHARACTERISTICS

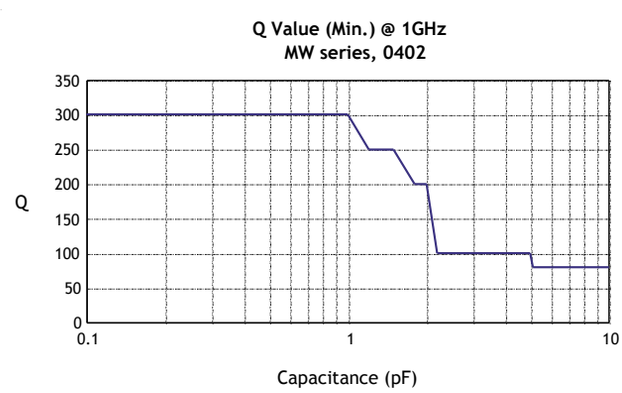


Fig. 2 Q value criteria vs. capacitance for 0402

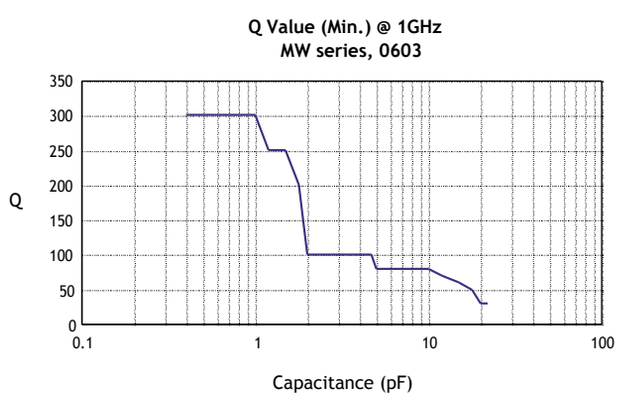


Fig. 3 Q value criteria vs. capacitance for 0603

■ CAPACITANCE RANGE

Dielectric		NPO	
Size		0402	0603
Rated Voltage (VDC)		50	50
capacitance	0.1pF (0R1)	N	
	0.2pF (0R2)	N	
	0.3pF (0R3)	N	
	0.4pF (0R4)	N	S
	0.5pF (0R5)	N	S
	0.6pF (0R6)	N	S
	0.7pF (0R7)	N	S
	0.8pF (0R8)	N	S
	0.9pF (0R9)	N	S
	1.0pF (1R0)	N	S
	1.2pF (1R2)	N	S
	1.5pF (1R5)	N	S
	1.8pF (1R8)	N	S
	2.0pF (2R0)	N	S
	2.2pF (2R2)	N	S
	2.7pF (2R7)	N	S
	3.0pF (3R0)	N	S
	3.3pF (3R3)	N	S
	3.9pF (3R9)	N	S
	4.0pF (4R0)	N	S
	4.7pF (4R7)	N	S
	5.0pF (5R0)	N	S
	5.6pF (5R6)	N	S
	6.0pF (6R0)	N	S
	6.8pF (6R8)	N	S
	7.0pF (7R0)	N	S
	8.0pF (8R0)	N	S
	8.2pF (8R2)	N	S
	9.0pF (9R0)	N	S
	10pF (100)	N	S
	12pF (120)		S
	15pF (150)		S
	18pF (180)		S
	22pF (220)		S

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

OP	32	B	103	K	201	C	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
OP=Open-mode	21=0805 (2012) 31=1206 (3216) 32=1210 (3225) 43=1812 (4532)	B=X7R	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: $102=10x10^2$ =1000pF	K=±10% M=±20%	Two significant digits followed byno. of zeros. And R is in place of decimal point. 101=100 VDC 201=200 VDC 251=250 VDC 501=500 VDC	L=Ag/Ni/Sn C=Cu/Ni/Sn (Note 1)	B=Bulk T=7”reeled G=13”reeled

Note 1: Please see below product rang table to find right temination code.

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Plastic tape	
			7” reel	13” reel	7” reel	13” reel
0805	0.80 ± 0.10	B	4k	15k	-	-
	1.25 ± 0.10	D	-	-	3k	10k
1206	0.80 ± 0.10	B	4k	15k	-	-
	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
1210	0.95 ± 0.10	C	-	-	3k	10k
	1.25 ± 0.10	D	-	-	3k	10k
	1.60 ± 0.20	G	-	-	2k	-
	2.50 ± 0.30	M	-	-	1k	-
1812	1.25 ± 0.10	D	-	-	1k	-
	2.00 ± 0.20	K	-	-	1k	-

Unit: pieces

■ INNER CONSTRUCTION OF OPEN-MODE DESIGN

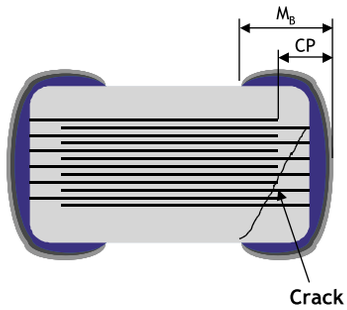


Fig. 2 Normal design (CP<M_B)–circuit leakage during cracking.

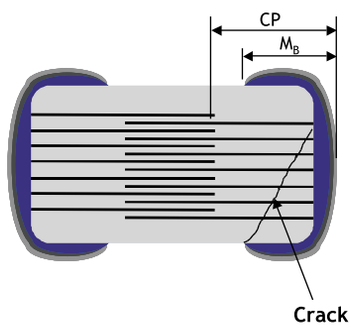


Fig. 3 Open-mode design (CP>M_B)–circuit open during cracking.

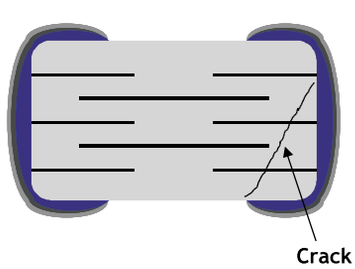


Fig. 4 Floating design (one kind of open-mode design)–circuit open during cracking.

■ CAPACITANCE RANGE

Dielectric		X7R															
Size		0805				1206				1210				1812			
Rated Voltage (VDC)		100	200	250	500	100	200	250	500	100	200	250	500	100	200	250	500
capacitance	100pF (101)	B	B	B	B^												
	120pF (121)	B	B	B	B^												
	150pF (151)	B	B	B	B^	B	D	D	D^								
	180pF (181)	B	B	B	B^	B	D	D	D^								
	220pF (221)	B	B	B	B^	B	D	D	D^								
	270pF (271)	B	B	B	B^	B	D	D	D^								
	330pF (331)	B	B	B	B^	B	D	D	D^								
	390pF (391)	B	B	B	B^	B	D	D	D^								
	470pF (471)	B	B	B	B^	B	D	D	D^								
	560pF (561)	B	B	B	B^	B	D	D	D^								
	680pF (681)	B	B	B	B^	B	D	D	D^								
	820pF (821)	B	B	B	B^	B	D	D	D^								
	1,000pF (102)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	1,200pF (122)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	1,500pF (152)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	1,800pF (182)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	2,200pF (222)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	2,700pF (272)	B	B	B	B^	B	D	D	D^	C	C	C	C^	D	D	D	D^
	3,300pF (332)	B	B	B		B	D	D	D^	C	C	C	C^	D	D	D	D^
	3,900pF (392)	B	B	B		B	D	D	D^	C	C	C	C^	D	D	D	D^
	4,700pF (472)	B	B	B		B	D	D	D^	C	C	C	C^	D	D	D	D^
	5,600pF (562)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	6,800pF (682)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	8,200pF (822)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	0.010μF (103)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	0.012μF (123)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	0.015μF (153)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	0.018μF (183)	B	D	D		B	D	D	D^	C	C	C	C^	D	D	D	D^
	0.022μF (223)	B	D	D		B	D	D	G^	C	C	C	D^	D	D	D	D^
	0.027μF (273)	D				B	D	D	G^	C	C	C	G^	D	D	D	D^
	0.033μF (333)	D				B	G	G	G^	C	C	C	G^	D	D	D	D^
	0.039μF (393)	D				B	G	G		C	C	C	G^	D	D	D	D^
	0.047μF (473)	D				B	G	G		C	D	D	G^	D	D	D	D^
	0.056μF (563)					B	G	G		C	D	D	G^	D	D	D	K^
	0.068μF (683)					B	G	G		C	G	G		D	D	D	K^
	0.082μF (823)					B	G	G		C	G	G		D	D	D	K^
	0.10μF (104)					D	G	G		C	G	G		D	D	D	K^
	0.12μF (124)					D				C	G	G		D	D	D	
	0.15μF (154)					G				D	M	M		D	K	K	
	0.18μF (184)					G				D	M	M		D	K	K	
	0.22μF (224)					G				D	M	M		D	K	K	
	0.27μF (274)									G				D	K	K	
	0.33μF (334)									G				D	K	K	
	0.39μF (394)									M				D	K	K	
	0.47μF (474)									M				K	K	K	
	0.56μF (564)									M				K			
	0.68μF (684)													K			
	0.82μF (824)													K			
	1.0μF (105)													K			

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with 〝^〞 mark is expressed product with Ag/Ni/Sn terminations.
3. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

LD	31	B	102	K	201	L	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
LD=Low Distortion	31=1206 (3216)	B=X7R	Two significant digits followed by no. of zeros. And R is in place of decimal point. Eg.: $102=10x10^2$ =1000pF	K=±10% M=±20%	Two significant digits followed byno. of zeros. And R is in place of decimal point. 101=100 VDC 201=200 VDC 251=250 VDC	L=Ag/Ni/Sn	B=Bulk T=7”reeled G=13”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Paper tape	
			7” reel	13” reel	7” reel	13” reel
1206	1.25±0.10	D	-	-	3k	10k

Unit: pieces

■ CAPACITANCE RANGE

Dielectric		X7R		
Size		1206		
Rated Voltage (VDC)		100	200	250
capacitance	100pF (101)			
	120pF (121)			
	150pF (151)	D	D	D
	180pF (181)	D	D	D
	220pF (221)	D	D	D
	270pF (271)	D	D	D
	330pF (331)	D	D	D
	390pF (391)	D	D	D
	470pF (471)	D	D	D
	560pF (561)	D	D	D
	680pF (681)	D	D	D
	820pF (821)	D	D	D
	1000pF (102)	D	D	D
	1200pF (122)	D	D	D
	1500pF (152)	D	D	D
	1800pF (182)	D	D	D
	2200pF (222)	D	D	D
	2700pF (272)	D	D	D
	3300pF (332)	D	D	D
	3900pF (392)	D	D	D
	4700pF (472)	D	D	D
	5600pF (562)	D	D	D
	6800pF (682)	D	D	D
	8200pF (822)	D	D	D
	0.010μF (103)	D	D	D
	0.012μF (123)	D	D	D
	0.015μF (153)	D	D	D
	0.018μF (183)	D	D	D
	0.022μF (223)	D	D	D
	0.027μF (273)	D	D	D
	0.033μF (333)	D	D	D
	0.039μF (393)	D	D	D
	0.047μF (473)	D	D	D
	0.056μF (563)	D		
	0.068μF (683)	D		
	0.082μF (823)	D		
	0.1μF (104)	D		

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local representative.

■ HOW TO ORDER

Y	4C	3	B	103	K	500	C	T
Series	**Cap. Nr.**	**Termination pitch**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Y=Capacitor Array	4C=4xCap	3=0.03" pitch	N=NP0 (C0G) B=X7R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 103=10x10^3 =10,000pF =10nF	J=±5% K=±10% M=±20% Z=-20%~+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 160=16 VDC 250=25 VDC 500=50 VDC	L=Ag/Ni/Sn (for NP0 dielectric) C=Cu/Ni/Sn (for X7R, Y5V, dielectric)	T=7"reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape	
			7" reel	13" reel
4 x 0603	0.80±0.10	B	4k	-

Unit: pieces

■ CAPACITANCE RANGE

Size		4 x 0603			
Dielectric		NPO	X7R		Y5V
Rated Voltage (VDC)		50	16	50	50
capacitance	10pF (100)	B			
	15pF (150)	B			
	22pF (220)	B			
	33pF (330)	B			
	47pF (470)	B			
	68pF (680)	B			
	100pF (101)	B			
	150pF (151)	B			
	180pF (181)	B		B	
	220pF (221)	B		B	
	330pF (331)	B		B	
	470pF (471)	B		B	
	1,000pF (102)			B	
	1,500pF (152)			B	
	2,200pF (222)			B	
	3,300pF (332)			B	
	4,700pF (472)			B	
	6,800pF (682)			B	
	0.010μF (103)			B	B
	0.015μF (153)		B	B	
	0.022μF (223)		B	B	B
	0.033μF (333)		B		
	0.047μF (473)		B		B
	0.068μF (683)		B		
	0.10μF (104)		B		B

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local sales representative.

■ HOW TO ORDER

0612	B	103	K	500	C	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
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=50 VDC	C=Cu/Ni/Sn	T=7”reeled

■ PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		7” reel / Paper tape
0612 (1632)	0.80±0.10	B	4k

Unit: pieces

■ CAPACITANCE RANGE

Size		X7R
Dielectric		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
	150pF (154)	B

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact POEI local sales representative.

<table>
<tr><th>NO.</th><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>1.</td><td>Visual and Mechanical</td><td>---</td><td>* No remarkable defect.
* Dimensions to confirm to individual specification sheet.</td></tr>
<tr><td>2.</td><td>Capacitance</td><td rowspan="2">Class I : NP0
Cap≤1000pF 1.0±0.2Vrms, 1MHz±10%
Cap>1000pF 1.0±0.2Vrms, 1KHz±10%

Class II : X7R, X5R, Y5V
Cap≤10±F, 1.0±0.2Vrms, 1KHz±10%
Cap>10±F, 0.5±0.2Vrms, 120Hz±20%</td><td>* Shall not exceed the limits given in the detailed spec.</td></tr>
<tr><td>3.</td><td>Q/ D.F.
(Dissipation Factor)</td><td>NP0: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C
X7R / X5R:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤2.5%</td><td>≤3%</td><td>0201(50V);0603≥0.047μF;0805≥0.18μF;
1206≥0.47μF</td></tr>
<tr><td rowspan="3">25V</td><td rowspan="3">≤3.5%</td><td>≤5%</td><td>0805≥1μF, 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF;TT series & Cap≥1μF;
0402≥0.1μF;0805≥2.2μF;1206≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0603≥0.68μF, 0805≥4.7μF; 1206≥6.8μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥4700pF;0402≥0.033μF; 0603≥0.15μF;
0805≥0.68μF;1206≥2.2μF;1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0603≥0.68μF;0805≥2.2μF; 1206≥6.8μF;
1210≥22μF;TT series & Cap≥1μF</td></tr>
<tr><td>10V</td><td>≤5.0%</td><td>≤10%</td><td>0603≥1μF;0805≥2.2μF;1206≥6.8μF;
1210≥22μF;TT series & Cap≥1μF</td></tr>
<tr><td>6.3V</td><td>≤10%</td><td>≤15%</td><td>0603≥10μF; 0805≥10μF;1210≥100μF;
TT series & Cap≥1μF</td></tr>
</table>
X7R, LD series; 100V: DF ≤ 1.4%; 200V & 250V: DF ≤ 1.0%

Y5V
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤5%</td><td>≤7%</td><td>0603≥0.1μF;0805≥0.47μF</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤5%</td><td>≤7%</td><td>0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;
1206≥1μF;1210≥4.7μF</td></tr>
<tr><td>≤9%</td><td>0402≥0.068μF;0603≥0.47μF;1206≥4.7μF</td></tr>
<tr><td>16V(C<1μF)</td><td>≤7%</td><td>≤9%</td><td>0402≥0.068μF;0603≥0.68μF</td></tr>
<tr><td>16V(C≥1μF)</td><td>≤9%</td><td>≤12.5%</td><td>0805≥4.7μF;1206≥10μF;1210≥22μF;
1812≥47μF;TT series & Cap≥1μF</td></tr>
<tr><td>10V</td><td>≤12.5%</td><td>---</td><td>---</td></tr>
<tr><td>6.3V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table></td></tr>
<tr><td>4a.</td><td>Dielectric Strength</td><td>* To apply voltage (≤50V) 250%.
* Duration : 1 to 5 sec.
* Charge & discharge current less than 50mA.

* To apply voltage :
100V ≥3 times V DC
200V ~ 300V&LD series ≥2 times V DC
500V ~ 999V ≥1.5 times V DC
1000V ~ 3000V ≥1.2 times V DC
* Cut-off, set at 10mA
* TEST= 15 sec.
* RAMP=0</td><td>* No evidence of damage or flash over during test.</td></tr>
<tr><td>4b.</td><td>Dielectric Strength
(for X1/Y2 & X2/Y3)</td><td>* To apply 1500 VAC voltage.
* Duration: 60 sec.</td><td>* No evidence of damage or flash over during test.</td></tr>
<tr><td rowspan="3">5.</td><td rowspan="3">Insulation Resistance</td><td colspan="2">To apply rated voltage for max. 120 sec.</td><td>≥10GΩ or RxC≥500Ω-F whichever is smaller.
6.3V: RxC≥100Ω-F</td></tr>
<tr><td>Rated voltage:
200 ~ 630V</td><td>To apply rated voltage (500V max) for 60 sec</td><td>≥10GΩ or RxC≥100Ω-F whichever is smaller.</td></tr>
<tr><td>Rated voltage:
> 630V</td><td>To apply 500V max for 60 sec</td><td>≥10GΩ</td></tr>
<tr><td>6.</td><td>Temperature Coefficient</td><td>With no electrical load.
<table>
<tr><th>T.C.</th><th>Operating Temp</th></tr>
<tr><td>NPO (C0G)</td><td>-55~125°C at 25°C</td></tr>
<tr><td>NPO (C0J)</td><td>-55~125°C at 25°C</td></tr>
<tr><td>X7R</td><td>-55~125°C at 25°C</td></tr>
<tr><td>X5R</td><td>-55~85°C at 25°C</td></tr>
<tr><td>Y5V</td><td>-25~85°C at 20°C</td></tr>
</table></td><td>
<table>
<tr><th>T.C.</th><th>Capacitance Change</th></tr>
<tr><td>NPO (C0G)</td><td>Within ±30ppm / °C</td></tr>
<tr><td>NPO (C0J)</td><td>Within ±120ppm / °C</td></tr>
<tr><td>X7R</td><td>Within ±15%</td></tr>
<tr><td>X5R</td><td>Within ±15%</td></tr>
<tr><td>Y5V</td><td>Within ±30%/-80%</td></tr>
</table></td></tr>
<tr><td>7.</td><td>Adhesive Strength of Termination</td><td>* Pressurizing force:
0201: 2N
0402 & 0603: 5N
>0603: 10N
* Test time: 10±1 sec.</td><td>* No remarkable damage or removal of the terminations.</td></tr>
<tr><td>8.</td><td>Vibration Resistance</td><td>* Vibration frequency: 10~55 Hz/min.
* Total amplitude: 1.5mm
* Test time: 6 hrs. (Two hrs each in three mutually perpendicular directions.)</td><td>* No remarkable damage.
* Cap change and Q/D.F.: To meet initial spec.</td></tr>
</table>

<table>
<tr><th>NO.</th><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>9.</td><td>Solderability</td><td>* Solder temperature: 235±5 °C
* Dipping time: 2±0.5 sec.</td><td>95% min. coverage of all metalized area.</td></tr>
<tr><td>10.</td><td>Bending Test</td><td>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec.
* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.
* Cap change:
NP0: within ±5.0% or ±0.5pF whichever is larger.
X7R, X5R: within ±12.5%
Y5V: within ±30%
(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</td></tr>
<tr><td>11.</td><td>Resistance to Soldering Heat</td><td>* Solder temperature: 270±5°C
* Dipping time: 10±1 sec
* Preheating: 120 to 150°C for 1 minute before immerse the capacitor in an eutectic solder.
* Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 48±4 hrs at room temp.
* Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II).</td><td>* No remarkable damage.
* Cap change:
NP0: within ±2.5% or ±0.25pF whichever is larger.
X7R, X5R: within ±7.5%
Y5V: within ±20%
* Q/D.F., I.R. and dielectric strength: To meet initial requirements.
* 25% max. leaching on each edge.</td></tr>
<tr><td>12.</td><td>Temperature Cycle</td><td>* Conduct the five cycles according to the temperatures and time.
<table>
<tr><th>Step</th><th>Temp.(°C)</th><th>Time.(min.)</th></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>
* Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 48±4 hrs at room temp.
* Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II).</td><td>* No remarkable damage.
* Cap change:
NP0: within ±2.5% or ±0.25pF whichever is larger.
X7R, X5R: within ±7.5%
Y5V: within ±20%
* Q/D.F., I.R. and dielectric strength: To meet initial requirements.</td></tr>
<tr><td>13.</td><td>Humidity (Steady State)</td><td>* Test temp.: 40±2°C
* Humidity: 90~95% RH
* Test time: 500+24/-0hrs.
* Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II).</td><td>* No remarkable damage.
* Cap change: NP0: within ±5.0% or ±0.5pF whichever is larger.
X7R/X5R: ≥10V, within ±12.5%, 6.3V, within ±25%
TT series & Cap≥1μF, within ±25%
Y5V: ≥10V, within ±30%, 6.3V, within +30/-40%
* Q/D.F. value:
NP0: Cap≥30pF Q≥350, 10pF≤Cap<30pF, Q≥275+2.5C
Cap>10pF Q≥200+10C
X7R/X5R:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤3%</td><td>≤6%</td><td>0201(50V);0603≥0.047μF;0805≥0.18μF;
1206≥0.47μF</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0805≥1μF;1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF;1210≥10μF;TT series & Cap≥
1μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0402≥0.033μF;0603≥0.15μF;
0805≥0.68μF;1206≥2.2μF;1210≥4.7μF;
TT series & Cap≥1μF</td></tr>
<tr><td>≤15%</td><td>1210≥22μF</td></tr>
<tr><td>10V</td><td>≤7.5%</td><td>≤15%</td><td>0402≥0.056μF;0603≥0.33μF;
0805≥2.2μF;1206≥2.2μF;1210≥22μF;
TT series & Cap≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0603≥10μF; 0805≥10μF;1210≥100μF;
TT series & Cap≥1μF</td></tr>
</table>
Y5V:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤7.5%</td><td>---</td><td>---</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤7.5%</td><td>≤10%</td><td>0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;
1206≥1μF;1210≥4.7μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.47μF</td></tr>
<tr><td>16V(C<1.0μF)</td><td>≤10%</td><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.68μF</td></tr>
<tr><td>16V(C≥1.0μF)</td><td>≤12.5%</td><td>≤20%</td><td>0805≥4.7μF;1206≥10μF;1210≥22μF;
1812≥47μF;TT series & Cap≥1μF</td></tr>
<tr><td>10V</td><td>≤15%</td><td>---</td><td>---</td></tr>
<tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥10V 1GΩ or 50Ω-F whichever is smaller.
6.3V 1GΩ-F</td></tr>
</table>

<table>
<tr><th>NO.</th><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>14.</td><td>Humidity Load (Damp Heat)</td><td>* Test temp.: 40±2°C
* Humidity: 90~95%RH
* Test time: 500+24/-0 hrs.
* To apply voltage: rated voltage (Max. 500V)
* Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II).</td><td>* No remarkable damage.
* Cap change: NP0: within ±7.5% or ±0.75pF whichever is larger.
X7R/X5R: ≥10V, within ±12.5%, 6.3V, within ±25%
TT series & Cap≥1μF, within ±25%
Y5V: ≥10V, within ±30%, 6.3V, within +30 / -40%
* Q/D.F. value:
NP0: C≥30pF, Q≥200; C<30pF, Q≥100+10/3C
X7R / X5R:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤3%</td><td>≤6%</td><td>0201(50V), 0603≥0.047μF;0805≥0.18μF;
1206≥0.47μF</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0805≥1μF, 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF;1206≥10μF;TT series & Cap≥1μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0402≥0.033μF;0603≥0.15μF;0805≥0.68μF;
1206≥2.2μF;1210≥4.7μF;TT series & Cap≥1μF</td></tr>
<tr><td>≤15%</td><td>1210≥22μF</td></tr>
<tr><td>10V</td><td>≤7.5%</td><td>≤15%</td><td>0402≥0.056μF;0603≥0.33μF;
0805≥2.2μF;1206≥2.2μF;1210≥22μF;
TT series & Cap≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0603≥10μF;0805≥10μF;1210≥100μF;
TT series & Cap≥1μF</td></tr>
</table>
Y5V:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤7.5%</td><td>---</td><td>---</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤7.5%</td><td>≤10%</td><td>0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;
1206≥1μF;1210≥4.7μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.47μF</td></tr>
<tr><td>16V(C<1.0μF)</td><td>≤10%</td><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.68μF</td></tr>
<tr><td>16V(C≥1.0μF)</td><td>≤12.5%</td><td>≤20%</td><td>0805≥4.7μF;1206≥10μF;1210≥22μF;
1812≥47μF;TT series & Cap≥1μF</td></tr>
<tr><td>10V</td><td>≤15%</td><td>---</td><td>---</td></tr>
<tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥10V, 500MΩ-F or 25Ω-F whichever is smaller. 6.3V, 5Ω-F</td></tr>
<tr><td>15.</td><td>High Temperature Load (Endurance)</td><td>* Test temp.:
NP0, X7R: 125±3°C
X5R, Y5V: 85±3°C
* To apply voltage:
(1) 6.3V or C≥10μF (for X7R, X5R): 150% of rated voltage.
(2) 6.3V<V<500V and C<10μF (for X7R, X5R):
200% of rated voltage.
(3) 500V: 150% of rated voltage.
(4) V≥630V: 120% of rated voltage.
* Test time: 1000+24/-0 hrs.
* Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II).</td><td>* No remarkable damage.
* Cap change: NP0: within ±3.0% or ±0.3pF whichever is larger.
X7R/X5R: ≥10V, within ±12.5%, 6.3V, within ±25%
TT series & Cap≥1μF, within ±25%
Y5V: ≥10V, within ±30%
6.3V, within +30 to -40%
* Q/D.F. value:
NP0: Cap≥30pF, Q≥350
10pF≤Cap<30pF, Q≥275+2.5C
Cap<10pF, Q≥200+10C
X7R / X5R:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤3%</td><td>≤6%</td><td>0201(50V); 0603≥0.047μF;0805≥0.18μF;
1206≥0.47μF</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0805≥1μF, 1206≥1μF, 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF; 1210≥10μF;
TT series & Cap≥1μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0402≥0.033μF;0603≥0.15μF;0805≥0.68μF;
1206≥2.2μF; 1210≥4.7μF;TT series & Cap≥1μF</td></tr>
<tr><td>≤15%</td><td>1210≥22μF</td></tr>
<tr><td>10V</td><td>≤7.5%</td><td>≤15%</td><td>0402≥0.056μF;0603≥0.33μF;0805≥2.2μF;
1206≥2.2μF;1210≥22μF;TT series & Cap≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0603≥10μF;0805≥10μF;1210≥100μF;
TT series & Cap≥1μF</td></tr>
</table>
Y5V:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception D.F.≤</th></tr>
<tr><td>≥50V</td><td>≤7.5%</td><td>---</td><td>---</td></tr>
<tr><td rowspan="2">25V</td><td rowspan="2">≤7.5%</td><td>≤10%</td><td>0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;
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<tr><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.47μF</td></tr>
<tr><td>16V(C<1μF)</td><td>≤10%</td><td>≤12.5%</td><td>0402≥0.068μF;0603≥0.68μF</td></tr>
<tr><td>16V(C≥1μF)</td><td>≤12.5%</td><td>≤20%</td><td>0805≥4.7μF;1206≥10μF;1210≥22μF;
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<tr><td>10V</td><td>≤15%</td><td>---</td><td>---</td></tr>
<tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥10V 1GΩ or 50Ω-F whichever is smaller.
6.3V, 10Ω-F</td></tr>
</table>

❖ Constructions

NO.	Name		NPO/X7R	X7R/X5R/Y5V
①	Ceramic material		$BaTiO_3$ based	
②	Inner electrode		AgPd alloy	Ni
③	Termination	Inner layer	Ag	Cu
④		Middle layer	Ni	
⑤		Outer layer	Sn (Matt)	

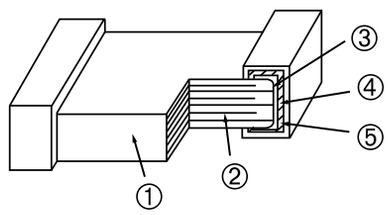

Fig.1 The construction of MLCC

❖ 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 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 N2 within oven are recommended.

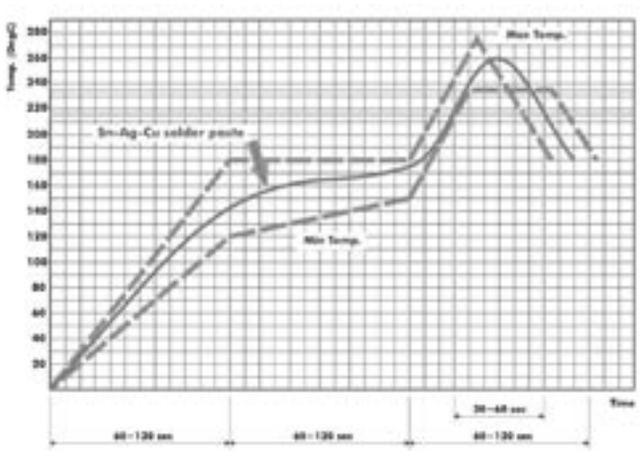

Fig. 2 IR reflow soldering profile for SMT process with SnAgCu series solder paste.

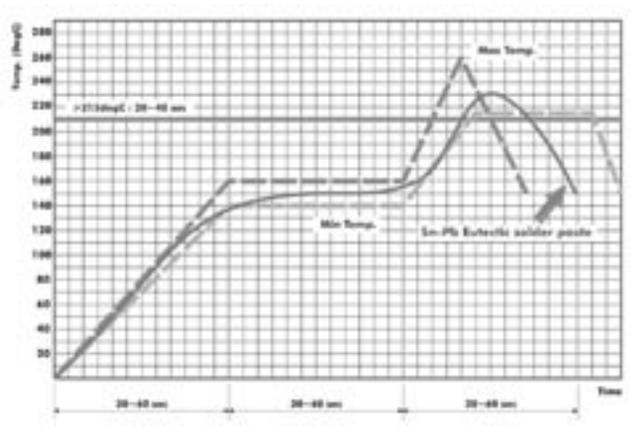

Fig. 3 IR reflow soldering profile for SMT process with eutectic SnPb solder paste.