PASSIVE SYSTEM ALLIANCE
Walsin Technology Corporation

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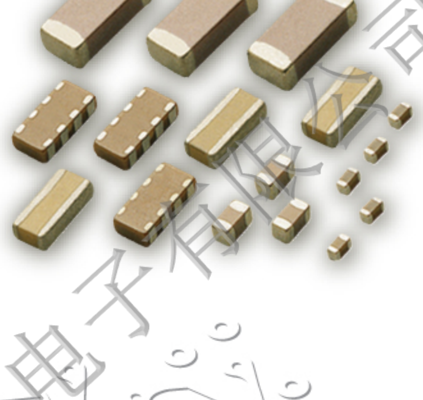
WALSIN ALWAYS AROUND YOU

Multilayer Ceramic Capacitors

Product catalog



昆山同凯电子有限公司

華新科技股份有限公司
Walsin Technology Corporation

PSA 華科事業群 PASSIVE SYSTEM ALLIANCE

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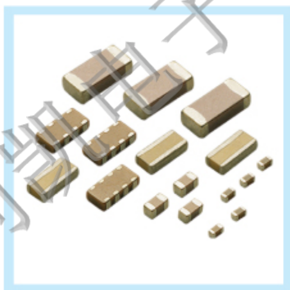
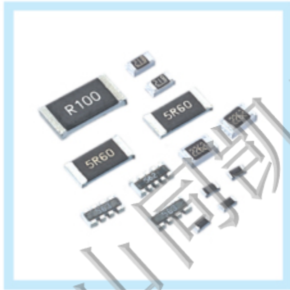
Product Portfolio



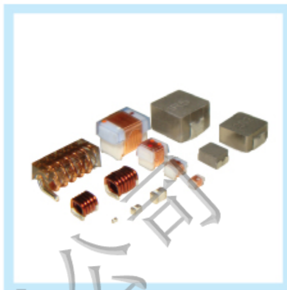
Multilayer Ceramic Capacitors (MLCC)



Chip-Resistor

Disc Capacitors

RF Device and High Frequency Inductors



Inductors

Varistors and SMD-Varistors

IEC-63 Nominal Resistance / Capacitance

E1	100																							
E3	100								220								470							
E6	100				150				220				330				470				680			
E12	100		120		150		180		220		270		330		390		470		560		680		820	
E24	100	110	120	130	150	160	180	200	220	240	270	300	330	360	390	430	470	510	560	620	680	750	820	910
E96	100	102	121	124	147	150	178	182	215	221	261	267	316	324	383	392	464	475	562	576	681	698	825	845
	105	107	127	130	154	158	187	191	226	232	274	280	332	340	402	412	487	499	590	604	715	732	866	887
	110	113	133	137	162	165	196	200	237	243	287	294	348	357	422	432	511	523	619	634	750	768	909	931
	115	118	140	143	169	174	205	210	249	255	301	309	365	374	442	453	536	549	649	665	787	806	953	976

E6: $\sqrt[6]{10} \fallingdotseq 1.46$ E12: $\sqrt[12]{10} \fallingdotseq 1.21$
E1 series resistance: 1Ω, 10Ω, 100Ω, 1000Ω, 10000Ω, 100000Ω

"Vector Graphics by VectorOpenStock.com"

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*The specifications are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering.
*This catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

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■ QUICK PRODUCT INFORMATION

Series	Dielectric	Size	Capacitance	Rated voltage	Page
General Purpose Caps (6.3V~100V)	NPO	0201, 0402, 0603,0805, 1206, 1210, 1812,1825,2220,2225	0.1pF~0.1μF	10V, 16V, 25V, 50V, 100V	5
	X7R	0201, 0402, 0603,0805, 1206, 1210, 1812,1825,2220,2225	100pF~47μF	6.3V, 10V, 16V, 25V, 50V, 100V	
	X6S	0402, 0603, 0805, 1206,1210	0.47μF~100μF	6.3V, 10V, 16V, 25V	
	X5R	0201, 0402, 0603, 0805, 1206,1210	0.027μF~220μF	6.3V, 10V, 16V, 25V,50V	
	Y5V	0402, 0603, 0805, 1206, 1210, 1812	0.01μF~100μF	6.3V, 10V, 16V, 25V, 50V, 100V	
Ultra-small Caps (01R5 series)	NPO	01005	0.2pF~100pF	16V	10
	X7R	01005	100pF~1000pF	10V	
	X5R	01005	1000pF~0.1μF	6.3V,10V	
Middle & High Voltage Caps (200V~3kV)	NPO	0603, 0805, 1206, 1210, 1808, 1812,1825,2220,2225	0.5pF~0.01μF	200V, 250V, 500V, 630V, 1kV, 2kV, 3kV	12
	X7R	0603, 0805, 1206, 1210, 1808, 1812,1825,2220,2225	100pF~1μF	200V, 250V, 500V, 630V, 1kV, 2kV, 3kV	
	Y5V	0805, 1206, 1210,1812	0.01μF~0.68μF	200V, 250V	
High Q & Low ESR Caps (HH series)	NPO	0201, 0402, 0603,0805	0.3pF to 3300pF	16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V	15
Microwave Caps (RF series)	NPO	01005, 0201,0402,0603, 0805,0505	0.1pF~100pF	6.3V, 10V, 25V, 50V,100V,500V	17
Soft Termination Capacitors (SH/ SG series)	NPO	0402,0603, 0805, 1206, 1210, 1808, 1812	0.5pF~0.039μF	10V,16V,25V,50V,100V,200V,250V,500V, 630V,1KV,3KV	19
	X7R	0402,0603, 0805, 1206, 1210, 1808, 1812	100pF~22μF	10V,16V,25V,50V,100V,200V,250V,500V, 630V, 1kV,2kV, 3kV	
Open-mode Design Caps (OP series)	X7R	0805, 1206, 1210, 1812	100pF~1μF	100V, 200V, 250V, 500V	24
Capacitor Arrays (Y4C2/Y4C3 series)	NPO	0508 (4x0402), 0612 (4x0603)	10pF~470pF	25V, 50V,100V	26
	X7R	0508 (4x0402), 0612 (4x0603)	180pF~0.1μF	10V, 16V, 25V, 50V	
	Y5V	0612 (4x0603)	0.01μF~0.1μF	16V, 50V	
Low Profile Caps (TT series)	X7R	0805, 1206	0.22μF~4.7μF	10V, 16V, 25V, 50V	27
	X5R	0603, 0805, 1206, 1210	0.22μF~22μF	6.3V, 10V, 16V, 25V,50V	
	Y5V	0805, 1206, 1210	1μF~10μF	10V, 16V, 25V, 50V	
Low Inductance Caps (0612 series)	X7R	0612	0.01μF~0.15μF	50V	28
Safety Certificated Caps X1/Y2 (S2 series)	NPO	1808, 1812, 2211	4pF~680pF	250Vac	29
	X7R	1808, 1812,2220, 2211	100pF~4700pF	250Vac	
Safety Certificated Caps X2/Y3 (S3 series)	NPO	1808, 1812	3.9pF~1000pF	250Vac	30
	X7R	1808, 1812	150pF~5600pF	250Vac	
Automotive Capacitor Qualified to AEC-Q200 (MT series)	NPO	0402, 0603, 0805, 1206,1210	0.5pF~0.01μF	10V,16V,25V,50V,100V, 250V, 500V, 630V	31
	X7R	0402, 0603, 0805, 1206,	100pF~1μF	10V,16V,25V,50V,100V	
Automotive Caps Without AEC-Q200 Certification (MG series)	NPO	0402, 0603, 0805, 1206, 1210, 1812	0.5pF~0.033μF	10V,16V,25V,50V,100V,200V,250V	32
	X7R	0402, 0603, 0805, 1206, 1210, 1812	100pF~2.2μF	10V,16V,25V,50V,100V,200V,250V	
	X5R	0402, 0603, 0805, 1206, 1210	0.056μF~10μF	6.3V,10V,16V,25V	
Automotive Capacitor Arrays Qualified AEC-Q200 (MY Series)	NPO	0508 (4x0402)	10pF~220pF	50V	35
	X7R	0508 (4x0402)	1000pF~0.1μF	10V, 16V, 25V	

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■ HOW TO ORDER

Type of MLCC	0805	B	104	K	500	C	T
General Purpose MLCC Middle & High Voltage MLCC Ultra-small MLCC	**Size** Inch (mm) : 0201 (0603), 0603 (1608), 1206 (3216), 1808 (4520), 1825 (4563), 2225 (5763) 01R5 (0402), 0402 (1005), 0805 (2012), 1210 (3225), 1812 (4532), 2220 (5750),	**Dielectric** N=NP0 B=X7R S=X6S X=X5R F=Y5V	**Capacitance** Two significant digits followed by no. of zeros. And R is in place of decimal point. R47=0.47pF 0R5=0.5pF 1R0=1pF 100=10pF 101=100pF 102=1000pF 103=0.01uF 104=0.1uF 105=1uF 106=10uF 107=100uF	**Tolerance** A= ±0.05pF B= ±0.1pF C= ±0.25pF D= ±0.5pF F= ±1% G= ±2% J= ±5% K= ±10% M= ±20% Z=-20/+80%	**Rated voltage** Two significant digits followed by no. of zeros. And R is in place of decimal point. 4R0=4 Vdc 6R3=6.3 Vdc 100=10 Vdc 160=16 Vdc 250=25 Vdc 500=50 Vdc 101=100 Vdc 201=200 Vdc 251=250 Vdc 501=500 Vdc 631=630 Vdc 102=1k Vdc 202=2k Vdc 302=3k Vdc 502=5k Vdc 602=6k Vdc	**Termination** L=Ag/Ni/Sn C=Cu/Ni/Sn	**Packaging** B=Bulk C=Bulk cassette T=7" reeled Q=10" reeled G=13" reeled
Low Inductance MLCC	0612 (1632)						
High Q / Low ESR MLCC Microwave MLCC Low Profile MLCC Open Mode MLCC Safety Certificated MLCC Low Distortion MLCC Automotive MLCC	**RF** — **Series** HH=High Q/ Low ESR RF=Microwave TT=Low profile OP=Open-mode design S2=X1/Y2 safety class S3=X2/Y3 safety class LD= Low distortion MG=Automotive Cap. without AEC-Q200 MT=Automotive Cap. with AEC-Q200 MY=Automotive Array with AEC-Q200 **03** — **Size** Inch : 02=01005 03=0201 15=0402 11=0505 18=0603 21=0805 22=1111 31=1206 32=1210 42=1808 43=1812 52=2211 55=2220 56=2225					L=Ag/Ni/Sn C=Cu/Ni/Sn P=Cu/Polymer Ni/Sn	
Soft Termination MLCC	SH=With Ag polymer SG=With Cu polymer					C=Cu/Polymer Ni/Sn	
Cap Arrays MLCC	**Y** — **Type** Y=Capacitor array **4 C** — **Cap. Nr.** 4C=4xCap **3** — **Termination pitch** 3=0.03 inch 2=0.02 inch					C=Cu/Ni/Sn	

* The packaging code per each size of reel, please refer to following table "packaging style and quantity".

■ PACKAGING STYLE AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape 7" reel	Paper tape 13" reel	Plastic tape 7" reel	Plastic tape 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	-	-
	0.50+0.02/-0.05	Q	10,000	50,000	-	-
	0.50±0.20	E	10,000	-	-	-
0603 (1608)	0.50±0.10	H	4,000	-	-	-
	0.80±0.07	S	4,000	15,000	-	-
	0.80+0.15/-0.10	X	4,000	15,000	-	-
0805 (2012)	0.50±0.10	H	4,000	15,000	-	-
	0.60±0.10	A	4,000	15,000	-	-
	0.80±0.10	B	4,000	15,000	-	-
	0.85±0.10	T	4,000	15,000	-	-
	1.25±0.10	D	-	-	3,000	10,000
	1.25±0.20	I	-	-	3,000	10,000
1206 (3216)	0.80±0.10	B	4,000	15,000	-	-
	0.85±0.10	T	4,000	15,000	-	-
	0.95±0.10	C	-	-	3,000	10,000
	1.15±0.15	J	-	-	3,000	10,000
	1.25±0.10	D	-	-	3,000	10,000
	1.60±0.20	G	-	-	2,000	10,000
	1.60+0.30/-0.10	P	-	-	2,000	9,000
1210 (3225)	0.85±0.10	T	-	-	3,000	10,000
	0.95±0.10	C	-	-	3,000	10,000
	1.25±0.10	D	-	-	3,000	10,000
	1.60±0.20	G	-	-	2,000	-
	2.00±0.20	K	-	-	1,000	6,000
	2.50±0.30	M	-	-	1,000	6,000
1808 (4520)	1.25±0.10	D	-	-	2,000	10,000
	1.10±0.15	F	-	-	2,000	10,000
	1.60±0.20	G	-	-	2,000	8,000
	2.00±0.20	K	-	-	1,000	6,000
1812 (4532)	1.25±0.10	D	-	-	1,000	5,000
	1.60±0.20	G	-	-	1,000	-
	2.00±0.20	K	-	-	1,000	-
	2.50±0.30	M	-	-	500	3,000
	2.80±0.30	U	-	-	500	-
1825 (4563) 2220 (5750) 2225 (5763)	2.00±0.20	K	-	-	1,000	-
	2.50±0.30	M	-	-	500	-
	2.80±0.30	U	-	-	500	-

Unit: pieces

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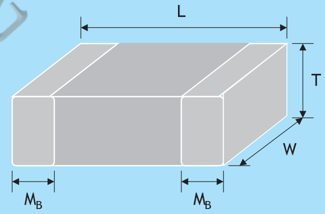
The Outlines and External Dimensions of Capacitor

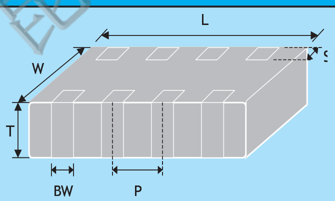
■ SINGLE CHIP CAPACITORS



Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		SolderingMethod *	M_B (mm)
	01R5 (0402)	0.40±0.02	0.20±0.02	0.20±0.02	V	R	0.10±0.03
	0201 (0603)	0.6±0.03	0.3±0.03	0.3±0.03	L	R	0.15±0.05
		0.6±0.05[#2]	0.3±0.05[#2]	0.3±0.05[#2]			
		0.6±0.09[#3]	0.3±0.09[#3]	0.3±0.09[#3]			0.15+0.1/-0.05
	0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N	R	0.25+0.05/-0.10
				0.50+0.02/-0.05	Q	R	
		1.00±0.20	0.50±0.20	0.50±0.20	E	R	
	0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S	R / W	0.40±0.15
		1.60+0.15/-0.10	0.80+0.15/-0.10	0.50±0.10	H	R / W	
				0.80+0.15/-0.10	X	R / W	
		1.60±0.20[#1]	0.80±0.20[#1]	0.80±0.20[#1]			
	0805 (2012)	2.00±0.15	1.25±0.10	0.50±0.10	H	R / W	0.50±0.20
				0.60±0.10	A	R / W	
				0.80±0.10	B	R / W	
				1.25±0.10	D	R	
		2.00±0.20	1.25±0.20	0.85±0.10	T	R / W	
				1.25±0.10	I	R	
	1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	B	R / W	0.60±0.20 (0.5±0.25)***
				0.95±0.10	C	R	
				1.25±0.10	D	R	
		3.20±0.20		1.15±0.15	J	R	
			1.60±0.20	1.60±0.20	G	R	
				0.85±0.10	T	R / W	
		3.20 +0.30/-0.10	1.60 +0.30/-0.10	1.60+0.30/-0.10	P	R	
	1210 (3225)	3.20±0.30	2.50±0.20	0.95±0.10	C	R	0.75±0.25
				0.85±0.10	T	R	
				1.25±0.10	D	R	
		3.20±0.40	2.50±0.30	1.60±0.20	G	R	
				2.00±0.20	K	R	
				2.50±0.30	M	R	
	1808 (4520)	4.50±0.40 (4.5+0.5/-0.3)**	2.03±0.25	1.25±0.10	D	R	0.75±0.25 (0.5±0.25)***
				1.40±0.15	F	R	
				1.60±0.20	G	R	
				2.00±0.20	K	R	
	1812 (4532)	4.50±0.40 (4.5+0.5/-0.3)**	3.20±0.30	1.25±0.10	D	R	0.75±0.25 (0.5±0.25)***
				1.60±0.20	G	R	
				2.00±0.20	K	R	
			3.20±0.40	2.50±0.30	M	R	
				2.80±0.30	U	R	
	1825 (4563)	4.60±0.50	6.30±0.40	1.60±0.20 (G) 2.00±0.20 (K) 2.50±0.30 (M) 2.80±0.30 (U)		R	≥0.26
	2211 (5728)	5.70±0.50	2.80±0.30			R	≥0.30
	2220 (5750)	5.70±0.50	5.00±0.40			R	≥0.30
	2225 (5763)	5.70±0.50	6.30±0.40			R	≥0.30

* R = Reflow soldering process ; W = Wave soldering process.
** For 1808_200~3kV, 1812_200V~3kV and safety certificated products.
*** For 1206_1000V ~3kV, 1808_200~3kV, 1812_200~3kV and safety certificated products.
#1 : For 0603/X5R/X6S/6.3V/Cap≥10μF products.
#2 : For 0201/Cap≥0.68μF products. #3 : For 0201/Cap ≧1μF products.
The table only for General Purpose Series, Soft termination and others please refer to individual sheet for details

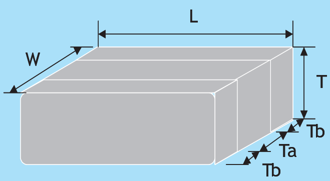
■ Capacitor Arrays



Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/ Symbol		S (mm)	BW (mm)	P (mm)
	0603 x 4 (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
	0402 x 4 (0508 (1220)	2.00±0.15	1.25±0.15	0.85±0.10	T	0.20±0.10	0.25±0.10	0.50±0.10

Reflow soldering process only.

■ Low Inductance Capacitors



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

Reflow soldering process only.

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■ FEATURES

* A wide selection of sizes is available (0201 to 1812).
* High capacitance in given case size.
* Capacitor with lead-free termination (pure Tin).

■ GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	X6S	X5R	Y5V
Size	0201, 0402, 0603, 0805, 1206, 1210, 1812, 1825, 2220, 2225				
Capacitance range	0.1pF to 0.1µF	100pF to 47µF	0.1µF to 100µF	100pF to 220µF	0.01µF to 100µF
Capacitance tolerance	Cap≤5pF[#1]: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F(±1%), G (±2%), J (±5%),K (±10%)	J (±5%), K (±10%), M (±20%)	K (±10%), M (±20%)	K (±10%), M (±20%)	M (±20%), Z (-20/+80%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V	6.3V, 10V, 16V, 25V, 50V, 100V			
Operating temperature	-55 to +125°C		-55 to +105°C	-55 to +85°C	-25 to +85°C
Capacitance characteristic	±30ppm	±15%	±22%	±15%	+30/-80%
Termination	Ni/Sn (lead-free termination)				

#1: NP0, 0.1pF product only provide B tolerance

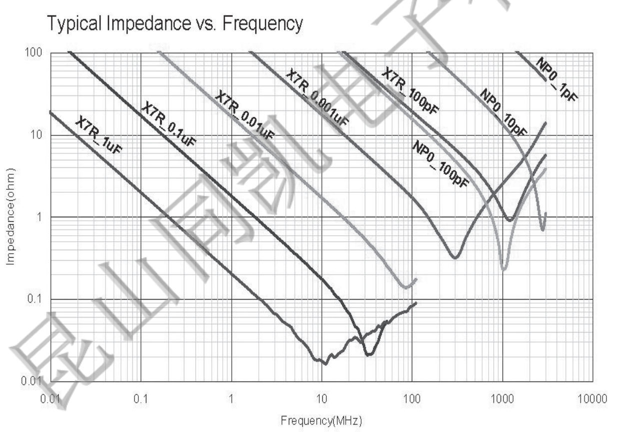
■ EXPLANATION OF PART NUMBERS

1206	F	104	Z	500	C	T
Size (Inch (mm)) 1206 (3216)	**Dielectric** F=Y5V	**Capacitance** 104=10x10^4=100nF	**Tolerance** Z=-20/+80%	**Rated voltage** 500=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging style** T=7" reeled

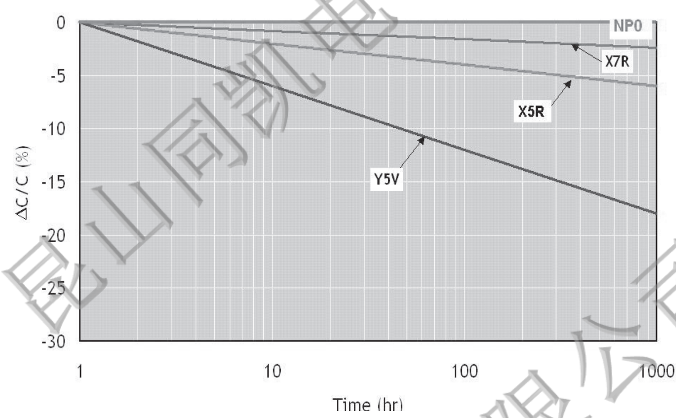
Please refer to page 2 " How to order" for more information.

■ ELECTRICAL CHARACTERISTICS

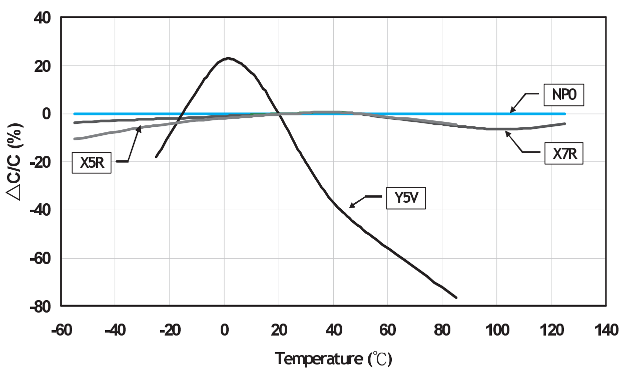
1) Frequency characteristics



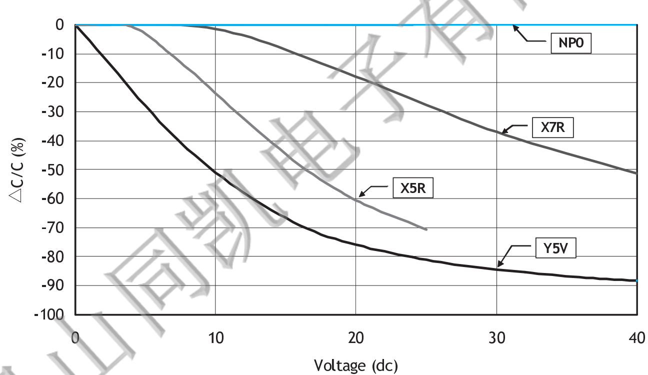
2) Capacitance Change - Typical aging rate



3) Temperature characteristics of capacitance (TCC)



4) DC Bias characteristics



All above typical electronic characteristics are for reference only.
Please contact with Walsin representative for detail information of any specific item.

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■ CAPACITANCE RANGE

NP0 Dielectric

Dielectric	NP0																
Size	0201		0402		0603		0805			1206			1210			1812	
Rated Voltage (VDC)	16 25	50	10 16 25 50	100	10 16 25 50	100	10 16	25 50	100	10 16	25 50	100	10 16	25 50	100	10 16 25 50	100
0.3pF (0R3)	L	L	N		S												
0.4pF (0R4)	L	L	N		S												
0.5pF (0R5)	L	L	N	N	S	S	A	A	A								
0.6pF (0R6)	L	L	N	N	S	S	A	A	A								
0.7pF (0R7)	L	L	N	N	S	S	A	A	A								
0.8pF (0R8)	L	L	N	N	S	S	A	A	A								
0.9pF (0R9)	L	L	N	N	S	S	A	A	A								
1.0pF (1R0)	L	L	N	N	S	S	A	A	A								
1.2pF (1R2)	L	L	N	N	S	S	A	A	A	B	B	B					
1.5pF (1R5)	L	L	N	N	S	S	A	A	A	B	B	B					
1.8pF (1R8)	L	L	N	N	S	S	A	A	A	B	B	B					
2.0pF (2R0)	L	L	N	N	S	S	A	A	A	B	B	B					
2.2pF (2R2)	L	L	N	N	S	S	A	A	A	B	B	B					
2.7pF (2R7)	L	L	N	N	S	S	A	A	A	B	B	B					
3.0pF (3R0)	L	L	N	N	S	S	A	A	A	B	B	B					
3.3pF (3R3)	L	L	N	N	S	S	A	A	A	B	B	B					
3.9pF (3R9)	L	L	N	N	S	S	A	A	A	B	B	B					
4.0pF (4R0)	L	L	N	N	S	S	A	A	A	B	B	B					
4.7pF (4R7)	L	L	N	N	S	S	A	A	A	B	B	B					
5.0pF (5R0)	L	L	N	N	S	S	A	A	A	B	B	B					
5.6pF (5R6)	L	L	N	N	S	S	A	A	A	B	B	B					
6.0pF (6R0)	L	L	N	N	S	S	A	A	A	B	B	B					
6.8pF (6R8)	L	L	N	N	S	S	A	A	A	B	B	B					
7.0pF (7R0)	L	L	N	N	S	S	A	A	A	B	B	B					
8.0pF (8R0)	L	L	N	N	S	S	A	A	A	B	B	B					
8.2pF (8R2)	L	L	N	N	S	S	A	A	A	B	B	B					
9.0pF (9R0)	L	L	N	N	S	S	A	A	A	B	B	B					
10pF (100)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
12pF (120)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
15pF (150)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
18pF (180)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
22pF (220)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
27pF (270)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
33pF (330)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
39pF (390)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
47pF (470)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
56pF (560)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
68pF (680)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
82pF (820)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
100pF (101)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
120pF (121)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
150pF (151)			N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
180pF (181)			N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
220pF (221)			N	N	S	S	A	A	A	B	B	B	C	C	C	D	D
270pF (271)			N		S	S	A	A	A	B	B	B	C	C	C	D	D
330pF (331)			N		S	S	A	A	A	B	B	B	C	C	C	D	D
390pF (391)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
470pF (471)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
560pF (561)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
680pF (681)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
820pF (821)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
1,000pF (102)			N		S	S	B	B	B	B	B	B	C	C	C	D	D
1,200pF (122)					X	X	B	B	B	B	B	B	C	C	C	D	D
1,500pF (152)					X	X	B	B	B	B	B	B	C	C	C	D	D
1,800pF (182)					X		B	B	B	B	B	B	C	C	C	D	D
2,200pF (222)					X		B	B	B	B	B	B	C	C	C	D	D
2,700pF (272)					X		D	D	D	B	B	B	C	C	C	D	D
3,300pF (332)					X		D	D	D	B	B	B	C	C	C	D	D
3,900pF (392)					X		D	D	D	B	B	B	C	C	C	D	D
4,700pF (472)					X		D	D	D	B	B	B	C	C	C	D	D
5,600pF (562)					X		D	D	D	B	B	B	C	C	C	D	D
6,800pF (682)					X		D	D	D	C	C	C	C	C	C	D	D
8,200pF (822)					X		D	D		D	D	D	C	C	C	D	D
0.010uF (103)					X		D	D		D	D	D	C	C	C	D	D
0.012uF (123)							T	T		T	T	T	D	D	D	D	D
0.015uF (153)							T	T		T	T	T	D	D	D	D	D
0.018uF (183)							D	D		T	T	T	K	K	K	D	D
0.022uF (223)							D	D		T	T	T	K	K	K	D	D
0.027uF (273)										T	T		K	K	K	D	D
0.033uF (333)										T	T		K	K	K	D	D
0.039uF (393)										J	J					M	M
0.056uF (563)										J	J					M	M
0.068uF (683)										G	G					M	M
0.082uF (823)										G	G					M	M
0.1uF (104)										G	G					M	M

Capacitance

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 WTC local representative.

昆山同凯电子有限公司

X7R Dielectric

Dielectric		X7R																																		
Size		0201			0402				0603						0805						1206						1210					1812				
Rated Voltage (VDC)		6.3 10 16	25	50	6.3 10	16 25	50	100	6.3	10	16	25	50	100	6.3	10	16	25	50	100	6.3	10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
Capacitance	100pF (101)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B																
	120pF (121)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B																
	150pF (151)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	180pF (181)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	220pF (221)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	270pF (271)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	330pF (331)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	390pF (391)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	470pF (471)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	560pF (561)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	680pF (681)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	820pF (821)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B										
	1,000pF (102)	L	L	L	N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,200pF (122)	L	L		N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,500pF (152)	L	L		N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,800pF (182)	L			N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	2,200pF (222)	L			N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	2,700pF (272)	L			N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	3,300pF (332)	L	L		N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	3,900pF (392)	L			N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	4,700pF (472)	L			N	N	N	N		S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	5,600pF (562)	L			N	N	N			S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	6,800pF (682)	L			N	N	N			S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	8,200pF (822)	L			N	N	N			S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.010uF (103)	L			N	N	N			S	S	S	S	S		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.012uF (123)				N	N				S	S	S	S	X		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.015uF (153)				N	N				S	S	S	S	X		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.018uF (183)				N	N				S	S	S	S	X		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.022uF (223)				N	N	N			S	S	S	S	X		B	B	B	B	B		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.027uF (273)				N	N				S	S	S	S	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.033uF (333)				N	N	N			S	S	S	X	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.039uF (393)				N	N				S	S	S	X	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.047uF (473)				N	N	N			S	S	S	X	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.056uF (563)				N	N	N			S	S	S	X	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.068uF (683)				N		N			S	S	S	X	X		B	B	B	B	D		B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.082uF (823)				N					S	S	S	X	X		B	B	B	B	D		B	B	B	B	D	C	C	C	C	C	D	D	D	D	D
	0.10uF (104)				N	N	N			S	S	S	X	X		B	B	B	B	D		B	B	B	B	D	C	C	C	C	C	D	D	D	D	D
	0.12uF (124)									S	S	X				B	B	B	D			B	B	B	B	D	C	C	C	C	C	D	D	D	D	D
	0.15uF (154)									S	S	X				D	D	D	D			C	C	C	C	G	C	C	C	C	D	D	D	D	D	D
	0.18uF (184)									S	S	X				D	D	D	D			C	C	C	C	G	C	C	C	C	D	D	D	D	D	D
	0.22uF (224)				N	N				S	S	X	X			D	D	D	D			C	C	C	C	G	C	C	C	C	D	D	D	D	D	D
	0.27uF (274)								X	X	X	X				D	D	D	I			C	C	C	D	G	C	C	C	C	G	D	D	D	D	D
	0.33uF (334)								X	X	X	X				D	D	D	I			C	C	C	D	G	C	C	C	D	G	D	D	D	D	D
	0.39uF (394)								X	X	X	X				D	D	D	I			C	C	J	P	G	C	C	C	D	M	D	D	D	D	D
	0.47uF (474)				N				X	X	X	X	X			D	D	D	I			J	J	J	P	G	C	C	C	D	M	D	D	D	D	K
	0.56uF (564)								X	X	X					D	D	D				J	J	J	P	P	D	D	D	D	M	D	D	D	D	K
	0.68uF (684)								X	X	X					D	D	D				J	J	J	P	P	D	D	D	D	K	D	D	D	K	K
	0.82uF (824)								X	X	X					D	D	D				J	J	J	P	P	D	D	D	D	K	D	D	D	K	K
	1.0uF (105)				N				X	X	X	X	X			D	D	D	I			J	J	J	P	P	D	D	D	D	K	D	D	D	K	K
	1.5uF (155)															I	I	I			J	J	J	P				K	G	M	M					K
	2.2uF (225)								X	X	X				I	I	I	I	I		J	J	J	P	P	P		K	G	M	M				M	M
	3.3uF (335)																					P	P	P				K	G	K						
	4.7uF (475)														I	I	I	I			P	P	P	P	P		K	K	K	M						
	6.8uF (685)																																			
	10uF (106)														I	I	I				P	P	P	P			K	K	K	M						
	22uF (226)																				P	P	P				M	M	M							
	47uF (476)																										M									

1. The letter in cell is expressed the symbol of product thickness.
2. 0402 size, Cap.1.0uF_6.3V only.
3. 0201/16V no provide Cap.5600pF to 8200pF.
4. For more information about products with special capacitance or other data, please contact WTC local representative.

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Y5V Dielectric (0402, 0603, 0805 Size)

Dielectric	Y5V															
Size	0402					0603					0805					
Rated Voltage (VDC)	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	100
Capacitance 0.010uF (103)		N	N	N	N		S	S	S	S		A	A	A	A	B
0.015uF (153)		N	N	N	N		S	S	S	S		A	A	A	A	B
0.022uF (223)		N	N	N	N		S	S	S	S		A	A	A	A	B
0.033uF (333)		N	N	N	N		S	S	S	S		A	A	A	A	B
0.047uF (473)		N	N	N			S	S	S	S		A	A	A	A	B
0.068uF (683)		N	N	N			S	S	S	S		A	A	A	A	B
0.10uF (104)		N	N	N			S	S	S	S		A	A	A	A	B
0.15uF (154)		N	N				S	S	S	S		A	A	A	A	
0.22uF (224)	N	N	N			S	S	S	S	S		A	A	A	A	
0.33uF (334)	N	N	N				S	S	S	X		B	B	B	B	
0.47uF (474)	N	N	N				S	S	X	X		B	B	B	B/D	
0.68uF (684)	N						S	X	X			B	B	D	D	
1.0uF (105)	N	N					S	X	X			B	B	D	D	
1.5uF (155)							S					D	D			
2.2uF (225)						S	S	X				D	D	I		
3.3uF (335)												D	D			
4.7uF (475)						X	X					D	D	I		
6.8uF (685)												I				
10uF (106)											I	I	I			
22uF (226)											I	I				

Y5V Dielectric (1206, 1210, 1812 Size)

Dielectric	Y5V																		
Size	1206							1210							1812				
Rated Voltage (VDC)	6.3	10	16	25	35	50	100	6.3	10	16	25	35	50	100	10	16	25	50	100
Capacitance 0.010uF (103)		B	B	B		B	B							C					D
0.015uF (153)		B	B	B		B	B							C					D
0.022uF (223)		B	B	B		B	B							C					D
0.033uF (333)		B	B	B		B	B							C					D
0.047uF (473)		B	B	B		B	B							C					D
0.068uF (683)		B	B	B		B	B							C					D
0.10uF (104)		B	B	B		B	B		C	C	C		C	C	D	D	D	D	D
0.15uF (154)		B	B	B		B	C		C	C	C		C	C	D	D	D	D	D
0.22uF (224)		B	B	B		B	C		C	C	C		C	C	D	D	D	D	D
0.33uF (334)		B	B	B		B			C	C	C		C	C	D	D	D	D	D
0.47uF (474)		B	B	B		B			C	C	C		C		D	D	D	D	D
0.68uF (684)		B	B	B		B			C	C	C		C		D	D	D	D	D
1.0uF (105)		C	C	C		C/D			C	C	C		C		D	D	D	D	D
1.5uF (155)		C	C	C					C	C	C				D	D	D	D	
2.2uF (225)		C	C	C		J			C	C	C		G		D	D	D	D	
3.3uF (335)		J	J	J					C	C	C				D	D	D	D	
4.7uF (475)		J	J	J	J	P			C	C	D		G		D	D	D	D	
6.8uF (685)		J	J						C	C	D		K		D	D	D	D	
10uF (106)		J	J	P					D	D	G	K	K		D	D	D	K	
22uF (226)		P	P						K	K									
47uF (476)	P							K	K							M			
100uF (107)								M											

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 WTC local representative.

X5R Dielectric

Dielectric	X5R																													
Size	0201					0402					0603					0805					1206					1210				
Rated Voltage (VDC)	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	4	6.3 10	16	25	50	6.3	10	16	25	50	4	6.3 10	16	25	50
Capacitance 100pF (101)	L	L	L	L	L																									
220pF (221)	L	L	L	L	L																									
470pF (471)	L	L	L	L	L																									
1000pF (102)	L	L	L	L	L																									
2200pF (222)	L	L	L																											
4700pF (472)	L	L	L																											
0.010µF (103)	L	L	L	L																										
0.027µF (273)	L	L						N																						
0.033µF (333)	L	L						N																						
0.039µF (393)	L	L						N																						
0.047µF (473)	L	L						N																						
0.056µF (563)	L	L					N	N																						
0.068µF (683)	L	L					N	N																						
0.082µF (823)	L	L				N	N	N																						
0.10µF (104)	L	L	L	L		N	N	N	N	N																				
0.15µF (154)						N	N	N	N																					
0.22µF (224)	L	L				N	N	N	N	N			X	X	X															
0.27uF (274)												X	X	X																
0.33µF (334)	L					N	N				X	X	X	X																
0.39µF (394)												X	X	X																
0.47µF (474)	L					N	N	E	E	E	X	X	X	X	X															
0.68µF (684)						N	N				X	X	X	X																
0.82uF (824)											X	X	X																	
1.0µF (105)	L	L				N	N	N	N		X	X	X	X	X		D	D	D	I										
1.5µF (155)											X						I	I	I			J	J				K	K		
2.2µF (225)	L					N	N	E	E		X	X	X	X	X		I	I	I	I		J	J	P	P		K	K		
3.3µF (335)											X	X					I	I	I			P	P	P						
4.7µF (475)						E	E				X	X	X	X			I	I	I	I	P	P	P	P	P		K	K	K	
6.8uF (685)																					P	P								
10µF (106)						E	E				X	X	X	X			I	I	I	I	P	P	P	P	P		K	K	K	M
22µF (226)											X	X					I	I	I		P	P	P	P			M	M	M	
47µF (476)											X						I				P	P					M	M		
100µF (107)																I					P						M			
220µF (227)																										M				

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 WTC local representative.

X6S Dielectric

Dielectric	X6S																										
Size	0201		0402				0603					0805						1206					1210				
Rated Voltage (VDC)	4	6.3	6.3	10	16	25	4	6.3	10	16	25	4	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50
Capacitance 0.10µF (104)	L	L																									
0.15µF (154)																											
0.22µF (224)		L																									
0.33µF (334)																											
0.47µF (474)			E																								
0.68µF (684)																											
1.0µF (105)	L		E	E	E	E																					
1.5µF (155)																											
2.2µF (225)			E	E	E						X																
3.3µF (335)																											
4.7µF (475)								X		X	X					I	I										
6.8uF (685)																											
10µF (106)								X	X	X		I	I	I	I	I					G						
22µF (226)							X	X					I	I	I				P	P						M	
47µF (476)												I						P					M	M	M		
100µF (107)																							M				

1. The letter in cell is expressed the symbol of product thickness.
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昆山同凯电子有限公司

■ CAPACITANCE RANGE

NP0 Dielectric

DIELECTRIC	NP0														
SIZE	1825				2220						2225				
RATED VOLTAGE (VDC)	50	1000	2000	3000	50	500	630	1000	2000	3000	50	200	1000	2000	3000
Capacitance 10pF (100)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
12pF (120)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
15pF (150)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
18pF (180)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
22pF (220)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
27pF (270)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
33pF (330)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
39pF (390)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
47pF (470)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
56pF (560)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
68pF (680)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
82pF (820)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
100pF (101)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
120pF (121)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
150pF (151)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
180pF (181)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
220pF (221)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
270pF (271)	G	K	K	K	G	G	G	K	K	K	G	G	K	K	K
330pF (331)	G	K	K	K	G	G	G	K	K	M	G	G	K	K	K
390pF (391)	G	K	K	K	G	G	G	K	K	M	G	G	K	K	K
470pF (471)	G	K	K	K	G	G	G	K	K	M	G	G	K	K	K
560pF (561)	G	K	K	K	G	G	G	K	K	M	G	G	K	K	K
680pF (681)	G	K	K	M	G	G	G	K	K	M	G	G	K	K	K
820pF (821)	G	K	K	M	G	G	G	K	K	M	G	G	K	M	M
1,000pF (102)	G	K	K	M	G	G	G	K	K	M	G	G	K	M	M
1,200pF (122)	G	K	K	M	G	G	G	M	M	M	G	G	K	M	M
1,500pF (152)	G	K	M	M	G	G	G	M	M	M	G	G	K	M	M
1,800pF (182)	G	K	M	M	G	G	G	M	M	M	G	G	K	M	M
2,200pF (222)	G	K	M	M	G	G	G	M	M	M	G	G	K	M	M
2,700pF (272)	G	K	M	M	G	G	G	M	M	M	G	G	K	M	M
3,300pF (332)	G	K	M		G	G	G	M	M	M	G	G	K	M	M
3,900pF (392)	G	M	M		G	G	G	M	M		G	G	K	M	
4,700pF (472)	G	M	M		G	G	G	M	M		G	G	K	M	
5,600pF (562)	G	M	M		G	G	G	M	M		G	G	M	M	
6,800pF (682)	G	M	M		G	G	G	M	M		G	G	M	M	
8,200pF (822)	G	M	M		G	G	G	M	M		G	G	M	M	
0.010μF (103)	G	M			G	G	G	M			G	G	M	M	
0.012μF (123)	G	M			G	G	G	M			G	G	M		
0.015μF (153)	G				G	G	G				G	G			
0.018μF (183)	G				G	G	G				G	G			
0.022μF (223)	G				G	G	G				G	G			
0.027μF (273)	G				G	G	G				G	G			
0.033μF (333)	G				K	K	K				G	G			
0.039μF (393)	G					K	K				G	K			
0.047μF (473)											G				
0.056μF (563)															
0.068μF (683)															
0.082μF (823)															
0.1μF (104)															

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昆山同凯电子有限公司

■ CAPACITANCE RANGE

X7R Dielectric

	DIELECTRIC	X7R																				
	SIZE	1825						2220							2225							
	RATED VOLTAGE (VDC)	50, 100	200, 250	500, 630	1000	1500, 2000	3000	25, 50	100	200, 250	500, 630	1000	1500, 2000	3000	25, 50	100	200, 250	500	630	1000	1500, 2000	3000
Capacitance	1,000pF (102)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	1,200pF (122)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	1,500pF (152)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	1,800pF (182)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	2,200pF (222)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	2,700pF (272)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	3,300pF (332)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	3,900pF (392)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	4,700pF (472)	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
	5,600pF (562)	K	K	K	K	K	M	K	K	K	K	K	K	K	K	K	K	K	K	K	K	M
	6,800pF (682)	K	K	K	K	K	M	K	K	K	K	K	K	K	K	K	K	K	K	K	K	M
	8,200pF (822)	K	K	K	K	K	M	K	K	K	K	K	M	M	K	K	K	K	K	K	K	M
	0.010μF (103)	K	K	K	K	K	M	K	K	K	K	K	M	M	K	K	K	K	K	K	K	M
	0.012μF (123)	K	K	K	K	M	U	K	K	K	K	K	M	U	K	K	K	K	K	K	M	M
	0.015μF (153)	K	K	K	K	M	U	K	K	K	K	K	M	U	K	K	K	K	K	K	M	M
	0.018μF (183)	K	K	K	K	M	U	K	K	K	K	K	U	U	K	K	K	K	K	K	M	U
	0.022μF (223)	K	K	K	K	M		K	K	K	K	K	U		K	K	K	K	K	K	M	
	0.027μF (273)	K	K	K	K	U		K	K	K	K	K	U		K	K	K	K	K	K	M	
	0.033μF (333)	K	K	K	K	U		K	K	K	K	K	U		K	K	K	K	K	K	M	
	0.039μF (393)	K	K	K	K	U		K	K	K	K	K	U		K	K	K	K	K	K	U	
	0.047μF (473)	K	K	K	K	U		K	K	K	K	K	U		K	K	K	K	K	K	U	
	0.056μF (563)	K	K	K	K	U		K	K	K	K	K	U		K	K	K	K	K	K	U	
	0.068μF (683)	K	K	K	K			K	K	K	K	M			K	K	K	K	K	K		
	0.082μF (823)	K	K	K	M			K	K	K	K	M			K	K	K	K	K	K		
	0.10μF (104)	K	K	K	M			K	K	K	K	M			K	K	K	K	K	M		
	0.12μF (124)	K	K	K	U			K	K	K	K	M			K	K	K	K	K	U		
	0.15μF (154)	K	K	K	U			K	K	K	K	U			K	K	K	K	K	U		
	0.18μF (184)	K	K	K	U			K	K	K	K	U			K	K	K	K	K	U		
	0.22μF (224)	K	K	K	U			K	K	K	K	U			K	K	K	K	K	U		
	0.27μF (274)	K	K		U			K	K	K	K	U			K	K	K	K		U		
	0.33μF (334)	K	K		U			K	K	K	K	U			K	K	K	K		U		
	0.39μF (394)	K	K					K	K	K	K	U			K	K	K	K		U		
	0.47μF (474)	K	K					K	K	K	K				K	K	K	K				
	0.56μF (564)	K	K					K	K	K					K	K	K	K				
	0.68μF (684)	K	K					K	K	K					K	K	K	K				
	0.82μF (824)	K	K					K	K	K					K	K	K	M				
	1.0μF (105)	K	K					K	K	K					K	K	K	M				
	1.5μF (155)	K						K	K	M					K	K	M					
	2.2μF (225)	K						K	K	M					K	K	M					
	3.3μF (335)	K						K	K						K	K						
	4.7μF (475)	K						K	M						K							
	6.8μF (685)							M	U						M							
	10μF (106)							U	U						U							

1. The letter in cell is expressed the symbol of product thickness.
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Ultra-small Capacitors
01R5 Series

■ FEATURES

* High capacitance in unit size.
* High precision dimensional tolerances.
* Suitable used in high-accuracy automatic mounting machine.

■ GENERAL ELECTRICAL DATA

Size	01R5		
Dielectric	NP0	X7R	X5R
Capacitance*	0.2pF to 100pF	100pF & 1000pF	1000pF to 0.1μF
Capacitance tolerance**	Cap≤10pF: C (±0.25pF) Cap>10pF: J (±5%)	K (±10%), M (±20%)	
Rated voltage (WVDC)	16V, 25V	10V	6.3V, 10V
Operating temperature	-55 to +125°C	-55 to +125°C	-55 to +85°C
Capacitance change	±30ppm	±15%	
Termination	Ni/Sn (lead-free termination)		

■ EXPLANATION OF PART NUMBERS

01R5	N	100	J	160	C	T
Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
01R5 =01005 (0402)	N=NP0(C0G)	100=10x10^{0}=10pF	J=±5%	160=16 VDC	C=Cu/Ni/Sn	T=7" reeled

Please refer to page 2 " How to order" for more information.

■ CAPACITANCE RANGE

SIZE	01R5	
DIELECTRIC	NP0	
RATED VOLTAGE (VDC)	16	25
Capacitance: 0.2pF (0R2)	V	
0.3pF (0R3)	V	
0.4pF (0R4)	V	
0.5pF (0R5)	V	V
1.0pF (1R0)	V	V
1.5pF (1R5)	V	V
2.0pF (2R0)	V	V
3.0pF (3R0)	V	V
4.0pF (4R0)	V	V
5.0pF (5R0)	V	V
6.0pF (6R0)	V	V
7.0pF (7R0)	V	V
8.0pF (8R0)	V	V
9.0pF (9R0)	V	V
10pF (100)	V	V
12pF (120)	V	V
15pF (150)	V	V
18pF (180)	V	V
22pF (220)	V	V
27pF (270)	V	V
33pF (330)	V	V
39pF (390)	V	V
47pF (470)	V	V
56pF (560)	V	V
68pF (680)	V	V
82pF (820)	V	V
100pF (101)	V	V

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SIZE	01R5
DIELECTRIC	X7R
RATED VOLTAGE (VDC)	10
Capacitance: 100pF (101)	V
120pF (121)	
150pF (151)	V
180pF (181)	
220pF (221)	V
270pF (271)	
330pF (331)	V
390pF (391)	
470pF (471)	V
560pF (561)	
680pF (681)	
820pF (821)	
1,000pF (102)	V

SIZE	01R5	
DIELECTRIC	X5R	
RATED VOLTAGE (VDC)	6.3	10
Capacitance: 1,000pF (102)	V	V
1,500pF (152)		V
2,200pF (222)		V
3,300pF (332)		V
4,700pF (472)		V
6,800pF (682)		V
0.010μF (103)	V	V
0.015μF (153)		
0.022μF (223)	V	
0.033μF (333)	V	
0.047μF (473)	V	
0.068μF (683)	V	
0.10μF (104)	V	

昆山同凯电子有限公司

■ FEATURES

* High voltage in a given case size.
* High stability and reliability.

■ GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	Y5V
Size	0603, 0805, 1206, 1210, 1808, 1812		0805, 1206, 1210, 1812
Capacitance	0.5pF to 0.01μF	100pF to 1.0μF	0.01μF to 0.68μF
Capacitance tolerance	Cap≤5pF: C (±0.25pF) 5pF<Cap<10pF: D (±0.5pF) Cap≥10pF: J (±5%), K (±10%)	K (±10%), M (±20%)	Z (-20/+80%)
Rated voltage (WVDC)	200V to 3kV		200V, 250V
DF/ Q	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	≤2.5%	≤5%
Insulation resistance at Ur	Ur=200~630V: ≥10GΩ or RxC≥100Ω-F whichever is smaller Ur=1000~3000V: ≥10GΩ		
Dielectric strength	200~300V: ≥2 x WVDC 500~999V: ≥1.5 x WVDC 1000~3000V: ≥1.2 x WVDC		
Operating temperature	-55 to +125°C		-25 to +85°C
Capacitance characteristic	±30ppm	±15%	+30/-80%
Termination	Ni/Sn (lead-free termination)		

■ EXPLANATION OF PART NUMBERS

1808	N	100	J	202	C	T
Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
1808 (4520)	N=NP0(C0G)	100=10x10^{0}=10pF	J=±5%	202=2000 VDC	C=Cu/Ni/Sn	T=7” reeled

Please refer to page 2 “ How to order” for more information.

■ CAPACITANCE RANGE

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

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NP0 Dielectric 200V to 3kV

DIELECTRIC	NPO																								
SIZE	0603	0805				1206					1210					1808				1812					
RATED VOLTAGE (VDC)	200 250	200	250	500 630	1000	200	250	500 630	1000	1500 2000	200	250	500 630	1000	1500 2000	500 630	1000	1500 2000	3000	200	250	500 630	1000	1500 2000	3000
Capacitance 0.5pF (0R5)	S	A	A	A	D																				
1.0pF (1R0)	S	A	A	A	D																				
1.2pF (1R2)	S	A	A	A	D																				
1.5pF (1R5)	S	A	A	A	D	B	B	B	B	B															
1.8pF (1R8)	S	A	A	A	D	B	B	B	B	B															
2.2pF (2R2)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
2.7pF (2R7)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
3.3pF (3R3)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
3.9pF (3R9)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
4.7pF (4R7)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
5.6pF (5R6)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
6.8pF (6R8)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
8.2pF (8R2)	S	A	A	A	D	B	B	B	B	B						D	D	D	D						
10pF (100)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
12pF (120)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
15pF (150)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
18pF (180)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
22pF (220)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
27pF (270)	S	A	A	A	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
33pF (330)	S	A	A	A	D	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
39pF (390)	S	A	A	A	D	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
47pF (470)	S	A	A	A	D	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
56pF (560)	S	A	A	A	D	B	B	B	C	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
68pF (680)	S	A	A	A	D	B	B	B	C	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
82pF (820)	S	A	A	B	D	B	B	B	D	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
100pF (101)	S	A	B	B	D	B	B	B	D	D	C	C	C	D	D	D	D	D	K	D	D	D	D	D	D
120pF (121)	S	A	B	D	D	B	B	B	D	G	C	C	C	D	D	D	D	D	K	D	D	D	D	D	D
150pF (151)	S	B	D	D	D	B	B	B	D	G	C	C	C	D	G	D	D	K	K	D	D	D	D	D	D
180pF (181)	S	B	D	D	D	B	B	B	G	G	C	C	C	D	G	D	D	K	K	D	D	D	D	D	K
220pF (221)	S	D	D	D	D	B	B	B	G	G	C	C	C	G	G	D	D	K	K	D	D	D	D	D	K
270pF (271)	X	D	D	D	D	B	C	C	G	P	C	C	C	G	K	K	K	K	K	D	D	D	D	K	K
330pF (331)	X	D	D	D	D	B	C	C	G	P	C	C	C	G	K	K	K	K	K	D	D	D	D	K	K
390pF (391)	X	D	D	D	D	B	C	C	G	P	C	C	C	G	M	K	K	K		D	D	D	D	K	K
470pF (471)	X	D	D	I		C	C	C	G		C	C	C	G	M	K	K	K		D	D	D	K	K	K
560pF (561)		D	D	I		C	D	D	G		C	C	C	G		K	K	K		D	D	D	K	K	
680pF (681)		D	D	I		C	D	D	G		C	C	C	G		K	K	K		D	D	D	K	K	
820pF (821)		D	D	I		C	G	G	G		C	C	C	G		K	K			D	D	D	K	K	
1,000pF (102)		D	D	I		C	G	G	G		D	D	D	G		K	K			D	D	D	K	K	
1,200pF (122)		D	D			C	G	G			D	D	D			K				D	D	D	K		
1,500pF (152)		D	D			D	G	G			D	D	D			K				D	D	D	K		
1,800pF (182)		D	D			D	G	G			D	D	D			K				D	D	D			
2,200pF (222)		D	D			D	G	G			D	D	D			K				D	D	D			
2,700pF (272)						D	G				D	D	D							D	D	D			
3,300pF (332)						D	G				D	D	D							D	D	D			
3,900pF (392)						D	G				D	D	D							D	D				
4,700pF (472)						D	G				G	G								D	D				
5,600pF (562)											G	G								D	D				
6,800pF (682)											G	G								D	D				
8,200pF (822)											G	G													
10,000pF (103)											G	G													

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 WTC local representative.

X7R Dielectric 200V to 3kV

DIELECTRIC	X7R																								
SIZE	0603	0805			1206						1210				1808				1812						
RATED VOLTAGE (VDC)	200 250	200 250	500 630	1000	200 250	500 630	1000	1500	2000	2500	200 250	500 630	1000	1500 2000	500 630	1000	1500 2000	3000	200	250	500	630	1000	1500 2000	3000
Capacitance																									
100pF (101)	X	B	B	B							D	D	D	D											
120pF (121)	X	B	B	B							D	D	D	D											
150pF (151)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D							
180pF (181)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D							
220pF (221)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D							
270pF (271)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D					D	D	
330pF (331)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	K					D	D	
390pF (391)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	K					D	D	
470pF (471)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	K					D	D	
560pF (561)	X	B	B	B	D	D	D	D	D	D	D	D	D	D	D	D	D	K					D	D	
680pF (681)	X	B	B	B	D	D	D	D	D	D	C	D	D	D	D	D	D	K					D	D	K
820pF (821)	X	B	B	B	D	D	D	G	G	D	C	D	D	D	D	D	D	K					D	D	K
1,000pF (102)	X	B	B	B	D	D	D	G	G	D	C	D	D	D	D	D	K	K	D		D		D	D	K
1,200pF (122)	X	B	B	B	D	D	D	G	G		C	D	D	M	D	D	K	K	D		D		D	D	K
1,500pF (152)	X	B	B	D	D	D	D	G	G		C	D	D	M	D	D	K	K	D		D		D	D	K
1,800pF (182)	X	B	B	D	D	D	D	G	G		C	D	D	M	D	D	K	K	D		D		D	D	M
2,200pF (222)	X	B	B	D	D	D	D	G	G		C	D	D	M	D	D	K		D		D		D	D	M
2,700pF (272)	X	B	B		D	D	D	G	G		C	D	D	M	D	D	K		D		D		D	D	M
3,300pF (332)	X	B	B		D	D	D	G	G		C	D	D	M	D	D	K		D		D		D	K	M
3,900pF (392)	X	B	B		D	D	D	G			C	D	G	M	D	D	K		D		D		D	K	
4,700pF (472)	X	B	D		D	D	D	G			C	D	G	M	D	D	K		D		D		D	K	
5,600pF (562)	X	D	D		D	D	D	G			C	D	G		K	K	K		D		D		D		
6,800pF (682)	X	D	D		D	D	D	G			C	D	G		K	K			D		D		D		
8,200pF (822)	X	D	D		D	D	D				C	D	G		K	K			D		D		D		
0.010µF (103)	X	D	D		D	D	D				C	D	G		K	K			D		D		D		
0.012µF (123)		D	D		D	D	G				C	D	G		K	K			D		D		K		
0.015µF (153)		D	D		D	D	G				C	D	G		K	K			D		D		K		
0.018µF (183)		D	D		D	D					C	D	G		K	K			D		D		M		
0.022µF (223)		D	D		D	G					C	D	G		K	K			D		D		M		
0.027µF (273)		D			D	G					C	G			K	K			D		D		M		
0.033µF (333)		D			G	G					C	G			K	K			D		D		M		
0.039µF (393)		D			G	G					C	G			K	K			D		D		M		
0.047µF (473)		D			G	G					D	G			K	K			D		D		M		
0.056µF (563)		D			G	G					D	G			K				D		K		M		
0.068µF (683)		D			G						G	K			K				D		K		M		
0.082µF (823)		D			G						G	K							D		K		M		
0.10µF (104)		D			G						G	K							D		K		M		
0.12µF (124)											G								D		M				
0.15µF (154)											M								K		M				
0.18µF (184)											M								K		M				
0.22µF (224)											M								K		M				
0.27µF (274)											M								K						
0.33µF (334)											M								K						
0.39µF (394)											M								K						
0.47µF (474)											M								K						
0.56µF (564)																			M						
0.68µF (684)																			M						
0.82µF (824)																			M						
1.00µF (105)																			M						

1. The letter in cell is expressed the symbol of product thickness.
2. 0805 size, Cap.>0.068uF_200V only.
3. For more information about products with special capacitance or other data, please contact WTC local representative.

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FEATURES

* High Q and low ESR performance at high frequency.
* Quality improvement of telephone calls for low power loss and better performance.

GENERAL ELECTRICAL DATA

Dielectric	NP0
Size	0201, 0402, 0603,0805
Capacitance	0.3pF to 3300pF
Capacitance tolerance	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)
Rated voltage (WVDC)	16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V
Q	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125°C
Capacitance change	±30ppm
Termination	Ni/Sn (lead-free termination)

EXPLANATION OF PART NUMBERS

HH	15	N	100	G	500	C	T
Series HH=High Q/ Low ESR	**Size (Inch (mm))** 15=0402 (1005)	**Dielectric** N=NP0(C0G)	**Capacitance** 100=10x10^0=10pF	**Tolerance** G=±2%	**Rated voltage** 500=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging** T=7" reeled

* Please refer to page 2 " How to order" for more information.

ELECTRICAL CHARACTERISTICS

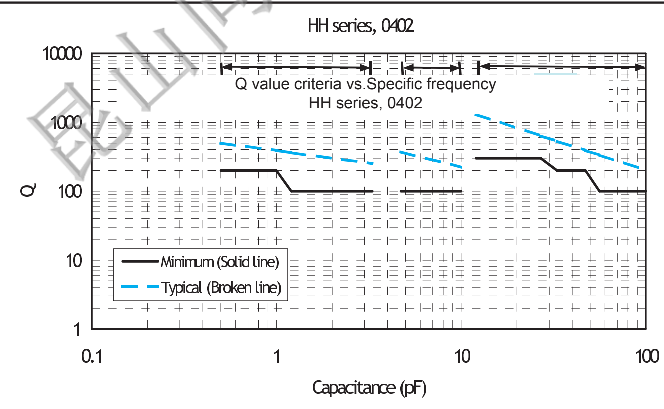

Fig. 1 Q factor specification vs. Specific frequency 0402

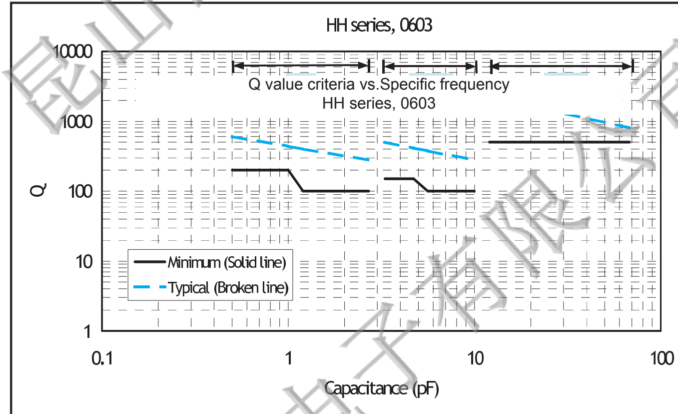

Fig. 2 Q factor specification vs. Specific frequency 0603

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■ CAPACITANCE RANGE

DIELECTRIC	NPO													
SIZE	0201		0402				0603				0805			
RATED VOLTAGE (VDC)	10,16	25,50	16	25	50	100	16	25	50	100	50	100	200,250	500,630
Capacitance 0.3pF (0R3)	L	L	N^	N^	N^	N^								
0.4pF (0R4)	L	L	N^	N^	N^	N^								
0.5pF (0R5)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B		
0.6pF (0R6)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B		
0.7pF (0R7)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B		
0.8pF (0R8)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B		
0.9pF (0R9)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B		
1.0pF (1R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
1.2pF (1R2)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
1.5pF (1R5)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
1.8pF (1R8)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
2.0pF (2R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
2.2pF (2R2)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
2.7pF (2R7)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
3.0pF (3R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
3.3pF (3R3)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
3.9pF (3R9)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
4.0pF (4R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
4.7pF (4R7)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
5.0pF (5R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
5.6pF (5R6)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
6.0pF (6R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
6.8pF (6R8)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
7.0pF (7R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
8.0pF (8R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
8.2pF (8R2)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
9.0pF (9R0)	L	L	N^	N^	N^	N^	S^	S^	S^	S^	B	B	B	B
10pF (100)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
12pF (120)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
15pF (150)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
18pF (180)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
22pF (220)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
27pF (270)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
33pF (330)	L	L	N	N	N	N	S	S	S	S	B	B	B	B
39pF (390)			N	N	N	N	S	S	S	S	B	B	B	B
47pF (470)			N	N	N	N	S	S	S	S	B	B	B	B
56pF (560)			N	N	N	N	S	S	S	S	B	B	B	B
68pF (680)			N	N	N	N	S	S	S	S	B	B	B	B
82pF (820)			N	N	N	N	S	S	S	S	B	B	B	B
100pF (101)			N	N	N	N	S	S	S	S	B	B	B	B
120pF (121)			N	N	N	N	S	S	S	S	D	D	D	D
150pF (151)			N	N	N	N	S	S	S	S	D	D	D	D
180pF (181)			N	N	N	N	S	S	S	S			D	D
220pF (221)			N	N	N	N	S	S	S	S			D	D
270pF (271)			N	N	N		S	S	S	S			D	D
330pF (331)			N	N	N		S	S	S	S			D	D
390pF (391)			N	N	N		S	S	S	S			D	D
470pF (471)			N	N	N		S	S	S	S				
560pF (561)							S	S	S	S				
680pF (681)							S	S	S	S				
820pF (821)							S	S	S	S				
1,000pF (102)							S	S	S	S				
1,200pF (122)							X	X	X					
1,500pF (152)							X	X	X					
1,800pF (182)							X	X	X					
2,200pF (222)							X	X	X					
2,700pF (272)							X	X	X					
3,300pF (332)							X	X	X					

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 WTC local representative.

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■ FEATURES

* Ultra high Q and low ESR performance at high frequency.
* Quality improvement of telephone calls for low power loss and better performance.

TAIWAN EXCELLENCE 2013

SILVER 國家發明獎 National Invention Award

■ GENERAL ELECTRICAL DATA

Dielectric	NP0
Size	01005, 0201, 0402, 0603, 0805
Capacitance	0.1pF to 100pF
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, 250V, 500V
Q	Cap≥30pF, Q≥1000 Cap<30pF,Q≥400+20C
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125°C
Capacitance change	±30ppm/°C; 0201Cap≥22pF, ±60ppm/°C
Termination	Ni/Sn (lead-free termination)

■ EXPLANATION OF PART NUMBERS

RF	15	N	100	G	500	C	T
Series RF=Microwave	**Size (Inch (mm))** 15=0402 (1005)	**Dielectric** N=NP0	**Capacitance** 100=10x10^0=10pF	**Tolerance** G=±2%	**Rated voltage** 500=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging** T=7" reeled

* Please refer to page 2 " How to order" for more information.

■ ELECTRICAL CHARACTERISTICS

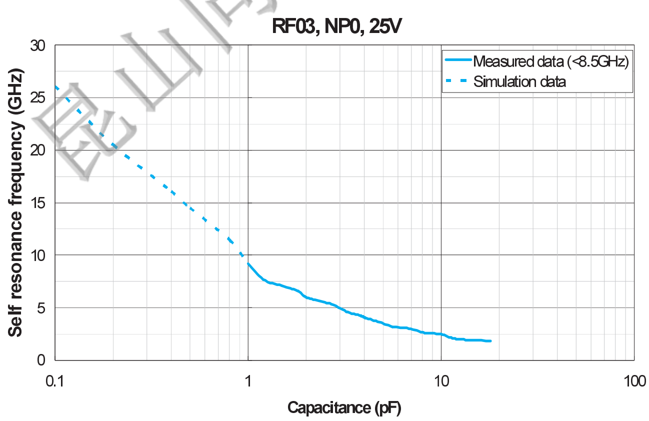

Fig. 3 Self resonance frequency vs. Capacitance (0201 size)

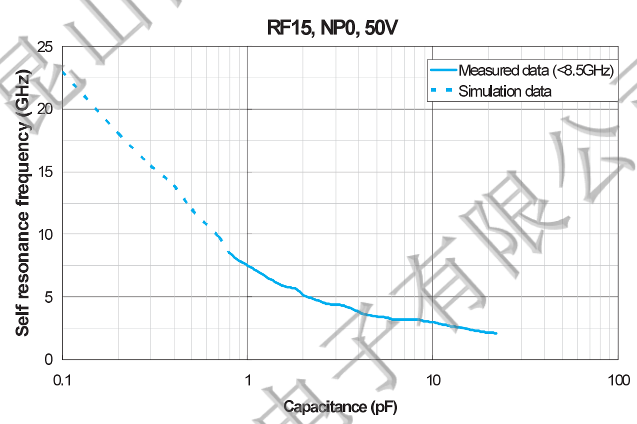

Fig. 4 Self resonance frequency vs. Capacitance (0402 size)

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■ CAPACITANCE RANGE

DIELECTRIC		NPO															
SIZE		01005		0201		0402				0603			0805				0505
RATED VOLTAGE (VDC)		16	25	6.3 10 25	60	25	50	100	200	50	100	250	50	100	250	500	50 100 250
Capacitance	0.1pF (0R1)			L	L	N	N	N	N	H	H	H					
	0.2pF (0R2)	V	V	L	L	N	N	N	N	H	H	H	A	A	A	A	
	0.3pF (0R3)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	
	0.4pF (0R4)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	0.5pF (0R5)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	0.6pF (0R6)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	0.7pF (0R7)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	0.8pF (0R8)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	0.9pF (0R9)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	1.0pF (1R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	1.2pF (1R2)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	1.5pF (1R5)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	1.8pF (1R8)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	2.0pF (2R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	2.2pF (2R2)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	2.7pF (2R7)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	3.0pF (3R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	3.3pF (3R3)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	3.9pF (3R9)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	4.0pF (4R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	4.7pF (4R7)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	5.0pF (5R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	5.6pF (5R6)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	6.0pF (6R0)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	6.8pF (6R8)	V		L	L	N	N	N	N	S	S	S	T	T	T	T	J
	7.0pF (7R0)	V		L	L	N	N	N	N	S	S	S	T	T	T	T	J
	8.0pF (8R0)	V		L	L	N	N	N	N	S	S	S	T	T	T	T	J
	8.2pF (8R2)	V		L	L	N	N	N	N	S	S	S	T	T	T	T	J
	9.0pF (9R0)	V		L	L	N	N	N	N	S	S	S	T	T	T	T	J
	10pF (100)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	11pF (110)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	12pF (120)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	13pF (130)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	15pF (150)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	16pF (160)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	18pF (180)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	20pF (200)	V	V	L	L	N	N	N	N	S	S	S	T	T	T	T	J
	22pF (220)	V	V	L		N	N	N	N	S	S	S	T	T	T	T	J
	24pF (240)			L		N	N	N	N	S	S	S	T	T	T	T	J
	27pF (270)			L		N	N	N	N	S	S	S	T	T	T	T	J
	30pF (300)			L		N	N	N	N	S	S	S	T	T	T	T	J
	33pF (330)			L		N	N	N	N	S	S	S	T	T	T	T	J
	36pF (360)					N	N	N		S	S	S	T	T	T	T	J
	39pF (390)					N	N	N		S	S	S	T	T	T	T	J
	43pF (430)					N	N	N		S	S	S	T	T	T	T	J
	47pF (470)					N	N	N		S	S	S	T	T	T	T	J
	56pF (560)					N	N	N		S	S	S	T	T	T	T	J
	68pF (680)					N	N			S	S	S	T	T	T	T	J
	82pF (820)					N	N			S	S	S	T	T	T		J
	100pF (101)					N	N			S	S	S	T	T	T		J

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

昆山同凯电子有限公司

Soft Termination Capacitors
SH/ SG Series

昆山同凯电子有限公司

■ FEATURES

* MLCC's terminations build a soft & flexible polymer layer to withstand high bending stress in SMT line.
* Available for any item in standard series range.

■ GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	0603, 0805, 1206, 1210, 1808, 1812	
Capacitance range	0.5pF to 0.039μF	100pF to 22μF
Capacitance tolerance	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%), K (±10%), M (±20%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V, 2000V, 3000V	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Termination	Ni/Sn (lead-free termination)	

■ EXPLANATION OF PART NUMBERS

SH	31	N	100	D	501	C	T
Series SH=With Ag polymer SG=With Cu polymer	**Size (Inch (mm))** 31=1206 (3216)	**Dielectric** N=NP0(C0G)	**Capacitance** 100=10x10^0=10pF	**Tolerance** D=±0.5pF	**Rated voltage** 501=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging** T=7" reeled

* Please refer to page 2 " How to order" for more information.

■ PACKAGING DIMENSION AND QUANTITY

Size	L(mm)	W(mm)	Thickness (mm)/Symbol		Paper tape		Plastic tape	
					7" reel	13" reel	7" reel	13" reel
0402 (1005)	1.00±0.20	0.50±0.20	0.50±0.20	E	1,000	-	-	-
0603 (1608)	1.60±0.20	0.80±0.10	0.80±0.07	S	4,000	15,000	-	-
	1.60±0.30	0.80±0.30	0.80±0.30	X	4,000	15,000	-	-
0805 (2012)	2.00±0.20	1.25±0.10	0.60±0.10	A	4,000	15,000	-	-
			0.80±0.10	B	4,000	15,000	-	-
			1.25±0.10	D	-	-	3,000	10,000
	2.00±0.30	1.25±0.30	1.25±0.30	I	-	-	3,000	10,000
1206 (3216)	3.20+0.4/-0.1	1.60±0.15	0.80±0.10	B	4,000	15,000	-	-
			0.95±0.10	C	-	-	3,000	10,000
			1.15±0.15	J	-	-	3,000	10,000
			1.25±0.10	D	-	-	3,000	10,000
	3.20+0.4/-0.1	1.60±0.20	1.60±0.20	G	-	-	2,000	10,000
	3.20±0.50	1.60±0.50	1.60±0.50	P	-	-	2,000	9,000
1210 (3225)	3.20±0.40	2.50±0.20	0.95±0.10	C	-	-	3,000	10,000
			1.25±0.10	D	-	-	3,000	10,000
	3.20±0.60	2.50±0.50	1.60±0.20	G	-	-	2,000	10,000
			2.00±0.20	K	-	-	1,000	6,000
			2.50±0.50	M	-	-	1,000	6,000
1808 (4520)	4.50+0.60/-0.4	2.03±0.25	1.25±0.10	D	-	-	2,000	-
			2.00±0.20	K	-	-	1,000	-
1812 (4532)	4.50+0.60/-0.4	3.20±0.30	1.25±0.10	D	-	-	1,000	-
			2.00±0.20	K	-	-	1,000	-
		3.20±0.40	2.50±0.50	M	-	-	500	3,000

Unit: pieces

■ CAPACITANCE RANGE(SH Series/ SG Series)

NP0 Dielectric

DIELECTRIC	NP0																																
SIZE	0402		0603			0805						1206							1210					1808				1812					
RATED VOLTAGE (VDC)	10, 16, 25, 50	100	10, 16, 25, 50	100	200, 250	10, 16, 25, 50,	100	200	250	500, 630	1000	10, 16, 25, 50	100	200	250	500, 630	1000	1500, 2000	10, 16, 25, 50, 100	200, 250	500, 630	1000	1500, 2000	500, 630	1000	1500, 2000	3000	10, 16, 25, 50, 100	200, 250	500, 630	1000	1500, 2000	3000
Capacitance																																	
0.5pF (0R5)	E	E	S	S	S	A	A	A	A	A	D																						
1.0pF (1R0)	E	E	S	S	S	A	A	A	A	A	D																						
1.2pF (1R2)	E	E	S	S	S	A	A	A	A	A	D																						
1.5pF (1R5)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B															
1.8pF (1R8)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B															
2.2pF (2R2)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
2.7pF (2R7)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
3.3pF (3R3)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
3.9pF (3R9)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
4.7pF (4R7)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
5.6pF (5R6)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
6.8pF (6R8)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
8.2pF (8R2)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B						D	D	D	D						
10pF (100)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
12pF (120)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
15pF (150)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
18pF (180)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
22pF (220)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
27pF (270)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
33pF (330)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
39pF (390)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
47pF (470)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D
56pF (560)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	C	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
68pF (680)	E	E	S	S	S	A	A	A	A	A	D	B	B	B	B	B	C	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
82pF (820)	E	E	S	S	S	A	A	A	A	B	D	B	B	B	B	B	D	D	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D
100pF (101)	E	E	S	S	S	A	A	A	B	B	D	B	B	B	B	B	D	D	C	C	C	D	D	D	D	D	K	D	D	D	D	D	D
120pF (121)	E	E	S	S	S	A	A	A	B	D	D	B	B	B	B	B	D	G	C	C	C	D	D	D	D	D	K	D	D	D	D	D	D
150pF (151)	E	E	S	S	S	A	A	B	D	D	D	B	B	B	B	B	D	G	C	C	C	D	G	D	D	K	K	D	D	D	D	D	D
180pF (181)	E	E	S	S	S	A	A	B	D	D	D	B	B	B	B	B	G	G	C	C	G	D	G	D	D	K	K	D	D	D	D	D	K
220pF (221)	E	E	S	S	S	A	A	D	D	D	D	B	B	B	B	B	G	G	C	C	C	G	G	D	D	K	K	D	D	D	D	D	K
270pF (271)	E		S	S	X	A	A	D	D	D	D	B	B	B	C	C	G	P	C	C	C	G	K	K	K	K	K	D	D	D	D	K	K
330pF (331)	E		S	S	X	A	A	D	D	D	D	B	B	B	C	C	G	P	C	C	C	G	K	K	K	K	K	D	D	D	D	K	K
390pF (391)	E		S	S	X	B	B	D	D	D	D	B	B	B	C	C	G	P	C	C	C	G	M	K	K	K		D	D	D	D	K	K
470pF (471)	E		S	S	X	B	B	D	D	I		B	B	C	C	C	G		C	C	C	G	M	K	K	K		D	D	D	K	K	K
560pF (561)	E		S	S		B	B	D	D	I		B	B	C	D	D	G		C	C	C	G		K	K	K		D	D	D	K	K	
680pF (681)	E		S	S		B	B	D	D	I		B	B	C	D	D	G		C	C	C	G		K	K	K		D	D	D	K	K	
820pF (821)	E		S	S		B	B	D	D	I		B	B	C	G	G	G		C	C	C	G		K	K			D	D	D	K	K	
1,000pF (102)	E		S	S		B	B	D	D	I		B	B	C	G	G	G		C	D	D	G		K	K			D	D	D	K	K	
1,200pF (122)			X			B	B	D	D			B	B	C	G	G			C	D	D			K				D	D	D	K		
1,500pF (152)			X			B	B	D	D			B	B	D	G	G			C	D	D			K				D	D	D	K		
1,800pF (182)			X			B	B	D	D			B	B	D	G	G			C	D	D			K				D	D	D			
2,200pF (222)			X			B	B	D	D			B	B	D	G	G			C	D	D			K				D	D	D			
2,700pF (272)			X			D	D					B	B	D	G				C	D	D							D	D	D			
3,300pF (332)			X			D	D					B	B	D	G				C	D	D							D	D	D			
3,900pF (392)						D	D					B	B	D	G				C	D	D							D	D				
4,700pF (472)						D	D					B	B	D	G				C	G								D	D				
5,600pF (562)						D	D					B	B						C	G								D	D				
6,800pF (682)						D	D					C	C						C	G								D	D				
8,200pF (822)						D						D	D						C	G								D					
0.010µF (103)						D						D	D						C	G								D					
0.012µF (123)												P	P						D									D					
0.015µF (153)												P	P						D									D					
0.022µF (223)												P	P															D					
0.033µF (333)												P																D					
0.039µF (393)												P																					

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■ CAPACITANCE RANGE (SH Series/ SG Series)

X7R Dielectric 10V To 250V

DIELECTRIC	X7R																										
SIZE	0402				0603					0805				1206					1210					1812			
RATED VOLTAGE (VDC)	10 16	25	50	100	10 16	25	50	100	200 250	10 16 25	50	100, 200	250	10 16	25	50	100	200 250	10, 16	25	50	100	200 250	10 16 25	50	100	200 250
Capacitance 100pF (101)	E	E	E	E	S	S	S	S	X	D	D	D	D														
120pF (121)	E	E	E	E	S	S	S	S	X	D	D	D	D														
150pF (151)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
180pF (181)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
220pF (221)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
270pF (271)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
330pF (331)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
390pF (391)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
470pF (471)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
560pF (561)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
680pF (681)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
820pF (821)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D									
1,000pF (102)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
1,200pF (122)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
1,500pF (152)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
1,800pF (182)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
2,200pF (222)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
2,700pF (272)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
3,300pF (332)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
3,900pF (392)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
4,700pF (472)	E	E	E	E	S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
5,600pF (562)	E	E	E		S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
6,800pF (682)	E	E	E		S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
8,200pF (822)	E	E	E		S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.010µF (103)	E	E	E		S	S	S	S	X	D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.012µF (123)	E	E			S	S	S	X		D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.015µF (153)	E	E			S	S	S	X		D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.018µF (183)	E	E			S	S	S	X		D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.022µF (223)	E	E			S	S	S	X		D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.027µF (273)	E	E			S	S	S	X		D	D	D	D	D	D	D	D	D	C	C	C	C	C	D	D	D	D
0.033µF (333)	E	E			S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	C	D	D	D	D
0.039µF (393)	E	E			S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	C	D	D	D	D
0.047µF (473)	E	E			S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	D	D	D	D	D
0.056µF (563)	E				S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	D	D	D	D	D
0.068µF (683)	E				S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	G	D	D	D	D
0.082µF (823)	E				S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	G	D	D	D	D
0.10µF (104)	E				S	S	X	X		D	D	D	D	D	D	D	D	G	C	C	C	C	G	D	D	D	D
0.12µF (124)					S	X				D	D			D	D	D	D		C	C	C	C	G	D	D	D	D
0.15µF (154)					S	X				D	D			C	C	C	G		C	C	C	D	M	D	D	D	K
0.18µF (184)					S	X				D	D			C	C	C	G		C	C	C	D	M	D	D	D	K
0.22µF (224)					S	X				D	D	I*		C	C	C	G		C	C	C	D	M	D	D	D	K
0.27µF (274)					X	X				I	I			C	C	D	G		C	C	C	G	M	D	D	D	K
0.33µF (334)					X	X				I	I			C	C	D	G		C	C	C	G	M	D	D	D	K
0.39µF (394)					X	X				I	I			J	J	P	G		C	C	C	M	M	D	D	D	K
0.47µF (474)					X	X				I	I			J	J	P	G*		C	C	C	M	M	D	D	K	K
0.56µF (564)					X					I				J	J	P	P		D	D	D	M		D	D	K	M
0.68µF (684)					X					I				J	J	P	P		D	D	D	K		D	K	K	M
0.82µF (824)					X					I				J	J	P	P		D	D	D	K		D	K	K	M
1.0µF (105)					X					I	I*			J	J	P	P*		D	D	D	K		D	K	K	M
1.5µF (155)										I				J	P				K	G	M	M				K	
2.2µF (225)										I*				J	P	P*			K	G	M*	M*			M	M	
3.3µF (335)														P	P				K	G							
4.7µF (475)										I*				P	P				K	K	M*						
10µF (106)														P*	P*				K	K	M*						
22µF (226)														P*					M*								
47µF (476)																											

1. The letter in cell is expressed the symbol of product thickness.
2. 0805 size, Cap. 0.22uF_100V only, 1210 size, Cap.22uF_10V only.
3. The letter in cell with "*" mark is expressed only provide SH series(product with Ag polymer terminations).
4. For more information about products with special capacitance or other data, please contact WTC local representative.

■ CAPACITANCE RANGE (SH Series/ SG Series)

X7R Dielectric 500V To 3kV

DIELECTRIC		X7R																					
SIZE		0805			1206						1210				1808				1812				
RATED VOLTAGE (VDC)		500	630	1000	500	630	1000	1500	2000	2500	500	630	1000	1500, 2000	500 630	1000	1500, 2000	2500, 3000	500 630	1000	1500, 2000	3000
Capacitance	100pF (101)	B	B	B																		
	120pF (121)	B	B	B																		
	150pF (151)	B	B	B	D	D	D	D	D	D					D	D	D	D				
	180pF (181)	B	B	B	D	D	D	D	D	D					D	D	D	D				
	220pF (221)	B	B	B	D	D	D	D	D	D					D	D	D	D				
	270pF (271)	B	B	B	D	D	D	D	D	D					D	D	D	D		D	D	K
	330pF (331)	B	B	B	D	D	D	D	D	D					D	D	D	K		D	D	K
	390pF (391)	B	B	B	D	D	D	D	D	D					D	D	D	K		D	D	K
	470pF (471)	B	B	B	D	D	D	D	D	D					D	D	D	K		D	D	K
	560pF (561)	B	B	B	D	D	D	D	D	D					D	D	D	K		D	D	K
	680pF (681)	B	B	B	D	D	D	D	D	D					D	D	D	K		D	D	K
	820pF (821)	B	B	B	D	D	D	G	G	D					D	D	D	K		D	D	K
	1,000pF (102)	B	B	B	D	D	D	G	G	D	D	D	D	M	D	D	K	K	D	D	D	K
	1,200pF (122)	B	B	B	D	D	D	G	G		D	D	D	M	D	D	K	K	D	D	D	K
	1,500pF (152)	B	B	D	D	D	D	G	G		D	D	D	M	D	D	K	K	D	D	D	K
	1,800pF (182)	B	B	D	D	D	D	G	G		D	D	D	M	D	D	K	K	D	D	D	M
	2,200pF (222)	B	B	D	D	D	D	G	G		D	D	D	M	D	D	K		D	D	D	M
	2,700pF (272)	B	B		D	D	D	G	G		D	D	D	M	D	D	K		D	D	D	M
	3,300pF (332)	B	B		D	D	D	G	G		D	D	D	M	D	D	K		D	D	K	M
	3,900pF (392)	B	B		D	D	D	G			D	D	G	M	D	D	K		D	D	K	
	4,700pF (472)	D	D		D	D	D	G			D	D	G	M	D	D	K		D	D	K	
	5,600pF (562)	D	D		D	D	D	G			D	D	G		K	K	K		D	D		
	6,800pF (682)	D	D		D	D	D	G			D	D	G		K	K			D	D		
	8,200pF (822)	D	D		D	D	D				D	D	G		K	K			D	D		
	0.010μF (103)	D	D		D	D	D				D	D	G		K	K			D	D		
	0.012μF (123)	D	D		D	D	G				D	D	G		K	K			D	K		
	0.015μF (153)	D	D		D	D	G				D	D	G		K	K			D	K		
	0.018μF (183)	D	D		D	D					D	D	G		K	K			D	M		
	0.022μF (223)	D	D		G	G					D	D	G		K	K			D	M		
	0.027μF (273)				G	G					G	G			K	K			D	M		
	0.033μF (333)				G	G					G	G			K	K			D	M		
	0.039μF (393)				G	G					G	G			K	K			D	M		
	0.047μF (473)				G	G					G	G			K	K			D	M		
	0.056μF (563)				G	G					G	G			K				K	M		
	0.068μF (683)										K	K			K				K	M		
	0.082μF (823)										K	K							K	M		
	0.10μF (104)										K	K							K	M		
	0.12μF (124)																		M			
	0.15μF (154)																		M			
	0.18μF (184)																		M			
	0.22μF (224)																		M			
	0.27μF (274)																					
	0.33μF (334)																					
	0.39μF (394)																					
	0.47μF (474)																					
	0.56μF (564)																					
	0.68μF (684)																					
	0.82μF (824)																					
	1.00μF (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 WTC local representative

Open-Mode Design Capacitors
OP Series

■ FEATURES

* High voltage in a given case size.
* Circuit open during product cracking.
* High stability and reliability.

■ GENERAL ELECTRICAL DATA

Dielectric	X7R
Size	0805, 1206, 1210, 1812
Capacitance	100pF to 1μF
Capacitance tolerance	K (±10%), M (±20%)
Rated voltage (WVDC)	50V, 100V, 200V, 250V, 500V
DF(Tan δ)	≤2.5%
Insulation resistance at Ur	≥10GΩ or RxC≥500Ω-F whichever is smaller
Dielectric strength	100V: ≥2.5 x WVDC 200V and 250V: ≥2 x WVDC 500V: ≥1.5 x WVDC
Operating temperature	-55 to +125°C
Capacitance characteristic	±15%
Termination	Ni/Sn (lead-free termination)

■ EXPLANATION OF PART NUMBERS

OP	32	B	103	K	201	C	T
Series	**Size (Inch (mm))**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
OP=Open-mode	32=1210 (3225)	B=X7R	103=10x10^3=10nF	K=±10%	201=200 VDC	C=Cu/Ni/Sn	T=7” reeled

* Please refer to page 2 “ How to order” for more information.

■ INNER CONSTRUCTION OF OPEN-MODE DESIGN

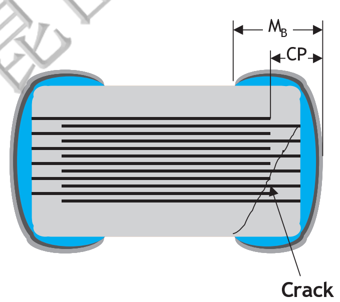

Fig.5 Normal design (CP<M_B) – circuit leakage during cracking.

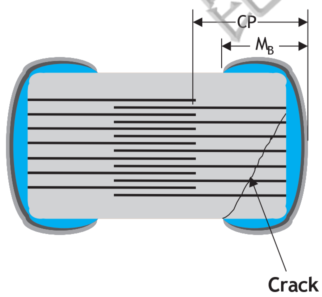

Fig. 6 Open-mode design (CP>M_B) – circuit open during cracking.

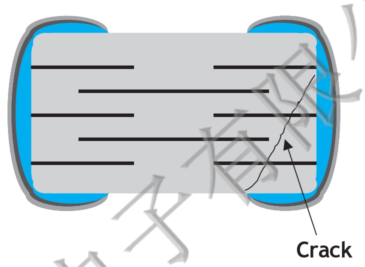

Fig. 7 Floating design (one kind of open-mode design) – circuit open during cracking.

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WTSN www.passivecomponent.com

■ CAPACITANCE RANGE

DIELECTRIC	X7R																
SIZE	0805				1206					1210				1812			
RATED VOLTAGE (VDC)	100	200	250	500, 630	50	100	200	250	500, 630	100	200	250	500, 630	100	200	250	500, 630
Capacitance 100pF (101)	B	B	B	B													
120pF (121)	B	B	B	B													
150pF (151)	B	B	B	B	B	B	D	D	D								
180pF (181)	B	B	B	B	B	B	D	D	D								
220pF (221)	B	B	B	B	B	B	D	D	D								
270pF (271)	B	B	B	B	B	B	D	D	D								
330pF (331)	B	B	B	B	B	B	D	D	D								
390pF (391)	B	B	B	B	B	B	D	D	D								
470pF (471)	B	B	B	B	B	B	D	D	D								
560pF (561)	B	B	B	B	B	B	D	D	D								
680pF (681)	B	B	B	B	B	B	D	D	D								
820pF (821)	B	B	B	B	B	B	D	D	D								
1,000pF (102)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
1,200pF (122)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
1,500pF (152)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
1,800pF (182)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
2,200pF (222)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
2,700pF (272)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
3,300pF (332)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
3,900pF (392)	B	B	B	B	B	B	D	D	D	C	C	C	D	D	D	D	D
4,700pF (472)	B	B	B	D	B	B	D	D	D	C	C	C	D	D	D	D	D
5,600pF (562)	B	D	D	D	B	B	D	D	D	C	C	C	D	D	D	D	D
6,800pF (682)	B	D	D	D	B	B	D	D	D	C	C	C	D	D	D	D	D
8,200pF (822)	B	D	D	D	B	B	D	D	D	C	C	C	D	D	D	D	D
0.010μF (103)	B	D	D	D	B	B	D	D	D	C	C	C	D	D	D	D	D
0.012μF (123)	B	D	D		B	B	D	D	D	C	C	C	D	D	D	D	D
0.015μF (153)	B	D	D		B	B	D	D	D	C	C	C	D	D	D	D	D
0.018μF (183)	B	D	D		B	B	D	D	D	C	C	C	D	D	D	D	D
0.022μF (223)	B	D	D		B	B	D	D	G	C	C	C	D	D	D	D	D
0.027μF (273)	D				B	B	D	D	G	C	C	C	D	D	D	D	D
0.033μF (333)	D				B	B	G	G	G	C	C	C	G	D	D	D	D
0.039μF (393)	D				B	B	G	G		C	C	C	G	D	D	D	D
0.047μF (473)	D				B	B	G	G		C	D	D	G	D	D	D	D
0.056μF (563)					B	B	G	G		C	D	D	G	D	D	D	K
0.068μF (683)					B	B	G	G		C	G	G	G	D	D	D	K
0.082μF (823)					D	D	G	G		C	G	G		D	D	D	K
0.10μF (104)					D	D	G	G		C	G	G		D	D	D	K
0.12μF (124)					D	D				C	G	G		D	D	D	
0.15μF (154)					D	G				D	M	M		D	K	K	
0.18μF (184)					D	G				D	M	M		D	K	K	
0.22μF (224)					D	G				D	M	M		D	K	K	
0.27μF (274)					D					G				D	K	K	
0.33μF (334)					D					G				D	K	K	
0.39μF (394)					D					M				D	K	K	
0.47μF (474)					D					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. For more information about products with special capacitance or other data, please contact WTC local representative.

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Capacitor Array Capacitors
Y4C3/Y4C2 Series

FEATURES

* High density mounting due to mounting space saving.
* Mounting cost saving.
* Increased throughput.

GENERAL ELECTRICAL DATA

Dielectric	NP0		X7R		Y5V
Size	4x0402	4x0603	4x0402	4x0603	4x0603
Capacitance*	10pF to 270pF	10pF to 470pF	1000pF to 100nF	180pF to 100nF	10nF to 100nF
Capacitance tolerance**	J (±5%), K (±10%)		K (±10%), M (±20%)		Z (-20/+80%)
Rated voltage (WVDC)	25,50V,100V	25, 50V,100V	10V, 16V, 25V, 50V	16V, 25V, 50V	16V, 50V
Q/DF(Tan δ)*	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000		Ur=50V, ≤2.5% Ur=25V&16V, ≤3.5% Ur=10V, ≤5.0%		Ur=50V, ≤5% Ur=16V, ≤7%
Insulation resistance at Ur	≥10GΩ		≥10GΩ or RxC≥500ΩxF whichever is less		
Operating temperature	-55 to +125°C				-25 to +85°C
Capacitance characteristic	±30ppm		±15%		+30/-80%
Termination	Ni/Sn (lead-free termination)				

EXPLANATION OF PART NUMBERS

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 2=0.02" pitch	B=X7R	103=10x10^3=10nF	K=±10%	500=50 VDC	C=Cu/Ni/Sn	T=7" reeled

* Please refer to page 2 " How to order" for more information.

CAPACITANCE RANGE

SIZE	4 x 0402					4 x 0603					
DIELECTRIC	NP0	X7R				NP0	X7R			Y5V	
RATED VOLTAGE (VDC)	25,50,100	10	16	25	50	25,50,100	16	25	50	16	50
Capacitance 10pF (100)	T					B					
15pF (150)	T					B					
22pF (220)	T					B					
33pF (330)	T					B					
47pF (470)	T					B					
68pF (680)	T					B					
100pF (101)	T					B					
150pF (151)	T					B					
180pF (181)	T					B		B	B		
220pF (221)	T					B		B	B		
270pF (271)	T					B		B	B		
330pF (331)						B		B	B		
470pF (471)						B		B	B		
6,80pF (681)								B	B		
1,000pF (102)		T	T	T	T			B	B		
1,500pF (152)		T	T	T	T			B	B		
2,200pF (222)		T	T	T	T			B	B		
3,300pF (332)		T	T	T	T			B	B		
4,700pF (472)		T	T	T	T			B	B		
6,800pF (682)		T	T	T	T			B	B		
0.010µF (103)		T	T	T	T			B	B		B
0.015µF (153)		T	T	T			B	B	B		B
0.022µF (223)		T	T	T			B	B	B		B
0.033µF (333)		T	T	T			B				B
0.047µF (473)		T	T	T			B				B
0.068µF (683)		T	T	T			B				B
0.10µF (104)		T	T	T			B			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 WTC local representative.

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■ FEATURES

* Standard size with thin thickness.
* Small size with high capacitance.
* Capacitor with lead-free termination (pure Tin).

■ GENERAL ELECTRICAL DATA

Dielectric	X7R	X5R	Y5V
Size	0402, 0603, 0805, 1206, 1210		
Capacitance range	0.22μF to 4.7μF	0.22μF to 22μF	1μF to 10μF
Capacitance tolerance	K (±10%), M (±20%)		Z (-20/+80%)
Rated voltage (WVDC)	6.3V, 10V, 16V, 25V	6.3V, 10V, 16V, 25V, 50V	10V, 16V, 25V, 50V
DF(Tan δ)*	16V, 10V: ≤10.0% 6.3V: ≤15.0%		50V: ≤7% 25V: ≤9% 16V, 10V: ≤12.5%
Insulation resistance at Ur	RxC≥100ΩxF		
Operating temperature	-55 to +125°C	-55 to +85°C	-25 to +85°C
Capacitance characteristic	±15%		+30/-80%
Termination	Ni/Sn (lead-free termination)		

■ EXPLANATION OF PART NUMBERS

TT	31	X	225	K	100	C	T
Series	Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
TT=Low profile	31=1206 (3216)	X=X5R	225=22x10^5=2.2μF	K=±10%	100=10 VDC	C=Cu/Ni/Sn	T=7" reeled

* Please refer to page 2 " How to order" for more information.

■ CAPACITANCE RANGE

Dielectric		X5R															
Size		0402		0603		0805				1206					1210		
Rated voltage (VDC)		6.3	25	10	16	6.3	10	16	25	6.3	10	16	25	50	10	16	25
Capacitance	0.22uF (224)		L	H	H												
	0.47uF (474)	L	L														
	1.0μF (105)	L		H	H		T	T	T		T	T	T				
	1.5μF (155)						T	T			T	T	T				
	2.2μF (225)					T	T	T	T		T	T	T	T			
	3.3μF (335)										T	T	T		T		
	4.7μF (475)			H		T	T	T	T		T	T	T		T		
	6.8μF (685)																
	10μF (106)					T	T	T		J	T		T		T		T
	22μF (226)					T	T			T		T				T	
	47μF (476)									T							

Dielectric		X7R						Y5V								
Size		0805		1206			1210	0805				1206				1210
Rated voltage (VDC)		10	16, 25	10	25	50	100	10	16	25	50	10	16	25	50	10
Capacitance	1.0μF (105)				T						T					
	1.5μF (155)															
	2.2μF (225)		T			T	K		T			T	T	T	T	
	3.3μF (335)							T								
	4.7μF (475)	T			T			T	T			T	T			
	6.8μF (685)											T				
	10μF (106)			T				T				T				T
	22μF (226)															

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 WTC local representative.

Low Inductance Capacitors
0612 Series

昆山同凯电子有限公司

FEATURES

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

GENERAL ELECTRICAL DATA

Dielectric	X7R
Size	0612
Capacitance range	10nF to 150nF
Capacitance tolerance	K (±10%), M (±20%)
Rated voltage (WVDC)	50V
DF(Tan δ)*	≤2.5%
Insulation resistance at Ur	≥10GΩ or RxC≥500ΩxF whichever is less
Operating temperature	-55 to +125°C
Capacitance characteristic	±15%
Termination	Ni/Sn (lead-free termination)
ESL	500pH

EXPLANATION OF PART NUMBERS

0612	B	103	K	500	C	T
Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
0612(1632)	B=X7R	103=10x10^3=10nF	K=±10%	500=50 VDC	C=Cu/Ni/Sn	T=7” reeled

* Please refer to page 2 “ How to order” for more information.

CAPACITANCE RANGE

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

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

FEATURES

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

GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	1808, 1812, 2211	1808, 1812, 2220, 2211
Capacitance	4pF to 680pF	100pF to 4700pF
Capacitance tolerance	J (±5%), K (±10%)	
Rated voltage (WVAC)	250Vrms	
Q/ DF(Tan δ)	Cap<30pF: Q≥400+20C	DF≤2.5%
Insulation resistance at Ur	≥10GΩ	
Dielectric withstanding strength	1500VAC	
Peak impulse voltage	5000V	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Termination	Ni/Sn (lead-free termination)	
Certified number	TUV: R500021351,R50118359, R50195920,UL: E250427, E182369	
Test standard	EN 60384-14:2005, IEC 60384-14:2005, EN 60384-14:2005, UL 60950:2000, UL 60384-14	

EXPLANATION OF PART NUMBERS

S2	42	N	100	J	302	L	T
Series S2=X1/Y2	**Size (Inch (mm))** 42=1808 (4520)	**Dielectric** N=NP0	**Capacitance** 100=10x10^0=10pF	**Tolerance** J=±5%	**Rated voltage** 302=3000 VDC 602=6000 Impulse Voltage	**Termination** L=Ag/Ni/Sn C=Cu/Ni/Sn	**Packaging** T=7" reeled

* Please refer to page 2 " How to order" for more information.

CAPACITANCE RANGE

DIELECTRIC	NP0			
SIZE	1808	1812	2211	
RATED VOLTAGE (VDC)	3000	3000	3000	
PEAK IMPULSE VOLTAGE	5000	5000	5000	6000
Capacitance 4pF (4R0)	F		K	K*
5pF (5R0)	F		K	K*
10pF (100)	F	D	K	K*
12pF (120)	F	D	K	K*
15pF (150)	F	D	K	K*
18pF (180)	F	D	K	K*
22pF (220)	F	D	K	K*
27pF (270)	F	D	K	K*
33pF (330)	F	D	K	K*
39pF (390)	G	D	K	K*
47pF (470)	G	D	K	K*
56pF (560)	G	D	K	K*
68pF (680)	G	D	K	M*
82pF (820)	G	D	K	M*
100pF (101)	K	D	K	U*
120pF (121)	K	D	M	
150pF (151)	K	D	M	
180pF (181)		D	M	
220pF (221)		K	M	
270pF (271)		K	M	
330pF (331)		K	M	
390pF (391)		K	M	
470pF (471)		K	M	
560pF (561)			M	
680pF (681)			M	

DIELECTRIC	X7R			
SIZE	1808	1812	2211	2220
RATED VOLTAGE (VDC)	3000			
PEAK IMPULSE VOLTAGE	5000			
Capacitance 56pF (560)				
68pF (680)				
82pF (820)				
100pF (101)	G			
120pF (121)	G			
150pF (151)	G	G	G	
180pF (181)	G	G	G	K
220pF (221)	G	G	G	K
270pF (271)	K	G	G	K
330pF (331)	K	G	G	K
390pF (391)	K	G	G	K
470pF (471)	K	G	K	K
560pF (561)	K	G	K	K
680pF (681)	K	K	K	K
820pF (821)	K	K	K	K
1,000pF (102)	K	M	M	K
1,200pF (122)			M	M
1,500pF (152)			M	M
1,800pF (182)			M	M
2,200pF (222)			M	M
3,300pF (332)				M
4,700pF (472)				M

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

PACKAGING DIMENSION AND QUANTITY (X1/Y2 & X2/Y3 Series)

Size Inch (mm)	L (mm)	W (mm)	MB min(mm)	T (mm)/Symbol		7" Plastic tape
1808 (4520)	4.50+0.5/-0.3	2.03±0.25	0.26	1.40±0.15	F	2,000
				1.60±0.20	G	1,000
				2.00±0.20	K	1,000
1812 (4532)	4.50+0.5/-0.3	3.20±0.30	0.26	1.60±0.20	G	1,000
				2.00±0.20	K	1,000
				2.50±0.30	M	500
2220 (5750)	5.70±0.40	5.00±0.40	0.30	2.00±0.20	K	1,000
				2.50±0.30	M	500
2211 (5728)	5.70±0.40	2.80±0.30	0.30	1.60±0.20	G	1,000
				2.00±0.20	K	1,000
				2.50±0.30	M	500

昆山同凯电子有限公司

Safety Certificated Capacitors X2/Y3
S3 Series

■ FEATURES

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

■ GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	1808, 1812	
Capacitance*	3.9pF to 1000pF	150pF to 5600pF
Capacitance tolerance	J (±5%), K (±10%)	K (±10%), M (±20%)
Rated voltage (WVDC)	2000V, 3000V	
Rated voltage (WVAC)	250Vrms	
Q/ DF(Tan δ)	Cap<30pF: Q≥400+20C	Tan δ≤2.5%
Insulation resistance at Ur	≥10GΩ	
Dielectric withstanding strength	1500VAC	
Peak impulse voltage (X2)	2500V	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Termination	Ni/Sn (lead-free termination)	
Certified number	TUV: R500021351,R50118359, R50195920, UL: E250427, E182369	
Test standard	EN 60384-14:2005, IEC 60384-14:2005, UL 60950:2000, UL 60384-14	

■ EXPLANATION OF PART NUMBERS

S3	42	N	100	J	202	L	T
Series	Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
S3=X2/Y3	42=1808 (4520)	N=NP0	100=10x10^0 =10pF	J=±5%	202=2000 VDC	L=Ag/Ni/Sn	T=7" reeled

* Please refer to page 2 " How to order" for more information.

■ CAPACITANCE RANGE

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

DIELECTRIC		X7R			
SIZE		1808		1812	
RATED VOLTAGE (VDC)		2000	3000	2000	3000
Capacitance	150pF (151)	G			
	180pF (181)	G			
	220pF (221)	G			
	270pF (271)	G		G	
	330pF (331)	G	G	G	
	390pF (391)	G	G	G	
	470pF (471)	G	G	G	
	560pF (561)	G	G	G	
	680pF (681)	G	G	G	G
	820pF (821)	G	G	G	G
	1,000pF (102)	K	K	G	G
	1,200pF (122)	K		G	
	1,500pF (152)	K		K	
	1,800pF (182)	K		K	
	2,200pF (222)	K		M	
	2,700pF (272)			M	
	3,300pF (332)			M	
	3,900pF (392)			M	
	4,700pF (472)			M	
	5,600pF (562)			M	

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 WTC local representative.

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■ GENERAL ELECTRICAL DATA

Dielectric	NPO	X7R
Size	0402, 0603, 0805, 1206, 1210	
Capacitance range	0.5pF to 0.01uF	100pF to 1μF
Capacitance tolerance	Cap≤5pF:B,C; 5pF<Cap<10pF:C,D; Cap≥10pF:F, G, J	J (±5%), K (±10%), M (±20%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V, 250V, 500V, 630V	10V, 16V, 25V, 50V, 100V
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm/°C	±15%
Termination	Ni/Sn (lead-free termination)	

■ EXPLANATION OF PART NUMBERS

MT	31	B	104	K	500	C	T
Series	Size (Inch (mm))	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
MT= Automotive (with AEC-Q200 qualification)	31=1206 (3216)	B=X7R	104=10x10^4 =0.1uF	K=±10%	500=50 VDC	C=Cu/Ni/Sn	T=7" reeled

■ CAPACITANCE RANGE

NP0 Dielectric

DIELECTRIC	NPO									
Size	0402	0603		0805			1206			1210
RATED VOLTAGE (VDC)	10 16 25 50	10 16 25 50 100	200	10 16 25 50	100	250	10 16 25 50	100	250 500 630	250
Capacitance										
0.5pF (0R5)	N	S	S	A	A	A				
0.6pF (0R6)	N	S	S	A	A	A				
0.7pF (0R7)	N	S	S	A	A	A				
0.8pF (0R8)	N	S	S	A	A	A				
0.9pF (0R9)	N	S	S	A	A	A				
1.0pF (1R0)	N	S	S	A	A	A				
1.2pF (1R2)	N	S	S	A	A	A	B	B	B	
1.5pF (1R5)	N	S	S	A	A	A	B	B	B	
1.8pF (1R8)	N	S	S	A	A	A	B	B	B	
2.2pF (2R2)	N	S	S	A	A	A	B	B	B	
2.7pF (2R7)	N	S	S	A	A	A	B	B	B	
3.3pF (3R3)	N	S	S	A	A	A	B	B	B	
3.9pF (3R9)	N	S	S	A	A	A	B	B	B	
4.7pF (4R7)	N	S	S	A	A	A	B	B	B	
5.6pF (5R6)	N	S	S	A	A	A	B	B	B	
6.8pF (6R8)	N	S	S	A	A	A	B	B	B	
8.2pF (8R2)	N	S	S	A	A	A	B	B	B	
10pF (100)	N	S	S	A	A	A	B	B	B	C
12pF (120)	N	S	S	A	A	A	B	B	B	C
15pF (150)	N	S	S	A	A	A	B	B	B	C
18pF (180)	N	S	S	A	A	A	B	B	B	C
22pF (220)	N	S	S	A	A	A	B	B	B	C
27pF (270)	N	S	S	A	A	A	B	B	B	C
33pF (330)	N	S	S	A	A	A	B	B	B	C
39pF (390)	N	S	S	A	A	A	B	B	B	C
47pF (470)	N	S	S	A	A	A	B	B	B	C
56pF (560)	N	S	S	A	A	A	B	B	B	C
68pF (680)	N	S	S	A	A	A	B	B	B	C
82pF (820)	N	S	S	A	A	A	B	B	B	C
100pF (101)	N	S	S	A	A	B	B	B	B	C
120pF (121)	N	S		A	A	B	B	B	B	C
150pF (151)	N	S		A	A	D	B	B	B	C
180pF (181)	N	S		A	A	D	B	B	B	C
220pF (221)	N	S		A	A	D	B	B	B	C
270pF (271)	N	S		A	A	D	B	B	C	C
330pF (331)	N	S		A	A	D	B	B	C	C
390pF (391)	N	S		B	B	D	B	B	C	C
470pF (471)	N	S		B	B	D	B	B	C	C
560pF (561)	N	S		B	B	D	B	B	D	C
680pF (681)	N	S		B	B	D	B	B	D	C
820pF (821)	N	S		B	B		B	B	G	C
1,000pF (102)	N	S		B	B		B	B	G	D
1,200pF (122)				B	B		B	B	G	D
1,500pF (152)				B	B		B	B	G	D
1,800pF (182)				B	B		B	B	G	D
2,200pF (222)				B	B		B	B	G	D
2,700pF (272)				D	D		B	B		D
3,300pF (332)				D	D		B	B		D
3,900pF (392)				D	D		B	B		D
4,700pF (472)				D	D		B	B		
5,600pF (562)				D			B	B		
6,800pF (682)				D			C	C		
8,200pF (822)				D			D	D		
0.010uF (103)				D			D	D		

X7R Dielectric

DIELECTRIC	X7R																		
Size	0402	0603			0805					1206						1210			
RATED VOLTAGE (VDC)	10 16 25 50	10 16 25	50	100	10 16 25	50	100	200 250	500 630	10 16	25	50	100	200 250	500 630	10 16 25 50	100	200 250	500
Capacitance																			
100pF (101)	N	S	S	S	B	B	B	B	B					D	D			D	D
120pF (121)	N	S	S	S	B	B	B	B	B					D	D			D	D
150pF (151)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
180pF (181)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
220pF (221)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
270pF (271)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
330pF (331)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
390pF (391)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
470pF (471)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
560pF (561)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			D	D
680pF (681)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			C	D
820pF (821)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D			C	D
1,000pF (102)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
1,200pF (122)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
1,500pF (152)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
1,800pF (182)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
2,200pF (222)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
2,700pF (272)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
3,300pF (332)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
3,900pF (392)	N	S	S	S	B	B	B	B	B	B	B	B	B	D	D	C	C	C	D
4,700pF (472)	N	S	S	S	B	B	B	B	D	B	B	B	B	D	D	C	C	C	D
5,600pF (562)	N	S	S	S	B	B	B	B	D	B	B	B	B	D	D	C	C	C	D
6,800pF (682)	N	S	S	S	B	B	B	B	D	B	B	B	B	D	D	C	C	C	D
8,200pF (822)	N	S	S	S	B	B	B	B	D	B	B	B	B	D	D	C	C	C	D
0.010uF (103)	N	S	S	S	B	B	B	D	D	B	B	B	B	D	D	C	C	C	D
0.012uF (123)		S	S		B	B	B	D		B	B	B	B	D		C	C	C	D
0.015uF (153)		S	S		B	B	B	D		B	B	B	B	D		C	C	C	D
0.018uF (183)		S	S		B	B	B	D		B	B	B	B	D		C	C	C	D
0.022uF (223)		S	S		B	B	B	D		B	B	B	B	D		C	C	C	D
0.027uF (273)		S	S		B	B	D			B	B	B	B			C	C	C	
0.033uF (333)		S	X		B	B	D			B	B	B	B			C	C	C	
0.039uF (393)		S	X		B	B	D			B	B	B	B			C	C	C	
0.047uF (473)		S	X		B	B	D			B	B	B	B			C	C	D	
0.056uF (563)		S	X		B	B	D			B	B	B	B			C	C		
0.068uF (683)		S	X		B	B	D			B	B	B	B			C	C		
0.082uF (823)		S	X		B	B	D			B	B	B	D			C	C		
0.10uF (104)		S	X		B	B	D			B	B	B	D			C	C		
0.12uF (124)					B	D				B	B	B	D			C			
0.15uF (154)					D	D				C	C	C	G			C			
0.18uF (184)					D	D				C	C	C	G			C			
0.22uF (224)					D	D				C	C	C	G			C			
0.27uF (274)					D					C	C	D							
0.33uF (334)					D					C	C	D							
0.39uF (394)					D					C	J	P							
0.47uF (474)					D					J	J	P							
0.56uF (564)					D					J	J	P							
0.68uF (684)					D					J	J	P							
0.82uF (824)					D					J	J	P							
1.0uF (105)					D					J	J	P							
1.5uF (155)																			
2.2uF (225)																			

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 WTC local representative.

昆山同凯电子有限公司

Automotive Capacitors without AEC-Q200
MG Series

■ FEATURES

* A wide selection of sizes is available (0402 to 1812).
* High capacitance in given case size.
* Capacitor with lead-free termination (pure Tin).
* High reliability design with severe quality controls.

■ GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	X5R
Size	0402, 0603, 0805, 1206, 1210, 1812		
Capacitance range*	0.5pF to 0.033µF	100pF to 2.2µF	0.056µF to 10µF
Capacitance tolerance**	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)	J (±5%), K (±10%), M (±20%)	
Rated voltage (WVDC)	16V, 25V, 50V, 100V	10V, 16V, 25V, 50V, 100V, 200V, 250V	6.3V, 10V, 16V, 25V
Operating temperature	-55 to +125°C		-55 to +85°C
Capacitance characteristic	±30ppm/°C		±15%
Termination	Ni/Sn (lead-free termination)		

■ EXPLANATION OF PART NUMBERS

MG	31	B	104	K	500	C	T
Series MG= Automotive (without AEC-Q200 certification)	**Size (Inch (mm))** 31=1206 (3216)	**Dielectric** B=X7R	**Capacitance** 104=10x10^4 =0.1uF	**Tolerance** K=±10%	**Rated voltage** 500=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging** T=7" reeled

* Please refer to page 2 " How to order" for more information.

■ CAPACITANCE RANGE

X5R Dielectric

Dielectric	X5R																
Size	0402			0603				0805				1206				1210	
Rated Voltage(VDC)	6.3	10	16	6.3	10	16	25	6.3	10	16	25	6.3	10	16	25	10	16
Capacitance 0.056µF (563)		N															
0.068µF (683)		N															
0.082µF (823)		N															
0.10µF (104)		N	N														
0.15µF (154)		N	N														
0.22µF (224)	N	N	N				X										
0.27uF (274)	N	N			X	X	X										
0.33µF (334)	N	N			X	X	X										
0.39µF (394)	N				X	X	X										
0.47µF (474)	N				X	X	X										
0.68µF (684)	N				X	X	X										
0.82uF (824)	N			X	X	X	X										
1.0µF (105)				X	X	X	X										
1.5µF (155)								I	I				J	J	P	K	K
2.2µF (225)								I	I	I	I		J	J	P	K	K
3.3µF (335)										I	I	P	P	P	P	K	K
4.7µF (475)										I	I	P	P	P	P	K	K
6.8uF (685)												P	P				
10µF (106)												P	P				

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 WTC local representative.

WALSIN
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NP0 Dielectric

Dielectric	NP0													
Size	0402	0603	0805					1206		1210			1812	
Rated Voltage (VDC)	10,16, 25,50, 100	10,16, 25,50, 100	10,16, 25,50	100	200	250	500, 630	10,16, 25,50,	100	10,16	25,50	100	10,16, 25,50	100
Capacitance														
0.1pF (0R1)														
0.2pF (0R2)														
0.3pF (0R3)														
0.4pF (0R4)														
0.5pF (0R5)	N	S	A	A	A	A	A							
0.6pF (0R6)	N	S	A	A	A	A	A							
0.7pF (0R7)	N	S	A	A	A	A	A							
0.8pF (0R8)	N	S	A	A	A	A	A							
0.9pF (0R9)	N	S	A	A	A	A	A							
1.0pF (1R0)	N	S	A	A	A	A	A							
1.2pF (1R2)	N	S	A	A	A	A	A							
1.5pF (1R5)	N	S	A	A	A	A	A	B	B					
1.8pF (1R8)	N	S	A	A	A	A	A	B	B					
2.2pF (2R2)	N	S	A	A	A	A	A	B	B					
2.7pF (2R7)	N	S	A	A	A	A	A	B	B					
3.3pF (3R3)	N	S	A	A	A	A	A	B	B					
3.9pF (3R9)	N	S	A	A	A	A	A	B	B					
4.7pF (4R7)	N	S	A	A	A	A	A	B	B					
5.6pF (5R6)	N	S	A	A	A	A	A	B	B					
6.8pF (6R8)	N	S	A	A	A	A	A	B	B					
8.2pF (8R2)	N	S	A	A	A	A	A	B	B					
10pF (100)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
12pF (120)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
15pF (150)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
18pF (180)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
22pF (220)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
27pF (270)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
33pF (330)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
39pF (390)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
47pF (470)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
56pF (560)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
68pF (680)	N	S	A	A	A	A	A	B	B	C	C	C	D	D
82pF (820)	N	S	A	A	A	A	B	B	B	C	C	C	D	D
100pF (101)	N	S	A	A	A	B	B	B	B	C	C	C	D	D
120pF (121)	N	S	A	A	A	B	D	B	B	C	C	C	D	D
150pF (151)	N	S	A	A	B	D	D	B	B	C	C	C	D	D
180pF (181)	N	S	A	A	B	D	D	B	B	C	C	C	D	D
220pF (221)	N	S	A	A	D	D	D	B	B	C	C	C	D	D
270pF (271)		S	A	A	D	D	D	B	B	C	C	C	D	D
330pF (331)		S	A	A	D	D	D	B	B	C	C	C	D	D
390pF (391)		S	B	B	D	D	D	B	B	C	C	C	D	D
470pF (471)		S	B	B	D	D		B	B	C	C	C	D	D
560pF (561)		S	B	B	D	D		B	B	C	C	C	D	D
680pF (681)		S	B	B	D	D		B	B	C	C	C	D	D
820pF (821)		S	B	B	D	D		B	B	C	C	C	D	D
1,000pF (102)		S	B	B	D	D		B	B	C	C	C	D	D
1,200pF (122)			B	B	D	D		B	B	C	C	C	D	D
1,500pF (152)			B	B	D	D		B	B	C	C	C	D	D
1,800pF (182)			B	B	D	D		B	B	C	C	C	D	D
2,200pF (222)			B	B	D	D		B	B	C	C	C	D	D
2,700pF (272)			D	D				B	B	C	C	C	D	D
3,300pF (332)			D					B	B	C	C	C	D	D
3,900pF (392)			D					B	B	C	C	C	D	D
4,700pF (472)			D					B	B	C	C	C	D	D
5,600pF (562)			D					B	B	C	C	C	D	D
6,800pF (682)			D					C		C	C	C	D	D
8,200pF (822)			D					D		C	C	C	D	D
0.010uF (103)			D					D		C	C	C	D	D
0.012uF (123)										C	D	D	D	D
0.015uF (153)										C	D	D	D	D
0.018uF (183)													D	D
0.022uF (223)													D	D
0.027uF (273)													D	D
0.033uF (333)													D	D

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 WTC local representative.

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X7R Dielectric

Dielectric		X7R																								
Size		0402			0603				0805					1206					1210					1812			
Rated Voltage (VDC)		10, 16	25	50	6.3, 10, 16	25	50	100	10, 16	25	50	100	200, 250	10, 16	25	50	100	200, 250	10, 16	25	50	100	200, 250	10, 16, 25	50	100	200, 250
Capacitance	100pF (101)	N	N	N	S	S	S	S	B	B	B	B	B														
	120pF (121)	N	N	N	S	S	S	S	B	B	B	B	B														
	150pF (151)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	180pF (181)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	220pF (221)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	270pF (271)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	330pF (331)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	390pF (391)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	470pF (471)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	560pF (561)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	680pF (681)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	820pF (821)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B									
	1,000pF (102)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	1,200pF (122)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	1,500pF (152)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	1,800pF (182)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	2,200pF (222)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	2,700pF (272)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	3,300pF (332)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	3,900pF (392)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	4,700pF (472)	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	5,600pF (562)	N	N	N	S	S	S	S	B	B	B	B	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	6,800pF (682)	N	N	N	S	S	S	S	B	B	B	B	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	8,200pF (822)	N	N	N	S	S	S	S	B	B	B	B	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	0.010uF (103)	N	N	N	S	S	S	S	B	B	B	B	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	0.012uF (123)	N	N		S	S	S		B	B	B	B	D	B	B	B	B	B	C	C	C	C	C	D	D	D	D
	0.015uF (153)	N	N		S	S	S		B	B	B	B	D	B	B	B	B	C	C	C	C	C	C	D	D	D	D
	0.018uF (183)	N	N		S	S	S		B	B	B	B	D	B	B	B	B	C	C	C	C	C	C	D	D	D	D
	0.022uF (223)	N	N		S	S	S		B	B	B	B	D	B	B	B	B	C	C	C	C	C	C	D	D	D	D
	0.027uF (273)	N	N		S	S	S		B	B	B	D		B	B	B	B	C	C	C	C	C	C	D	D	D	D
	0.033uF (333)	N	N		S	S	X		B	B	B	D		B	B	B	B	G	C	C	C	C	C	D	D	D	D
	0.039uF (393)	N	N		S	S	X		B	B	B	D		B	B	B	B	G	C	C	C	C	C	D	D	D	D
	0.047uF (473)	N	N		S	S	X		B	B	B	D		B	B	B	B	G	C	C	C	C	D	D	D	D	D
	0.056uF (563)	N			S	S	X		B	B	B	D		B	B	B	B	G	C	C	C	C	D	D	D	D	D
	0.068uF (683)	N			S	S	X		B	B	B	D		B	B	B	B	G	C	C	C	C	G	D	D	D	D
	0.082uF (823)	N			S	S	X		B	B	B	D		B	B	B	D	G	C	C	C	C	G	D	D	D	D
	0.10uF (104)	N	N		S	S	X		B	B	B	D		B	B	B	D	G	C	C	C	C	G	D	D	D	D
	0.12uF (124)				S	X			D	D	D			B	B	B	D		C	C	C	C	G	D	D	D	D
	0.15uF (154)				S	X			D	D	D			C	C	C	G		C	C	C	D	M	D	D	D	K
	0.18uF (184)				S	X			D	D	D			C	C	C	G		C	C	C	D	M	D	D	D	K
	0.22uF (224)				S	X			D	D	D			C	C	C	G		C	C	C	D	M	D	D	D	K
	0.27uF (274)				X				D	D				C	C	D			C	C	C	G	M	D	D	D	K
	0.33uF (334)				X				D	D				C	C	D			C	C	D	G	M	D	D	D	K
	0.39uF (394)				X				D	D				C	J	P			C	C	D	M	M	D	D	D	K
	0.47uF (474)				X				D	D				J	J	P			C	C	D	M	M	D	D	K	K
	0.56uF (564)								D	D				J	J	P			D	D	D	M		D	D	K	
	0.68uF (684)								D	D				J	J	P			D	D	D	K		D	K	K	
	0.82uF (824)								D	D				J	J	P			D	D	D	K		D	K	K	
	1.0uF (105)								D	D				J	J	P			D	D	D	K		D	K	K	
	1.5uF (155)													J	P				K	G						K	
	2.2uF (225)													J	P				K	G						M	

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 WTC local representative.

FEATURES

* High density mounting due to mounting space saving.
* Mounting cost saving.
* Increased throughput.

GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	4x0402	4x0402
Capacitance range*	10pF to 220pF	1000pF to 0.1μF
Capacitance tolerance**	J (±5%), K (±10%)	K (±10%), M (±20%)
Rated voltage (WVDC)	50V	10V, 16V, 25V
Insulation resistance at Ur	≥10GΩ or RxC≥500ΩxF whichever is less	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Termination	Ni/Sn (lead-free termination)	

EXPLANATION OF PART NUMBERS

MY	24	N	102	J	500	C	T
Series MY= Automotive Capacitor array (with AEC-Q200 qualification)	**Size (Inch (mm))** 24=4x0402	**Dielectric** N=NP0 (C0G) B=X7R	**Capacitance** 102=10x10^2 =1000pFuF	**Tolerance** J=±5%	**Rated voltage** 500=50 VDC	**Termination** C=Cu/Ni/Sn	**Packaging** T=7" reeled G=13" reeled

* Please refer to page 2 " How to order" for more information.

CAPACITANCE RANGE

Size		4 x 0402			
Dielectric		NP0	X7R		
Rated Voltage(VDC)		50	10	16	25
Capacitance	10pF (100)	T			
	15pF (150)	T			
	22pF (220)	T			
	33pF (330)	T			
	47pF (470)	T			
	68pF (680)	T			
	100pF (101)	T			
	150pF (151)	T			
	180pF (181)	T			
	220pF (221)	T			
	270pF (271)				
	330pF (331)				
	470pF (471)				
	6,80pF (681)				
	1,000pF (102)		T	T	T
	1,500pF (152)		T	T	T
	2,200pF (222)		T	T	T
	3,300pF (332)		T	T	T
	4,700pF (472)		T	T	T
	6,800pF (682)		T	T	T
	0.010μF (103)		T	T	T
	0.015μF (153)		T	T	T
	0.022μF (223)		T	T	T
	0.033μF (333)		T	T	T
	0.047μF (473)		T	T	T
	0.068μF (683)		T	T	T
	0.10μF (104)		T	T	T

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 WTC local representative.

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Appendix I : Reliability Test Conditions and Requirements

No	*Item	Test Condition	Requirements
1.	Visual and Mechanical	---	* No remarkable defect. * Dimensions to conform to individual specification sheet.
2.	Capacitance	Class I: NP0 Cap≤1000pF 1.0±0.2Vrms, 1MHz±10% Cap>1000pF 1.0±0.2Vrms, 1KHz±10% Class II * : X7R,X7E, X6S, X5R,Y5V Cap≤10μF, 1.0±0.2Vrms, 1kHz±10% ** Cap>10μF, 0.5±0.2Vrms, 120Hz±20% ** Test condition: 0.5±0.2Vrms, 1KHz±10% X7R: 0805=106(6.3V&10V) X5R: 01R5≥103, 0201≥224 (6.3V,10V) [#1], 0402≥475 (6.3V,16V), 0402≥225(10V), 0603=106 (6.3V,10V), TT18X≥475(10V) , TT15X series X6S:0201≥104 (6.3V),0402≥225 (6.3V), 0603≥106 (6.3V), #1 Excluding 0201X105K6R3(1.0±0.2Vrms,1KHz±10%) * Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement.	* Shall not exceed the limits given in the detailed spec.
3.	Q/ D.F. (Dissipation Factor)		NP0: Cap≥30pF, Q≥1000; Cap<30pF,Q≥400+20C[#2] #2.RF15(≥100V), RF18, RF21, RF11,RF22: Cap<30pF:Q≥800+20C;Cap≥30pF:Q≥1400 X7R, X6S, X5R:

Rated vol.	D.F.≤	Exception of D.F. ≤	
≥100V	≤2.5%	≤3%	1206≥0.47μF
		≤5%	0805≥0.1μF, 0603≥0.068μF; 1206>1μF;1210≥2.2μF; TT series
50V	≤2.5%	≤3%	0201(50V); 0603≥0.047μF; 0805≥0.18μF;1206≥0.47μF
		≤5%	1210≥4.7μF
		≤10%	0402≥0.1μF; 0603>0.1μF; 0805≥1μF;1206≥2.2μF; 1210≥10μF;TT series
35V	≤3.5%	≤10%	0603≥1μF;0805≥2.2μF;1206≥2.2μF; 1210≥10μF
25V	≤3.5%	≤5%	0201≥0.01μF;0805≥1μF; 1210≥10μF
		≤7%	0603≥0.33μF; 1206≥4.7μF
		≤10%	0201≥0.1μF;0402≥0.10μF;0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF ; TT series
		≤12.5%	0402≥0.47μF
16V	≤3.5%	≤5%	0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤10%	0201≥0.1μF;0402≥0.22uF;0603≥0.68μF;0805≥2.2μF; 1206≥4.7μF; 1210≥22μF; TT series
10V	≤5%	≤10%	0201≥0.012μF;0402≥0.33μF(0402/X7R≥0.22μF);0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF; TT series; 01R5
		≤15%	0201≥0.1μF; 0402≥1μF
6.3V	≤10%	≤15%	0201≥0.1μF;0402≥1μF;0603≥10μF; 0805≥4.7μF; 1206≥47μF :1210≥100μF; TT series
		≤20%	0402≥2.2μF
4V	≤15%	---	---

Y5V:

Rated vol.	D.F. ≤	Exception of D.F.≤	
≥50V	≤5%	≤7%	0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF; TT series & Cap≥1μF
		≤12.5%	1210≥6.8μF
35V	≤7%	---	---
25V	≤5%	≤7%	0402≥0.047μF;0603≥0.1μF; 0805≥0.33μF;1206≥1μF; 1210≥4.7μF
		≤9%	0402≥0.068μF;0603≥0.47μF; 1206≥4.7μF; 1210≥22μF; TT series & Cap≥1μF
16V (C<1.0μF)	≤7%	≤9%	0402≥0.068μF; 0603≥0.68μF
		≤12.5%	0402≥0.22μF
16V (C≥1.0μF)	≤9%	≤12.5%	0603≥2.2μF; 0805≥3.3μF;1206≥10μF; 1210≥22μF; 1812≥47μF; TT series & Cap≥1μF
10V	≤12.5%	≤20%	0402≥0.47μF
6.3V	≤20%	---	---

No	*Item	Test Condition	Requirements
4a.	Dielectric Strength	*To apply voltage(≤100V) 250%. *Duration: 1 to 5 sec. *Charge & discharge current less than 50mA.	*No evidence of damage or flash over during test.
		*To apply voltage: 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	
4b.	Dielectric Strength (for X1/Y2 & X2/Y3)	* To apply 1500 VAC voltage. * Duration: 60 sec.	* No evidence of damage or flash over during test.
5.	Insulation Resistance	To apply rated voltage for max. 120 sec.	10GΩ or RxC≥500Ω-F whichever is smaller. Class II (X7R, X6S, X5R, Y5V)

Rated voltage	Insulation Resistance
100V: X7R	10GΩ or RxC≥100 Ω-F whichever is smaller.
50V:0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF	
35V:0805≥2.2μF;1206≥2.2μF;1210≥10μF	
25V:0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF	
16V:0201≥0.1μF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;1206≥10μF;1210≥47μF	
10V:0201≥47nF;0402≥0.47μF;0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF;1210≥47μF	
6.3V ; 4V ; TT series	
All X6S items	RxC≥50 Ω-F
50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF;1206≥10μF / 35V: 0603≥1μF / 25V: 0201≥0.1μF; 0402≥0.22μF;0603≥10μF; 0805≥10μF;1206≥22μF / 16V: 0603≥10μF / 10V: 0201>0.1μF; 0603≥10μF; 0805≥47μF; TT21>4.7μF / 6.3V: 0201≥0.1μF; 0603≥4.7μF;1206≥10μF/ 4V:0603≥22μF; 0805≥47μF; 1206≥100μF	

No	*Item	Test Condition		Requirements
		Rated Voltage: 200V ~ 630V	To apply rated voltage (500V max.) for 60 sec.	>10GΩ or 100Ω-F whichever is smaller.
		Rated Voltage: >630V	To apply 500V for 60sec.	>10GΩ
6.	Temperature Coefficient	With no electrical load.		

T.C.	Operating Temp
NPO (C0G)	-55~125°C at 25°C
NPO (C0H)	-55~125°C at 25°C
NPO (C0J)	-55~125°C at 25°C
X7R	-55~125°C at 25°C
X7E	-55~125°C at 25°C
X6S	-55~105°C at 25°C
X5R	-55~ 85°C at 25°C
Y5V	-25~ 85°C at 20°C

T.C.	Capacitance Change
NPO (C0G)	Within ±30ppm/°C
NPO (C0H)	Within ±60ppm/°C
NPO (C0J)	Within ±120ppm/°C
X7R	Within ±15%
X7E	Within ±4.7%
X6S	Within ±22%
X5R	Within ±15%
Y5V	Within +30%/-80%

* This Reliability Test Conditions and Requirements only for General Purpose series, please refer to individual sheet for other products information.

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<table>
<tr><th>No</th><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>6.</td><td>Temperature Coefficient
(Continued)</td><td>To apply voltage:
<table>
<tr><th>01005</th><th>0201</th></tr>
<tr><td>Cap≤0.01μF: 0.5V</td><td>Cap<0.1μF:1V</td></tr>
<tr><td>Cap>0.01μF: 0.2V</td><td>0.1μF≤Cap<1μF: 0.2V</td></tr>
<tr><td></td><td>Cap≥1μF: 0.1V</td></tr>
<tr><th>0402</th><th>0603</th></tr>
<tr><td>Cap<1μF: 1V</td><td>Cap≤1μF: 1V</td></tr>
<tr><td>Cap=1μF: 0.5V</td><td>1μF<Cap≤4.7μF: 0.5V</td></tr>
<tr><td>1μF<Cap<10μF: 0.2V</td><td>Cap>4.7μF: 0.2V</td></tr>
<tr><td>Cap≥10μF: 0.1V</td><td></td></tr>
<tr><th>0805</th><th>1206/1210</th></tr>
<tr><td>Cap<10μF: 1V</td><td>Cap≤10μF: 1V</td></tr>
<tr><td>Cap=10μF: 0.5V</td><td>10μF<Cap≤100μF: 0.5V</td></tr>
<tr><td>Cap>10μF: 0.2V</td><td>Cap>100μF: 0.2V</td></tr>
</table></td><td></td></tr>
<tr><td>7.</td><td>Adhesive Strength of Termination</td><td>*Pressurizing force:
01005:1N, 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.)
* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable defect.
* Dimensions to conform to individual specification sheet.</td></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.**
**SH/SG series: 75% 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 / SH series: 5 mm#3 / SG series: 3 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.
#3. SH21B224_101/SH31B226_100/SH31B106_160/SH31B106_250/SH31B225_500/SH31B474_101/SH31B105_101/SH32B476_6R3/SH32B226_160/SH32B106_250/SH32B225_500/SH32B475_500/SH32B106_500/SH32B225_101/SH21B105_500/SH21B225_250/SH21B475_160</td><td>* No remarkable damage.
* Cap change:
NP0: within ±5% or 0.5pF whichever is larger
X7R, X7E, X6S, 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: 260±5°C
* Dipping time: 10±1 sec
* Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder.
* Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp.
* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.
* Cap change:
NP0: within ±2.5% or 0.25pF whichever is larger
X7R, X7E, X6S, 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 24±2 hrs at room temp.
* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.
* Cap change:
NP0: within ±2.5% or 0.25pF whichever is larger
X7R, X7E, X6S, 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 (Damp Heat) Steady State</td><td>* Test temp.: 40±2°C
* Humidity: 90~95% RH
* Test time: 500+24/-0hrs.
*Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp.
* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.
* Cap change: NP0: within ±5% or 0.5pF whichever is larger
X7R, X7E, X6S, X5R: ≥10V**,within ±12.5%;≤6.3V within ±25%;TT series,within ±25%
**10V:0603≥4.7μF;0402≥1μF;0201≥0.1μF, within ±25%;
Y5V: ≥10V, within ±30%; 6.3V, within +30/-40%
* Q/D.F. value:
NP0: More than 30pF Q≥350, 10pF≤C≤30pF, Q≥275+2.5C,Less than 10pF Q≥200+10C
X7R, X6S, X5R:
<table>
<tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception of D.F. ≤</th></tr>
<tr><td rowspan="2">≥100V</td><td rowspan="2">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0805≥0.1μF, 0603≥0.068μF; 1206>1μF;1210≥2.2μF; TT series</td></tr>
<tr><td rowspan="3">≥50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V);0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>1210≥4.7μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.1μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF;1210≥10μF; TT series</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF;1206≥2.2μF;1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF;0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF;1206≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF;0402≥0.10μF;0603≥0.47μF;0805≥2.2μF;1206≥6.8μF; 1210≥22μF; TT series</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF;0805≥0.68μF;1206≥2.2μF;1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.01μF;0402≥0.033μF;0603≥0.68μF;0805≥2.2μF;1206≥4.7μF; 1210≥22μF; TT series</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF;0402≥0.33μF(0402/X7R≥0.22μF); 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF ;0402≥1μF; TT series; 01R5</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF;0402≥1μF;0603≥10μF; 0805≥4.7μF;1206≥47μF;1210≥100μF;TT series</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table></td></tr>
</table>

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Appendix I : Reliability Test Conditions and Requirements

No	Item	Test Condition	Requirements
13.	Humidity (Damp Heat) Steady State (Continued)		Y5V: (see tables below)

Y5V:

Rated vol.	D.F.≤	Exception of D.F.≤	
≥50V	≤7.5%	≤10%	0603≥0.1μF;0805≥0.47μF;1206≥4.7μF
		≤20%	1210≥6.8μF
35V	≤10%	---	---
25V	≤7.5%	≤10%	0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;1206≥1μF; 1210≥4.7μF
		≤15%	0402≥0.068μF;0603≥0.47μF;1206≥4.7μF;1210≥22μF; TT series & Cap≥1μF
16V(C<1.0μF)	≤10%	≤12.5%	0402≥0.068μF; 0603≥0.68μF
		≤20%	0402≥0.22μF
16V(C≥1.0μF)	≤12.5%	≤20%	0603≥2.2μF;0805≥3.3μF;1206≥10μF;1210≥22μF;1812≥47μF; TT series & Cap≥1μF
10V	≤20%	≤30%	0402≥0.47μF
6.3V	≤30%	---	---

*I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is smaller.
Class II (X7R, X7E, X6S, X5R, Y5V)

Rated voltage	Insulation Resistance
100V: X7R	1GΩ or RxC≥10 Ω-F whichever is smaller.
50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF	
35V:0603≥1μF;0805≥2.2μF; 1206≥2.2μF;1210≥10μF	
25V:0201≥0.1uF; 0402≥0.22μF; 0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF	
16V:0201≥0.1μF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;1206≥10μF;1210≥47μF	
10V:0201≥47nF;0402≥0.47μF;0603≥0.47μF; 0805≥2.2μF;1206≥4.7μF;1210≥47μF	
6.3V ; 4V ; TT series ; All X6S items	

No	Item	Test Condition	Requirements
14.	Humidity (Damp Heat) Load	* Test temp.: 40±2°C * Humidity: 90~95%RH * Test time: 500+24/-0 hrs. * To apply voltage: Rated voltage.(Max.500V) * Before initial measurement(Class II only): To apply test voltage for 1hr at 40°C and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. Cap change: NP0: ±7.5% or 0.75pF whichever is larger. X7R, X7E, X6S, X5R: ≥10V**,within ±12.5%;≦6.3V within ±25%;TT series,within ±25% **10V:0603≥4.7μF;0402≥1μF;0201≥0.1μF, 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, X6S, X5R: (see tables below)

X7R, X6S, X5R:

Rated vol.	D.F.≤	Exception of D.F. ≤	
≥100V	≤3%	≤6%	1206≥0.47μF
		≤7.5%	0805≥0.1μF, 0603≥0.068μF; 1206>1μF;1210≥2.2μF; TT series
≥50V	≤3%	≤6%	0201(50V);0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF
		≤10%	1210≥4.7μF
		≤20%	0402≥0.1μF;0603>0.1μF; 0805≥1μF;1206≥2.2μF; 1210≥10μF; TT series
35V	≤5%	≤20%	0603≥1μF; 0805≥2.2μF;1206≥2.2μF;1210≥10μF
25V	≤5%	≤10%	0201≥0.01μF;0805≥1μF; 1210≥10μF
		≤14%	0603≥0.33μF;1206≥4.7μF
		≤15%	0201≥0.1μF;0402≥0.10μF;0603≥0.47μF;0805≥2.2μF;1206≥6.8μF;1210≥22μF; TT series
		≤20%	0402≥0.47μF
16V	≤5%	≤10%	0603≥0.15μF;0805≥0.68μF;1206≥2.2μF;1210≥4.7μF
		≤15%	0201≥0.01μF;0402≥0.033μF;0603≥0.68μF;0805≥2.2μF; 1206≥4.7μF; 1210≥22μF; TT series
10V	≤7.5%	≤15%	0201≥0.012μF; 0402≥0.33μF; 0603≥0.33μF;0805≥2.2μF;1206≥2.2μF; 1210≥22μF
		≤20%	0201≥0.1μF ;0402≥1μF; TT series; 01R5
6.3V	≤15%	≤30%	0201≥0.1μF;0402≥1μF;0603≥10μF; 0805≥4.7μF;1206≥47μF;1210≥100μF;TT series
4V	≤20%	---	---

Y5V:

Rated vol.	D.F.≤	Exception of D.F.≤	
≥50V	≤7.5%	≤10%	0603≥0.1μF; 0805≥0.47μF;1206≥4.7μF; TT series & Cap≥1μF
		≤20%	1210≥6.8μF
35V	≤10%	---	---
25V	≤7.5%	≤10%	0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;1206≥1μF; 1210≥4.7μF
		≤15%	0402≥0.068μF;0603≥0.47μF;1206≥4.7μF;1210≥22μF; TT series & Cap≥1μF
16V (C<1.0μF)	≤10%	≤12.5%	0402≥0.068μF; 0603≥0.68μF
		≤20%	0402≥0.22μF
16V (C≥1.0μF)	≤12.5%	≤20%	0603≥2.2μF;0805≥3.3μF;1206≥10μF;1210≥22μF;1812≥47μF; TT series & Cap≥1μF
10V	≤20%	≤30%	0402≥0.47μF
6.3V	≤30%	---	---

*I.R.: ≥10V, 500MΩ or 25 Ω-F whichever is smaller.
Class II (X7R, X7E, X6S, X5R, Y5V)

Rated voltage	Insulation Resistance
100V: X7R	500MΩ or RxC≥5 Ω-F whichever is smaller.
50V:0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF	
35V:0603≥1μF;0805≥2.2μF; 1206≥2.2μF;1210≥10μF	
25V:0201≥0.1uF; 0402≥0.22μF; 0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF	
16V:0201≥0.1μF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;1206≥10μF;1210≥47μF	
10V:0201≥47nF;0402≥0.47μF;0603≥0.47μF ;0805≥2.2μF;1206≥4.7μF;1210≥47μF	
6.3V ; 4V ; TT series; All X6S items	

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No	Item	Test Condition	Requirements
15.	High Temperature Load (Endurance)	*Test temp.: NP0, X7R/X7E: 125±3°C X6S: 105±3°C X5R, Y5V: 85±3°C *Test time: 1000+24/-0 hrs. *To apply voltage: (1) 6.3V or C≥10μF or TT series: 150% of rated voltage. (2) 10V≤Ur<500V 200% of rated voltage. (3) 500V: 150% of rated voltage. (4) Ur≥630V: 120% of rated voltage. (5) 100% of rated voltage for below range.	* No remarkable damage. Cap change: NP0: ±3.0% or ±0.3pF whichever is larger X7R, X7E, X6S, X5R: ≥10V**,within ±12.5%;≦6.3V within ±25%;TT series,within ±25% **10V:0603≥4.7μF;0402≥1μF;0201≥0.1μF, within ±25%; Y5V: ≥10V, within ±30%; 6.3V, within +30/-40% Q/D.F. value: NP0: More than 30pF, Q≥350; 10pF≤C<30pF, Q≥275+2.5C; Less than 10pF, Q≥200+10C X7R, X6S, X5R:

Size	Dielectric	Rated voltage	Capacitance range
0201	X7R/ X6S/ X5R	≤10V	C≥0.1μF
0402		6.3V~25V	C≥1.0μF
0603		4V	C≥22μF
		6.3V,10V	C≥4.7μF
		25V,35V	C≥1.0μF
0805		4V	C≥47μF
		6.3V	C≥22μF
		10V~50V	C≥10μF
1206		≤6.3V	C≥47μF
	NP0	3000V	C≥1.5pF
1210	X5R/X7R/X6S	16V	C≥47μF
TT18	Y5V	6.3V,10V	C≥2.2μF
TT21	Y5V	6.3V	C≥10μF
	X5R/X7R/X6S	≤10V	C≥10μF
TT31	Y5V	6.3V	C≥22μF

**1WV items must follow de-rating conditions
(6)150% of rated voltage for below range.

Size	Dielectric	Rated voltage	Capacitance
0201	X5R/X7R/X6S	16V/25V	C≥0.1μF
0402	X5R/X7R/X6S	50V	C≥0.1μF
		10~25V	C≥0.22μF
	Y5V	16V	C≥0.47μF
0603	X7R	50V	C≥0.1μF
	X5R/X7R/	10V, 16V, 50V	C≥1.0μF
	Y5V	16V	C≥2.2μF
0805	X5R/X7R/X6S	10~50V	C≥4.7μF
	X5R/X7R	50V	C≥2.2μF
		100V	C≥0.47μF
	Y5V	16V	C≥4.7μF
1206	X5R/X7R/X6S	100V	C>1.0μF
1210	X5R/X7R/X6S	50V~100V	C≥2.2μF
1825 2220 2225	X7R	100V~250V	C≥1.0μF

*Before initial measurement (Class II only): To apply test voltage for 1hr at test temp. and then set for 24±2 hrs at room temp.
*Measurement to be made after keeping at room temp. for 24±2 hrs

Rated vol.	D.F.≤	Exception of D.F. ≤	
≥100V	≤3%	≤6%	1206≥0.47μF
		≤7.5%	0805≥0.1μF, 0603≥0.068μF, 1206>1μF;1210≥2.2μF; TT series
≥50V	≤3%	≤6%	0201(50V);0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF
		≤10%	1210≥4.7μF
		≤20%	0402≥0.1μF;0603>0.1μF; 0805≥1μF; 1206≥2.2μF;1210≥10μF; TT series
35V	≤5%	≤20%	0603≥1μF;0805≥2.2μF;1206≥2.2μF; 1210≥10μF
25V	≤5%	≤10%	0201≥0.01μF;0805≥1μF; 1210≥10μF
		≤14%	0603≥0.33μF;1206≥4.7μF
		≤15%	0201≥0.1μF;0402≥0.10μF;0603≥0.47μF;0805≥2.2μF;1206≥6.8μF;1210≥22μF; TT series
		≤20%	0402≥0.47μF
16V	≤5%	≤10%	0603≥0.15μF;0805≥0.68μF;1206≥2.2μF;1210≥4.7μF
		≤15%	0201≥0.01μF;0402≥0.033μF;0603≥0.68μF;0805≥2.2μF; 1206≥4.7μF; 1210≥22μF; TT series
10V	≤7.5%	≤15%	0201≥0.012μF; 0402≥0.33μF(0402/X7R≥0.22μF); 0603≥0.33μF;0805≥2.2μF; 1206≥2.2μF; 1210≥22μF
		≤20%	0201≥0.1μF ;0402≥1μF; TT series; 01R5
6.3V	≤15%	≤30%	0201≥0.1μF;0402≥1μF;0603≥10μF; 0805≥4.7μF;1206≥47μF;1210≥100μF;TT series
4V	≤20%	---	---

Y5V:

Rated vol.	D.F.≤	Exception of D.F.≤	
≥50V	≤7.5%	≤10%	0603≥0.1μF; 0805≥0.47μF;1206≥4.7μF; TT series & Cap≥1μF
		≤20%	1210≥6.8μF
35V	≤10%	---	---
25V	≤7.5%	≤10%	0402≥0.047μF;0603≥0.1μF;0805≥0.33μF;1206≥1μF; 1210≥4.7μF
		≤15%	0402≥0.068μF;0603≥0.47μF;1206≥4.7μF;1210≥22μF; TT series & Cap≥1μF
16V(C<1.0μF)	≤10%	≤12.5%	0402≥0.068μF; 0603≥0.68μF
		≤20%	0402≥0.22μF
16V(C≥1.0μF)	≤12.5%	≤20%	0603≥2.2μF;0805≥3.3μF;1206≥10μF;1210≥22μF;1812≥47μF;TT series & Cap≥1μF
10V	≤20%	≤30%	0402≥0.47μF
6.3V	≤30%	---	---

*I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is smaller.
Class II (X7R, X7E, X6S, X5R, Y5V)

Rated voltage	Insulation Resistance
100V: X7R	1GΩ or RxC≥10 Ω-F whichever is smaller.
50V: 0402>0.01μF; 0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF	
35V:0603≥1μF;0805≥2.2μF; 1206≥2.2μF;1210≥10μF	
25V:0201≥0.1uF; 0402≥0.22μF; 0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF	
16V:0201≥0.1μF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;1206≥10μF;1210≥47μF	
10V:0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF	
6.3V ; 4V ; TT series ; All X6S items	

No	Item	Test Condition	Requirements
16.	ESR	For RF Series only, refer to data sheet.	---

* This Reliability Test Conditions and Requirements only for General Purpose series, please refer to individual sheet for other products information.

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■ Constructions

No.	Name		NPO	NPO/X7R/X6S/X5R/Y5V
①	Ceramic material		BaTiO3 based	
②	Inner electrode		AgPd alloy	Ni
③	Termination	Inner layer	Ag	Cu
④		Middle layer	Ni	
⑤		Outer layer	Sn	

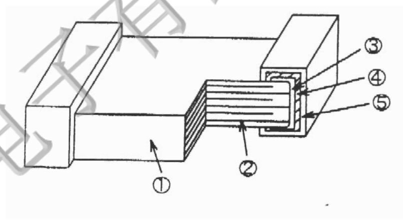

Fig. 1 The construction of MLCC

■ 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. 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.

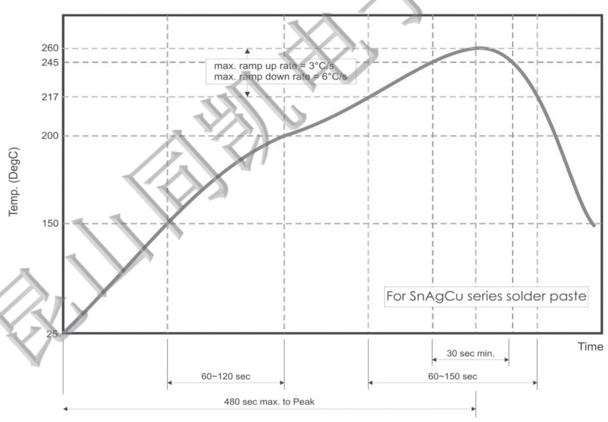

Fig. 2 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

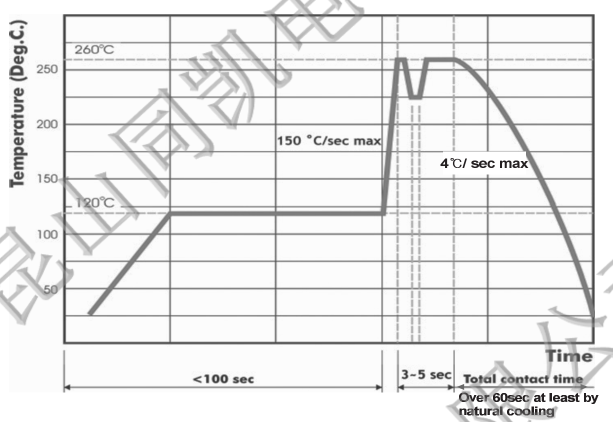

Fig. 3 Recommended wave soldering profile for SMT process with SnAgCu series solder.

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