

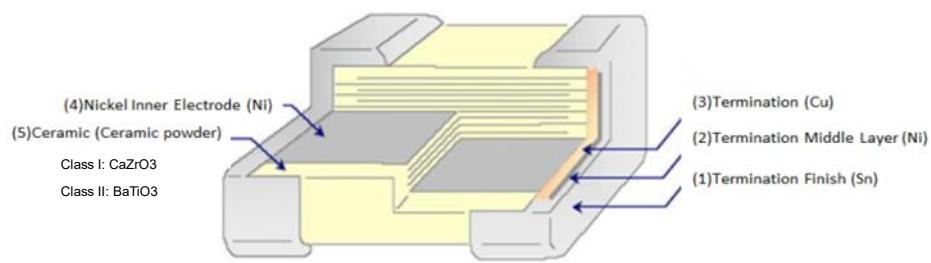
CONTENT (MLCC)

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E Standard Number

E3	1.0				2.2				4.7															
E6	1.0			1.5		2.2			3.3		4.7		6.8											
E12	1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2												
E24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1

Structure



Ordering Code

C 1005 NP0 101 J G T S △

PRODUCT CODE

C = MLCC

SIZE in mm (EIA CODE, in inch)

0402(01005) 0603(0201) 1005 (0402) 1608 (0603) 2012 (0805)
3216 (1206) 3225(1210) 4520 (1808) 4532 (1812)

T. C.

NP0: $0 \pm 30\text{ppm}/^\circ\text{C}$ -55°C to +125°C X5R: $\pm 15\%$ -55°C to +85°C
X7R: $\pm 15\%$ X7S: $\pm 22\%$ X7T: $+22\%/-33\%$ X7U: $+22\%/-56\%$ -55°C to +125°C
X6S: $\pm 22\%$ -55°C to +105°C

CAPACITANCE CODE

Expressed in pico-farads and identified by a three-digit number.

First two digits represent significant figures.

Last digit specifies the number of zeros.

(Use 9 for 1.0 through 9.9pF ; Use 8 for 0.20 through 0.99pF)

Examples:

Code	Cap (pF)
478	0.47
229	2.2
101	100
102	1000

TOLERANCE CODE

A: $\pm 0.05\text{pF}$ B: $\pm 0.1\text{pF}$ C: $\pm 0.25\text{pF}$ D: $\pm 0.5\text{pF}$ F: $\pm 1\%$ G: $\pm 2\%$
J: $\pm 5\%$ K: $\pm 10\%$ M: $\pm 20\%$

VOLTAGE CODE

B: 4V C: 6.3V D: 10V E: 16V F: 25V N: 35V G: 50V H: 100V
J: 200V K: 250V L: 500V M: 630V P: 1KV Q: 2KV R: 3KV S: 4KV

PACKAGING CODE

T: Paper tape reel Ø180mm (7")

P: Embossed tape reel Ø180mm (7")

N: Paper tape reel Ø250mm (10")

D: Embossed tape reel Ø250mm (10")

A: Paper tape reel Ø330mm (13")

E: Embossed tape reel Ø330mm (13")

W: Special Packing

Application Code

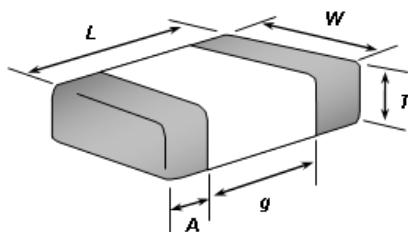
S: Standard Q: High Q/Low ESR F: Microwave A: Automotive Infotainment with AEC-Q200

Thickness Code

Code	Thick (mm)	Code	Thick(mm)	Code	Thick (mm)	Code	Thick (mm)
(blank)	Standard Thick	M	0.70	G	1.25	S	1.90
Z	0.20	D	0.80	H	1.50	--	--
A	0.30	E	0.85	L	1.60	--	--
Q	0.45	I	0.95	N	2.00	--	--
B	0.50	J	1.00	P	2.50	--	--
C	0.60	F	1.15	R	3.20	--	--

General Purpose

■ External Dimensions



TYPE		Dimension (mm)				
Size (EIA Size)	Kind	L (Length)	W (Width)	T (Max.)	g (Min)	A (Min/Max)
C0603 (0201)	Standard	0.6 ± 0.03	0.30 ± 0.03	0.33	0.15	0.10 / 0.20
	Special (1)	0.6 ± 0.05	0.30 ± 0.05	0.35		0.10 / 0.25
	Special (2)	0.6 ± 0.09	0.30 ± 0.09	0.39		
C1005 (0402)	Standard	1.0 ± 0.05	0.50 ± 0.05	0.55	0.30	0.15 / 0.35
	Special (1)	1.0 ± 0.10	0.50 ± 0.10	0.60		
	Special (2)	1.0 ± 0.15	0.50 ± 0.15	0.65		
	Special (3)	1.0 ± 0.20	0.50 ± 0.20	0.70		
	Special (4)	1.0 ± 0.30	0.50 ± 0.30	0.80		
C1608 (0603)	Standard	1.6 ± 0.10	0.80 ± 0.10	0.90	0.50	0.25 / 0.65
	Special (1)	1.6 ± 0.15	0.80 ± 0.15	0.95		
	Special (2)	1.6 ± 0.20	0.80 ± 0.20	1.00		
	Special (3)	1.6 ± 0.25	0.80 ± 0.25	1.05		
C2012 (0805)	Standard	2.0 ± 0.15	1.25 ± 0.15	1.45	0.70	0.25 / 0.75
	Special (1)	2.0 ± 0.20	1.25 ± 0.20	1.45		
C3216 (1206)	Standard	3.2 ± 0.15	1.60 ± 0.15	1.80	1.50	0.25 / 0.75
	Special (1)	3.2 ± 0.20	1.60 ± 0.20	1.90		
	Special (2)	3.2 ± 0.30	1.60 ± 0.30	1.90		
C3225 (1210)	Standard	3.2 ± 0.30	2.50 ± 0.20	2.80	1.50	0.3 / 0.90
	Special (1)	3.2 ± 0.30	2.50 ± 0.30	2.80		

For special parts, please see the "Part Number & Characteristic" for detail specification.

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance Value	Unit	Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
								L/W	Thick.		
50V	C1005NP0271□GTS	C1005NP0271□GT	1V, 1MHz	270	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.10%	Paper, 10Kpcs
	C1005NP0301□GTS	C1005NP0301□GT	1V, 1MHz	300	pF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0331□GTS	C1005NP0331□GT	1V, 1MHz	330	pF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0391□GTS	C1005NP0391□GT	1V, 1MHz	390	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.10%	
	C1005NP0471□GTS	C1005NP0471□GT	1V, 1MHz	470	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.10%	
	C1005NP0561□GTS	C1005NP0561□GT	1V, 1MHz	560	pF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0681□GTS	C1005NP0681□GT	1V, 1MHz	680	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.10%	
	C1005NP0821□GTS	C1005NP0821□GT	1V, 1MHz	820	pF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0102□GTS	C1005NP0102□GT	1V, 1MHz	1.0	nF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0152JGTS	C1005NP0152JGT	1V, 1kHz	1.5	nF	±5%	0.50	±0.05	±0.05	0.10%	
25V	C1005NP0208□FTS	C1005NP0208□FT	1V, 1MHz	0.2	pF	±0.25pF,±0.1pF,±0.05pF	0.50	±0.05	±0.05	0.25%	Paper, 10Kpcs
	C1005NP0308□FTS	C1005NP0308□FT	1V, 1MHz	0.3	pF	±0.25pF,±0.1pF,±0.05pF	0.50	±0.05	±0.05	0.25%	
	C1005NP0508□FTS	C1005NP0508□FT	1V, 1MHz	0.5	pF	±0.25pF,±0.1pF,±0.05pF	0.50	±0.05	±0.05	0.24%	
	C1005NP0169BFTS	C1005NP0169BFT	1V, 1MHz	1.6	pF	±0.1pF	0.50	±0.05	±0.05	0.23%	
	C1005NP0689□FTS	C1005NP0689□FT	1V, 1MHz	6.8	pF	±0.5pF,±0.25pF,±0.1pF	0.50	±0.05	±0.05	0.19%	
	C1005NP0100JFTS	C1005NP0100JFT	1V, 1MHz	10	pF	±5%	0.50	±0.05	±0.05	0.17%	
	C1005NP0120□JFTS	C1005NP0120□JFT	1V, 1MHz	12	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.16%	
	C1005NP0160JFTS	C1005NP0160JFT	1V, 1MHz	16	pF	±5%	0.50	±0.05	±0.05	0.14%	
	C1005NP0180KFTS	C1005NP0180KFT	1V, 1MHz	18	pF	±10%	0.50	±0.05	±0.05	0.13%	
	C1005NP0220JFTS	C1005NP0220JFT	1V, 1MHz	22	pF	±5%	0.50	±0.05	±0.05	0.12%	
	C1005NP0240JFTS	C1005NP0240JFT	1V, 1MHz	24	pF	±5%	0.50	±0.05	±0.05	0.11%	
	C1005NP0270JFTS	C1005NP0270JFT	1V, 1MHz	27	pF	±5%	0.50	±0.05	±0.05	0.11%	
	C1005NP0330□JFTS	C1005NP0330□JFT	1V, 1MHz	33	pF	±10%,±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0470JFTS	C1005NP0470JFT	1V, 1MHz	47	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0560JFTS	C1005NP0560JFT	1V, 1MHz	56	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0101JFTS	C1005NP0101JFT	1V, 1MHz	100	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0201JFTS	C1005NP0201JFT	1V, 1MHz	200	pF	±5%	0.50	±0.05	±0.05	0.10%	
16V	C1005NP0221□JFTS	C1005NP0221□JFT	1V, 1MHz	220	pF	±10%,±5%	0.50	±0.05	±0.05	0.10%	Paper, 10Kpcs
	C1005NP0271JFTS	C1005NP0271JFT	1V, 1MHz	270	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0331JFTS	C1005NP0331JFT	1V, 1MHz	330	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0471JFTS	C1005NP0471JFT	1V, 1MHz	470	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0561JFTS	C1005NP0561JFT	1V, 1MHz	560	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0102JFTS	C1005NP0102JFT	1V, 1MHz	1.0	nF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0109BETS	C1005NP0109BET	1V, 1MHz	1.0	pF	±0.1pF	0.50	±0.05	±0.05	0.24%	
10V	C1005NP0129BETS	C1005NP0129BET	1V, 1MHz	1.2	pF	±0.1pF	0.50	±0.05	±0.05	0.24%	Paper, 10Kpcs
	C1005NP0100JETS	C1005NP0100JET	1V, 1MHz	10	pF	±5%	0.50	±0.05	±0.05	0.17%	
	C1005NP0150□ETS	C1005NP0150□ET	1V, 1MHz	15	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.14%	
	C1005NP0220FETS	C1005NP0220FET	1V, 1MHz	22	pF	±1%	0.50	±0.05	±0.05	0.12%	
	C1005NP0300JETS	C1005NP0300JET	1V, 1MHz	30	pF	±5%	0.50	±0.05	±0.05	0.10%	
	C1005NP0470□ETS	C1005NP0470□ET	1V, 1MHz	47	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.10%	
	C1005NP0331□ETS	C1005NP0331□ET	1V, 1MHz	330	pF	±5%,±2%	0.50	±0.05	±0.05	0.10%	
	C1005NP0471JETS	C1005NP0471JET	1V, 1MHz	470	pF	±5%	0.50	±0.05	±0.05	0.10%	Paper, 10Kpcs
	C1005NP0220□DTS	C1005NP0220□DT	1V, 1MHz	22	pF	±5%,±2%,±1%	0.50	±0.05	±0.05	0.12%	

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance Value	Unit	Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
								L/W	Thick.		
50V	C1608NP0271□GTS	C1608NP0271□GT	1V, 1MHz	270	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	Paper, 4Kpcs
	C1608NP0331□GTS	C1608NP0331□GT	1V, 1MHz	330	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0391□GTS	C1608NP0391□GT	1V, 1MHz	390	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0431JGTS	C1608NP0431JGT	1V, 1MHz	430	pF	±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0471□GTS	C1608NP0471□GT	1V, 1MHz	470	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0561□GTS	C1608NP0561□GT	1V, 1MHz	560	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0681□GTS	C1608NP0681□GT	1V, 1MHz	680	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0821□GTS	C1608NP0821□GT	1V, 1MHz	820	pF	±5%,±2%	0.80	±0.10	±0.10	0.10%	
	C1608NP0102□GTS	C1608NP0102□GT	1V, 1MHz	1.0	nF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0122JGTS	C1608NP0122JGT	1V, 1kHz	1.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0152□GTS	C1608NP0152□GT	1V, 1kHz	1.5	nF	±5%,±2%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0182JGTS	C1608NP0182JGT	1V, 1kHz	1.8	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0222JGTS	C1608NP0222JGT	1V, 1kHz	2.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0272JGTS	C1608NP0272JGT	1V, 1kHz	2.7	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0332JGTS	C1608NP0332JGT	1V, 1kHz	3.3	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0392JGTS	C1608NP0392JGT	1V, 1kHz	3.9	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0472JGTS	C1608NP0472JGT	1V, 1kHz	4.7	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0562JGTS	C1608NP0562JGT	1V, 1kHz	5.6	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0682JGTS	C1608NP0682JGT	1V, 1kHz	6.8	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0822JGTS	C1608NP0822JGT	1V, 1kHz	8.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0103JGTS	C1608NP0103JGT	1V, 1kHz	10	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
25V	C1608NP0279CFTS	C1608NP0279CFT	1V, 1MHz	2.7	pF	±0.25pF	0.80	±0.10	±0.10	0.22%	Paper, 4Kpcs
	C1608NP0309CFTS	C1608NP0309CFT	1V, 1MHz	3.0	pF	±0.25pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0609DFTS	C1608NP0609DFT	1V, 1MHz	6.0	pF	±0.5pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0220JFTS	C1608NP0220JFT	1V, 1MHz	22	pF	±5%	0.80	±0.10	±0.10	0.12%	
	C1608NP0470JFTS	C1608NP0470JFT	1V, 1MHz	47	pF	±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0101□FTS	C1608NP0101□FT	1V, 1MHz	100	pF	±10%,±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0121□FTS	C1608NP0121□FT	1V, 1MHz	120	pF	±10%,±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0471□FTS	C1608NP0471□FT	1V, 1MHz	470	pF	±10%,±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0102JFTS	C1608NP0102JFT	1V, 1MHz	1.0	nF	±5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0152JFTS	C1608NP0152JFT	1V, 1kHz	1.5	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
16V	C1608NP0222JFTS	C1608NP0222JFT	1V, 1kHz	2.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	Paper, 4Kpcs
	C1608NP0682JFTS	C1608NP0682JFT	1V, 1kHz	6.8	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0822JFTS	C1608NP0822JFT	1V, 1kHz	8.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0103JFTS	C1608NP0103JFT	1V, 1kHz	10	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0180□ETS	C1608NP0180□ET	1V, 1MHz	18	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.13%	
	C1608NP0300JETS	C1608NP0300JET	1V, 1MHz	30	pF	±5%	0.80	±0.10	±0.10	0.10%	
10V	C1608NP0152JETS	C1608NP0152JET	1V, 1kHz	1.5	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	Paper, 4Kpcs
	C1608NP0222JETS	C1608NP0222JET	1V, 1kHz	2.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0272JETS	C1608NP0272JET	1V, 1kHz	2.7	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0332JETS	C1608NP0332JET	1V, 1kHz	3.3	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
	C1608NP0822JETS	C1608NP0822JET	1V, 1kHz	8.2	nF	±5%	0.80	+0.15/-0.10	+0.15/-0.10	0.10%	
10V	C1608NP0101□DTS	C1608NP0101□DT	1V, 1MHz	100	pF	±10%,±5%	0.80	±0.10	±0.10	0.10%	Paper, 4Kpcs

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
10V	C0603X5R105□DTS	C0603X5R105□DT	0.5V , 1kHz	1.0	uF	±10% , ±20%	0.30	±0.09	±0.09	12.5%	Paper, 15Kpcs	(II)*
	C0603X5R225MDTS	C0603X5R225MDT	1V , 1kHz	2.2	uF	±20%	0.30	±0.09	±0.09	15.0%		(III)*
6.3V	C0603X5R222□CTS	C0603X5R222□CT	1V , 1kHz	2.2	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%	Paper, 15Kpcs	(I)
	C0603X5R332□CTS	C0603X5R332□CT	1V , 1kHz	3.3	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R472□CTS	C0603X5R472□CT	1V , 1kHz	4.7	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R562□CTS	C0603X5R562□CT	1V , 1kHz	5.6	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R682□CTS	C0603X5R682□CT	1V , 1kHz	6.8	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R822□CTS	C0603X5R822□CT	1V , 1kHz	8.2	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R103□CTS	C0603X5R103□CT	1V , 1kHz	10	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(I)
	C0603X5R153□CTS	C0603X5R153□CT	1V , 1kHz	15	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R223□CTS	C0603X5R223□CT	1V , 1kHz	22	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R333□CTS	C0603X5R333□CT	1V , 1kHz	33	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R473□CTS	C0603X5R473□CT	1V , 1kHz	47	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R563□CTS	C0603X5R563□CT	1V , 1kHz	56	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R683□CTS	C0603X5R683□CT	1V , 1kHz	68	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R823□CTS	C0603X5R823□CT	1V , 1kHz	82	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R104□CTS	C0603X5R104□CT	0.5V , 1kHz	100	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%		(II)
	C0603X5R224□CTS	C0603X5R224□CT	1V , 1kHz	220	nF	±10% , ±20%	0.30	±0.05	±0.05	10.0%		(II)*
	C0603X5R334□CTS	C0603X5R334□CT	1V , 1kHz	330	nF	±10% , ±20%	0.30	±0.09	±0.09	10.0%		(II)*
	C0603X5R474□CTS	C0603X5R474□CT	1V , 1kHz	470	nF	±10% , ±20%	0.30	±0.09	±0.09	12.5%		(II)*
	C0603X5R105□CTS	C0603X5R105□CT	1V , 1kHz	1.0	uF	±10% , ±20%	0.30	±0.05	±0.05	12.5%		(II)*
	C0603X5R225MCTS	C0603X5R225MCT	0.5V , 1kHz	2.2	uF	±20%	0.30	±0.09	±0.09	20.0%		(II)*
	C0603X5R475MCTS		0.5V , 1kHz	4.7	uF	±20%	0.50	±0.09	±0.05	20.0%	Paper, 10Kpcs	(II)*
4V	C0603X5R473□BTS	C0603X5R473□BT	1V , 1kHz	47	nF	±10% , ±20%	0.30	±0.03	±0.03	10.0%	Paper, 15Kpcs	(II)
	C0603X5R474□BTS	C0603X5R474□BT	1V , 1kHz	470	nF	±10% , ±20%	0.30	±0.09	±0.09	12.5%		(II)*
	C0603X5R105□BTS	C0603X5R105□BT	0.5V , 1kHz	1.0	uF	±10% , ±20%	0.30	±0.05	±0.05	10.0%		(II)*
	C0603X5R225MBTS	C0603X5R225MBT	0.5V , 1kHz	2.2	uF	±20%	0.30	±0.09	±0.09	20.0%		(II)*
2.5V	C0603X5R475MTTSB		0.5V , 1kHz	4.7	uF	±20%	0.50	±0.09	±0.05	20.0%	Paper, 10Kpcs	(II)*

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
6.3V	C1005X5R224□CTS	C1005X5R224□CT	1V , 1kHz	220	nF	±10% , ±20%	0.50	±0.05	±0.05	10.0%	Paper, 10Kpcs	(II)
	C1005X5R334□CTS	C1005X5R334□CT	1V , 1kHz	330	nF	±10% , ±20%	0.50	±0.05	±0.05	10.0%		(II)
	C1005X5R474□CTS	C1005X5R474□CT	1V , 1kHz	470	nF	±10% , ±20%	0.50	±0.05	±0.05	10.0%		(II)
	C1005X5R684□CTS	C1005X5R684□CT	1V , 1kHz	680	nF	±10% , ±20%	0.50	±0.05	±0.05	10.0%		(II)
	C1005X5R105MCTS A		1V , 1kHz	1.0	uF	±20%	0.30	±0.05	±0.03	12.5%	Paper, 15Kpcs	(II)*
	C1005X5R105□CTS	C1005X5R105□CT	0.5V , 1kHz	1.0	uF	±10% , ±20%	0.50	±0.05	±0.05	10.0%		(II)
	C1005X5R225MCTS A		0.5V , 1kHz	2.2	uF	±20%	0.30	±0.05	±0.03	10.0%	Paper, 15Kpcs	(II)*
	C1005X5R225□CTS	C1005X5R225□CT	1V , 1kHz	2.2	uF	±10% , ±20%	0.50	±0.20	±0.20	10.0%		(II)*
	C1005X5R475MCTS A		0.5V , 1kHz	4.7	uF	±20%	0.30	±0.20	±0.03	10.0%	Paper, 15Kpcs	(II)*
	C1005X5R475□CTS	C1005X5R475□CT	0.5V , 1kHz	4.7	uF	±10% , ±20%	0.50	±0.15	±0.15	10.0%		(II)*
4V	C1005X5R106MCTS	C1005X5R106MCT	0.5V , 1kHz	10	uF	±20%	0.50	±0.20	±0.20	15.0%	Paper, 10Kpcs	(II)
	C1005X5R226MCTS	C1005X5R226MCT	0.5V , 120Hz	22	uF	±20%	0.50	±0.20	±0.20	15.0%		(II)*
	C1005X5R105□BTS	C1005X5R105□BT	1V , 1kHz	1.0	uF	±10% , ±20%	0.50	±0.05	±0.05	15.0%		(II)
	C1005X5R225□BTS	C1005X5R225□BT	1V , 1kHz	2.2	uF	±10% , ±20%	0.50	±0.20	±0.20	10.0%		(II)
	C1005X5R225MBTSA		0.5V , 1kHz	2.2	uF	±20%	0.30	±0.05	±0.03	10.0%	Paper, 15Kpcs	(II)
	C1005X5R475□BTS	C1005X5R475□BT	0.5V , 1kHz	4.7	uF	±10% , ±20%	0.50	±0.15	±0.15	10.0%		(II)
	C1005X5R106MBTS	C1005X5R106MBT	0.5V , 1kHz	10	uF	±20%	0.50	±0.20	±0.20	15.0%	Paper, 10Kpcs	(II)
	C1005X5R226MBTS	C1005X5R226MBT	0.5V , 120Hz	22	uF	±20%	0.50	±0.20	±0.20	15.0%		(II)*

● C1608X5R Series (EIA0603)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
50V	C1608X5R102KGTS	C1608X5R102KGT	1V , 1kHz	1.0	nF	±10%	0.80	±0.10	±0.10	5.0%	Paper, 4Kpcs	(I)
	C1608X5R103KGTS	C1608X5R103KGT	1V , 1kHz	10	nF	±10%	0.80	±0.10	±0.10	5.0%		(I)
	C1608X5R333KGTS	C1608X5R333KGT	1V , 1kHz	33	nF	±10%	0.80	±0.15	±0.15	5.0%		(I)
	C1608X5R104KGTS	C1608X5R104KGT	1V , 1kHz	100	nF	±10%	0.80	±0.15	±0.15	5.0%		(II)
	C1608X5R224 GTS	C1608X5R224 GT	1V , 1kHz	220	nF	±10% , ±20%	0.80	±0.15	±0.15	5.0%		(II)
	C1608X5R474 GTS	C1608X5R474 GT	1V , 1kHz	470	nF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
	C1608X5R105 GTS	C1608X5R105 GT	1V , 1kHz	1.0	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%		(II)
35V	C1608X5R225 GTS	C1608X5R225 GT	1V , 1kHz	2.2	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X5R475 GTS	C1608X5R475 GT	1V , 1kHz	4.7	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%		(II)*
	C1608X5R106MNTS	C1608X5R106MNT	1V , 1kHz	10	uF	±20%	0.80	±0.20	±0.20	10.0%		(II)*
	C1608X5R104 FTS	C1608X5R104 FT	1V , 1kHz	100	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%		(I)
25V	C1608X5R224 FTS	C1608X5R224 FT	1V , 1kHz	220	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%	Paper, 4Kpcs	(I)
	C1608X5R334KFTS	C1608X5R334KFT	1V , 1kHz	330	nF	±10%	0.80	±0.15	±0.15	7.5%		(I)
	C1608X5R474 FTS	C1608X5R474 FT	1V , 1kHz	470	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%		(II)
	C1608X5R684KFTS	C1608X5R684KFT	1V , 1kHz	680	nF	±10%	0.80	±0.15	±0.15	7.5%		(II)
	C1608X5R105 FTS	C1608X5R105 FT	1V , 1kHz	1.0	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
	C1608X5R105 FTSB		1V , 1kHz	1.0	uF	±10% , ±20%	0.50	±0.10	+/-0.10	12.5%		(II)*
	C1608X5R225 FTS	C1608X5R225 FT	1V , 1kHz	2.2	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
	C1608X5R335FTS	C1608X5R335FT	1V , 1kHz	3.3	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%		(II)
16V	C1608X5R475 FTS	C1608X5R475 FT	1V , 1kHz	4.7	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X5R106 FTS	C1608X5R106 FT	1V , 1kHz	10	uF	±20%	0.80	±0.20	±0.20	10.0%		(II)
	C1608X5R104 ETS	C1608X5R104 ET	1V , 1kHz	100	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%		(I)
	C1608X5R224 ETS	C1608X5R224 ET	1V , 1kHz	220	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%		(I)
	C1608X5R334 ETS	C1608X5R334 ET	1V , 1kHz	330	nF	±10% , ±20%	0.80	±0.10	±0.10	5.0%		(I)
	C1608X5R474 ETS	C1608X5R474 ET	1V , 1kHz	470	nF	±10% , ±20%	0.80	±0.10	±0.10	3.5%		(II)
	C1608X5R684 ETS	C1608X5R684 ET	1V , 1kHz	680	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(II)
	C1608X5R105 ETS	C1608X5R105 ET	1V , 1kHz	1.0	uF	±10% , ±20%	0.80	±0.10	±0.10	10.0%		(II)
10V	C1608X5R105 ETSB		0.5V , 1kHz	1.0	uF	±10% , ±20%	0.50	±0.10	+/-0.10	10.0%	Paper, 4kpcs	(II)
	C1608X5R225 ETS	C1608X5R225 ET	1V , 1kHz	2.2	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
	C1608X5R335 ETS	C1608X5R335 ET	1V , 1kHz	3.3	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)*
	C1608X5R475 ETS	C1608X5R475 ET	1V , 1kHz	4.7	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)*
	C1608X5R106 ETS	C1608X5R106 ET	1V , 1kHz	10	uF	±10% , ±20%	0.80	±0.20	±0.20	10.0%		(II)*
	C1608X5R104 DTS	C1608X5R104 DT	1V , 1kHz	100	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(I)
	C1608X5R224 DTS	C1608X5R224 DT	1V , 1kHz	220	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(I)
	C1608X5R334 DTS	C1608X5R334 DT	1V , 1kHz	330	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(I)
	C1608X5R474 DTS	C1608X5R474 DT	1V , 1kHz	470	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(I)
	C1608X5R684 DTS	C1608X5R684 DT	1V , 1kHz	680	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(I)
	C1608X5R105 DTS	C1608X5R105 DT	1V , 1kHz	1.0	uF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(II)
	C1608X5R225 DTS	C1608X5R225 DT	1V , 1kHz	2.2	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
6.3V	C1608X5R335 DTS	C1608X5R335 DT	1V , 1kHz	3.3	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%	Paper, 4Kpcs	(II)
	C1608X5R475 DTS	C1608X5R475 DT	1V , 1kHz	4.7	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)
	C1608X5R106 MCTS		0.5V , 1kHz	10	uF	±20%	0.50	±0.10	±0.10	10.0%		(II)*
	C1608X5R106 CTS	C1608X5R106 CT	0.5V , 1kHz	10	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)*
	C1608X5R226MCTS	C1608X5R226MDT	0.5V , 120Hz	22	uF	±20%	0.80	±0.20	±0.20	10.0%		(II)*
	C1608X5R226MDWS	C1608X5R226MDW	0.5V , 120Hz	22	uF	±20%	0.80	±0.20	±0.20	10.0%		Embossed, 4Kpcs
	C1608X5R106 MCTS	C1608X5R106 CTS	0.5V , 120Hz	22	uF	±20%	0.80	±0.20	±0.20	10.0%		(II)*
4V	C1608X5R104 CTS	C1608X5R104 CT	1V , 1kHz	100	nF	±10% , ±20%	0.80	±0.10	±0.10	7.5%	Paper, 4Kpcs	(I)
	C1608X5R105 CTS	C1608X5R105 CT	1V , 1kHz	1.0	uF	±10% , ±20%	0.80	±0.10	±0.10	7.5%		(II)
	C1608X5R225 CTS	C1608X5R225 CT	1V , 1kHz	2.2	uF	±10% , ±20%	0.80	±0.15	±0.15	10.0%		(II)

□ Tolerance Code: K=±10%, M=±20% ;Special tolerance on the request.

(II)* High temperature load life test are applicable in rated voltage *100%

- X6S Series
- C0603X6S Series (EIA0201)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
25V	C0603X6S103KFTS	C0603X6S103KFT	1V , 1kHz	10	nF	±10%	0.30	± 0.03	±0.03	5%	Paper, 15Kpcs	(I)
	C0603X6S104□FTS	C0603X6S104□FT	1V , 1kHz	100	nF	±10%, ±20%	0.30	± 0.03	±0.03	10%		(II)*
16V	C0603X6S103KETS	C0603X6S103KET	1V , 1kHz	10	nF	±10%	0.30	± 0.03	±0.03	5%	Paper, 15Kpcs	(I)
	C0603X6S104□ETS	C0603X6S104□ET	1V , 1kHz	100	nF	±10%, ±20%	0.30	± 0.05	±0.05	10%		(II)*
10V	C0603X6S473KDTS	C0603X6S473KDT	1V , 1kHz	47	nF	±10%	0.30	± 0.03	±0.03	5%	Paper, 15Kpcs	(I)
	C0603X6S104KDTS	C0603X6S104KDT	1V , 1kHz	100	nF	±10%	0.30	± 0.05	±0.05	10%		(II)
	C0603X6S224□DTS	C0603X6S224□DT	1V , 1kHz	220	nF	±10%, ±20%	0.30	± 0.03	±0.03	10%		(II)*
6.3V	C0603X6S103□CTS	C0603X6S103□CT	1V , 1kHz	10	nF	±10%, ±20%	0.30	± 0.03	±0.03	5%	Paper, 15Kpcs	(I)
	C0603X6S153KCTS	C0603X6S153KCT	1V , 1kHz	15	nF	±10%	0.30	± 0.05	±0.05	10%		(II)
	C0603X6S333□CTS	C0603X6S333□CT	1V , 1kHz	33	nF	±10%, ±20%	0.30	± 0.05	±0.05	10%		(II)
	C0603X6S473□CTS	C0603X6S473□CT	1V , 1kHz	47	nF	±10%, ±20%	0.30	± 0.05	±0.05	10%		(II)
	C0603X6S104□CTS	C0603X6S104□CT	1V , 1kHz	100	nF	±10%, ±20%	0.30	± 0.05	±0.05	10%		(II)*
	C0603X6S224□CTS	C0603X6S224□CT	0.5V , 1kHz	220	nF	±10%, ±20%	0.30	± 0.03	±0.03	10%		(II)*
	C0603X6S105MCTS	C0603X6S105MCT	0.5V , 1kHz	1.0	uF	±20%	0.30	± 0.09	±0.09	10%		(II)*
4V	C0603X6S104□BTS	C0603X6S104□BT	1V , 1kHz	100	nF	±10%, ±20%	0.30	± 0.05	±0.05	10%	Paper, 15Kpcs	(II)
	C0603X6S224□BTS	C0603X6S224□BT	0.5V , 1kHz	220	nF	±10%, ±20%	0.30	± 0.03	±0.03	10%		(II)
	C0603X6S474MBTS	C0603X6S474MBT	0.5V , 1kHz	470	nF	±20%	0.30	± 0.03	±0.03	10%		(II)
	C0603X6S105MBTS	C0603X6S105MBT	0.5V , 1kHz	1.0	uF	±20%	0.30	± 0.09	±0.09	10%		(II)*

- C1005X6S Series (EIA0402)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
25V	C1005X6S104KFTS	C1005X6S104KFT	1V , 1kHz	100	nF	±10%	0.50	± 0.05	±0.05	10.0%	Paper, 10Kpcs	(II)
	C1005X6S224KFTS	C1005X6S224KFT	1V , 1kHz	220	nF	±10%	0.50	± 0.10	±0.10	10.0%		(II)
	C1005X6S105□FTS	C1005X6S105□FT	0.5V , 1kHz	1.0	uF	±10%, ±20%	0.50	± 0.10	±0.10	10.0%		(III)*
	C1005X6S225□FTS	C1005X6S225□FT	1V , 1kHz	2.2	uF	±10%, ±20%	0.50	± 0.20	±0.20	10.0%		(III)*
16V	C1005X6S104KETS	C1005X6S104KET	1V , 1kHz	100	nF	±10%	0.50	± 0.05	±0.05	10.0%	Paper, 10Kpcs	(II)
	C1005X6S224KETS	C1005X6S224KET	1V , 1kHz	220	nF	±10%	0.50	± 0.10	±0.10	10.0%		(II)
	C1005X6S334KETS	C1005X6S334KET	1V , 1kHz	330	nF	±10%	0.50	± 0.10	±0.10	12.5%		(II)*
	C1005X6S474□ETS	C1005X6S474□ET	1V , 1kHz	470	nF	±10%, ±20%	0.50	± 0.10	±0.10	12.5%		(II)*
	C1005X6S105□ETS	C1005X6S105□ET	1V , 1kHz	1.0	uF	±10%, ±20%	0.50	± 0.10	±0.10	12.5%		(II)*
	C1005X6S225□ETS	C1005X6S225□ET	1V , 1kHz	2.2	uF	±10%, ±20%	0.50	± 0.20	±0.20	10.0%		(II)
10V	C1005X6S105□DTS	C1005X6S105□DT	1V , 1kHz	1.0	uF	±10%, ±20%	0.50	± 0.05	±0.05	12.5%	Paper, 10Kpcs	(II)*
	C1005X6S225□DTS	C1005X6S225□DT	1V , 1kHz	2.2	uF	±10%, ±20%	0.50	± 0.20	±0.20	12.5%		(II)
	C1005X6S475MDTS	C1005X6S475MDT	1V , 1kHz	4.7	uF	±20%	0.50	± 0.20	±0.20	10.0%		(II)
6.3V	C1005X6S224KCTS	C1005X6S224KCT	1V , 1kHz	220	nF	±10%	0.50	± 0.10	±0.10	10.0%	Paper, 10Kpcs	(II)
	C1005X6S334KCTS	C1005X6S334KCT	1V , 1kHz	330	nF	±10%	0.50	± 0.10	±0.10	12.5%		(II)*
	C1005X6S105□CTS	C1005X6S105□CT	1V , 1kHz	1.0	uF	±10%, ±20%	0.50	± 0.05	±0.05	12.5%		(II)*
	C1005X6S225□CTS	C1005X6S225□CT	0.5V , 1kHz	2.2	uF	±10%, ±20%	0.50	± 0.15	±0.15	12.5%		(II)*
	C1005X6S475MCTS	C1005X6S475MCT	0.5V , 1kHz	4.7	uF	±20%	0.50	± 0.15	±0.15	10.0%		(II)*
	C1005X6S106MCTS	C1005X6S106MCT	0.5V , 1kHz	10	uF	±20%	0.50	± 0.20	±0.20	10.0%		(II)*
4V	C1005X6S334KBTS	C1005X6S334KBT	1V , 1kHz	330	nF	±10%	0.50	± 0.10	±0.10	10.0%	Paper, 10Kpcs	(II)
	C1005X6S105□BTS	C1005X6S105□BT	1V , 1kHz	1.0	uF	±10%, ±20%	0.50	± 0.05	±0.05	10.0%		(II)*
	C1005X6S106MBTS	C1005X6S106MBT	0.5V , 1kHz	10	uF	±20%	0.50	± 0.20	±0.20	10.0%		(II)*
	C1005X6S226MBTS	C1005X6S226MBT	0.5V , 120Hz	22	uF	±20%	0.50	± 0.30	±0.30	20.0%		(II)*
2.5V	C1005X6S226MTTS	C1005X6S226MTT	0.5V , 120Hz	22	uF	±20%	0.50	± 0.30	±0.30	20.0%	Paper, 10Kpcs	(II)*

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
10V	C0603X7R473KDT	C0603X7R473KDT	1V , 1kHz	47	nF	±10%	0.30	± 0.03	± 0.03	5.0%	Paper, 15Kpcs	(I)
	C0603X7R104□DTS	C0603X7R104□DT	1V , 1kHz	100	nF	±10%, ±20%	0.30	± 0.05	± 0.05	10%		(II)
6.3V	C0603X7R222KCTS	C0603X7R222KCT	1V , 1kHz	2.2	nF	±10%	0.30	± 0.03	± 0.03	5.0%	Paper, 15Kpcs	(I)
	C0603X7R332KCTS	C0603X7R332KCT	1V , 1kHz	3.3	nF	±10%	0.30	± 0.03	± 0.03	5.0%		(I)
	C0603X7R103KCTS	C0603X7R103KCT	1V , 1kHz	10	nF	±10%	0.30	± 0.03	± 0.03	5.0%		(II)
	C0603X7R153KCTS	C0603X7R153KCT	1V , 1kHz	15	nF	±10%	0.30	± 0.05	± 0.05	10%		(II)
	C0603X7R333KCTS	C0603X7R333KCT	1V , 1kHz	33	nF	±10%	0.30	± 0.05	± 0.05	10%		(III)
	C0603X7R104KCTS	C0603X7R104KCT	1V , 1kHz	100	nF	±10%	0.30	± 0.05	± 0.05	10%		(II)
	C0603X7R224KCTS	C0603X7R224KCT	1V , 1kHz	220	nF	±10%	0.30	± 0.05	± 0.05	12.5%		(II)*

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
6.3V	C1005X7R103KCTS	C1005X7R103KCT	1V , 1kHz	10	nF	±10%	0.50	±0.05	±0.05	5.0%	Paper, 10Kpcs	(I)
	C1005X7R223KCTS	C1005X7R223KCT	1V , 1kHz	22	nF	±10%	0.50	±0.05	±0.05	5.0%		(I)
	C1005X7R473KCTS	C1005X7R473KCT	1V , 1kHz	47	nF	±10%	0.50	±0.05	±0.05	5.0%		(I)
	C1005X7R683KCTS	C1005X7R683KCT	1V , 1kHz	68	nF	±10%	0.50	±0.05	±0.05	5.0%		(I)
	C1005X7R104□CTS	C1005X7R104□CT	1V , 1kHz	100	nF	±5%,±10%	0.50	±0.05	±0.05	5.0%		(I)
	C1005X7R224KCTS	C1005X7R224KCT	1V , 1kHz	220	nF	±10%	0.50	±0.10	±0.10	10.0%		(II)
	C1005X7R334KCTS	C1005X7R334KCT	1V , 1kHz	330	nF	±10%	0.50	±0.10	±0.10	10.0%		(III)
	C1005X7R474□CTS	C1005X7R474□CT	1V , 1kHz	470	nF	±10%, ±20%	0.50	±0.10	±0.10	10.0%		(II)
	C1005X7R105□CTS	C1005X7R105□CT	1V , 1kHz	1.0	uF	±10%, ±20%	0.50	±0.05	±0.05	12.5%		(II)*

● C2012X7R Series (EIA0805)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance Value	Unit	Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
								L/W	Thick.			
50V	C2012X7R101KGTS	C2012X7R101KGT	1V , 1kHz	100	pF	±10%	0.85	±0.15	±0.15	2.5%	Paper, 4Kpcs	(I)
	C2012X7R151KGTS	C2012X7R151KGT	1V , 1kHz	150	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R181KGTS	C2012X7R181KGT	1V , 1kHz	180	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R221KGTS	C2012X7R221KGT	1V , 1kHz	220	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R271KGTS	C2012X7R271KGT	1V , 1kHz	270	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R331KGTS	C2012X7R331KGT	1V , 1kHz	330	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R391KGTS	C2012X7R391KGT	1V , 1kHz	390	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R471KGTS	C2012X7R471KGT	1V , 1kHz	470	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R561KGTS	C2012X7R561KGT	1V , 1kHz	560	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R681KGTS	C2012X7R681KGT	1V , 1kHz	680	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R821KGTS	C2012X7R821KGT	1V , 1kHz	820	pF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R102□GTS	C2012X7R102□GT	1V , 1kHz	1.0	nF	±5%,±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R122KGTS	C2012X7R122KGT	1V , 1kHz	1.2	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R152KGTS	C2012X7R152KGT	1V , 1kHz	1.5	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R182KGTS	C2012X7R182KGT	1V , 1kHz	1.8	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R222KGTS	C2012X7R222KGT	1V , 1kHz	2.2	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R272KGTS	C2012X7R272KGT	1V , 1kHz	2.7	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R332KGTS	C2012X7R332KGT	1V , 1kHz	3.3	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R392KGTS	C2012X7R392KGT	1V , 1kHz	3.9	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R472KGTS	C2012X7R472KGT	1V , 1kHz	4.7	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R562KGTS	C2012X7R562KGT	1V , 1kHz	5.6	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R682KGTS	C2012X7R682KGT	1V , 1kHz	6.8	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R682KGPSG		1V , 1kHz	6.8	nF	±10%	1.25	±0.15	±0.20	2.5%	Embossed, 3Kpcs	(I)
	C2012X7R822KGTS	C2012X7R822KGT	1V , 1kHz	8.2	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R103□GTS	C2012X7R103□GT	1V , 1kHz	10	nF	±5%,±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R123KGTS	C2012X7R123KGT	1V , 1kHz	12	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R153KGTS	C2012X7R153KGT	1V , 1kHz	15	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R183KGTS	C2012X7R183KGT	1V , 1kHz	18	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R223□GTS	C2012X7R223□GT	1V , 1kHz	22	nF	±5%,±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R273KGTS	C2012X7R273KGT	1V , 1kHz	27	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R333KGTS	C2012X7R333KGT	1V , 1kHz	33	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R393KGTS	C2012X7R393KGT	1V , 1kHz	39	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R473KGTS	C2012X7R473KGT	1V , 1kHz	47	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R563KGTS	C2012X7R563KGT	1V , 1kHz	56	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R683KGTS	C2012X7R683KGT	1V , 1kHz	68	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R823KGTS	C2012X7R823KGT	1V , 1kHz	82	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R104□GTS		1V , 1kHz	100	nF	±5%,±10%,±20%	0.80	±0.15	±0.10	2.5%		(I)
	C2012X7R104KGTS	C2012X7R104KGT	1V , 1kHz	100	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R124KGTS	C2012X7R124KGT	1V , 1kHz	120	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R154KGTS	C2012X7R154KGT	1V , 1kHz	150	nF	±10%	0.85	±0.15	±0.15	2.5%		(I)
	C2012X7R184KGTS	C2012X7R184KGT	1V , 1kHz	180	nF	±10%	0.85	±0.15	±0.15	3.0%		(I)
	C2012X7R184KGPSG		1V , 1kHz	180	nF	±10%	1.25	±0.15	±0.20	3.0%	Embossed, 3Kpcs	(I)
	C2012X7R224KGTS	C2012X7R224KGT	1V , 1kHz	220	nF	±10%	0.85	±0.15	±0.15	3.0%		(I)
	C2012X7R224KGPS	C2012X7R224KGP	1V , 1kHz	220	nF	±10%	1.25	±0.15	±0.20	3.0%		(I)
	C2012X7R334KGPS	C2012X7R334KGP	1V , 1kHz	330	nF	±10%	1.25	±0.15	±0.20	3.0%		(I)
	C2012X7R474KGPS	C2012X7R474KGP	1V , 1kHz	470	nF	±10%	1.25	±0.15	±0.20	3.5%		(II)
	C2012X7R684KGPS	C2012X7R684KGP	1V , 1kHz	680	nF	±10%	1.25	±0.15/±0.20	±0.20	10.0%	Embossed, 3Kpcs	(II)
	C2012X7R105□GPSG	C2012X7R105□GP	1V , 1kHz	1.0	uF	±10%,±20%	1.25	±0.15/±0.20	±0.20	10.0%		(II)
	C2012X7R225KGPSG	C2012X7R225KGP	1V , 1kHz	2.2	uF	±10%	1.25	±0.20	±0.20	10.0%		(II)

- X7S Series
- C0603X7S Series (EIA0201)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
16V	C0603X7S104JETS	C0603X7S104JET	1V , 1kHz	100	nF	±10%,±20%	0.30	± 0.05	± 0.05	10.0%	Paper, 15Kpcs	(II)*
10V	C0603X7S104KDT	C0603X7S104KDT	1V , 1kHz	100	nF	±10%	0.30	± 0.05	± 0.05	10.0%	Paper, 15Kpcs	(II)
6.3V	C0603X7S104KCTS	C0603X7S104KCT	1V , 1kHz	100	nF	±10%	0.30	± 0.05	± 0.05	10.0%	Paper, 15Kpcs	(II)
	C0603X7S224KCTS	C0603X7S224KCT	1V , 1kHz	220	nF	±10%	0.30	± 0.05	± 0.05	12.5%	Paper, 15Kpcs	(II)*

- C1005X7S Series (EIA0402)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
10V	C1005X7S105KDT	C1005X7S105KDT	1V , 1kHz	1.0	uF	±10%	0.50	± 0.10	± 0.10	10.0%	Paper, 10Kpcs	(II)*
	C1005X7S225KDT	C1005X7S225KDT	1V , 1kHz	2.2	uF	±10%	0.50	± 0.20	± 0.20	10.0%		(II)
6.3V	C1005X7S225KCTS	C1005X7S225KCT	1V , 1kHz	2.2	uF	±10%	0.50	± 0.20	± 0.20	10.0%	Paper, 10Kpcs	(II)

- C1608X7S Series (EIA0603)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
25V	C1608X7S225KFTS	C1608X7S225KFT	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)*
16V	C1608X7S225KETS	C1608X7S225KET	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X7S475KETS	C1608X7S475KET	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%		(II)
10V	C1608X7S225KDT	C1608X7S225KDT	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X7S475KDT	C1608X7S475KDT	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%		(II)
6.3V	C1608X7S475KCTS	C1608X7S475KCT	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)

- C2012X7S Series (EIA0805)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
25V	C1608X7S225KFTS	C1608X7S225KFT	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)*
16V	C1608X7S225KETS	C1608X7S225KET	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X7S475KETS	C1608X7S475KET	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%		(II)
10V	C1608X7S225KDT	C1608X7S225KDT	1V , 1kHz	2.2	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)
	C1608X7S475KDT	C1608X7S475KDT	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%		(II)
6.3V	C1608X7S475KCTS	C1608X7S475KCT	1V , 1kHz	4.7	uF	±10%	0.80	± 0.20	± 0.20	10.0%	Paper, 4Kpcs	(II)

- C3225X7S Series (EIA1210)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
6.3V	C3225X7S107MCPS	C3225X7S107MCP	0.5V , 120Hz	100	uF	±20%	2.50	± 0.30	± 0.30	10.0%	Embossed,1Kpcs	(II)*

□ Tolerance Code: K=±10%, M=±20%; Special tolerance on the request.

(II)* High temperature load life test are applicable in rated voltage *100%

- X7T Series
- C1608X7T Series (EIA0603)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
10V	C1608X7T225MDTS	C1608X7T225MDT	1V , 1kHz	2.2	uF	±20%	0.80	±0.20	±0.20	10.0%	Paper, 4Kpcs	(II)
6.3V	C1608X7T106MCTS	C1608X7T106MCT	1V , 1kHz	10	uF	±20%	0.80	± 0.20	±0.20	10.0%	Paper, 4Kpcs	(II)

- C2012X7T Series (EIA0805)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
10V	C2012X7T226MDPS	C2012X7T226MDP	0.5V , 120Hz	22	uF	±20%	1.25	± 0.20	±0.20	10.0%	Embossed, 3Kpcs	(II)*
6.3V	C2012X7T226MCPS	C2012X7T226MCP	0.5V , 120Hz	22	uF	±20%	1.25	± 0.20	±0.20	10.0%	Embossed, 3Kpcs	(II)

□ Tolerance Code: K=±10%, M=±20%; Special tolerance on the request.

(II)* High temperature load life test are applicable in rated voltage *100%

- X7U Series
- C3216X7U Series (EIA1206)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
6.3V	C3216X7U476MCPS	C3216X7U476MCP	0.5V , 120Hz	47	uF	±20%	1.60	± 0.30	±0.30	15.0%	Embossed, 2Kpcs	(II)*
4V	C3216X7U107MBPS	C3216X7U107MBP	0.5V , 120Hz	100	uF	±20%	1.60	± 0.30	±0.30	15.0%	Embossed, 2Kpcs	(II)*

□ Tolerance Code: K=±10%, M=±20%; Special tolerance on the request.

(II)* High temperature load life test are applicable in rated voltage *100%

- X8R Series
- C1608X8R Series (EIA0603)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
50V	C1608X8R104KGTS	C1608X8R104KGT	1V, 1kHz	100	nF	±10%	0.8	±0.15	±0.15	2.5%	Paper, 4Kpcs	(I)

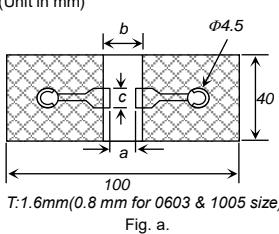
- C2012X8R Series (EIA0805)

RV	DARFON P/N	DARFON P/N 2	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing	Test Spec.
				Value	Unit			L/W	Thick.			
50V	C2012X8R104KGPS	C2012X8R104KGP	1V, 1kHz	100	nF	±10%	1.25	±0.15	±0.15	5.0%	Embossed, 3Kpcs	(I)

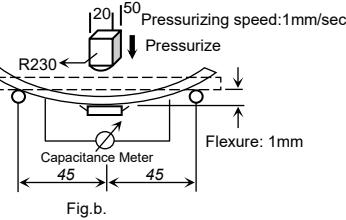
□ Tolerance Code: K=±10%, M=±20%; Special tolerance on the request.

- **Test Spec.**
- General Purpose (I)

No	Item	Specification		Test Method
		Temp. compensation type	High dielectric constant type	
1	Operation Temperature Range	NP0: -55 to 125 °C X5R: -55 to 85 °C X6S: -55 to 105 °C X7R/X7S/X7T/X7U: -55 to 125 °C X8R: -55 to 150 °C	X5R: -55 to 85 °C X6S: -55 to 105 °C X7R/X7S/X7T/X7U: -55 to 125 °C X8R: -55 to 150 °C	---
2	Rated Voltage	Shown in the table of "Part Number & Characteristic"		The rated voltage is defined as the maximum voltage, which may be applied continuously to the capacitor.
3	Appearance	No defects or abnormalities.		Visual inspection
4	Dimensions	Within the specified dimension.		Using calipers
5	Dielectric Strength	No defects or abnormalities.		No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds. The charge and discharge current is less than 50mA.
6	Insulation Resistance (I.R.)	To apply rated voltage. I.R. $\geq 10G\Omega$ or $R_{CR} \geq 500\Omega\text{-F}$ (whichever is smaller)		The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH max, and within 1 minute of charging.
7	Capacitance	Within the specified tolerance * X5R, X6S, X7RS, X7S, X7T, X7U and X8R at 1000 hours		The capacitance / D.F. shall be measured at 25°C at the frequency and voltage shown in the table of "Part Number & Characteristic".
8	Q/Dissipation Factor (D.F.)	NP0: If $C \leq 30\text{pF}$, DF $\leq 1/(400+20C)$, C in pF If $C > 30\text{pF}$, DF $\leq 0.1\%$.	Show in the table of "Part Number & Characteristic"	
9	Capacitance Temperature Characteristics	Capacitance change NP0 within $0 \pm 30\text{ppm}/^{\circ}\text{C}$ under operating temperature range.	Capacitance change X5R/X7R/X8R within $\pm 15\%$ X6S/X7S within $\pm 22\%$ X7T: -33% to + 22% X7U: -56% to + 22%	1. Temperature compensation type: The capacitance value at 25°C and 85°C shall be measured and calculated from the formula given below. $T.C. = (C_{85}-C_{25})/C_{25} * \Delta T * 10^6 (\text{PPM}/^{\circ}\text{C})$ 2. High dielectric constant type: The ranges of capacitance change compared with the 25°C value over the temperature ranges shall be within the specified ranges. Measurement Voltage : Less than 1.0Vrms (Refer to the electrical characteristics)
10	Termination Strength	No removal of the terminations or marking defect.		Apply a parallel force of 5N to a PCB mounted sample for 10±1sec. *2N for 0603 (EIA 0201).
11	Deflection (Bending Strength)	No cracking or marking defects shall occur at 1mm deflection. Capacitance change: NP0: within $\pm 5\%$ or $\pm 0.5\text{pF}$. (whichever is larger) X5R, X6S, X7R, X7S, X7T, X7U, X8R within $\pm 12.5\%$		Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.a using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X5R, X6S, X7R, X7S, X7T, X7U and X8R). Then apply a force in the direction shown in Fig.b. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.
12	Solderability of Termination	90% of the terminations are to be soldered evenly and continuously.		Immerse the test capacitor into a methanol solution containing rosin for 3 to 5 seconds, preheat it 150 to 180°C for 2 to 3 minutes and immerse it into SAC305(Sn96.5Ag3.0Cu0.5) solder of $245 \pm 5^{\circ}\text{C}$ for 3 ± 1 seconds.
13	Resistance to Soldering Heat	Appearance	No marking defects	*Preheat the capacitor at 120 to 150°C for 1 minute.
		Cap. Change	NP0 within $\pm 2.5\%$ or 0.25pF (whichever is larger)	Immerse the capacitor in a SAC305(Sn96.5Ag3.0Cu0.5) solder solution at $270 \pm 5^{\circ}\text{C}$ for 10 ± 1 seconds. Let sit at room temperature for 24±2 hours, then measure.
		Q/D.F.	If $C \leq 30\text{pF}$, DF $\leq 1/(400+20C)$ If $C > 30\text{pF}$, DF $\leq 0.1\%$	To satisfy the specified initial spec.
		I.R.	I.R. $\geq 10,000\text{M}\Omega$ or $R_{CR} \geq 500\Omega\text{-F}$. (whichever is smaller)	* High dielectric constant type: Initial measurement : perform a heat treatment at $150 \pm 0/-10^{\circ}\text{C}$ for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.



Size	a	b	C
0603	0.3	0.9	0.3
1005	0.4	1.5	0.5
1608	1.0	3.0	1.2
2012	1.2	4.0	1.65
3216	2.2	5.0	2.0
4520	3.5	7.0	2.5
4532	3.5	7.0	3.7



No	Item	Specification		Test Method
		Temp. compensation type	High dielectric constant type	
14	Temperature cycle (Thermal shock)	Appearance	No marking defects	Solder the capacitor to supporting jig (Glass epoxy board) and perform the five cycles according to the four heat treatments listed in the following table. Let sit for 24±2hrs at room temperature, then measure. Step 1: Minimum operating temperature 30±3min Step 2: Room temperature 2~3 min Step 3: Maximum operating temperature 30±3min Step 4: Room temperature 2~3min *High dielectric constant type: Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.
		Cap. Change	NPO within ±2.5% or 0.25pF (whichever is larger)	
		Q/D.F.	If C≤30pF, DF≤1/(400+20C) If C>30pF, DF≤0.1%	
		I.R.	I.R. ≥ 10GΩ or R _C ≥ 500Ω·F. (whichever is smaller)	
15	Humidity load	Appearance	No marking defects	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. The charge / discharge current is less than 50mA. [Temperature compensation type] Remove and let sit for 24±2 hours at room temperature, then measure. [High dielectric constant type] *Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. *Measurement after test Perform a heat treatment and then let sit for 24±2 hours at room temperature, then measure.
		Cap. Change	NPO within ±7.5% or 0.75pF (whichever is larger)	
		Q/D.F.	If C>30pF, DF≤0.5% If C≤30pF, DF≤1/(100+10xC/3), C in pF	
		I.R.	I.R. ≥ 500MΩ or R _C ≥ 25Ω·F. (whichever is smaller)	
16	High temperature load life test	Appearance	No marking defects	Apply 200% of the rated voltage for 1000±12 hours at the maximum operating temperature ± 3°C. The charge / discharge current is less than 50mA. [Temperature compensation type] Remove and let sit for 24±2 hours at room temperature, then measure. [High dielectric constant type] *Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. *Measurement after test Perform a heat treatment and then let sit for 24±2 hours at room temperature, then measure.
		Cap. Change	NPO within ±7.5% or 0.75pF (whichever is larger)	
		Q/D.F.	If C>30pF, DF≤0.3% If 10pF<C≤30pF, DF≤1/(275+5xC/2) If C≤10pF, DF≤1/(200+10C), C in pF	
		I.R.	More than 1GΩ or R _C ≥ 50Ω·F (whichever is less.)	

● General Purpose (II)

No	Item	Specification	Test Method																															
1	Operation Temperature Range	X5R: -55 to 85 °C X6S: -55 to 105 °C X7R/X7S/X7T/X7U: -55 to 125 °C X8R: -55 to 150 °C	---																															
2	Rated Voltage	Shown in the table of "Part Number & Characteristic"	The rated voltage is defined as the maximum voltage, which may be applied continuously to the capacitor.																															
3	Appearance	No defects or abnormalities.	Visual inspection																															
4	Dimensions	Within the specified dimension.	Using calipers																															
5	Dielectric Strength	No defects or abnormalities.	No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds. The charge and discharge current is less than 50mA.																															
6	Insulation Resistance (I.R.)	R _{C_R} ≥ 50Ω·F High cap: R _{C_R} ≥ 20Ω·F C1005X6S226MBTS	The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH max, and within 1 minute of charging, provided the charge/discharge current is less than 50 mA.																															
7	Capacitance	Within the specified tolerance * X5R, X6S, X7R, X7S, X7T, X7U and X8R at 1000 hours	The capacitance / D.F. shall be measured at 25°C at the frequency and voltage shown in the table of "Part Number & Characteristic".																															
8	Q/Dissipation Factor (D.F.)	Shown in the table of "Part Number & Characteristic"	The ranges of capacitance change compared with the 25°C value over the temperature ranges shall be within the specified ranges. Measurement Voltage : Less than 1.0Vrms (Refer to the electrical characteristics)																															
9	Capacitance Temperature Characteristics	Capacitance change X5R/X7R/X8R within ±15% , X6S/X7S within ±22% X7U: -56% to + 22% X7T: -33% to + 22%																																
10	Termination Strength	No removal of the terminations or marking defect.	Apply a parallel force of 5N to a PCB mounted sample for 10±1sec. *2N for 0603 (EIA 0201).																															
11	Deflection (Bending Strength)	No cracking or marking defects shall occur at 1mm deflection. Capacitance change: X5R, X6S, X7R, X7S, X7T, X7U, X8R :within ±12.5% (Unit in mm) <table border="1"> <thead> <tr> <th>Size</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>1005</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>2012</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> <tr> <td>3216</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>4520</td> <td>3.5</td> <td>7.0</td> <td>2.5</td> </tr> <tr> <td>4532</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> </tr> </tbody> </table> 	Size	a	b	c	0603	0.3	0.9	0.3	1005	0.4	1.5	0.5	1608	1.0	3.0	1.2	2012	1.2	4.0	1.65	3216	2.2	5.0	2.0	4520	3.5	7.0	2.5	4532	3.5	7.0	3.7
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13	Resistance to Soldering Heat	Appearance	No marking defects																															
		Cap. Change	X5R/X6S/X7R/X7S/X7T/X7U/X8R within ±7.5%																															
		D.F.	To satisfy the specified initial spec.																															
		I.R.	R _{C_R} ≥ 50Ω·F. High cap: R _{C_R} ≥ 20Ω·F C1005X6S226MBTS																															

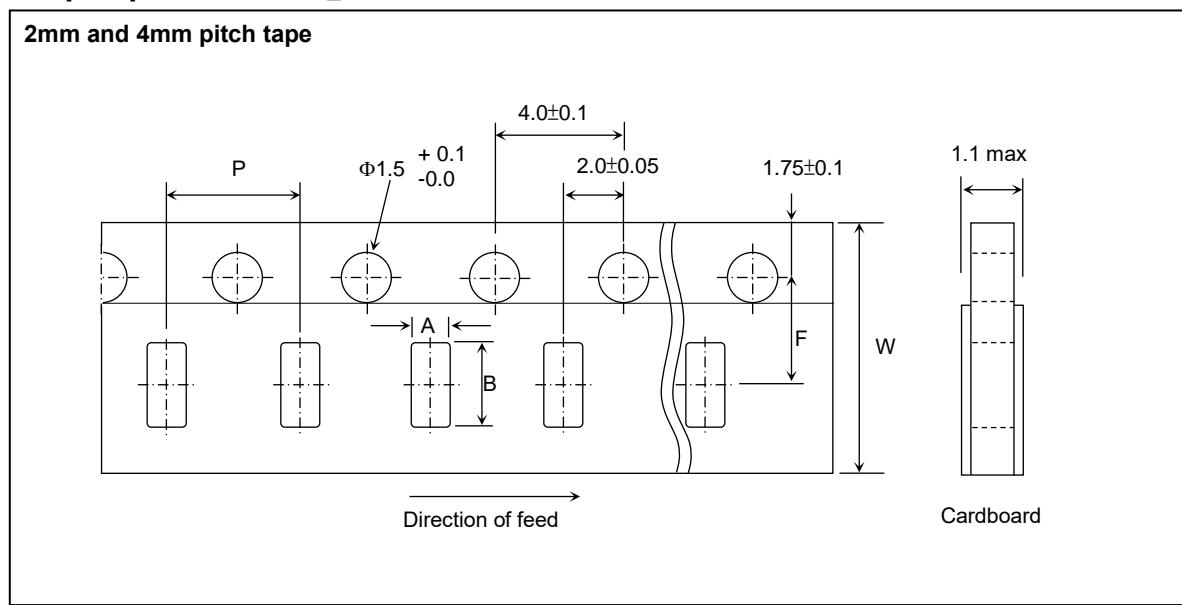
No	Item	Specification	Test Method
14	Temperature cycle (Thermal shock)	Appearance No marking defects	Solder the capacitor to supporting jig (Glass epoxy board) and perform the five cycles according to the four heat treatments listed in the following table. Let sit for 24±2hrs at room temperature, then measure. Step 1: Minimum operating temperature 30±3min Step 2: Room temperature 2~3 min Step 3: Maximum operating temperature 30±3min Step 4: Room temperature 2~3min * Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.
		Cap. Change X5R/X6S/X7R/X7S/X7T/X7U/X8R within ±7.5% X7U within ±30%	
		Q/D.F. To satisfy the specified initial spec.	
		I.R. I.R. \geq 10GΩ or R _{CR} \geq 50Ω-F. (whichever is smaller) High cap: R _{CR} \geq 20Ω-F C1005X6S226MBTS	
15	Humidity load	Appearance No marking defects	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. The charge / discharge current is less than 50mA. *Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. *Measurement after test Perform a heat treatment and then let sit for 24±2 hours at room temperature, then measure.
		Cap. Change X5R/X6S/X7R/X7S/X7T/X7U/X8R within ±12.5%	
		Q/D.F. X5R/X6S/X7R/X7S/X7T/X7U/X8R 200% max of initial spec.	
		I.R. I.R. \geq 500MΩ or R _{CR} \geq 12.5Ω-F. (whichever is smaller) High cap: R _{CR} \geq 1Ω-F C1005X6S226MBTS	
16	High temperature load life test	Appearance No marking defects	Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ± 3°C. The charge / discharge current is less than 50mA. *Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. *Measurement after test Perform a heat treatment and then let sit for 24±2 hours at room temperature, then measure. * Some of the parts are applicable in rated voltage *100%. Please refer to "Part Number & Characteristic" with (II)* labeled in "Test Spec."
		Cap. Change X5R/X6S/X7R/X7S/X7T/X7U/X8R within ±12.5%	
		D.F. X5R/X6S/X7R/X7S/X7T/X7U/X8R 200% max of initial spec.	
		I.R. More than 1GΩ or R _{CR} \geq 250Ω-F (whichever is less.) High cap: R _{CR} \geq 2Ω-F C1005X6S226MBTS	

Package

- Tape and reel packaging**

Tape and reel packaging is currently the most promising system for high-speed production. A typical 180mm (7 inch) diameter reel contains 1,500 to 15,000 capacitors, 250mm (10 inch) contains 10,000 capacitors, and 330mm (13 inch) contains 10,000 to 50,000 capacitors. Three standard sizes are available in taped and reeled package either with paper carrier tapes or embossed tapes.

【Paper tape specifications】

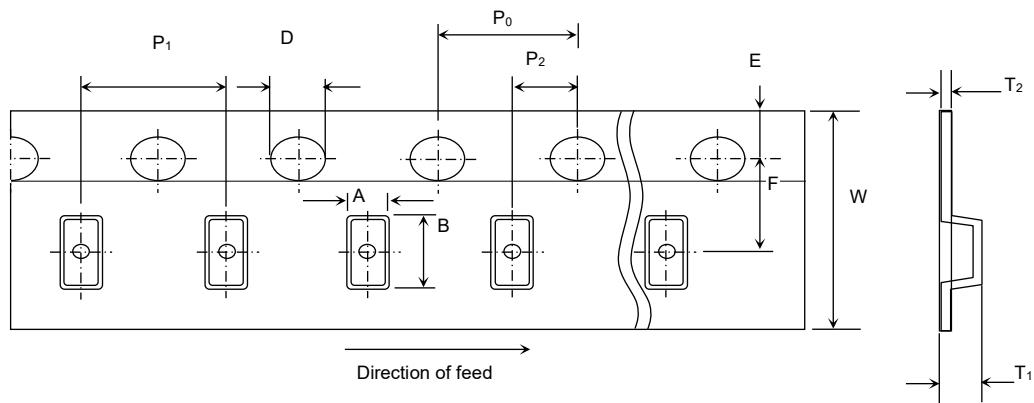


SYMBOL	PRODUCT SIZE CODE												UNIT	
	C0603(0201)		C1005(0402) Standard		C1005(0402) Special (1)		C1005(0402) Special (2)		C1005(0402) Special (3)		C1005(0402) Special (4)			
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.		
A	0.38	± 0.04	0.65	± 0.10	0.70	± 0.10	0.72	± 0.10	0.80	± 0.10	0.90	± 0.10	mm	
B	0.68	± 0.04	1.15	± 0.10	1.19	± 0.10	1.25	± 0.10	1.35	± 0.10	1.45	± 0.10	mm	
F	3.5	± 0.05	3.5	± 0.05	3.5	± 0.05	3.5	± 0.05	3.5	± 0.05	3.5	± 0.05	mm	
P	2	± 0.10	2	± 0.10	2	± 0.10	2	± 0.10	2	± 0.10	2	± 0.10	mm	
W	8	± 0.20	8	± 0.20	8	± 0.20	8	± 0.20	8	± 0.20	8	± 0.20	mm	

SYMBOL	PRODUCT SIZE CODE (EIA)										UNIT	
	C1608(0603) Standard		C1608 (0603) Special (1)		C1608 (0603) Special (2/3)		C2012 (0805)		C3216 (1206)			
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.		
A	1.0	±0.2	1.0	±0.2	1.1	±0.2	1.5	±0.2	1.9	±0.2	mm	
B	1.8	±0.2	1.8	±0.2	1.9	±0.2	2.3	±0.2	3.6	±0.2	mm	
F	3.5	±0.05	3.5	±0.05	3.5	±0.05	3.5	±0.05	3.5	±0.05	mm	
P	4	±0.1	4	±0.1	4	±0.1	4	±0.1	4	±0.1	mm	
W	8	±0.2	8	±0.2	8	±0.2	8	±0.2	8	±0.2	mm	

【Embossed tape specifications】

1mm and 4mm and 8mm pitch tape

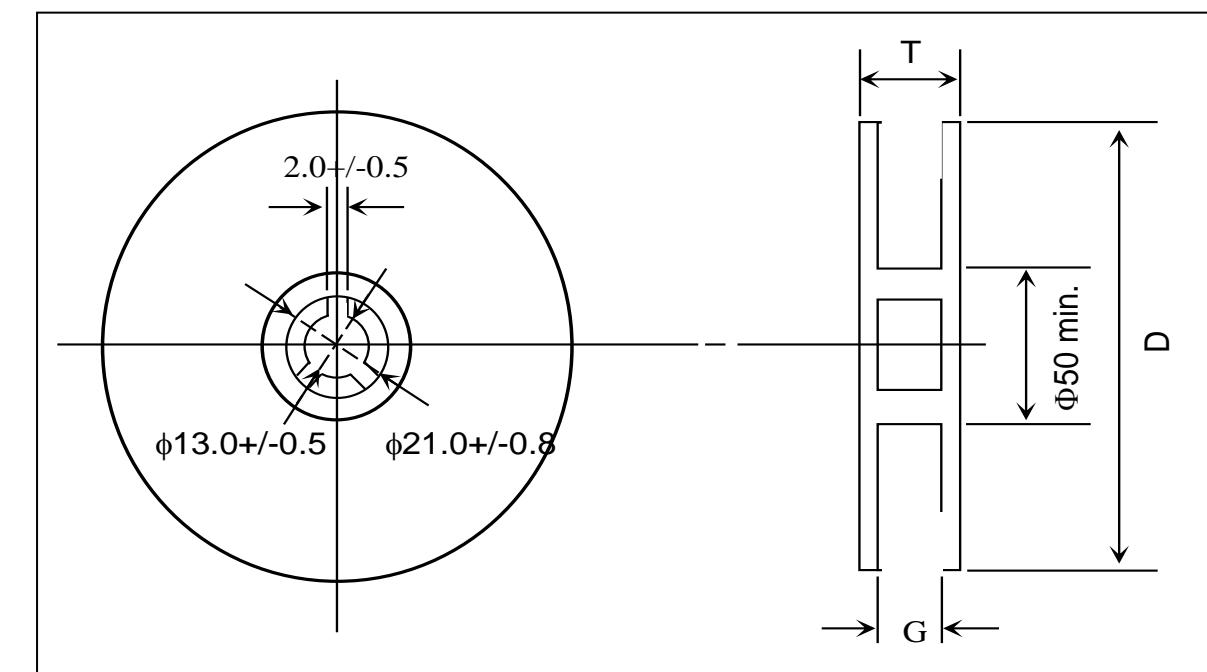


For $W= 8\text{mm}$: $T_1=2.5\text{mm}$ max.

For $W= 12\text{mm}$: $T_1= 4.5\text{mm}$

DIMENSION (mm)	PRODUCT SIZE CODE					
	4 mm tape				8 mm tape	
	1608 (0603)	2012 (0805)	3216 (1206)	3225 (1210)	4520 (1808)	4532 (1812)
P_1	4 ± 0.1	4 ± 0.1	4 ± 0.1	4 ± 0.1	8 ± 0.1	8 ± 0.1
P_0	4 ± 0.1	4 ± 0.1	4 ± 0.1	4 ± 0.1	4 ± 0.1	4 ± 0.1
P_2	2 ± 0.05	2 ± 0.05	2 ± 0.05	2 ± 0.05	2 ± 0.05	2 ± 0.05
A	1.2 ± 0.2	1.45 ± 0.2	1.9 ± 0.2	2.8 ± 0.2	2.3 ± 0.2	3.6 ± 0.2
B	2.0 ± 0.2	2.3 ± 0.2	3.5 ± 0.2	3.6 ± 0.2	4.9 ± 0.2	4.9 ± 0.2
W	8 ± 0.3	8 ± 0.2	8 ± 0.2	8 ± 0.2	12 ± 0.2	12 ± 0.2
E	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1
F	3.5 ± 0.05	3.5 ± 0.05	3.5 ± 0.05	3.5 ± 0.05	5.5 ± 0.05	5.5 ± 0.05
D	1.5 $(+0.1/-0.0)$	1.5 $(+0.1/-0.0)$	1.5 $(+0.1/-0.0)$	1.5 $(+0.1/-0.0)$	1.5 $(+0.1/-0.0)$	1.5 $(+0.1/-0.0)$
T_1	1.4 max.	2.5 max.	2.5 max.	2.5 max.	4.5	4.5
T_2	0.25 ± 0.1	0.305 ± 0.1	0.30 ± 0.1	0.30 ± 0.1	0.30 ± 0.1	0.30 ± 0.1

【Reel specifications】



TAPE WIDTH (mm)	G (mm)	T max. (mm)	D (mm)
4	5.0 ± 1.5	8.0	180
8	10.0 ± 1.5	14.5	180
8	10.0 ± 1.5	14.5	250
8	10.0 ± 1.5	14.5	330
12	14.0 ± 1.5	18.5	180

【Thickness and Packing Amount】

Thickness			Amount per reel			
Code	Spec.(mm)	Size (EIA)	180 mm (7")		330 mm (13")	
			Paper	Embossed	Paper	Embossed
Z	0.20	0402 (01005)	20K	40K ^{#1}		
A	0.30	0603 (0201)	15K		50K	
		1005 (0402)	15K		50K	
B	0.50	1005 (0402)	10K		50K	
Q	0.45	1005 (0402)	10K		50K	
		1608 (0603)	4K		15K	
C	0.60	2012 (0805)	4K		15K	
		3216 (1206)	4K		15K	
D	0.80	1608 (0603)	4K	4K	15K	
		2012 (0805)	4K		15K	
		3216 (1206)	4K		15K	
E	0.85	2012 (0805)	4K		15K	
		3216 (1206)	4K		15K	
		3225 (1210)		3K		10K
		4532 (1812)		1K		
I	0.95	2012 (0805)		3K		
		3216 (1206)		3K		
F	1.15	3216 (1206)		3K		10K
		4520 (1808)		3K		
G	1.25	2012 (0805)		2K/3K		10K
		3216 (1206)		3K		10K
		3225 (1210)		3K		
		4520 (1808)		2K/3K		
		4532 (1812)		1K		
		3225 (1210)		3K		
L	1.60	3216 (1206)		2K		
		3225 (1210)		2K		
		4520 (1808)		2K		
		4532 (1812)		1K		
N	2.00	3216 (1206)		2K/3K		
		3225 (1210)		1K/2K		
		4520 (1808)		1K		
		4532 (1812)		1K		
P	2.50	3225 (1210)		500pcs/1K		

#1: 4mm width 1mm pitch Embossed Taping

【Packing Rule】

EIA SIZE	Tape type	Reel Size	Max Reels/Box
01005	Emboss	7"	16
01005	Paper	7"	10
0201	Paper	7"	10
0402	Paper	7"	10
0603	Paper/Emboss	7"	10
0805	Paper/Emboss	7"	10
1206	Paper/Emboss	7"	10
1210	Emboss	7"	10
1808	Emboss	7"	10
1812	Emboss	7"	10

*Maximum 60 reels in one carton.

Others

【Storage】

1. The chip capacitors shall be packaged in carrier tapes or bulk cases.
2. Keep storage place temperatures from +5°C to +35°C, humidity from 45 to 70% RH.
3. The storage atmosphere must be free of gas containing sulfur and chlorine. Also, avoid exposing the product to saline moisture. If the product is exposed to such atmospheres, the terminations will oxidize and solderability will be affected.
4. The solderability is assured for 12 months from our final inspection date if the above storage condition is followed.

【Circuit Design】

1. Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance, which are provided in both the catalog and the specifications. Exceeding the specifications listed may result in inferior performance. It may also cause a short, open, smoking, or flaming to occur, etc.
2. Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications. Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur. The loss of capacitance will occur, and may self-heat due to equivalent series resistance when alternating electric current is passed through. As this effect becomes critical in high frequency circuits, please exercise with caution. When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rise remain below 20°C.
3. Please keep voltage under the rated voltage, which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC voltage is super-imposed to the DC voltage. In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage. Exceeding the rated voltage provided in both catalog and specifications may lead to defective withstanding voltage or, in worse case situations, may cause the capacitor to burn out.
4. It's a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.

【Handling】

Chip capacitors should be handled with care to avoid contamination or damage. The use of vacuum pick-up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

【Flux】

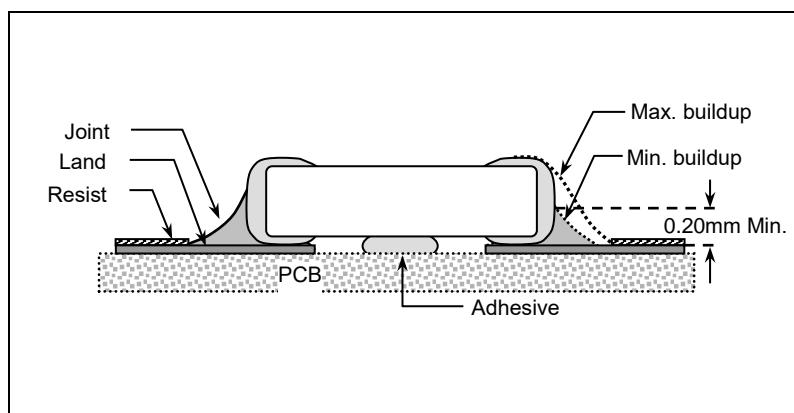
1. An excessive amount of flux or too rapid temperature rise can cause solvent burst, solder can generate a large quantity of gas. The gas can spread small solder particles to cause solder balling effect or bridging problem.
2. Flux containing too high of a percentage of halide may cause corrosion of termination unless sufficient cleaning is applied.
3. Use rosin-type flux. Highly acidic flux (halide content less than 0.2wt%) is not recommended.
4. The water soluble flux causes deteriorated insulation resistance between outer terminations unless sufficiently cleaned.

【Component Spacing】

For wave soldering components, the spacing must be sufficient far apart to prevent bridging or shadowing. This is not so important for reflow process but enough space for rework should be considered. The suggested spacing for reflow soldering and wave soldering is 0.5mm and 1.0mm, respectively.

【Solder Fillet】

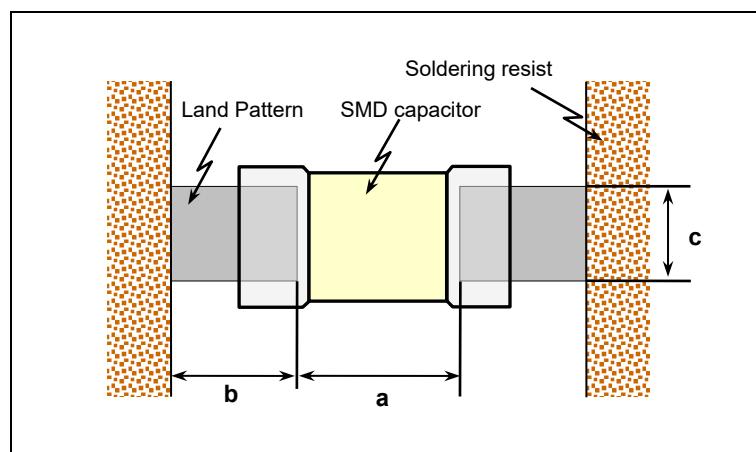
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive Strength and cause parts falling off PCB. When soldering, confirm that the solder is placed over 0.2mm of the surface of the terminations.



【Recommended Land Pattern Dimensions】

When mounting the capacitor to substrate, it's important to consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

1. The greater the amount of solder, the greater the stress to the elements, as this may cause the substrate to break or crack.
2. In the situation where two or more devices are mounted onto a common land, separate the device into exclusive pads by using soldering resist.
3. Land width equal to or less than component. It is permissible to reduce land width to 80% of component width.



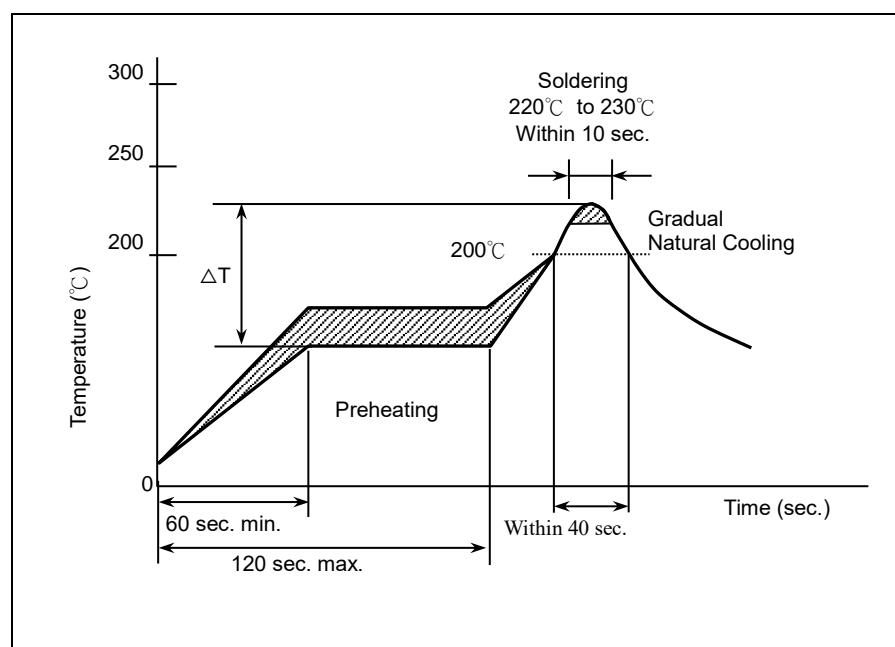
Size mm (EIA)	L x W (mm) (Dimension tolerance)	a (mm)	b (mm)	c (mm)
0402 (01005)	0.4*0.2	0.16 to 0.20	0.12 to 0.18	0.20 to 0.23
0603 (0201)	0.6*0.3	0.15 to 0.35	0.2 to 0.3	0.25 to 0.3
1005 (0402)	1.0*0.5 (within±0.10)	0.3 to 0.5	0.35 to 0.45	0.4 to 0.5
	1.0*0.5 (±0.15/±0.20)	0.4 to 0.6	0.4 to 0.5	0.5 to 0.6
1608 (0603)	1.6*0.8 (within±0.10)	0.7 to 1.0	0.6 to 0.8	0.7 to 0.8
	1.6*0.8 (±0.15/±0.20/±0.25)	0.8 to 1.1	0.7 to 0.9	0.8 to 0.9
2012 (0805)	2.0*1.25	1.0 to 1.3	0.7 to 0.9	1.0 to 1.2
3216 (1206)	3.2*1.6	2.1 to 2.5	1.0 to 1.2	1.3 to 1.6
3225 (1210)	3.2*2.5	2.1 to 2.5	1.0 to 1.2	2.0 to 2.5
4520 (1808)	4.5*2.0	3.2 to 3.8	1.2 to 1.4	1.7 to 2.0
4532 (1812)	4.5*3.2	3.2 to 3.8	1.2 to 1.4	2.7 to 3.2

【Resin Mold】

If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin. The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin. Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.

【Soldering Profile for SMT Process with SnPb Solder Paste】

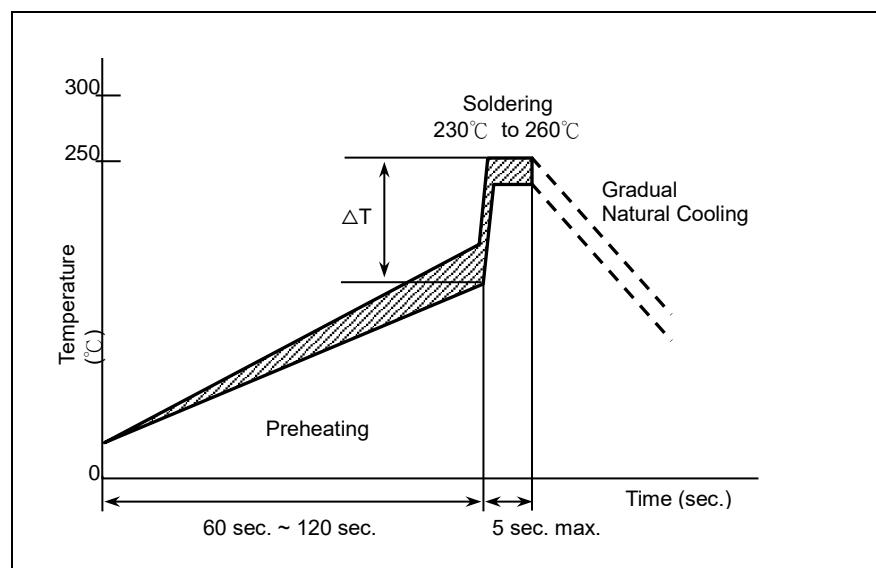
Reflow Soldering



The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed 4°C/sec and a target of 2°C/sec is preferred.

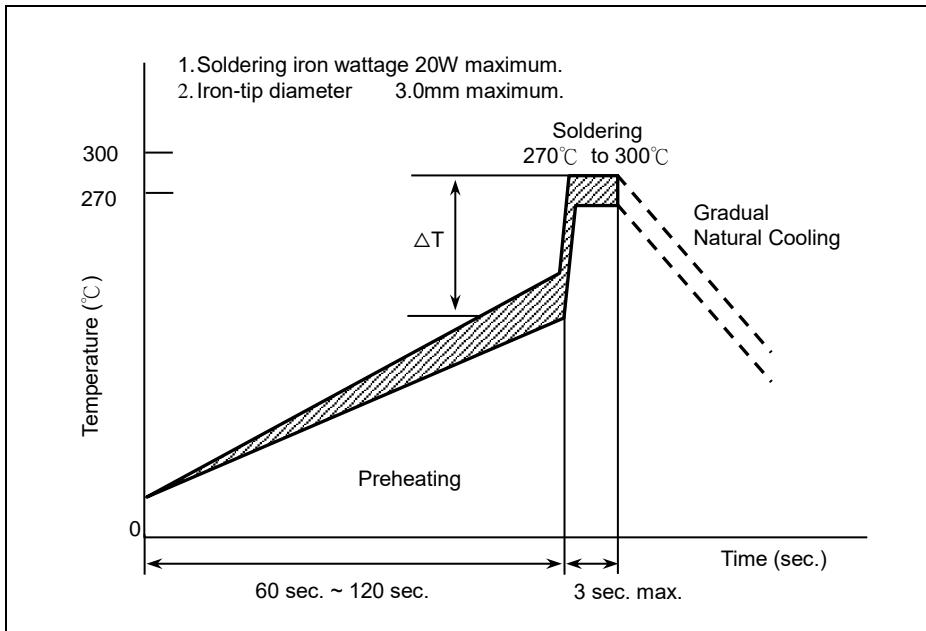
Chip Size	3216 and smaller	3225 and above
Preheating	$\Delta T \leq 150^{\circ}\text{C}$	$\Delta T \leq 130^{\circ}\text{C}$

Wave Soldering



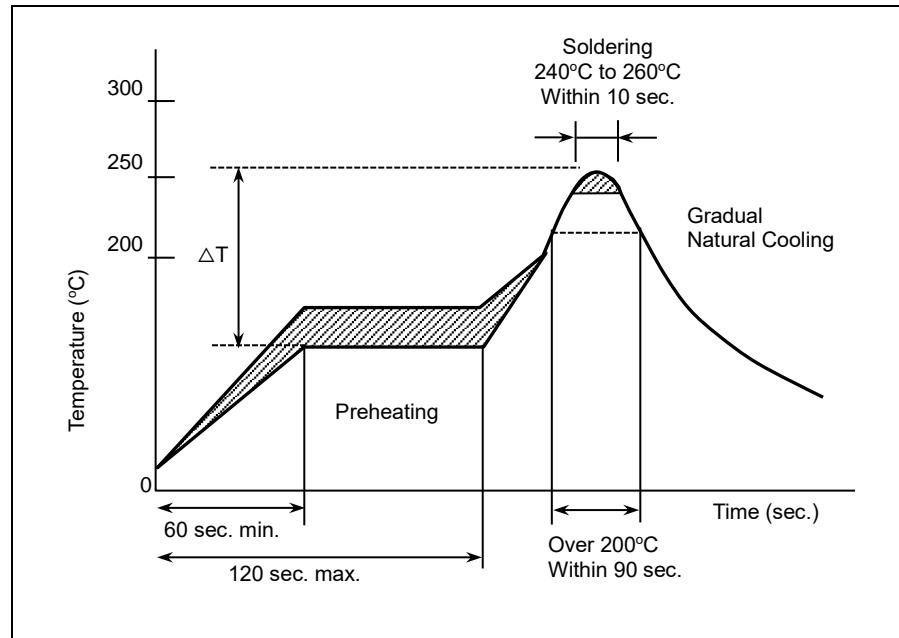
Chip Size	1608/2012/3216	3225 and above
Preheating	$\Delta T \leq 150^\circ\text{C}$	-

Soldering Iron



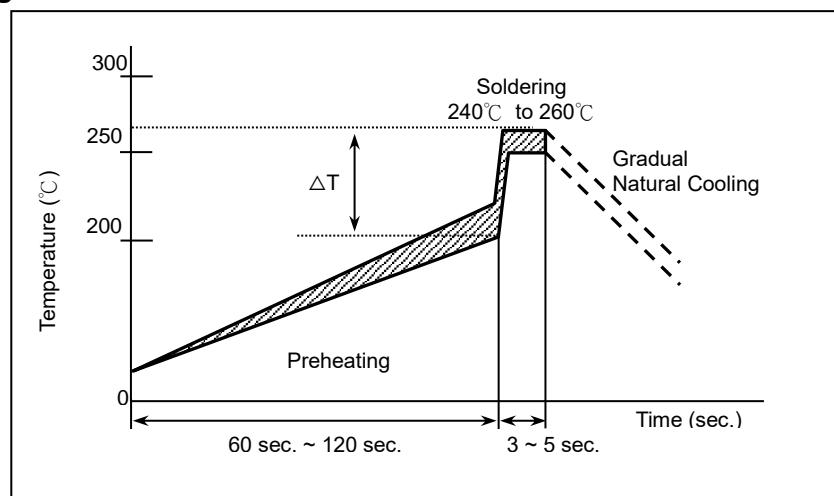
Chip Size	3216 and smaller	3225 and above
Preheating	$\Delta T \leq 190^\circ\text{C}$	$\Delta T \leq 130^\circ\text{C}$

【Soldering】

Reflow Soldering for Lead free Termination

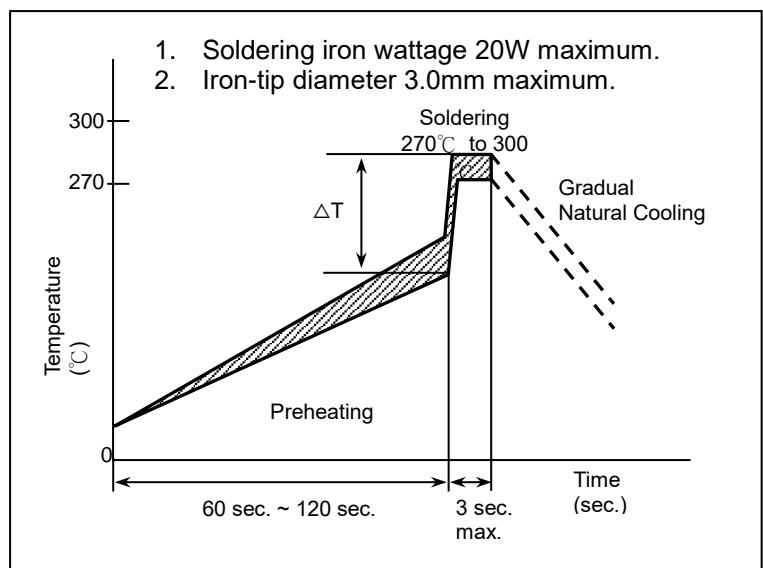
The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed 4°C/sec and a target of 2°C/sec is preferred.

Chip Size	3216 and smaller	3225 and above
Preheating	$\Delta T \leq 150^\circ\text{C}$	$\Delta T \leq 130^\circ\text{C}$

Flow Soldering for Lead free Termination

Chip Size	1608/2012/3216	3225 and above
Preheating	$\Delta T \leq 150^\circ\text{C}$	-

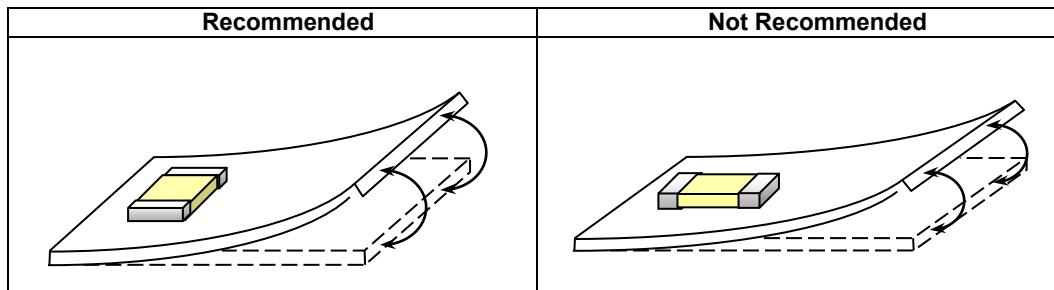
Soldering Iron



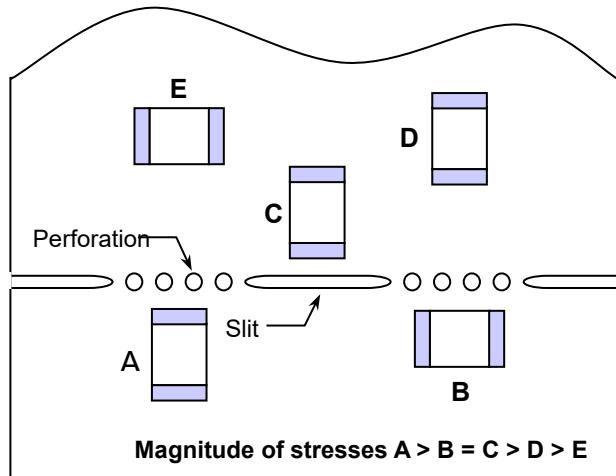
Chip Size	3216 and smaller	3225 and above
Preheating	$\Delta T \leq 190^{\circ}\text{C}$	$\Delta T \leq 130^{\circ}\text{C}$

【Chip Layout and Breaking PCB】

- To layout the SMD capacitors for reducing bend stress from board deflection of PCB. The following are examples of Hood and bad layout.

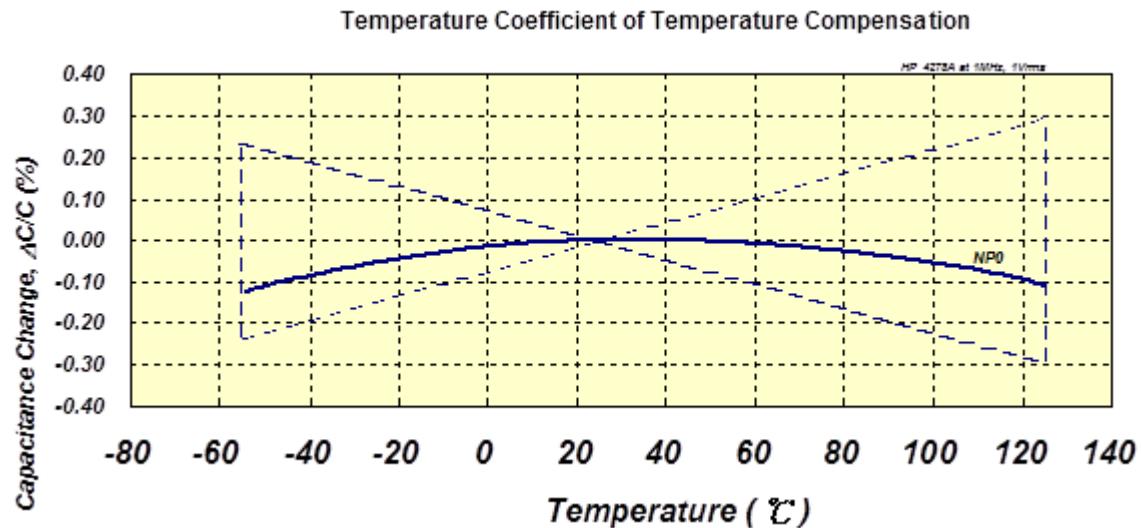


- When breaking PCB, the layout should be noted that the mechanical stresses are depending on the position of capacitors. The following example shows recommendation for better design.

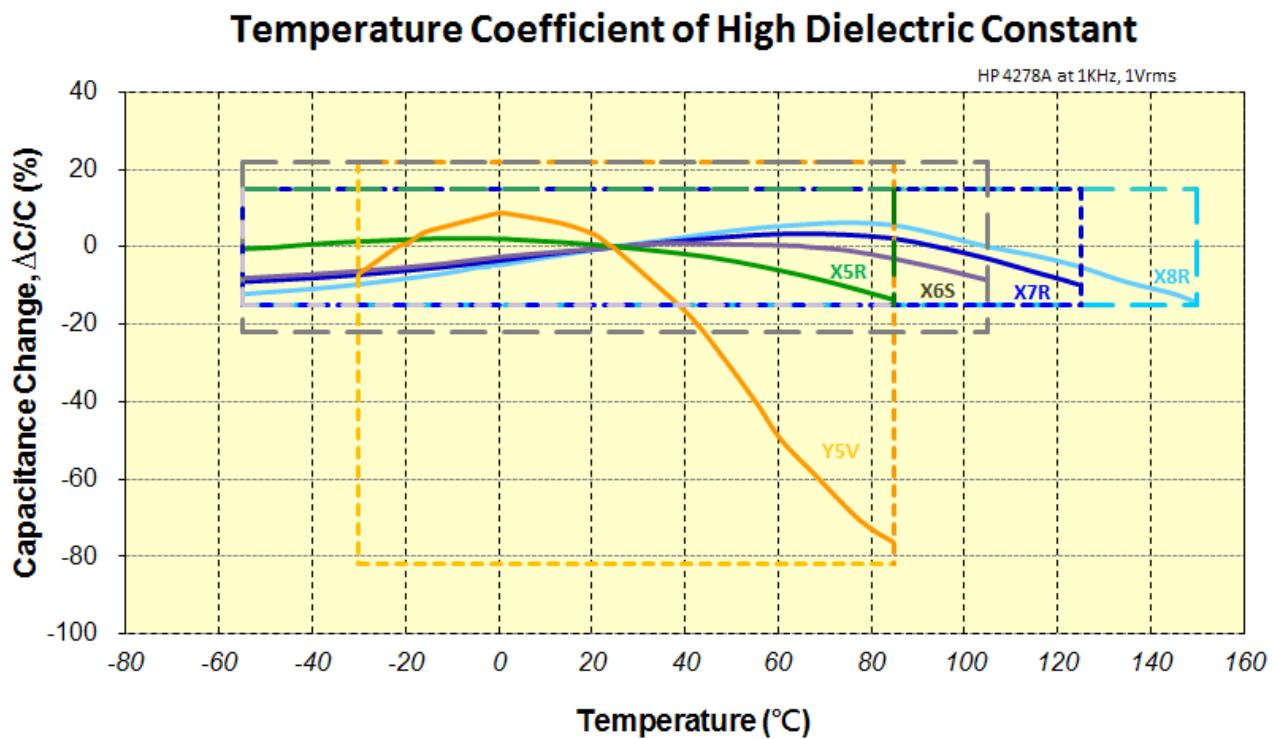


【Temperature Coefficient】

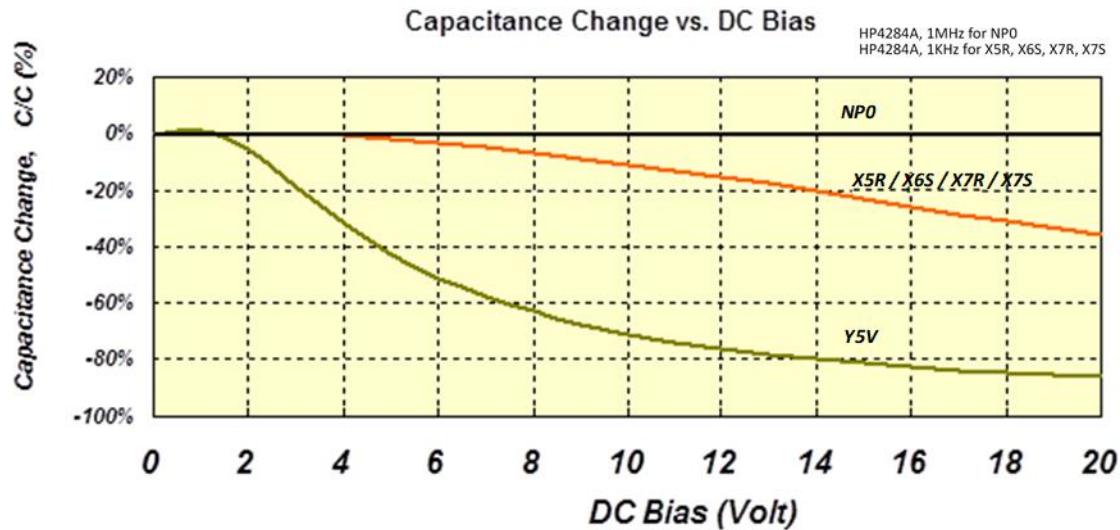
- Class 1 (Temperature Compensation series)



- Class 2 (High Dielectric Constant Series)

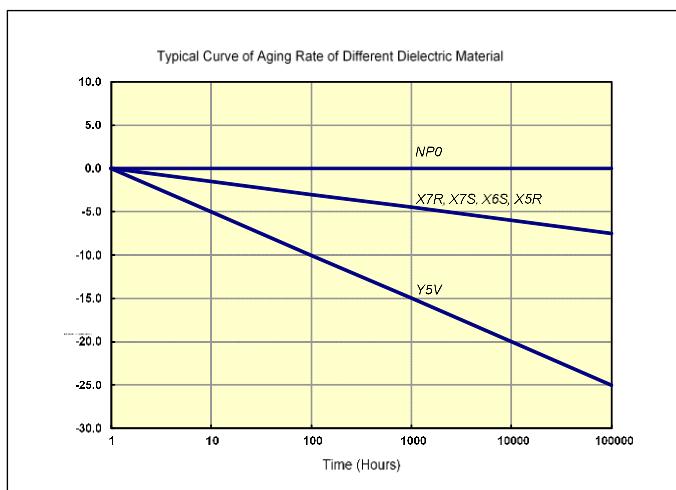


【DC Voltage Coefficient】



【Aging Rate】

The capacitance and dissipation factor of class 2 capacitors decreases with time. It is known as 'aging' that follows a logarithmic law and expressed in terms of an aging constant. Aging is caused by a gradual re-alignment of the crystalline structure of the ceramic. The aging constant is defined as the percentage loss of capacitance at a 'time decade'. The law of capacitance aging is expressed as following equation:



$$C_{t2} = C_{t1} \times (1 - k \times \log_{10}(t_2/t_1))$$

C_{t1} : Capacitance after t_1 hours of start aging.

C_{t2} : Capacitance after t_2 hours of start aging.

k : aging constant (capacitance decrease per decade)

t_1, t_2 : time in hours from start of aging.

A typical curve of aging rate is shown in following figure.

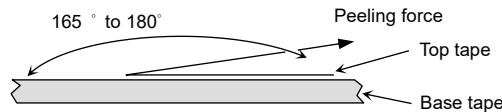
When heating the capacitors above Curie temperature ($130^{\circ}\text{C} \sim 150^{\circ}\text{C}$) the capacitance can be re-new. So capacitance of class 2 capacitors will be complete de-aged by soldering process; subsequently a new aging process begins.

Because of aging, it is specified an age for measurement to meet the prescribed tolerance for class 2 capacitors. Normally, 1000 hours ($t_2=1000$ hrs) is defined.

【Peeling Off Force】

Peeling off force: 0.1N to 1.0 N* in the direction shown as below.

The peeling speed: 300±10 mm/min



1. The taped tape on reel is wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
2. There are minimum 150 mm as the leader and minimum 40 mm empty tape as the tail is attached to the end of the tape.