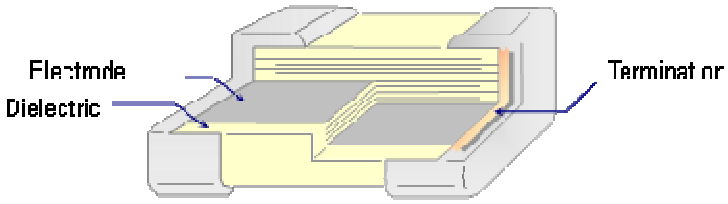
CONTENT (MLCC)

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

DARFON

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 ± 30ppm/℃ -55℃ to +125℃
X7R: ±15% -55℃ to +125℃ X6S: ±22% -55℃ to +105℃
X5R: ±15% -55℃ to +85℃ Y5V: +22%/-82% -30℃ to +85℃

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: ± 0.05pF B: ± 0.1pF C: ± 0.25pF D: ± 0.5pF F: ±1% G: ±2%
J: ±5% K: ±10% M: ±20% Z: +80/-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”)
N: Paper tape reel Ø250mm (10”)
A: Paper tape reel Ø330mm (13”)
W: Special Packing
P: Embossed tape reel Ø180mm (7”)
D: Embossed tape reel Ø250mm (10”)
E: Embossed tape reel Ø330mm (13”)

Application Code

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

Thickness Code

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

Automotive Application (AEC-Q200 compliant)

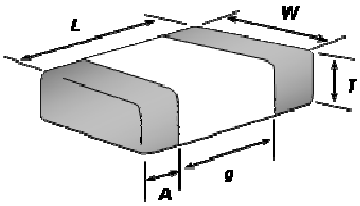
■ Feature

1. Monolithic structure ensures high reliability and mechanical strength.
2. RoHS compliant
3. AEC-Q200 compliant

■ Application

1. Automotive comfort & infotainment systems
2. Bluetooth & wireless communication systems
3. Navigation system
4. Automotive after-market electronics

■ Standard External Dimensions



TYPE	Dimension (mm)				
(EIA Size)	L (Length)	W (Width)	T (Max.)	g (Min)	A (Min/Max)
C0603 (0201)	0.6±0.03	0.30 ±0.03	0.33	0.15	0.10/0.20
C1005 (0402)	1.0 ± 0.05	0.50 ± 0.05	0.55	0.30	0.10 / 0.30
C1608 (0603)	1.6 ± 0.10	0.80 ± 0.10	0.90	0.50	0.25 / 0.65
C2012 (0805)	2.0 ± 0.15	1.25 ± 0.15	1.45	0.70	0.25 / 0.75
C3216 (1206)	3.2 ± 0.15	1.60 ±0.15	1.80	1.50	0.25 / 0.75
C3225 (1210)	3.2 ± 0.30	2.50 ± 0.20	2.70	1.50	0.25 / 0.75

For some special parts, please see the “Part Number & Characteristic” for detail specification.

■ Product Range

TCC	Series	EIA	Capacitance Range (F)																					
					1p			10p			100p			1n			10n			100n			1u	
NP0	C1608NP0_A	0603	0.2pF											2.2nF										
	C2012NP0_A	0805		1pF												4.7nF								
	C3216NP0_A	1206					10pF							3.3nF										
X7R	C1005X7R_A	0402							100pF										100nF					
	C1608X7R_A	0603							100pF											220nF				
	C2012X7R_A	0805									150pF										470nF			
	C3216X7R_A	1206												8.2nF		8.2nF								

DARFON

■ Part Number & Characteristic

■ NP0 Series

● C1608NP0_A Series (EIA0603)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
100V	C1608NP0308□HTA	1V, 1MHz	0.30	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.25%	7" Paper 4 Kpcs
	C1608NP0408□HTA	1V, 1MHz	0.40	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.25%	
	C1608NP0508□HTA	1V, 1MHz	0.50	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0608□HTA	1V, 1MHz	0.60	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0708□HTA	1V, 1MHz	0.70	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0758□HTA	1V, 1MHz	0.75	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0808□HTA	1V, 1MHz	0.80	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0908□HTA	1V, 1MHz	0.90	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0109□HTA	1V, 1MHz	1.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0129□HTA	1V, 1MHz	1.2	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0159□HTA	1V, 1MHz	1.5	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0189□HTA	1V, 1MHz	1.8	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0209□HTA	1V, 1MHz	2.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0229□HTA	1V, 1MHz	2.2	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0249□HTA	1V, 1MHz	2.4	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0279□HTA	1V, 1MHz	2.7	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0309□HTA	1V, 1MHz	3.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0339□HTA	1V, 1MHz	3.3	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0399□HTA	1V, 1MHz	3.9	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0409□HTA	1V, 1MHz	4.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0439□HTA	1V, 1MHz	4.3	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0479□HTA	1V, 1MHz	4.7	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0509□HTA	1V, 1MHz	5.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0569□HTA	1V, 1MHz	5.6	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0609□HTA	1V, 1MHz	6.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0629□HTA	1V, 1MHz	6.2	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0689□HTA	1V, 1MHz	6.8	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0709□HTA	1V, 1MHz	7.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0829□HTA	1V, 1MHz	8.2	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.18%	
	C1608NP0909□HTA	1V, 1MHz	9.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.17%	
	C1608NP0919□HTA	1V, 1MHz	9.1	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.17%	
	C1608NP0100□HTA	1V, 1MHz	10	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.17%	
	C1608NP0110□HTA	1V, 1MHz	11	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.16%	
	C1608NP0120□HTA	1V, 1MHz	12	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.16%	
	C1608NP0150□HTA	1V, 1MHz	15	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.14%	
	C1608NP0180□HTA	1V, 1MHz	18	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.13%	
	C1608NP0200□HTA	1V, 1MHz	20	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.13%	
	C1608NP0220□HTA	1V, 1MHz	22	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.12%	
	C1608NP0240□HTA	1V, 1MHz	24	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.11%	
	C1608NP0270□HTA	1V, 1MHz	27	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.11%	
	C1608NP0300□HTA	1V, 1MHz	30	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0330□HTA	1V, 1MHz	33	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0360□HTA	1V, 1MHz	36	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0390□HTA	1V, 1MHz	39	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0430□HTA	1V, 1MHz	43	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0470□HTA	1V, 1MHz	47	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0560□HTA	1V, 1MHz	56	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0620□HTA	1V, 1MHz	62	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0680□HTA	1V, 1MHz	68	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0750□HTA	1V, 1MHz	75	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0820□HTA	1V, 1MHz	82	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0910□HTA	1V, 1MHz	91	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0101□HTA	1V, 1MHz	100	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0121□HTA	1V, 1MHz	120	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0151□HTA	1V, 1MHz	150	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0181□HTA	1V, 1MHz	180	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0201□HTA	1V, 1MHz	200	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0221□HTA	1V, 1MHz	220	pF	5%	0.80	±0.10	±0.10	0.10%	

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
100V	C1608NP0271□HTA	1V, 1MHz	270	pF	5%	0.80	±0.10	±0.10	0.10%	7" Paper 4 Kpcs
	C1608NP0331□HTA	1V, 1MHz	330	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0391□HTA	1V, 1MHz	390	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0471□HTA	1V, 1MHz	470	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0561□HTA	1V, 1MHz	560	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0681□HTA	1V, 1MHz	680	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0821□HTA	1V, 1MHz	820	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0102□HTA	1V, 1MHz	1.0	nF	5%	0.80	±0.10	±0.10	0.10%	
50V	C1608NP0308□GTA	1V, 1MHz	0.30	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.25%	7" Paper 4 Kpcs
	C1608NP0508□GTA	1V, 1MHz	0.50	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0758□GTA	1V, 1MHz	0.75	pF	±0.1pF,±0.05pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0109□GTA	1V, 1MHz	1.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0129□GTA	1V, 1MHz	1.2	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.24%	
	C1608NP0159□GTA	1V, 1MHz	1.5	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0189□GTA	1V, 1MHz	1.8	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0209□GTA	1V, 1MHz	2.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0229□GTA	1V, 1MHz	2.2	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.23%	
	C1608NP0249□GTA	1V, 1MHz	2.4	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0279□GTA	1V, 1MHz	2.7	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0309□GTA	1V, 1MHz	3.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.22%	
	C1608NP0339□GTA	1V, 1MHz	3.3	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0399□GTA	1V, 1MHz	3.9	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0409□GTA	1V, 1MHz	4.0	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.21%	
	C1608NP0479□GTA	1V, 1MHz	4.7	pF	±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0509□GTA	1V, 1MHz	5.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0569□GTA	1V, 1MHz	5.6	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.20%	
	C1608NP0609□GTA	1V, 1MHz	6.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0689□GTA	1V, 1MHz	6.8	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0709□GTA	1V, 1MHz	7.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.19%	
	C1608NP0829□GTA	1V, 1MHz	8.2	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.18%	
	C1608NP0909□GTA	1V, 1MHz	9.0	pF	±0.5pF,±0.25pF,±0.1pF	0.80	±0.10	±0.10	0.17%	
	C1608NP0100□GTA	1V, 1MHz	10	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.17%	
	C1608NP0110□GTA	1V, 1MHz	11	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.16%	
	C1608NP0120□GTA	1V, 1MHz	12	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.16%	
	C1608NP0150□GTA	1V, 1MHz	15	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.14%	
	C1608NP0180□GTA	1V, 1MHz	18	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.13%	
	C1608NP0200□GTA	1V, 1MHz	20	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.13%	
	C1608NP0220□GTA	1V, 1MHz	22	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.12%	
	C1608NP0240□GTA	1V, 1MHz	24	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.11%	
	C1608NP0270□GTA	1V, 1MHz	27	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.11%	
	C1608NP0300□GTA	1V, 1MHz	30	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0330□GTA	1V, 1MHz	33	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0360□GTA	1V, 1MHz	36	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0390□GTA	1V, 1MHz	39	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0430□GTA	1V, 1MHz	43	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0470□GTA	1V, 1MHz	47	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0560□GTA	1V, 1MHz	56	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0620□GTA	1V, 1MHz	62	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0680□GTA	1V, 1MHz	68	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0750□GTA	1V, 1MHz	75	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0820□GTA	1V, 1MHz	82	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0910□GTA	1V, 1MHz	91	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0101□GTA	1V, 1MHz	100	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	0.10%	
	C1608NP0121□GTA	1V, 1MHz	120	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0151□GTA	1V, 1MHz	150	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0181□GTA	1V, 1MHz	180	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0201□GTA	1V, 1MHz	200	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0221□GTA	1V, 1MHz	220	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0271□GTA	1V, 1MHz	270	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0331□GTA	1V, 1MHz	330	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0391□GTA	1V, 1MHz	390	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0471□GTA	1V, 1MHz	470	pF	5%	0.80	±0.10	±0.10	0.10%	

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF ,D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C1608NP0561□GTA	1V, 1MHz	560	pF	5%	0.80	±0.10	±0.10	0.10%	7" Paper 4 Kpcs
	C1608NP0681□GTA	1V, 1MHz	680	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0821□GTA	1V, 1MHz	820	pF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0102□GTA	1V, 1MHz	1.0	nF	5%	0.80	±0.10	±0.10	0.10%	
	C1608NP0122□GTA	1V, 1kHz	1.2	nF	5%	0.80	±0.10	±0.15	0.10%	
	C1608NP0152□GTA	1V, 1kHz	1.5	nF	5%	0.80	±0.10	±0.15	0.10%	
	C1608NP0182□GTA	1V, 1kHz	1.8	nF	5%	0.80	±0.10	±0.15	0.10%	
	C1608NP0222□GTA	1V, 1kHz	2.2	nF	5%	0.80	±0.10	±0.15	0.10%	

- C2012NP0_A Series (EIA0805)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
100V	C2012NP0100□HTA	1V, 1MHz	10	pF	±5%,±2%	0.60	±0.15	±0.15	0.17%	
	C2012NP0120□HTA	1V, 1MHz	12	pF	±5%,±2%	0.60	±0.15	±0.15	0.16%	
	C2012NP0150□HTA	1V, 1MHz	15	pF	±5%,±2%	0.60	±0.15	±0.15	0.14%	
	C2012NP0180□HTA	1V, 1MHz	18	pF	±5%,±2%	0.60	±0.15	±0.15	0.13%	
	C2012NP0200□HTA	1V, 1MHz	20	pF	±5%,±2%	0.60	±0.15	±0.15	0.13%	
	C2012NP0220□HTA	1V, 1MHz	22	pF	±5%,±2%	0.60	±0.15	±0.15	0.12%	
	C2012NP0240□HTA	1V, 1MHz	24	pF	±5%,±2%	0.60	±0.15	±0.15	0.11%	
	C2012NP0270□HTA	1V, 1MHz	27	pF	±5%,±2%	0.60	±0.15	±0.15	0.11%	
	C2012NP0300□HTA	1V, 1MHz	30	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0330□HTA	1V, 1MHz	33	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0360□HTA	1V, 1MHz	36	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0390□HTA	1V, 1MHz	39	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0430□HTA	1V, 1MHz	43	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0470□HTA	1V, 1MHz	47	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0560□HTA	1V, 1MHz	56	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0620□HTA	1V, 1MHz	62	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0680□HTA	1V, 1MHz	68	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0750□HTA	1V, 1MHz	75	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0820□HTA	1V, 1MHz	82	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0101□HTA	1V, 1MHz	100	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0121□HTA	1V, 1MHz	120	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0151□HTA	1V, 1MHz	150	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0181□HTA	1V, 1MHz	180	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0201□HTA	1V, 1MHz	200	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0221□HTA	1V, 1MHz	220	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0271□HTA	1V, 1MHz	270	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0331□HTA	1V, 1MHz	330	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0391□HTA	1V, 1MHz	390	pF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0471□HTA	1V, 1MHz	470	pF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0561□HTA	1V, 1MHz	560	pF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0681□HTA	1V, 1MHz	680	pF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0821□HTA	1V, 1MHz	820	pF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0102□HTA	1V, 1MHz	1.0	nF	5%	0.85	±0.15	±0.15	0.10%	

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C2012NP0100□GTA	1V, 1MHz	10	pF	±5%,±2%	0.60	±0.15	±0.15	0.17%	7" Paper 4 Kpcs
	C2012NP0120□GTA	1V, 1MHz	12	pF	±5%,±2%	0.60	±0.15	±0.15	0.16%	
	C2012NP0150□GTA	1V, 1MHz	15	pF	±5%,±2%	0.60	±0.15	±0.15	0.14%	
	C2012NP0180□GTA	1V, 1MHz	18	pF	±5%,±2%	0.60	±0.15	±0.15	0.13%	
	C2012NP0200□GTA	1V, 1MHz	20	pF	±5%,±2%	0.60	±0.15	±0.15	0.13%	
	C2012NP0220□GTA	1V, 1MHz	22	pF	±5%,±2%	0.60	±0.15	±0.15	0.12%	
	C2012NP0270□GTA	1V, 1MHz	27	pF	±5%,±2%	0.60	±0.15	±0.15	0.11%	
	C2012NP0300□GTA	1V, 1MHz	30	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0330□GTA	1V, 1MHz	33	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0360□GTA	1V, 1MHz	36	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0470□GTA	1V, 1MHz	47	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0680□GTA	1V, 1MHz	68	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0820□GTA	1V, 1MHz	82	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0101□GTA	1V, 1MHz	100	pF	±5%,±2%	0.60	±0.15	±0.15	0.10%	
	C2012NP0121□GTA	1V, 1MHz	120	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0151□GTA	1V, 1MHz	150	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0201□GTA	1V, 1MHz	200	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0221□GTA	1V, 1MHz	220	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0271□GTA	1V, 1MHz	270	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0331□GTA	1V, 1MHz	330	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0391□GTA	1V, 1MHz	390	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0471□GTA	1V, 1MHz	470	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0561□GTA	1V, 1MHz	560	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0681□GTA	1V, 1MHz	680	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0821□GTA	1V, 1MHz	820	pF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0102□GTA	1V, 1MHz	1.0	nF	5%	0.60	±0.15	±0.15	0.10%	
	C2012NP0122□GTA	1V, 1kHz	1.2	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0152□GTA	1V, 1kHz	1.5	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0182□GTA	1V, 1kHz	1.8	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0222□GTA	1V, 1kHz	2.2	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0272□GTA	1V, 1kHz	2.7	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0332□GTA	1V, 1kHz	3.3	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0392□GTA	1V, 1kHz	3.9	nF	5%	0.85	±0.15	±0.15	0.10%	
	C2012NP0472□GTA	1V, 1kHz	4.7	nF	5%	0.85	±0.15	±0.15	0.10%	

- C3216NP0_A Series (EIA1206)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C3216NP0100□GTA	1V, 1MHz	10	pF	±5%	0.85	±0.15	±0.15	0.17%	7" Paper 4 Kpcs
	C3216NP0120□GTA	1V, 1MHz	12	pF	±5%	0.85	±0.15	±0.15	0.16%	
	C3216NP0150□GTA	1V, 1MHz	15	pF	±5%	0.85	±0.15	±0.15	0.14%	
	C3216NP0180□GTA	1V, 1MHz	18	pF	±5%	0.85	±0.15	±0.15	0.13%	
	C3216NP0220□GTA	1V, 1MHz	22	pF	±5%	0.85	±0.15	±0.15	0.12%	
	C3216NP0270□GTA	1V, 1MHz	27	pF	±5%	0.85	±0.15	±0.15	0.11%	
	C3216NP0330□GTA	1V, 1MHz	33	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0390□GTA	1V, 1MHz	39	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0470□GTA	1V, 1MHz	47	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0560□GTA	1V, 1MHz	56	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0680□GTA	1V, 1MHz	68	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0820□GTA	1V, 1MHz	82	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0101□GTA	1V, 1MHz	100	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0121□GTA	1V, 1MHz	120	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0151□GTA	1V, 1MHz	150	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0181□GTA	1V, 1MHz	180	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0221□GTA	1V, 1MHz	220	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0271□GTA	1V, 1MHz	270	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0331□GTA	1V, 1MHz	330	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0391□GTA	1V, 1MHz	390	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0471□GTA	1V, 1MHz	470	pF	±5%	0.85	±0.15	±0.15	0.10%	

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF ,D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C3216NP0561□GTA	1V, 1MHz	560	pF	±5%	0.85	±0.15	±0.15	0.10%	7" Paper 4 Kpcs
	C3216NP0681□GTA	1V, 1MHz	680	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0821□GTA	1V, 1MHz	820	pF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0102□GTA	1V, 1MHz	1.0	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0122□GTA	1V, 1kHz	1.2	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0152□GTA	1V, 1kHz	1.5	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0182□GTA	1V, 1kHz	1.8	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0222□GTA	1V, 1kHz	2.2	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0272□GTA	1V, 1kHz	2.7	nF	±5%	0.85	±0.15	±0.15	0.10%	
	C3216NP0332□GTA	1V, 1kHz	3.3	nF	±5%	0.85	±0.15	±0.15	0.10%	

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF ,D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

■ X7R Series

● C1005X7R_A Series (EIA0402)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
16V	C1005X7R101□ETA	1V , 1kHz	100	pF	±10%	0.50	±0.05	±0.05	5.0%	7" Paper 10 Kpcs
	C1005X7R121□ETA	1V , 1kHz	120	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R151□ETA	1V , 1kHz	150	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R181□ETA	1V , 1kHz	180	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R221□ETA	1V , 1kHz	220	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R271□ETA	1V , 1kHz	270	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R331□ETA	1V , 1kHz	330	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R391□ETA	1V , 1kHz	390	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R471□ETA	1V , 1kHz	470	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R561□ETA	1V , 1kHz	560	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R681□ETA	1V , 1kHz	680	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R821□ETA	1V , 1kHz	820	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R102□ETA	1V , 1kHz	1.0	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R122□ETA	1V , 1kHz	1.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R152□ETA	1V , 1kHz	1.5	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R182□ETA	1V , 1kHz	1.8	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R222□ETA	1V , 1kHz	2.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R272□ETA	1V , 1kHz	2.7	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R332□ETA	1V , 1kHz	3.3	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R392□ETA	1V , 1kHz	3.9	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R472□ETA	1V , 1kHz	4.7	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R562□ETA	1V , 1kHz	5.6	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R682□ETA	1V , 1kHz	6.8	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R822□ETA	1V , 1kHz	8.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R103□ETA	1V , 1kHz	10	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R123□ETA	1V , 1kHz	12	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R153□ETA	1V , 1kHz	15	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R183□ETA	1V , 1kHz	18	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R223□ETA	1V , 1kHz	22	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R273□ETA	1V , 1kHz	27	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R333□ETA	1V , 1kHz	33	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R393□ETA	1V , 1kHz	39	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R473□ETA	1V , 1kHz	47	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R563□ETA	1V , 1kHz	56	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R683□ETA	1V , 1kHz	68	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R823□ETA	1V , 1kHz	82	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R104□ETA	1V , 1kHz	100	nF	±10%	0.50	±0.05	±0.05	5.0%	

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
10V	C1005X7R101□DTA	1V , 1kHz	100	pF	±10%	0.50	±0.05	±0.05	5.0%	7" Paper 10 Kpcs
	C1005X7R121□DTA	1V , 1kHz	120	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R151□DTA	1V , 1kHz	150	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R181□DTA	1V , 1kHz	180	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R221□DTA	1V , 1kHz	220	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R271□DTA	1V , 1kHz	270	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R331□DTA	1V , 1kHz	330	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R391□DTA	1V , 1kHz	390	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R471□DTA	1V , 1kHz	470	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R561□DTA	1V , 1kHz	560	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R681□DTA	1V , 1kHz	680	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R821□DTA	1V , 1kHz	820	pF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R102□DTA	1V , 1kHz	1.0	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R122□DTA	1V , 1kHz	1.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R152□DTA	1V , 1kHz	1.5	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R182□DTA	1V , 1kHz	1.8	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R222□DTA	1V , 1kHz	2.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R272□DTA	1V , 1kHz	2.7	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R332□DTA	1V , 1kHz	3.3	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R392□DTA	1V , 1kHz	3.9	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R472□DTA	1V , 1kHz	4.7	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R562□DTA	1V , 1kHz	5.6	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R682□DTA	1V , 1kHz	6.8	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R822□DTA	1V , 1kHz	8.2	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R103□DTA	1V , 1kHz	10	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R123□DTA	1V , 1kHz	12	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R153□DTA	1V , 1kHz	15	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R183□DTA	1V , 1kHz	18	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R223□DTA	1V , 1kHz	22	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R273□DTA	1V , 1kHz	27	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R333□DTA	1V , 1kHz	33	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R393□DTA	1V , 1kHz	39	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R473□DTA	1V , 1kHz	47	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R563□DTA	1V , 1kHz	56	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R683□DTA	1V , 1kHz	68	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R823□DTA	1V , 1kHz	82	nF	±10%	0.50	±0.05	±0.05	5.0%	
	C1005X7R104□DTA	1V , 1kHz	100	nF	±10%	0.50	±0.05	±0.05	5.0%	

- C1608X7R_A Series (EIA0603)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
25V	C1608X7R101□FTA	1V , 1kHz	100	pF	±10%	0.80	±0.10	±0.10	3.5%	7" Paper 4 Kpcs
	C1608X7R121□FTA	1V , 1kHz	120	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R151□FTA	1V , 1kHz	150	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R181□FTA	1V , 1kHz	180	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R221□FTA	1V , 1kHz	220	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R271□FTA	1V , 1kHz	270	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R331□FTA	1V , 1kHz	330	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R391□FTA	1V , 1kHz	390	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R471□FTA	1V , 1kHz	470	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R561□FTA	1V , 1kHz	560	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R681□FTA	1V , 1kHz	680	pF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R821□FTA	1V , 1kHz	820	pF	±10%	0.80	±0.10	±0.10	3.5%	

□ Tolerance Code: J=±5%, K=±10%, M=±20%; Special tolerance on the request.

DARFON

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
25V	C1608X7R102□FTA	1V , 1kHz	1.0	nF	±10%	0.80	±0.10	±0.10	3.5%	7" Paper 4 Kpcs
	C1608X7R122□FTA	1V , 1kHz	1.2	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R152□FTA	1V , 1kHz	1.5	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R182□FTA	1V , 1kHz	1.8	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R222□FTA	1V , 1kHz	2.2	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R272□FTA	1V , 1kHz	2.7	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R332□FTA	1V , 1kHz	3.3	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R392□FTA	1V , 1kHz	3.9	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R472□FTA	1V , 1kHz	4.7	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R562□FTA	1V , 1kHz	5.6	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R682□FTA	1V , 1kHz	6.8	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R822□FTA	1V , 1kHz	8.2	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R103□FTA	1V , 1kHz	10	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R123□FTA	1V , 1kHz	12	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R153□FTA	1V , 1kHz	15	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R183□FTA	1V , 1kHz	18	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R223□FTA	1V , 1kHz	22	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R273□FTA	1V , 1kHz	27	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R333□FTA	1V , 1kHz	33	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R393□FTA	1V , 1kHz	39	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R473□FTA	1V , 1kHz	47	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R563□FTA	1V , 1kHz	56	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R683□FTA	1V , 1kHz	68	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R823□FTA	1V , 1kHz	82	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R104□FTA	1V , 1kHz	100	nF	±10%	0.80	±0.10	±0.10	3.5%	
	C1608X7R224□FTA	1V , 1kHz	220	nF	±10%	0.80	±0.15	±0.15	3.5%	
16V	C1608X7R102□ETA	1V , 1kHz	1.0	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R122□ETA	1V , 1kHz	1.2	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R152□ETA	1V , 1kHz	1.5	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R182□ETA	1V , 1kHz	1.8	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R222□ETA	1V , 1kHz	2.2	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R272□ETA	1V , 1kHz	2.7	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R332□ETA	1V , 1kHz	3.3	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R392□ETA	1V , 1kHz	3.9	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R472□ETA	1V , 1kHz	4.7	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R562□ETA	1V , 1kHz	5.6	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R682□ETA	1V , 1kHz	6.8	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R822□ETA	1V , 1kHz	8.2	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R103□ETA	1V , 1kHz	10	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R123□ETA	1V , 1kHz	12	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R153□ETA	1V , 1kHz	15	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R183□ETA	1V , 1kHz	18	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R223□ETA	1V , 1kHz	22	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R273□ETA	1V , 1kHz	27	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R333□ETA	1V , 1kHz	33	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R393□ETA	1V , 1kHz	39	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R473□ETA	1V , 1kHz	47	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R563□ETA	1V , 1kHz	56	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R683□ETA	1V , 1kHz	68	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R823□ETA	1V , 1kHz	82	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R104□ETA	1V , 1kHz	100	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R224□ETA	1V , 1kHz	220	nF	±10%	0.80	±0.15	±0.15	5.0%	
10V	C1608X7R103□DTA	1V , 1kHz	10	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R123□DTA	1V , 1kHz	12	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R153□DTA	1V , 1kHz	15	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R183□DTA	1V , 1kHz	18	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R223□DTA	1V , 1kHz	22	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R273□DTA	1V , 1kHz	27	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R333□DTA	1V , 1kHz	33	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R393□DTA	1V , 1kHz	39	nF	±10%	0.80	±0.10	±0.10	5.0%	

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
10V	C1608X7R473□DTA	1V , 1kHz	47	nF	±10%	0.80	±0.10	±0.10	5.0%	7" Paper 4 Kpcs
	C1608X7R563□DTA	1V , 1kHz	56	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R683□DTA	1V , 1kHz	68	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R823□DTA	1V , 1kHz	82	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R104□DTA	1V , 1kHz	100	nF	±10%	0.80	±0.10	±0.10	5.0%	
	C1608X7R224□DTA	1V , 1kHz	220	nF	±10%	0.80	±0.15	±0.15	5.0%	

- C2012X7R_A Series (EIA0805)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
200V	C2012X7R181□JTA	1V , 1kHz	180	pF	±10%	0.85	±0.15	±0.15	2.5%	7" Paper 4 Kpcs
	C2012X7R221□JTA	1V , 1kHz	220	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R271□JTA	1V , 1kHz	270	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R331□JTA	1V , 1kHz	330	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R391□JTA	1V , 1kHz	390	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R471□JTA	1V , 1kHz	470	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R561□JTA	1V , 1kHz	560	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R681□JTA	1V , 1kHz	680	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R821□JTA	1V , 1kHz	820	pF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R102□JTA	1V , 1kHz	1.0	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R122□JTA	1V , 1kHz	1.2	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R152□JTA	1V , 1kHz	1.5	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R182□JTA	1V , 1kHz	1.8	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R222□JTA	1V , 1kHz	2.2	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R272□JTA	1V , 1kHz	2.7	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R332□JTA	1V , 1kHz	3.3	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R392□JTA	1V , 1kHz	3.9	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R472□JTA	1V , 1kHz	4.7	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R562□JPA	1V , 1kHz	5.6	nF	±10%	1.25	±0.15	±0.20	2.5%	7" Embossed 3 Kpcs
	C2012X7R682□JPA	1V , 1kHz	6.8	nF	±10%	1.25	±0.15	±0.20	2.5%	
	C2012X7R822□JPA	1V , 1kHz	8.2	nF	±10%	1.25	±0.15	±0.20	2.5%	
	C2012X7R103□JPA	1V , 1kHz	10	nF	±10%	1.25	±0.15	±0.20	2.5%	
	C2012X7R123□JPA	1V , 1kHz	12	nF	±10%	1.25	±0.15	±0.20	2.5%	
50V	C2012X7R151□GTA	1V , 1kHz	150	pF	±10%	0.60	±0.15	±0.15	2.5%	7" Paper 4 Kpcs
	C2012X7R181□GTA	1V , 1kHz	180	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R221□GTA	1V , 1kHz	220	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R271□GTA	1V , 1kHz	270	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R331□GTA	1V , 1kHz	330	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R391□GTA	1V , 1kHz	390	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R471□GTA	1V , 1kHz	470	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R561□GTA	1V , 1kHz	560	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R681□GTA	1V , 1kHz	680	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R821□GTA	1V , 1kHz	820	pF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R102□GTA	1V , 1kHz	1.0	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R122□GTA	1V , 1kHz	1.2	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R152□GTA	1V , 1kHz	1.5	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R182□GTA	1V , 1kHz	1.8	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R222□GTA	1V , 1kHz	2.2	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R272□GTA	1V , 1kHz	2.7	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R332□GTA	1V , 1kHz	3.3	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R392□GTA	1V , 1kHz	3.9	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R472□GTA	1V , 1kHz	4.7	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R562□GTA	1V , 1kHz	5.6	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R682□GTA	1V , 1kHz	6.8	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R822□GTA	1V , 1kHz	8.2	nF	±10%	0.60	±0.15	±0.15	2.5%	

□ Tolerance Code: J=±5%, K=±10%, M=±20%; Special tolerance on the request.

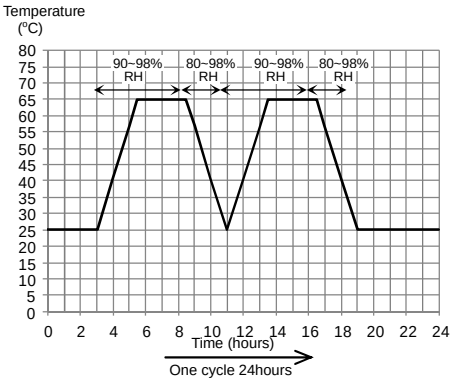
RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C2012X7R103□GTA	1V , 1kHz	10	nF	±10%	0.60	±0.15	±0.15	2.5%	7" Paper 4 Kpcs
	C2012X7R123□GTA	1V , 1kHz	12	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R153□GTA	1V , 1kHz	15	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R183□GTA	1V , 1kHz	18	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R223□GTA	1V , 1kHz	22	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R273□GTA	1V , 1kHz	27	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R333□GTA	1V , 1kHz	33	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R393□GTA	1V , 1kHz	39	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R473□GTA	1V , 1kHz	47	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R563□GTA	1V , 1kHz	56	nF	±10%	0.60	±0.15	±0.15	2.5%	
	C2012X7R683□GTA	1V , 1kHz	68	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R823□GTA	1V , 1kHz	82	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R104□GTA	1V , 1kHz	100	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R124□GTA	1V , 1kHz	120	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R154□GTA	1V , 1kHz	150	nF	±10%	0.85	±0.15	±0.15	2.5%	
	C2012X7R184□GTA	1V , 1kHz	180	nF	±10%	0.85	±0.15	±0.15	3.0%	
	C2012X7R224□GTA	1V , 1kHz	220	nF	±10%	0.85	±0.15	±0.15	3.0%	
	C2012X7R274□GTA	1V , 1kHz	270	nF	±10%	0.85	±0.15	±0.15	3.0%	
	C2012X7R334□GPA	1V , 1kHz	330	nF	±10%	1.25	±0.15	±0.20	3.0%	7" Embossed 3 Kpcs
	C2012X7R474□GPA	1V , 1kHz	470	nF	±10%	1.25	±0.15	±0.20	3.0%	
25V	C2012X7R103□FTA	1V , 1kHz	10	nF	±10%	0.60	±0.15	±0.15	3.5%	7" Paper 4 Kpcs
	C2012X7R123□FTA	1V , 1kHz	12	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R153□FTA	1V , 1kHz	15	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R183□FTA	1V , 1kHz	18	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R223□FTA	1V , 1kHz	22	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R273□FTA	1V , 1kHz	27	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R333□FTA	1V , 1kHz	33	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R393□FTA	1V , 1kHz	39	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R473□FTA	1V , 1kHz	47	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R563□FTA	1V , 1kHz	56	nF	±10%	0.60	±0.15	±0.15	3.5%	
	C2012X7R683□FTA	1V , 1kHz	68	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R823□FTA	1V , 1kHz	82	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R104□FTA	1V , 1kHz	100	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R124□FTA	1V , 1kHz	120	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R154□FTA	1V , 1kHz	150	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R184□FTA	1V , 1kHz	180	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R224□FTA	1V , 1kHz	220	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R274□FTA	1V , 1kHz	270	nF	±10%	0.85	±0.15	±0.15	3.5%	
	C2012X7R334□FPA	1V , 1kHz	330	nF	±10%	1.25	±0.15	±0.20	3.5%	7" Embossed 3 Kpcs
	C2012X7R394□FPA	1V , 1kHz	390	nF	±10%	1.25	±0.15	±0.20	3.5%	
	C2012X7R474□FPA	1V , 1kHz	470	nF	±10%	1.25	±0.15	±0.20	3.5%	
16V	C2012X7R104□ETA	1V , 1kHz	100	nF	±10%	0.85	±0.15	±0.15	5.0%	7" Paper 4 Kpcs
	C2012X7R124□ETA	1V , 1kHz	120	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R154□ETA	1V , 1kHz	150	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R184□ETA	1V , 1kHz	180	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R224□ETA	1V , 1kHz	220	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R274□ETA	1V , 1kHz	270	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R334□EPA	1V , 1kHz	330	nF	±10%	1.25	±0.15	±0.20	5.0%	7" Embossed 3 Kpcs
	C2012X7R394□EPA	1V , 1kHz	390	nF	±10%	1.25	±0.15	±0.20	5.0%	
	C2012X7R474□EPA	1V , 1kHz	470	nF	±10%	1.25	±0.15	±0.20	5.0%	
10V	C2012X7R224□DTA	1V , 1kHz	220	nF	±10%	0.85	±0.15	±0.15	5.0%	7" Paper 4 Kpcs
	C2012X7R274□DTA	1V , 1kHz	270	nF	±10%	0.85	±0.15	±0.15	5.0%	
	C2012X7R334□DPA	1V , 1kHz	330	nF	±10%	1.25	±0.15	±0.20	5.0%	7" Embossed 3 Kpcs
	C2012X7R394□DPA	1V , 1kHz	390	nF	±10%	1.25	±0.15	±0.20	5.0%	
	C2012X7R474□DPA	1V , 1kHz	470	nF	±10%	1.25	±0.15	±0.20	5.0%	

- C3216X7R_A Series (EIA1206)

RV	DARFON P/N	Measuring Condition	Capacitance		Available Tolerance	Thick. (mm)	Tolerance(mm)		DF (max.)	Standard Packing
			Value	Unit			L/W	Thick.		
50V	C3216X7R822□GTA	1V , 1kHz	8.2	nF	±10%	0.85	±0.15	±0.10	3.5%	7" Paper 4 Kpcs

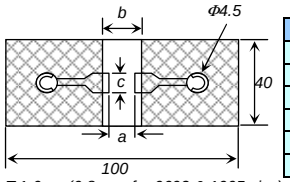
□ Tolerance Code: J=±5%, K=±10%, M=±20%; Special tolerance on the request.

Test Spec.

	AEC-Q200 Test Item		Specification		AEC-Q200 Test Method
			Temp. compensation type	High dielectric constant type	
1	Pre- and Post-Stress Electrical Test		---		---
2	High Temperature Exposure (Storage)	Appearance	No marking defects		Set the capacitor at 150±3℃ for 1000±12 hours, let sit for 24±2 hours at room temperature, then measure.
		Cap. Change	NP0 within ±2.5% or 0.25pF (whichever is larger)	X7R within ±10.0%	
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: 200% max of initial spec.	
		I.R.	I.R.≧1,000MΩ or R_iC_R≧50Ω-F. (whichever is smaller)		
3	Temperature Cycle (Thermal shock)	Appearance	No marking defects		Solder the capacitor to supporting jig (Glass epoxy board) and perform 1000 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 15±3min Step 2: Room temperature 1 min Step 3: Maximum operating temperature 15±3min Step 4: Room temperature 1 min *High dielectric constant type: Initial measurement: perform a heat treatment at 150±10℃ for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.
		Cap. Change	NP0 within ±2.5% or 0.25pF (whichever is larger)	X7R within ±10.0%	
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
4	Destructive Physical Analysis		No defects or abnormalities		Per EIA-469
5	Moisture Resistance	Appearance	No marking defects		Perform 10 cycles of the 24-hour heat (25 to 65℃) and humidity (80 to 98%) treatments as shown below. Let sit for 24±2hrs at room temperature, then measure.  Initial measurement: perform a heat treatment at 150±10℃ for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.
		Cap. Change	NP0 within ±3.0% or 0.30pF (whichever is larger)	X7R within ±12.5%	
		Q/D.F.	If C<10pF, DF≦1/(200+10C) If 10pF≦C≦30pF, DF≦1/(275+5C/2) If C >30pF, DF≦0.285%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
6	Biased Humidity	Appearance	No marking defects		Apply 100% and 150% of the rated voltage at 85±3℃ and 80 to 85% humidity for 1000±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℃ for one hou r and then let sit for 24±2 hours at room temperature. Perform the initial measurement.
		Cap. Change	NP0 within ±3.0% or 0.30pF (whichever is larger)	X7R within ±12.5%	
		Q/D.F.	If C<30pF, DF≦1/(100+10C/3) If C >30pF, DF≦0.5%	X7R: 200% max of initial spec.	
		I.R.	I.R.≧500MΩ or R_iC_R≧25Ω-F. (whichever is smaller)		

AEC-Q200 Test Item			Specification		Test Method
			Temp. compensation type	High dielectric constant type	
7	Operational Life	Appearance	No marking defects		Apply 100% of the rated voltage for 1000±12 hours at the maximum operating temperature ± 3℃. 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 Apply 200% of the rated DC voltage for one hour at the maximum operating temperature ± 3℃. Remove and let sit for 24±2 hours at room temperature. Perform the initial measurement.
		Cap. Change	NP0 within ±3.0% or 0.30pF (whichever is larger)	X7R within ±12.5%	
		Q/D.F.	If C<10pF, DF≦1/(200+10C) If 10pF≦C≦30pF, DF≦1/(275+5C/2) If C >30pF, DF≦0.285%	X7R: 200% max of initial spec.	
		I.R.	I.R.≧1,000MΩ or R_iC_R≧50Ω-F. (whichever is smaller)		
8	External Visual		No defects or abnormalities		Visual inspection
9	Physical Dimension		Within the specified dimensions		Using calipers
10	Resistance to Solvents	Appearance	No marking defects		Per MIL-STD-202 Method 215 Solvent 1: 1 part (by volume) of isopropyl alcohol 3 parts (by volume) of mineral spirits Solvent 2: Terpene defluxer Solvent 3: 42 parts (by volume) of water 1 part (by volume) of propylene glycol monomethylether 1 part (by volume) of monoethanolomine
		Cap. Change	Within the specified tolerance		
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
11	Mechanical Shock	Appearance	No marking defects		Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks). The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1500g and velocity change: 4.7m/s.
		Cap. Change	Within the specified tolerance		
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
12	Vibration	Appearance	No marking defects		Solder the capacitor to supporting jig (Glass epoxy board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2000Hz. The frequency range, from 10 to 2000Hz and return to 10Hz, should be traversed in approximately 20 minutes. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total 36 times).
		Cap. Change	Within the specified tolerance		
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
13	Resistance to Soldering Heat	Appearance	No marking defects		*Preheat the capacitor at 120 to 150℃ for 1 minute. Immerse the capacitor in a SAC305(Sn96.5Ag3.0Cu0.5) solder solution at 260±5℃ for 10±1 seconds. Let sit at room temperature for 24±2 hours, then measure. * Preheat 150 to 200℃ for size≧3216. *High dielectric constant type: Initial measurement : perform a heat treatment at 150+0/-10℃ for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.
		Cap. Change	NP0 within ±3.0% or 0.30pF (whichever is larger)	X7R within ±12.5%	
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		

AEC-Q200 Test Item			Specification		Test Method
			Temp. compensation type	High dielectric constant type	
14	ESD	Appearance	No marking defects		Per AEC-Q200-002
		Cap. Change	Within the specified tolerance		
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		
15	Solderability of Termination		95% of the terminations are to be soldered evenly and continuously.		(a) Preheat at 155℃ for 4 hours. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 5+0/-0.5 seconds at 235±5℃. (b) Should be placed into steam aging for 8 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 5+0/-0.5 seconds at 235±5℃ (c) Should be placed into steam aging for 8 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 120±5 seconds at 260±5℃
16	Electrical Characterization	Appearance	No marking defects		The capacitance / D.F. shall be measured at 25℃ at the frequency and voltage shown in the table of "Part Number & Characteristic".
		Cap. Change	Within the specified tolerance		
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R. 25℃	I.R.≧100,000MΩ or R_iC_R≧1000Ω-F. (whichever is smaller)	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)	The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25℃ and 125℃, within 1 minute of charging.
		Dielectric Strength	No failure		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.
17	Board Flex	Appearance	No marking defects		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 X7R). Then apply a force in the direction shown in Fig.b for 5±1sec. 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.
		Cap. Change	NP0 within ±5.0% or 0.5pF (whichever is larger)	X7R within ±10.0%	
		Q/D.F.	If C≦30pF, DF≦1/(400+20C) If C >30pF, DF≦0.1%	X7R: To satisfy the specified initial spec	
		I.R.	I.R.≧10,000MΩ or R_iC_R≧500Ω-F. (whichever is smaller)		



T:1.6mm(0.8 mm for 0603 & 1005 size)

Fig. a.

Size	a	b	c
0603	0.3	0.9	0.3
1005	0.5	1.5	0.6
1608	0.6	2.2	0.9
2012	0.8	3.0	1.3
3216	2.0	4.4	1.7
3225	2.0	4.4	2.6

(Unit in mm)

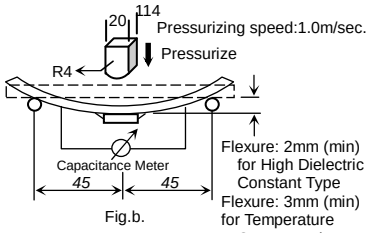
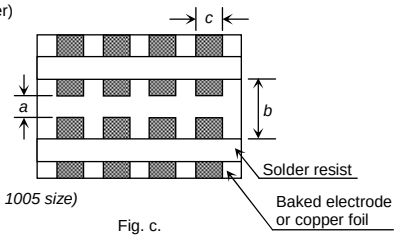


Fig.b.

<table>
<tr><th colspan="3" rowspan="2">AEC-Q200
Test Item</th><th colspan="2">Specification</th><th rowspan="2">Test Method</th></tr>
<tr><th>Temp. compensation type</th><th>High dielectric constant type</th></tr>
<tr><td rowspan="4">18</td><td rowspan="4">Terminal Strength</td><td>Appearance</td><td colspan="2">No marking defects</td><td rowspan="4">Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.c using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X7R).
Then apply *18N force in the direction parallel to the testing jig for 60sec. 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.
*2N for 0603 & 1005 size
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
3225 | 2.2 | 5.0 | 2.9
(Unit in mm)</td></tr>
<tr><td>Cap. Change</td><td colspan="2">Within the specified tolerance</td></tr>
<tr><td>Q/D.F.</td><td>If C≦30pF, DF≦1/(400+20C)
If C >30pF, DF≦0.1%</td><td>X7R:
To satisfy the specified initial spec</td></tr>
<tr><td>I.R.</td><td colspan="2">I.R.≧10,000MΩ or R_iC_R≧500Ω-F.
(whichever is smaller)
 

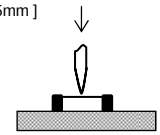
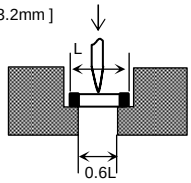
T:1.6mm
(0.8 mm for 0603 & 1005 size)
Fig. c.</td></tr>
<tr><td>19</td><td colspan="2">Beam Load Test</td><td colspan="2">Destruction value should exceed the following:
[Chip L dimension <2.5mm]
Chip T thickness > 0.5mm: 20N
Chip T thickness≦0.5mm: 8N
[Chip L dimension <3.2mm]
Chip T thickness≧1.25mm: 54.5N
Chip T thickness < 1.25mm: 15N</td><td>Place the capacitor in the beam load fixture as Fig. d and apply a force.
[Chip L dimension <2.5mm]
 
[Chip L dimension <3.2mm]
 

Fig. d.
Speed supplied the Stress Load: *0.5mm/sec.
*0.1mm/sec. for 0603 size</td></tr>
<tr><td>20</td><td colspan="2">Capacitance Temperature Characteristics</td><td>Capacitance change
NP0 within 0±30ppm/℃ under operating temperature range.</td><td>Capacitance change
X7R within ±15%</td><td>1.Temperature compensation type:
The capacitance value at 25℃ and 85℃ shall be measured and calculated from the formula given below.
T.C.=(C_{85}-C_{25})/C_{25}*ΔT*10^6(PPM/℃)
2.High dielectric constant type:
The ranges of capacitance change compared with the 25℃ value over the temperature ranges shall be within the specified ranges.</td></tr>
</table>

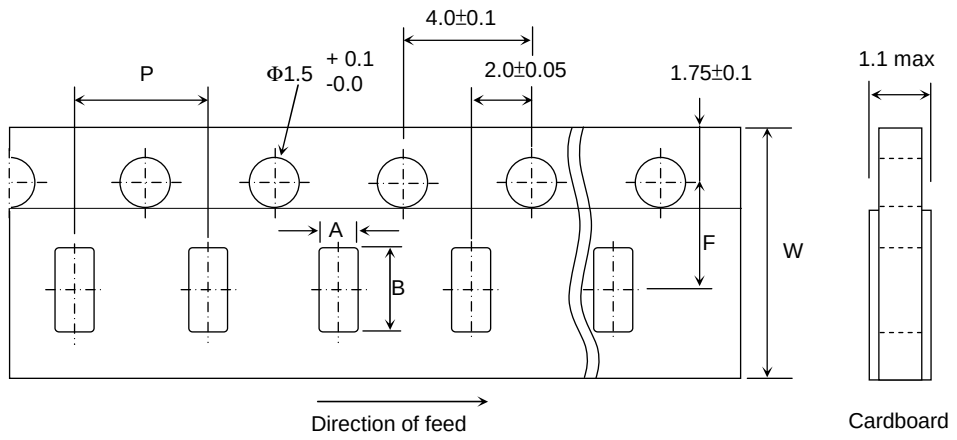
Package

- **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】

2mm and 4mm pitch tape

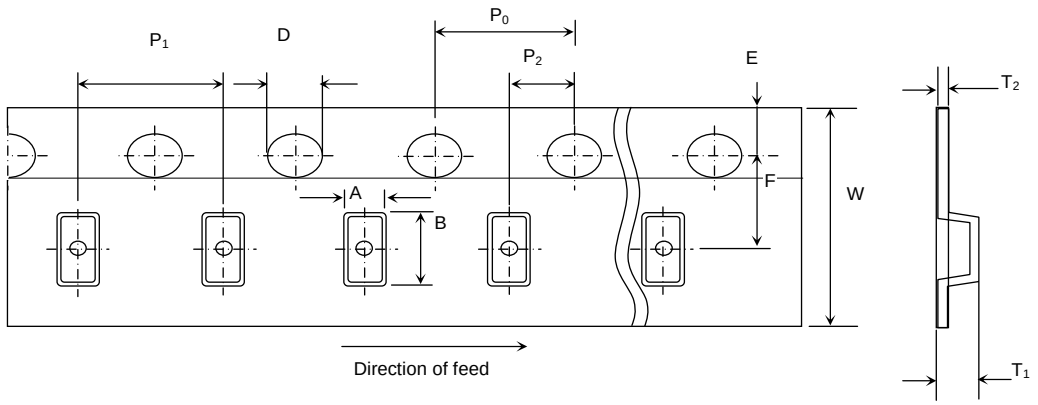


SYMBOL	PRODUCT SIZE CODE												UNIT
	0402(01005)		0603(0201)		1005(0402) (±0.05 mm)		1005(0402) (±0.10 mm)		1005(0402) (±0.15 mm)		1005(0402) (±0.20 mm)		
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	
A	0.23	± 0.02	0.38	± 0.04	0.65	± 0.10	0.70	± 0.10	0.72	± 0.10	0.80	± 0.10	mm
B	0.43	± 0.02	0.68	± 0.04	1.15	± 0.10	1.19	± 0.10	1.25	± 0.10	1.35	± 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	± 0.05	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
	1608 (0603) (±0.15 mm)		1608 (0603) (±0.20 mm)		2012 (0805)		3216 (1206)		
	Size	Tol.	Size	Tol.	Size	Tol.	Size	Tol.	
A	1.0	±0.2	1.1	±0.2	1.5	±0.2	1.9	±0.2	mm
B	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	mm
P	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	mm

【Embossed tape specifications】

1mm and 4mm and 8mm pitch tape

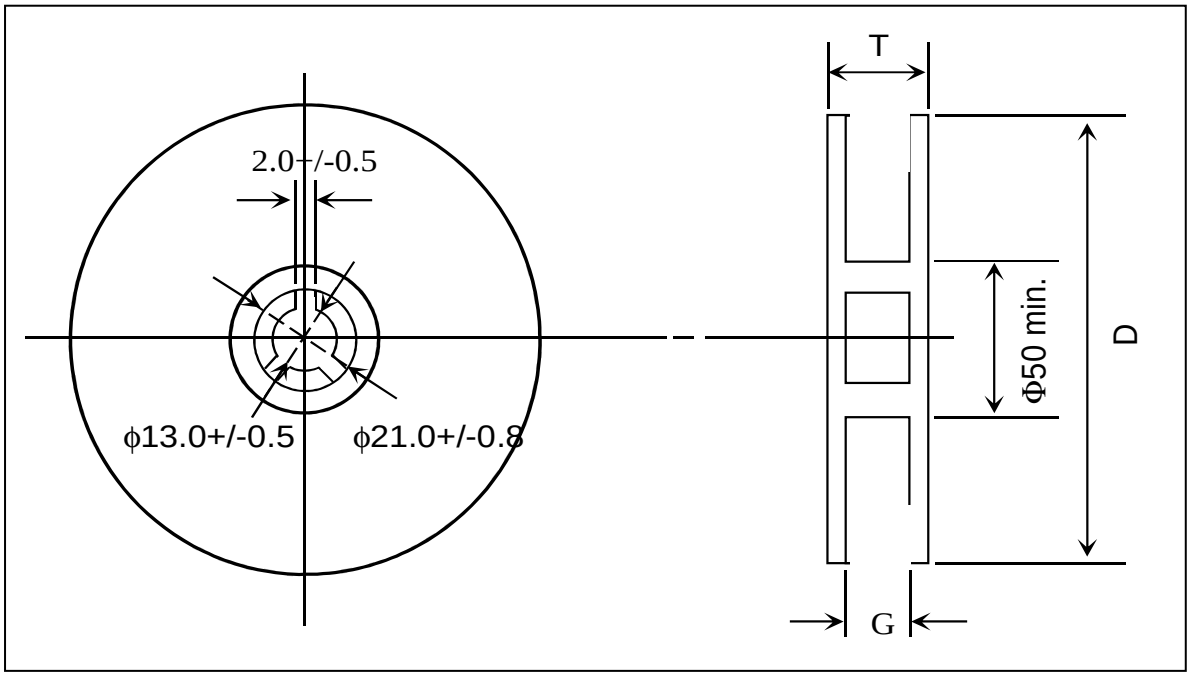


For W= 8mm: T_1=2.5mm max.

For W= 12mm: T_1= 4.5mm

DIMENSION (mm)		PRODUCT SIZE CODE					
	1mm tape	4 mm tape				8 mm tape	
	0402 (01005)	1608 (0603)	2012 (0805)	3216 (1206)	3225 (1210)	4520 (1808)	4532 (1812)
P_1	1±0.02	4±0.1	4±0.1	4±0.1	4±0.1	8±0.1	8±0.1
P_O	2±0.04	4±0.1	4±0.1	4±0.1	4±0.1	4±0.1	4±0.1
P_2	1±0.02	2±0.05	2±0.05	2±0.05	2±0.05	2±0.05	2±0.05
A	0.23±0.02	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	0.43±0.02	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	4±0.05	8±0.3	8±0.2	8±0.2	8±0.2	12±0.2	12±0.2
E	0.9±0.05	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	1.8±0.02	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	0.8±0.04	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	0.5 max	1.4 max.	2.5 max.	2.5 max.	2.5 max.	4.5	4.5
T_2	0.15~0.40	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			
			180 mm (7”)		330 mm (13”)	
Code	Spec.(mm)	Size (EIA)	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	
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		
H	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)		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	Reel Size	Reels/Box	Boxes/ Carton
01005	Emboss	7”	8	12
01005	Paper	7”	5	12
0201	Paper	7"	5	12
0402	Paper	7"	5	12
0603	Paper/Emboss	7"	5	12
0805	Paper/Emboss	7"	5	12
1206	Paper/Emboss	7"	5	12
1210	Emboss	7"	5	12
1808	Emboss	7"	5	12
1812	Emboss	7"	5	12

Others

【Storage】

1. The chip capacitors shall be packaged in carrier tapes or bulk cases.
2. Keep storage place temperatures from +5℃ to +35℃, 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℃.
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 is 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】

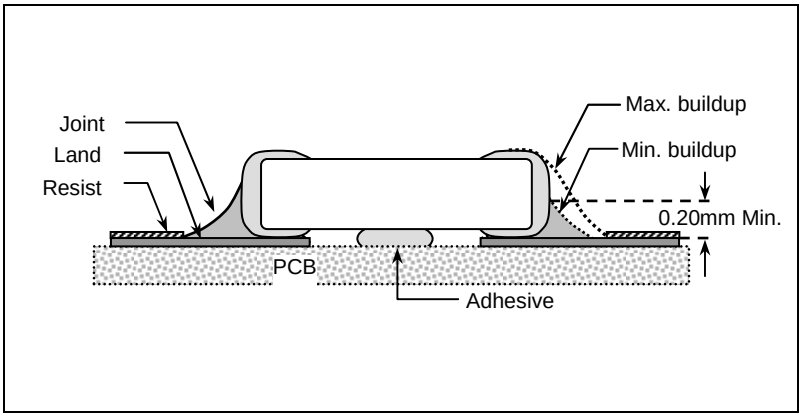
1. An excessive amount of flux or too rapid temperature rise can causes solvent burst, solder can generate a large quantity of gas. The gas can spreads small solder particles to cause solder balling effect or bridging problem.
2. Flux containing too high of a percentage of halide may cause corrosion 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】

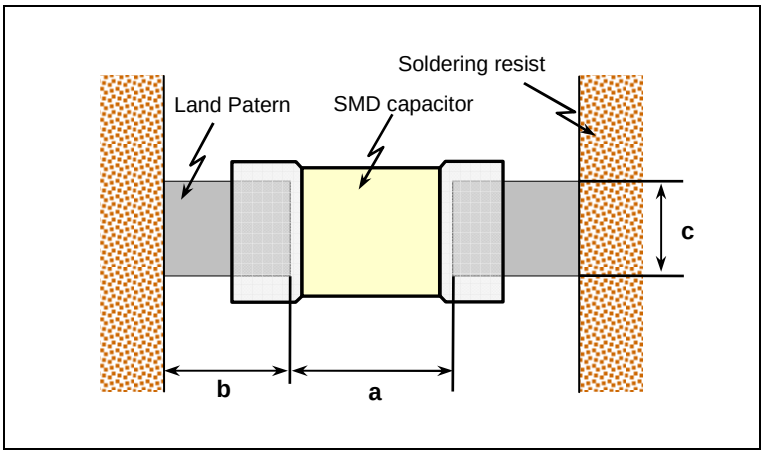
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive Strength and cause parts falling off PCB. When soldering, confirm that the solder is placed over 0.2mm of the surface of the terminations.



【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.



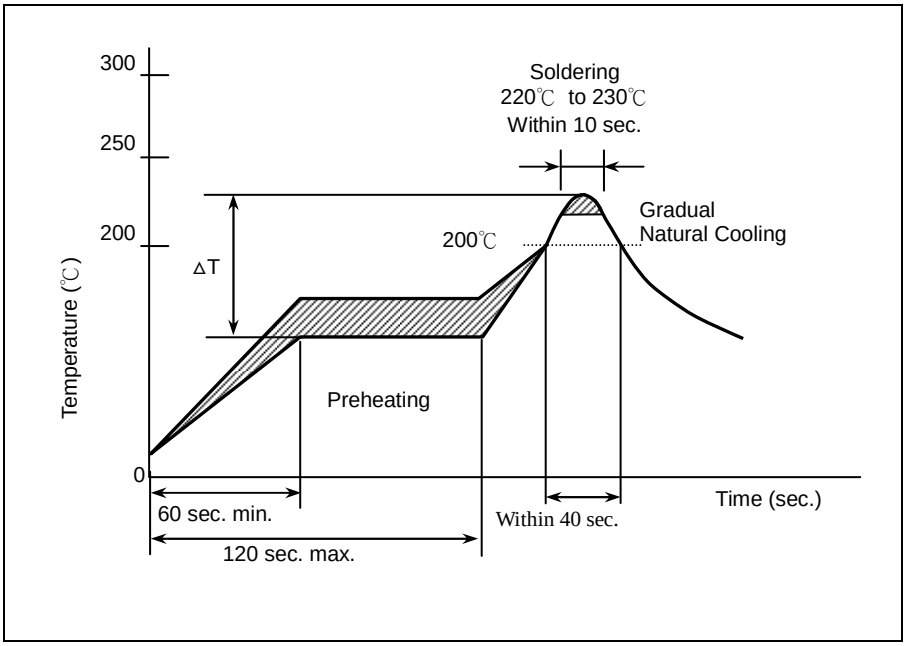
Size mm (EIA)	L x W (mm) (Dimension tolerance)	a (mm)	b (mm)	c (mm)
0402 (01005)	0.4*0.2	0.16 to 0.20	0.12 to 0.18	0.20 to 0.23
0603 (0201)	0.6*0.3	0.15 to 0.35	0.2 to 0.3	0.25 to 0.3
1005 (0402)	1.0*0.5 (within±0.10)	0.3 to 0.5	0.35 to 0.45	0.4 to 0.5
	1.0*0.5 (±0.15 or ±0.20)	0.4 to 0.6	0.4 to 0.5	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 or ±0.20)	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】

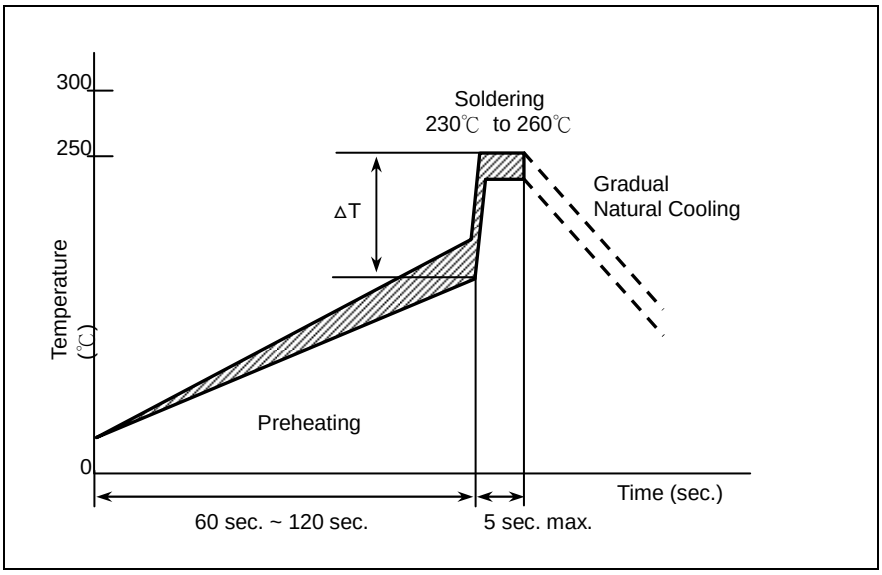
Reflow Soldering



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

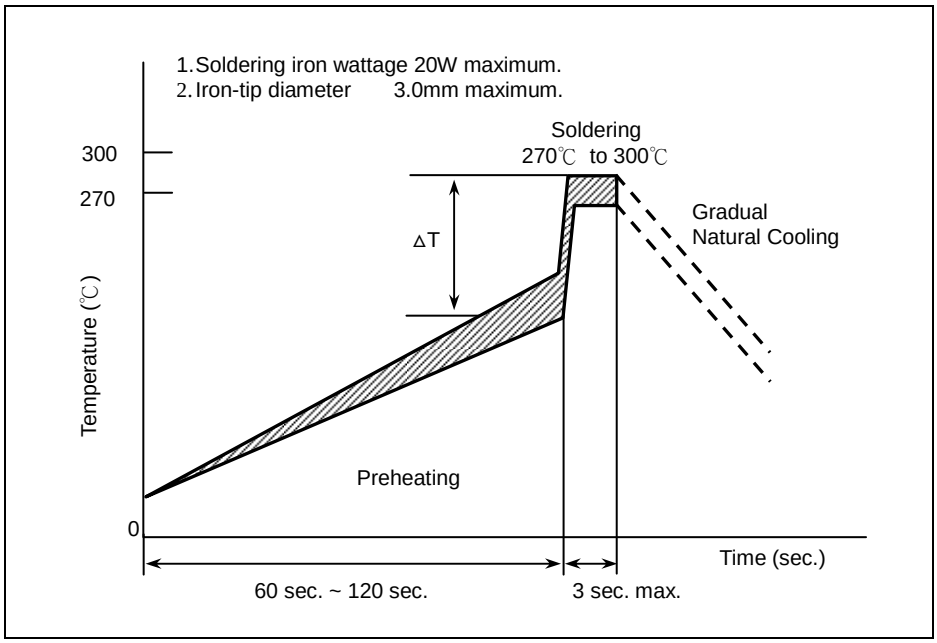
Chip Size	3216 and smaller	3225 and above
Preheating	△T≦150℃	△T≦130℃

Wave Soldering



Chip Size	3216 and smaller	3225 and above
Preheating	△T≦150℃	-

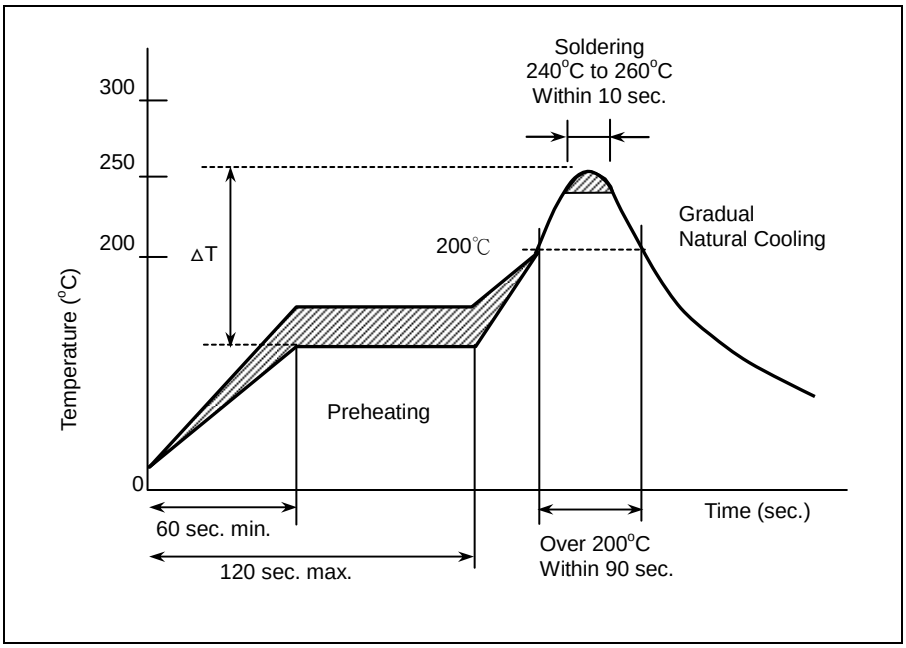
Soldering Iron



Chip Size	3216 and smaller	3225 and above
Preheating	△T≦190℃	△T≦130℃

【Soldering】

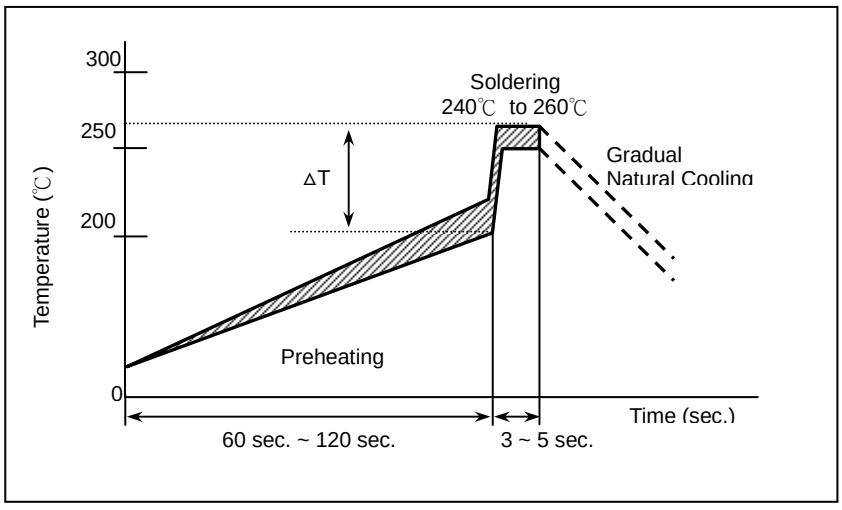
Reflow Soldering for Lead free Termination



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

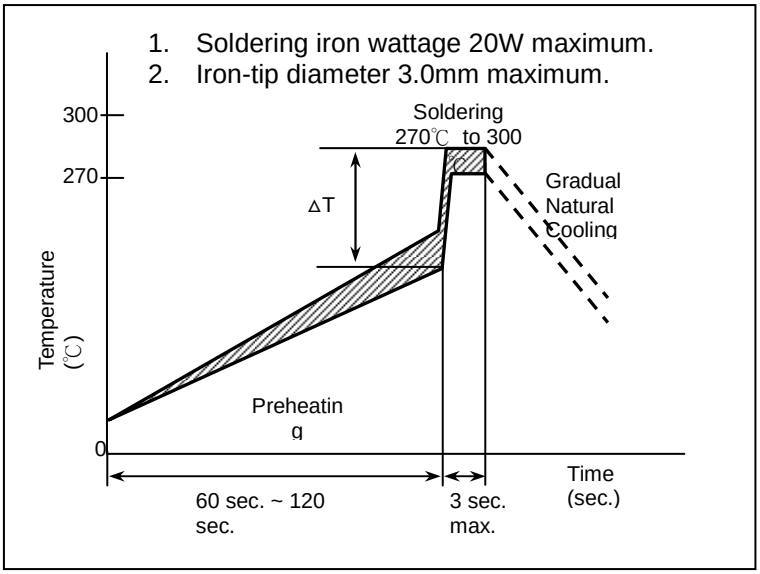
Chip Size	3216 and smaller	3225 and above
Preheating	△T≦150℃	△T≦130℃

Flow Soldering for Lead free Termination



Chip Size	3216 and smaller	3225 and above
Preheating	△T≦150℃	-

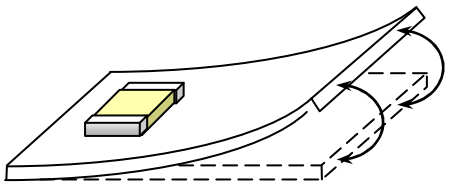
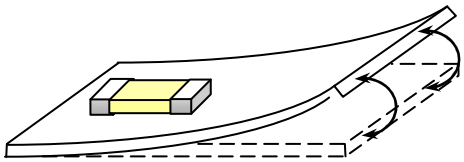
Soldering Iron



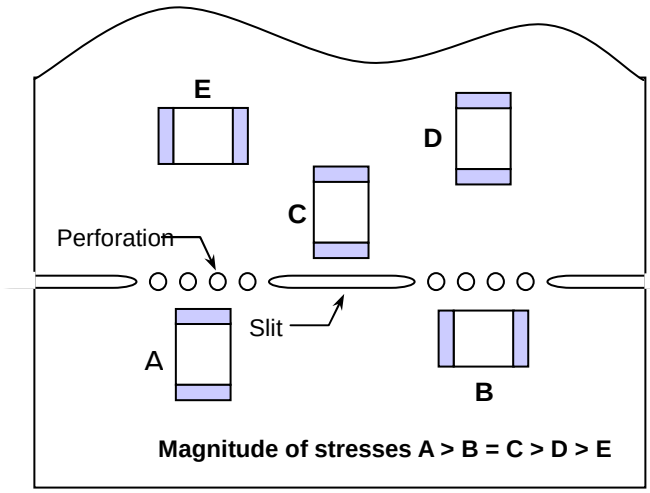
Chip Size	3216 and smaller	3225 and above
Preheating	△T≦190℃	△T≦130℃

【Chip Layout and Breaking PCB】

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

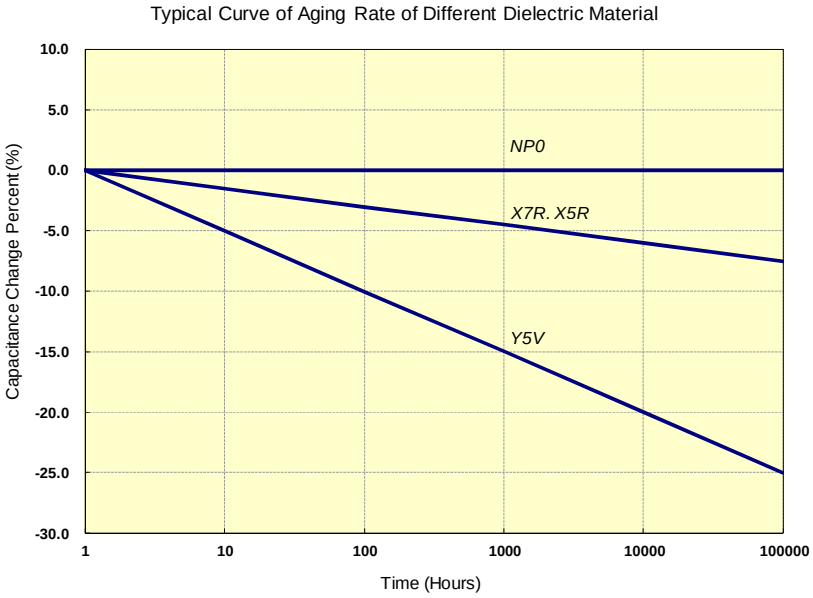
Recommended	Not Recommended
	

2. 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.



【Aging Rate】

The capacitance and dissipation factor of class 2 capacitors decreases with time. It is known as 'aging' that follows a logarithmic low 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 t1 hours of start aging.

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

k: aging constant (capacitance decrease per decade)

t1, t2: time in hours from start of aging.

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

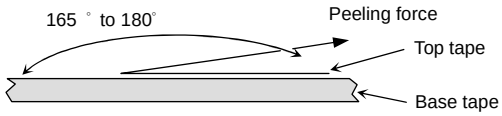
When heating the capacitors above Curie temperature (130℃~150℃) the capacitance can be re-new. So capacitance of class 2 capacitors will be complete de-aged by soldering process; subsequently a new aging process begins.

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.