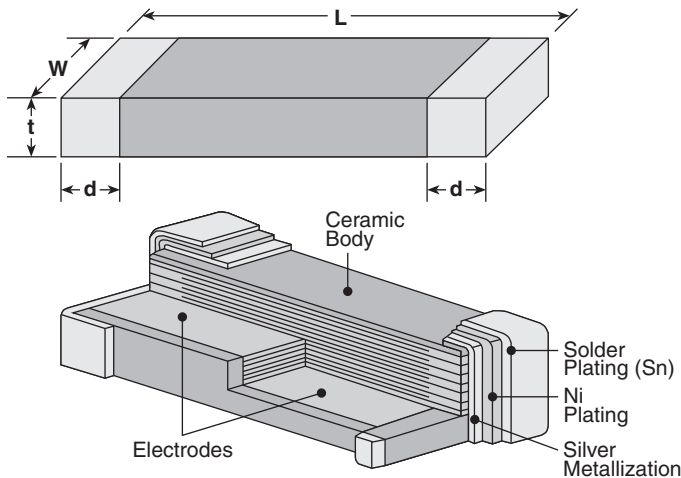


## features

- High Q factor
- Low T.C.C.
- Available in high capacitance values (up to 100  $\mu$ F)
- Products with lead-free terminations meet EU RoHS requirements

## dimensions and construction



Case Size	Dimensions inches (mm)			
	L	W	t (Max.)	d
0402	.039 $\pm$ .004 (1.0 $\pm$ 0.1)	.02 $\pm$ .004 (0.5 $\pm$ 0.1)	.021 (0.55)	.01 $\pm$ .006 (0.25 $\pm$ 0.15)
0603	.063 $\pm$ .006 (1.6 $\pm$ 0.15)	.032 $\pm$ .006 (0.81 $\pm$ 0.15)	.035 (0.9)	.014 $\pm$ .006 (0.35 $\pm$ 0.15)
0805	.079 $\pm$ .008 (2.01 $\pm$ 0.2)	.049 $\pm$ .008 (1.25 $\pm$ 0.2)	.051 (1.3)	.02 $\pm$ .01 (0.50 $\pm$ 0.25)
1206	.126 $\pm$ .008 (3.2 $\pm$ 0.2)	.063 $\pm$ .008 (1.6 $\pm$ 0.2)	.059 (1.5)	.02 $\pm$ .01 (0.5 $\pm$ 0.25)
1210	.126 $\pm$ .008 (3.2 $\pm$ 0.2)	.098 $\pm$ .008 (2.5 $\pm$ 0.2)	.067 (1.7)	.02 $\pm$ .01 (0.5 $\pm$ 0.25)

## ordering information

New Part #	NPO	0805	H	T	TD	101	K
	<b>Dielectric</b>	<b>Size</b>	<b>Voltage</b>	<b>Termination Material</b>	<b>Packaging</b>	<b>Capacitance</b>	<b>Tolerance</b>
	NPO X5R X7R Y5V	0402 0603 0805 1206 1210	A = 10V C = 16V E = 25V H = 50V I = 100V J = 200V K = 6.3V	T: Sn	TP: 7" 2mm pitch (0402 only) TD: 7" paper tape TE: 7" embossed plastic TDB: 13" paper tape TEB: 13" embossed plastic	NPO, X5R, X7R, Y5V: 2 significant digits + no. of zeros. "R" indicates decimal point	B: $\pm$ 0.1pF C: $\pm$ 0.25pF D: $\pm$ 0.5pF F: $\pm$ 1% G: $\pm$ 2% J: $\pm$ 5% K: $\pm$ 10% M: $\pm$ 20% Z: +80, -20%

For further information on packaging, please refer to Appendix B.

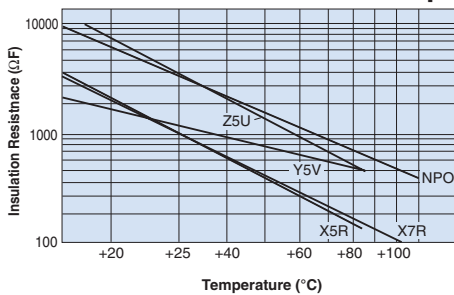
## applications and ratings

Dielectric	Capacitance Range	Capacitance Tolerance*	Voltage Ratings	Dissipation Factor	T.C.C.	Test Voltage	Operating Temperature	Insulation Resistance
NPO	0.47pF - 0.010μF	.47pF~8.2pF= C:±0.25pF 5.6pF~8.2pF= D±0.5pF 10pF~ 10000pF= F:±1%, G:±2%,J:±5%	16V 25V 50V 100V 200V	For Values >30pF: 0.1% max., ≤30pF: Q = 400 + 20 x C DF = 1/Q C is in pF	0 ± 30 ppm/°C	1.0 ± 0.2 Vrms	-55°C to +125°C	+25°C 100,000MΩ min. or 1000 MΩ - μF min. whichever is less
X5R	0.068μF - 22μF	K: ±10%	6.3V 10V	6.3V = 7.5% max. 10V = 10% max.	±15% (0 VDC)	1.0 ± 0.2 Vrms	-55°C to +85°C	+25°C 100,000MΩ min. or 500 MΩ - μF min. whichever is less
X7R	100pF - 4.7μF	K: ±10%	10V 16V 25V 50V 100V 200V	10V = 10% max. 16V = 3.5% max. 25V, 50V, 100V = 2.5% max.	±15% (0 VDC)	1.0 ± 0.2 Vrms	-55°C to +125°C	+25°C 100,000MΩ min. or 1000 MΩ - μF min. whichever is less
Y5V	10000pF - 22μF	Z: +80, -20%	10V 16V 25V 50V	16V & 25V = 7.0% 50V = 5.0%	+22% to -82% max.	1.0 ± 0.2 Vrms	-30°C to +85°C	+25°C 10,000MΩ min. or 1000 MΩ - μF min. whichever is less

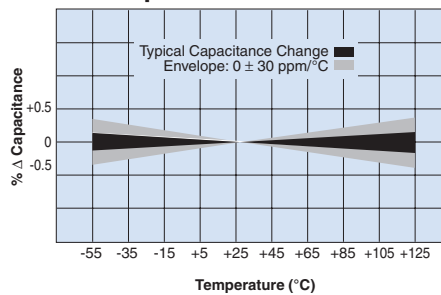
\* Special tolerances available, please consult factory.

## environmental applications

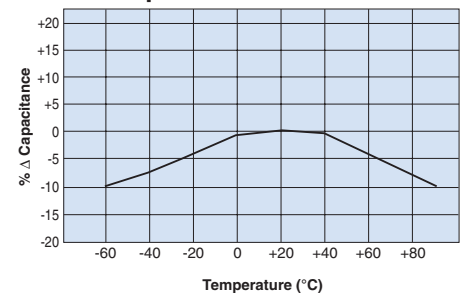
### Insulation Resistance vs Temp.



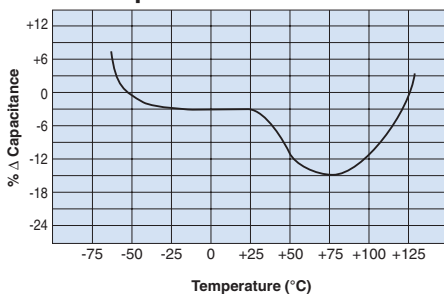
### NPO - Temperature Coefficient



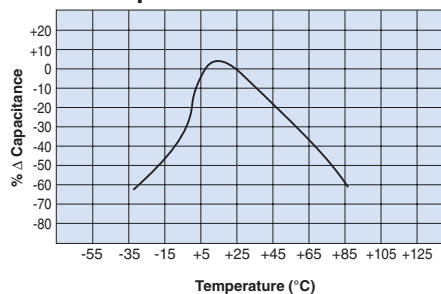
### X5R - Temperature Coefficient



### X7R - Temperature Coefficient



### Y5V - Temperature Coefficient



## NPO capacitance voltage availability

Size				0402*			0603*		0805			1206			1210	
pF	Capacitance values		WVDC	16 (C)	25 (E)	50 (H)	50 (H)	100 (I)	50 (H)	100 (I)	200 (J)	50 (H)	100 (I)	200 (J)	50 (H)	200 (J)
	µF	Cap. Code														
0.47		R47														
0.56		R56														
0.68		R68														
0.82		R82														
1		1R0														
1.2		1R2														
1.5		1R5														
1.8		1R8														
2.2		2R2														
2.7		2R7														
3.3		3R3														
3.9		3R9														
4.7		4R7														
5.6		5R6														
6.8		6R8														
8.2		8R2														
10		100														
12		120														
15		150														
18		180														
22		220														
27		270														
33		330														
39		390														
47		470														
56		560														
68		680														
82		820														
100	.0001	101														
120	.00012	121														
150	.00015	151														
180	.00018	181														
220	.00022	221														
270	.00027	271														
330	.00033	331														
390	.00039	391														
470	.00047	471														
560	.00056	561														
680	.00068	681														
820	.00082	821														
1000	.0010	102														
1200	.0012	122														
1500	.0015	152														
1800	.0018	182														
2200	.0022	222														
2700	.0027	272														
3300	.0033	332														
3900	.0039	392														
4700	.0047	472														
5600	.0056	562														
6800	.0068	682														
8200	.0082	822														
10000	.010	103														
12000	.012	123														
15000	.015	153														
18000	.018	183														
22000	.022	223														
27000	.027	273														
33000	.033	333														
39000	.039	393														

Capacitance tolerance available:  
 .47pF~8.2pF = C: ±0.25pF  
 5.6pF~8.2pF = D: ±0.5pF  
 10pF~10000pF = F: ±1%, G: ±2%, J: ±5%

## X5R capacitance voltage availability

Size	0402			0603				0805				1206				1210	
	6.3 (K)	10 (A)	16 (C)	6.3 (K)	10 (A)	16 (C)	25 (E)	6.3 (K)	10 (A)	16 (C)	25 (E)	6.3 (K)	10 (A)	16 (C)	25 (E)	6.3 (K)	10 (A)
100																	
150																	
220																	
330																	
470																	
680																	
1000																	
1200																	
1500																	
1800																	
2200																	
2700																	
3300																	
3900																	
4700																	
5600																	
6800																	
8200																	
0.010																	
0.012																	
0.015																	
0.018																	
0.022																	
0.027																	
0.033																	
0.039																	
0.047																	
0.056		■															
0.068		■															
0.082		■															
0.10		■															
0.12		■															
0.15		■															
0.18																	
0.22																	
0.27																	
0.33					■												
0.47					■												
0.56					■												
0.68																	
0.82																	
1.0				■	■												
1.2																	
1.5																	
1.8																	
2.2								■	■								
3.3								■	■								
4.7								■	■			■	■				
6.8												■	■				
10												■	■			■	
22												■	■				
47																	
100																	

Capacitance tolerance available: ±10%

## X7R capacitance voltage availability

Size	Capacitance values			0402				0603				0805				1206				1210								
	pF	μF	Cap. Code	10 (A)	16 (C)	25 (E)	50 (H)	10 (A)	16 (C)	25 (E)	50 (H)	10 (A)	16 (C)	25 (E)	50 (H)	100 (I)	200 (J)	10 (A)	16 (C)	25 (E)	50 (H)	100 (I)	200 (J)	50 (H)	100 (I)	200 (J)		
100	.0001	101																										
120	.00012	121																										
150	.00015	151																										
180	.00018	181																										
220	.00022	221																										
270	.00027	271																										
330	.00033	331																										
390	.00039	391																										
470	.00047	471																										
560	.00056	561																										
680	.00068	681																										
820	.00082	821																										
1000	.0010	102																										
1200	.0012	122																										
1500	.0015	152																										
1800	.0018	182																										
2200	.0022	222																										
2700	.0027	272																										
3300	.0033	332																										
3900	.0039	392																										
4700	.0047	472																										
5600	.0056	562																										
6800	.0068	682																										
8200	.0082	822																										
10000	.010	103																										
12000	.012	123																										
15000	.015	153																										
18000	.018	183																										
22000	.022	223																										
27000	.027	273																										
33000	.033	333																										
39000	.039	393																										
47000	.047	473																										
56000	.056	563																										
68000	.068	683																										
82000	.082	823																										
100000	.100	104																										
120000	.120	124																										
150000	.150	154																										
180000	.180	184																										
220000	.220	224																										
270000	.270	274																										
330000	.330	334																										
390000	.390	394																										
470000	.470	474																										
560000	.560	564																										
680000	.680	684																										
1000000	1.00	105																										
1200000	1.20	125																										
1500000	1.50	155																										
1800000	1.80	185																										
2200000	2.20	225																										
3900000	3.90	395																										
4700000	4.70	475																										

Capacitance tolerance available: ±10%

capacitors

## Y5V capacitance voltage availability

Size			0402		0603				0805				1206			
Capacitance values pF	μF	Cap. Code	10	16	10	16	25	50	10	16	25	50	10	16	25	50
			(A)	(C)	(A)	(C)	(E)	(H)	(A)	(C)	(E)	(H)	(A)	(C)	(E)	(H)
2200	.0022	222														
2700	.0027	272														
3300	.0033	332														
3900	.0039	392														
4700	.0047	472														
5600	.0056	562														
6800	.0068	682														
8200	.0082	822														
10000	.010	103														
12000	.012	123														
15000	.015	153														
18000	.018	183														
22000	.022	223														
27000	.027	273														
33000	.033	333														
39000	.039	393														
47000	.047	473														
56000	.056	563														
68000	.068	683														
82000	.082	823														
100000	.100	104														
120000	.120	124														
150000	.150	154														
180000	.180	184														
220000	.220	224														
270000	.270	274														
330000	.330	334														
390000	.390	394														
470000	.470	474														
560000	.560	564														
680000	.680	684														
820000	.820	824														
1000000	1.0	105														
1200000	1.2	125														
1500000	1.5	155														
1800000	1.8	185														
2200000	2.2	225														
2700000	2.7	275														
3300000	3.3	335														
3900000	3.9	395														
4700000	4.7	475														
5600000	5.6	565														
6800000	6.8	685														
10000000	10	106														
22000000	22	226														

Capacitance tolerance available: +80, -20%

capacitors