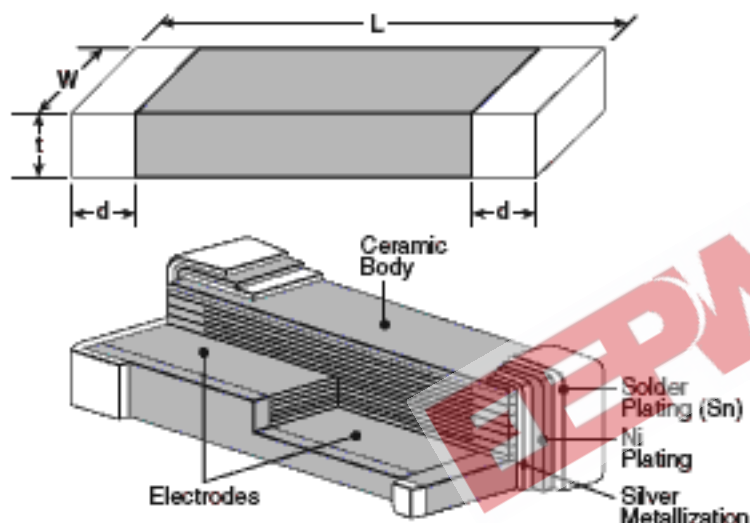


### features

- High Q factor
- Low T.C.C.
- Available in high capacitance values (up to 100  $\mu$ F)

### dimensions and construction



Case Size	Dimensions inches (mm)			
	L	W	t (Max.)	d
0402	.039±.004 (1.0±0.1)	.02±.004 (0.5±0.1)	.021 (0.55)	.01±.006 (0.25±0.15)
0603	.063±.006 (1.6±0.15)	.032±.006 (0.81±0.15)	.035 (0.9)	.014±.006 (0.35±0.15)
0805	.079±.008 (2.01±0.2)	.049±.008 (1.25±0.2)	.051 (1.3)	.02±.01 (0.50±0.25)
1206	.126±.008 (3.2±0.2)	.068±.008 (1.6±0.2)	.059 (1.5)	.02±.01 (0.5±0.25)
1210	.126±.008 (3.2±0.2)	.098±.008 (2.5±0.2)	.067 (1.7)	.02±.01 (0.5±0.25)
1812	.177±.012 (4.5±0.3)	.126±.008 (3.2±0.2)	.067 (1.7)	.024±.014 (0.61±0.36)
1825	.177±.012 (4.5±0.3)	.252±.016 (6.4±0.4)	.067 (1.7)	.024±.014 (0.61±0.36)
2220	.224±.016 (5.7±0.4)	.197±.016 (5.0±0.4)	.087 (2.2)	.025±.015 (0.64±0.39)

### ordering information

Old Part #	0805	NPO	H	T	T	101	K
New Part #	NPO	0805	H	T	TD	101	K
	Dielectric	Size	Voltage	Termination Material	Packaging	Capacitance	Tolerance
	NPO X5R X7R Y5V Z5U	0402 0603 0805 1206 1210 1812 1825 2220	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 Z5U: 2 significant digits + no. of zeros	B: ±0.1pF C: ±0.25pF D: ±0.5pF F: ±1% G: ±2% J: ±5% K: ±10% M: ±20% Z: +80, -20%

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

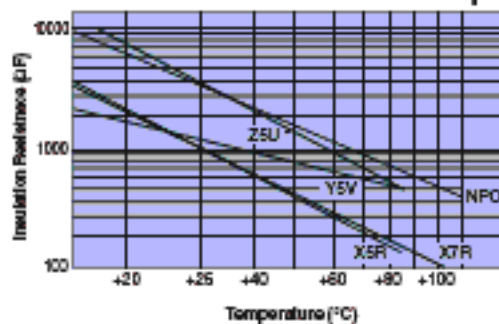
## applications and ratings

Dielectric	Capacitance Range	Capacitance Tolerance*	Voltage Ratings	Dissipation Factor	T.C.C.	Test Voltage	Operating Temperature	Insulation Resistance
NPO	0.5pF - 0.033μF	B: ±0.1pF (1.0pF - 8.2pF) C: ±0.25pF (1.0pF - 8.2pF) D: ±0.5pF (5.6pF - 8.2pF) F: ±1%, G: ±2% J: ±5%, K: ±10%	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 - 100μF	K: ±10%	6.3V 10V	6.3 = 7.5% 10 = 5.0%	±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 - 1.0μF	K: ±10%	10V 16V 25V 50V 100V 200V	For 50 & 100 volts 2.5% max. 25 = 3.0% 16 = 3.5%	±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	2200pF - 4.7μF	Z: +80, -20%	10V 16V 25V 50V	16V & 25V = 7.0% 50V = 5.0%	+22% to -82% max.	1.0 ± 0.2 Vrms	-55°C to +125°C	+25°C 10,000MΩ min. or 1000 MΩ - μF min. whichever is less
Z5U	0.01 μF - 1.0μF	M: ±20% Z: +80, -20%	25V 50V	4.0% max.	+22% to -56% max.	0.5 ± 0.2 Vrms	-55°C to +125°C	+25°C 10,000MΩ min. or 1000 MΩ - μF min. whichever is less

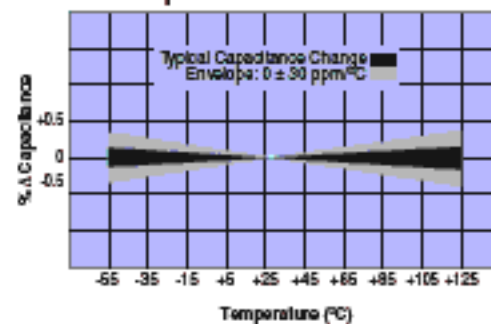
\* Special tolerances available, please consult factory.

## environmental applications

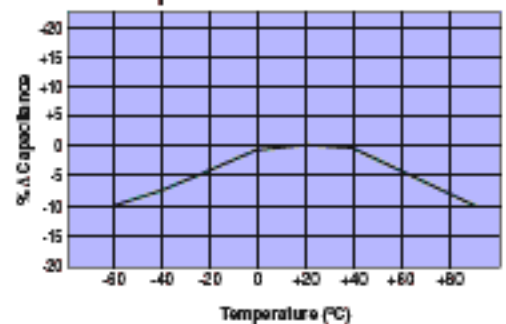
Insulation Resistance vs Temp.



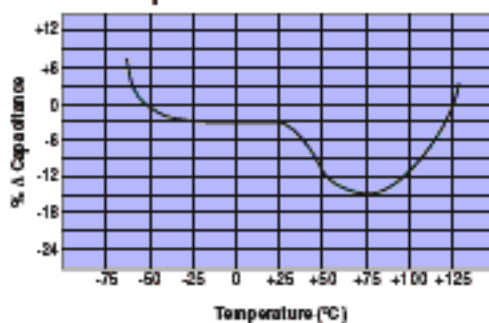
NPO - Temperature Coefficient



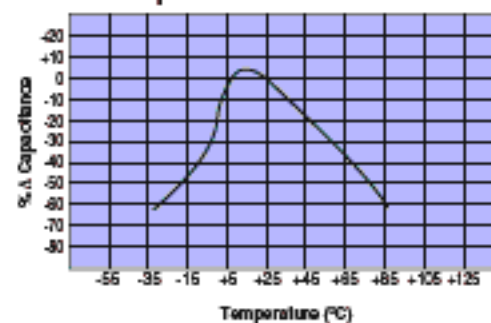
X5R - Temperature Coefficient



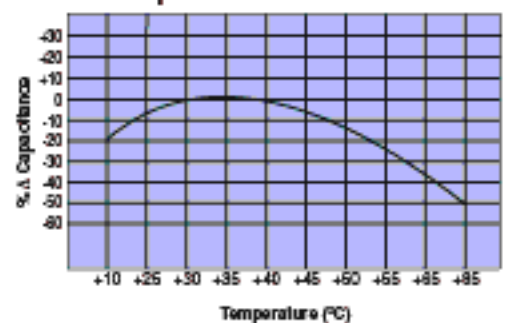
X7R - Temperature Coefficient



Y5V - Temperature Coefficient



Z5U - Temperature Coefficient



## NPO capacitance voltage availability

Size				0402*			0603*		0805			1206				1210		
Capacitance values pF	Code	WVDC		16	25	50	50	100	50	100	200	25	50	100	200	50	200	500
0.47	R47																	
0.56	R56																	
0.68	R68																	
0.82	R82																	
1	1R0																	
1.2	1R2PF																	
1.5	1R5PF																	
1.8	1R8PF																	
2.2	2R2PF																	
2.7	2R7PF																	
3.3	3R3PF																	
3.9	3R9PF																	
4.7	4R7PF																	
5.6	5R6PF																	
6.8	6R8PF																	
8.2	8R2PF																	
10	100PF																	
12	120PF																	
15	150PF																	
18	180PF																	
22	220PF																	
27	270PF																	
33	330PF																	
39	390PF																	
47	470PF																	
56	560PF																	
68	680PF																	
82	820PF																	
100	.0001 101PF																	
120	.00012 121PF																	
150	.00015 151PF																	
180	.00018 181PF																	
220	.00022 221PF																	
270	.00027 271PF																	
330	.00033 331PF																	
390	.00039 391PF																	
470	.00047 471PF																	
560	.00056 561PF																	
680	.00068 681PF																	
820	.00082 821PF																	
1000	.0010 102PF																	
1200	.0012 122PF																	
1500	.0015 152PF																	
1800	.0018 182PF																	
2200	.0022 222PF																	
2700	.0027 272PF																	
3300	.0033 332PF																	
3900	.0039 392PF																	
4700	.0047 472PF																	
5600	.0056 562PF																	
6800	.0068 682PF																	
8200	.0082 822PF																	
10000	.010 103PF																	
12000	.012 123PF																	
15000	.015 153PF																	
18000	.018 183PF																	
22000	.022 223PF																	
27000	.027 273PF																	
33000	.033 333PF																	
39000	.039 393PF																	

\* IR and vapor phase solder only recommended

Capacitance tolerance available:

R47 ~ 8R2 = C:  $\pm 0.25$  pF, 5R6 ~ 8R2 = D  $\pm 0.5$  pF, 10 ~ 393 = J  $\pm 5\%$ , F  $\pm 1\%$ , G  $\pm 2\%$

## X5R capacitance voltage availability

Size	0402			0603				0805				1206				1210				1812				2220					
Capacitance values pF μF	6.3	10	16	6.3	10	16	25	6.3	10	16	25	6.3	10	16	25	6.3	10	16	25	6.3	10	16	25	6.3	10	16	25	6.3	
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	0402*			0603*				0805					1206					1210						
	16	25	50	10	16	25	50	100	10	16	25	50	100	200	10	16	25	50	100	200	50	100	200	
100																								
120																								
150																								
180																								
220																								
270																								
330																								
390																								
470																								
560																								
680																								
820																								
1000																								
1200																								
1500																								
1800																								
2200																								
2700																								
3300																								
3900																								
4700																								
5600																								
6800																								
8200																								
10000																								
12000																								
15000																								
18000																								
22000																								
27000																								
33000																								
39000																								
47000																								
56000																								
68000																								
82000																								
100000																								
120000																								
150000																								
180000																								
220000																								
270000																								
330000																								
390000																								
470000																								
560000																								
680000																								
1000000																								
1200000																								
1500000																								
1800000																								
2200000																								

\* IR and vapor phase solder only recommended

Capacitance tolerance available: ±10%

## Y5V capacitance voltage availability

Size			0402*		0603*			0805				1206				1210	
Capacitance values			16	50	10	16	25	50	10	16	25	50	10	16	25	50	25
pF	μF	Code															
2200	.0022	222PF															
2700	.0027	272PF															
3300	.0033	332PF															
3900	.0039	392PF															
4700	.0047	472PF															
5600	.0056	562PF															
6800	.0068	682PF															
8200	.0082	822PF															
10000	.010	103PF															
12000	.012	123PF															
15000	.015	153PF															
18000	.018	183PF															
22000	.022	223PF															
27000	.027	273PF															
33000	.033	333PF															
39000	.039	393PF															
47000	.047	473PF															
56000	.056	563PF															
68000	.068	683PF															
82000	.082	823PF															
100000	.100	104PF															
120000	.120	124PF															
150000	.150	154PF															
180000	.180	184PF															
220000	.220	224PF															
270000	.270	274PF															
330000	.330	334PF															
390000	.390	394PF															
470000	.470	474PF															
560000	.560	564PF															
680000	.680	684PF															
820000	.820	824PF															
1000000	1.0	105PF															
1200000	1.2	125PF															
1500000	1.5	155PF															
1800000	1.8	185PF															
2200000	2.2	225PF															
2700000	2.7	275PF															
3300000	3.3	335PF															
3900000	3.9	395PF															
4700000	4.7	475PF															
5600000	5.6	565PF															
6800000	6.8	685PF															
10000000	10	106PF															

\* IR and vapor phase solder only recommended

Capacitance tolerance available: +80, -20%

capacitors

## Z5U capacitance voltage availability

Size	0603*		0805	1206	1210
Capacitance values pF    μF    Code	25	50	50	50	50
2200 .0022 222PF					
2700 .0027 272PF					
3300 .0033 332PF					
3900 .0039 392PF					
4700 .0047 472PF					
5600 .0056 562PF					
6800 .0068 682PF					
8200 .0082 822PF					
10000 .010 103PF					
12000 .012 123PF					
15000 .015 153PF					
18000 .018 183PF					
22000 .022 223PF					
27000 .027 273PF					
33000 .033 333PF					
39000 .039 393PF					
47000 .047 473PF					
56000 .056 563PF					
68000 .068 683PF					
82000 .082 823PF					
100000 .100 104PF					
120000 .120 124PF					
150000 .150 154PF					
180000 .180 184PF					
220000 .220 224PF					
270000 .270 274PF					
330000 .330 334PF					
390000 .390 394PF					
470000 .470 474PF					
560000 .560 564PF					
680000 .680 684PF					
820000 .820 824PF					
1000000 1.0 105PF					
1500000 1.5 155PF					

\* IR and vapor phase solder only recommended

Capacitance tolerance: +80, -20%

