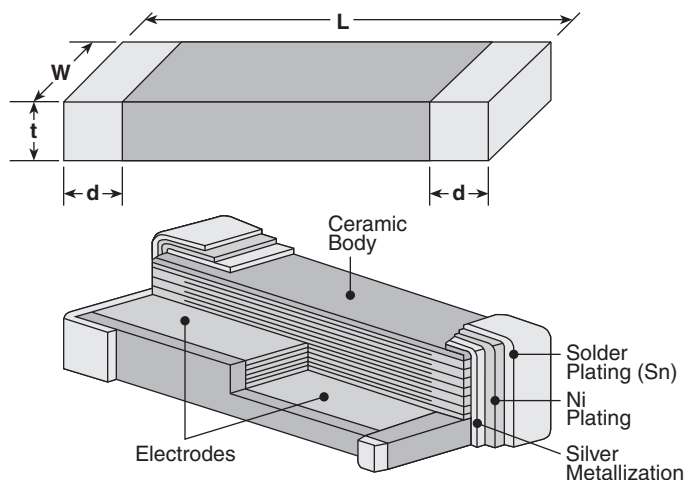


### features

- 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 $\pm$ .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 Z5U	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 Z5U: 2 significant digits + no. of zeros	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

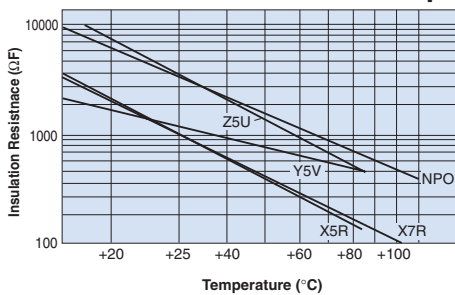
Dielectric	Capacitance Range	Capacitance Tolerance*	Voltage Ratings	Dissipation Factor	T.C.C.	Test Voltage	Operating Temperature	Insulation Resistance
NPO	0.47pF - 0.039μF	.47pF~8.2pF= C:±0.25pF 5.6pF~8.2pF= D±0.5pF 10pF~ 10000pF= F:±1%, G:±2%,J:±5%	16V 25V 50V 100V 200V	For Values >30pF: 0.1% max., ≤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 - 10μF	K: ±10%	6.3V 10V	6.3 = 7.3% 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 - 4.7μF	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 - 10μF	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
Z5U	2200pF - 1.5μF	Z: +80, -20%	25V 50V	4.0% max.	+22% to -56% max.	0.5 ± 0.2 Vrms	+10°C to +85°C	+25°C 10,000MΩ min. or 1000 MΩ - μF min. whichever is less

\* Special tolerances available, please consult factory.

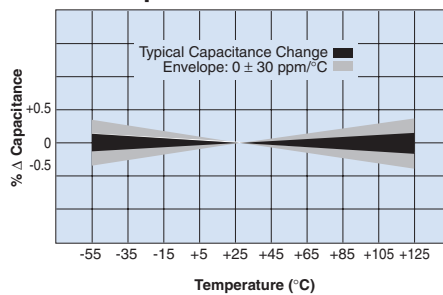
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### environmental applications

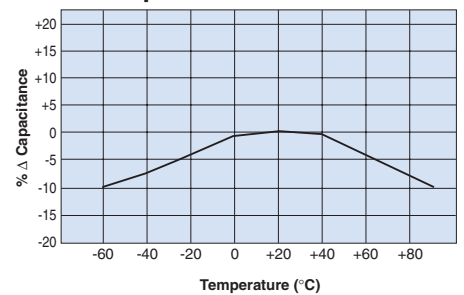
#### Insulation Resistance vs Temp.



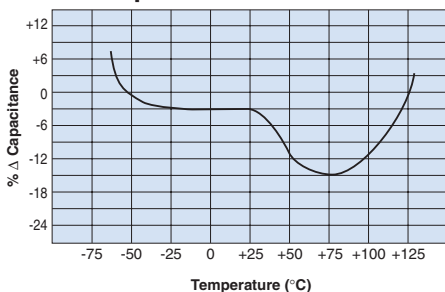
#### NPO - Temperature Coefficient



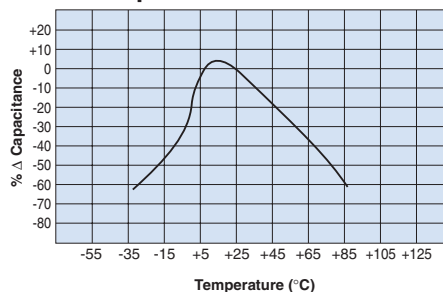
#### X5R - Temperature Coefficient



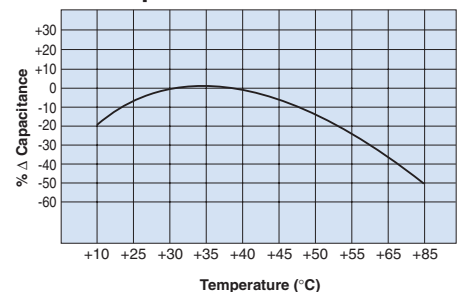
#### X7R - Temperature Coefficient



#### Y5V - Temperature Coefficient



#### Z5U - Temperature Coefficient



Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

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## NPO capacitance voltage availability

Size				0402*			0603*		0805			1206			1210		
Capacitance pF	values µF	Cap. Code	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)	500 (M)
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															

\* IR and vapor phase solder only recommended

Capacitance tolerance available:

.47pF~8.2pF = C: ±0.25pF

5.6pF~8.2pF = D: ±0.5pF

10pF~10000pF = F: ±1%, G: ±2%, J: ±5%

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

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## 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)	16 (C)	25 (E)
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%

capacitors

## X7R capacitance voltage availability

Size	0402*			0603*				0805					1206					1210									
	Capacitance pF	Capacitance μF	Cap. Code	16 (C)	25 (E)	50 (H)	10 (A)	16 (C)	25 (E)	50 (H)	100 (I)	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																									

\* IR and vapor phase solder only recommended

Capacitance tolerance available: ±10%

capacitors

## Y5V capacitance voltage availability

Size			0402*		0603*				0805				1206			
Capacitance values pF	μF	Cap. Code	16	50	10	16	25	50	10	16	25	50	10	16	25	50
			(C)	(H)	(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														

capacitors

\* IR and vapor phase solder only recommended

Capacitance tolerance available: +80, -20%

## Z5U capacitance voltage availability

Size	0603*		0805	1206	1210
Capacitance values pF    μF    Cap. Code	25 (E)	50 (H)	50 (H)	50 (H)	50 (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					
1500000 1.5 155					

\* IR and vapor phase solder only recommended

Capacitance tolerance: +80, -20%