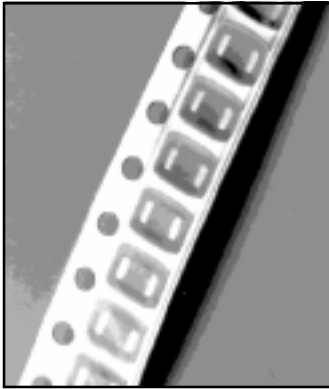


# Chips Multilayer Ceramic Capacitors



- Surface Mount
- COG, X7R, Z5U, Y5V Temperature Coefficients
- Nickel Barrier/Solder Terminations
- Tape and Reel — Standard
- 50 Volt Units Can Be Used For 63 Volt Applications

## GENERAL SPECIFICATIONS

Voltage Range:  
 COG: 10, 16, 25, 50, 100 and 200 VDC  
 X7R: 10, 16, 25, 50, 100 and 200 VDC  
 Z5U: 50 and 100 VDC  
 Y5V: 10, 16, 25 and 50 VDC

Capacitance Range:  
 COG: 0.5 pF to .012  $\mu$ F  
 X7R: 150 pF to .33  $\mu$ F  
 Z5U: 6800 pF to .47  $\mu$ F  
 Y5V: .022  $\mu$ F to 2.2  $\mu$ F

Standard Sizes: (Four)  
 0402, 0603, 0805, 1206, 1210  
 (0603 not available in Z5U Temperature Coefficient)

**Tape and Reel:**  
 7" reel per EIA RS 481-1  
 Parts with ^ (caret) following part number are 2,500 pcs. per reel.  
 Parts with # following part number are 10,000 pieces per reel.  
 All others are 4,000 pcs per reel.  
 13" reels are available by special request.

**Note:** Other chip sizes are available upon special request. Contact NACC for availability and prices.

## Performance Characteristics

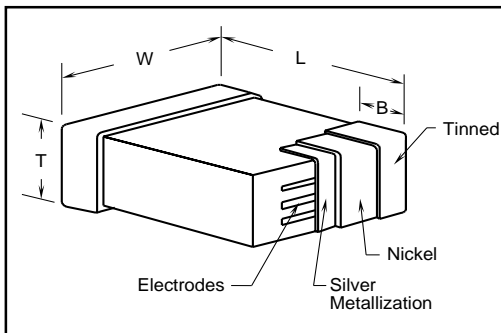
Parameter	COG (NPO)	X7R	Z5U	Y5V
<b>Temperature Characteristics:</b>				
Range, °C: .....	-55°C to +125°C	-55°C to +125°C	+10°C to +85°C	-30°C to +85°C
Capacitance change without DC voltage: .....	0 $\pm$ 30 PPM/°C*	$\pm$ 15%	+22%, -56%	+22%, -82%
<b>Aging Rate: %<math>\Delta</math>C / Decade Hour, Maximum: .....</b>				
	0%	2.5%	5.0%	3.5% 0603; 7% 0805
<b>Dissipation Factor:</b>				
Test Conditions @ 25°C: .....	>100 pF w/1.0 vrms@1 kHz	w/1.0 vrms@1 kHz	w/ 0.5 vrms @ 1 kHz	w/ 1.0 vrms @ 1 kHz
	$\leq$ 100 pF w/1.0 vrms@1 MHz			
Limits: .....	0.10 % Max	2.5 % Max	4.0 % Max	7.0 % Max
<b>Insulation Resistance (IR):</b>				
After 2 min. electrification @ 25°C with rated voltage applied:				
	1000 megohms x $\mu$ F or 100 gigaohms	1000 megohms x $\mu$ F or 100 gigaohms	1000 megohms x $\mu$ F or 10 gigaohms	500 megohms x $\mu$ F or 10,000 Megohms
<b>Moisture Resistance: MIL-STD-202, Method 106</b> (20 cycles with 50 Volts applied)				
Post test limits @ 25°C, whichever is smaller: .....	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 1 gigaohm	10 megohms x $\mu$ F or 1,000 Megohms
<b>Immersion Cycling: MIL-STD-202, Method 104, Condition B</b> (2 cycles @ 15 minutes each. Each cycle consists of immersion in hot bath @ 65°C followed by immersion in cold salt water bath.)				
Post test limits @ 25°C :				
Insulation Resistance, whichever is smaller: .....	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 1 gigaohm	10 megohms x $\mu$ F or 1,000 Megohms
<b>Life Test: - 1000 Hrs.</b>				
Test Potential and Temperature: .....	200% V @ 125°C	200% V @ 125°C	150% V @ 85°C	200% V @ 85°C
Post test limits @ 25°C:				
Capacitance Change, whichever is greater: .....	< 2% or 0.5pF	$\pm$ 15% of initial value**	$\pm$ 30% of initial value**	$\pm$ 30% of initial value**
Dissipation Factor: .....	0.25% Max	2.5% Max	5.0% Max	7.0% Max
Insulation Resistance, whichever is smaller: .....	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 10 gigaohms	100 megohms x $\mu$ F or 1 gigaohm	10 megohms x $\mu$ F or 1,000 Megohms
Dielectric Strength 2.5 times rated voltage for 5 seconds with current limited to 50 mA				

\* 60 PPM/°C below 10pF nominal  
 +53 PPM -30 PPM/°C from +25°C to -55°C comparable to MIL-C-20

\*\* X7R and Z5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be de-aged for 2 hours @ 150°C and stabilized at room temperature for 48 hours before capacitor measurements are made.

### Z5U meets all Y5V requirements and can be used in its place

Y5V -  $\Delta$ C  $\leq$  +22/-82% over -30°C to +85°C  
 Z5U -  $\Delta$ C  $\leq$  +22/-56% over +10°C to +85°C



Dimensions - Millimeters (Inches)				
Size Code	L Length	W Width	T Thickness Maximum	B Bandwidth
0402	1.0(.040) $\pm$ 0.05(.002)	0.5(.020) $\pm$ 0.05(.002)	0.55(.022)	0.2(.008)Minimum
0603	1.6(.063) $\pm$ 0.15(.006)	0.8(.032) $\pm$ 0.15(.006)	0.9(.035)	0.35(.014) $\pm$ 0.15(.006)
0805	2.0(.079) $\pm$ 0.2(.008)	1.25(.049) $\pm$ 0.2(.008)	1.3(.051)	0.5(.020) $\pm$ 0.25(.010)
1206	3.2(.126) $\pm$ 0.2(.008)	1.6(.063) $\pm$ 0.2(.008)	1.5(.059)	0.5(.020) $\pm$ 0.25(.010)
1210	3.2(.126) $\pm$ 0.2(.008)	2.5(.098) $\pm$ 0.2(.008)	1.7(.067)	0.5(.020) $\pm$ 0.25(.010)

## COG (NPO) Temperature Coefficient



### 0402 Size Code

Capacitance	Catalog Number			
	10 VDC	16VDC	25 VDC	50 VDC
.5pF	C0402C508*8GAC#	C0402C508*4GAC#	C0402C508*3GAC#	C0402C508*5GAC#
.75pF	C0402C758*8GAC#	C0402C758*4GAC#	C0402C758*3GAC#	C0402C758*5GAC#
1.0pF	C0402C109*8GAC#	C0402C109*4GAC#	C0402C109*3GAC#	C0402C109*5GAC#
1.2pF	C0402C129*8GAC#	C0402C129*4GAC#	C0402C129*3GAC#	C0402C129*5GAC#
1.5pF	C0402C159*8GAC#	C0402C159*4GAC#	C0402C159*3GAC#	C0402C159*5GAC#
1.8pF	C0402C189*8GAC#	C0402C189*4GAC#	C0402C189*3GAC#	C0402C189*5GAC#
2.2pF	C0402C229*8GAC#	C0402C229*4GAC#	C0402C229*3GAC#	C0402C229*5GAC#
2.7pF	C0402C279*8GAC#	C0402C279*4GAC#	C0402C279*3GAC#	C0402C279*5GAC#
3.3pF	C0402C339*8GAC#	C0402C339*4GAC#	C0402C339*3GAC#	C0402C339*5GAC#
3.9pF	C0402C399*8GAC#	C0402C399*4GAC#	C0402C399*3GAC#	C0402C399*5GAC#
4.7pF	C0402C479*8GAC#	C0402C479*4GAC#	C0402C479*3GAC#	C0402C479*5GAC#
5.6pF	C0402C569*8GAC#	C0402C569*4GAC#	C0402C569*3GAC#	C0402C569*5GAC#
6.8pF	C0402C689*8GAC#	C0402C689*4GAC#	C0402C689*3GAC#	C0402C689*5GAC#
8.2pF	C0402C829*8GAC#	C0402C829*4GAC#	C0402C829*3GAC#	C0402C829*5GAC#
10pF	C0402C100*8GAC#	C0402C100*4GAC#	C0402C100*3GAC#	C0402C100*5GAC#
12pF	C0402C120*8GAC#	C0402C120*4GAC#	C0402C120*3GAC#	C0402C120*5GAC#
15pF	C0402C150*8GAC#	C0402C150*4GAC#	C0402C150*3GAC#	C0402C150*5GAC#
18pF	C0402C180*8GAC#	C0402C180*4GAC#	C0402C180*3GAC#	C0402C180*5GAC#
22pF	C0402C220*8GAC#	C0402C220*4GAC#	C0402C220*3GAC#	C0402C220*5GAC#
27pF	C0402C270*8GAC#	C0402C270*4GAC#	C0402C270*3GAC#	C0402C270*5GAC#
33pF	C0402C330*8GAC#	C0402C330*4GAC#	C0402C330*3GAC#	C0402C330*5GAC#
39pF	C0402C390*8GAC#	C0402C390*4GAC#	C0402C390*3GAC#	C0402C390*5GAC#
47pF	C0402C470*8GAC#	C0402C470*4GAC#	C0402C470*3GAC#	C0402C470*5GAC#
56pF	C0402C560*8GAC#	C0402C560*4GAC#	C0402C560*3GAC#	C0402C560*5GAC#
68pF	C0402C680*8GAC#	C0402C680*4GAC#	C0402C680*3GAC#	C0402C680*5GAC#
82pF	C0402C820*8GAC#	C0402C820*4GAC#	C0402C820*3GAC#	C0402C820*5GAC#
100pF	C0402C101*8GAC#	C0402C101*4GAC#	C0402C101*3GAC#	C0402C101*5GAC#

\* Insert proper letter code for desired tolerance:  
 ±0.25pF (C) is standard on values less than 10 pF  
 ±5% (J) is standard on values ≥ 10 pF

Other Available Tolerances:  
 Values less than 27pF:  
 C = ±0.25pF, D = ±0.5pF  
 Values greater than 10 pF:  
 F = ±1%; G = ±2%; H = ±2.5%;  
 J = ±5%; K = ±10%; M = ±20%

^ Parts with caret (^) following catalog number are 2,500 pcs per reel.  
 # Parts with (#) following catalog number are 10,000 pcs per reel.  
 All others are 4,000 pcs per reel

### 0603 Size Code

Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
.5pF	C0603C508*5GAC		
.75pF	C0603C758*5GAC		
1.0pF	C0603C109*5GAC	C0603C109*1GAC	C0603C109*2GAC
1.2pF	C0603C129*5GAC	C0603C129*1GAC	C0603C129*2GAC
1.5pF	C0603C159*5GAC	C0603C159*1GAC	C0603C159*2GAC
1.8pF	C0603C189*5GAC	C0603C189*1GAC	C0603C189*2GAC
2.2pF	C0603C229*5GAC	C0603C229*1GAC	C0603C229*2GAC
2.7pF	C0603C279*5GAC	C0603C279*1GAC	C0603C279*2GAC
3.3pF	C0603C339*5GAC	C0603C339*1GAC	C0603C339*2GAC
3.9pF	C0603C399*5GAC	C0603C399*1GAC	C0603C399*2GAC
4.7pF	C0603C479*5GAC	C0603C479*1GAC	C0603C479*2GAC
5.6pF	C0603C569*5GAC	C0603C569*1GAC	C0603C569*2GAC
6.8pF	C0603C689*5GAC	C0603C689*1GAC	C0603C689*2GAC
8.2pF	C0603C829*5GAC	C0603C829*1GAC	C0603C829*2GAC
10pF	C0603C100*5GAC	C0603C100*1GAC	C0603C100*2GAC
12pF	C0603C120*5GAC	C0603C120*1GAC	C0603C120*2GAC
15pF	C0603C150*5GAC	C0603C150*1GAC	C0603C150*2GAC
18pF	C0603C180*5GAC	C0603C180*1GAC	C0603C180*2GAC
22pF	C0603C220*5GAC	C0603C220*1GAC	C0603C220*2GAC
27pF	C0603C270*5GAC	C0603C270*1GAC	C0603C270*2GAC
33pF	C0603C330*5GAC	C0603C330*1GAC	C0603C330*2GAC
39pF	C0603C390*5GAC	C0603C390*1GAC	C0603C390*2GAC
47pF	C0603C470*5GAC	C0603C470*1GAC	C0603C470*2GAC
56pF	C0603C560*5GAC	C0603C560*1GAC	C0603C560*2GAC
68pF	C0603C680*5GAC	C0603C680*1GAC	C0603C680*2GAC
82pF	C0603C820*5GAC	C0603C820*1GAC	C0603C820*2GAC
100pF	C0603C101*5GAC	C0603C101*1GAC	
120pF	C0603C121*5GAC	C0603C121*1GAC	
150pF	C0603C151*5GAC	C0603C151*1GAC	
180pF	C0603C181*5GAC	C0603C181*1GAC	
220pF	C0603C221*5GAC		

### 0805 Size Code

Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
1.0pF	C0805C109*5GAC	C0805C109*1GAC	C0805C109*2GAC
1.2pF	C0805C129*5GAC	C0805C129*1GAC	C0805C129*2GAC
1.5pF	C0805C159*5GAC	C0805C159*1GAC	C0805C159*2GAC
1.8pF	C0805C189*5GAC	C0805C189*1GAC	C0805C189*2GAC
2.2pF	C0805C229*5GAC	C0805C229*1GAC	C0805C229*2GAC
2.7pF	C0805C279*5GAC	C0805C279*1GAC	C0805C279*2GAC
3.3pF	C0805C339*5GAC	C0805C339*1GAC	C0805C339*2GAC
3.9pF	C0805C399*5GAC	C0805C399*1GAC	C0805C399*2GAC
4.7pF	C0805C479*5GAC	C0805C479*1GAC	C0805C479*2GAC
5.6pF	C0805C569*5GAC	C0805C569*1GAC	C0805C569*2GAC
6.8pF	C0805C689*5GAC	C0805C689*1GAC	C0805C689*2GAC
8.2pF	C0805C829*5GAC	C0805C829*1GAC	C0805C829*2GAC
10pF	C0805C100*5GAC	C0805C100*1GAC	C0805C100*2GAC
12pF	C0805C120*5GAC	C0805C120*1GAC	C0805C120*2GAC
15pF	C0805C150*5GAC	C0805C150*1GAC	C0805C150*2GAC
18pF	C0805C180*5GAC	C0805C180*1GAC	C0805C180*2GAC
22pF	C0805C220*5GAC	C0805C220*1GAC	C0805C220*2GAC
27pF	C0805C270*5GAC	C0805C270*1GAC	C0805C270*2GAC
33pF	C0805C330*5GAC	C0805C330*1GAC	C0805C330*2GAC
39pF	C0805C390*5GAC	C0805C390*1GAC	C0805C390*2GAC
47pF	C0805C470*5GAC	C0805C470*1GAC	C0805C470*2GAC
56pF	C0805C560*5GAC	C0805C560*1GAC	C0805C560*2GAC
68pF	C0805C680*5GAC	C0805C680*1GAC	C0805C680*2GAC
82pF	C0805C820*5GAC	C0805C820*1GAC	C0805C820*2GAC
100pF	C0805C101*5GAC	C0805C101*1GAC	C0805C101*2GAC
120pF	C0805C121*5GAC	C0805C121*1GAC	C0805C121*2GAC
150pF	C0805C151*5GAC	C0805C151*1GAC	C0805C151*2GAC
180pF	C0805C181*5GAC	C0805C181*1GAC	C0805C181*2GAC
220pF	C0805C221*5GAC	C0805C221*1GAC	C0805C221*2GAC
270pF	C0805C271*5GAC	C0805C271*1GAC	C0805C271*2GAC^
330pF	C0805C331*5GAC	C0805C331*1GAC	C0805C331*2GAC^

50 volt units can be used for 63 volt applications

See next page for more COG (NPO) parts

## COG (NPO) Temperature Coefficient

0805 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
390pF	C0805C391*5GAC	C0805C391*1GAC	C0805C391*2GAC <sup>^</sup>
470pF	C0805C471*5GAC	C0805C471*1GAC	C0805C471*2GAC <sup>^</sup>
560pF	C0805C561*5GAC	C0805C561*1GAC	
680pF	C0805C681*5GAC	C0805C681*1GAC <sup>^</sup>	
820pF	C0805C821*5GAC	C0805C821*1GAC <sup>^</sup>	
1000pF	C0805C102*5GAC	C0805C102*1GAC <sup>^</sup>	
1200pF	C0805C122*5GAC		
1500pF	C0805C152*5GAC		
1800pF	C0805C182*5GAC		

1206 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
1.0pF	C1206C109*5GAC	C1206C109*1GAC	C1206C109*2GAC
1.2pF	C1206C129*5GAC	C1206C129*1GAC	C1206C129*2GAC
1.5pF	C1206C159*5GAC	C1206C159*1GAC	C1206C159*2GAC
1.8pF	C1206C189*5GAC	C1206C189*1GAC	C1206C189*2GAC
2.2pF	C1206C229*5GAC	C1206C229*1GAC	C1206C229*2GAC
2.7pF	C1206C279*5GAC	C1206C279*1GAC	C1206C279*2GAC
3.3pF	C1206C339*5GAC	C1206C339*1GAC	C1206C339*2GAC
3.9pF	C1206C399*5GAC	C1206C399*1GAC	C1206C399*2GAC
4.7pF	C1206C479*5GAC	C1206C479*1GAC	C1206C479*2GAC
5.6pF	C1206C569*5GAC	C1206C569*1GAC	C1206C569*2GAC
6.8pF	C1206C689*5GAC	C1206C689*1GAC	C1206C689*2GAC
8.2pF	C1206C829*5GAC	C1206C829*1GAC	C1206C829*2GAC
10pF	C1206C100*5GAC	C1206C100*1GAC	C1206C100*2GAC
12pF	C1206C120*5GAC	C1206C120*1GAC	C1206C120*2GAC
15pF	C1206C150*5GAC	C1206C150*1GAC	C1206C150*2GAC
18pF	C1206C180*5GAC	C1206C180*1GAC	C1206C180*2GAC
22pF	C1206C220*5GAC	C1206C220*1GAC	C1206C220*2GAC
27pF	C1206C270*5GAC	C1206C270*1GAC	C1206C270*2GAC
33pF	C1206C330*5GAC	C1206C330*1GAC	C1206C330*2GAC
39pF	C1206C390*5GAC	C1206C390*1GAC	C1206C390*2GAC
47pF	C1206C470*5GAC	C1206C470*1GAC	C1206C470*2GAC
56pF	C1206C560*5GAC	C1206C560*1GAC	C1206C560*2GAC
68pF	C1206C680*5GAC	C1206C680*1GAC	C1206C680*2GAC
82pF	C1206C820*5GAC	C1206C820*1GAC	C1206C820*2GAC
100pF	C1206C101*5GAC	C1206C101*1GAC	C1206C101*2GAC
120pF	C1206C121*5GAC	C1206C121*1GAC	C1206C121*2GAC
150pF	C1206C151*5GAC	C1206C151*1GAC	C1206C151*2GAC
180pF	C1206C181*5GAC	C1206C181*1GAC	C1206C181*2GAC
220pF	C1206C221*5GAC	C1206C221*1GAC	C1206C221*2GAC
270pF	C1206C271*5GAC	C1206C271*1GAC	C1206C271*2GAC
330pF	C1206C331*5GAC	C1206C331*1GAC	C1206C331*2GAC
390pF	C1206C391*5GAC	C1206C391*1GAC	C1206C391*2GAC
470pF	C1206C471*5GAC	C1206C471*1GAC	C1206C471*2GAC
560pF	C1206C561*5GAC	C1206C561*1GAC	C1206C561*2GAC
680pF	C1206C681*5GAC	C1206C681*1GAC	C1206C681*2GAC
820pF	C1206C821*5GAC	C1206C821*1GAC	C1206C821*2GAC
1000pF	C1206C102*5GAC	C1206C102*1GAC	C1206C102*2GAC <sup>^</sup>
1200pF	C1206C122*5GAC	C1206C122*1GAC	C1206C122*2GAC <sup>^</sup>
1500pF	C1206C152*5GAC	C1206C152*1GAC	C1206C152*2GAC <sup>^</sup>
1800pF	C1206C182*5GAC	C1206C182*1GAC	C1206C182*2GAC <sup>^</sup>
2200pF	C1206C222*5GAC	C1206C222*1GAC <sup>^</sup>	
2700pF	C1206C272*5GAC	C1206C272*1GAC <sup>^</sup>	
3300pF	C1206C332*5GAC	C1206C332*1GAC <sup>^</sup>	
3900pF	C1206C392*5GAC	C1206C392*1GAC <sup>^</sup>	
4700pF	C1206C472*5GAC		
5600pF	C1206C562*5GAC		

1210 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
10pF	C1210C100*5GAC	C1210C100*1GAC	C1210C100*2GAC
12pF	C1210C120*5GAC	C1210C120*1GAC	C1210C120*2GAC
15pF	C1210C150*5GAC	C1210C150*1GAC	C1210C150*2GAC
18pF	C1210C180*5GAC	C1210C180*1GAC	C1210C180*2GAC
22pF	C1210C220*5GAC	C1210C220*1GAC	C1210C220*2GAC
27pF	C1210C270*5GAC	C1210C270*1GAC	C1210C270*2GAC
33pF	C1210C330*5GAC	C1210C330*1GAC	C1210C330*2GAC
39pF	C1210C390*5GAC	C1210C390*1GAC	C1210C390*2GAC
47pF	C1210C470*5GAC	C1210C470*1GAC	C1210C470*2GAC
56pF	C1210C560*5GAC	C1210C560*1GAC	C1210C560*2GAC
68pF	C1210C680*5GAC	C1210C680*1GAC	C1210C680*2GAC
82pF	C1210C820*5GAC	C1210C820*1GAC	C1210C820*2GAC
100pF	C1210C101*5GAC	C1210C101*1GAC	C1210C101*2GAC
120pF	C1210C121*5GAC	C1210C121*1GAC	C1210C121*2GAC
150pF	C1210C151*5GAC	C1210C151*1GAC	C1210C151*2GAC
180pF	C1210C181*5GAC	C1210C181*1GAC	C1210C181*2GAC
220pF	C1210C221*5GAC	C1210C221*1GAC	C1210C221*2GAC
270pF	C1210C271*5GAC	C1210C271*1GAC	C1210C271*2GAC
330pF	C1210C331*5GAC	C1210C331*1GAC	C1210C331*2GAC
390pF	C1210C391*5GAC	C1210C391*1GAC	C1210C391*2GAC
470pF	C1210C471*5GAC	C1210C471*1GAC	C1210C471*2GAC
560pF	C1210C561*5GAC	C1210C561*1GAC	C1210C561*2GAC
680pF	C1210C681*5GAC	C1210C681*1GAC	C1210C681*2GAC
820pF	C1210C821*5GAC	C1210C821*1GAC	C1210C821*2GAC
1000pF	C1210C102*5GAC	C1210C102*1GAC	C1210C102*2GAC
1200pF	C1210C122*5GAC	C1210C122*1GAC	C1210C122*2GAC
1500pF	C1210C152*5GAC	C1210C152*1GAC	C1210C152*2GAC
1800pF	C1210C182*5GAC	C1210C182*1GAC	C1210C182*2GAC
2200pF	C1210C222*5GAC	C1210C222*1GAC	C1210C222*2GAC <sup>^</sup>
2700pF	C1210C272*5GAC	C1210C272*1GAC	C1210C272*2GAC <sup>^</sup>
3300pF	C1210C332*5GAC	C1210C332*1GAC	C1210C332*2GAC <sup>^</sup>
3900pF	C1210C392*5GAC	C1210C392*1GAC <sup>^</sup>	
4700pF	C1210C472*5GAC <sup>^</sup>	C1210C472*1GAC <sup>^</sup>	
5600pF	C1210C562*5GAC <sup>^</sup>	C1210C562*1GAC <sup>^</sup>	
6800pF	C1210C682*5GAC <sup>^</sup>	C1210C682*1GAC <sup>^</sup>	
8200pF	C1210C822*5GAC <sup>^</sup>		
10000pF	C1210C103*5GAC <sup>^</sup>		
12000pF	C1210C123*5GAC <sup>^</sup>		

\* Insert proper letter code for desired tolerance:  
 ±0.25pF (C) is standard on values less than 10 pF  
 ±5% (J) is standard on values ≥ 10 pF

Other Available Tolerances:  
 Values less than 27pF:  
 C = ±0.25pF, D = ±0.5pF  
 Values greater than 10 pF:  
 F = ±1%; G = ±2%; H = ±2.5%;  
 J = ±5%; K = ±10%; M = ±20%

<sup>^</sup> Parts with caret (^) following catalog number are 2,500 pcs per reel  
 All others are 4,000 pcs per reel

50 volt units can be used for 63 volt applications

## X7R Temperature Coefficient



0402 Size Code				
Capacitance	Catalog Number			
	10 VDC	16VDC	25 VDC	50 VDC
150pF	C0402C151*8RAC#	C0402C151*4RAC#	C0402C151*3RAC#	C0402C151*5RAC#
180pF	C0402C181*8RAC#	C0402C181*4RAC#	C0402C181*3RAC#	C0402C181*5RAC#
220pF	C0402C221*8RAC#	C0402C221*4RAC#	C0402C221*3RAC#	C0402C221*5RAC#
270pF	C0402C271*8RAC#	C0402C271*4RAC#	C0402C271*3RAC#	C0402C271*5RAC#
330pF	C0402C331*8RAC#	C0402C331*4RAC#	C0402C331*3RAC#	C0402C331*5RAC#
390pF	C0402C391*8RAC#	C0402C391*4RAC#	C0402C391*3RAC#	C0402C391*5RAC#
470pF	C0402C471*8RAC#	C0402C471*4RAC#	C0402C471*3RAC#	C0402C471*5RAC#
560pF	C0402C561*8RAC#	C0402C561*4RAC#	C0402C561*3RAC#	C0402C561*5RAC#
680pF	C0402C681*8RAC#	C0402C681*4RAC#	C0402C681*3RAC#	C0402C681*5RAC#
820pF	C0402C821*8RAC#	C0402C821*4RAC#	C0402C821*3RAC#	C0402C821*5RAC#
1000pF	C0402C102*8RAC#	C0402C102*4RAC#	C0602C102*3RAC#	C0602C102*5RAC#
1200pF	C0402C122*8RAC#	C0402C122*4RAC#	C0402C122*3RAC#	C0402C122*5RAC#
1500pF	C0402C152*8RAC#	C0402C152*4RAC#	C0402C152*3RAC#	C0402C152*5RAC#
1800pF	C0402C182*8RAC#	C0402C182*4RAC#	C0402C182*3RAC#	
2200pF	C0402C222*8RAC#	C0402C222*4RAC#	C0402C222*3RAC#	
2700pF	C0402C272*8RAC#	C0402C272*4RAC#	C0402C272*3RAC#	
3300pF	C0402C332*8RAC#	C0402C332*4RAC#	C0402C332*3RAC#	
3900pF	C0402C392*8RAC#	C0402C392*4RAC#	C0402C392*3RAC#	
4700pF	C0402C472*8RAC#	C0402C472*4RAC#	C0402C472*3RAC#	

0603 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
180pF	C0603C181*5RAC	C0603C181*1RAC	C0603C181*2RAC
220pF	C0603C221*5RAC	C0603C221*1RAC	C0603C221*2RAC
270pF	C0603C271*5RAC	C0603C271*1RAC	C0603C271*2RAC
330pF	C0603C331*5RAC	C0603C331*1RAC	C0603C331*2RAC
390pF	C0603C391*5RAC	C0603C391*1RAC	C0603C391*2RAC
470pF	C0603C471*5RAC	C0603C471*1RAC	C0603C471*2RAC
560pF	C0603C561*5RAC	C0603C561*1RAC	C0603C561*2RAC
680pF	C0603C681*5RAC	C0603C681*1RAC	C0603C681*2RAC
820pF	C0603C821*5RAC	C0603C821*1RAC	C0603C821*2RAC
1000pF	C0603C102*5RAC	C0603C102*1RAC	C0603C102*2RAC
1200pF	C0603C122*5RAC	C0603C122*1RAC	
1500pF	C0603C152*5RAC	C0603C152*1RAC	
1800pF	C0603C182*5RAC	C0603C182*1RAC	
2200pF	C0603C222*5RAC	C0603C222*1RAC	
2700pF	C0603C272*5RAC	C0603C272*1RAC	
3300pF	C0603C332*5RAC	C0603C332*1RAC	
3900pF	C0603C392*5RAC	C0603C392*1RAC	
4700pF	C0603C472*5RAC	C0603C472*1RAC	
5600pF	C0603C562*5RAC		
6800pF	C0603C682*5RAC		
8200pF	C0603C822*5RAC		
10000pF	C0603C103*5RAC		
12000pF	C0603C123*5RAC		
15000pF	C0603C153*5RAC		
18000pF	C0603C183*5RAC		

0805 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
220pF	C0805C221*5RAC	C0805C221*1RAC	C0805C221*2RAC
270pF	C0805C271*5RAC	C0805C271*1RAC	C0805C271*2RAC
330pF	C0805C331*5RAC	C0805C331*1RAC	C0805C331*2RAC
390pF	C0805C391*5RAC	C0805C391*1RAC	C0805C391*2RAC
470pF	C0805C471*5RAC	C0805C471*1RAC	C0805C471*2RAC
560pF	C0805C561*5RAC	C0805C561*1RAC	C0805C561*2RAC
680pF	C0805C681*5RAC	C0805C681*1RAC	C0805C681*2RAC
820pF	C0805C821*5RAC	C0805C821*1RAC	C0805C821*2RAC
1000pF	C0805C102*5RAC	C0805C102*1RAC	C0805C102*2RAC
1200pF	C0805C122*5RAC	C0805C122*1RAC	C0805C122*2RAC
1500pF	C0805C152*5RAC	C0805C152*1RAC	C0805C152*2RAC
1800pF	C0805C182*5RAC	C0805C182*1RAC	C0805C182*2RAC
2200pF	C0805C222*5RAC	C0805C222*1RAC	C0805C222*2RAC
2700pF	C0805C272*5RAC	C0805C272*1RAC	C0805C272*2RAC
3300pF	C0805C332*5RAC	C0805C332*1RAC	C0805C332*2RAC
3900pF	C0805C392*5RAC	C0805C392*1RAC	C0805C392*2RAC
4700pF	C0805C472*5RAC	C0805C472*1RAC	C0805C472*2RAC
5600pF	C0805C562*5RAC	C0805C562*1RAC	C0805C562*2RAC
6800pF	C0805C682*5RAC	C0805C682*1RAC	C0805C682*2RAC
8200pF	C0805C822*5RAC	C0805C822*1RAC	
10000pF	C0805C103*5RAC	C0805C103*1RAC	
12000pF	C0805C123*5RAC		
15000pF	C0805C153*5RAC		
18000pF	C0805C183*5RAC		
22000pF	C0805C223*5RAC		
27000pF	C0805C273*5RAC		
33000pF	C0805C333*5RAC		
39000pF	C0805C393*5RAC		
47000pF	C0805C473*5RAC		
56000pF	C0805C563*5RAC		
68000pF	C0805C683*5RAC		
82000pF	C0805C823*5RAC		
.1uF	C0805C104*5RAC		

\* Insert proper letter code for desired tolerance:

±10 (K) Tolerance is standard

J = ±5%, K = ±10%, M = ±20%

^ Parts with caret (^) following catalog number are 2,500 pcs per reel.

# Parts with (#) following catalog number are 10,000 pcs per reel.

All others are 4,000 pcs per reel

**50 volt units can be used for 63 volt applications**

## X7R Temperature Coefficient

1206 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
1000pF	C1206C102*5RAC	C1206C102*1RAC	C1206C102*2RAC
1200pF	C1206C122*5RAC	C1206C122*1RAC	C1206C122*2RAC
1500pF	C1206C152*5RAC	C1206C152*1RAC	C1206C152*2RAC
1800pF	C1206C182*5RAC	C1206C182*1RAC	C1206C182*2RAC
2200pF	C1206C222*5RAC	C1206C222*1RAC	C1206C222*2RAC
2700pF	C1206C272*5RAC	C1206C272*1RAC	C1206C272*2RAC
3300pF	C1206C332*5RAC	C1206C332*1RAC	C1206C332*2RAC
3900pF	C1206C392*5RAC	C1206C392*1RAC	C1206C392*2RAC
4700pF	C1206C472*5RAC	C1206C472*1RAC	C1206C472*2RAC
5600pF	C1206C562*5RAC	C1206C562*1RAC	C1206C562*2RAC
6800pF	C1206C682*5RAC	C1206C682*1RAC	C1206C682*2RAC
8200pF	C1206C822*5RAC	C1206C822*1RAC	C1206C822*2RAC
10000pF	C1206C103*5RAC	C1206C103*1RAC	C1206C103*2RAC
12000pF	C1206C123*5RAC	C1206C123*1RAC	C1206C123*2RAC
15000pF	C1206C153*5RAC	C1206C153*1RAC	C1206C153*2RAC
18000pF	C1206C183*5RAC	C1206C183*1RAC	C1206C183*2RAC
22000pF	C1206C223*5RAC	C1206C223*1RAC	C1206C223*2RAC
27000pF	C1206C273*5RAC	C1206C273*1RAC	
33000pF	C1206C333*5RAC	C1206C333*1RAC	
39000pF	C1206C393*5RAC	C1206C393*1RAC	
47000pF	C1206C473*5RAC	C1206C473*1RAC	
56000pF	C1206C563*5RAC		
68000pF	C1206C683*5RAC		
82000pF	C1206C823*5RAC		
.1uF	C1206C104*5RAC		
.12uF	C1206C124*5RAC ^		
.15uF	C1206C154*5RAC ^		
.18 uF	C1206C184*5RAC ^		
.22 uF	C1206C224*5RAC ^		

1210 Size Code			
Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
2200pF	C1210C222*5RAC	C1210C222*1RAC	C1210C222*2RAC
2700pF	C1210C272*5RAC	C1210C272*1RAC	C1210C272*2RAC
3300pF	C1210C332*5RAC	C1210C332*1RAC	C1210C332*2RAC
3900pF	C1210C392*5RAC	C1210C392*1RAC	C1210C392*2RAC
4700pF	C1210C472*5RAC	C1210C472*1RAC	C1210C472*2RAC
5600pF	C1210C562*5RAC	C1210C562*1RAC	C1210C562*2RAC
6800pF	C1210C682*5RAC	C1210C682*1RAC	C1210C682*2RAC
8200pF	C1210C822*5RAC	C1210C822*1RAC	C1210C822*2RAC
10000pF	C1210C103*5RAC	C1210C103*1RAC	C1210C103*2RAC
12000pF	C1210C123*5RAC	C1210C123*1RAC	C1210C123*2RAC
15000pF	C1210C153*5RAC	C1210C153*1RAC	C1210C153*2RAC
18000pF	C1210C183*5RAC	C1210C183*1RAC	C1210C183*2RAC
22000pF	C1210C223*5RAC	C1210C223*1RAC	C1210C223*2RAC
27000pF	C1210C273*5RAC	C1210C273*1RAC	C1210C273*2RAC
33000pF	C1210C333*5RAC	C1210C333*1RAC	C1210C333*2RAC
39000pF	C1210C393*5RAC	C1210C393*1RAC	C1210C393*2RAC
47000pF	C1210C473*5RAC	C1210C473*1RAC	C1210C473*2RAC
56000pF	C1210C563*5RAC	C1210C563*1RAC	
68000pF	C1210C683*5RAC	C1210C683*1RAC	
82000pF	C1210C823*5RAC	C1210C823*1RAC	
.1uF	C1210C104*5RAC	C1210C104*1RAC ^	
.12uF	C1210C124*5RAC		
.15uF	C1210C154*5RAC		
.18uF	C1210C184*5RAC		
.22uF	C1210C224*5RAC ^		
.27uF	C1210C274*5RAC ^		
.33uF	C1210C334*5RAC ^		

\* Insert proper letter code for desired tolerance:

±10 (K) Tolerance is standard

J = ±5%, K = ±10%, M = ±20%

^ Parts with caret (^) following catalog number are 2,500 pcs per reel.  
All others are 4,000 pcs per reel

**50 volt units can be used for 63 volt applications**

## Z5U Temperature Coefficient

### 0805 Size Code

Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
6800pF	C0805C682*5UAC	C0805C682*1UAC	
8200pF	C0805C822*5UAC	C0805C822*1UAC	
10000pF	C0805C103*5UAC	C0805C103*1UAC	
12000pF	C0805C123*5UAC		
15000pF	C0805C153*5UAC		
18000pF	C0805C183*5UAC		
22000pF	C0805C223*5UAC		
27000pF	C0805C273*5UAC		
33000pF	C0805C333*5UAC		
39000pF	C0805C393*5UAC		
47000pF	C0805C473*5UAC		
56000pF	C0805C563*5UAC		
68000pF	C0805C683*5UAC		
82000pF	C0805C823*5UAC		
.1uF	C0805C104*5UAC		

### 1210 Size Code

Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
47000pF	C1210C473*5UAC	C1210C473*1UAC	
56000pF	C1210C563*5UAC	C1210C563*1UAC	
68000pF	C1210C683*5UAC	C1210C683*1UAC	
82000pF	C1210C823*5UAC	C1210C823*1UAC	
.1uF	C1210C104*5UAC		
.15uF	C1210C154*5UAC		
.18uF	C1210C184*5UAC		
.22uF	C1210C224*5UAC		
.27uF	C1210C274*5UAC		
.33uF	C1210C334*5UAC		
.39uF	C1210C394*5UAC		
.47uF	C1210C474*5UAC		

\* Insert proper letter code for desired tolerance:

±20 (M) Tolerance is standard

M = ±20%; Z = +80%-0%

### 1206 Size Code

Capacitance	Catalog Number		
	50 VDC	100 VDC	200 VDC
10000pF	C1206C103*5UAC	C1206C103*1UAC	
12000pF	C1206C123*5UAC	C1206C123*1UAC	
15000pF	C1206C153*5UAC	C1206C153*1UAC	
18000pF	C1206C183*5UAC	C1206C183*1UAC	
22000pF	C1206C223*5UAC	C1206C223*1UAC	
27000pF	C1206C273*5UAC	C1206C273*1UAC	
33000pF	C1206C333*5UAC	C1206C333*1UAC	
39000pF	C1206C393*5UAC	C1206C393*1UAC	
47000pF	C1206C473*5UAC		
56000pF	C1206C563*5UAC		
68000pF	C1206C683*5UAC		
82000pF	C1206C823*5UAC		
.1uF	C1206C104*5UAC		
.12uF	C1206C124*5UAC		
.15uF	C1206C154*5UAC		
.18uF	C1206C184*5UAC		
.22uF	C1206C224*5UAC		

**50 volt units can be used for 63 volt applications**

**Z5U meets all Y5V requirements and can be used in its place**

Y5V -  $\Delta C \leq +22/-82\%$  over  $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

Z5U -  $\Delta C \leq +22/-56\%$  over  $+10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

## Y5V Temperature Coefficient

0603 Size Code

Capacitance	Catalog Number		
	10 VDC	16 VDC	25 VDC
22000 pF	C0603C223*8VAC	C0603C223*4VAC	C0603C223*3VAC
27000 pF	C0603C273*8VAC	C0603C273*4VAC	C0603C273*3VAC
33000 pF	C0603C333*8VAC	C0603C333*4VAC	C0603C333*3VAC
39000 pF	C0603C393*8VAC	C0603C393*4VAC	C0603C393*3VAC
47000 pF	C0603C473*8VAC	C0603C473*4VAC	C0603C473*3VAC
56000 pF	C0603C563*8VAC	C0603C563*4VAC	C0603C563*3VAC
68000 pF	C0603C683*8VAC	C0603C683*4VAC	C0603C683*3VAC
82000 pF	C0603C823*8VAC	C0603C823*4VAC	C0603C823*3VAC
.1uF	C0603C104*8VAC	C0603C104*4VAC	C0603C104*3VAC
.15uF	C0603C154*8VAC	C0603C154*4VAC	C0603C154*3VAC
.22uF	C0603C224*8VAC	C0603C224*4VAC	C0603C224*3VAC

1206 Size Code

Capacitance	Catalog Number		
	10 VDC	16VDC	25 VDC
.22uF	C1206C224*8VAC	C1206C224*4VAC	C1206C224*3VAC
.33uF	C1206C334*8VAC	C1206C334*4VAC	C1206C334*3VAC
.47uF	C1206C474*8VAC	C1206C474*4VAC	C1206C474*3VAC
.68uF	C1206C684*8VAC	C1206C684*4VAC	C1206C684*3VAC
1.0uF	C1206C105*8VAC	C1206C105*4VAC	C1206C105*3VAC
2.2uF	C1206C225*8VAC	C1206C225*4VAC	

0805 Size Code

Capacitance	Catalog Number			
	10 VDC	16 VDC	25 VDC	50 VDC
22000 pF	C0805C223*8VAC	C0805C223*4VAC	C0805C223*3VAC	C0805C223*5VAC
27000 pF	C0805C273*8VAC	C0805C273*4VAC	C0805C273*3VAC	C0805C273*5VAC
33000 pF	C0805C333*8VAC	C0805C333*4VAC	C0805C333*3VAC	C0805C333*5VAC
39000 pF	C0805C393*8VAC	C0805C393*4VAC	C0805C393*3VAC	C0805C393*5VAC
47000 pF	C0805C473*8VAC	C0805C473*4VAC	C0805C473*3VAC	C0805C473*5VAC
56000 pF	C0805C563*8VAC	C0805C563*4VAC	C0805C563*3VAC	C0805C563*5VAC
68000 pF	C0805C683*8VAC	C0805C683*4VAC	C0805C683*3VAC	C0805C683*5VAC
82000 pF	C0805C823*8VAC	C0805C823*4VAC	C0805C823*3VAC	C0805C823*5VAC
.1uF	C0805C104*8VAC	C0805C104*4VAC	C0805C104*3VAC	C0805C104*5VAC
.15uF	C0805C154*8VAC	C0805C154*4VAC	C0805C154*3VAC	
.22uF	C0805C224*8VAC	C0805C224*4VAC	C0805C224*3VAC	
.33uF	C0805C334*8VAC	C0805C334*4VAC	C0805C334*3VAC	
.47uF	C0805C474*8VAC	C0805C474*4VAC	C0805C474*3VAC	
.68uF	C0805C684*8VAC	C0805C684*4VAC	C0805C684*3VAC	
1.0uF	C0805C105*8VAC	C0805C105*4VAC	C0805C105*3VAC	

1210 Size Code

Capacitance	Catalog Number	
	10 VDC	16VDC
.22uF	C1210C224*8VAC	C1210C224*4VAC
.33uF	C1210C334*8VAC	C1210C334*4VAC
.47uF	C1210C474*8VAC	C1210C474*4VAC
.68uF	C1210C684*8VAC	C1210C684*4VAC
1.0uF	C1210C105*8VAC	C1210C105*4VAC
2.2uF	C1210C225*8VAC	C1210C225*4VAC
3.7uF	C1210C375*8VAC	C1210C375*4VAC
4.7uF	C1210C475*8VAC	C1210C475*4VAC

\* Insert proper letter code for desired tolerance:  
M = ±20%; Z = +80%-0%

All Y5V units are supplied 4,000 pcs per reel

50 volt units can be used for 63 volt applications