

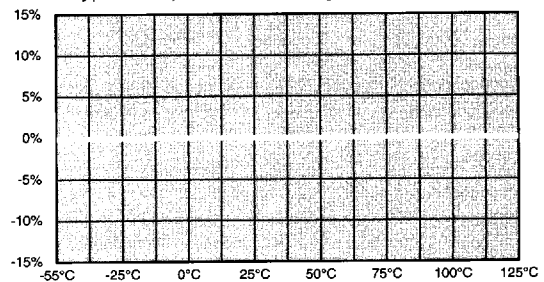
# Electrical Characteristics

## NPO DIELECTRIC CHARACTERISTICS

NPO capacitors feature Class I dielectric and exhibit extremely stable characteristics over time, temperature changes, and applied voltage. Ideally suited for precision applications such as filters, oscillators, and timing circuits

Temperature Coefficient:	0% ± 30 ppm / °C, -55 to +125°C
Dissipation Factor:	.001 (0.1%) max, 25°C
Ageing:	None
Insulation Resistance:	1000 ΩF or 100 GΩ, whichever is less @ 25°C, WVDC; 125°C IR is 10% of 25°C rating.
Dielectric Strength:	2.5 X WVDC min, 25°C, 50 mA max
Test Parameters:	1KHz ±50Hz, 1.0±0.2 VRMS, Values > 100 pF 1Mhz ±50kHz, 1.0±0.2 VRMS, Values ≤ 100 pF

Typical Capacitance Change vs Temperature

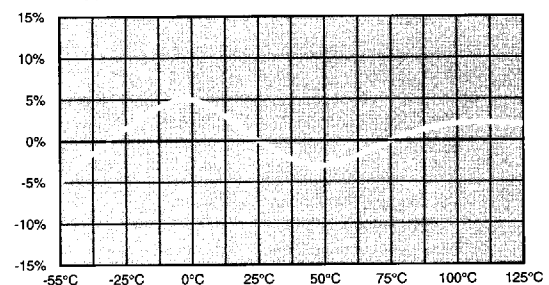


## X7R DIELECTRIC CHARACTERISTICS

X7R capacitors feature Class II dielectric and exhibit relatively stable characteristics and a substantial increase in available capacitance values than that of NPO. Ideally suited for bypass and decoupling applications, filtering, DC blocking, and voltage suppression.

Temperature Coefficient:	± 15% , -55 to +125°C
Dissipation Factor:	.025 (2.5%) max, 25°C
Ageing:	2.5% / decade hour, typical
Insulation Resistance:	1000 ΩF or 100 GΩ, whichever is less @ WVDC, 25°C; 125°C IR is 10% of 25°C rating.
Dielectric Strength:	2.5 X WVDC min, 25°C, 50 mA max
Test Parameters:	1KHz ±50Hz, 1.0±0.2 VRMS

Typical Capacitance Change vs Temperature

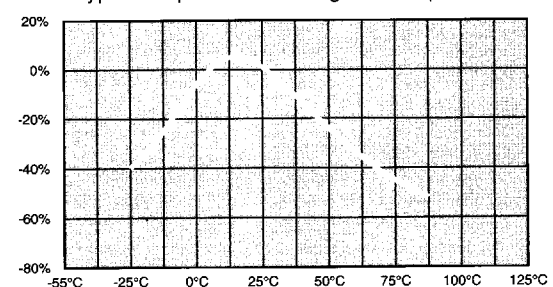


## Z5U DIELECTRIC CHARACTERISTICS

Z5U capacitors feature Class III dielectric characteristics and a further increase in available capacitance values than that of X7R. Ideally suited for bypass and decoupling applications in circuits operating with low DC bias at or near room temperature.

Temperature Coefficient:	+ 22% - 56% , +10 to +85°C
Dissipation Factor:	.04 (4%) max, 25°C
Ageing:	5% / decade hour, typical
Insulation Resistance:	100 ΩF or 10 GΩ, whichever is less, @ WVDC, 25°C.
Dielectric Strength:	2.5 X WVDC min, 25°C, 50 mA max
Test Parameters:	1KHz ±50Hz, 0.5±0.1 VRMS

Typical Capacitance Change vs Temperature

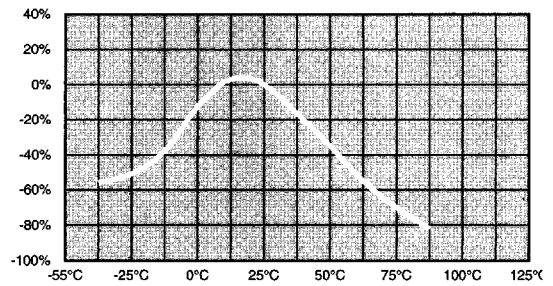


### Y5V DIELECTRIC CHARACTERISTICS

Y5V capacitors feature Class III dielectric and offer the highest capacitance values available. Ideally suited for bypass and decoupling applications where space is at a premium or as replacements for tantalum capacitors. Best performance is obtained at or near room temperature and at low DC bias conditions.

- Temperature Coefficient: + 22% - 82% , -30 to 85°C
- Dissipation Factor: .05 (5%) max, 25°C
- Ageing: 7% / decade hour
- Insulation Resistance: 100 ΩF or 10 GΩ, whichever is less, @ WVDC, 25°C
- Dielectric Strength: 2.5 X WVDC min, 25°C, 50 mA max
- Test Parameters: 1Khz ±50Hz, 0.5±0.1 VRMS

Typical Capacitance Change vs Temperature



### HOW TO ORDER (Surface Mount)

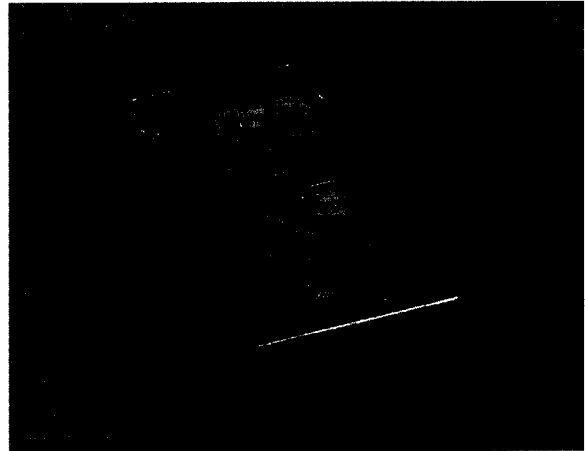
<b>500</b>	<b>R15</b>	<b>W</b>	<b>102</b>	<b>K</b>	<b>V</b>	<b>4</b>	<b>E</b>																		
<p><b>VOLTAGE</b></p> <p>160 = 16 V 250 = 25 V 500 = 50 V 101 = 100 V</p>	<p><b>CASE SIZE</b></p> <p>R07=0402 R14=0603 R15=0805 R18=1206 S41=1210 S43=1812</p>	<p><b>DIELECTRIC CHARACTERISTIC</b></p> <p>N = NPO      W = X7R Z = Z5U      Y = Y5V</p>	<p><b>CAPACITANCE</b></p> <p>1st two digits are significant; third digit denotes number of zeros, R = decimal.</p> <p>1R0 = 1.0 pF 100 = 10 pF 102 = 1,000 pF 474 = 0.47 μF</p>	<p><b>TOLERANCE</b></p> <p>N P O X 7 R Z S U</p> <p>* B = ± 0.10 pF * C = ± 0.25 pF * D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 % - 20 %</p> <p>Y5V: Z Tolerance * Values &lt; 10 pF only</p>	<p><b>TERMINATION</b></p> <p>V = Nickel Barrier</p>	<p><b>MARKING</b></p> <p>4 = Unmarked 6 = EIA "J" Code</p>	<p><b>TAPE MODIFIER</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Type</th> <th>Reel</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>Embossed</td> <td>7"</td> </tr> <tr> <td>U</td> <td>Embossed</td> <td>13"</td> </tr> <tr> <td>T</td> <td>Punched Paper</td> <td>7"</td> </tr> <tr> <td>R</td> <td>Punched Tape</td> <td>13"</td> </tr> <tr> <td>None</td> <td>Bulk Packaged</td> <td></td> </tr> </tbody> </table> <p>JDI tape specifications conform to EIA RS481.</p>	Code	Type	Reel	E	Embossed	7"	U	Embossed	13"	T	Punched Paper	7"	R	Punched Tape	13"	None	Bulk Packaged	
Code	Type	Reel																							
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None	Bulk Packaged																								



# Chip Capacitors for Hybrid Circuits

## HYBRID CHIP CAPACITORS

Offered with Palladium-Silver terminations suited for epoxy, low-medium temperature solder, and bond attachment processes. Dielectric specifications are shown on pages 4 & 5. BX dielectric characteristics are available at 50% of X7R voltage rating. Capacitance selection is offered in multiples of the following significant values: 10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82, 100. Popular values are also available in 1206, 1808, & 1812 sizes. Please consult the factory for capacitance, tolerance, or voltage requirements not shown.



CASE JDI	SIZE EIA	DIELEC. TYPE	AVAILABLE CAPACITANCE								
			1.0	10 pF	100 pF	1000 pF	.01 $\mu$ F	.10 $\mu$ F	1.0 $\mu$ F		
<b>R09 (0403)</b> Length .040 (1.02) Width .030 (.762) Thick .030 (.762) E/B .005 (.127)		NPO	1R0	680	101						100 Volt 50 Volt
		X7R		181		102	562				
		Z5U				102		223			
<b>R11 (0504)</b> Length .050 (1.27) Width .040 (1.02) Thick .040 (1.02) E/B .005 (0.38)		NPO	1R0		331	561					
		X7R		101			103	153			
		Z5U				102			473		
<b>R15 (0805)</b> Length .080 (2.03) Width .050 (1.27) Thick .050 (1.27) E/B .015 (0.38)		NPO	1R0			102	152				
		X7R		101				273	563		
		Z5U						472		154	
<b>S41 (1210)</b> Length .125 (3.18) Width .095 (2.41) Thick .065 (1.65) E/B .020 (.508)		NPO		101			472	103			
		X7R					102		104	334	
		Z5U							103		105

## HOW TO ORDER

<b>500</b>	<b>R11</b>	<b>W</b>	<b>103</b>	<b>K</b>	<b>P</b>	<b>4</b>	<b>E</b>
<b>VOLTAGE</b> Standard Voltages: 250 = 25 V 500 = 50 V 101 = 100 V	<b>CASE SIZE</b> See chart <b>DIELECTRIC</b> N = NPO W = X7R B = BX Z = Z5U	<b>CAPACITANCE</b> 1st two digits are significant; third digit denotes number of zeros, R = decimal. 1R0 = 1.0 pF 100 = 10 pF 102 = 1,000 pF 474 = 0.47 $\mu$ F	<b>TOLERANCE</b> * C = $\pm 0.25$ pF * D = $\pm 0.50$ pF J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ Z = $+80\% - 20\%$ * Values < 10 pF only	<b>TERMINATION</b> P = Palladium Silver <b>MARKING</b> 4 = Unmarked 6 = EIA "J" Code 3 = Non-Std Mark	<b>PART MODIFIER</b> Code Description H Hi-Rel Tests* W Waffle Package S Special Part None Bulk Package *Testing requirements specified by customer.		

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[C1608X7R1E334K](#) [C2012C0G2A472J](#) [2220J2K00562KXT](#) [KHC201E225M76N0T00](#) [1812J2K00332KXT](#) [CCR06CG153FSV](#)  
[CDR14BP471CJUR](#) [CDR31BX103AKWR](#) [CDR33BX683AKUS](#) [CGA2B2C0G1H010C](#) [CGA2B2C0G1H040C](#) [CGA2B2C0G1H050C](#)  
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[CGA2B2C0G1H390J](#) [CGA2B2C0G1H391J](#) [CGA2B2C0G1H3R3C](#) [CGA2B2C0G1H680J](#) [CGA2B2C0G1H6R8D](#) [CGA2B2C0G1H820J](#)