





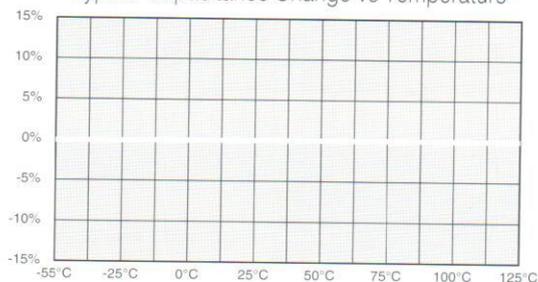
# Electrical Characteristics

## 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:  $0\% \pm 30 \text{ ppm} / ^\circ\text{C}$ ,  $-55$  to  $+125^\circ\text{C}$   
 Dissipation Factor: .001 (0.1%) max,  $25^\circ\text{C}$   
 Ageing: None  
 Insulation Resistance:  $1000 \Omega\text{F}$  or  $100 \text{ G}\Omega$ , whichever is less @  $25^\circ\text{C}$ , WVDC;  $125^\circ\text{C}$  IR is 10% of  $25^\circ\text{C}$  rating.  
 Dielectric Strength:  $2.5 \times \text{WVDC}$  min,  $25^\circ\text{C}$ , 50 mA max  
 Test Parameters: 1KHz  $\pm 50\text{Hz}$ ,  $1.0 \pm 0.2 \text{ VRMS}$ , Values  $> 100 \text{ pF}$   
 1MHz  $\pm 50\text{kHz}$ ,  $1.0 \pm 0.2 \text{ VRMS}$ , Values  $\leq 100 \text{ pF}$

Typical Capacitance Change vs Temperature

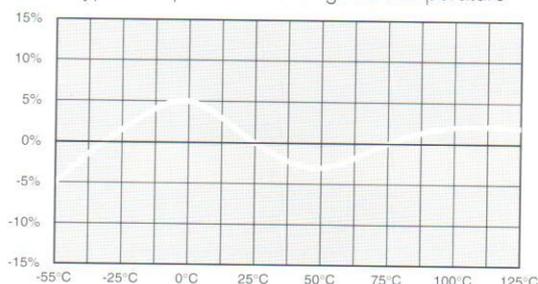


## X7R DIELECTRIC CHARACTERISTICS

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:  $\pm 15\%$ ,  $-55$  to  $+125^\circ\text{C}$   
 Dissipation Factor: .025 (2.5%) max,  $25^\circ\text{C}$   
 Ageing: 2.5% / decade hour, typical  
 Insulation Resistance:  $1000 \Omega\text{F}$  or  $100 \text{ G}\Omega$ , whichever is less @ WVDC,  $25^\circ\text{C}$ ;  $125^\circ\text{C}$  IR is 10% of  $25^\circ\text{C}$  rating.  
 Dielectric Strength:  $2.5 \times \text{WVDC}$  min,  $25^\circ\text{C}$ , 50 mA max  
 Test Parameters: 1KHz  $\pm 50\text{Hz}$ ,  $1.0 \pm 0.2 \text{ VRMS}$

Typical Capacitance Change vs Temperature

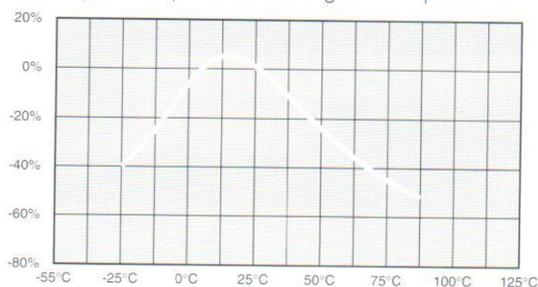


## Z5U DIELECTRIC CHARACTERISTICS

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  $+85^\circ\text{C}$   
 Dissipation Factor: .04 (4%) max,  $25^\circ\text{C}$   
 Ageing: 5% / decade hour, typical  
 Insulation Resistance:  $100 \Omega\text{F}$  or  $10 \text{ G}\Omega$ , whichever is less, @ WVDC,  $25^\circ\text{C}$ .  
 Dielectric Strength:  $2.5 \times \text{WVDC}$  min,  $25^\circ\text{C}$ , 50 mA max  
 Test Parameters: 1KHz  $\pm 50\text{Hz}$ ,  $0.5 \pm 0.1 \text{ VRMS}$

Typical Capacitance Change vs Temperature

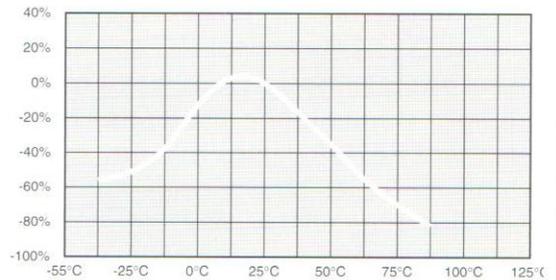


## Y5V DIELECTRIC CHARACTERISTICS

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>																		
<b>VOLTAGE</b> 160 = 16 V 250 = 25 V 500 = 50 V 101 = 100 V	<b>CASE SIZE</b> R07=0402 R14=0603 R15=0805 R18=1206 S41=1210 S43=1812	<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 μF	<b>TOLERANCE</b> NPO X7R Z5U * 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 % Y5V: Z Tolerance * Values < 10 pF only	<b>TERMINATION</b> V = Nickel Barrier	<b>MARKING</b> 4 = Unmarked 6 = EIA "J" Code	<b>TAPE MODIFIER</b> <table border="1"> <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 Paper</td><td>13"</td></tr> <tr><td>None</td><td>Bulk Packaged</td><td></td></tr> </tbody> </table> JDI tape specifications conform to EIA RS481.	Code	Type	Reel	E	Embossed	7"	U	Embossed	13"	T	Punched Paper	7"	R	Punched Paper	13"	None	Bulk Packaged		<b>DIELECTRIC CHARACTERISTIC</b> N = NPO      W = X7R Z = Z5U      Y = Y5V
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Standard capacitance tolerances are as follows: NPO = J, X7R = K, Z5U = M, Y5V = Z. Tighter tolerances are offered in each dielectric as indicated on many high volume parts but may not be available on all sizes & values shown. Please consult the factory with your specific requirements.