

***Applications-Information 08/08***

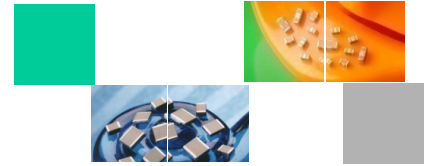
**Novacap's X7R and X5R series - alternative to tantalum and electrolytic capacitors in filter applications**

Novacap's X7R- and X5R Series



The in the **new X7R and X5R series** are packaged in **0402 to 1812 case sizes** with a **capacitance value range of 100 pF to 100  $\mu$ F**. These devices are ideal for **replacing polarized tantalum and electrolytic capacitors to simplify manufacturing**. Their **low ESR characteristics**, typically one to two orders of magnitude lower than alternative devices **at frequencies greater than 10 kHz**, allow for comparable filter circuit designs to be achieved at typically one-third to one-fifth of the capacitance values. Additionally, these devices offer **improved reliability performance** over tantalum and electrolytic capacitors utilizing less power. Typical applications for these capacitors **include digital circuits, power supply bypass capacitors, LCD modules, smoothing capacitors and input-output filters in DC-DC converters**.

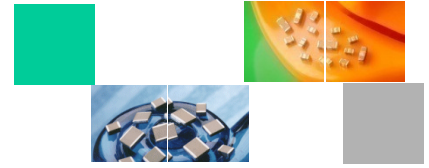




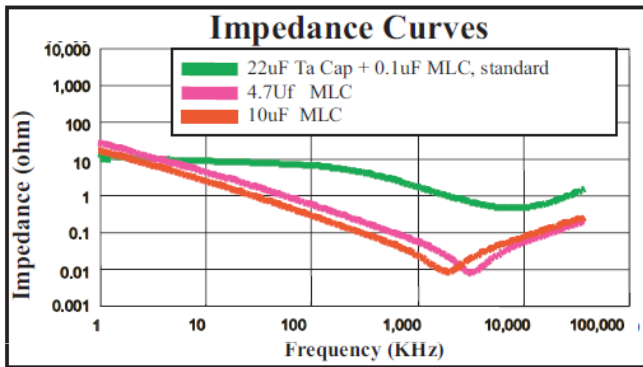
### ***Applications-Information 08/08***

#### **Novacap's value-added capabilities for the X7R and X5R series include:**

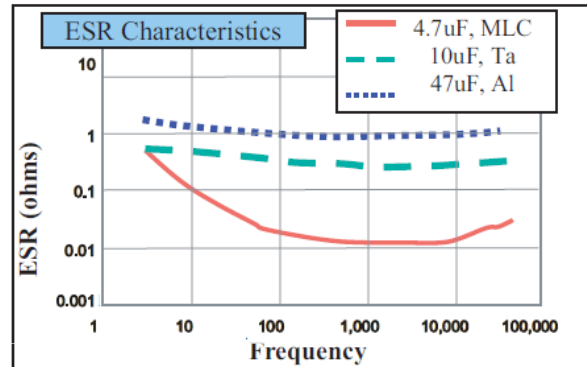
- Ability to provide unique, non-standard plating finishes, such as gold.
- Ability to assemble and stack capacitors to increase capacitance for a given board pad space without imposing a height restriction.
- Ability to use a single pick-and-place step to put the high-capacitance-value devices into an array along with multiple components (i.e., capacitors, resistor, inductors).
- Ability to affix various standard and custom lead frames to improve reliability through thermal and mechanical stress reduction.
- Ability to screen for optimum reliability. Products are burned in at an elevated voltage and temperature and are 100% electrically inspected to ascertain conformance to strict performance criteria.
- Ability to screen capacitor groups to various reliability MIL PRF levels (Group A, Group B, Group C tests) and provide qualification testing for each customer's SCD requirements.
- Ability to comply with environmentally friendly standards such as RoHS.



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TYPICAL DATA



TYPICAL DATA

**DIELECTRIC CHARACTERISTICS - X7R**

OPERATING TEMPERATURE RANGE: -55°C to 125°C

TEMPERATURE COEFFICIENT (X7R): +/-15% ΔC Max.

DISSIPATION FACTOR: 3.5% max Except:  
 0805 ≥ 1.0μF = 5%  
 1206 ≥ 4.7μF = 5%  
 1206 ≥ 22μF = 10%  
 1210 ≥ 10μF = 5%

INSULATION RESISTANCE, 25°C > 10GΩ or >500ΩF whichever is less

DIELECTRIC WITHSTANDING VOLTAGE: 250%

TEST PARAMETERS, 25°C 1KHz, 1.0 +/- 0.2 VRMS

**DIELECTRIC CHARACTERISTICS - X5R**

OPERATING TEMPERATURE RANGE: -55°C to 85°C

TEMPERATURE COEFFICIENT (X5R): +/-15% ΔC Max.

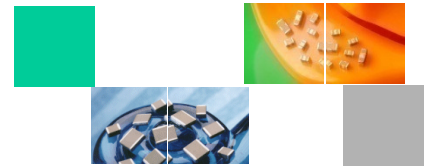
DISSIPATION FACTOR: 5% max Except:  
 0603 ≥ 2.2μF = 10%  
 0805 ≥ 10μF = 10%  
 1206 ≥ 22μF = 10%  
 1210 ≥ 47μF = 10%  
 1812 at 100μF = 10%

INSULATION RESISTANCE, 25°C > 10GΩ or >500ΩF whichever is less

DIELECTRIC WITHSTANDING VOLTAGE: 250%

TEST PARAMETERS, 25°C 1KHz, 1.0 +/- 0.2 VRMS  
 Except: 22μF 47μF and 100 μF  
 120 Hz, 0.5 +/- 0.1 VRMS





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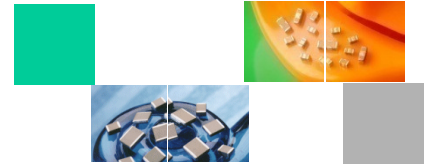
#### DIMENSIONS

SIZE	0402	0603	0805	1206	1210	1812
<b>DIMENSIONS</b> LENGTH L	.040 (1.02)	.063(1.60)	.080 (2.03)	.126 (3.20)	.126 (3.20)	.180 (4.57)
WIDTH W	.020 (.508)	.032 (.813)	.050 (1.27)	.063 (1.62)	.100 (2.54)	.125 (3.18)
T MAX.	.024 (.610)	.035 (.889)	.054 (1.37)	.072 (1.83)*	.085 (2.16)*	.110 (2.79)*
MB	.010 (.254)	.014 (.356)	.020 (.508)	.020 (.508)	.024 (.607)	.035 (.889)
<b>TOLERANCE +/-</b> LENGTH	.004 (.102)	.006 (.152)	.008 (.203)	.008 (.203)	.012 (.305)	.016 (.406)
WIDTH	.004 (.102)	.006 (.152)	.008 (.203)	.008 (.203)	.012 (.305)	.012 (.305)
MB	.004 (.102)	.010 (.254)	.010 (.254)	.012 (.305)	.012 (.305)	.020 (.508)

Dimensions in inches; bracketed dimensions in millimeters.

#### HOW TO ORDER

1206	W	476	M	6R3	N	X072	T
<b>SIZES</b>	<b>DIELECTRIC</b>	<b>CAPACITANCE</b>	<b>TOLERANCE</b>	<b>VOLTAGE-VDCW</b>	<b>TERMINATION</b>	<b>THICKNESS OPTION</b>	<b>PACKING OPTION</b>
0402	B = X7R	Value in Picofarads	K = +/- 10 %	160 = 16V	N = Nickel Barrier (100% Tin)	X = Denotes thickness maximum (Tmax). See NOTES on previous page for further explanation.	T = Reeled (Blank) = Bulk
0603	W = X5R	Two significant figures, followed by number of zeros:	M = +/- 20 %	250 = 25V	Y = Nickel Barrier (90% Tin/10% Lead)		
0805				500 = 50V	NG = Nickel Barrier Gold Flash		
1206				100 = 10V			
1210			47,000,000 pF		6R3 = 6.3V		
1812			476 = 47 μF		4R0 = 4.0V		

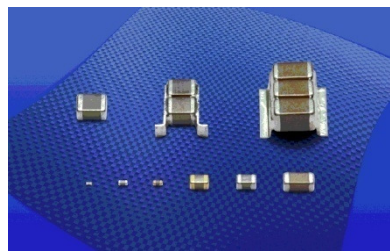


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**Please contact us for more information, samples and catalogs!!**

**We inform you gladly!!!**

***Your wts Team***



***Imprint***

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