

X2Y® EMI FILTER CAPACITORS



X2Y® filter capacitors employ a unique, patented design featuring two matched or balanced capacitors that are immune to temperature, voltage and aging performance differences.

This components offers superior filter and decoupling performance, virtually eliminates parasitics, and can replace multiple capacitors and inductors saving board space and reducing assembly costs.

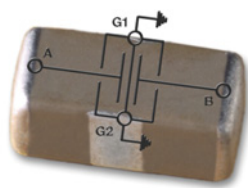
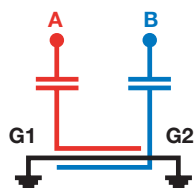
ADVANTAGES

- Superior noise suppression
- Differential and common mode attenuation
- Replace multiple components with one device
- Matched capacitance line to ground, both lines
- Low inductance due to cancellation effect

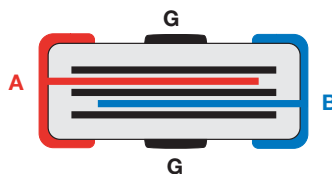
APPLICATIONS

- DC Motor Suppression
- Filtered Connectors
- Fiber Optic Components
- Cellular Handsets
- Broadband Filtering

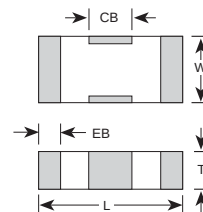
Equivalent Circuits



Cross-sectional View



Dimensional View



AVAILABLE CAPACITANCE & VOLTAGE RANGES

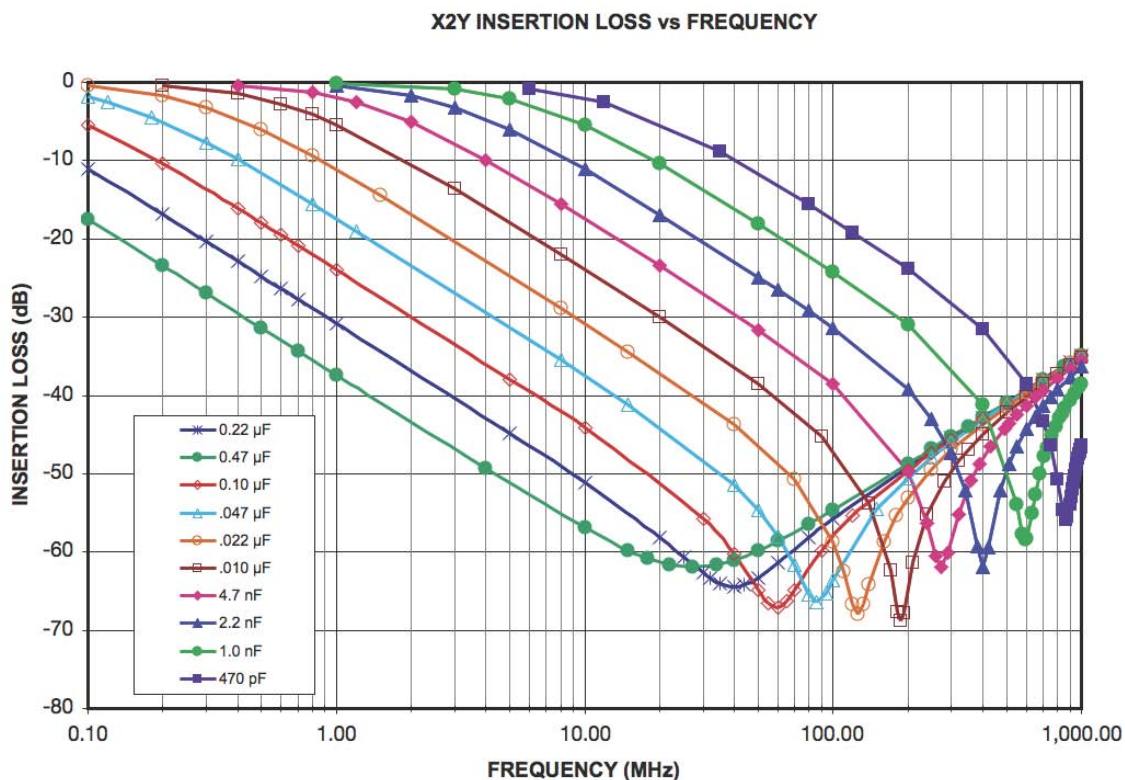
CHIP SIZE		DIELECTRIC	VOLTAGE (WVDC)	C1 CAPACITANCE RANGE		JOHANSON PART NUMBER
EIA	JDI			VALUE	CODE	
0603	X14	NPO	50	22 pF - 220 pF	220 - 221	500X14N***MV4*
		X7R	50	470 pF - .010 μ F	471 - 103	500X14W***MV4*
0805	X15	NPO	50	22 pF - 470 pF	220 - 471	500X15N***MV4*
		X7R	50	1000 pF - .47 μ F	102 - 474	500X15W***MV4*
1206	X18	NPO	50	1000 pF	102	500X18N***MV4*
		X7R	50	.022 μ F - 0.10 μ F	223 - 104	500X18W***MV4*
1410	X44	X7R	50	0.22 μ F - 0.68 μ F	224 - 684	500X44N***MV4*
1812	X43	X7R	50	0.22 μ F - 0.47 μ F	224 - 474	500X43N***MV4*

C1 = A or B to ground , C2 = A to B. Voltage rating is for A or B to ground.

X2Y filter capacitor meet JDI standard NPO & X7R dielectric specifications listed on page 20.

X2Y® technology patents and registered trademark under license from X2Y ATTENUATORS, LLC

X2Y® EMI FILTER CAPACITORS



MECHANICAL CHARACTERISTICS

	X14 / 0603		X15 / 0805		X18 / 1206		X43 / 1812		X44 / 1410	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
L	.064 ± .005	1.63 ± 0.13	.080 ± .008	2.03 ± 0.20	0.124 ± .010	3.15 ± 0.25	0.174 ± .010	4.42 ± 0.25	0.140 ± .010	3.56 ± 0.25
W	.035 ± .004	0.89 ± 0.10	.050 ± .008	1.27 ± 0.20	.063 ± .010	1.60 ± 0.25	0.125 ± .010	3.18 ± 0.25	.098 ± .010	2.49 ± 0.25
T	.026 max	0.66 max	.040 max	1.02 max	.050 max	1.27 max	.090 max	2.29 max	.070 max	1.78 max
EB	.009 ± .003	0.23 ± .08	.009 ± .003	0.23 ± .08	.009 ± .004	0.23 ± 0.10	.009 ± .004	0.23 ± 0.10	.009 ± .004	0.23 ± 0.10
CB	.018 ± .003	0.46 ± .08	.020 ± .004	0.51 ± 0.10	.040 ± .005	1.02 ± 0.13	.045 ± .005	1.14 ± 0.13	.045 ± .005	1.14 ± 0.13

HOW TO ORDER X2Y® EMI FILTER CAPACITORS

500	X18	W	473	M	V	4	E
VOLTAGE (C1) 500 = 50 V 101 = 100 V	CASE SIZE X14 = 0603 X15 = 0805 X18 = 1206 X43 = 1812 X44 = 1410	DIELECTRIC N = NPO W = X7R	CAPACITANCE 1st two digits are significant; third digit denotes number of zeros. 474 = 0.47 µF 105 = 1.00 µF	TOLERANCE M = ± 20%	TERMINATION V = Ni barrier w/ 100% Sn Plating	MARKING 4 = Unmarked	TAPE MODIFIER Code Tape Reel E Embossed 7" U Embossed 13" T Paper 7" R Paper 13" Tape specs. per EIA RS481

P/N written: 500X18W473MV4E

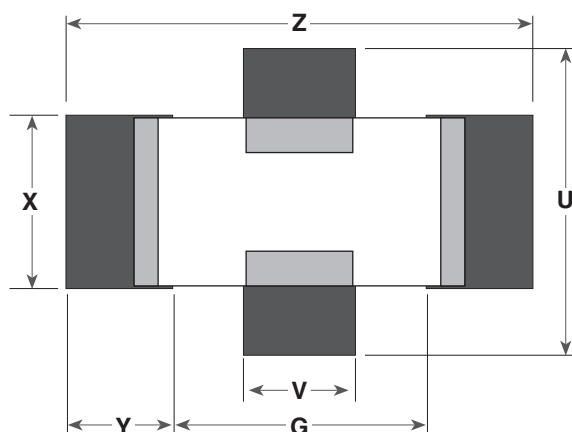
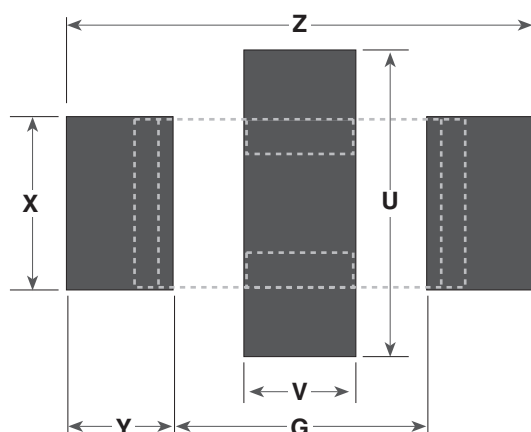


X2Y® EMI FILTER CAPACITORS

MECHANICAL CHARACTERISTICS & MOUNTING RECOMMENDATIONS

	X14 / 0603		X15 / 0805		X18 / 1206		X43 / 1812		X44 / 1410	
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For optimized X2Y device performance it is essential that each ground terminal be connected to system ground with the lowest resistance, shortest path possible. Recommended pad dimensions are typical. Individual manufacturing processes and application design requirements may necessitate modification of these dimensions.

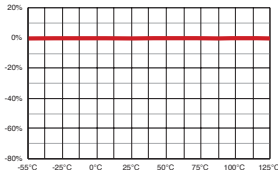
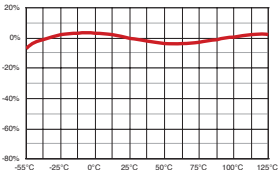
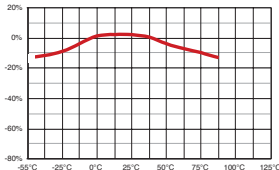


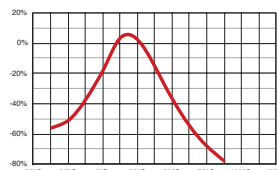
SOLDER PAD RECOMMENDATIONS

	0603		0805		1206		1410		1812	
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
X	0.037	0.94	0.052	1.32	0.065	1.65	0.100	2.54	0.127	3.23
Y	0.029	0.74	0.035	0.89	0.040	1.02	0.040	1.02	0.040	1.00
Z	0.100	2.54	0.125	3.18	0.175	4.45	0.190	4.60	0.225	5.72
G	0.042	1.07	0.055	1.40	0.095	2.41	0.110	2.79	0.146	3.71
U	0.080	2.03	0.100	2.54	0.115	2.92	0.150	3.81	0.175	4.45
V	0.020	0.51	0.022	0.56	0.042	1.07	0.047	1.19	0.047	1.19



ELECTRICAL CHARACTERISTICS

PARAMETER	NPO		X7R		X5R	
TEMPERATURE COEFFICIENT:	0± 30 ppm/°C	-55 to +125°C	± 15%	-55 to +125°C	± 15%	-55 to +85°C
						
DISSIPATION FACTOR:	.001 (0.1%) max		For Vrated ≥ 50 VDC, DF = 2.5% max For Vrated = 125 VDC, DF = 3.0% max For Vrated = 116 VDC, DF = 3.5% max		For Vrated = 25 VDC, DF = 3.0% max For Vrated = 16 VDC, DF = 3.5% max For Vrated = 10 VDC, DF = 5.0% max	
AGING:	None		2.5% / decade hour			
INSULATION RESISTANCE:	IR @ 25°C, WVDC = 1000ΩF or 100GΩ whichever is less ¹ IR @ 125°C, WVDC = 10% of 25°C rating				IR @ 25°C, WVDC = 1000ΩF or 100GΩ whichever is less ²	
DIELECTRIC STRENGTH:	For Vrated = 6 - 200 VDC, DWV = 2.5 X WVDC, 25°C, 50mA max. For Vrated = 201 - 499 VDC, DWV = 2.0 X WVDC, 25°C, 50mA max. For Vrated = 500 - 999 VDC, DWV = 1.5 X WVDC, 25°C, 50mA max. For Vrated = 1000+ VDC, DWV = 1.2 X WVDC, 25°C, 50mA max.				DWV = 2.5 X WVDC, 25°C, 50mA max.	
TEST PARAMETERS:	C > 100 pF; 1kHz ±50Hz; 1.0±0.2 VRMS C ≤ 100 pF 1Mhz ±50kHz; 1.0±0.2 VRMS		1kHz ±50Hz; 1.0±0.2 VRMS		1kHz ±50Hz; 1.0±0.2 VRMS	
NOTES:			1) Tanceram X7R IR = 500 ΩF or 10 GΩ,		2) Tanceram X5R IR = 500 ΩF or 10 GΩ	

PARAMETER	Z5U		X7R	
TEMPERATURE COEFFICIENT:	+22% -56%	+10 to +85°C	+22% -82%	-30 to +85°C
				
DISSIPATION FACTOR:	For Vrated ≥ 25 VDC, DF = 4.0 % max For Vrated = 16 VDC, DF = 5.0 % max		For Vrated = 25 VDC, DF = 5.0% max For Vrated = 16 VDC, DF = 7.0% max For Vrated = 10 VDC, DF = 9.0% max	
AGING:	5.0 % / decade hour		7.0 % / decade hour	
INSULATION RESISTANCE:	IR @ 25°C, WVDC = 100ΩF or 10GΩ whichever is less			
DIELECTRIC STRENGTH:	DWV = 2.5 X WVDC, 25°C, 50mA max.			
TEST PARAMETERS:	1kHz ±50Hz; 0.5±0.2 VRMS		1kHz ±50Hz; 1.0±0.2 VRMS	
NOTES:				