

# Surface Mount EMI Filters - E03 X2Y Integrated Passive Components

The Syfer X2Y Integrated Passive Component is a 3 terminal EMI chip device.

When used in balanced line applications, the revolutionary design provides simultaneous line-to-line and line-to-ground filtering, using a single ceramic chip. In this way, differential and common mode filtering are provided in one device.

For unbalanced applications, it provides ultra low ESL (equivalent series inductance). Capable of replacing 2 or more conventional devices, it is ideal for balanced and unbalanced lines, twisted pairs and dc motors, in automotive, audio, sensor and other applications.

Available in sizes from 0805 to 1812, these filters can prove invaluable in meeting stringent EMC demands.

Manufactured by Knowles Capacitors under licence from X2Y Attenuators LLC.



## Dielectric

X7R or COG/NPO

## Electrical configuration

Multiple capacitance

## Capacitance measurement

At 1000hr point

## Typical capacitance matching

Better than 5%  
(down to 1% available on request)

## Temperature rating

-55°C to 125°C

## Insulation resistance

100Gohms or 1000s (whichever is the less)

## Dielectric withstand voltage

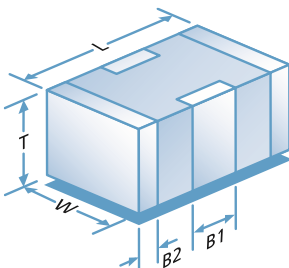
≤200V 2.5 times rated Volts for 5 secs  
500V 1.5 times rated Volts for 5 secs  
Charging current limited to 50mA Max.

Type		E03			
Chip size		0805	1206	1410	1812
Rated voltage	Dielectric				
16Vdc	COG/NPO	-	-	-	-
	X7R	-	-	-	-
25Vdc	COG/NPO	560pF - 820pF	1.8nF - 3.3nF	6.8nF - 8.2nF	12nF - 15nF
	X7R	56nF - 68nF	-	470nF	820nF
50Vdc	COG/NPO	390pF - 470pF	1.2nF - 1.5nF	4.7nF - 5.6nF	8.2nF - 10nF
	X7R	18nF - 47nF	56nF - 220nF	180nF - 400nF	390nF - 680nF
100Vdc	COG/NPO	10pF - 330pF	22pF - 1.0nF	100pF - 3.9nF	820pF - 6.8nF
	X7R	470pF - 15nF	1.5nF - 47nF	4.7nF - 150nF	8.2nF - 330nF
200Vdc	COG/NPO	-	22pF - 1.0nF	100pF - 3.3nF	820pF - 5.6nF
	X7R	-	820pF - 33nF	1.2nF - 120nF	2.7nF - 180nF
500Vdc	COG/NPO	-	-	-	820pF - 3.9nF
	X7R	-	-	-	2.7nF - 100nF

Note: For some lower capacitance parts, higher voltage rated parts may be supplied.

## AEC-Q200 range (E03) - capacitance values

Chip size		0805	1206	1410	1812
50Vdc	COG/NPO	390pF - 470pF	1.2nF - 1.5nF	4.7nF - 5.6nF	8.2nF - 10nF
	X7R	18nF - 33nF	56nF - 150nF	180nF - 330nF	390nF - 560nF
100Vdc	COG/NPO	10pF - 330pF	22pF - 1.0nF	100pF - 3.9nF	820pF - 6.8nF
	X7R	470pF - 15nF	1.5nF - 47nF	4.7nF - 150nF	8.2nF - 330nF

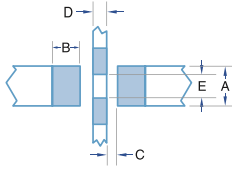


	0805	1206	1410	1812
L	2.0±0.3 (0.08±0.012)	3.2±0.3 (0.126±0.012)	3.6±0.3 (0.14±0.012)	4.5±0.35 (0.18±0.014)
W	1.25±0.2 (0.05±0.008)	1.60±0.2 (0.063±0.008)	2.5±0.3 (0.1±0.012)	3.2±0.3 (0.126±0.012)
T	1.0±0.15 (0.04±0.006)	1.1±0.2 (0.043±0.008)	2.0 max. (0.08 max.)	2.1 max. (0.08 max.)
B1	0.5±0.25 (0.02±0.01)	0.95±0.3 (0.037±0.012)	1.20±0.3 (0.047±0.012)	1.4±0.35 (0.06±0.014)
B2	0.3±0.15 (0.012±0.006)	0.5±0.25 (0.02±0.01)	0.5±0.25 (0.02±0.01)	0.75±0.25 (0.03±0.01)

- Notes: 1) All dimensions mm (inches).  
2) Pad widths less than chip width gives improved mechanical performance.  
3) The solder stencil should place 4 discrete solder pads. The un-printed distance between ground pads is shown as dim E.  
4) Insulating the earth track underneath the filters is acceptable and can help avoid displacement of filter during soldering but can result in residue entrapment under the chip.

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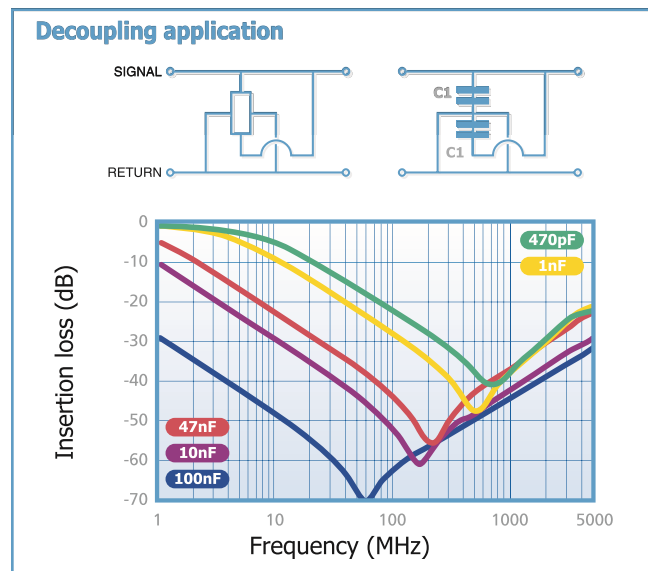
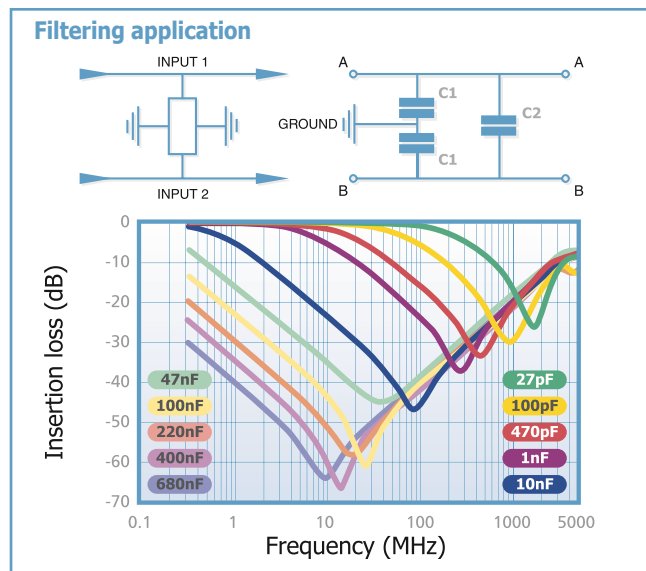
## Recommended solder lands



	0805	1206	1410	1812
A	0.95 (0.037)	1.2 (0.047)	2.05 (0.08)	2.65 (0.104)
B	0.9 (0.035)	0.9 (0.035)	1.0 (0.040)	1.4 (0.055)
C	0.3 (0.012)	0.6 (0.024)	0.7 (0.028)	0.8 (0.031)
D	0.4 (0.016)	0.8 (0.031)	0.9 (0.035)	1.4 (0.055)
E	0.75 (0.030)	1.0 (0.039)	1.85 (0.071)	2.05 (0.080)



Component	Advantages	Disadvantages	Applications
<b>Chip capacitor</b>	Industry standard	Requires 1 per line High inductance Capacitance matching problems	By-pass Low frequency
<b>3 terminal feedthrough</b>	Feedthrough Lower inductance	Current limited	Feedthrough Unbalanced lines High frequency
<b>Syfer X2Y Integrated Passive Component</b>	Very low inductance Replaces 2 (or 3) components Negates the effects of temperature, voltage and ageing Provides both common mode and differential mode attenuation Can be used on balanced & unbalanced lines	Care must be taken to optimise circuit design	By-pass Balanced lines High frequency dc electric motors Unbalanced lines Audio amplifiers CANBUS



## Ordering Information - X2Y IPC range

1812	Y	100	0334	M	X	T	E03
Chip Size	Termination	Voltage	Capacitance in picofarads (pF) C <sub>1</sub>	Tolerance	Dielectric	Packaging	Type
0805 1206 1410 1812	J = Nickel Barrier (Tin) *Y = FlexiCap™ (Tin - X7R only) A = (Tin/Lead) Not RoHS compliant. *H = FlexiCap™ (Tin/Lead) Not RoHS compliant.	016 = 16V 025 = 25V 050 = 50V 100 = 100V 200 = 200V 500 = 500V	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following Example: 0334 = 330nF. Note: C <sub>1</sub> = 2C <sub>2</sub>	M = ±20% (Tighter tolerances may be available on request).	A = C0G/NP0 AEC-Q200 C = C0G/NP0 E = X7R AEC-Q200 X = X7R	T = 178mm (7") reel R = 330mm (13") reel B = Bulk	Syfer X2Y Integrated Passive Component

Note: \*FlexiCap™ termination only available in X7R material. Please contact the sales office for any special requirements.

## Reeled quantities

178mm (7") reel	0805	1206	1410	1812	330mm (13") reel	0805	1206	1410	1812
	3000	2500	2000	1000		12000	10000	8000	4000