

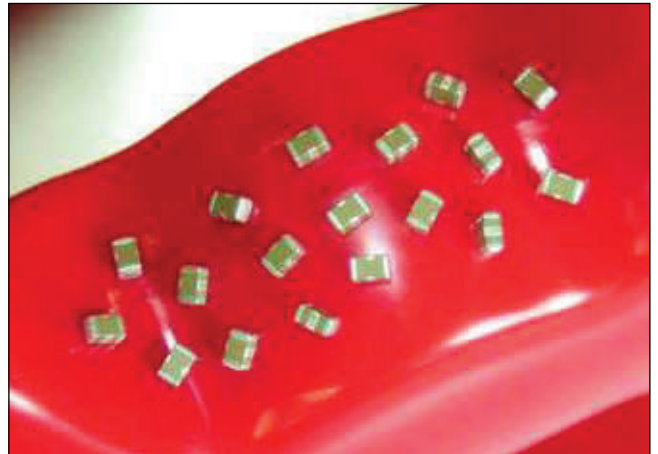
Surface Mount EMI Filters - E01 & E07 feedthrough capacitors

The Syfer E01 and E07 ranges of feedthrough MLCC chip 'C' filters are 3 terminal chip devices designed to offer reduced inductance compared to conventional MLCCs when used in signal line filtering.

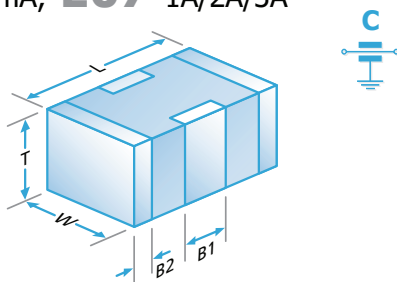
The filtered signal passes through the chip internal electrodes and the noise is filtered to the grounded side contacts, resulting in reduced length noise transmission paths.

Available in C0G/NP0 and X7R dielectrics, with current ratings of 300mA, 1A, 2A, 3A and voltage ratings of 25Vdc to 200Vdc. Also available with FlexiCap™ termination which is strongly recommended for new designs.

Commonly used in automotive applications, a range qualified to AEC-Q200 is also available.

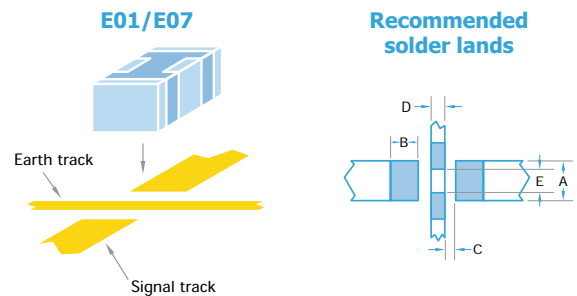


E01 300mA, E07 1A/2A/3A



Dimensions

	0805	1206	1806	1812
L	2.0 ± 0.3 (0.079 ± 0.012)	3.2 ± 0.3 (0.126 ± 0.012)	4.5 ± 0.35 (0.177 ± 0.014)	4.5 ± 0.35 (0.177 ± 0.014)
W	1.25 ± 0.2 (0.049 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	3.2 ± 0.3 (0.126 ± 0.012)
T	1.0 ± 0.15 (0.039 ± 0.006)	1.1 ± 0.2 (0.043 ± 0.008)	1.1 ± 0.2 (0.043 ± 0.008)	2.0 ± 0.3 (0.079 ± 0.012)
B1	0.60 ± 0.2 (0.024 ± 0.008)	0.95 ± 0.3 (0.037 ± 0.012)	1.4 ± 0.3 (0.055 ± 0.012)	1.45 ± 0.35 (0.055 ± 0.012)
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 (0.02 ± 0.01)



	0805	1206	1806	1812
A	0.95 (0.037)	1.20 (0.047)	1.2 (0.047)	2.65 (0.104)
B	0.90 (0.035)	0.90 (0.035)	1.40 (0.055)	1.40 (0.055)
C	0.30 (0.012)	0.60 (0.024)	0.80 (0.031)	0.80 (0.031)
D	0.40 (0.016)	0.80 (0.031)	1.40 (0.055)	1.40 (0.055)
E	0.75 (0.030)	1.0 (0.039)	1.0 (0.039)	2.05 (0.080)

- 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 unprinted 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.

Standard Range - E01 & E07 Feedthrough Capacitors

Type	E01			E07				
Chip Size	0805	1206	1806	0805	1206	1806	1812	
Max Current	300mA	300mA	300mA	1A	2A	2A	3A	
Rated Voltage	Dielectric	Minimum and maximum capacitance values						
25Vdc	C0G/NP0	180pF-1.5nF	560pF-3.9nF	820pF-4.7nF	180pF-1.5nF	560pF-3.9nF	820pF-4.7nF	-
	X7R	470pF-100nF	5.6nF-330nF	3.9nF-560nF	820pF-100nF	10nF-330nF	22nF-560nF	560nF-1.8µF
50Vdc	C0G/NP0	22pF-820pF	22pF-3.3nF	22pF-3.9nF	10pF-220pF	22pF-1nF	100pF-1.5nF	-
	X7R	560pF-68nF	4.7nF-220nF	3.3nF-330nF	1nF-68nF	10nF-220nF	22nF-330nF	330nF-1.5µF
100Vdc	C0G/NP0	22pF-560pF	22pF-2.2nF	22pF-3.3nF	10pF-120pF	22pF-560pF	100pF-680pF	-
	X7R	560pF-27nF	1.8nF-100nF	3.3nF-180nF	1nF-27nF	10nF-100nF	22nF-180nF	180nF-820nF
200Vdc	C0G/NP0	-	560pF-1.2nF	56pF-1nF	-	15pF-180pF	56pF-470pF	-
	X7R	-	2.7nF-56nF	3.9nF-100nF	-	12nF-56nF	22nF-100nF	100nF-270nF

Note: E07 25Vdc C0G/NP0 1206 and 1806 ranges in green, have maximum current of 1A.

AEC-Q200 Qualified Range - E01 & E07 Feedthrough Capacitors - maximum capacitance values

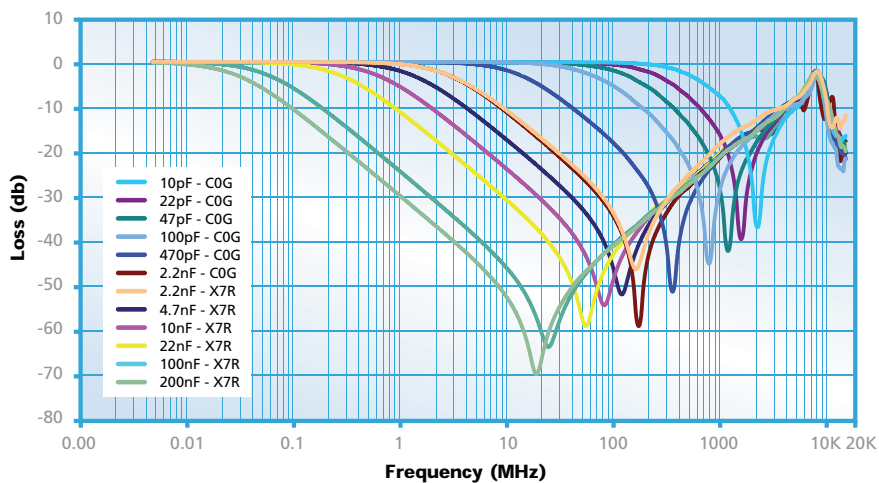
Type	E01			E07			
Chip Size	0805	1206	1806	0805	1206	1806	
50V	C0G/NP0	820pF	1nF	2.2nF	220pF	1nF	1.5nF
	X7R	47nF	100nF	200nF	47nF	100nF	200nF
100V	C0G/NP0	560pF	1nF	2.2nF	120pF	560pF	680pF
	X7R	15nF	15nF	68nF	15nF	15nF	68nF

Notes: ■ = AEC-Q200. For some lower capacitance parts, higher voltage rated parts may be supplied.

Surface Mount EMI Filters - E01 & E07 feedthrough capacitors

Open board insertion loss performance in 50Ω system

Open Board Performance						
Capacitance	0.1MHz	1MHz	10MHz	100MHz	1GHz	Resonance Freq (MHz) approx.
10pF	0	0	0	0	7.5	2200
22pF	0	0	0	0	16	1600
33pF	0	0	0	1	22	1350
47pF	0	0	0	2	28	1150
68pF	0	0	0	3	41	900
100pF	0	0	0	5	28	800
150pF	0	0	0	8	24	700
220pF	0	0	0	12	20	600
330pF	0	0	1	15	20	500
470pF	0	0	2	18	20	425
560pF	0	0	3	20	20	350
680pF	0	0	4	22	20	300
820pF	0	0	5	24	20	260
1.0nF	0	0	7	27	20	220
1.5nF	0	0	9	31	20	200
2.2nF	0	0	12	34	20	170
3.3nF	0	1	14	39	20	135
4.7nF	0	2	18	46	20	110
6.8nF	0	3	21	50	20	90
10nF	0	5	24	48	20	80
15nF	0	8	27	45	20	65
22nF	0	12	31	43	20	56
33nF	1	14	34	40	20	40
47nF	2	17	38	40	20	34
68nF	4	20	41	40	20	30
100nF	6	24	45	40	20	28
150nF	8	26	48	40	20	24
220nF	10	30	52	40	20	17
330nF	13	33	55	40	20	15.5
470nF	16	36	60	40	20	14
560nF	18	39	65	40	20	12



Ordering Information - E01 & E07 feedthrough capacitors

1206	Y	100	0103	M	X	T	E07
Chip size	Termination	Voltage	Capacitance in picofarads (pF)	Tolerance	Dielectric	Packaging	Type
0805 1206 1806 1812	J = Nickel Barrier (Tin) * Y = FlexiCap™ (Tin - X7R only) A = (Tin/Lead) Not RoHS compliant. * H = FlexiCap™ (Tin/Lead) Not RoHS compliant.	025 = 25V 050 = 50V 100 = 100V 200 = 200V	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following Example: 0103 = 10000pF.	M = ±20%	A = COG/NP0 AEC-Q200 C = COG/NP0 E = X7R AEC-Q200 X = X7R	T = 178mm (7") reel R = 330mm (13") reel B = Bulk	E01 E07

Note: *FlexiCap™ termination only available in X7R material. Please contact our Sales Office for any special requirements.

Reeled quantities

178mm (7") reel	0805	1206	1806	1812	330mm (13") reel	0805	1206	1806	1812
	3000	2500	2500	1000		12000	10000	10000	4000

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/NP0

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.

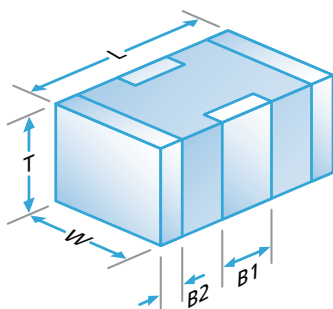
Type		E03			
Chip size		0805	1206	1410	1812
Rated voltage	Dielectric				
	COG/NP0	560pF - 820pF	1.8nF - 3.3nF	6.8nF - 8.2nF	12nF - 15nF
25Vdc	X7R	56nF - 68nF	-	470nF	820nF
	COG/NP0	390pF - 470pF	1.2nF - 1.5nF	4.7nF - 5.6nF	8.2nF - 10nF
50Vdc	X7R	18nF - 47nF	56nF - 220nF	180nF - 400nF	390nF - 680nF
	COG/NP0	10pF - 330pF	22pF - 1.0nF	100pF - 3.9nF	820pF - 6.8nF
100Vdc	X7R	470pF - 15nF	1.5nF - 47nF	4.7nF - 150nF	8.2nF - 330nF
	COG/NP0	-	22pF - 1.0nF	100pF - 3.3nF	820pF - 5.6nF
200Vdc	X7R	-	820pF - 33nF	1.2nF - 120nF	2.7nF - 180nF
	COG/NP0	-	-	-	820pF - 3.9nF
500Vdc	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/NP0	390pF - 470pF	1.2nF - 1.5nF	4.7nF - 5.6nF	8.2nF - 10nF
	X7R	18nF - 33nF	56nF - 150nF	180nF - 330nF	390nF - 560nF
100Vdc	COG/NP0	10pF - 330pF	22pF - 1.0nF	100pF - 3.9nF	820pF - 6.8nF
	X7R	470pF - 15nF	1.5nF - 47nF	4.7nF - 150nF	8.2nF - 330nF

Note: = AEC-Q200.

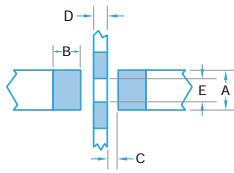


	0805	1206	1410	1812
L	2.0±0.3 (0.08±0.012)	3.2±0.3 (0.126±0.012)	3.6±0.3 (0.14±0.012)	4.5±0.35 (0.18±0.014)
W	1.25±0.2 (0.05±0.008)	1.60±0.2 (0.063±0.008)	2.5±0.3 (0.1±0.012)	3.2±0.3 (0.126±0.012)
T	1.0±0.15 (0.04±0.006)	1.1±0.2 (0.043±0.008)	2.0 max. (0.08 max.)	2.1 max. (0.08 max.)
B1	0.5±0.25 (0.02±0.01)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

Surface Mount EMI Filters - E03 X2Y Integrated Passive Components

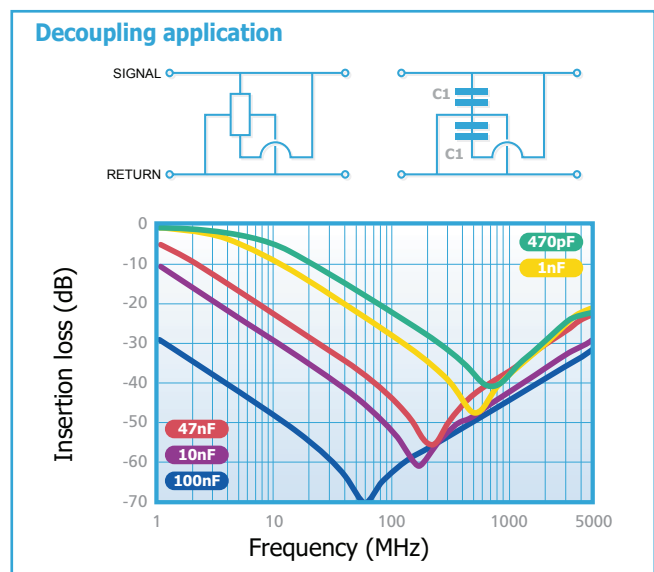
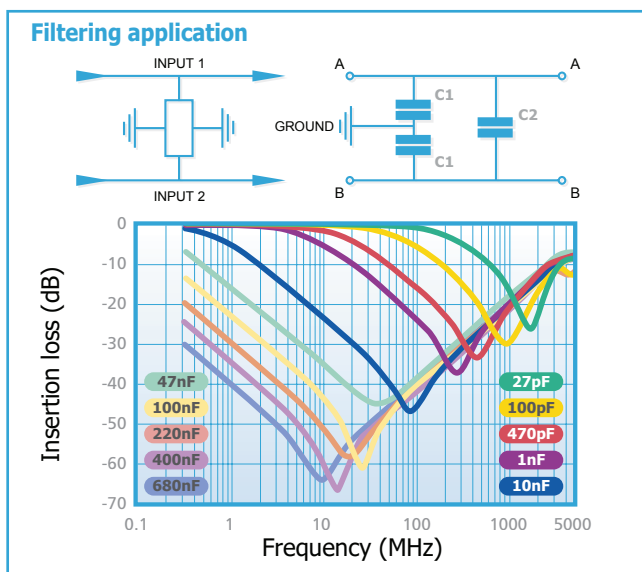
Recommended solder lands



	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
Chip capacitor	Industry standard	Requires 1 per line High inductance Capacitance matching problems	By-pass Low frequency
3 terminal feedthrough	Feedthrough Lower inductance	Current limited	Feedthrough Unbalanced lines High frequency
Syfer X2Y Integrated Passive Component	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 ₁	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.	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 ₁ = 2C ₂	M = ±20% (Tighter tolerances may be available on request).	A = COG/NP0 AEC-Q200 C = COG/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



Trimmers



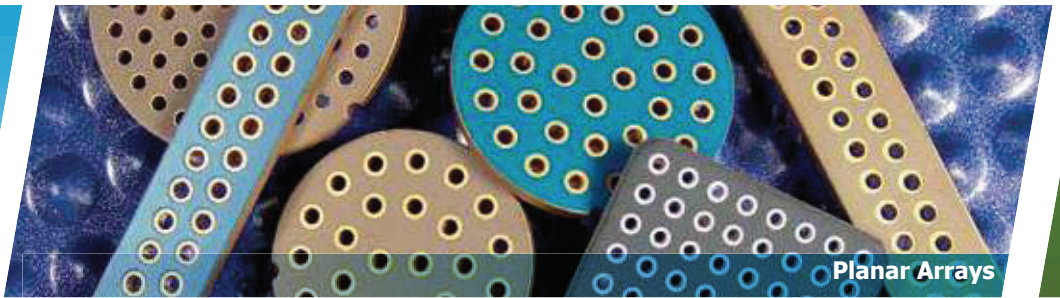
Pulse Capacitors



Special Discrete Filters



Half-turn Trimmers



Planar Arrays



Single Layer Capacitors



Feedthrough EMI Filters



Gain Equalizers



Specialty Products



Power Dividers



Varistor Filters



Trimmer Ca

Other products available