

Surface Mount EMI Filters - E01 & E07 Feedthrough Capacitors

EMI chip

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.

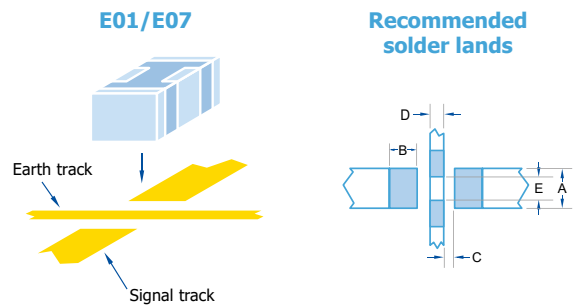
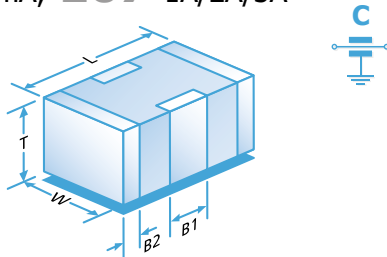
The filtered signal passes through the chip internal electrodes and the noise is filtered to the grounded side contacts, resulting in reduced length noise transmission paths.

Available in COG/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 AECQ-200 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 | COG/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 | COG/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 | COG/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 | COG/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 COG/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 | COG/NP0 | 820pF | 1nF | 2.2nF | 220pF | 1nF | 1.5nF |
| | X7R | 47nF | 100nF | 200nF | 47nF | 100nF | 200nF |
| 100V | COG/NP0 | 560pF | 1nF | 2.2nF | 120pF | 560pF | 680pF |
| | X7R | 15nF | 15nF | 68nF | 15nF | 15nF | 68nF |

Note: For some lower capacitance parts, higher voltage rated parts may be supplied. Please refer to the table on page 16.

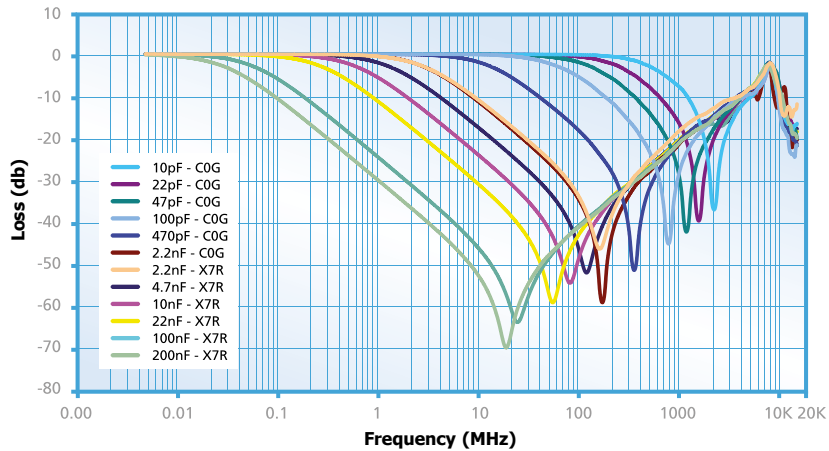
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EMI chip

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 |
| 1nF | 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 |

Note: For Insertion Loss graph see page 14.



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/NPO AEC-Q200 C = COG/NPO AEC-Q200 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 | 500 | | 12000 | 10000 | 10000 | 2000 |