

Common Mode SC12X Coils, SCF12X Series & SCT12X Series

Overview

The KEMET SCF12X & SCT12X coils are common mode chokes with a wide variety of characteristics. These toroidal coils are designed with nanocrystalline metal and Mn-Zn Ferrite cores and are useful in various noise countermeasure fields.

Applications

- Audio-visual equipment
- Industrial equipment
- Home appliances
- Power supplies

Benefits

- Nanocrystalline metal core for SCF12X
- Mn-Zn Ferrite 10HT for SCT12X
- Ultra-high inductance
- Ultra-high permeability
- Operating temperature range from -40°C to +130°C
- UL 94 V-0 flame retardant rated base and cap

SC12X-V



SC12XV-JV



Part Number System

| SC | F | 12X- | 010- | | OR35 | A | 053 | V |
|--------|---|---------------------------------|---|----------------------|--|------------|---|---|
| Series | Core material Code | Dimension Code (See Dimensions) | Rated Current (A) | Phase | Wire Diameter (mm) | Windings | Number of Turns | Terminal Base Type |
| SC | F = Nanocrystal core T = Mn-Zn Ferrite core 10HT | 12X | xxx- = xx.x A Examples: 010 = 1.0 A | Blank = Single-phase | R = Decimal point Examples: OR35 = 0.35 mm OR6 = 0.6 mm | A = Single | 0xx = xx turns Examples: 053 = 53 turns | V = Vertical type JV = Vertical type (With base) |

Magnetic Permeability of Ferrite Material

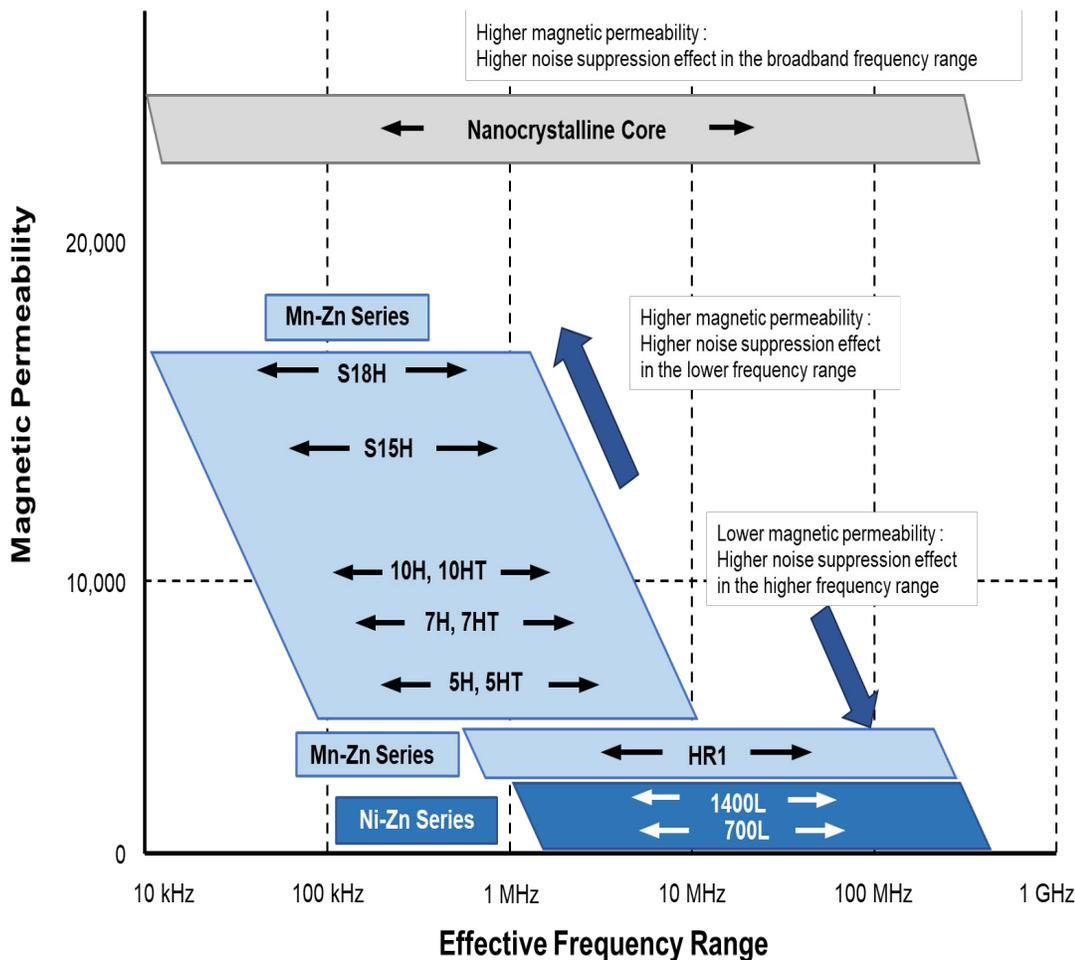
In order to achieve most efficient noise reduction, it is important to select the material according to the target frequency band. Depending on its magnetic permeability, a particular ferrite material or metal material will be effective in a certain frequency band. A schematic representation of the relationship between the magnetic permeability of each material and the corresponding effective band range is shown in Figure 1.

Ferrite materials with higher magnetic permeability are effective in the lower frequency range, while those with lower magnetic permeability are effective in the higher frequency range. Thus, Mn-Zn products are mainly used for reducing conduction noise, while Ni-Zn products are commonly used for radiation noise countermeasures. Metal materials, however, are effective throughout the broadband frequency range, in low as well as high frequencies.

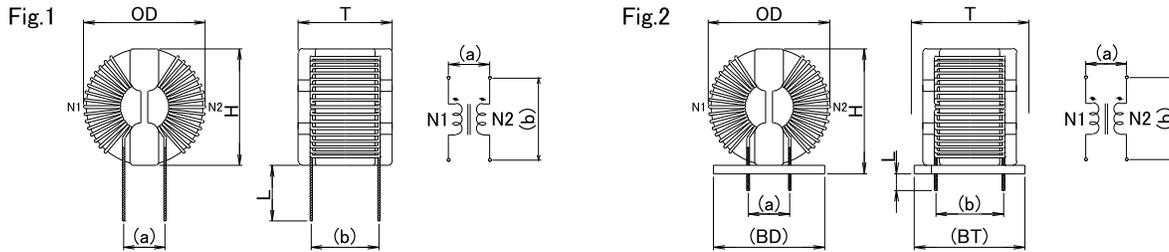
The effective frequency range varies depending on core shape, size, and number of windings. This frequency dependence of the magnetic permeability as shown in the figure serves for reference purposes only. It should be tested on the actual device to determine its effectiveness.

S18H, S15H, 10H, 10HT, 7H, 7HT, 5H, 5HT, HR1, 1400L, and 700L are KEMET's proprietary ferrite material names. Other materials are available upon request.

Figure 1 - Relationship between the magnetic permeability of each material and its effective frequency range



Dimensions – Millimeters



| Part Name | Dimensions (mm) | | | | Base Dimensions ² (Reference) | | Pin Pitch ³ (Reference) | | Figure |
|-----------------------|-----------------|-------------|-------------|-------------------|--|------|------------------------------------|------|--------|
| | OD (Maximum) | T (Maximum) | H (Maximum) | L | BD | BT | a | b | |
| SCF12X-010-0R35A053V | 15.5 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 1 |
| SCF12X-020-0R45A027V | 16.0 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 1 |
| SCF12X-030-0R5A019V | 15.5 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 1 |
| SCF12X-050-0R6A014V | 16.0 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 1 |
| SCF12X-010-0R35A053JV | 15.5 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 1 |
| SCF12X-020-0R45A027JV | 16.0 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 1 |
| SCF12X-030-0R5A019JV | 15.5 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 1 |
| SCF12X-050-0R6A014JV | 16.0 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 2 |
| SCT12X-010-0R35A053V | 15.5 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 2 |
| SCT12X-020-0R45A027V | 16.0 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 2 |
| SCT12X-030-0R5A019V | 15.5 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 2 |
| SCT12X-050-0R6A014V | 16.0 | 12.0 | 15.0 | 10.0 ¹ | - | - | 8.0 | 10.0 | Fig. 2 |
| SCT12X-010-0R35A053JV | 15.5 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 2 |
| SCT12X-020-0R45A027JV | 16.0 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 2 |
| SCT12X-030-0R5A019JV | 15.5 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 1 |
| SCT12X-050-0R6A014JV | 16.0 | 14.0 | 16.0 | 3.5±0.5 | 14.5 | 13.5 | 8.0 | 10.0 | Fig. 2 |

¹ Lead length listed above for reference only. Values not guaranteed.

² We do not inspect the terminal base dimension. (design guarantee)

³ Pin pitch listed above for reference only. Values not guaranteed.

Environmental Compliance

All KEMET AC line filters are RoHS Compliant.



Performance Characteristics

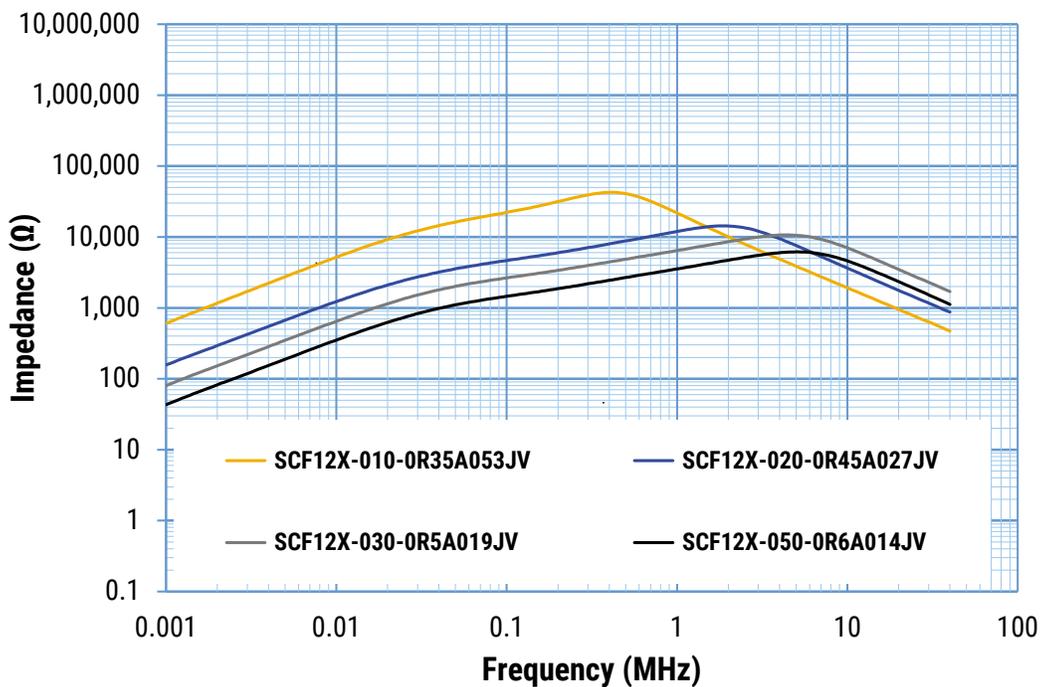
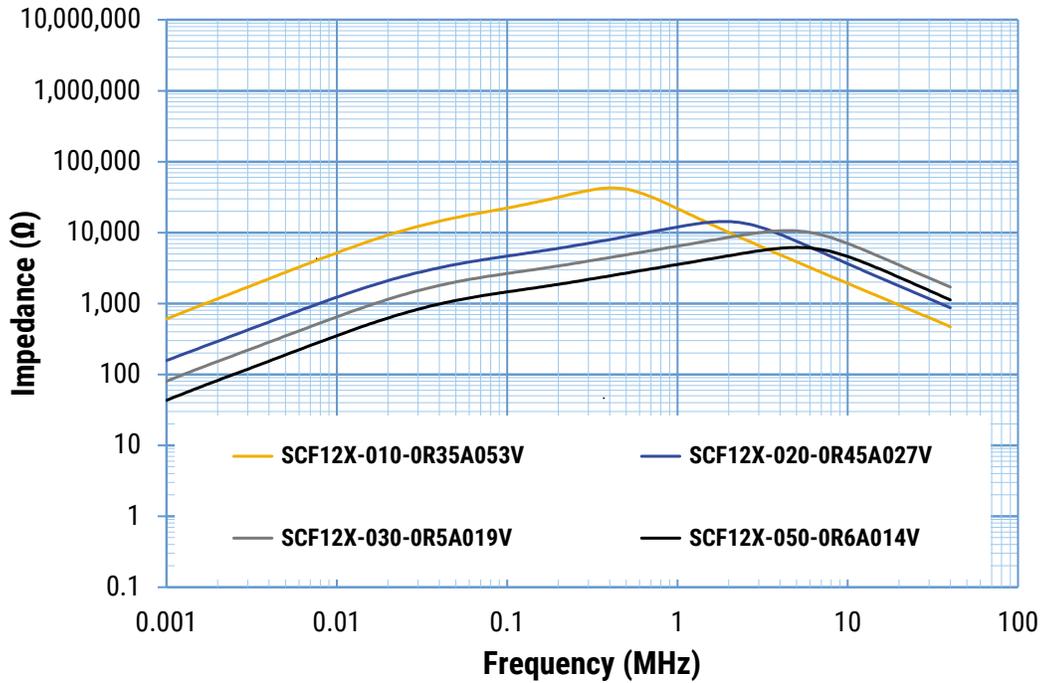
| Item | Performance Characteristics |
|----------------------------------|---|
| Rated Voltage | 250 VAC 320 VAC (IEC60664 -1) |
| Withstanding Voltage | 2,400 VAC (2 seconds, between lines) |
| Insulation Resistance | > 100 MΩ at 500 VDC (between lines) |
| Rated Current Range | 1 – 5 A |
| Rated Inductance Range | 0.62 – 50.0 mH minimum at 10kHz |
| | 0.64 – 12.54 mH minimum at 100kHz |
| Inductance Measurement Condition | 10kHz and 100 kHz |
| Thermal Class | 130°C |
| Operating Temperature Range | -40°C to +130°C (include self temperature rise) |

Table 1 – Ratings & Part Number Reference

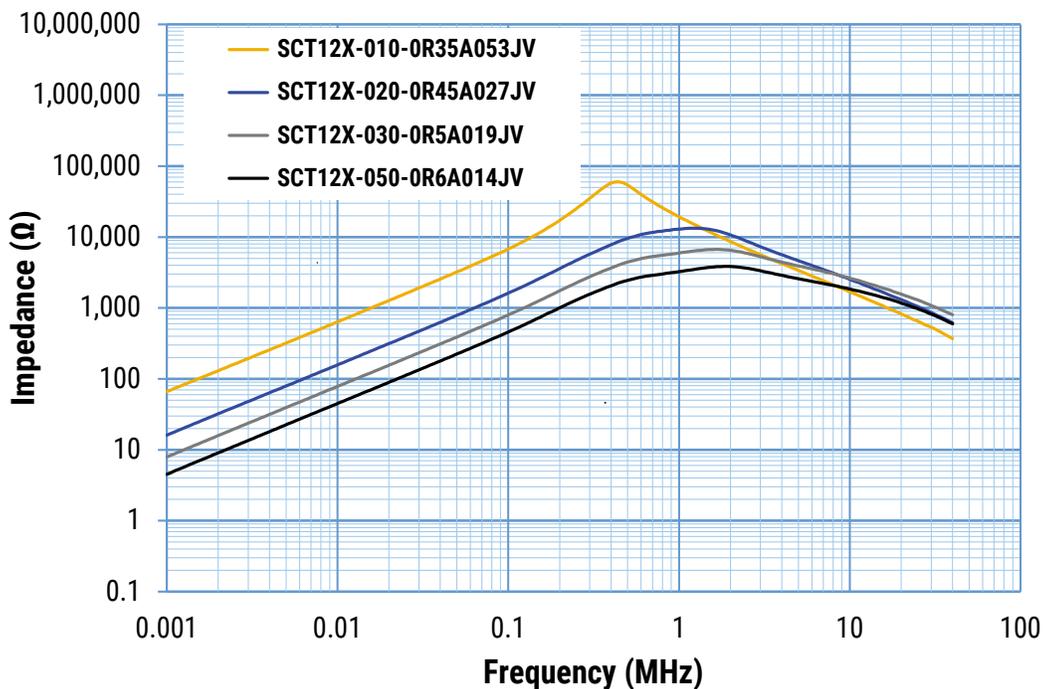
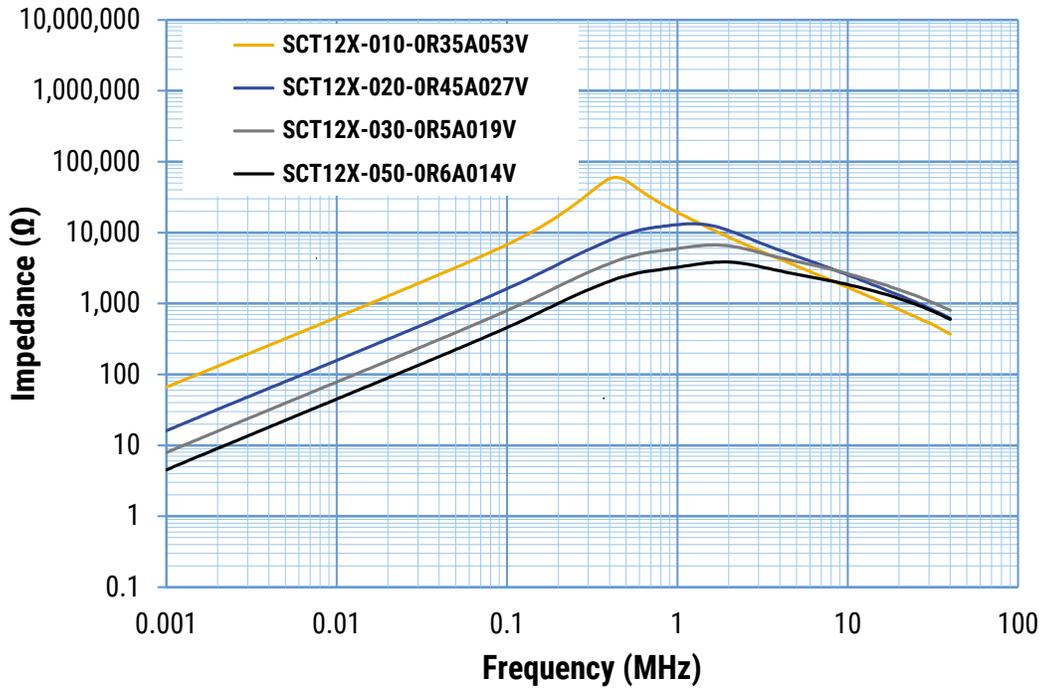
| Part Number | Rated Voltage AC/DC (V) | Rated Current AC (A) | Inductance 10kHz (mH) Minimum | Inductance 100kHz (mH) Minimum | DC Resistance/ Line (mΩ) Maximum | Temperature Rise (K) Maximum | Wire Diameter (mm) | Weight (g) Approximate |
|-----------------------|----------------------------|-------------------------|-------------------------------------|--------------------------------------|--|------------------------------------|--------------------------|------------------------------|
| SCF12X-010-0R35A053V | 250,320 1 | 1 | 50.0 | 12.54 | 289 | 45 | 0.35 | 4.7 |
| SCF12X-020-0R45A027V | 250,320 1 | 2 | 13.0 | 3.25 | 90 | 40 | 0.45 | 4.4 |
| SCF12X-030-0R5A019V | 250,320 1 | 3 | 6.5 | 1.61 | 50 | 45 | 0.50 | 4.1 |
| SCF12X-050-0R6A014V | 250,320 1 | 5 | 3.5 | 0.87 | 25 | 65 | 0.60 | 4.3 |
| SCF12X-010-0R35A053JV | 250,320 1 | 1 | 50.0 | 12.54 | 289 | 45 | 0.35 | 4.9 |
| SCF12X-020-0R45A027JV | 250,320 1 | 2 | 13.0 | 3.25 | 90 | 40 | 0.45 | 4.5 |
| SCF12X-030-0R5A019JV | 250,320 1 | 3 | 6.5 | 1.61 | 50 | 45 | 0.50 | 4.4 |
| SCF12X-050-0R6A014JV | 250,320 1 | 5 | 3.5 | 0.87 | 25.4 | 65 | 0.60 | 4.5 |
| SCT12X-010-0R35A053V | 250,320 1 | 1 | 9.00 | 9.27 | 289 | 45 | 0.35 | 5.6 |
| SCT12X-020-0R45A027V | 250,320 1 | 2 | 2.32 | 2.40 | 90 | 40 | 0.45 | 5.2 |
| SCT12X-030-0R5A019V | 250,320 1 | 3 | 1.15 | 1.18 | 50 | 45 | 0.50 | 5.1 |
| SCT12X-050-0R6A014V | 250,320 1 | 5 | 0.62 | 0.64 | 25 | 65 | 0.60 | 4.9 |
| SCT12X-010-0R35A053JV | 250,320 1 | 1 | 9.00 | 9.27 | 289 | 45 | 0.35 | 5.9 |
| SCT12X-020-0R45A027JV | 250,320 1 | 2 | 2.32 | 2.40 | 90 | 40 | 0.45 | 5.5 |
| SCT12X-030-0R5A019JV | 250,320 1 | 3 | 1.15 | 1.18 | 50 | 45 | 0.50 | 5.3 |
| SCT12X-050-0R6A014JV | 250,320 1 | 5 | 0.62 | 0.64 | 25.4 | 65 | 0.60 | 5.4 |

¹ 320 VAC/VDC (comply with IEC60664-1)

Frequency Characteristics



Frequency Characteristics cont.



Packaging

| Type | Packaging Type | Pieces Per Box |
|-----------|----------------|----------------|
| SCF12X-V | Tray | 1,300 |
| SCF12X-JV | | 560 |
| SCT12X-V | | 1,300 |
| SCT12X-JV | | 560 |

Handling Precautions

Precautions for product storage

AC Line Filters should be stored in normal working environments. While the chokes themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage.

KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 70% relative humidity. Atmospheres should be free of chlorine and sulfur bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts. Avoid storage near strong magnetic fields, as this might magnetize the product.

For optimized solderability, AC line filters stock should be used promptly and preferably within 6 months of receipt.

Product temperature rise values

The values listed for temperature rise are the result of self-heating in wires when the rated current (commercial frequency) is applied.

When using the product, check and evaluate the value of the core temperature rise under actual operating conditions.

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