Dual Mode SCN-XV Coils, Automotive Grade

Overview

The KEMET SCN-XV coils are dual mode chokes with a wide variety of characteristics for automotive and industrial application, especially suitable for harsh environment situations. These hybrid coils combine the two functions of normal mode countermeasure and common mode noise suppression in just one coil. Reducing the number of required products ensures cost savings and space efficiency. Our proprietary ferrite core material 7HT provides optimized solutions for high-temperature requirements, and in addition displays high Bs characteristics, and are useful in various noise countermeasure fields.

Applications

- On board charger for EV/PHEV
- Wireless charging systems with 85 kHz
- Medium power drives for steering, air conditioning and mild hybrid 48 V systems
- High voltage automotive and harsh environment industrial EMI filtering

Benefits

- Proprietary 7HT ferrite material
- High rated voltage up to 1,000 V AC/DC
- Operating temperature range from −40°C up to +150°C
- High permeability
- High impedance
- UL 94 V–0 flame retardant rated base and cap
- AEC-Q200 qualified

SCN35XV Type

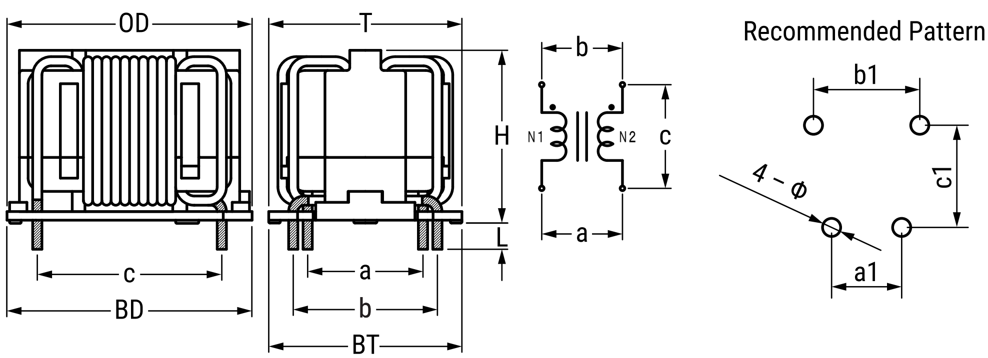
SCN35SXV Type

Part Number System

SCN	35XV-	100-	1R4	A	015	JH
Series	Dimension Code (See Dimensions)	Rated Current (A)	Wire Diameter (mm)	Windings	Number of Turns	Terminal Base Type
SCN	35XV 35SXV	xxx- = xx.x A Examples: 100 = 10.0 A 190 = 19.0 A	R = Decimal point Examples: 1R4 = 1.4 mm 1R9 = 1.9 mm	A = Single	00x = x turns 0xx = xx turns Examples: 008 = 8 turns 015 = 15 turns	JH = Horizontal type

Dimensions – Millimeters

Figure 1



Part Type	Dimensions (mm)				Base Dimensions[2]		Pin Pitch[3]			Recommended Hole Pattern[4]				Figure
	OD (Maximum)	T (Maximum)	H[1]	L	BD	BT	a	b	c	a1	b1	c1	φ	
SCN35XV-100-1R4A015JH	43.5	34.5	30.00 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	1.8	Fig. 1
SCN35XV-110-1R5A014JH	43.5	34.5	30.00 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.0	Fig. 1
SCN35XV-120-1R6A012JH	43.5	34.5	30.00 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.1	Fig. 1
SCN35XV-140-1R7A010JH	43.5	34.5	30.00 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.2	Fig. 1
SCN35XV-170-1R9A008JH	43.5	34.5	30.00 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.5	Fig. 1
SCN35SXV-110-1R4A015JH	43.5	34.5	20.50 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	1.8	Fig. 1
SCN35SXV-120-1R5A014JH	43.5	34.5	20.50 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.0	Fig. 1
SCN35SXV-130-1R6A012JH	43.5	34.5	20.50 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.1	Fig. 1
SCN35SXV-150-1R7A010JH	43.5	34.5	20.50 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.2	Fig. 1
SCN35SXV-190-1R9A008JH	43.5	34.5	20.50 +1.0/-0.6	3.50 ±0.5	42.5 ±0.5	33.5 ±0.5	20.0 ±0.5	25.0 ±0.5	32.0 ±0.5	20.0	25.0	32.0	2.5	Fig. 1

[1] ***We do not inspect the lower limit dimension. (Design Guarantee)***

[2] ***We do not inspect the terminal base dimension. (Design Guarantee)***

[3] ***Inspection by using pin-pitch gauge.***

[4] Implementation conditions, please con f rm that there is no pre-problem.

Magnetic Permeability of Ferrite Material

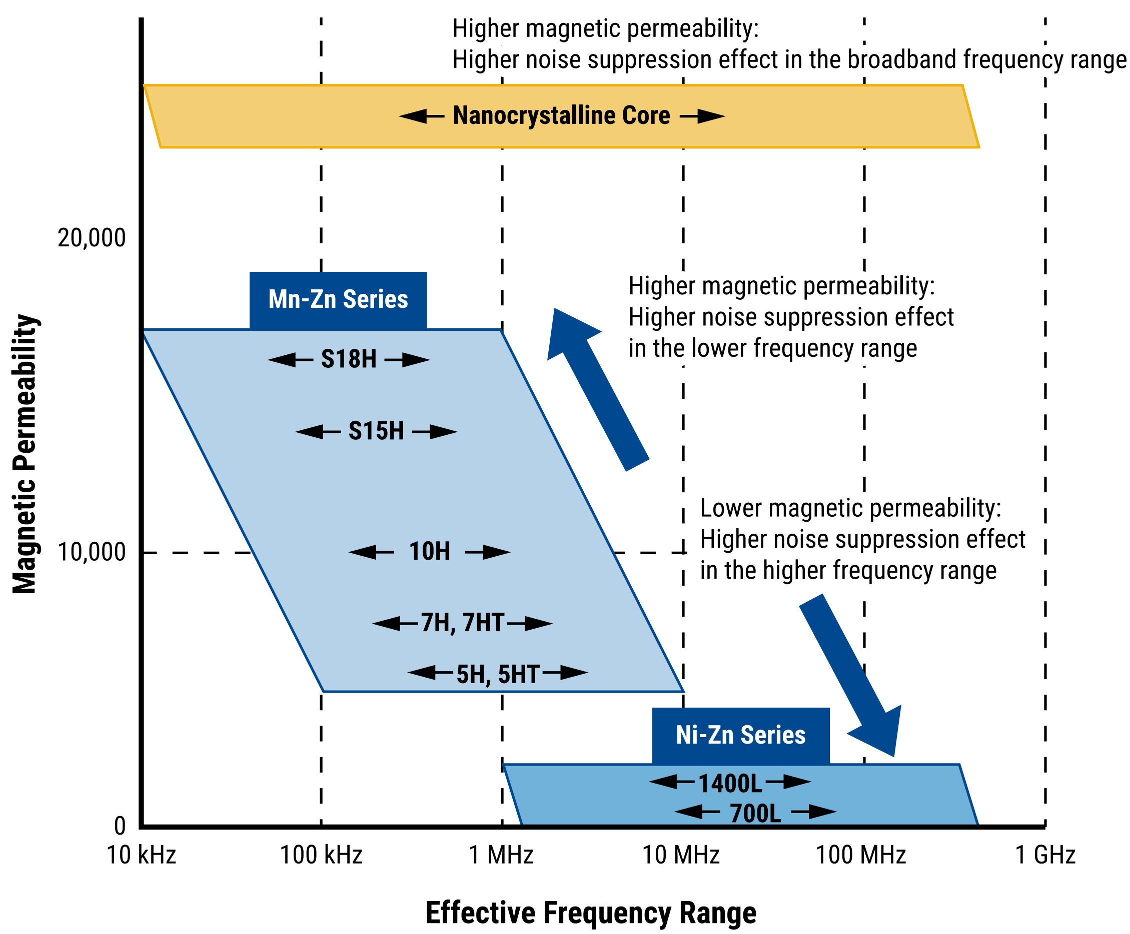
In order to achieve most efficient noise reduction, it is important to select the material according to the target frequency band. Depending on its magnetic permeability, a particular ferrite material will be effective in a certain frequency band. A schematic representation of the relationship between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

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.

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 and it should be tested on the actual device to determine its effectiveness.

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

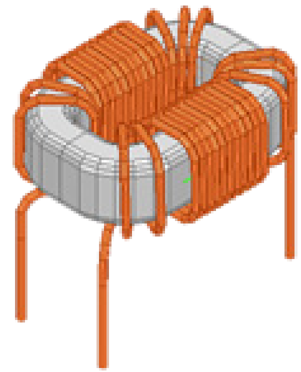
Figure 1 - Relationship between the magnetic permeability of each material and its effective frequency range



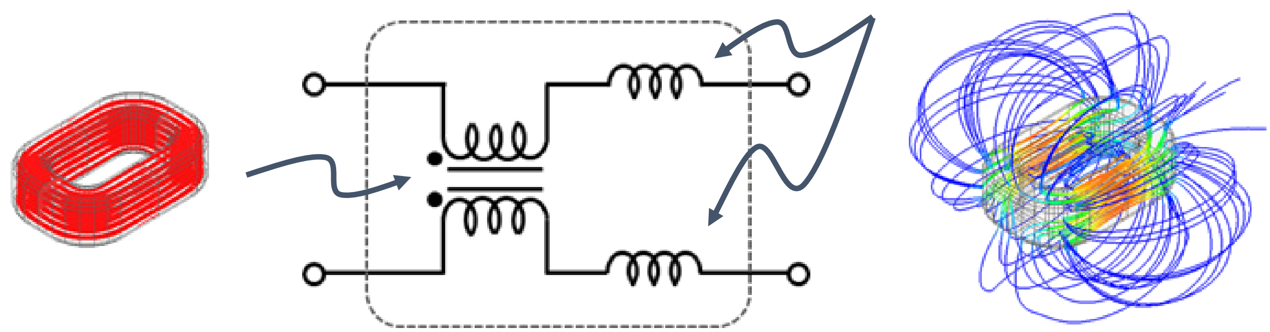
Material List

Core Structure for 2 Functions

- Both functions of common and differential mode in one package.
- High temperature resistant.
- Superior DC superimposing characteristics.
- Flat top surface for easy access to heat sink.



Common Mode **Differential (Normal) Mode**



Magnetic f ux is under control based on electromagnetic simulation.

Environmental Compliance

All KEMET AC Line Filters are RoHS Compliant.

Performance Characteristics

Item	Performance Characteristics
Rated Voltage	1,000 VAC/VDC
Withstanding Voltage	2,400 VAC (2 seconds, between lines)
Insulation Resistance	> 100 MΩ at 1,000 VDC (between lines)
Rated Current Range	10 – 19 A
Rated Inductance Range	0.38 – 2.7 mH ±30%
Inductance Measurement Condition	100 kHz
Operating Temperature Range	−40°C to +150°C (include self temperature rise)

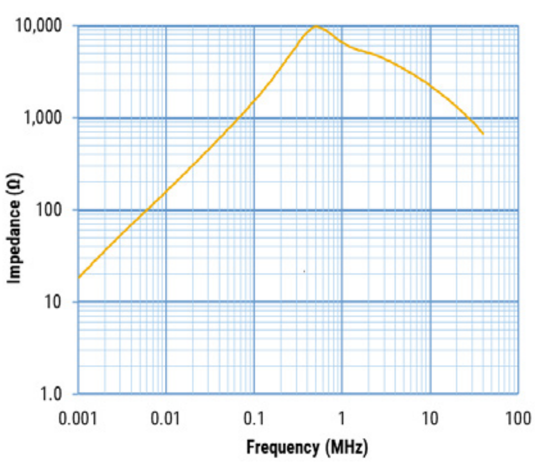
Table 1 – Ratings & Part Number Reference

Part Number	Rated Voltage AC/DC (V)	Rated Current (A)	Inductance (Common) 100 kHz (mH) ±30%	Inductance (Normal) 100 kHz (µH) ±20%	DC Resistance/ Line (mΩ) ±13%	Temperature Rise (K) Reference	Wire Diameter (mm)	Weight (g) Approximate
SCN35XV-100-1R4A015JH	1,000	10	2.61	15.6	11.10	50	1.4	81.9
SCN35XV-110-1R5A014JH	1,000	11	2.28	12.8	8.95	45	1.5	84.7
SCN35XV-120-1R6A012JH	1,000	12	1.67	10.4	6.85	40	1.6	83.8
SCN35XV-140-1R7A010JH	1,000	14	1.16	7.9	5.05	50	1.7	82.4
SCN35XV-170-1R9A008JH	1,000	17	0.75	5.0	3.25	45	1.9	82.8
SCN35SXV-110-1R4A015JH	1,000	11	1.31	11.9	7.78	50	1.4	49.6
SCN35SXV-120-1R5A014JH	1,000	12	1.14	10.2	6.36	45	1.5	51.1
SCN35SXV-130-1R6A012JH	1,000	13	0.83	8.1	4.85	45	1.6	50.5
SCN35SXV-150-1R7A010JH	1,000	15	0.58	6.2	3.52	45	1.7	49.6
SCN35SXV-190-1R9A008JH	1,000	19	0.37	4.0	2.36	45	1.9	50.0

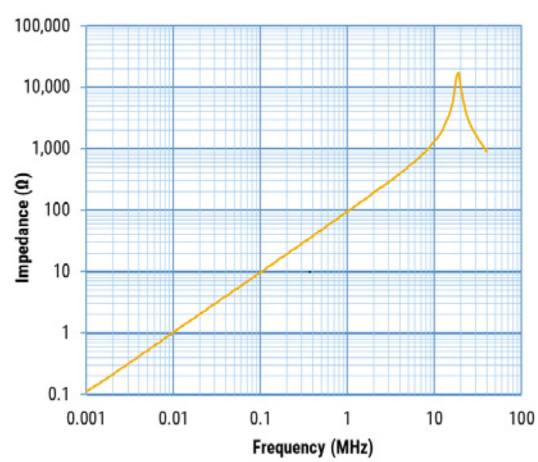
Frequency Characteristics

SCN35XV-100-1R4A015JH

Common Mode



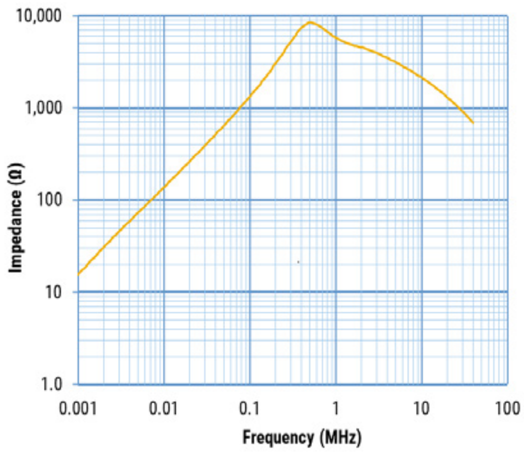
Normal Mode



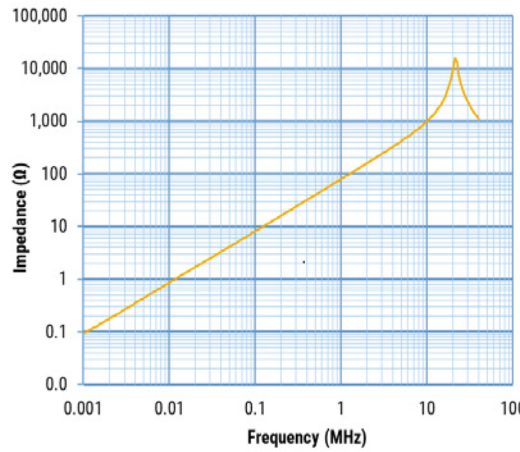
Frequency Characteristics cont.

SCN35XV-110-1R5A014JH

Common Mode

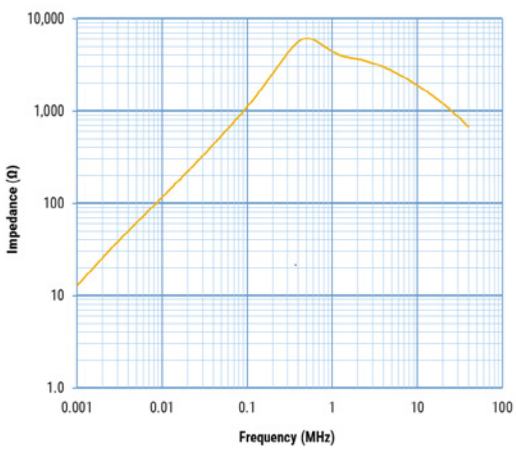


Normal Mode

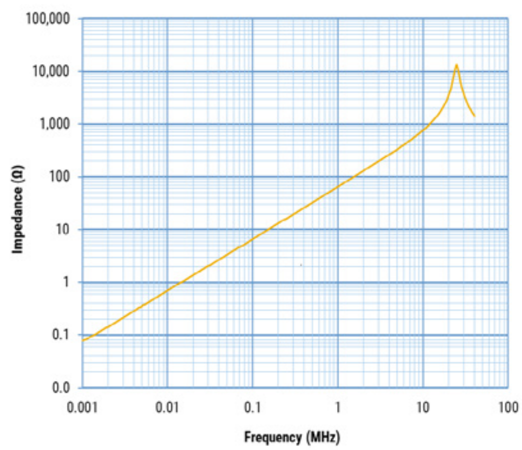


SCN35XV-120-1R6A012JH

Common Mode



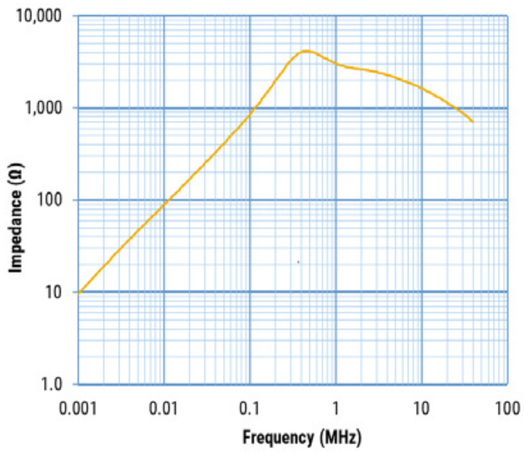
Normal Mode



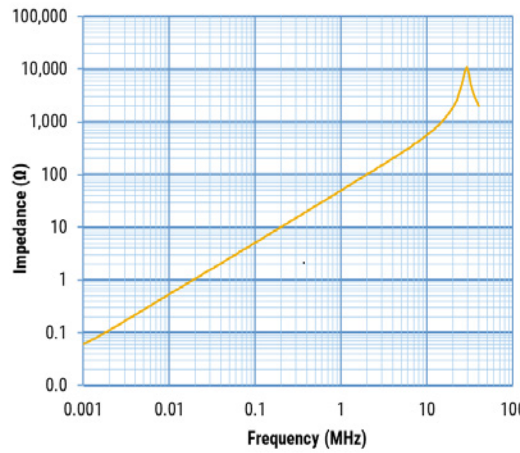
Frequency Characteristics cont.

SCN35XV-140-1R7A010JH

Common Mode

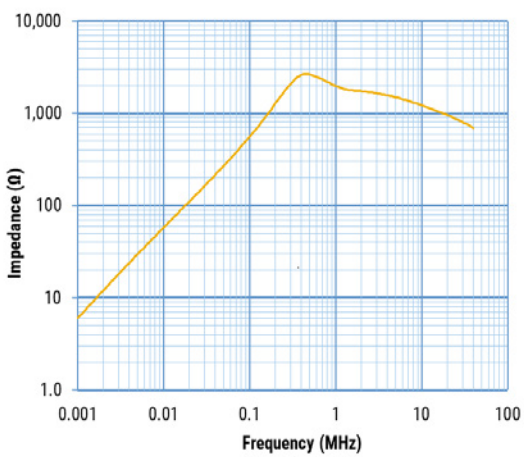


Normal Mode

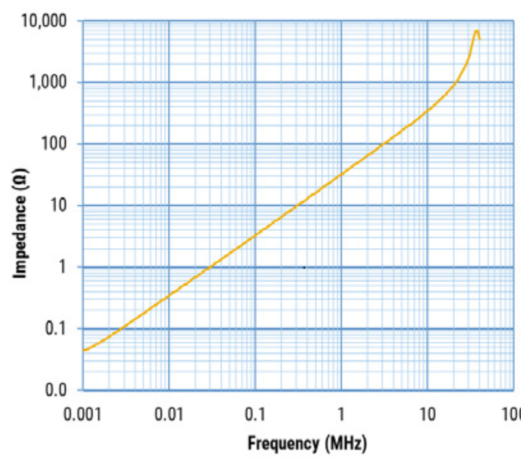


SCN35XV-170-1R9A008JH

Common Mode

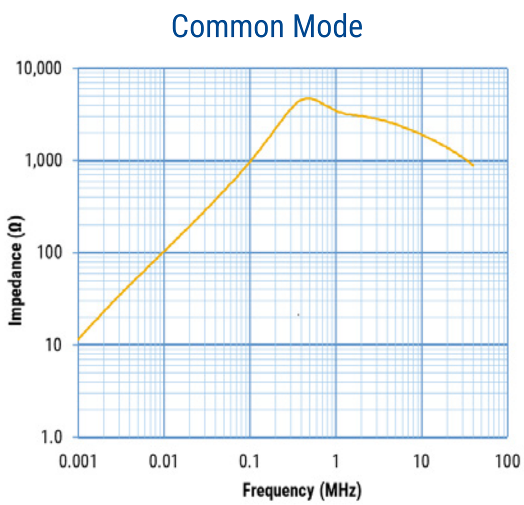


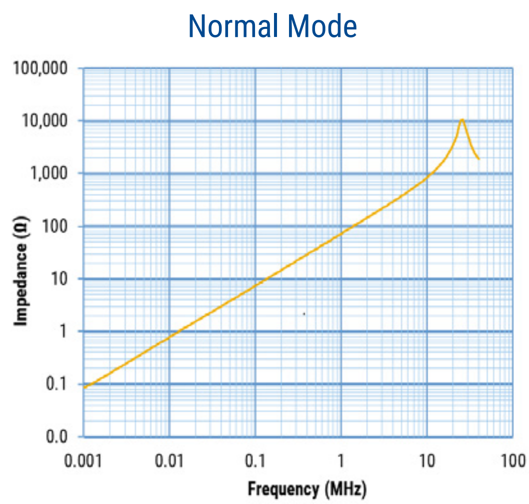
Normal Mode



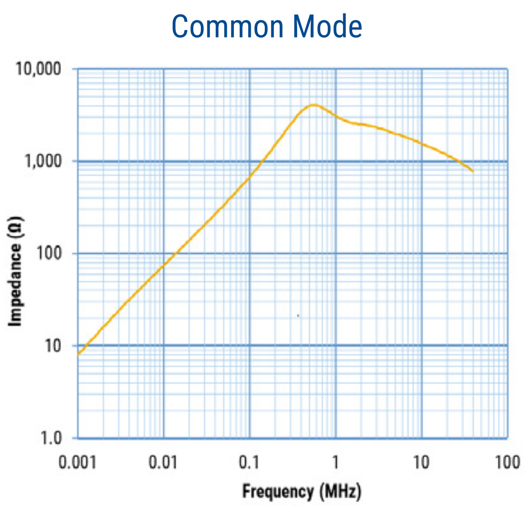
Frequency Characteristics cont.

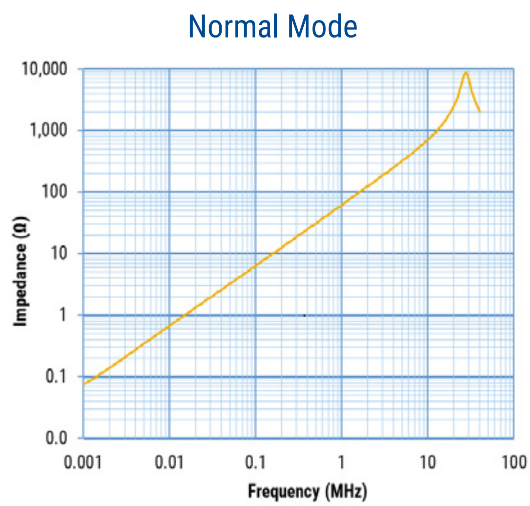
SCN35SXV-110-1R4A015JH





SCN35SXV-120-1R5A014JH

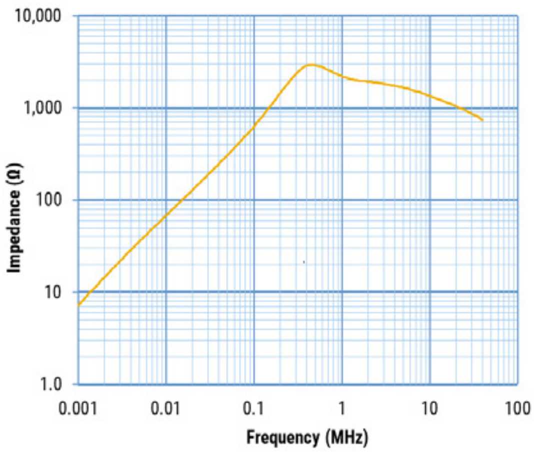




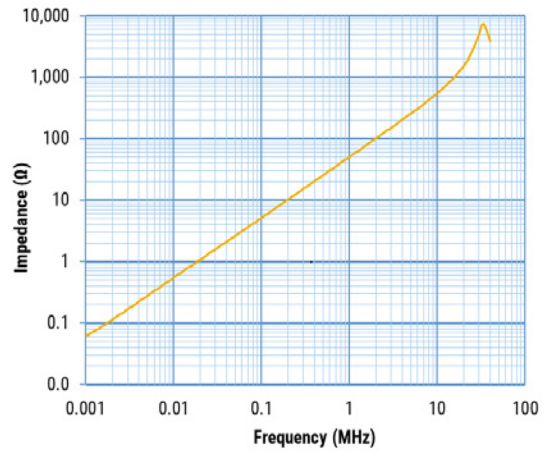
Frequency Characteristics cont.

SCN35SXV-130-1R6A012JH

Common Mode

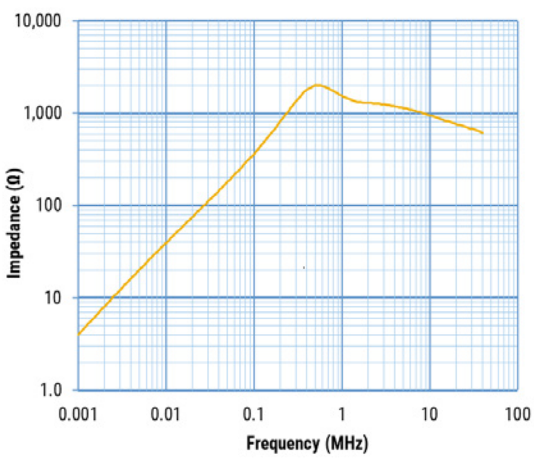


Normal Mode

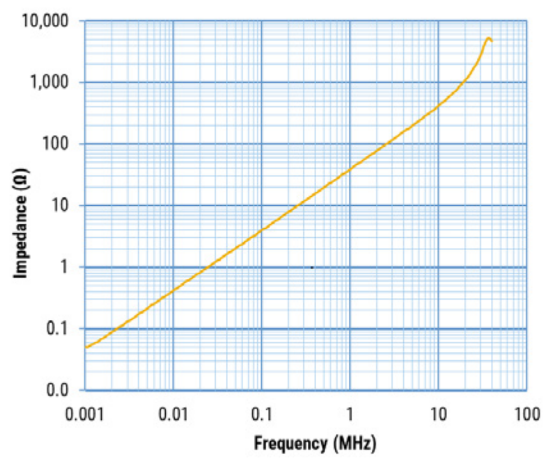


SCN35SXV-150-1R7A010JH

Common Mode

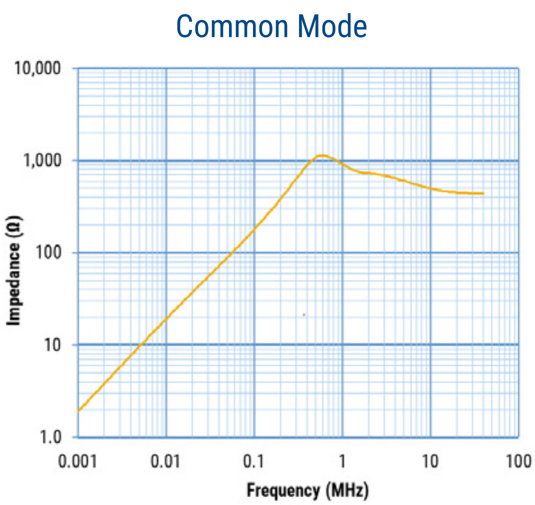


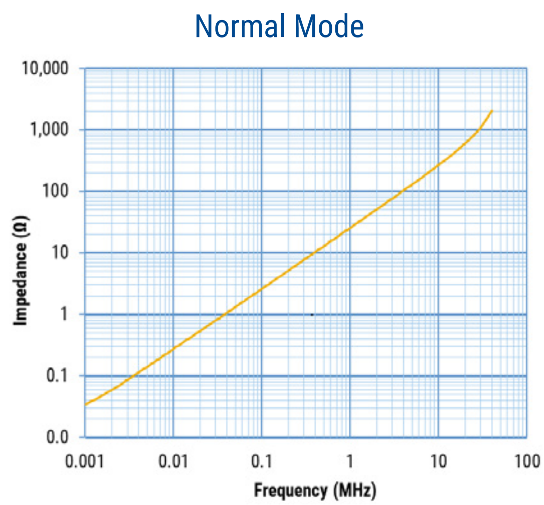
Normal Mode



Frequency Characteristics cont.

SCN35SXV-190-1R9A008JH





Packaging

Type	Packaging Type	Pieces Per Box
SCN35XV	Tray	80
SCN35SXV		100

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.

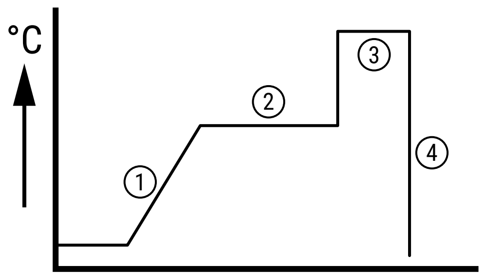
Product temperature rise values
The values listed for temperature rise are the result of self-heating in wires when the rated current (commercial frequency) is applied.

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

Recommended Solder Condition

Soldering Method	Temperature	Soldering Time	Number of Times
Solder Iron	400°C Maximum	3 Seconds Maximum	2 Times
Dip Soldering	260°C Maximum	3 Seconds Maximum	2 Times
Flow Soldering	See Below	See Below	See Below

Flow Soldering Condition



① Reserve Temperature
② Preheat Temperature: 80~110°C   Time: 120 seconds
③ Soak Temperature: 250°C   Time: 8 seconds
④ Cooling

Solder conditions are for reference only and should be con f rmed by the customer that there is no problem.

Temperature Rise Measuring Method

Connect the cable to the CMC by soldering and cool it to room temperature. Also, N1 and N2 are shorted.
In order to prevent temperature changes due to air convections, a rated current is applied to the CMC inside the container (container size: about 550 x 450 x 300 mm). At that time, the temperature of the inner diameter of the CMC and the ambient temperature are measured with a thermocouple and recorded with a data logger.

Figure 1 – Measurement System

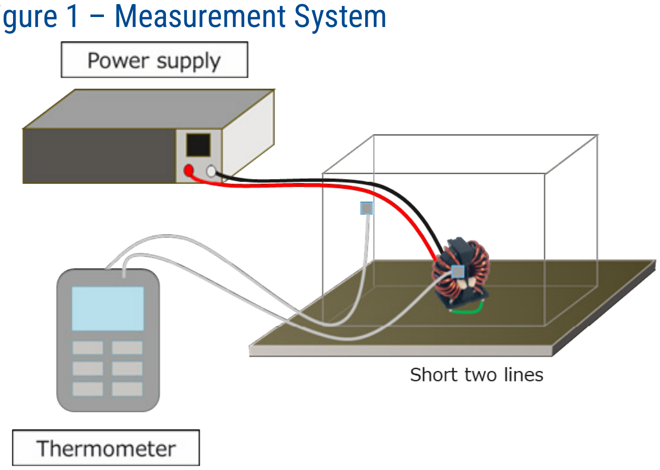
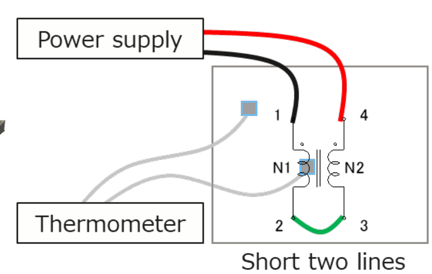


Figure 2 – Schematics



Temperature Rise Measuring Method cont.

After confirming that the temperature of the CMC has stabilized, turn off the power and calculate the temperature rise value from the measured data using the following formula:

$$T = (t_2 - t_{a2}) - (t_1 - t_{a1})$$

And then,

T : Temperature rising (°C)

t_1 : Initial temperature of CMC (°C)

t_2 : Temperature of CMC when current is applied (°C)

t_{a1} : Initial ambient temperature (°C)

t_{a2} : Ambient temperature when current is applied (°C)

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