

3S5

The new medium frequency EMI ferrite for high bias current conditions



Ferroxcube introduces 3S5, the superb material capable of EMI suppression up to 30 MHz in DC bias applications

In order to meet the EMI regulations in the frequency range from 150 kHz up to 30 MHz, FERROXCUBE has introduced its new 3S5 EMI suppression material. Although several ferrites are available for this frequency range, hardly any material can keep its absolute value of complex permeability (defining the inductor's impedance) when operating on a bias field (DC current). With the introduction of 3S5, FERROXCUBE is filling this gap. Applying 3S5 in an inductor gives EMI suppression over the full frequency range and has the major benefit of sufficient permeability even when high bias currents are applied.

Best of both worlds

As the major property of a common

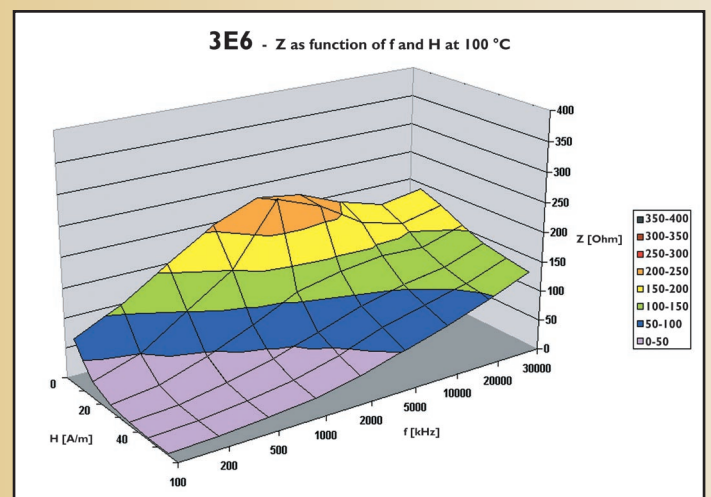
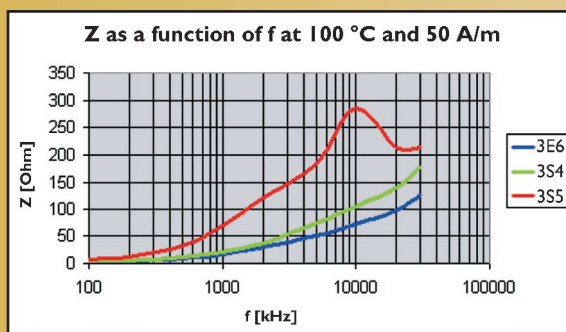
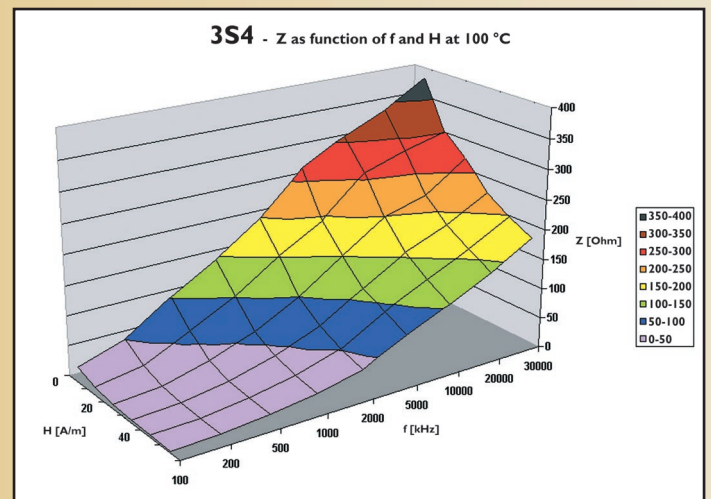
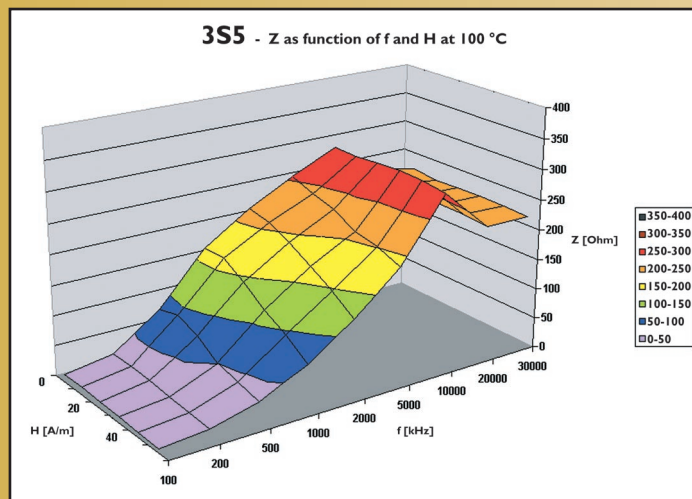
suppression material is a high value of the complex permeability, defining it's required impedance, the saturation value B_{sat} becomes important in those applications where bias currents are applied. It allows an EMI suppression inductor to operate on a high DC bias point without the risk of saturating. Although a high saturation value is a typical power ferrite property, FERROXCUBE has combined the best of both suppression and power properties in the 3S5 material. The material characteristics and typical graphs are given on the next page.

In the graphs below, the impedance plot of a number of our suppression ferrites is given for several load conditions. They have been measured

on T14/9/5 ring cores at an ambient temperature of 100 °C. It is clear that 3S5 gives the highest impedance and therefore the best suppressing capabilities over a wide frequency range with increasing load current.

Preferred applications

With the ever increasing demand of interference suppression, 3S5 can be applied in those applications where both high operating temperatures (140°C) and high currents are involved e.g. power lines in industrial, but especially automotive environments. Suppressing of interference signals along these lines can be achieved by inserting 3S5-based inductors. Suitable core shapes are those that are generally used for EMI suppression.



**Impedance curves at 100 °C,
measured on a toroid Ø14 x Ø9 x 5 mm
with 5 turns**

3S5 - Material Characteristics

	CONDITIONS	VALUE	UNIT
μ_i	25 °C, ≤ 10 kHz, 0.1 mT	$3800 \pm 20 \%$	
B	25 °C, 10 kHz, 1200 A/m 100 °C, 10 kHz, 1200 A/m	≈ 545 ≈ 435	mT
$ Z ^{(1)}$	25 °C, 1 MHz 25 °C, 10 MHz	≥ 20 ≥ 40	Ω
ρ	DC, 25 °C	≈ 10	Ωm
T_c		≥ 255	$^{\circ}\text{C}$
density		≈ 4800	kg/m^3

Note

1. Measured on a bead $\varnothing 5 \times \varnothing 2 \times 10$ mm.

