MAGMENT power magnetics

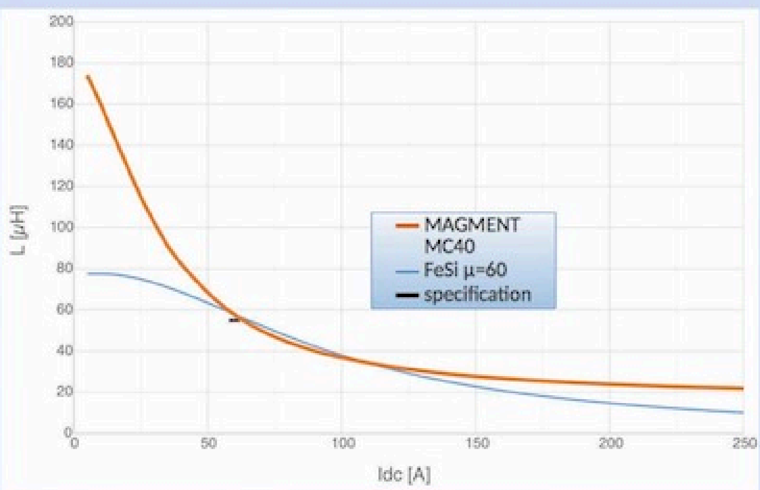
INCOPA

MAGMENT power inductors and transformers are based on a disruptive technology for both a novel material and an innovative magnetic design. The material is a **concrete** with magnetizable grains embedded in a cement matrix in a **pressureless** process. Its features are **high DC-bias capability** and **low losses** as well as very high **linearity, thermal conductivity** and mechanical robustness. This allows to design rugged inductive components with a **distributed air gap** for minimized eddy current losses by completely surrounding the coil by the MAGMENT material. This ensures a complete magnetic filling of the available volume within the aluminum housing yielding maximum performance and cooling. As compared to the conventional manufacturing of winding cores and sealing with a potting material, our **“wind and magnetic pour”** process goes along with full shape and size flexibility. This allows to both tailor components to any given space constraints and to minimize material utilization by a **special magnetic design algorithm** yielding lowest cost as compared to any other inductive technology. All component manufacturing process steps are under one roof ensuring **quickest turnaround time** from design-in to shipping.

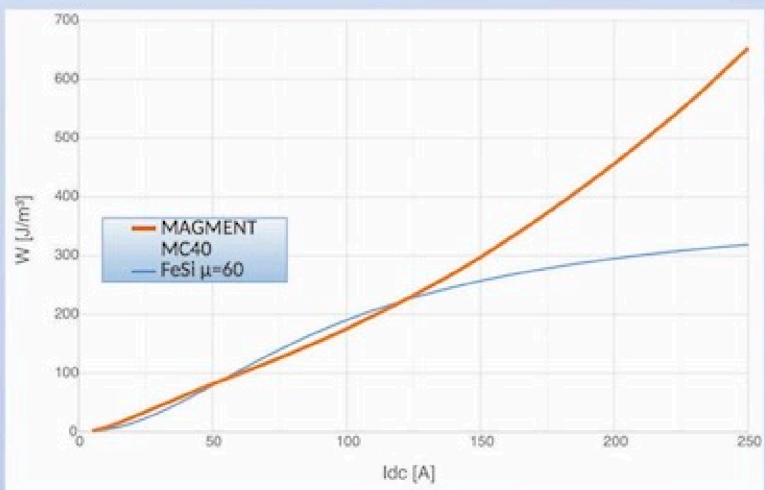
Design examples

Type	Part-No.	L / µH	I / A	DCR / mΩ	Dimensions / mm
IM10-180	740 0080 001	10	180	1,1	84 x 84 x 84
IM30-140	740 0080 002	30	140	1,5	84 x 84 x 164
IM90-75	740 0120 001	90	75	2,5	124 x 124 x 124

Inductance vs. DC Bias (compared to FeSi)



Stored Energy (compared to FeSi)



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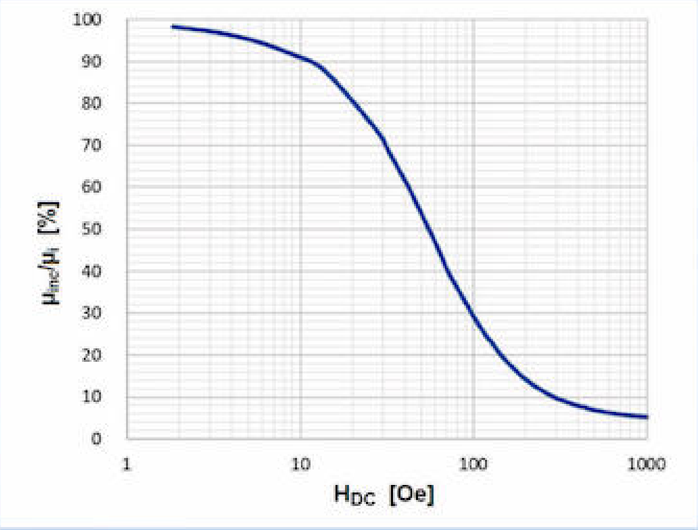
Datasheet MAGMENT MC40

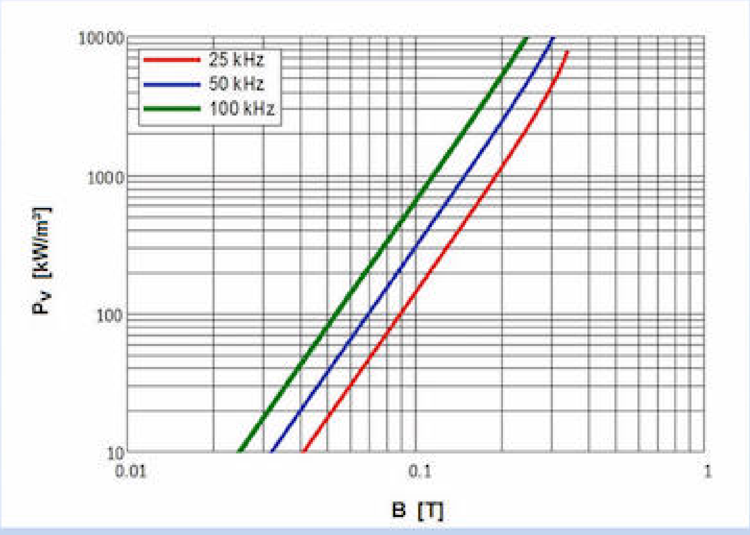
MAGMENT MC40 - material data

Initial permeability	25°C	μ_i		40 ± 10%
Flux density @ H=25 kA/m (314 Oe)	25°C	B_{max}	[mT]	350
	100°C	B_{max}	[mT]	290
Coercitive field strength	25°C	H_c	[A/m]	270
Curie-Temperature		T_c	[°C]	> 210
Resistivity	DC	ρ	[Ω m]	20
Density		γ	[kg/m³]	3750
Relative loss factor	@1 MHz	tanδ/μi	[10^{-3}]	< 0.4
Relative temperature coefficient	-40°C...150°C	α_F	[10^{-6}/K]	< 50
Hysteresis material constant	10kHz	η_B	[10^{-6}/mT]	< 3
DC-Bias (percent permeability change)	@4 kA/m (50 Oe)	μ_{rev}/μ_i		53%
	@8kA/m (100 Oe)	μ_{rev}/μ_i		30%
Realtive core losses	@ 50kHz, 100mT	P_V	[kW/m³]	300
Specific heat		c_p	[J/kg K]	700
Thermal conductivity		λ	[W/mK]	3
Young's modulus		E_c	[MPa]	25000
Compressive strength		f_c	[MPa]	20
Tensile strength		f_t	[MPa]	2
Linear expansion coefficient		Δl/l	[10^{-6}/K]	12

Permeability vs. field strength



Core loss vs. flux density



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