Product Brief 2019

Ferrite Materials

HF Power Ferrite Material PC200

TDK Corporation presents the MnZn-based PC200 ferrite material, which is characterized by low losses at high frequencies. It was developed specifically for power supplies and frequency converters that operate with fast-switching power semiconductors on a GaN basis. The new material is optimized for a frequency range from 700 kHz to 4 MHz.

Its maximum transmissible power is reached at a switching frequency of 1.8 MHz to 2 MHz and an operating temperature of 100 °C. The ferrite material's Curie temperature is in excess of 280 °C.

Applications

- SMPS
- USB-C charger
- Data center
- 48 V POL



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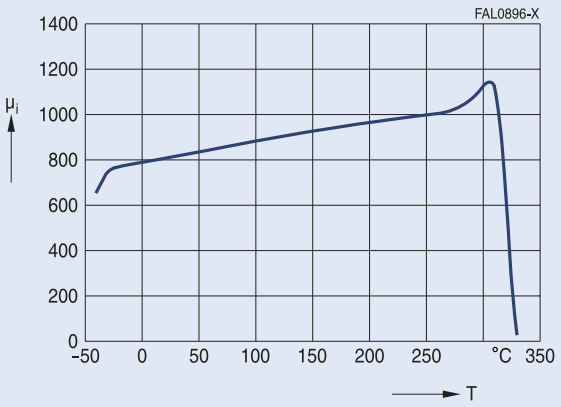
Material properties

Initial permeability (T = 25 °C)	μ_i		800 ±25%
Flux density (H = 1200 A/m, f = 10 kHz)	B_S (25 °C) B_S (100 °C)	mT mT	480 410
Optimum frequency range	f_{min} f_{max}	kHz kHz	700 4000
Curie temperature	T_C	°C	> 280
Relative core losses (typical values) 1 MHz, 50 mT, 100 °C 2 MHz, 30 mT, 100 °C 3 MHz, 10 mT, 100 °C 3 MHz, 30 mT, 100 °C	P_V	 kW/m³ kW/m³ kW/m³ kW/m³	 180 200 60 800

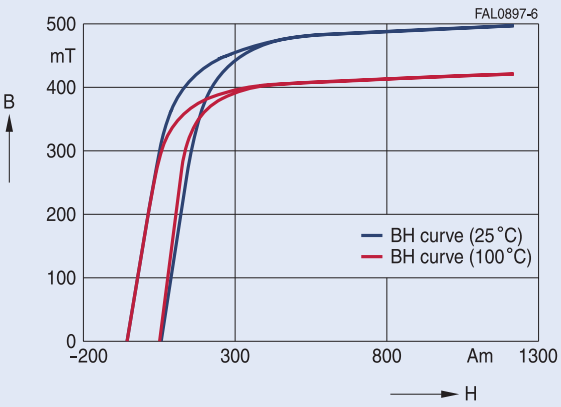
Based on IEC 60401-3, the data specified here are typical and have been determined principally using R 20 toroids.

Material diagrams

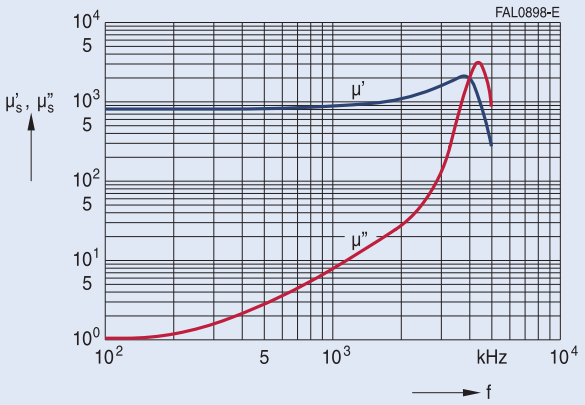
Initial permeability μ_i vs. T



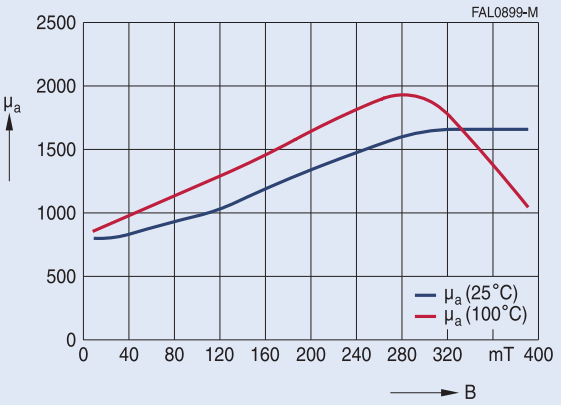
Dynamic magnetization curves



Complex permeability



Amplitude permeability vs. AC flux field density

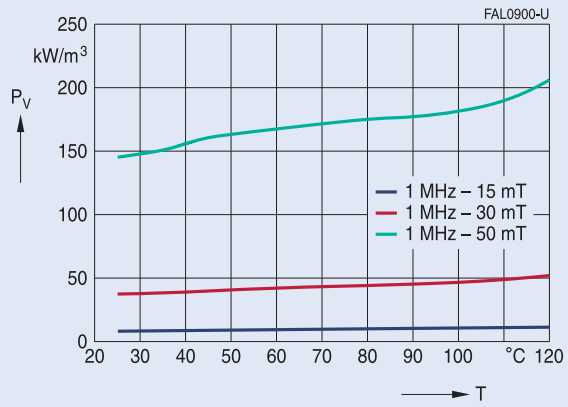


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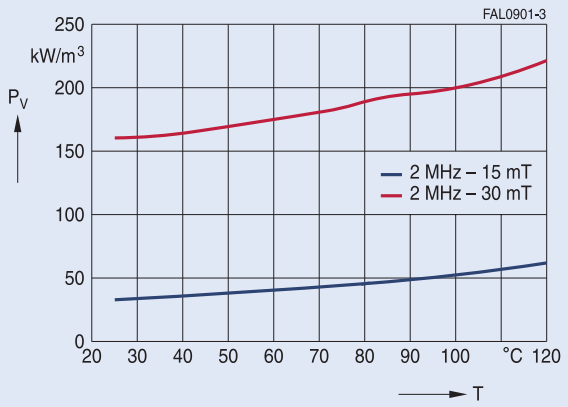
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Material diagrams

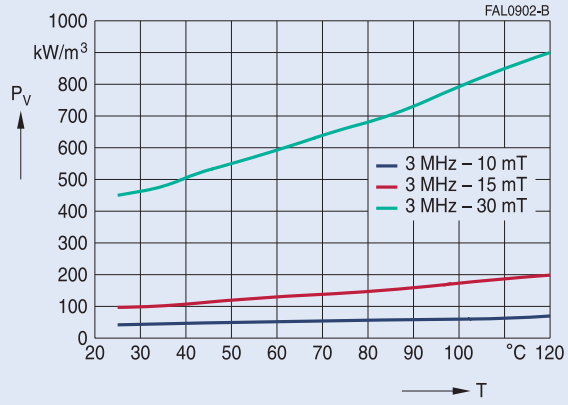
P_V vs. T @ 1 MHz



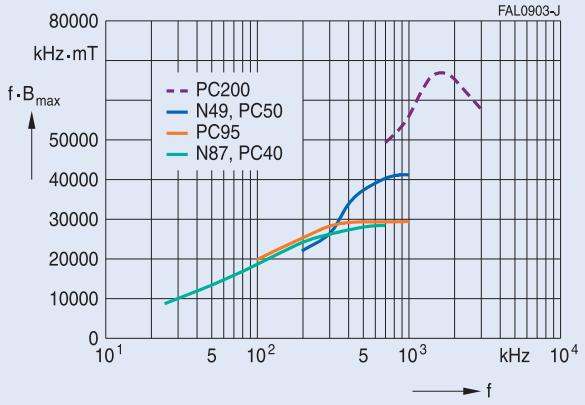
P_V vs. T @ 2 MHz



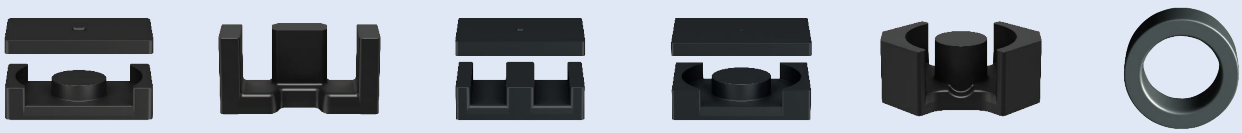
P_V vs. T @ 3 MHz



Performance factor vs. f @ T = 100 °C, P_V = 300 kW/m³



Available core shapes



The PC200 ferrite material is particularly suitable for transformers based on ring core or planar topologies. The material is available in ER, EFD, ELP, EQ, I, RM cores and toroids. The outstanding properties of this material will enable considerably more compact power supplies to be designed in future. At the same time, its efficiency is improved due to the low losses of the ferrite material, which is why the use of PC200 contributes to significantly greater energy savings.

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