

T12

超高磁导率材料
ULTRA-HIGH PERMEABILITY FERRITE

T12 为超高磁导率锰锌铁氧体，初始磁导率 (μ_i) 12000，为本目录最高，饱和磁通密度 (B_s) 400 mT (25 °C) / 210 mT (100 °C)，居里温度高于 110 °C。极高的 μ_i 让同一感量所需的匝数最少——共模扼流圈得以在最小体积下取得最大的共模阻抗与最低的直流电阻；100 kHz 的相对损耗因子低于 15×10^{-6} 、磁滞常数 η_B 仅 $0.5 \times 10^{-6}/\text{mT}$ ，信号路径的失真与插入损耗都小。代价是温度范围：居里温度 110 °C 与 100 °C 时 210 mT 的 B_s ，适合室温至中温、低磁通的信号与滤波场合，不宜承受直流偏磁或大磁通摆幅。典型应用为电源输入端共模扼流圈、宽频与 xDSL / 以太网路信号变压器、EMI 滤波器与低频电流互感器。在高磁导率系列中，需要更高使用温度与更低残留磁通时选 T10 (μ_i 10000, Br 60 mT)；要求耐温与 B_s 兼顾的通用场合选 T05 / T06；T07 则是 μ_i 与温度稳定性的折衷。

T12 is an ultra-high-permeability MnZn ferrite with an initial permeability (μ_i) of 12000 — the highest in this catalogue — a saturation flux density (B_s) of 400 mT at 25 °C (210 mT at 100 °C) and a Curie temperature above 110 °C. The very high μ_i minimises the turns needed for a given inductance, so a common-mode choke reaches the highest common-mode impedance and the lowest DC resistance in the smallest volume; a relative loss factor below 15×10^{-6} at 100 kHz and a hysteresis constant η_B of only $0.5 \times 10^{-6}/\text{mT}$ keep distortion and insertion loss in the signal path low. The trade-off is temperature: with T_c at 110 °C and 210 mT at 100 °C it belongs in room- to medium-temperature, low-flux signal and filter duty, not under DC bias or large flux swings. Typical uses are mains-input common-mode chokes, wideband and xDSL/Ethernet signal transformers, EMI filters and low-frequency current transformers. Within the high-permeability family, choose T10 (μ_i 10000, Br 60 mT) for higher operating temperature and lower remanence, T05/T06 for general duty balancing temperature and B_s , or T07 as the compromise between μ_i and temperature stability.

Common-Mode Choke

Wideband / xDSL Transformer

EMI Filter

Current Transformer

电磁特性 MAGNETIC CHARACTERISTICS

特性 Characteristic	条件 Condition	25 °C	100 °C	单位 Unit
初始磁导率 Initial Permeability μ_i	10 kHz & <0.2 mT	12000±30%		
饱和磁通密度 Saturation Flux Density B_s	1200 A/m 50 Hz	400	210	mT
残留磁通密度 Remanence Br	1200 A/m 50 Hz	130	110	mT
矫顽力 Coercivity H_c	1200 A/m 50 Hz	10	6	A/m
相对损耗因子 Loss Factor	100 kHz	<15		10^{-6}
磁滞常数 Hysteresis Constant η_B	100 kHz 1.5-3.0 mT	0.5		$10^{-6}/\text{mT}$
温度系数 Temperature Factor of	100kHz <0.2 mT	0~2.0		10^{-6}
居里温度 Curie Temperature T_c	100 kHz & <0.2 mT	>110		°C
密度 Density D	阿基米德法 Archimedes method	5.0		g/cm ³
电阻率 Electrical Resistivity ρ	直流电流 DC Current	0.1		$\Omega \cdot \text{m}$

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 特性曲线
CHARACTERISTIC CURVES