T12

超高磁导率材料
ULTRA-HIGH PERMEABILITY FERRITE

鐵研 TAK

T12 为超高磁导率锰锌铁氧体，初始磁导率（μi）12000，为本目录最高，饱和磁通密度（Bs）400 mT（25 ℃）/ 210 mT（100 ℃），居里温度高于 110 ℃。极高之 μi 使同一电感量所需匝数最少，共模扼流圈得以在最小体积下获得最高之共模阻抗与最低之直流电阻；100 kHz 相对损耗因子低于 15×10⁻⁶、磁滞常数 ηB 0.5×10⁻⁶/mT，信号路径之失真与插入损耗均低。其限制在于温度范围：居里温度 110 ℃ 与 100 ℃ 时 210 mT 之 Bs，适用于室温至中温、低磁通之信号与滤波场合，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 / 乙太网路信号变压器、EMI 滤波器与低频电流互感器。于高磁导率系列中，需较高使用温度与较低残留磁通者采 T10（μi 10000，Br 60 mT）；需兼顾耐温与 Bs 之通用场合采 T05 / T06；T07 则为 μi 与温度稳定性之折衷。

T12 is an ultra-high-permeability MnZn ferrite with an initial permeability (μi) of 12000 — the highest in this catalogue — a saturation flux density (Bs) of 400 mT at 25 °C (210 mT at 100 °C) and a Curie temperature above 110 °C. The very high μi minimises the number of turns for a given inductance, so a common-mode choke achieves the highest common-mode impedance and the lowest DC resistance in the smallest volume; the relative loss factor at 100 kHz is below 15×10⁻⁶ and the hysteresis constant ηB 0.5×10⁻⁶/mT, giving low distortion and insertion loss in the signal path. Its limitation is the temperature range: with a Curie temperature of 110 °C and 210 mT at 100 °C it is intended for room- to moderate-temperature, low-flux signal and filter applications, not for DC bias or large flux swings. Typical applications are mains-input common-mode chokes, wideband and xDSL/Ethernet signal transformers, EMI filters and low-frequency current transformers. Within the high-permeability family, T10 (μi 10000, Br 60 mT) is recommended where a higher operating temperature and lower remanence are required, T05/T06 for general applications balancing temperature capability and Bs, and T07 as the compromise between μi 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 ℃	100 ℃	单位 Unit
初始磁导率 Initial Permeability μi	10 kHz & <0.2 mT	12000±30%		
饱和磁通密度 Saturation Flux Density Bs	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 Hc	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 ηB	100 kHz 1.5-3.0 mT	0.5		10^{-6}/mT
温度系数 Temperature Factor αf	100kHz <0.2 mT	0~2.0		10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>110		℃
密度 Density D	阿基米德法 Archimedes method	5.0		g/cm³
电阻率 Electrical Resistivity ρ	直流电流 DC Current	0.1		Ω·m

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特性曲线
CHARACTERISTIC CURVES





