T10

极高磁导率低残磁材料
VERY-HIGH PERMEABILITY LOW-REMANENCE FERRITE

鐵研 TAK

T10 为极高磁导率低残磁锰锌铁氧体，初始磁导率（μi）10000，饱和磁通密度（Bs）420 mT（25 ℃）/ 240 mT（100 ℃），居里温度高于 140 ℃。残留磁通密度（Br）70 mT（25 ℃）/ 60 mT（100 ℃）为系列内最低，矫顽力（Hc）8 → 6 A/m：直流暂态或开关突波后磁芯几乎不残留磁化，电流互感器之比差与相位差不因此偏移；100 kHz 相对损耗因子低于 15×10⁻⁶，磁滞常数 ηB 0.4×10⁻⁶/mT，共模扼流圈于相同体积下可获得接近 T12 之阻抗。相较于 T12，居里温度由 110 ℃ 提高至 140 ℃，100 ℃ 之 Bs 由 210 mT 提高至 240 mT，工作温度上限较宽。典型应用为精密电流互感器与漏电保护互感器、电源输入端共模扼流圈、宽频信号变压器。于高磁导率系列中，T10 为 T12 之耐温低残磁版本：以 μi 上限为优先且环境温度温和者采 T12（μi 12000）；温度特性优先者采 T07；需热态 Bs 者采 T05。μi 公差 ±30 %，对电感量精度要求高时以匝数或气隙微调。

T10 is a very-high-permeability low-remanence MnZn ferrite with an initial permeability (μi) of 10000, a saturation flux density (Bs) of 420 mT at 25 °C (240 mT at 100 °C) and a Curie temperature above 140 °C. Its remanence (Br) of 70 mT at 25 °C (60 mT at 100 °C) is the lowest in the family and its coercivity (Hc) 8 → 6 A/m: after a DC transient or switching surge the core retains almost no magnetisation, so the ratio and phase errors of a current transformer are not offset; the relative loss factor at 100 kHz is below 15×10⁻⁶ and the hysteresis constant ηB 0.4×10⁻⁶/mT, so a common-mode choke of the same volume achieves an impedance close to that of T12. Compared with T12 the Curie temperature is raised from 110 °C to 140 °C and the 100 °C Bs from 210 mT to 240 mT, giving a wider upper operating-temperature limit. Typical applications are precision current transformers and residual-current transformers, mains-input common-mode chokes and wideband signal transformers. Within the high-permeability family T10 is the temperature-tolerant low-remanence counterpart of T12: T12 (μi 12000) is recommended where the μi ceiling takes priority in a moderate environment, T07 where temperature stability takes priority and T05 where hot-state Bs is required. The μi tolerance is ±30 %; where inductance accuracy is critical, fine adjustment by turns or gap is advised.

Precision Current Transformer | Residual-Current Transformer | Common-Mode Choke | Wideband Signal 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	100 kHz & <0.2 mT	10000±30%		
饱和磁通密度 Saturation Flux Density Bs	1200 A/m 50 Hz	420	240	mT
残留磁通密度 Remanence Br	1200 A/m 50 Hz	70	60	mT
矫顽力 Coercivity Hc	1200 A/m 50 Hz	8	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	0.4		10^{-6}/mT
温度系数 Temperature Factor αf	100kHz <0.2 mT	1~2		10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>140		℃
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	0.2		Ω·m

特性曲线详见次页 CHARACTERISTIC CURVES — SEE NEXT PAGE

T10

特性曲线
CHARACTERISTIC CURVES





