SL50

宽温稳定材料
WIDE TEMP STABLE MATERIALS

鐵研 TAK

SL50 为镍锌铁氧体材料，初始磁导率（μi）约 500，饱和磁通密度（Bs）约 350 mT（25 ℃）/ 230 mT（100 ℃），居里温度高于 180 ℃。本材料的核心是温度稳定性：温度系数 αμr 在 −40 ~ 140 ℃ 全范围内仅 0 ~ 2×10⁻⁶/K——磁导率在整个车载温度区间内几乎持平，配合 18×10⁻⁶（0.1 MHz）/ 35×10⁻⁶（1.0 MHz）的低损耗因子，滤波与调谐特性不随温度漂移。相对地，其 100 ℃ 饱和磁通仅约 230 mT，不以功率磁通见长，定位在低磁通与 EMI 用途。典型应用为宽频 EMI 滤波器、信号线抗干扰磁环与共模扼流圈，以及 RF/IF 线圈、高频滤波与匹配电感、高速数据线磁珠；亦见于车载传感器与 ADAS、RFID 天线及通信设备滤波器等需要全温域一致特性的场合。与同定位的 SL80（μi 约 800）相比，SL50 磁导率较低、温度系数更紧（0 ~ 2 对 0 ~ 4）；与 DL 系列（αμr 约 20 ~ 30×10⁻⁶/K）相比，温度漂移低一个数量级——需要温度不敏感的滤波 / 谐振特性时，应优先选用 SL 系列。

SL50 is a NiZn ferrite with an initial permeability (μi) of approx. 500, a saturation flux density (Bs) of approx. 350 mT at 25 °C (230 mT at 100 °C) and a Curie temperature above 180 °C. Its defining property is temperature stability: the permeability temperature coefficient αμr stays within 0–2×10⁻⁶/K across the full −40 to 140 °C range — essentially flat over the entire automotive temperature span — and with a low loss factor of 18×10⁻⁶ at 0.1 MHz / 35×10⁻⁶ at 1.0 MHz, filter and tuning characteristics do not drift with temperature. In exchange, Bs at 100 °C is only about 230 mT, so the grade is positioned for low-flux and EMI duties rather than power flux. Typical uses are broadband EMI filters, signal-line suppression rings and common-mode chokes, plus RF/IF coils, HF filtering/matching inductors and high-speed data-line beads; it also serves automotive sensors and ADAS, RFID antennas and communication-equipment filters where characteristics must hold across the whole temperature range. Against SL80 (μi approx. 800) of the same wide-temperature family, SL50 offers a lower permeability with a tighter coefficient (0–2 vs 0–4); against the DL family (αμr approx. 20–30×10⁻⁶/K) its drift is an order of magnitude lower — the SL grades are the first choice when temperature-insensitive filtering or resonance is required.

Broadband EMI Filter | Common-Mode Choke | High-Speed Data-Line Bead | RF / IF Coil | RFID Antenna

电磁特性 MAGNETIC CHARACTERISTICS

特性 Characteristic	条件 Condition	值 Value	单位 Unit
初始磁导率 μi Initial Permeability	100 kHz & <0.2 mT	500±25%	
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 25 ℃ 100 Hz	350	mT
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 100 ℃ 100 Hz	230	mT
残留磁通密度 Br Remanence	3000 A/m · 25 ℃ 100 Hz	180	mT
残留磁通密度 Br Remanence	3000 A/m · 100 ℃ 100 Hz	110	mT
矫顽力 Hc Coercivity	3000 A/m · 25 ℃ 100 Hz	100	A/m
矫顽力 Hc Coercivity	3000 A/m · 100 ℃ 100 Hz	80	A/m
αμr（温度系数） Temperature coefficient of permeability	-40 ~ 140 ℃	0~2	×10⁻⁶/K
相对损耗因子 tanδ/μi Relative Loss Factor	0.1 MHz & <0.2 mT	18	×10⁻⁶
相对损耗因子 tanδ/μi Relative Loss Factor	1.0 MHz & <0.2 mT	35	×10⁻⁶
居里温度 Tc Curie Temp.	100 kHz & <0.2 mT	>180	℃
密度 D Density	阿基米德法 Archimedes method	5.0	g/cm³
电阻率 ρ Volume Resistivity	直流电流 DC Current	10^7	Ω·m
功率损耗 Pcv Power Loss	100 kHz/100 mT | 500 kHz/30 mT | 1 MHz/30 mT · 25 °C	994 | 254 | 652	kW/m³

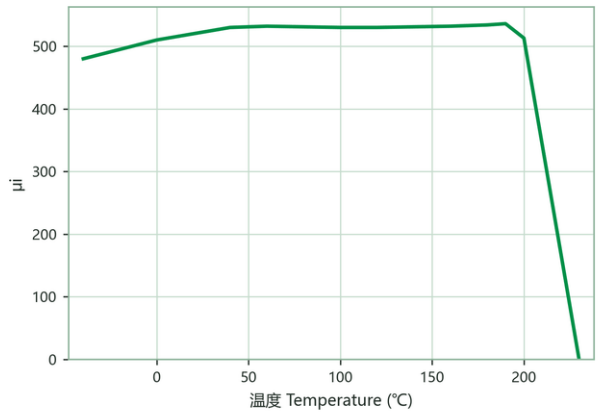
备注：各项数值均为环形磁芯T22×14×8测得的典型数值，由于几何形状和尺寸的影响，产品规格将与这些数据有所差异。25 ℃ 之功率损耗 Pcv 为 T22×14×8 环形磁芯绕线 3 匝实测。

Note: all values are typical data measured on a T22×14×8 toroidal core; actual product specifications will vary with geometry and size. Pcv values at 25 °C are measured on a T22×14×8 toroid wound with 3 turns.

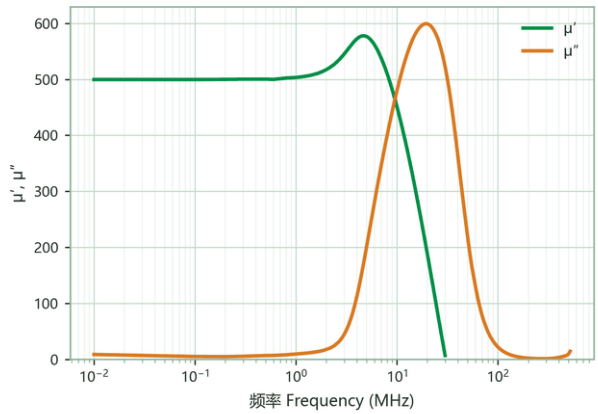
特性曲线详见次页 CHARACTERISTIC CURVES — SEE NEXT PAGE

SL50

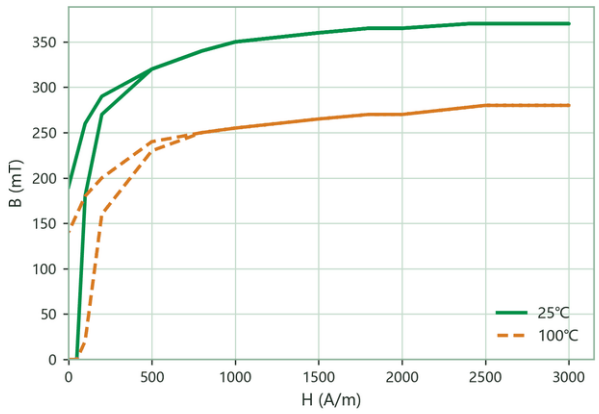
特性曲线
CHARACTERISTIC CURVES



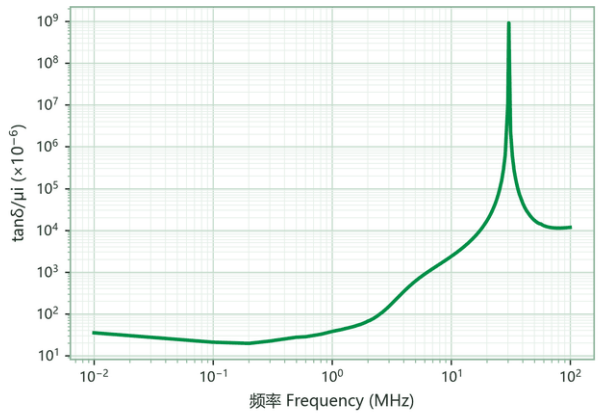
初始磁导率—温度特性
Initial Permeability vs. Temperature



复数磁导率—频率特性
Complex Permeability (μ′, μ″) vs. Frequency



静态磁化曲线
Static Magnetization Curves (B–H)



相对损耗因子—频率特性
Relative Loss Factor (tanδ/μi) vs. Frequency