G5A

高磁导高磁通EMI材料
HIGH PERM. & HIGH FLUX & EMI MATERIALS

鐵研 TAK

G5A 为镍锌铁氧体材料，初始磁导率（μi）约 800，饱和磁通密度（Bs）约 400 mT（25 ℃）/ 310 mT（100 ℃），居里温度高于 190 ℃。本材料在 μi≈800 的阻抗水平上配置了高饱和磁通：差模滤波与功率电感的导线直接承载工作电流，较高的 Bs（100 ℃ 仍有约 310 mT）使阻抗与感量在直流偏置及大电流下不易塌陷；相对损耗因子低至 10×10^{-6}（0.1 MHz）/ 30×10^{-6}（1.0 MHz），亦可胜任 0.1～1 MHz 的功率电感与直流转换器。典型应用为电源模块的功率电感、EMI 共模 / 差模滤波器与高频变压器，车用领域见于 ADAS 传感器与电机驱动系统的 EMC 防护。同为标称 μi≈800 的三种材料中，G5A 以高 Bs 主打差模与功率承载（宽温低漂移选 SL80、EMI 宽频抑制选 L43）；需要更高阻抗与储能时可选 G5B（μi 约 1000、Bs 约 390 mT）。

G5A is a NiZn ferrite with an initial permeability (μi) of approx. 800, a saturation flux density (Bs) of approx. 400 mT at 25 °C (310 mT at 100 °C) and a Curie temperature above 190 °C. It pairs the μi ≈ 800 impedance level with a high saturation flux density: in differential-mode filters and power inductors, where the winding carries the working current, the higher Bs (about 310 mT still available at 100 °C) keeps impedance and inductance from collapsing under DC bias and high current; with a relative loss factor as low as 10×10^{-6} at 0.1 MHz / 30×10^{-6} at 1.0 MHz, it also serves 0.1–1 MHz power inductors and DC converters. Typical uses are power inductors in power modules, common- and differential-mode EMI filters and high-frequency transformers; in automotive it protects ADAS sensors and motor-drive systems as EMC components. Among the three grades at a nominal μi of approx. 800, G5A leads with high Bs for differential-mode and power current capability (choose SL80 for temperature stability, L43 for broadband EMI suppression); step up to G5B (μi approx. 1000, Bs approx. 390 mT) for higher impedance and energy storage.

Power Inductor | Differential-Mode EMI Filter | Common-Mode Choke | HF Transformer | ADAS / Motor-Drive EMC

电磁特性 MAGNETIC CHARACTERISTICS

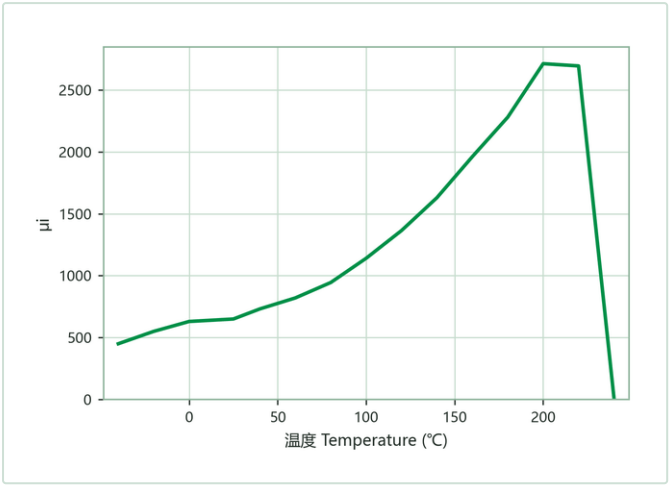
特性 Characteristic	条件 Condition	值 Value	单位 Unit
初始磁导率 μi Initial Permeability	100 kHz & <0.2 mT	800±25%	
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 25 ℃ 100 Hz	400	mT
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 100 ℃ 100 Hz	310	mT
残留磁通密度 Br Remanence	3000 A/m · 25 ℃ 100 Hz	250	mT
残留磁通密度 Br Remanence	3000 A/m · 100 ℃ 100 Hz	220	mT
矫顽力 Hc Coercivity	3000 A/m · 25 ℃ 100 Hz	25	A/m
矫顽力 Hc Coercivity	3000 A/m · 100 ℃ 100 Hz	15	A/m
αμr（温度系数） Temperature coefficient of permeability	20～60 ℃	10	$\times10^{-6}$/K
相对损耗因子 tanδ/μi Relative Loss Factor	0.1 MHz & <0.2 mT	10	$\times10^{-6}$
相对损耗因子 tanδ/μi Relative Loss Factor	1.0 MHz & <0.2 mT	30	$\times10^{-6}$
居里温度 Tc Curie Temp.	100 kHz & <0.2 mT	>190	℃
密度 D Density	阿基米德法 Archimedes method	5.1	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	562 | 366 | 994	kW/m³

备注：各项数值均为环形磁芯T31×19×8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 T31×19×8 环形磁芯绕线 3 匝实测。

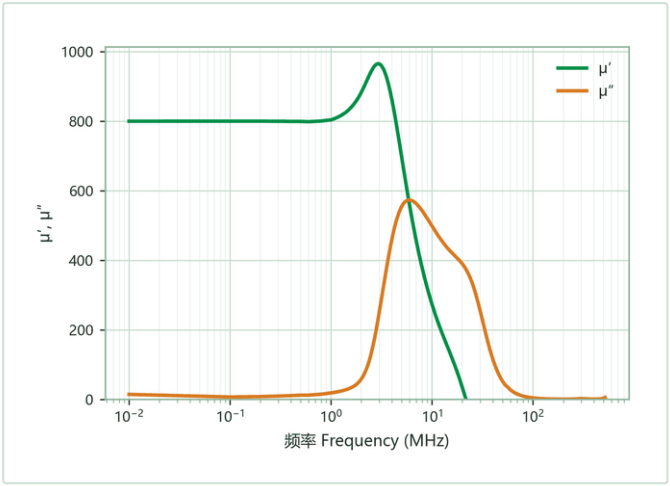
Note: all values are typical data measured on a T31×19×8 toroidal core; actual product specifications will vary with geometry and size. Pcv values at 25 °C are measured on a T31×19×8 toroid wound with 3 turns.

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

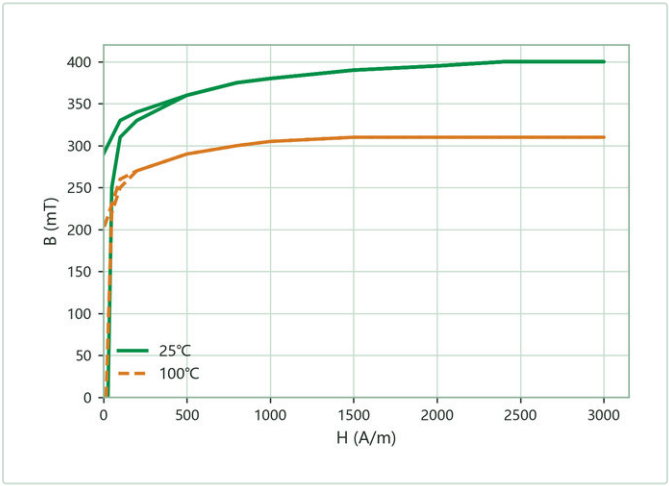
G5A 特性曲线
CHARACTERISTIC CURVES



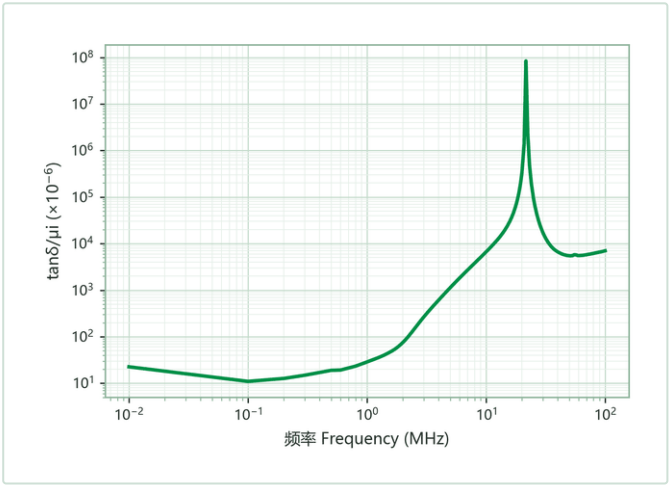
初始磁导率—温度特性
Initial Permeability vs. Temperature



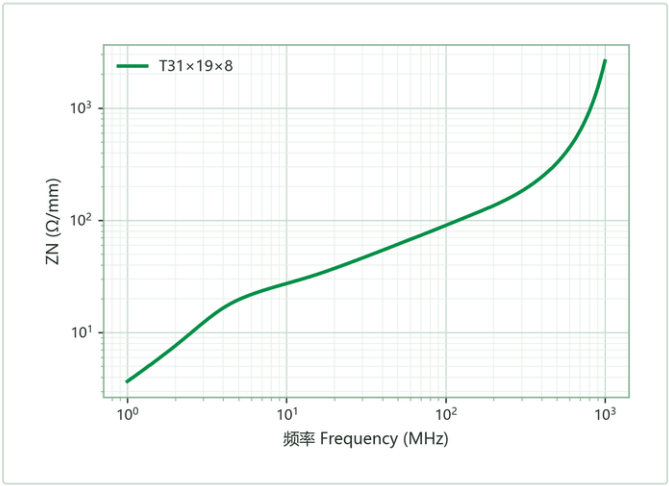
复数磁导率—频率特性
Complex Permeability (μ′, μ″) vs. Frequency



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



标准化阻抗—频率特性（Φ0.5 mm 漆包线 100 mm · 单圈测量）
Normalized Impedance ZN vs. Frequency (single turn of Φ0.5 mm wire, 100 mm long)