M5E1

高频稳定材料
HIGH FREQUENCY STABLE MATERIALS

鐵研 TAK

M5E1 为镍锌铁氧体材料，初始磁导率（μi）约 15，饱和磁通密度（Bs）约 170 mT（25 ℃）/ 165 mT（100 ℃），居里温度高于 320 ℃。低磁导率把可用频率上限推至百 MHz 级，在 10～130 MHz 频段维持稳定的低损耗与高 Q；温度系数约 10×10⁻⁶/K，配合高于 320 ℃ 的居里温度，频率与温度特性都非常稳定，适合对调谐精度敏感的射频电路。典型应用为 RF 天线匹配电感、宽频 EMI 滤波器与中高频射频变压器。在高频族阶梯（μi 10→250）中，M5E1 介于 V4F1（约 10）与 V2F1（约 30）之间：频率上限略低于 V4F1，但 Q 值与匹配稳定性更佳，是 VHF 频段匹配与滤波的首选档。

M5E1 is a NiZn ferrite with an initial permeability (μi) of approx. 15, a saturation flux density (Bs) of approx. 170 mT at 25 °C (165 mT at 100 °C) and a Curie temperature above 320 °C. The low permeability pushes the usable ceiling to the hundred-MHz class, holding low loss and high Q across 10–130 MHz; with a temperature coefficient of about 10×10⁻⁶/K and Tc above 320 °C, both frequency and temperature behaviour are very stable — suited to tuning-sensitive RF circuits. Typical uses are RF antenna-matching inductors, broadband EMI filters and mid/high-frequency RF transformers. In the high-frequency ladder (μi 10 → 250) M5E1 sits between V4F1 (approx. 10) and V2F1 (approx. 30): its ceiling is slightly below V4F1's, but its Q and matching stability are better — the first pick for VHF matching and filtering.

Antenna Matching Inductor | Broadband EMI Filter | HF RF Transformer

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	15±25%	
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 25 ℃ 100 Hz	170	mT
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 100 ℃ 100 Hz	165	mT
残留磁通密度 Br Remanence	3000 A/m · 25 ℃ 100 Hz	110	mT
残留磁通密度 Br Remanence	3000 A/m · 100 ℃ 100 Hz	105	mT
矫顽力 Hc Coercivity	3000 A/m · 25 ℃ 100 Hz	1400	A/m
矫顽力 Hc Coercivity	3000 A/m · 100 ℃ 100 Hz	1380	A/m
αμr（温度系数） Temperature coefficient of permeability	20～60 ℃	10	×10⁻⁶/K
相对损耗因子 tanδ/μi Relative Loss Factor	10 MHz & <0.2 mT	400	×10⁻⁶
相对损耗因子 tanδ/μi Relative Loss Factor	50 MHz & <0.2 mT	420	×10⁻⁶
居里温度 Tc Curie Temp.	100 kHz & <0.2 mT	>320	℃
密度 D Density	阿基米德法 Archimedes method	4.9	g/cm³
电阻率 ρ Volume Resistivity	直流电流 DC Current	10^7	Ω·m

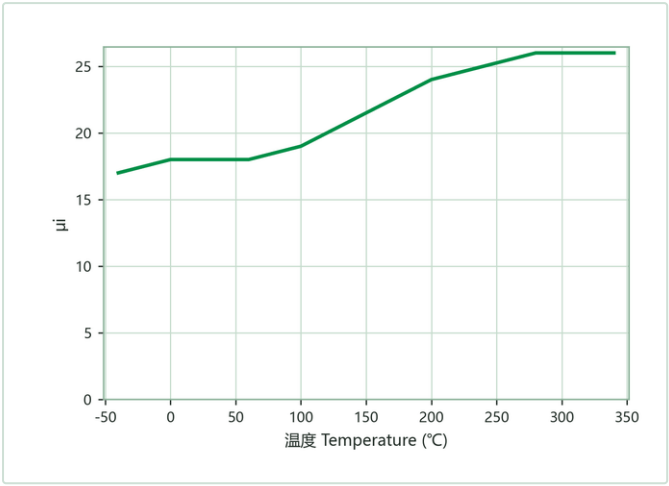
备注：各项数值均为环形磁芯T31×19×8测得的典型数值，由于几何形状和尺寸的影响，产品规格将与这些数据有所差异。

Note: all values are typical data measured on a T31×19×8 toroidal core; actual product specifications will vary with geometry and size.

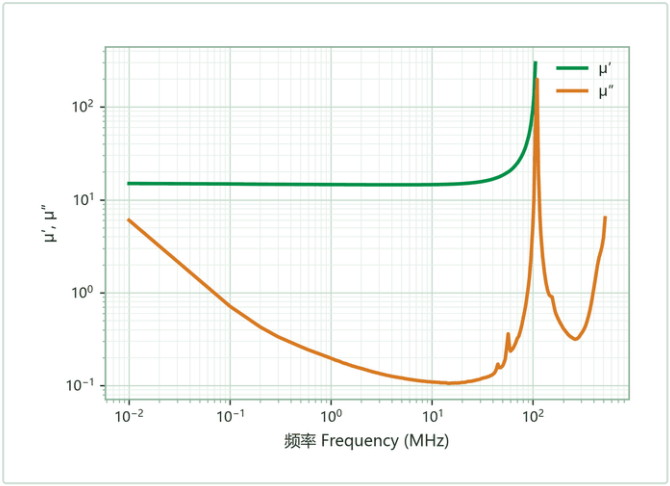
特性曲线详见次页 CHARACTERISTIC CURVES — SEE NEXT PAGE

M5E1

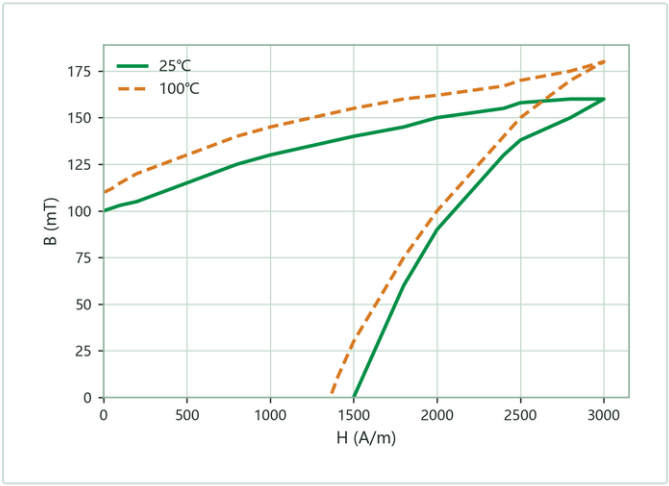
特性曲线
CHARACTERISTIC CURVES



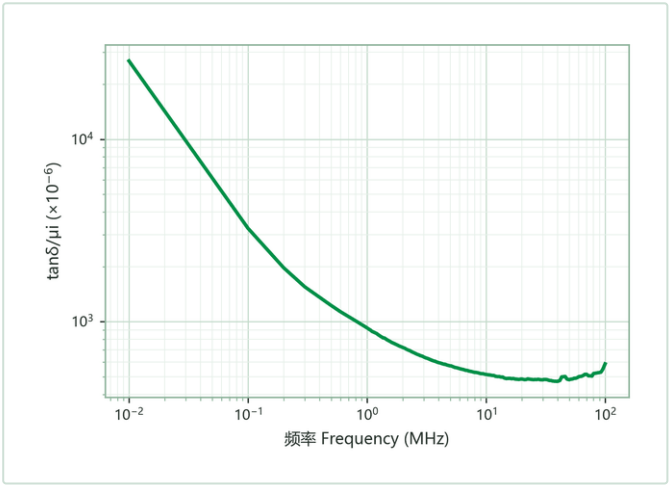
初始磁导率—温度特性
Initial Permeability vs. Temperature



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