鐵研 TAK

V4F1

高频稳定材料
HIGH FREQUENCY STABLE MATERIALS

V4F1 为镍锌铁氧体材料，初始磁导率（μi）约 10，饱和磁通密度（Bs）约 150 mT（25 ℃）/ 140 mT（100 ℃），居里温度高于 320 ℃。本材料以极低的磁导率换取极高的频率上限——依 Snoek 极限，μi 越低共振频率越高，V4F1 因此能在 VHF / UHF 频段仍保持感性行为与低插入损耗，是本册高频族的频率端点；居里温度高于 320 ℃、Bs 随温度几乎不变，特性对温度极不敏感。典型应用为 UHF 频段以上的抑制磁珠、超高频 RF 滤波器与高速信号线的共模噪声抑制，亦见于无线充电与医疗电子的高频电路。同族的 V2F1（μi 约 30）名称相近但定位不同——V4F1 的 μi 反而更低、频率上限更高；一般 100 MHz 级以下的滤波与谐振选 V2F1 或 M5E1 即可，V4F1 保留给最高频段。

V4F1 is a NiZn ferrite with an initial permeability (μi) of approx. 10, a saturation flux density (Bs) of approx. 150 mT at 25 °C (140 mT at 100 °C) and a Curie temperature above 320 °C. It trades an extremely low permeability for an extremely high frequency ceiling — by Snoek's law, the lower the μi the higher the resonance frequency — so V4F1 keeps inductive behaviour and low insertion loss into the VHF/UHF range, the frequency end-point of this volume's high-frequency family; with Tc above 320 °C and Bs almost unchanged with temperature, its characteristics are highly temperature-insensitive. Typical uses are suppression beads above the UHF band, ultra-high-frequency RF filters and common-mode noise suppression on high-speed lines, plus HF circuits in wireless charging and medical electronics. Despite the similar name, V2F1 (μi approx. 30) is positioned differently — V4F1's μi is in fact lower and its frequency ceiling higher; for filtering and resonance below the 100 MHz class choose V2F1 or M5E1, reserving V4F1 for the topmost band.

UHF Suppression Bead | VHF / UHF RF Filter | High-Speed Line Choke

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	10±25%	
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 25 ℃ 100 Hz	150	mT
饱和磁通密度 Bs Saturation Flux Density	3000 A/m · 100 ℃ 100 Hz	140	mT
残留磁通密度 Br Remanence	3000 A/m · 25 ℃ 100 Hz	95	mT
残留磁通密度 Br Remanence	3000 A/m · 100 ℃ 100 Hz	90	mT
矫顽力 Hc Coercivity	3000 A/m · 25 ℃ 100 Hz	1450	A/m
矫顽力 Hc Coercivity	3000 A/m · 100 ℃ 100 Hz	1400	A/m
αμr（温度系数）Temperature coefficient of permeability	20～60 ℃	40	$\times10^{-6}$/K
相对损耗因子 tanδ/μi Relative Loss Factor	25 MHz & <0.2 mT	600	$\times10^{-6}$
相对损耗因子 tanδ/μi Relative Loss Factor	100 MHz & <0.2 mT	700	$\times10^{-6}$
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/cm^3
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

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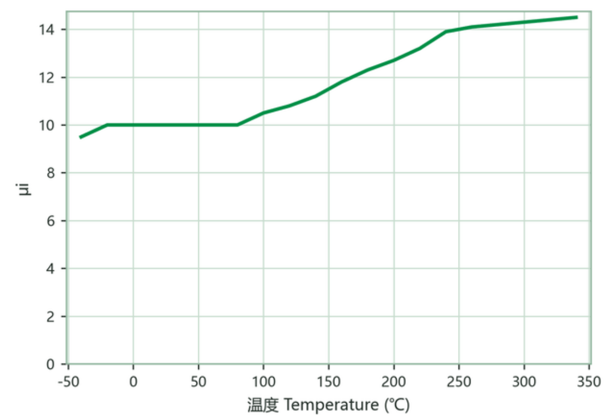
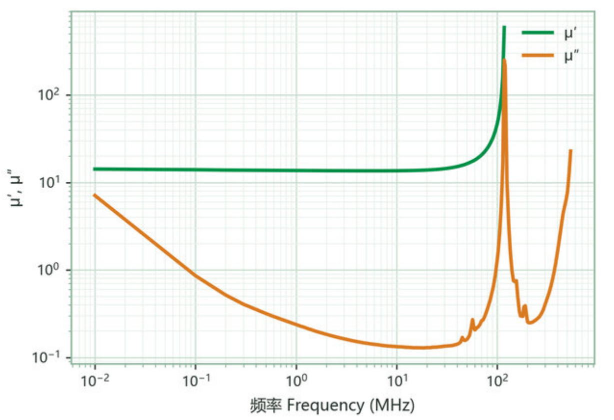
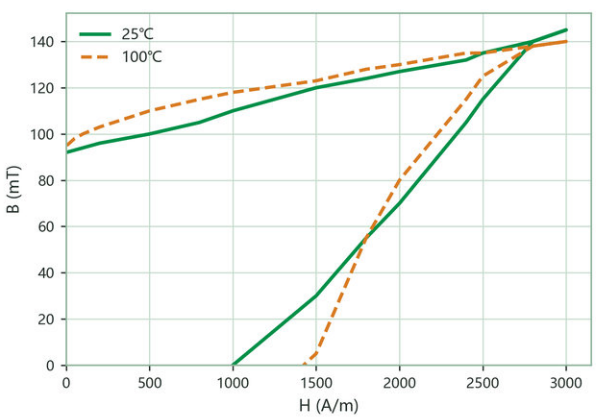
V4F1 特性曲线 CHARACTERISTIC CURVES



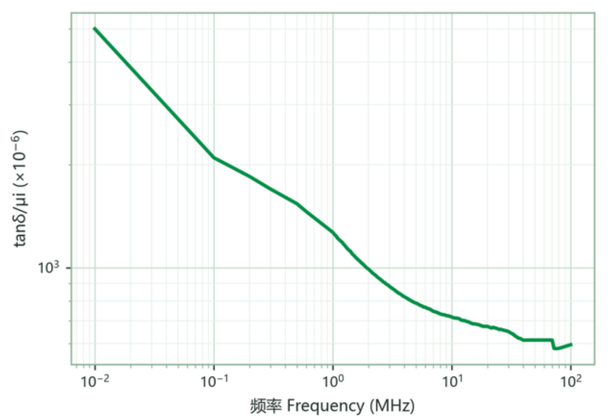
初始磁导率—温度特性
Initial Permeability vs. Temperature



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