鐵研 TAK

DL5H

高磁通耐热冲击材料

HIGH FLUX & THERMAL SHOCK RESISTANT FERRITE

DL5H 为镍锌铁氧体材料，初始磁导率（μi）约 530，饱和磁通密度（Bs）约 400 mT（25 ℃） / 305 mT（100 ℃），居里温度高于 200 ℃。此材料把 DL 功率系的磁导率推到最高，同时保住 400 mT 级的饱和磁通：较高的 μi 提高单位匝数的感量——在环形等闭磁路设计中，同感量所需匝数较少，有利于降低铜损与绕线体积；低矫顽力（Hc 约 22 A/m）亦使磁滞损维持低位。损耗因子于 1.0 MHz 达 80×10⁻⁶，适用频带较 DL5 略偏低中频。耐热冲击与耐焊性能优异，可承受急冷急热与高温回流焊。典型应用为高功率宽频电感、EMI 滤波器与共模扼流圈，特别适合追求感量密度的 SMD 电源模块与工业、车规功率设计。在 DL 系列中，DL5H 是 “高磁导×高磁通” 的折衷版：相较 DL5（μi 约 400、Bs 420 mT、Tc >240 ℃）标称磁导率高约三成，代价是耐温上限与 100 ℃ 磁通略低——长时间高温工作优先选 DL5 / DL6，常温至中温、重视感量与体积时选 DL5H。

DL5H is a NiZn ferrite with an initial permeability (μi) of approx. 530, a saturation flux density (Bs) of approx. 400 mT at 25 °C (305 mT at 100 °C) and a Curie temperature above 200 °C. It pushes permeability to the top of the DL power side while holding a 400 mT-class flux density: the higher μi raises the inductance per turn — in toroids and other closed magnetic circuits this directly cuts the turns needed for a given inductance, saving copper loss and winding volume — while the low coercivity (Hc approx. 22 A/m) keeps hysteresis loss small. With the loss factor reaching 80×10^{-6} at 1.0 MHz, its useful band sits somewhat lower than DL5's. Excellent thermal-shock resistance and solderability withstand rapid thermal cycling and high-temperature reflow. Typical uses are high-power wideband inductors, EMI filters and common-mode chokes, especially SMD power modules and industrial/automotive power designs where inductance density matters. Within the DL family, DL5H is the high-permeability × high-flux compromise: over DL5 (μi approx. 400, Bs 420 mT, Tc >240 °C) it offers roughly 30 % higher nominal permeability at the cost of a lower temperature ceiling and less flux at 100 °C — prefer DL5/DL6 for sustained hot operation, DL5H when inductance and size lead under normal-to-warm conditions.

High-Power Wideband Inductor | EMI Filter | Common-Mode Choke | SMD Power Inductor

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	530±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	305	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	100	mT
矫顽力 Hc Coercivity	3000 A/m · 25 ℃ 100 Hz	22	A/m
矫顽力 Hc Coercivity	3000 A/m · 100 ℃ 100 Hz	16	A/m
αμr（温度系数） Temperature coefficient of permeability	20～60 ℃	20	$\times10^{-6}$/K
相对损耗因子 tanδ/μi Relative Loss Factor	0.1 MHz & <0.2 mT	35	$\times10^{-6}$
相对损耗因子 tanδ/μi Relative Loss Factor	1.0 MHz & <0.2 mT	80	$\times10^{-6}$
居里温度 Tc Curie Temp.	100 kHz & <0.2 mT	>200	℃
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	609 | 528 | 1484	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

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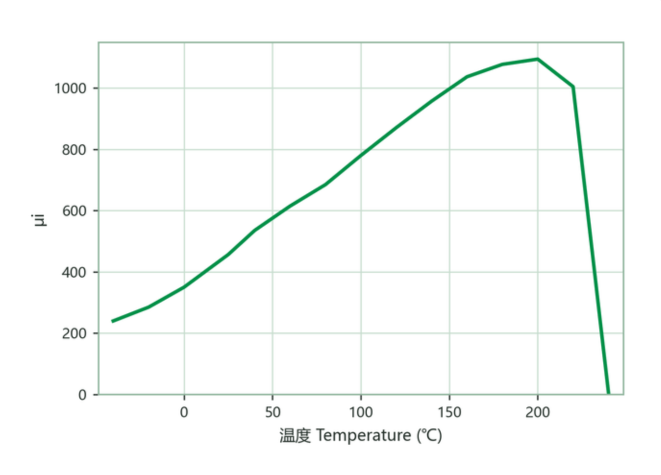
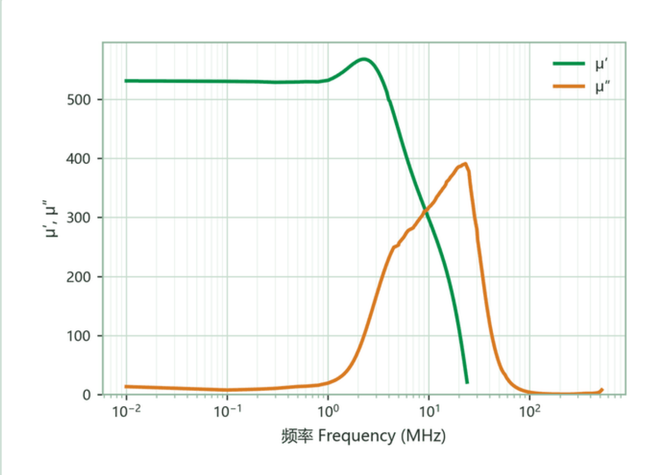
DL5H

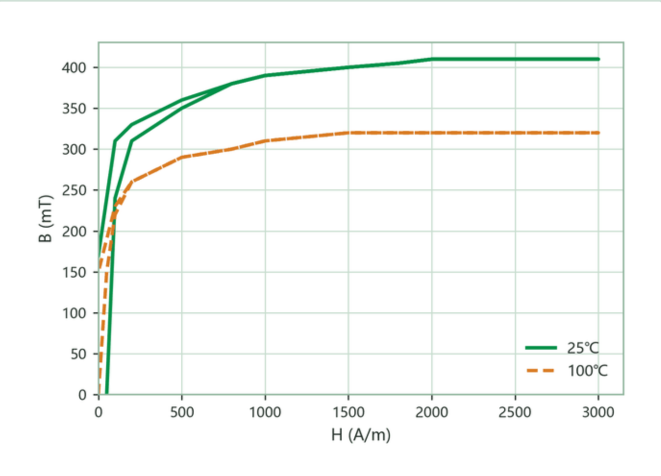
特性曲线
CHARACTERISTIC CURVES



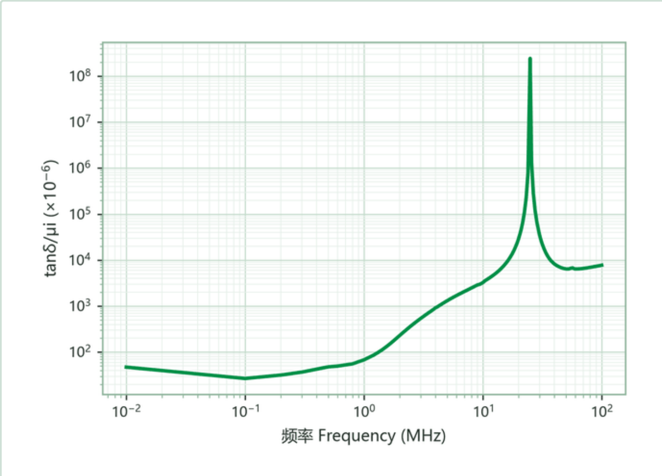
初始磁导率—温度特性
Initial Permeability vs. Temperature



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