TM65

高频电感功率材料
HIGH-FREQUENCY INDUCTOR POWER FERRITE

鐵研 TAK

TM65 为高频电感用锰锌功率铁氧体，初始磁导率（μi）1300，为高频功率材料中最高，饱和磁通密度（Bs）540 mT（25 ℃）/ 440 mT（100 ℃），居里温度高于 240 ℃。损耗极小值位于工作温度：1 MHz / 50 mT 之 Pcv 由 25 ℃ 的 250 kW/m³ 降至 100 ℃ 的 180 kW/m³，800 kHz / 60 mT 为 300 → 220 kW/m³，1 MHz / 30 mT 为 70 → 50 kW/m³；100 ℃ 之残留磁通密度（Br）50 mT。于同一 UD 磁芯之八种材料直流偏磁实测中，220 nH 档 100 ℃ I@90 % 达 47.3 A，与 TM59 同级而高频损耗较低，符合单匝、大电流 MHz 级电感之需求。典型应用为 CPU / GPU 供电之 VRM 与 TLVR 电感、POL 高频电感，以及 1 MHz 级 DC-DC 电感与变压器。于高频功率材料之中，TM65 为新设计电感之建议材料（TM61 属前一代，供既有设计沿用，1–3 MHz 变压器亦可续用）；小尺寸 MHz 级变压器首选 TM63。500 kHz / 100 mT 为 600 → 630 kW/m³，700 kHz 以下之大磁通变压器仍以 TM59 为主。

TM65 is a high-frequency inductor MnZn power ferrite with an initial permeability (μi) of 1300, the highest of the high-frequency power grades, a saturation flux density (Bs) of 540 mT at 25 °C (440 mT at 100 °C) and a Curie temperature above 240 °C. Its loss minimum lies at operating temperature: Pcv at 1 MHz / 50 mT decreases from 250 kW/m³ at 25 °C to 180 kW/m³ at 100 °C, at 800 kHz / 60 mT it is 300 → 220 kW/m³ and at 1 MHz / 30 mT 70 → 50 kW/m³; the remanence (Br) at 100 °C is 50 mT. In the DC-bias measurement of eight grades on the same UD core, its 100 °C I@90 % reaches 47.3 A in the 220 nH band, equivalent to TM59 with lower high-frequency loss, meeting the requirements of single-turn high-current MHz-class inductors. Typical applications are VRM and TLVR inductors for CPU/GPU power, POL high-frequency inductors, and 1 MHz-class DC-DC inductors and transformers. Among the high-frequency grades TM65 is the recommended inductor grade for new designs (TM61 is the earlier generation, retained for existing designs and still applicable to 1–3 MHz transformers); small-size MHz transformers should use TM63. At 500 kHz / 100 mT it reads 600 → 630 kW/m³, so large-flux transformers below 700 kHz remain the domain of TM59.

VRM / TLVR Inductor | POL High-Frequency Inductor | MHz DC-DC Inductor | High-Frequency Transformer

电磁特性 MAGNETIC CHARACTERISTICS

特性 Characteristic	条件 Condition	25 ℃	100 ℃	单位 Unit
初始磁导率 Initial Permeability μi	100 kHz & <0.2 mT	1300±25%		
增幅磁导率 Amplitude Permeability μa	25 kHz/400 mT	> 2400	> 2400	
饱和磁通密度 Saturation Flux Density Bs	1200 A/m 100 Hz	540	440	mT
残留磁通密度 Remanence Br	1200 A/m 100 Hz	70	50	mT
矫顽力 Coercivity Hc	1200 A/m 100 Hz	15	20	A/m
相对损耗因子 Loss Factor	100 kHz & <0.2 mT	<15		10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>240		℃
密度 Density D	阿基米德法 Archimedes method	>4.85		g/cm^3
电阻率 Electrical Resistivity ρ	直流电流 DC Current	>10		Ω·m

功率损耗 Pcv POWER LOSS · KW/M³

测试条件 Condition	25 ℃	100 ℃	测试条件 Condition	25 ℃	100 ℃
500 kHz/50 mT	70	50	800 kHz/80 mT	650	600
500 kHz/100 mT	600	630	1 MHz/30 mT	70	50
800 kHz/60 mT	300	220	1 MHz/50 mT	250	180

Steinmetz 系数 Pcv = K·f^α·B^β

频段 Range	K	α	β
100 ≤500	5.064E-09	1.3197	3.7683
100 ≤1000	1.313E-10	1.7771	3.9893
100 ≤3000	2.212E-13	2.7658	3.8768

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

TM65

特性曲线
CHARACTERISTIC CURVES











