TM63

高频低损耗功率材料
HIGH-FREQUENCY LOW-LOSS POWER FERRITE

鐵研 TAK

TM63 为高频锰锌功率铁氧体，初始磁导率（μi）700，饱和磁通密度（Bs）540 mT（25 ℃）/ 450 mT（100 ℃），居里温度高于 290 ℃，适用频率上限为功率系列最高；100 ℃ 仍保有 450 mT（保持率 83 %）。较低之 μi 提供最宽之适用频带：1 MHz / 50 mT 之 Pcv 为 70 → 80 kW/m³，2 MHz / 50 mT 为 200 → 250 kW/m³，3 MHz / 30 mT 为 140 → 180 kW/m³。细晶粒低 μi 材料之烧结窗较窄，不生产大尺寸磁芯；其适用范围为小尺寸、MHz 级、磁通摆幅较小之变压器：GaN / SiC 谐振变压器（1–3 MHz）、MHz 级隔离与栅极驱动变压器、超音波与压电驱动变压器（1–5 MHz），以及车用引擎室等高温环境之小型高频电源。不适用于大电流单匝储能电感（直流偏磁能力为八种材料实测中最低，220 nH 档 100 ℃ I@90 % 41.7 A）：MHz 级电感首选 TM65（TM61 替代）；需较高 μi 之 1–3 MHz 变压器可采 TM61。

TM63 is a high-frequency MnZn power ferrite with an initial permeability (μi) of 700, a saturation flux density (Bs) of 540 mT at 25 °C (450 mT at 100 °C) and a Curie temperature above 290 °C; it has the highest usable frequency in the power series, with 450 mT retained at 100 °C (83 %). The low μi provides the widest usable band: Pcv is 70 → 80 kW/m³ at 1 MHz / 50 mT, 200 → 250 kW/m³ at 2 MHz / 50 mT and 140 → 180 kW/m³ at 3 MHz / 30 mT. The fine-grained low-μi material has a narrow sintering window and is not produced in large cores; its scope is small MHz-class transformers with limited flux swing: GaN/SiC resonant transformers (1–3 MHz), MHz-class isolation and gate-drive transformers, ultrasonic and piezo driver transformers (1–5 MHz), and small high-frequency supplies in high-temperature environments such as automotive engine compartments. It is not suited to high-current single-turn storage inductors (the lowest DC-bias capability of the eight grades measured, I@90 % = 41.7 A at 100 °C, 220 nH band): MHz-class inductors should use TM65 (TM61 as alternate), and 1–3 MHz transformers needing higher μi may use TM61.

GaN / SiC Resonant Transformer | MHz Gate-Drive / Isolation Transformer | Ultrasonic / Piezo Driver | MHz Current Transformer | High-Temp HF Supply

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	700±25%		
增幅磁导率 Amplitude Permeability μa	25 kHz/400 mT	> 1400	> 1200	
饱和磁通密度 Saturation Flux Density Bs	1200 A/m 50 Hz	540	450	mT
残留磁通密度 Remanence Br	1200 A/m 50 Hz	100	90	mT
矫顽力 Coercivity Hc	1200 A/m 50 Hz	20	15	A/m
相对损耗因子 Loss Factor	1 MHz	<6	<30	10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>290		℃
密度 Density D	阿基米德法 Archimedes method	>4.85		g/cm³
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/100 mT	400	600	2 MHz/50 mT	200	250
1 MHz/50 mT	70	80	3 MHz/30 mT	140	180

Steinmetz 系数 Pcv = K·f^α·B^β

频段 Range	K	α	β
100 ≤500	2.80E-08	0.989056	3.83745
100 ≤1000	5.27E-09	1.13879	3.96891
100 ≤5000	3.57E-07	1.93874	1.47495

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特性曲线
CHARACTERISTIC CURVES











