

TM63

超高频功率材料
ULTRA-HIGH-FREQUENCY POWER FERRITE

TM63 为超高频锰锌功率铁氧体，初始磁导率 (μ i) 700，饱和磁通密度 (Bs) 540 mT (25 °C) / 450 mT (100 °C)，居里温度高于 290 °C，为功率系列中频率上限与 Tc 最高的一支。低 μ i 换来最宽的可用频带：1 MHz / 50 mT 仅 70 → 80 kW/m³，2 MHz / 50 mT 为 200 → 250 kW/m³，3 MHz / 30 mT 为 140 → 180 kW/m³，1 MHz 相对损耗因子低于 6×10^{-6} ；残留磁通密度 (Br) 100 mT (25 °C) / 90 mT (100 °C)，矫顽力 (Hc) 20 → 15 A/m。损耗随温度缓升而非下降，热设计以热态值为准。典型应用为 2–5 MHz 的 DC-DC 与谐振变换器、MHz 级变压器与电感、GaN 高频电源。在 700 kHz–5 MHz 群中，TM63 是频率极限版： μ i 700 表示同一感量需要较多匝数，直流偏磁能力也为八材质实测中最低 (220 nH 档 100 °C I@90 % 41.7 A)，大电流单匝电感选 TM65，1 MHz 前后的变压器选 TM61。把它留给频率与温度都逼近极限的设计。

TM63 is an ultra-high-frequency MnZn power ferrite with an initial permeability (μ i) 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 — the highest frequency ceiling and Tc in the power series. The low μ i buys the widest usable band: only 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, with a relative loss factor below 6×10^{-6} at 1 MHz; remanence (Br) is 100 mT at 25 °C (90 mT at 100 °C) and coercivity (Hc) 20 → 15 A/m. Loss creeps up with temperature, so design on the hot values. Typical uses are 2–5 MHz DC-DC and resonant converters, MHz-class transformers and inductors and GaN high-frequency supplies. Within the 700 kHz–5 MHz group TM63 is the frequency extreme: a μ i of 700 means more turns for a given inductance, and its DC-bias capability is the lowest of the eight grades measured (I@90 % = 41.7 A at 100 °C, 220 nH band), so high-current inductors go to TM65 and transformers around 1 MHz to TM61. Reserve it for designs pushing both frequency and temperature to their limits.

- 2–5 MHz DC-DC Converter
- MHz Resonant Transformer
- Ultra-High-Frequency Inductor
- GaN High-Frequency Power

电磁特性

MAGNETIC CHARACTERISTICS

特性 Characteristic	条件 Condition	25 °C	100 °C	单位 Unit
初始磁导率 Initial Permeability μ i	100 kHz & <0.2 mT	700±25%		
增幅磁导率 Amplitude Permeability μ a	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		°C
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		$\Omega \cdot m$

功率损耗 Pcv

POWER LOSS · KW/M³

测试条件 Condition	25 °C	100 °C	测试条件 Condition	25 °C	100 °C
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

$P_{cv} = K \cdot f^\alpha \cdot B^\beta$

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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TM63

特性曲线

CHARACTERISTIC CURVES

