

TM59 为中高频低损耗锰锌功率铁氧体，初始磁导率 (μ_i) 1900，饱和磁通密度 (B_s) 530 mT (25 °C) / 430 mT (100 °C)，居里温度高于 260 °C。损耗谷底就落在工作温度：500 kHz / 50 mT 由 25 °C 的 80 kW/m³ 降到 100 °C 的 50 kW/m³，1 MHz / 50 mT 为 350 → 250 kW/m³，磁芯越热越省——正是伺服器 LLC 在满载热态所需要的走向。全系最低的残留磁通密度 (B_r 35 mT @100 °C) 与 10 A/m 的矫顽力把磁滞损压在低位；100 °C 的直流偏磁能力在同一颗 UD 磁芯的八材质实测中居首 (220 nH 档 $I_{@90\%}$ 48.4 A)，所以除了主变压器，也是谐振电感与输出电感的同材料选择，整台电源可统一料号。典型应用为 300 kHz–1 MHz 的 LLC 谐振变压器、伺服器与通信电源、高频 DC-DC 以及 VRM / TLVR 电感。在高频群中，需要更高 μ_i 与更大磁通摆幅时选 TM50A；工作频率越过 1 MHz 则换 TM65。

TM59 is a medium-high-frequency low-loss MnZn power ferrite with an initial permeability (μ_i) of 1900, a saturation flux density (B_s) of 530 mT at 25 °C (430 mT at 100 °C) and a Curie temperature above 260 °C. Its loss minimum sits right at operating temperature: at 500 kHz / 50 mT the loss falls from 80 kW/m³ at 25 °C to 50 kW/m³ at 100 °C, and at 1 MHz / 50 mT from 350 to 250 kW/m³ — the hotter the core, the lower the loss, exactly what a server LLC stage needs at full-load steady state. The lowest remanence in the series (B_r 35 mT at 100 °C) and a coercivity of 10 A/m keep hysteresis loss small, and its 100 °C DC-bias capability ranks first among eight grades measured on the same UD core (220 nH band, $I_{@90\%}$ = 48.4 A), so besides the main transformer it is also the same-material choice for resonant and output inductors — one grade for the whole supply. Typical uses are 300 kHz–1 MHz LLC resonant transformers, server and telecom power, high-frequency DC-DC and VRM / TLVR inductors. Within the high-frequency group, choose TM50A for higher μ_i and larger flux swing, or TM65 once the switching frequency passes 1 MHz.

- LLC Resonant Transformer
- Server / Telecom Power
- High-Frequency DC-DC
- VRM / TLVR Inductor

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	1900±25%		
增幅磁导率 Amplitude Permeability μ_a	25 kHz/400 mT	> 3000	> 3000	
饱和磁通密度 Saturation Flux Density B_s	1200 A/m 100 Hz	530	430	mT
残留磁通密度 Remanence B_r	1200 A/m 100 Hz	55	35	mT
矫顽力 Coercivity H_c	1200 A/m 100 Hz	15	10	A/m
相对损耗因子 Loss Factor	100 kHz & <0.2 mT	<5		10 ⁻⁶
居里温度 Curie Temperature T_c	100 kHz & <0.2 mT	>260		°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		Ω·m

功率损耗 P_{cv}

POWER LOSS · KW/M³

测试条件 Condition	25 °C	100 °C	测试条件 Condition	25 °C	100 °C
300 kHz/100 mT	250	230	800 kHz/60 mT	330	250
500 kHz/50 mT	80	50	1 MHz/30 mT	100	70
500 kHz/100 mT	600	550	1 MHz/50 mT	350	250

Steinmetz 系数

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

频段 Range	K	α	β
100 ≤300	5.129E-09	1.455	3.5423
100 ≤1000	8.028E-11	2.0925	3.6525

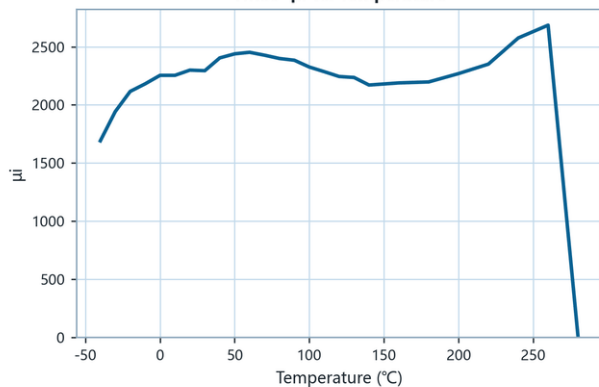
特性曲线详见次页

CHARACTERISTIC CURVES — SEE NEXT PAGE

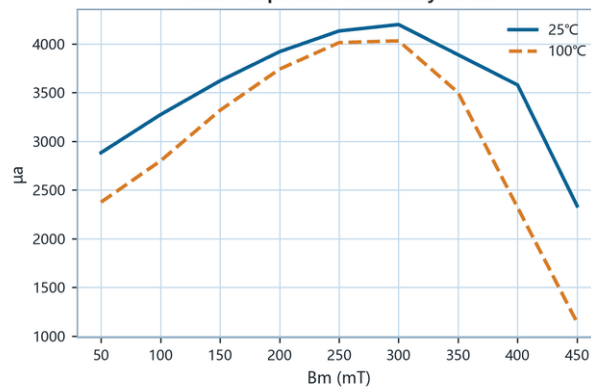
TM59

特性曲线

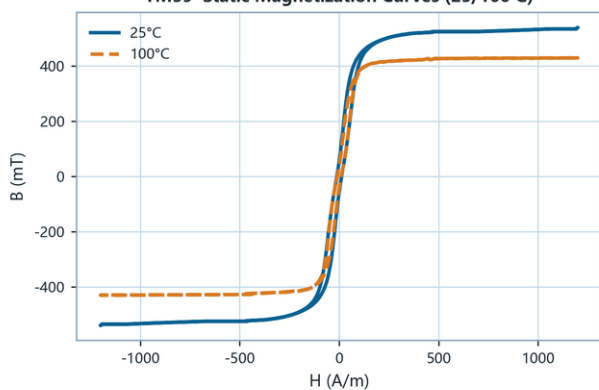
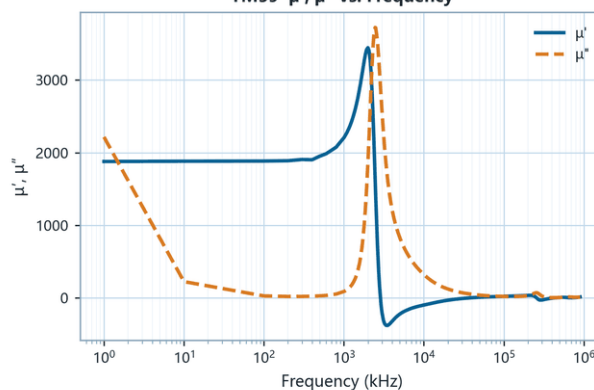
CHARACTERISTIC CURVES

TM59 μ_i vs. Temperature

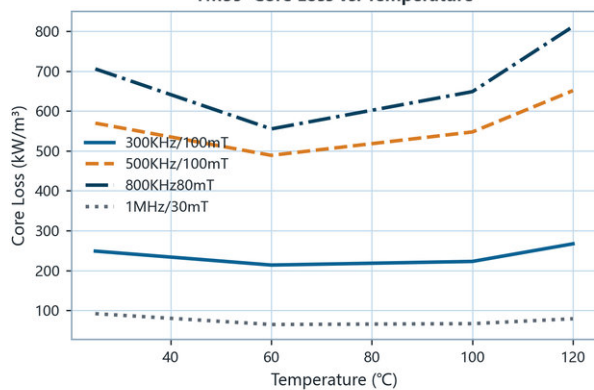
TM59 Amplitude Permeability vs. Bm



TM59 Static Magnetization Curves (25/100°C)

TM59 μ' , μ'' vs. Frequency

TM59 Core Loss vs. Temperature



TM59 Core Loss vs. Flux Density

