

TP40 通用低损耗功率材料
GENERAL-PURPOSE LOW-LOSS POWER FERRITE

TP40 为通用低损耗锰锌功率铁氧体，初始磁导率 (μ i) 2000，饱和磁通密度 (Bs) 480 mT (25 °C) / 390 mT (100 °C)，居里温度高于 220 °C。损耗谷底落在 100 °C：100 kHz / 200 mT 由 25 °C 的 720 kW/m³ 降到 100 °C 的 480 kW/m³，300 kHz / 100 mT 为 660 → 400 kW/m³，矫顽力 (Hc) 也由 12 A/m 降到 6.5 A/m，磁芯升温后进入低损耗区，正是开关电源满载热态的工作点。典型应用为 100–300 kHz 的正激 / 反激与半桥主变压器、工业与大功率电源，尤其是 EE / EC / PQ 等大尺寸磁芯。在 300 kHz 以下低损耗高 Bs 群中，TP40 是通用基准：100 kHz / 200 mT 的损耗预算更紧时选 TP44 (100 °C 330 kW/m³)；需要较高 μ i 减少匝数时选 TP45 (μ i 2500)。大尺寸磁芯的热点温度高于表面，选用时以磁芯内部温度对照损耗曲线。

TP40 is a general-purpose low-loss MnZn power ferrite with an initial permeability (μ i) of 2000, a saturation flux density (Bs) of 480 mT at 25 °C (390 mT at 100 °C) and a Curie temperature above 220 °C. Its loss minimum sits at 100 °C: 100 kHz / 200 mT falls from 720 kW/m³ at 25 °C to 480 kW/m³ at 100 °C, 300 kHz / 100 mT from 660 to 400 kW/m³, and coercivity (Hc) from 12 to 6.5 A/m — the core enters its low-loss region as it warms, right at the full-load operating point of a switch-mode supply. Typical uses are 100–300 kHz forward, flyback and half-bridge main transformers and industrial and high-power supplies, especially on large EE/EC/PQ cores. Within the sub-300 kHz low-loss high-Bs group TP40 is the general baseline: choose TP44 (330 kW/m³ at 100 °C) when the 100 kHz / 200 mT loss budget is tighter, TP45 (μ i 2500) when a higher μ i is needed to save turns. The hot spot of a large core runs above its surface, so match the loss curve to the internal core temperature.

- SMPS Main Transformer
- Forward / Flyback Transformer
- Industrial Power
- Large-Size Core

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	2000±25%		
增幅磁导率 Amplitude Permeability μ a	25 kHz/400 mT	> 3000	> 3200	
饱和磁通密度 Saturation Flux Density Bs	1200 A/m 100 Hz	480	390	mT
残留磁通密度 Remanence Br	1200 A/m 100 Hz	150	60	mT
矫顽力 Coercivity Hc	1200 A/m 100 Hz	12	6.5	A/m
相对损耗因子 Loss Factor	100 kHz & <0.2 mT	<10		10 ⁻⁶
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>220		°C
密度 Density D	阿基米德法 Archimedes method	4.8		g/cm³
电阻率 Electrical Resistivity ρ	直流电流 DC Current	>9		Ω·m

功率损耗 Pcv POWER LOSS · KW/M³

测试条件 Condition	25 °C	100 °C
25 kHz/200 mT	110	60
100 kHz/200 mT	720	480
300 kHz/100 mT	660	400

Steinmetz 系数 Pcv = K · f^α · B^β

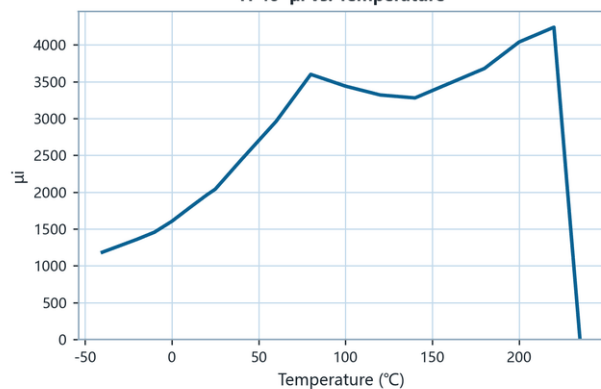
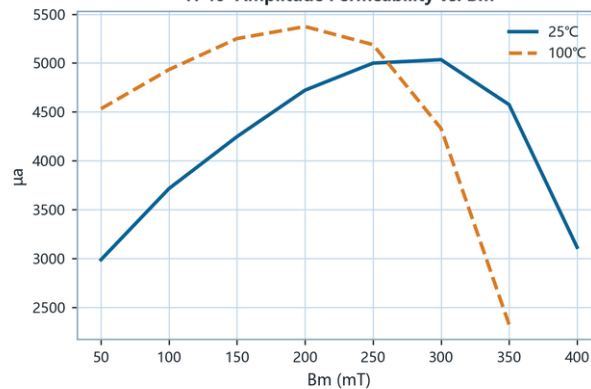
频段 Range	K	α	β
80 ≤500	3.91E-06	1.51865	2.16883
100 ≤500	4.48E-07	1.73981	2.42323

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

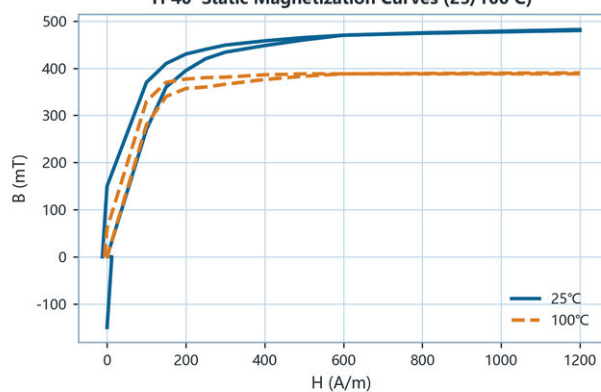
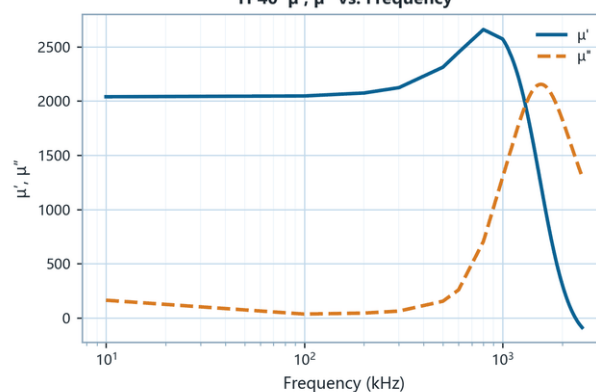
TP40

特性曲线

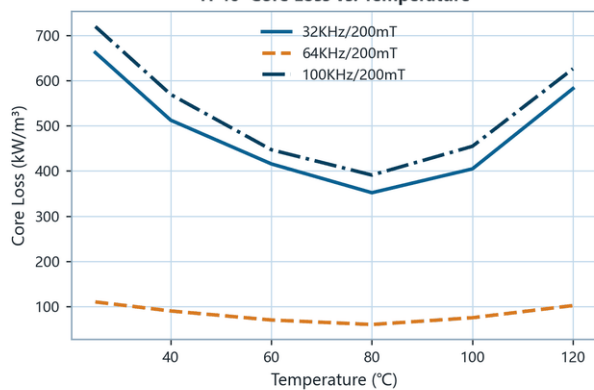
CHARACTERISTIC CURVES

TP40 μ_i vs. TemperatureTP40 Amplitude Permeability vs. B_m 

TP40 Static Magnetization Curves (25/100°C)

TP40 μ' , μ'' vs. Frequency

TP40 Core Loss vs. Temperature



TP40 Core Loss vs. Flux Density

