TM80

宽温低损耗功率材料

WIDE-TEMPERATURE LOW-LOSS POWER FERRITE

鐵研 TAK

TM80 为宽温低损耗锰锌功率铁氧体，初始磁导率（μi）3000，饱和磁通密度（Bs）520 mT（25 ℃）/ 420 mT（100 ℃），居里温度高于 230 ℃。其磁芯损耗在 25 ℃ 至 100 ℃ 之间近乎恒定（100 kHz / 200 mT：350 → 330 kW/m³；500 kHz / 50 mT：200 → 200 kW/m³），不具传统功率材料常温损耗偏高、须升温后方进入低损耗区之特性，冷启动与满载热态之效率因此同样可预测；100 ℃ 之 Bs 420 mT 与矫顽力 7 A/m，使变压器于大磁通摆幅下仍保有饱和裕度。典型应用为 100–300 kHz 之开关电源主变压器与正激 / 反激变压器，尤其适用于环境温度变化幅度大之车载、户外与工业电源。于中频六种材料中，TM80 为宽温系列于 100 kHz 高磁通区之基准（TP 系三种材料则属常温损耗较高、热态较低之类型）：工作点偏向 300 kHz / 100 mT 者采 TM81；磁芯长期处于 120–140 ℃ 者采 TM83。

TM80 is a wide-temperature low-loss MnZn power ferrite with an initial permeability (μi) of 3000, a saturation flux density (Bs) of 520 mT at 25 °C (420 mT at 100 °C) and a Curie temperature above 230 °C. Its core loss is nearly constant between 25 °C and 100 °C (100 kHz / 200 mT: 350 → 330 kW/m³; 500 kHz / 50 mT: 200 → 200 kW/m³), without the behaviour of conventional power grades whose loss is elevated at room temperature and reaches its minimum only when warm; efficiency at cold start and at full-load steady state is therefore equally predictable. With 420 mT of Bs and a coercivity of 7 A/m at 100 °C, transformers retain their saturation margin at large flux swings. Typical applications are 100–300 kHz switch-mode main transformers and forward/flyback transformers, particularly automotive, outdoor and industrial supplies exposed to wide ambient variation. Among the six mid-frequency grades TM80 is the reference of the wide-temperature series for the 100 kHz high-flux region (the three TP grades are of the room-temperature-high, hot-state-low type): TM81 is recommended for operating points around 300 kHz / 100 mT and TM83 where the core remains at 120–140 °C for extended periods.

SMPS Main Transformer | Forward / Flyback Transformer | Automotive Power | Wide-Temperature 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	3000±25%		
增幅磁导率 Amplitude Permeability μa	25 kHz/400 mT	> 4000	> 4000	
饱和磁通密度 Saturation Flux Density Bs	1200 A/m 100 Hz	520	420	mT
残留磁通密度 Remanence Br	1200 A/m 100 Hz	80	60	mT
矫顽力 Coercivity Hc	1200 A/m 100 Hz	10	7	A/m
相对损耗因子 Loss Factor	100 kHz & <0.2 mT	<6		10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>230		℃
密度 Density D	阿基米德法 Archimedes method	>4.8		g/cm^3
电阻率 Electrical Resistivity ρ	直流电流 DC Current	>5.5		Ω·m

功率损耗 Pcv POWER LOSS · KW/M³

测试条件 Condition	25 ℃	100 ℃
100 kHz/200 mT	350	330
300 kHz/100 mT	380	360
500 kHz/50 mT	200	200

Steinmetz 系数 Pcv = K·f^α·B^β

频段 Range	K	α	β
100 ≤200	1.09E-07	1.7553	2.63056
100 ≤500	4.03E-07	1.71695	2.40254

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

TM80

特性曲线
CHARACTERISTIC CURVES











