TM81

宽温中频低损耗材料
WIDE-TEMPERATURE MID-FREQUENCY LOW-LOSS FERRITE

鐵研 TAK

TM81 为宽温中频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 220 ℃。其损耗特性针对 300 kHz / 100 mT 最佳化：该点为 260 kW/m³（25 ℃）/ 310 kW/m³（100 ℃），200 kHz / 125 mT 为 230 → 270 kW/m³，两温度之差异均在 20 % 以内，冷态与热态表现一致；100 ℃ 之残留磁通密度（Br）50 mT、矫顽力（Hc）7 A/m，磁滞损耗维持低值。100 kHz / 200 mT 为 340 → 400 kW/m³，与 TM80 相当而 100 ℃ 值略高。典型应用为 200–300 kHz 之 LLC 谐振与半桥变压器、伺服器与通信电源，以及 PFC 前级之宽温设计。于中频六种材料中，TM81 为宽温系列于 300 kHz 区之选择：工作点位于 100 kHz 高磁通区者采 TM80（100 ℃ 330 kW/m³）；磁芯长期处于 120–140 ℃ 者采 TM83。选用时先依工作频率与磁通摆幅定位，再依磁芯实际温度确认损耗。

TM81 is a wide-temperature mid-frequency 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 220 °C. Its loss characteristic is optimised for 300 kHz / 100 mT: 260 kW/m³ at 25 °C and 310 kW/m³ at 100 °C, with 230 → 270 kW/m³ at 200 kHz / 125 mT; the difference between the two temperatures remains within 20 %, so cold and hot-state behaviour are consistent. At 100 °C the remanence (Br) is 50 mT and the coercivity (Hc) 7 A/m, keeping hysteresis loss low. At 100 kHz / 200 mT it reads 340 → 400 kW/m³, comparable to TM80 with a slightly higher 100 °C value. Typical applications are 200–300 kHz LLC resonant and half-bridge transformers, server and telecom supplies and wide-temperature PFC front ends. Among the six mid-frequency grades TM81 is the wide-temperature choice for the 300 kHz region: TM80 (330 kW/m³ at 100 °C) is recommended for 100 kHz high-flux operating points and TM83 where the core remains at 120–140 °C. Selection should be based first on operating frequency and flux swing, then confirmed against the actual core temperature.

LLC Resonant Transformer | Server / Telecom Power | PFC Front-End | 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	> 3400	
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	70	50	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	<5		10^{-6}
居里温度 Curie Temperature Tc	100 kHz & <0.2 mT	>220		℃
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	>5		Ω·m

功率损耗 Pcv POWER LOSS · KW/M³

测试条件 Condition	25 ℃	100 ℃
100 kHz/200 mT	340	400
200 kHz/125 mT	230	270
300 kHz/100 mT	260	310

Steinmetz 系数 Pcv = K·f^α·B^β

频段 Range	K	α	β
100 ≤200	6.48E-08	1.73019	2.7204
100 ≤500	1.07E-06	1.62784	2.27797
100 ≤1000	3.79E-06	1.71035	1.93164

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

TM81

特性曲线
CHARACTERISTIC CURVES











