鐵研 TAK

TM83

全温域低损耗功率材料
FULL-TEMPERATURE-RANGE LOW-LOSS POWER FERRITE

TM83 为全温域低损耗锰锌功率铁氧体，初始磁导率（μi）3000，饱和磁通密度（Bs）545 mT（25 ℃）/ 425 mT（100 ℃），居里温度 240 ℃ 以上。其特点为损耗随温度之增幅极小：100 kHz / 200 mT 由 25 ℃ 的 240 kW/m³ 至 100 ℃ 250、120 ℃ 280、140 ℃ 320 kW/m³，300 kHz / 100 mT 为 190 / 220 / 260 / 300 kW/m³，140 ℃ 之 320 kW/m³ 仍低于 TM80 于 25 ℃ 之 350 kW/m³；100 ℃ 之残留磁通密度（Br）60 mT、矫顽力（Hc）10 A/m。磁芯于高功率密度、散热受限之机壳内即使处于 120–140 ℃，效率亦不致显著下降。典型应用为磁芯温度偏高之 100–300 kHz 开关电源：伺服器与通信电源、笔记型电脑与充电器变压器、车载电源。于中频六种材料中，TM83 为唯一提供 120 ℃ 与 140 ℃ 损耗数据者；工作温度在 100 ℃ 以内时，100 kHz 高磁通区采 TM80、300 kHz 区采 TM81 即可。400 kHz / 125 mT 为 630 → 820 kW/m³，更高频率宜改用中高频功率材料（TM50A / TM59）。

TM83 is a full-temperature-range low-loss MnZn power ferrite with an initial permeability (μi) of 3000, a saturation flux density (Bs) of 545 mT at 25 °C (425 mT at 100 °C) and a Curie temperature of 240 °C or higher. Its distinguishing feature is the very small increase of loss with temperature: at 100 kHz / 200 mT from 240 kW/m³ at 25 °C to 250 at 100 °C, 280 at 120 °C and 320 kW/m³ at 140 °C, and at 300 kHz / 100 mT 190 / 220 / 260 / 300 kW/m³; the 140 °C value of 320 kW/m³ is still below TM80's 350 kW/m³ at 25 °C. At 100 °C the remanence (Br) is 60 mT and the coercivity (Hc) 10 A/m. Efficiency therefore does not degrade significantly when a core in a dense, thermally constrained enclosure operates at 120–140 °C. Typical applications are 100–300 kHz switch-mode supplies with elevated core temperature: server and telecom power, notebook and charger transformers and automotive supplies. Among the six mid-frequency grades TM83 is the only one with 120 °C and 140 °C loss data; below 100 °C, TM80 (100 kHz high flux) and TM81 (300 kHz) are sufficient. At 400 kHz / 125 mT it reads 630 → 820 kW/m³; at higher frequencies the mid-high-frequency grades (TM50A/TM59) should be used.

Server / Telecom Power | Notebook / Charger Transformer | Automotive Power | High-Temperature SMPS

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	f=10 kHz, B<0.25 mT	3000 ±25%		
增幅磁导率 Amplitude Permeability μa	f=25 kHz, B=200 mT	>4000	>4200	
饱和磁通密度 Saturation Flux Density Bs	1200 A/m, 100 Hz	545	425	mT
残留磁通密度 Remanence Br	1200 A/m, 100 Hz	70	60	mT
矫顽力 Coercivity Hc	1200 A/m, 100 Hz	15	10	A/m
居里温度 Curie Temperature Tc	f=10 kHz, B<0.25 mT	≥240		℃
密度 Density D	Archimedes method （阿基米德法）	4.9		g/cm³
电阻率 Electrical Resistivity ρ	DC Current (直流电流)	5		Ωm

功率损耗 Pcv POWER LOSS · KW/M³

测试条件 Condition	25 ℃	100 ℃	120 ℃	140 ℃
100 kHz, 200 mT	240	250	280	320
300 kHz, 100 mT	190	220	260	300
400 kHz, 125 mT	630	820	970	1160

Steinmetz 系数 Pcv = K·f^α·B^β

频段 Range	K	α	β
100 ℃ ≤300	4.69E-08	1.72071	2.73226
100 ℃ ≤500	9.16E-08	1.62615	2.72509

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

TM83

特性曲线
CHARACTERISTIC CURVES









