

## 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 ( $\mu_i$ ) 3000，饱和磁通密度 ( $B_s$ ) 545 mT (25 °C) / 425 mT (100 °C)，居里温度 240 °C 以上。特点是损耗随温度的爬升极缓：100 kHz / 200 mT 由 25 °C 的 240 kW/m<sup>3</sup> 到 100 °C 250、120 °C 280、140 °C 320 kW/m<sup>3</sup>，300 kHz / 100 mT 为 190 / 220 / 260 / 300 kW/m<sup>3</sup>，140 °C 的 320 kW/m<sup>3</sup> 仍低于 TM80 在 25 °C 的 350 kW/m<sup>3</sup>；100 °C 残留磁通密度 ( $B_r$ ) 60 mT、矫顽力 ( $H_c$ ) 10 A/m。这让磁芯在高密度、散热受限的机壳内即使停在 120–140 °C，效率也不会突然崩落。典型应用为伺服器与通信电源、笔电与充电器变压器、车载电源等磁芯温度偏高的 100–300 kHz 开关电源。在宽温三支中，TM83 是唯一提供 120 / 140 °C 损耗数据的一支：工作温度在 100 °C 以内时，100 kHz 高磁通选 TM80、300 kHz 段选 TM81 即可。400 kHz / 125 mT 为 630 → 820 kW/m<sup>3</sup>，频率再往上请改用高频群。

TM83 is a full-temperature-range low-loss MnZn power ferrite with an initial permeability ( $\mu_i$ ) of 3000, a saturation flux density ( $B_s$ ) of 545 mT at 25 °C (425 mT at 100 °C) and a Curie temperature of 240 °C or higher. Its distinguishing trait is how slowly loss climbs with temperature: at 100 kHz / 200 mT from 240 kW/m<sup>3</sup> at 25 °C to 250 at 100 °C, 280 at 120 °C and 320 kW/m<sup>3</sup> at 140 °C, and at 300 kHz / 100 mT 190 / 220 / 260 / 300 kW/m<sup>3</sup> — the 140 °C figure is still below TM80's 350 kW/m<sup>3</sup> at room temperature; at 100 °C remanence ( $B_r$ ) is 60 mT and coercivity ( $H_c$ ) 10 A/m. Efficiency therefore does not collapse when a core in a dense, thermally constrained enclosure settles at 120–140 °C. Typical uses are 100–300 kHz switch-mode supplies whose cores run hot: server and telecom power, notebook and charger transformers, automotive supplies. Within the wide-temperature trio TM83 is the only grade with 120 °C and 140 °C loss data; below 100 °C, TM80 (100 kHz high flux) and TM81 (300 kHz) suffice. At 400 kHz / 125 mT it reads 630 → 820 kW/m<sup>3</sup> — beyond that, move to the high-frequency group.

Server / Telecom Power

Notebook / Charger Transformer

Automotive Power

High-Temperature SMPS

## 电磁特性 MAGNETIC CHARACTERISTICS

| 特性<br>Characteristic                    | 条件<br>Condition              | 25 °C     | 100 °C | 单位<br>Unit        |
|-----------------------------------------|------------------------------|-----------|--------|-------------------|
| 初始磁导率<br>Initial Permeability $\mu_i$   | f=10 kHz, B<0.25 mT          | 3000 ±25% |        |                   |
| 增幅磁导率<br>Amplitude Permeability $\mu_a$ | f=25 kHz, B=200 mT           | >4000     | >4200  |                   |
| 饱和磁通密度<br>Saturation Flux Density $B_s$ | 1200 A/m, 100 Hz             | 545       | 425    | mT                |
| 残留磁通密度<br>Remanence $B_r$               | 1200 A/m, 100 Hz             | 70        | 60     | mT                |
| 矫顽力<br>Coercivity $H_c$                 | 1200 A/m, 100 Hz             | 15        | 10     | A/m               |
| 居里温度<br>Curie Temperature $T_c$         | f=10 kHz, B<0.25 mT          | ≥240      |        | °C                |
| 密度<br>Density $D$                       | Archimedes method<br>(阿基米德法) | 4.9       |        | g/cm <sup>3</sup> |
| 电阻率<br>Electrical Resistivity $\rho$    | DC Current (直流电流)            | 5         |        | Ωm                |

功率损耗  $P_{cv}$  POWER LOSS · KW/M<sup>3</sup>

| 测试条件<br>Condition  | 25 °C | 100 °C | 120 °C | 140 °C |
|--------------------|-------|--------|--------|--------|
| 100 kHz,<br>200 mT | 240   | 250    | 280    | 320    |
| 300 kHz,<br>100 mT | 190   | 220    | 260    | 300    |
| 400 kHz,<br>125 mT | 630   | 820    | 970    | 1160   |

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

| 频段<br>Range    | K        | $\alpha$ | $\beta$ |
|----------------|----------|----------|---------|
| 100 °C<br>≤300 | 4.69E-08 | 1.72071  | 2.73226 |
| 100 °C<br>≤500 | 9.16E-08 | 1.62615  | 2.72509 |

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## TM83

## 特性曲线

## CHARACTERISTIC CURVES

