

➤ 产品外观 / Appearance



$V_{CES} = 650V$

$I_{C\ nom} = 400A / I_{CRM} = 800A$

➤ 特性 / Features

A. 低导通压降

A. Low V_{CEsat}

B. 低开关损耗

B. Low Switching Losses

C. 功率端子超声焊接

C. Ultrasonic Welding of Power Terminals

➤ 用途 / Applications

A. 电机传动

A. Motor Drives

B. 汽车应用

B. Automotive Applications

C. 商业化的农业工具

C. Commercial Agriculture Vehicles

➤ 相关信息 / Related Information

条形码 / Barcode Code



二维码 / DMX – Code



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6K400M07A1E

IGBT, 逆变器 / IGBT, Inverter



最大额定值 / Maximum Rated Values

| | | | | |
|--|---|--------------------|-------|---|
| 集电极-发射极电压 Collector-emitter voltage | $T_j = 25^\circ\text{C}$ | V_{CES} | 650 | V |
| 连续集电极直流电流 Continuous DC collector current | $T_C = 80^\circ\text{C}, T_{j\max} = 175^\circ\text{C}$ | $I_{C\text{ nom}}$ | 400 | A |
| 集电极重复峰值电流 Repetitive peak collector current | $t_p = 1\text{ ms}$ | I_{CRM} | 800 | A |
| 栅极-发射极峰值电压 Gate-emitter peak voltage | | V_{GES} | +/-20 | V |

特征值 / Characteristic Values

| | | Min. | Typ. | Max. | | |
|---|--|--|----------------------|----------------------|----------|------------------|
| 集电极-发射极饱和电压 Collector-emitter saturation voltage | $I_C = 400\text{ A}, V_{GE} = 15\text{ V}$ $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | $V_{CE\text{ sat}}$ | 1.55 1.70 1.75 | 1.90 | V | |
| 栅极阈值电压 Gate threshold voltage | $I_C = 6\text{ mA}, V_{CE} = V_{GE}, T_j = 25^\circ\text{C}$ | V_{GEth} | 5.0 | 5.9 | 6.8 | V |
| 内部栅极电阻 Internal gate resistor | | R_{Gint} | 1.0 | | Ω | |
| 输入电容/Input capacitance | $f = 1\text{ MHz}, T_j = 25^\circ\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$ | C_{ies} | 32 | | nF | |
| 反向传输电容 Reverse transfer capacitance | | C_{res} | 1.18 | | nF | |
| 集电极-发射极截止电流 Collector-emitter cut-off current | $V_{CE} = 650\text{ V}, V_{GE} = 0\text{ V}, T_j = 25^\circ\text{C}$ | I_{CES} | | 1.0 | mA | |
| 栅极-发射极漏电流 Gate-emitter leakage current | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_j = 25^\circ\text{C}$ | I_{GES} | | 400 | nA | |
| 开通延迟时间/Turn-on delay time | $I_C = 400\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_G = 2\ \Omega$ Inductive Load | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | $t_{d\text{ on}}$ | 410 410 420 | ns | |
| 上升时间/Rise time | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | t_r | 240 250 260 | ns | |
| 关断延迟时间/Turn-off delay time | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | $t_{d\text{ off}}$ | 360 360 365 | ns | |
| 下降时间/Fall time | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | t_f | 120 140 140 | ns | |
| 开通损耗能量/Turn-on energy loss | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | E_{on} | 5.0 6.7 7.1 | mJ | |
| 关断损耗能量/Turn-off energy loss | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | E_{off} | 22.8 26.0 27.1 | mJ | |
| 结 - 外壳热阻 Thermal resistance, junction to case | | 每个 IGBT / per IGBT | R_{thJC} | | 0.12 | K/W |
| 在开关状态下温度 Temperature under switching | | | $T_{j\text{ op}}$ | -40 | 150 | $^\circ\text{C}$ |

6K400M07A1E

二极管, 逆变器 / Diode, Inverter

负温度系数热敏电阻 / NTC-Thermistor



二极管, 逆变器 / Diode, Inverter

最大额定值 / Maximum Rated Values

| | | | | |
|---|--------------------------|-----------|-----|---|
| 反向重复峰值电压 Repetitive peak reverse voltage | $T_j = 25^\circ\text{C}$ | V_{RRM} | 650 | V |
| 连续正向直流电流 Continuous DC forward current | | I_F | 400 | A |
| 正向重复峰值电流 Repetitive peak forward current | $t_{pF} = 1\text{ ms}$ | I_{FRM} | 800 | A |

特征值 / Characteristic Values

| | | | Min. | Typ. | Max. | |
|--|---|--|-------------------|----------------------|------|------------------|
| 正向电压/Forward voltage | $I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | V_F | 1.60 1.55 1.50 | | V |
| 反向恢复峰值电流 Peak reverse recovery current | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | I_{RM} | 122 160 180 | | A |
| 恢复电荷/Recovered charge | $I_F = 400\text{ A}, V_R = 300\text{ V}$ $V_{GE} = -15\text{ V}$ $-di_F/dt = 2400\text{ A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | Q_r | 10.7 20.3 25.4 | | μC |
| 反向恢复损耗 Reverse recovery energy | | $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$ | E_{rec} | 0.62 2.87 4.12 | | mJ |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个二极管 / per diode | | R_{thJC} | | 0.24 | K/W |
| 在开关状态下温度 Temperature under switching | | | $T_{j\text{ op}}$ | -40 | 150 | $^\circ\text{C}$ |

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

| | | | Min. | Typ. | Max. | |
|------------------------|--|--------------|------|------|------|------------|
| 额定阻值/Rated resistance | $T_C = 25^\circ\text{C}$ | R_{25} | | 5.00 | | k Ω |
| 阻值误差/Deviation of R100 | $T_C = 100^\circ\text{C}, R_{100} = 465\ \Omega$ | $\Delta R/R$ | -5 | | 5 | % |
| 功率损耗/Power dissipation | $T_C = 25^\circ\text{C}$ | P_{25} | | | 10.0 | mW |
| B 值/B - value | $R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298.15\text{K}))]$ | $B_{25/50}$ | | 3380 | | K |
| B 值/B - value | $R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298.15\text{K}))]$ | $B_{25/80}$ | | 3468 | | K |
| B 值/B - value | $R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298.15\text{K}))]$ | $B_{25/100}$ | | 3523 | | K |

6K400M07A1E

模块 / Module



| | | | | |
|--|--|-------------------|-------------|----|
| 绝缘测试电压 Isolation test voltage | RMS, f = 50 Hz, t = 1 min. | V _{ISOL} | 2.5 | kV |
| 模块基板材料 Material of module baseplate | | | Cu | |
| 内部绝缘/Internal isolation | 基本绝缘 (class 1, IEC61140) Basic insulation (class 1, IEC61140) | | ZTA | |
| 爬电距离/Creepage distance | 端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal | | 12.0 6.1 | mm |
| 电气间隙/Clearance | 端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal | | 12.0 6.1 | mm |
| 相对电痕指数 Comperative tracking index | | CTI | > 200 | |

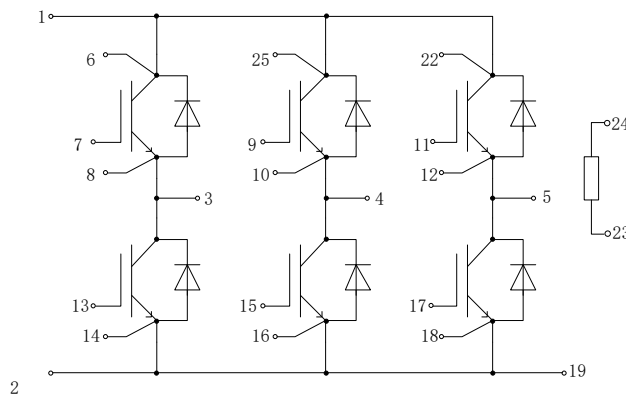
| | | | Min. | Typ. | Max. | |
|---|--|---------------------|------|------|------|----|
| 杂散电感, 模块 Stray inductance module | | L _{sCE} | | 30 | | nH |
| 模块引线电阻 Module lead resistance | T _c = 25°C, 每个开关 / per switch | R _{CC'+EE} | | 1.02 | | mΩ |
| 储存温度/Storage temperature | | T _{stg} | -40 | | 125 | °C |
| 模块安装的安装扭矩 / Mounting torque for module mounting | 螺丝 M5 / Screw M5 | M | 3.00 | | 6.00 | Nm |
| 端子联接扭矩 Terminal connection torque | 螺丝 M6 / Screw M6 | M | 3.0 | | 6.0 | Nm |
| 重量/Weight | | G | | 470 | | g |

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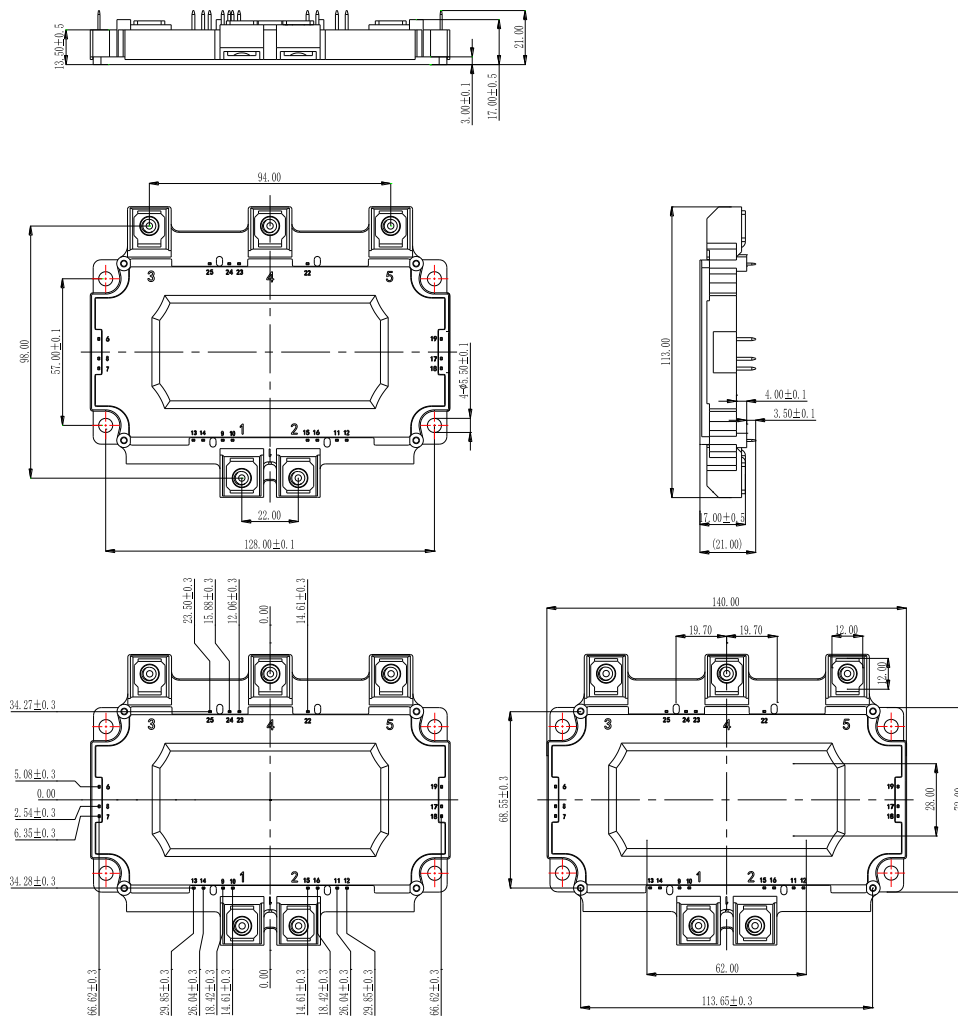
封装 / Package



接线图 / Circuit Diagram



封装尺寸 / Package outlines

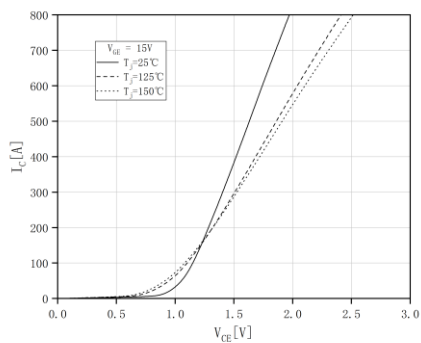


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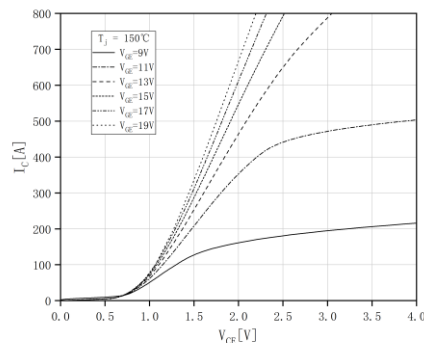
性能 / Performance



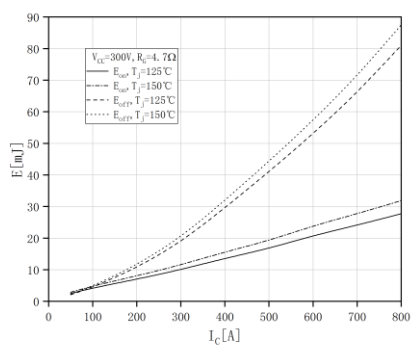
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)



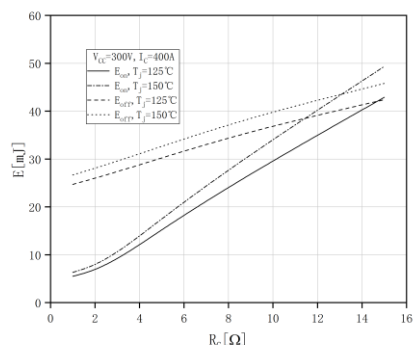
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)



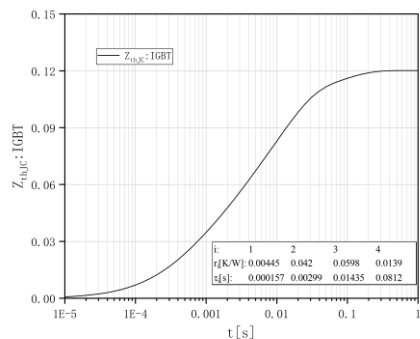
开关损耗 IGBT, 逆变器 (典型)
switching losses IGBT, Inverter (typical)



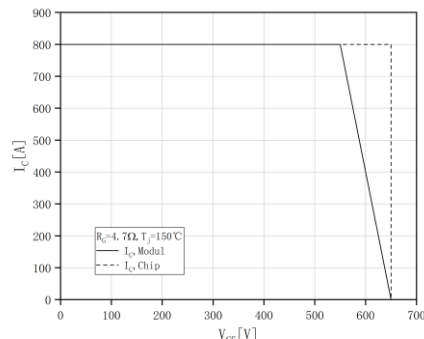
开关损耗 IGBT, 逆变器 (典型)
switching losses IGBT, Inverter (typical)



瞬态热阻抗 IGBT, 逆变器
transient thermal impedance IGBT, Inverter



反偏安全工作区 IGBT, 逆变器 (RBSOA)
Reverse bias safe operating area IGBT, Inverter(RBSOA)

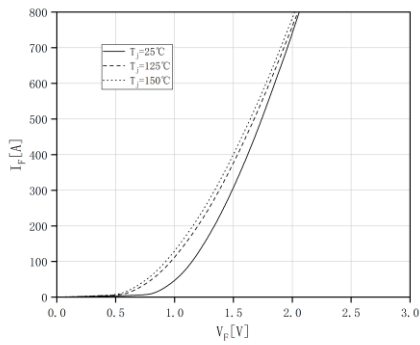


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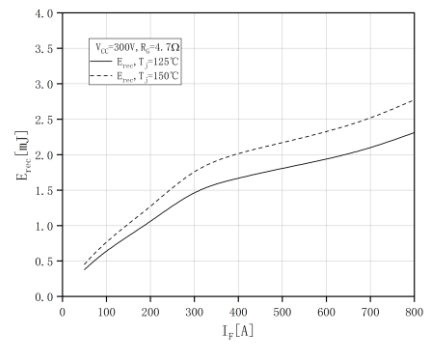
性能 / Performance



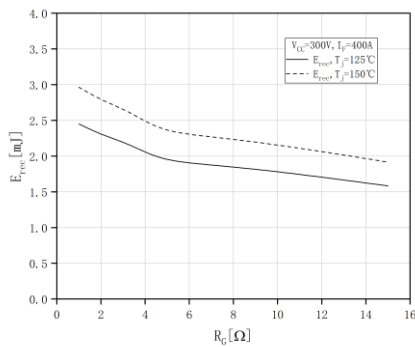
正向偏压特性 二极管,逆变器 (典型)
forward characteristic of Diode, Inverter(typical)



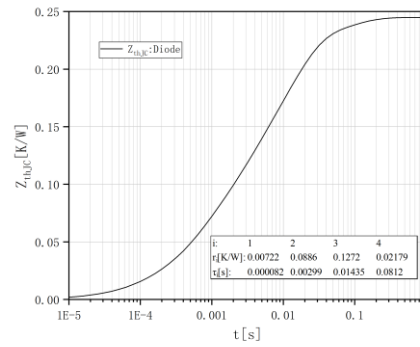
开关损耗 二极管, 逆变器 (典型)
switching losses Diode, Inverter(typical)



开关损耗 二极管, 逆变器 (典型)
switching losses Diode, Inverter(typical)



瞬态热阻抗 二极管, 逆变器
transient thermal impedance Diode, Inverter



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使用条件及条款

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