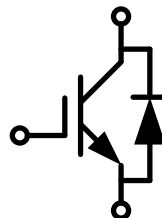


IGBT Discrete with Anti-Parallel Diode

电气特性:

- 650V 沟槽栅/场终止工艺
- 低开关损耗
- 正温度系数



典型应用:

- 充电桩
- UPS
- 逆变器



$V_{CES} = 650V$, $I_{C\ nom} = 75A$ / $I_{CRM} = 150A$

双极晶体管/IGBT

最大额定值 / Maximum Ratings

| Parameter | Conditions | Symbol | Value | cUnit |
|--|---|--------------|----------|-------|
| 集电极-发射极电压 Collector-Emitter voltage | $T_{vj} = 25^{\circ}C$ | V_{CES} | 650 | V |
| 连续集电极直流电流 Continuous DC collector current | $T_C = 100^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$ | $I_{C\ nom}$ | 75 | A |
| 集电极重复峰值电流 Repetitive peak collector current | $t_p = 1\ ms$ | I_{CRM} | 150 | A |
| 总功率损耗 Total power dissipation | $T_C = 25^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$ | P_{tot} | 395 | W |
| 栅极-发射极电压 Gate emitter voltage | | V_{GE} | ± 20 | V |

特征值 / Characteristic Values

| Parameter | Conditions | Symbol | Value | | | Unit |
|---|--|--|--------------|----------------------|------|------|
| | | | Min. | Typ. | Max. | |
| 集电极-发射极饱和电压 Collector-Emitter saturation voltage | $V_{GE} = 15V$, $I_C = 75A$ $V_{GE} = 15V$, $I_C = 75A$ $V_{GE} = 15V$, $I_C = 75A$ | $T_{vj} = 25^{\circ}C$ $T_{vj} = 125^{\circ}C$ $T_{vj} = 150^{\circ}C$ | V_{CESat} | 1.63 2.03 2.13 | 2.10 | V |
| 栅极-发射极阈值电压 Gate-Emitter threshold voltage | $I_C = 0.75mA$, $V_{GE} = V_{CE}$ | $T_{vj} = 25^{\circ}C$ | $V_{GE(th)}$ | 4.2 | 5.1 | 6.0 |
| 跨导 | $V_{CE} = 20V$, $I_C = 75A$ | | G_{fs} | 91 | | S |

| | | | | | | |
|---|--|------------------------------|--------------|-----|------|--------------------|
| Transconductance | | | | | | |
| 输入电容 Input capacitance | | | C_{ies} | | 7.44 | |
| 输出电容 Output capacitance | $f=1\text{ MHz}, V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$ | $T_{vj}=25^{\circ}\text{C}$ | C_{oes} | | 0.24 | nF |
| 反向传输电容 Reverse transfer capacitance | | | C_{res} | | 0.13 | |
| 集电极-发射极截止电流 Collector-emitter cut-off current | $V_{CE}=650\text{ V}, V_{GE}=0\text{ V}$ | $T_{vj}=25^{\circ}\text{C}$ | I_{CES} | | 1 | mA |
| 栅极-发射极漏电流 Gate-emitter leakage current | $V_{CE}=0\text{ V}, V_{GE}=20\text{ V}$ | $T_{vj}=25^{\circ}\text{C}$ | I_{GES} | | 200 | nA |
| 开通延迟时间 Turn-on delay time | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | $t_{d\ on}$ | | 34 | |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 37 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 40 | |
| 上升时间 Rise time | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | t_r | | 153 | |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 157 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 163 | |
| 关断延迟时间 Turn-off delay time | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | $t_{d\ off}$ | | 183 | ns |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 198 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 208 | |
| 下降时间 Fall time | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | t_f | | 67 | |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 68 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 73 | |
| 开通损耗能量 (每脉冲) Turn-on energy loss per pulse | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | E_{on} | | 4.28 | mJ |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 4.35 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 4.57 | |
| 关断损耗能量 (每脉冲) Turn-off energy loss per pulse | $I_C=75\text{ A}, V_{CE}=400\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=8\Omega$ (电感负载) / (inductive load) | $T_{vj}=25^{\circ}\text{C}$ | E_{off} | | 1.08 | |
| | | $T_{vj}=125^{\circ}\text{C}$ | | | 1.12 | |
| | | $T_{vj}=150^{\circ}\text{C}$ | | | 1.20 | |
| 结-外壳热阻 IGBT thermal resistance, junction | | | R_{thJC} | | 0.38 | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\ op}$ | -40 | 175 | $^{\circ}\text{C}$ |

二极管/Diode

最大额定值 / Maximum Ratings

| Parameter | Conditions | Symbol | Value | Unit |
|---|--|-----------|-------|------|
| 反向重复峰值电压 Repetitive peak reverse voltage | $T_{vj}=25^{\circ}\text{C}$ | V_{RRM} | 650 | V |
| 连续正向直流电流 Continuous DC forward current | $T_C=100^{\circ}\text{C}, T_{vj\ max}=175^{\circ}\text{C}$ | I_F | 75 | A |
| 正向重复峰值电流 Repetitive peak forward current | $t_p=1\text{ ms}$ | I_{FRM} | 120 | A |

特征值 / Characteristic Values

| Parameter | Conditions | Symbol | Value | | | Unit |
|---|---|--|--------------|----------------------|------|-------------|
| | | | Min. | Typ. | Max. | |
| 正向电压 Forward voltage | $I_F=75A, V_{GE}=0V$ $I_F=75A, V_{GE}=0V$ $I_F=75A, V_{GE}=0V$ | $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ | V_F | 1.48 1.61 1.62 | 2.0 | V |
| 反向恢复峰值电流 Peak reverse recovery current | $I_F=75A,$ $-di_F/dt=462A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=400V, V_{GE}=-15V$ | $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ | I_{RM} | 17 23 25 | | A |
| 反向恢复电荷 Reverse Recovered charge | $I_F=75A,$ $-di_F/dt=462A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=400V, V_{GE}=-15V$ | $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ | Q_{rr} | 2.43 3.37 3.72 | | μC |
| 反向恢复时间 Reverse Recovery Time | $I_F=75A,$ $-di_F/dt=462A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=400V, V_{GE}=-15V$ | $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ | t_{rr} | 200 211 227 | | ns |
| 反向恢复损耗（每脉冲） Reverse recovered energy | $I_F=75A,$ $-di_F/dt=462A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=400V, V_{GE}=-15V$ | $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$ | E_{rec} | 0.68 0.91 0.99 | | mJ |
| 结-外壳热阻 Diode thermal resistance, junction | | | R_{thJC} | 0.45 | | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\ op}$ | -40 | 175 | $^{\circ}C$ |

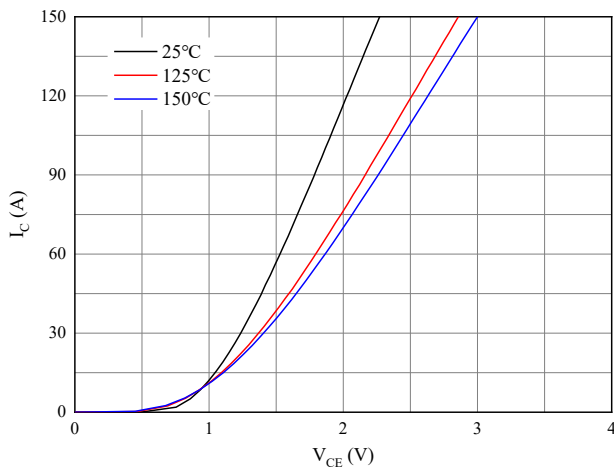


图 1. 典型输出特性 ($V_{GE}=15V$)

Figure 1. Typical output characteristics ($V_{GE}=15V$)

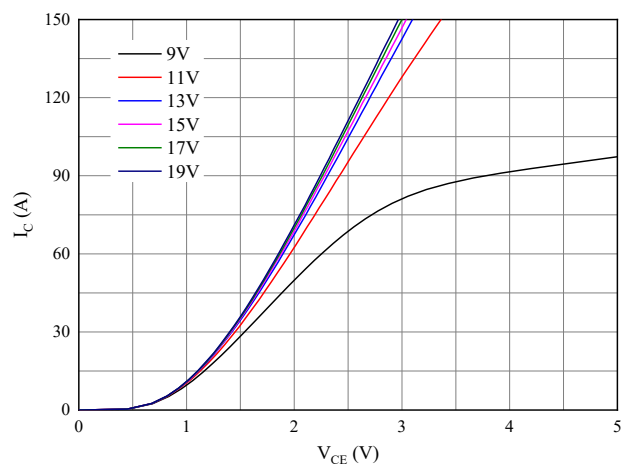


图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)

Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

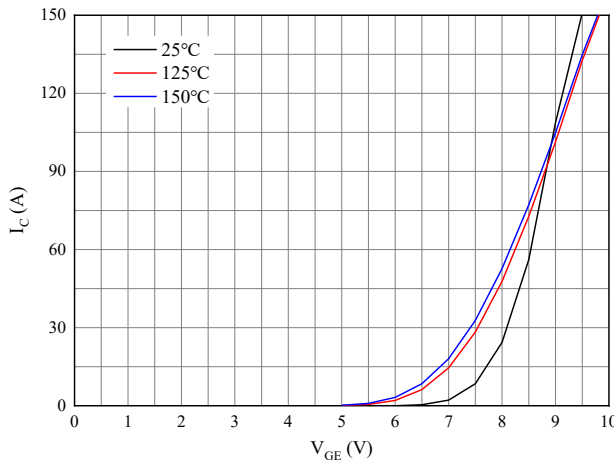


图 3. 典型传输特性 ($V_{CE}=20V$)

Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

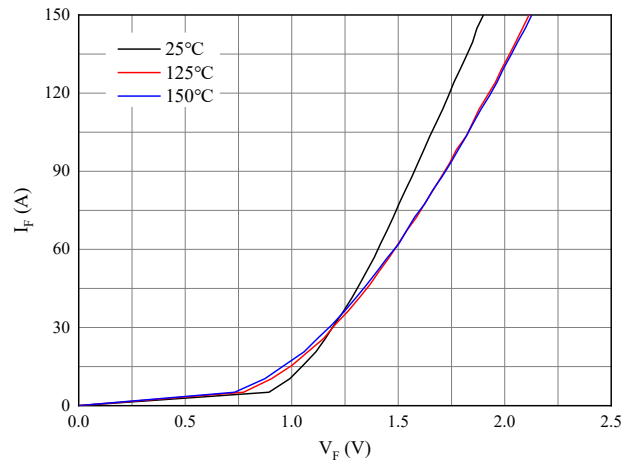


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

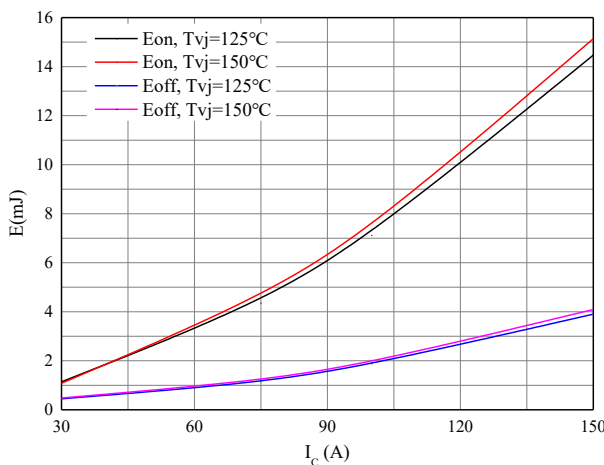


图 5. 开关损耗

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=8\Omega, R_{Goff}=8\Omega, V_{CE}=400V$

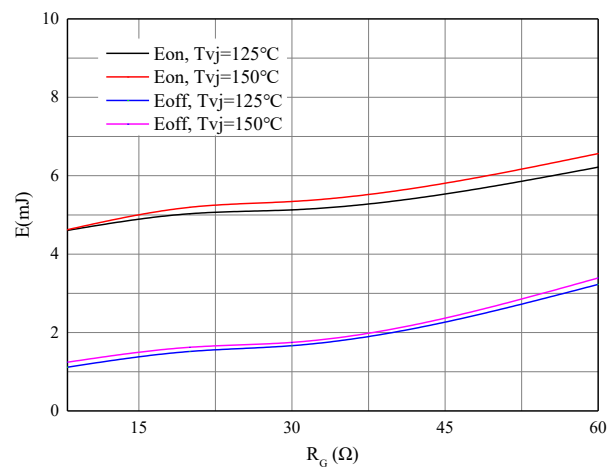


图 6. 开关损耗

Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V, I_C=75A, V_{CE}=400V$

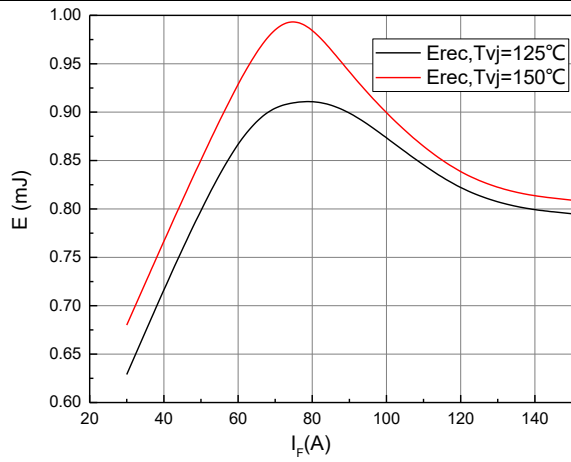


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

$R_{gon}=8\Omega, V_{CE}=400V$

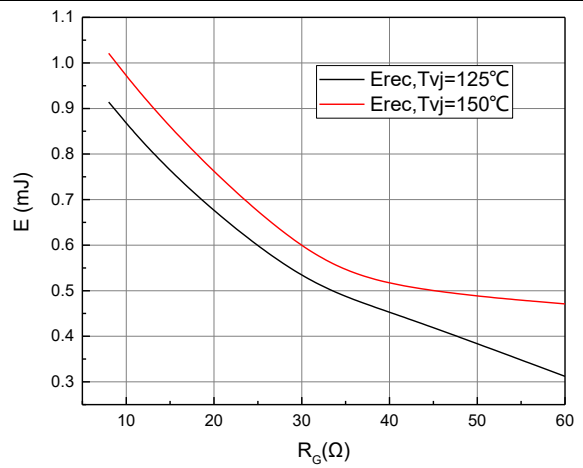


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

$I_F=75A, V_{CE}=400V$

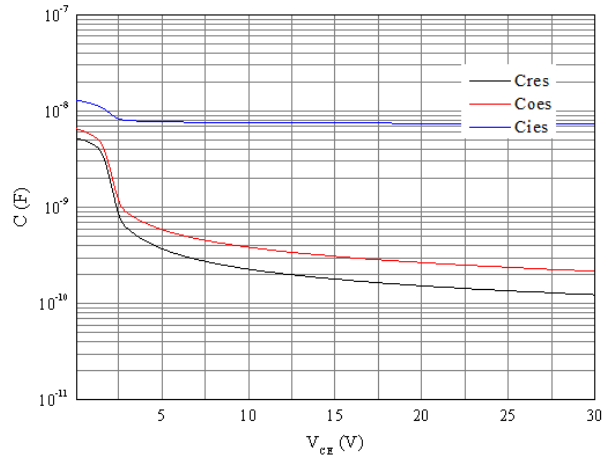
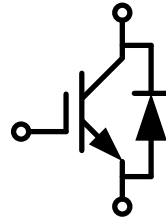


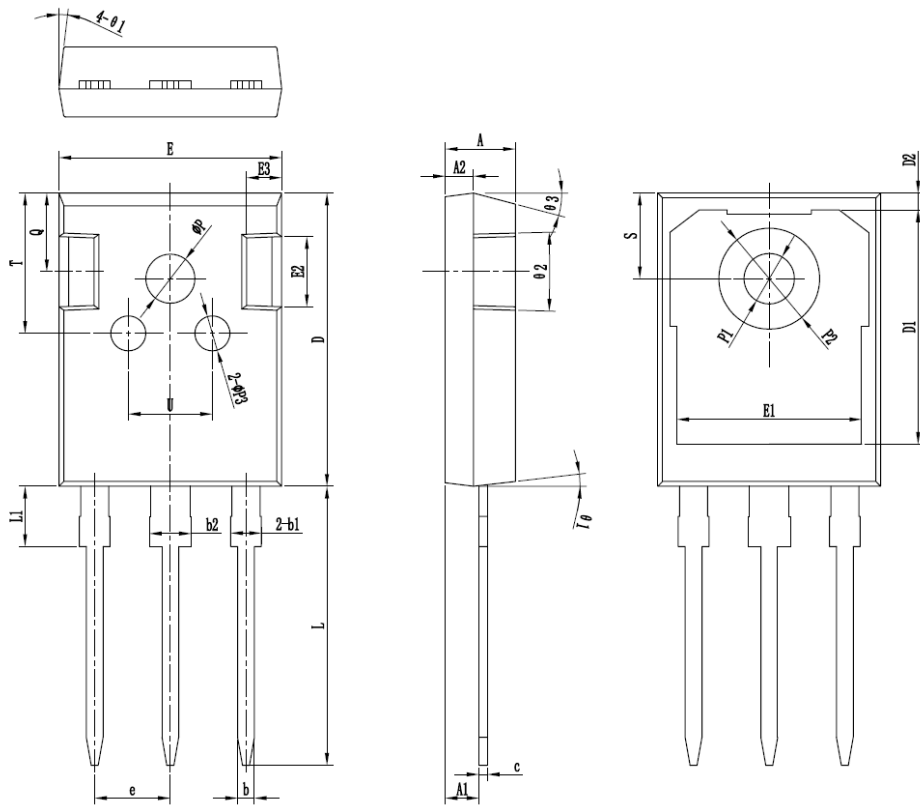
图 9. 电容特性

Figure 9. Capacitance characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines



| 符号 | 单位:mm | | |
|------|-------|-------|-------|
| | MIN | NOM | MAX |
| ∅A | 4.90 | 5.00 | 5.10 |
| ∅A1 | 2.31 | 2.41 | 2.51 |
| A2 | 1.90 | 2.00 | 2.10 |
| ∅B | 1.15 | 1.20 | 1.25 |
| ∅B1 | 1.95 | 2.10 | 2.25 |
| ∅B2 | 2.95 | 3.10 | 3.25 |
| ∅C | 0.65 | 0.60 | 0.65 |
| ∅D | 20.90 | 21.00 | 21.10 |
| D1 | 16.35 | 16.55 | 16.75 |
| D2 | 1.05 | 1.20 | 1.35 |
| ∅E | 15.70 | 15.80 | 15.90 |
| E1 | 13.10 | 13.25 | 13.40 |
| E2 | 4.90 | 5.00 | 5.10 |
| E3 | 2.40 | 2.50 | 2.60 |
| ∅E | 5.40 | 5.44 | 5.48 |
| ∅L | 19.80 | 19.92 | 20.10 |
| ∅L1 | - | - | 4.30 |
| ∅∅P | 3.70 | 3.80 | 3.90 |
| ∅∅P1 | 3.50 | 3.60 | 3.70 |
| ∅P2 | 7.00 | 7.20 | 7.40 |
| ∅P3 | 2.40 | 2.50 | 2.60 |
| Q | 5.60 | 5.80 | 6.00 |
| ∅S | 6.05 | 6.15 | 6.25 |
| T | 9.80 | 10.00 | 10.20 |
| U | 6.00 | 6.20 | 6.40 |
| θ1 | 5° | 7° | 9° |
| θ2 | 1° | 3° | 5° |
| θ3 | 13° | 15° | 17° |

*为关键管控尺寸