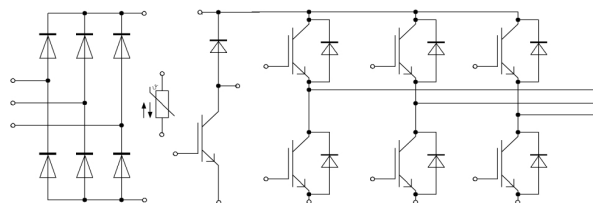
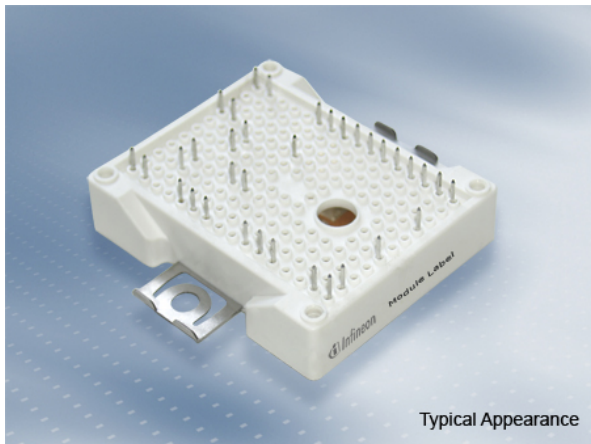


EasyPIM™ 模块 采用第四代沟槽栅/场终止IGBT4和第四代发射极控制二极管 带有温度检测NTC  
EasyPIM™ module with Trench/Fieldstop IGBT4 and Emitter Controlled 4 diode and NTC



$V_{CES} = 1200V$   
 $I_{C\ nom} = 15A / I_{CRM} = 30A$

**典型应用**

- 辅助逆变器
- 空调
- 电机传动

**电气特性**

- 低开关损耗
- 低  $V_{CEsat}$
- 沟槽栅IGBT4
- $V_{CEsat}$  带正温度系数

**机械特性**

- 低热阻的三氧化二铝 (  $Al_2O_3$  衬底
- 紧凑型设计
- 符合RoHS
- 集成的安装夹使安装坚固

**Typical Applications**

- Auxiliary Inverters
- Air Conditioning
- Motor Drives

**Electrical Features**

- Low Switching Losses
- Low  $V_{CEsat}$
- Trench IGBT 4
- $V_{CEsat}$  with positive Temperature Coefficient

**Mechanical Features**

- $Al_2O_3$  Substrate with Low Thermal Resistance
- Compact design
- RoHS compliant
- Rugged mounting due to integrated mounting clamps

**Module Label Code**

Barcode Code 128



DMX - Code



**Content of the Code**

| Content of the Code        | Digit   |
|----------------------------|---------|
| Module Serial Number       | 1 - 5   |
| Module Material Number     | 6 - 11  |
| Production Order Number    | 12 - 19 |
| Datecode (Production Year) | 20 - 21 |
| Datecode (Production Week) | 22 - 23 |

|                 |                                 |  |
|-----------------|---------------------------------|--|
| prepared by: CM | date of publication: 2013-11-11 |  |
| approved by: MB | revision: 3.0                   |  |

**IGBT, 逆变器 / IGBT, Inverter**

**最大额定值 / Maximum Rated Values**

|  |   |                            |          |        |
|--|---|----------------------------|----------|--------|
| 集电极 - 发射极电压<br>Collector-emitter voltage       | $T_{vj} = 25^{\circ}\text{C}$   | $V_{CES}$                  | 1200     | V      |
| 连续集电极直流电流<br>Continuous DC collector current   | $T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$<br>$I_C$ | 15<br>30 | A<br>A |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P = 1\text{ ms}$   | $I_{CRM}$                  | 30       | A      |
| 总功率损耗<br>Total power dissipation               | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$  | $P_{\text{tot}}$           | 145      | W      |
| 栅极 - 发射极峰值电压<br>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<br>Collector-emitter saturation voltage | $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,85<br>2,15<br>2,25    | 2,25 | V<br>V<br>V |   |
| 栅极阈值电压<br>Gate threshold voltage                      | $I_C = 0,48\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$  |   | $V_{GEth}$         | 5,2                     | 5,8  | 6,4         | V   |
| 栅极电荷<br>Gate charge                                   | $V_{GE} = -15\text{ V} \dots +15\text{ V}$  |   | $Q_G$              | 0,12                    |      |             | $\mu\text{C}$                                   |
| 内部栅极电阻<br>Internal gate resistor                      | $T_{vj} = 25^{\circ}\text{C}$   |   | $R_{Gint}$         | 0,0                     |      |             | $\Omega$  |
| 输入电容<br>Input capacitance                             | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{ies}$          | 0,89                    |      |             | nF  |
| 反向传输电容<br>Reverse transfer capacitance                | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{res}$          | 0,03                    |      |             | nF  |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current      | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{CES}$          |                         |      | 1,0         | mA  |
| 栅极-发射极漏电流<br>Gate-emitter leakage current             | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{GES}$          |                         |      | 400         | nA  |
| 开通延迟时间(电感负载)<br>Turn-on delay time, inductive load    | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 39\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{on}}$   | 0,029<br>0,029<br>0,029 |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 上升时间(电感负载)<br>Rise time, inductive load               | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 39\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$              | 0,019<br>0,022<br>0,023 |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 关断延迟时间(电感负载)<br>Turn-off delay time, inductive load   | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 39\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{off}}$  | 0,18<br>0,275<br>0,28   |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 下降时间(电感负载)<br>Fall time, inductive load               | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 39\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$              | 0,15<br>0,22<br>0,26    |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 开通损耗能量(每脉冲)<br>Turn-on energy loss per pulse          | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 575\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 39\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$           | 1,05<br>1,40<br>1,55    |      |             | mJ<br>mJ<br>mJ                                  |
| 关断损耗能量(每脉冲)<br>Turn-off energy loss per pulse         | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 3300\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$          | 0,80<br>1,35<br>1,50    |      |             | mJ<br>mJ<br>mJ                                  |
| 短路数据<br>SC data                                       | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$<br>$V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                           |   | $I_{SC}$           | 55                      |      |             | A   |
| 结 - 外壳热阻<br>Thermal resistance, junction to case      | 每个 IGBT / per IGBT  |   | $R_{thJC}$         | 0,95                    | 1,05 |             | K/W   |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink    | 每个 IGBT / per IGBT<br>$\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$                                      |   | $R_{thCH}$         | 0,80                    |      |             | K/W   |
| 在开关状态下温度<br>Temperature under switching conditions    |   |   | $T_{vj\text{op}}$  | -40                     |      | 150         | $^{\circ}\text{C}$                              |

|                 |                                 |
|-----------------|---------------------------------|
| prepared by: CM | date of publication: 2013-11-11 |
| approved by: MB | revision: 3.0                   |

**二极管, 逆变器 / Diode, Inverter**  
**最大额定值 / Maximum Rated Values**

|  |  |           |              |                                      |
|--|--|-----------|--------------|--------------------------------------|
| 反向重复峰值电压<br>Repetitive peak reverse voltage    | $T_{vj} = 25^{\circ}\text{C}$  | $V_{RRM}$ | 1200         | V                                    |
| 连续正向直流电流<br>Continuous DC forward current      |  | $I_F$     | 15           | A                                    |
| 正向重复峰值电流<br>Repetitive peak forward current    | $t_P = 1\text{ ms}$  | $I_{FRM}$ | 30           | A                                    |
| I <sup>2</sup> t-值<br>I <sup>2</sup> t - value | $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$<br>$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$    | 40,0<br>34,0 | A <sup>2</sup> s<br>A <sup>2</sup> s |

**特征值 / Characteristic Values**

|  |  |   | min.        | typ.                 | max. |   |
|--|--|---|-------------|----------------------|------|---|
| 正向电压<br>Forward voltage                            | $I_F = 15\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 15\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 15\text{ A}, V_{GE} = 0\text{ V}$         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_F$       | 1,75<br>1,75<br>1,75 | 2,15 | V<br>V<br>V                                     |
| 反向恢复峰值电流<br>Peak reverse recovery current          | $I_F = 15\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $I_{RM}$    | 18,5<br>19,5<br>20,0 |      | A<br>A<br>A                                     |
| 恢复电荷<br>Recovered charge                           | $I_F = 15\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $Q_r$       | 1,30<br>2,40<br>2,70 |      | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| 反向恢复损耗 (每脉冲)<br>Reverse recovery energy            | $I_F = 15\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{rec}$   | 0,50<br>0,85<br>0,97 |      | mJ<br>mJ<br>mJ                                  |
| 结 - 外壳热阻<br>Thermal resistance, junction to case   | 每个二极管 / per diode  |   | $R_{thJC}$  | 1,30                 | 1,45 | K/W   |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink | 每个二极管 / per diode<br>$\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$      |   | $R_{thCH}$  | 1,05                 |      | K/W   |
| 在开关状态下温度<br>Temperature under switching conditions |  |   | $T_{vj op}$ | -40                  | 150  | $^{\circ}\text{C}$                              |

**二极管, 整流器 / Diode, Rectifier**  
**最大额定值 / Maximum Rated Values**

|   |   |             |            |                                      |
|---|---|-------------|------------|--------------------------------------|
| 反向重复峰值电压<br>Repetitive peak reverse voltage             | $T_{vj} = 25^{\circ}\text{C}$   | $V_{RRM}$   | 1600       | V                                    |
| 最大正向均方根电流(每芯片)<br>Maximum RMS forward current per chip  | $T_C = 80^{\circ}\text{C}$  | $I_{FRMSM}$ | 30         | A                                    |
| 最大整流器输出均方根电流<br>Maximum RMS current at rectifier output | $T_C = 80^{\circ}\text{C}$  | $I_{RMSM}$  | 30         | A                                    |
| 正向浪涌电流<br>Surge forward current                         | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$   | 300<br>245 | A<br>A                               |
| I <sup>2</sup> t-值<br>I <sup>2</sup> t - value          | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$      | 450<br>300 | A <sup>2</sup> s<br>A <sup>2</sup> s |

**特征值 / Characteristic Values**

|  |   |  | min.        | typ. | max. |                    |
|--|---|--|-------------|------|------|--------------------|
| 正向电压<br>Forward voltage                            | $T_{vj} = 150^{\circ}\text{C}, I_F = 15\text{ A}$   |  | $V_F$       | 0,85 |      | V                  |
| 反向电流<br>Reverse current                            | $T_{vj} = 150^{\circ}\text{C}, V_R = 1600\text{ V}$   |  | $I_R$       | 1,00 |      | mA                 |
| 结 - 外壳热阻<br>Thermal resistance, junction to case   | 每个二极管 / per diode   |  | $R_{thJC}$  | 1,15 | 1,30 | K/W                |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink | 每个二极管 / per diode<br>$\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ |  | $R_{thCH}$  | 1,10 |      | K/W                |
| 在开关状态下温度<br>Temperature under switching conditions |   |  | $T_{vj op}$ | -40  | 150  | $^{\circ}\text{C}$ |

|                 |                                 |
|-----------------|---------------------------------|
| prepared by: CM | date of publication: 2013-11-11 |
| approved by: MB | revision: 3.0                   |

**IGBT, 制动-斩波器 / IGBT, Brake-Chopper**

**最大额定值 / Maximum Rated Values**

|  |   |                            |          |        |
|--|---|----------------------------|----------|--------|
| 集电极 - 发射极电压<br>Collector-emitter voltage       | $T_{vj} = 25^{\circ}\text{C}$   | $V_{CES}$                  | 1200     | V      |
| 连续集电极直流电流<br>Continuous DC collector current   | $T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$<br>$I_C$ | 15<br>30 | A<br>A |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P = 1\text{ ms}$   | $I_{CRM}$                  | 30       | A      |
| 总功率损耗<br>Total power dissipation               | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$  | $P_{\text{tot}}$           | 145      | W      |
| 栅极 - 发射极峰值电压<br>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<br>Collector-emitter saturation voltage | $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,85<br>2,15<br>2,25    | 2,25 | V<br>V<br>V |   |
| 栅极阈值电压<br>Gate threshold voltage                      | $I_C = 0,48\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$  |   | $V_{GEth}$         | 5,2                     | 5,8  | 6,4         | V   |
| 栅极电荷<br>Gate charge                                   | $V_{GE} = -15\text{ V} \dots +15\text{ V}$  |   | $Q_G$              | 0,12                    |      |             | $\mu\text{C}$                                   |
| 内部栅极电阻<br>Internal gate resistor                      | $T_{vj} = 25^{\circ}\text{C}$   |   | $R_{Gint}$         | 0,0                     |      |             | $\Omega$  |
| 输入电容<br>Input capacitance                             | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{ies}$          | 0,89                    |      |             | nF  |
| 反向传输电容<br>Reverse transfer capacitance                | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{res}$          | 0,03                    |      |             | nF  |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current      | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{CES}$          |                         |      | 1,0         | mA  |
| 栅极-发射极漏电流<br>Gate-emitter leakage current             | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{GES}$          |                         |      | 400         | nA  |
| 开通延迟时间(电感负载)<br>Turn-on delay time, inductive load    | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 43\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{on}}$   | 0,029<br>0,029<br>0,029 |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 上升时间(电感负载)<br>Rise time, inductive load               | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 43\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$              | 0,019<br>0,022<br>0,023 |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 关断延迟时间(电感负载)<br>Turn-off delay time, inductive load   | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 43\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{off}}$  | 0,18<br>0,275<br>0,28   |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 下降时间(电感负载)<br>Fall time, inductive load               | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 43\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$              | 0,15<br>0,22<br>0,26    |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 开通损耗能量(每脉冲)<br>Turn-on energy loss per pulse          | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 575\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 43\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$           | 1,05<br>1,40<br>1,55    |      |             | mJ<br>mJ<br>mJ                                  |
| 关断损耗能量(每脉冲)<br>Turn-off energy loss per pulse         | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 3300\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$          | 0,80<br>1,35<br>1,50    |      |             | mJ<br>mJ<br>mJ                                  |
| 短路数据<br>SC data                                       | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$<br>$V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                           |   | $I_{SC}$           | 55                      |      |             | A   |
| 结 - 外壳热阻<br>Thermal resistance, junction to case      | 每个 IGBT / per IGBT  |   | $R_{thJC}$         | 0,95                    | 1,05 |             | K/W   |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink    | 每个 IGBT / per IGBT<br>$\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$                                      |   | $R_{thCH}$         | 0,80                    |      |             | K/W   |
| 在开关状态下温度<br>Temperature under switching conditions    |   |   | $T_{vj\text{op}}$  | -40                     |      | 150         | $^{\circ}\text{C}$                              |

prepared by: CM

date of publication: 2013-11-11

approved by: MB

revision: 3.0

**二极管，制动-斩波器 / Diode, Brake-Chopper**  
**最大额定值 / Maximum Rated Values**

|  |  |           |              |                                      |
|--|--|-----------|--------------|--------------------------------------|
| 反向重复峰值电压<br>Repetitive peak reverse voltage    | $T_{vj} = 25^{\circ}\text{C}$  | $V_{RRM}$ | 1200         | V                                    |
| 连续正向直流电流<br>Continuous DC forward current      |  | $I_F$     | 10           | A                                    |
| 正向重复峰值电流<br>Repetitive peak forward current    | $t_P = 1\text{ ms}$  | $I_{FRM}$ | 20           | A                                    |
| I <sup>2</sup> t-值<br>I <sup>2</sup> t - value | $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$<br>$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$    | 16,0<br>14,0 | A <sup>2</sup> s<br>A <sup>2</sup> s |

**特征值 / Characteristic Values**

|  |   |   | min.               | typ.                 | max. |   |
|--|---|---|--------------------|----------------------|------|---|
| 正向电压<br>Forward voltage                            | $I_F = 10\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 10\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 10\text{ A}, V_{GE} = 0\text{ V}$    | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_F$              | 1,75<br>1,75<br>1,75 | 2,25 | V<br>V<br>V                                     |
| 反向恢复峰值电流<br>Peak reverse recovery current          | $I_F = 10\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $I_{RM}$           | 14,0<br>12,0<br>9,50 |      | A<br>A<br>A                                     |
| 恢复电荷<br>Recovered charge                           | $I_F = 10\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $Q_r$              | 0,95<br>1,75<br>1,95 |      | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| 反向恢复损耗 (每脉冲)<br>Reverse recovery energy            | $I_F = 10\text{ A}, -di_F/dt = 575\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{rec}$          | 0,26<br>0,57<br>0,64 |      | mJ<br>mJ<br>mJ                                  |
| 结 - 外壳热阻<br>Thermal resistance, junction to case   | 每个二极管 / per diode   |   | $R_{thJC}$         | 1,45                 | 1,60 | K/W   |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink | 每个二极管 / per diode<br>$\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ |   | $R_{thCH}$         | 1,15                 |      | K/W   |
| 在开关状态下温度<br>Temperature under switching conditions |   |   | $T_{vj\text{ op}}$ | -40                  | 150  | $^{\circ}\text{C}$                              |

**负温度系数热敏电阻 / NTC-Thermistor**

**特征值 / Characteristic Values**

|                              |   |  | min.         | typ. | max. |            |
|------------------------------|---|--|--------------|------|------|------------|
| 额定电阻值<br>Rated resistance    | $T_C = 25^{\circ}\text{C}$                                    |  | $R_{25}$     | 5,00 |      | k $\Omega$ |
| R100 偏差<br>Deviation of R100 | $T_C = 100^{\circ}\text{C}, R_{100} = 493\ \Omega$            |  | $\Delta R/R$ | -5   | 5    | %          |
| 耗散功率<br>Power dissipation    | $T_C = 25^{\circ}\text{C}$                                    |  | $P_{25}$     |      | 20,0 | mW         |
| B-值<br>B-value               | $R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$  |  | $B_{25/50}$  | 3375 |      | K          |
| B-值<br>B-value               | $R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\text{ K}))]$  |  | $B_{25/80}$  | 3411 |      | K          |
| B-值<br>B-value               | $R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\text{ K}))]$ |  | $B_{25/100}$ | 3433 |      | K          |

根据应用手册标定

Specification according to the valid application note.

|                 |                                 |
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| prepared by: CM | date of publication: 2013-11-11 |
| approved by: MB | revision: 3.0                   |

**模块 / Module**

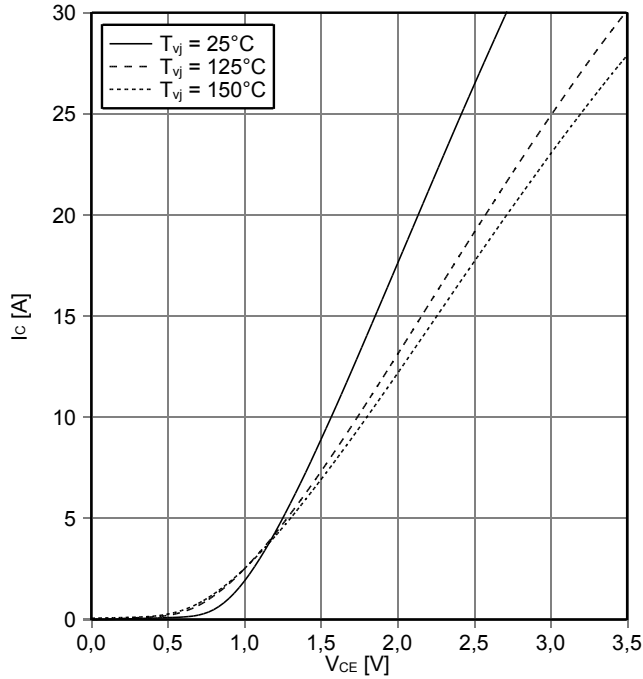
|   |  |  |                                |              |                  |
|---|--|--|--------------------------------|--------------|------------------|
| 绝缘测试电压<br>Isolation test voltage                                  | RMS, f = 50 Hz, t = 1 min  | V <sub>ISOL</sub>                            | 2,5                            |              | kV               |
| 内部绝缘<br>Internal isolation  | 基本绝缘 (class 1, IEC 61140)<br>basic insulation (class 1, IEC 61140) |  | Al <sub>2</sub> O <sub>3</sub> |              |                  |
| 爬电距离<br>Creepage distance   | 端子- 散热片 / terminal to heatsink<br>端子- 端子 / terminal to terminal    |  | 11,5<br>6,3                    |              | mm               |
| 电气间隙<br>Clearance   | 端子- 散热片 / terminal to heatsink<br>端子- 端子 / terminal to terminal    |  | 10,0<br>5,0                    |              | mm               |
| 相对电痕指数<br>Comperative tracking index                              |  | CTI  | > 200                          |              |                  |
|   |  |  | min.                           | typ.         | max.             |
| 杂散电感,模块<br>Stray inductance module                                |  | L <sub>sCE</sub>                             |                                | 30           | nH               |
| 模块引线电阻,端子-芯片<br>Module lead resistance, terminals - chip          | T <sub>c</sub> = 25°C, 每个开关 / per switch                           | R <sub>CC'+EE'</sub><br>R <sub>AA'+CC'</sub> |                                | 5,00<br>6,00 | mΩ               |
| 最大结温<br>Maximum junction temperature                              | 逆变器,制动-斩波器 / inverter, brake-chopper<br>整流器 / rectifier            | T <sub>vj max</sub>                          |                                |              | 175 °C<br>150 °C |
| 在开关状态下温度<br>Temperature under switching conditions                | 逆变器,制动-斩波器 / inverter, brake-chopper<br>整流器 / rectifier            | T <sub>vj op</sub>                           | -40<br>-40                     |              | 150 °C<br>150 °C |
| 储存温度<br>Storage temperature                                       |  | T <sub>stg</sub>                             | -40                            |              | 125 °C           |
| Anpresskraft für mech. Bef. pro Feder<br>mounting force per clamp |  | F  | 40                             | -            | 80 N             |
| 重量<br>Weight  |  | G  |                                | 39           | g                |

Der Strom im Dauerbetrieb ist auf 30A effektiv pro Anschlusspin begrenzt.  
The current under continuous operation is limited to 30A rms per connector pin.

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| prepared by: CM | date of publication: 2013-11-11 |
| approved by: MB | revision: 3.0                   |

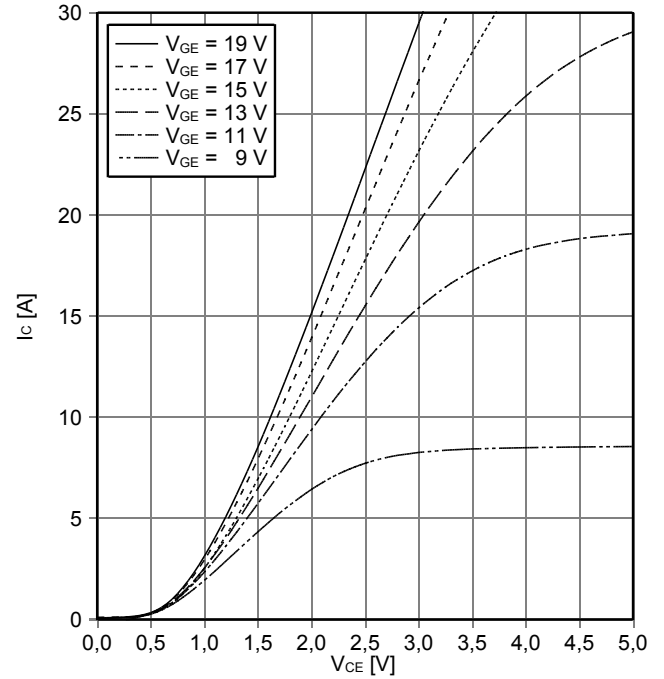
输出特性 IGBT, 逆变器 (典型)  
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$



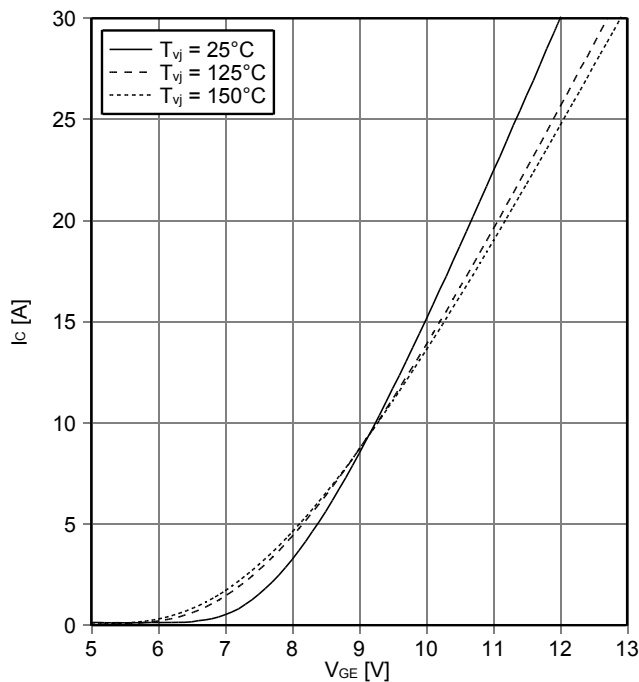
输出特性 IGBT, 逆变器 (典型)  
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$   
 $T_{vj} = 150^\circ\text{C}$



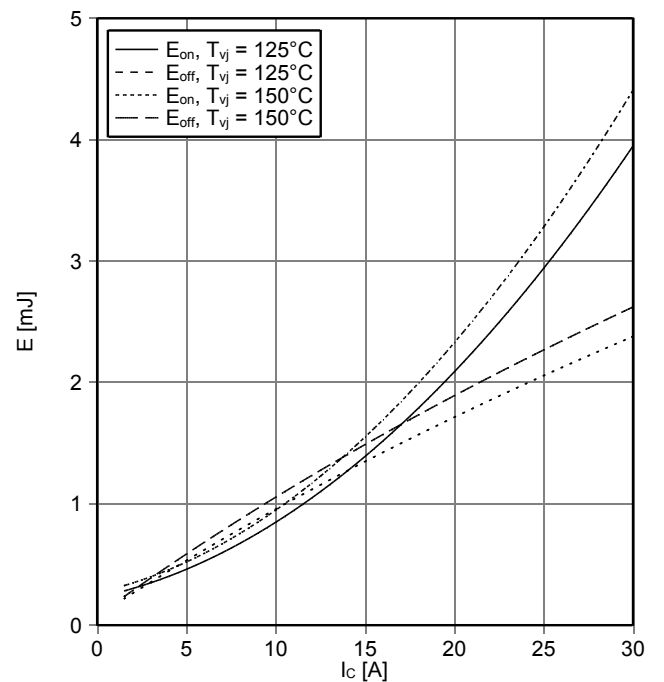
传输特性 IGBT, 逆变器 (典型)  
transfer characteristic IGBT, Inverter (typical)

$I_C = f(V_{GE})$   
 $V_{CE} = 20\text{ V}$



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

$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15\text{ V}$ ,  $R_{Gon} = 39\ \Omega$ ,  $R_{Goff} = 39\ \Omega$ ,  $V_{CE} = 600\text{ V}$

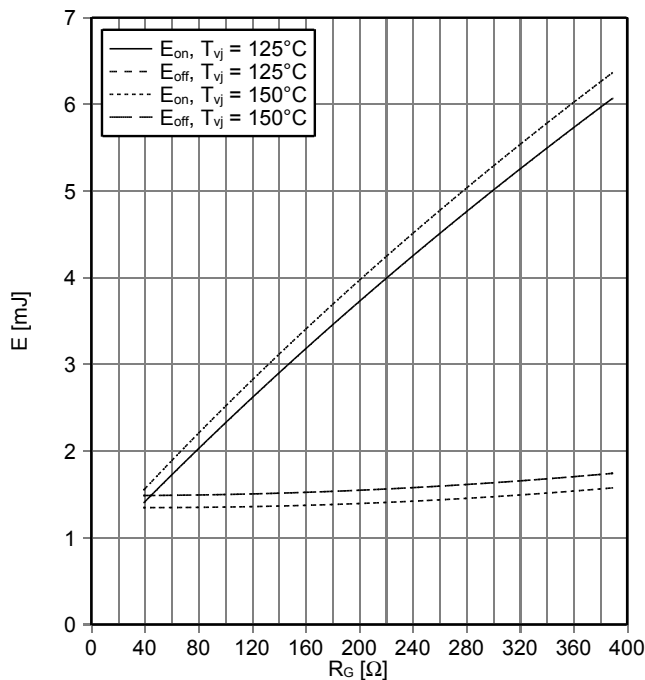


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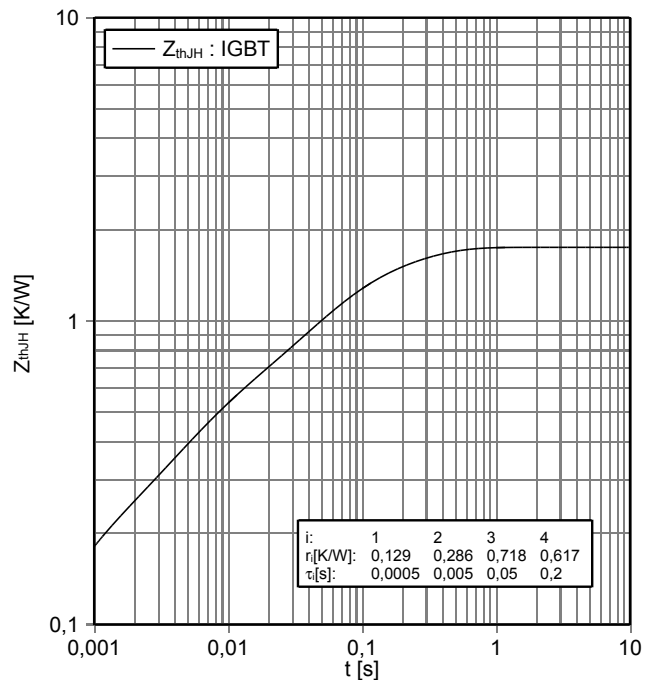
开关损耗 IGBT, 逆变器 (典型)  
switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$   
 $V_{GE} = \pm 15\text{ V}, I_C = 15\text{ A}, V_{CE} = 600\text{ V}$



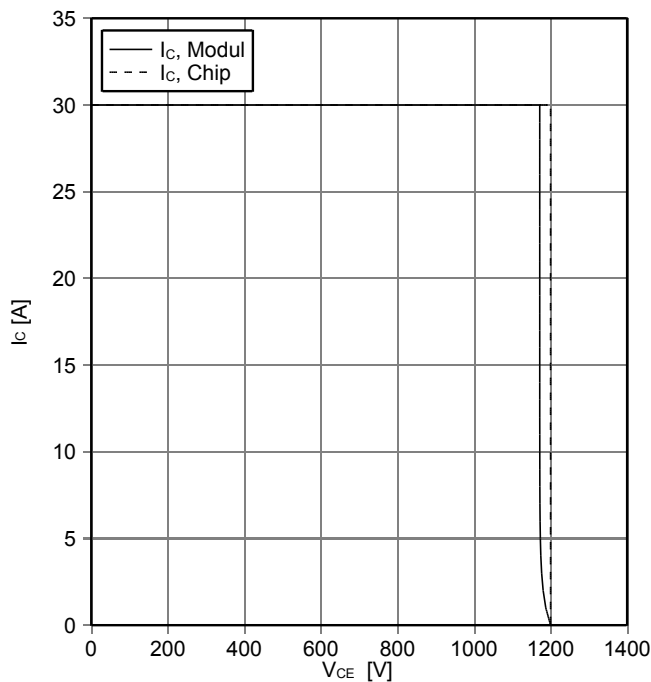
瞬态热阻抗 IGBT, 逆变器  
transient thermal impedance IGBT, Inverter

$Z_{thJH} = f(t)$



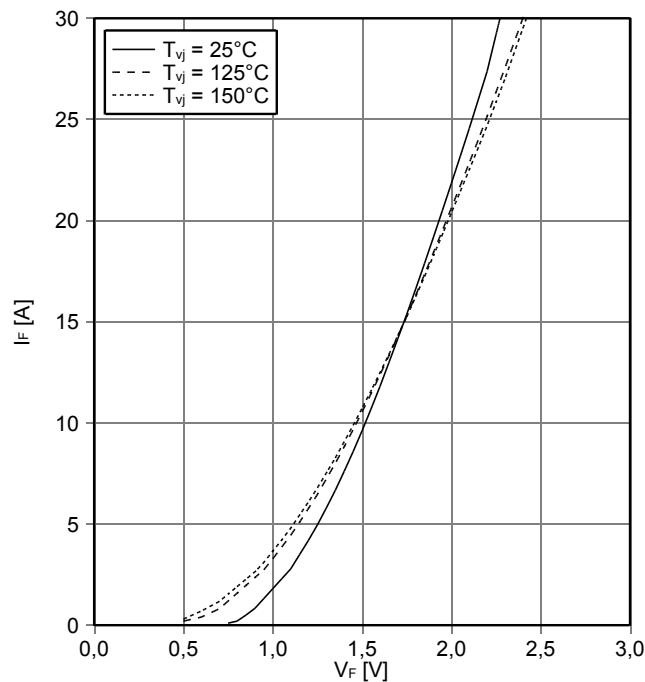
反偏安全工作区 IGBT, 逆变器 (RBSOA)  
reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C = f(V_{CE})$   
 $V_{GE} = \pm 15\text{ V}, R_{Goff} = 39\ \Omega, T_{vj} = 150^\circ\text{C}$



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

$I_F = f(V_F)$



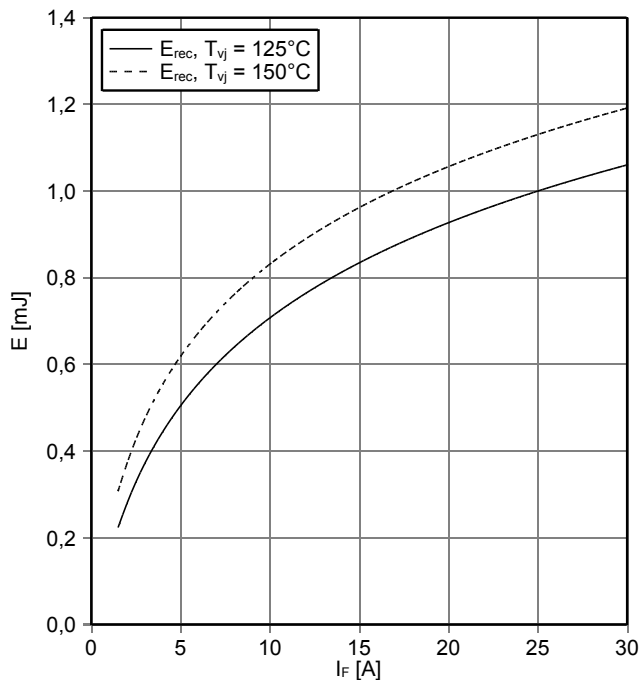
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| approved by: MB | revision: 3.0                   |





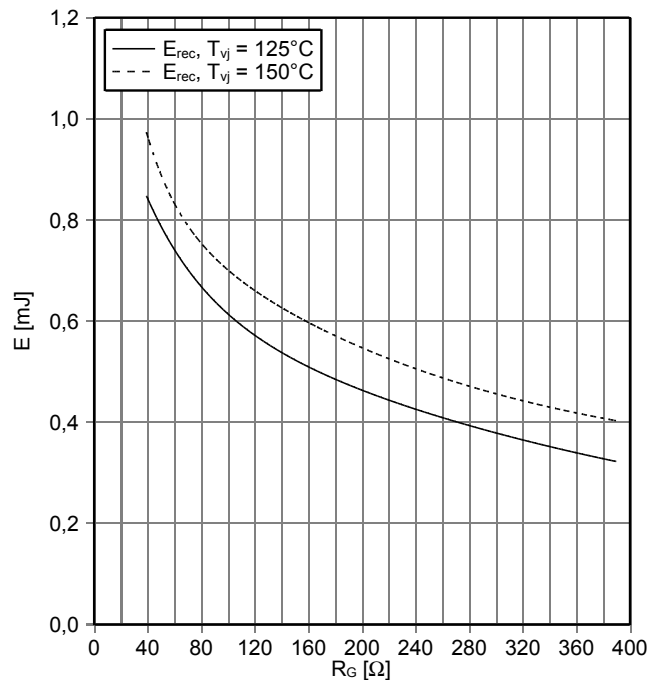
开关损耗 二极管, 逆变器 (典型)  
switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$   
 $R_{Gon} = 39 \Omega, V_{CE} = 600 V$



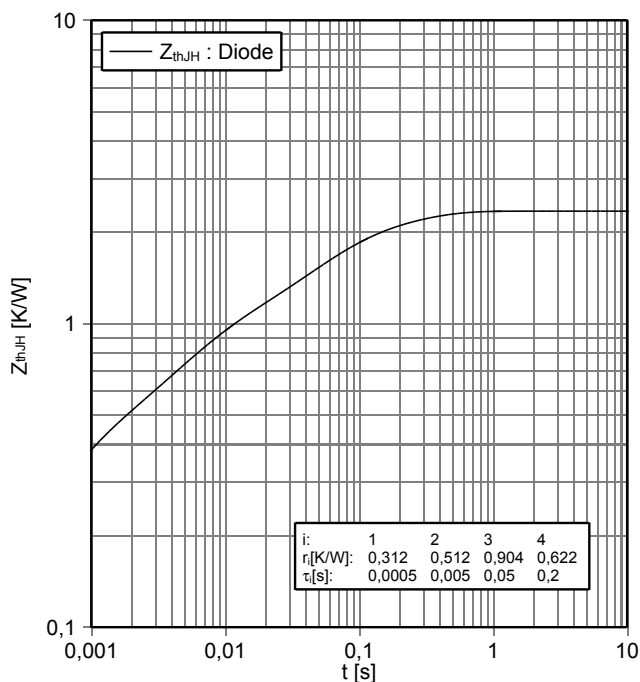
开关损耗 二极管, 逆变器 (典型)  
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$   
 $I_F = 15 A, V_{CE} = 600 V$



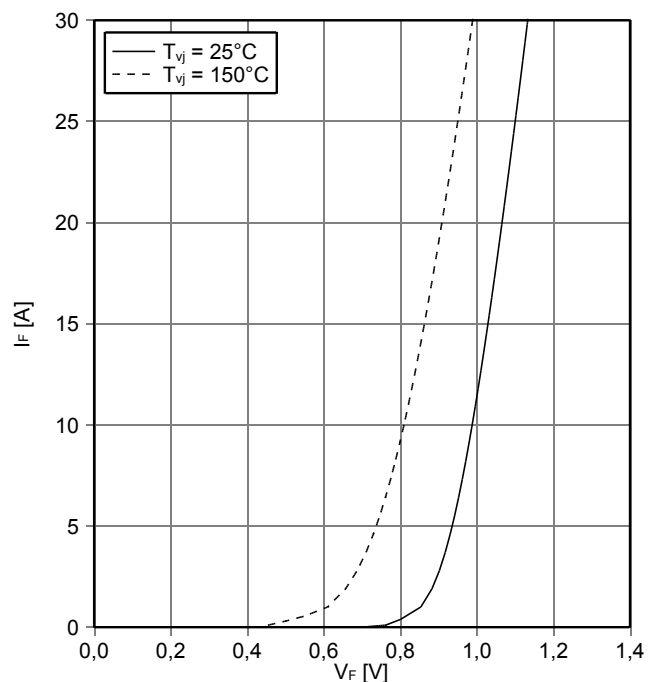
瞬态热阻抗 二极管, 逆变器  
transient thermal impedance Diode, Inverter

$Z_{thJH} = f(t)$



正向偏压特性 二极管, 整流器 (典型)  
forward characteristic of Diode, Rectifier (typical)

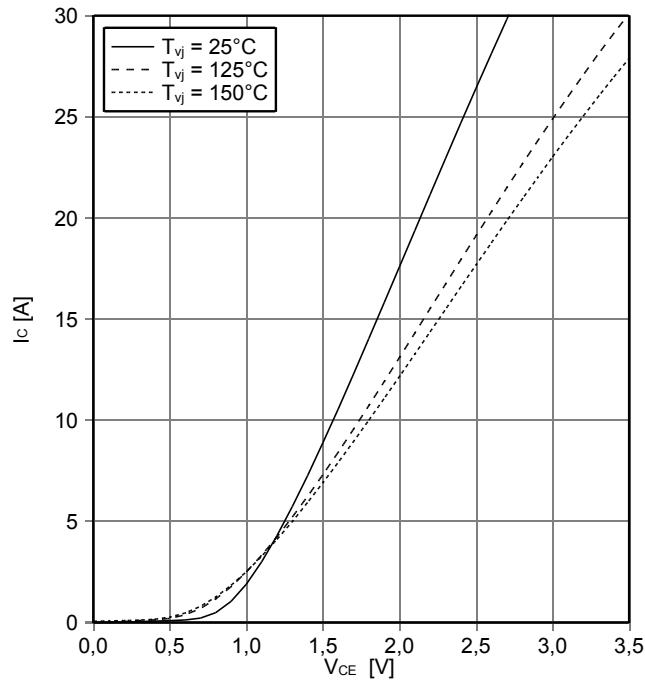
$I_F = f(V_F)$



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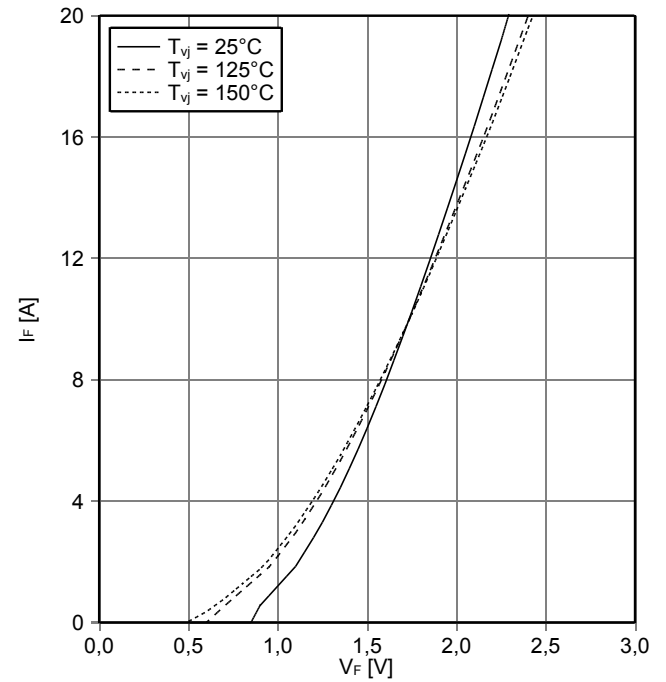
输出特性 IGBT, 制动-斩波器 (典型)  
output characteristic IGBT, Brake-Chopper (typical)

$I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$



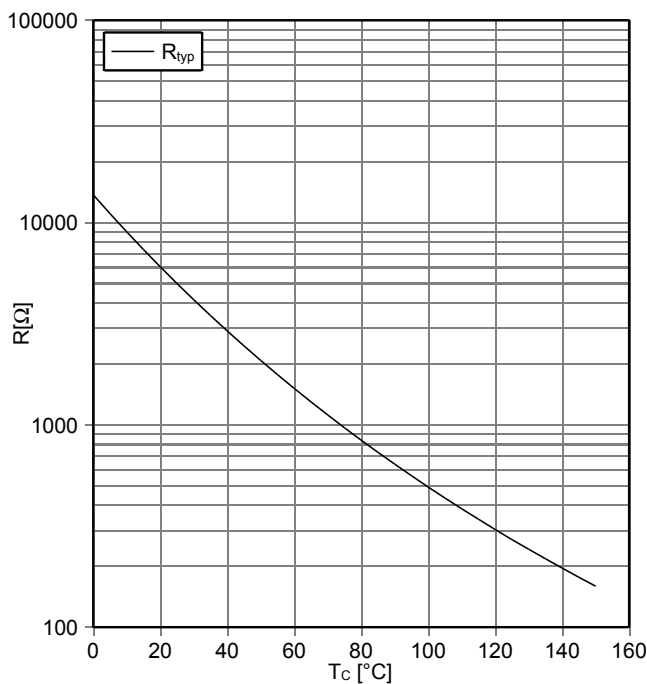
正向偏压特性 二极管, 制动-斩波器 (典型)  
forward characteristic of Diode, Brake-Chopper (typical)

$I_F = f(V_F)$



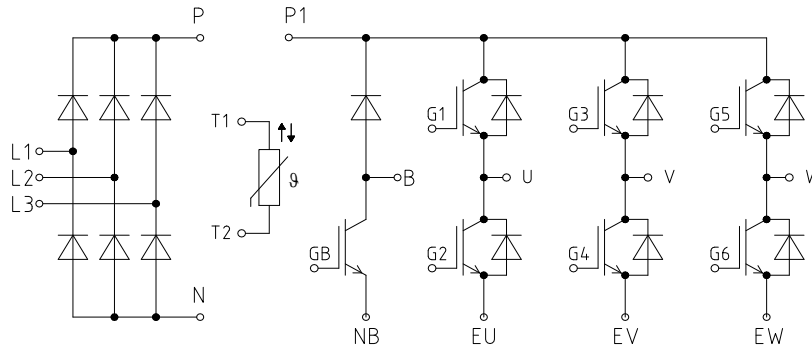
负温度系数热敏电阻 温度特性  
NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$

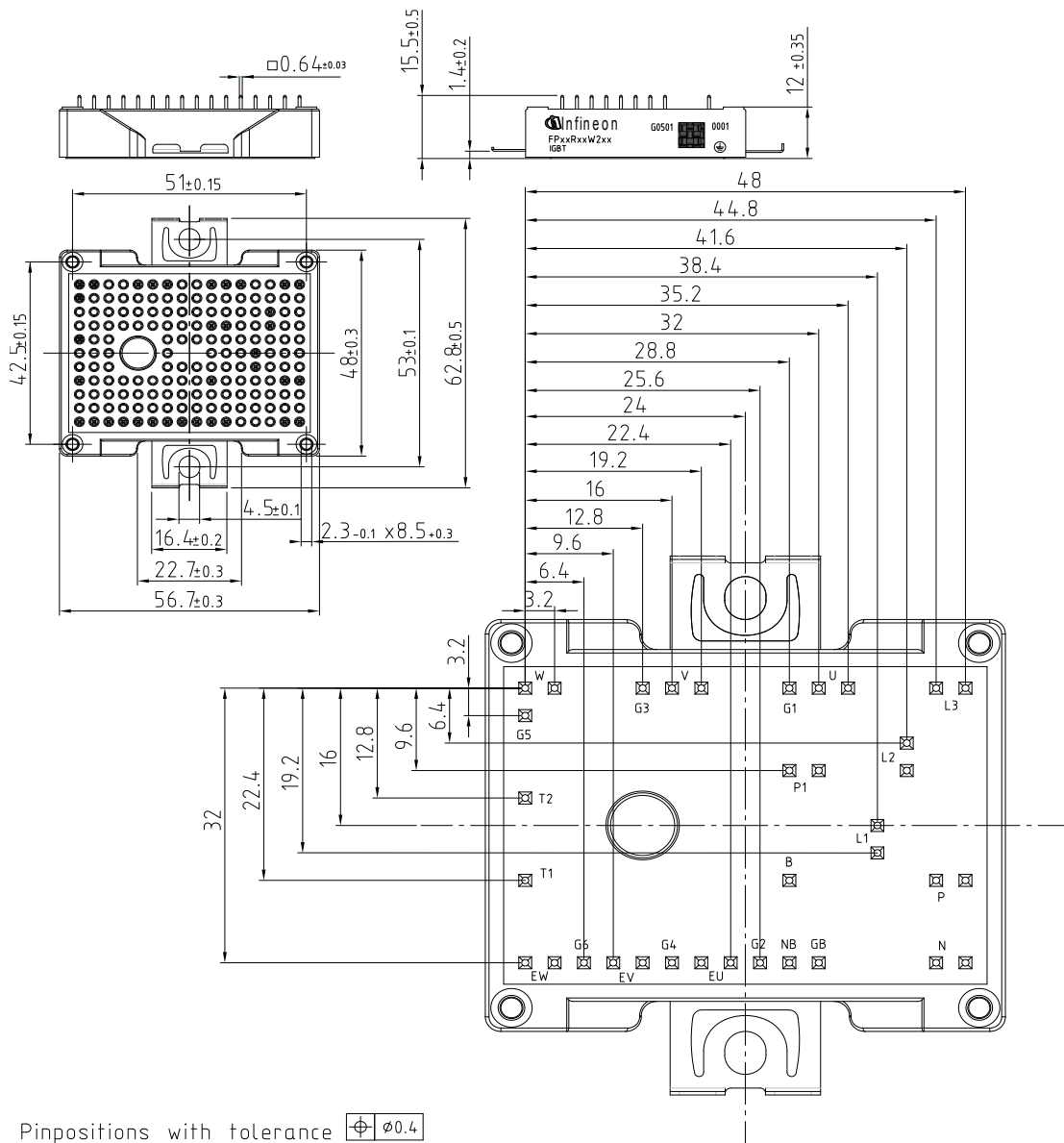


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| approved by: MB | revision: 3.0                   |

## 接线图 / circuit\_diagram\_headline



## 封装尺寸 / package outlines



prepared by: CM  
approved by: MB

date of publication: 2013-11-11  
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