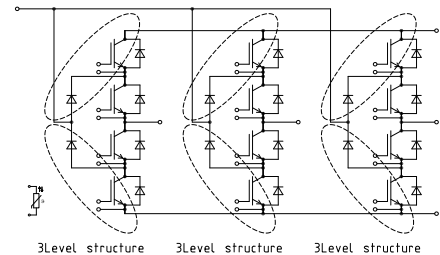
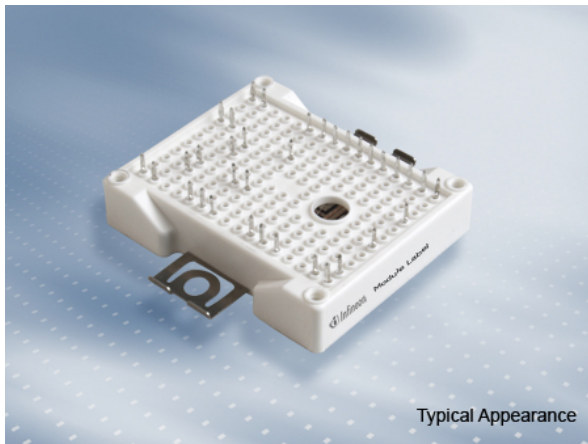


EasyPACK 模块 采用第三代高速沟槽栅/场终止IGBT和第三代发射极控制二极管  
带有pressfit压接管脚和温度检测NTC

EasyPACK module with fast Trench/Fieldstop IGBT3 and Emitter Controlled 3 diode and PressFIT / NTC



$V_{CES} = 650V$

$I_{C\ nom} = 50A / I_{CRM} = 100A$

## 典型应用

- 三电平应用
- 电机传动
- 太阳能应用
- UPS系统

## 电气特性

- 
- 高速IGBT H3
- 低开关损耗

## 机械特性

- 3 kV 交流 1分钟 绝缘
- 低热阻的三氧化二铝 (  $Al_2O_3$  ) 衬底
- 紧凑型设计
- PressFIT 压接技术
- 集成的安装夹使安装坚固

## Typical Applications

- 3-level-applications
- Motor drives
- Solar applications
- UPS systems

## Electrical Features

- CoolSiC (TM) Schottky diode gen 5
- High speed IGBT H3
- Low switching losses

## Mechanical Features

- 3 kV AC 1min insulation
- $Al_2O_3$  substrate with low thermal resistance
- Compact design
- PressFIT contact technology
- 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 |

## 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       | $T_{vj} = 25^{\circ}\text{C}$                                | $V_{CES}$         | 650   | V |
| 连续集电极直流电流<br>Continuous DC collector current   | $T_H = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$ | 50    | A |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                          | $I_{CRM}$         | 100   | A |
| 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 | $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 50\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 50\text{ A}, V_{GE} = 15\text{ V}$                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,45<br>1,60<br>1,70    | 1,80 | V<br>V<br>V                                     |
| 栅极阈值电压<br>Gate threshold voltage                      | $I_C = 0,80\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                      |                                                                                                   | $V_{GEth}$         | 5,00                    | 5,80 | 6,50 V                                          |
| 栅极电荷<br>Gate charge                                   | $V_{GE} = -15\text{ V} \dots +15\text{ V}$                                                                                                                                                |                                                                                                   | $Q_G$              | 0,50                    |      | $\mu\text{C}$                                   |
| 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                             | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                |                                                                                                   | $C_{ies}$          | 3,10                    |      | nF                                              |
| 反向传输电容<br>Reverse transfer capacitance                | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                |                                                                                                   | $C_{res}$          | 0,095                   |      | nF                                              |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current      | $V_{CE} = 650\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                 |                                                                                                   | $I_{CES}$          |                         | 1,0  | mA                                              |
| 栅极-发射极漏电流<br>Gate-emitter leakage current             | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                  |                                                                                                   | $I_{GES}$          |                         | 100  | nA                                              |
| 开通延迟时间(电感负载)<br>Turn-on delay time, inductive load    | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 16\ \Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{don}$          | 0,037<br>0,037<br>0,037 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 上升时间(电感负载)<br>Rise time, inductive load               | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 16\ \Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$              | 0,042<br>0,044<br>0,047 |      | $\mu\text{s}$<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   | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 16\ \Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{doff}$         | 0,255<br>0,28<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               | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 16\ \Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$              | 0,058<br>0,064<br>0,066 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 开通损耗能量(每脉冲)<br>Turn-on energy loss per pulse          | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 1100\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 16\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$           | 0,96<br>1,20<br>1,25    |      | mJ<br>mJ<br>mJ                                  |
| 关断损耗能量(每脉冲)<br>Turn-off energy loss per pulse         | $I_C = 50\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 3600\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 16\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$          | 1,20<br>1,60<br>1,70    |      | mJ<br>mJ<br>mJ                                  |
| 短路数据<br>SC data                                       | $V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$<br>$t_P \leq 6\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                                |                                                                                                   | $I_{SC}$           | 330                     |      | A                                               |
| 结 - 散热器热阻<br>Thermal resistance, junction to heatsink | 每个 IGBT / per IGBT                                                                                                                                                                        |                                                                                                   | $R_{thJH}$         | 1,40                    |      | K/W                                             |
| 在开关状态下温度<br>Temperature under switching conditions    |                                                                                                                                                                                           |                                                                                                   | $T_{vj\text{op}}$  | -40                     | 150  | $^{\circ}\text{C}$                              |

## 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 | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                | $V_{RRM}$ | 650          | V                                            |
| 连续正向直流电流<br>Continuous DC forward current   |                                                                                                                                              | $I_F$     | 30           | A                                            |
| 正向重复峰值电流<br>Repetitive peak forward current | $t_P = 1\text{ ms}$                                                                                                                          | $I_{FRM}$ | 60           | A                                            |
| $I^2t$ -值<br>$I^2t$ - value                 | $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$<br>$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$    | 90,0<br>82,0 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

### 特征值 / Characteristic Values

|                                                       |                                                                                                                                           |                                                                                                   |                    | min. | typ.                 | max. |                                                 |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------|------|----------------------|------|-------------------------------------------------|
| 正向电压<br>Forward voltage                               | $I_F = 30\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 30\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 30\text{ A}, V_{GE} = 0\text{ V}$          | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_F$              |      | 1,60<br>1,55<br>1,50 | 2,00 | V<br>V<br>V                                     |
| 反向恢复峰值电流<br>Peak reverse recovery current             | $I_F = 30\text{ A}, -di_F/dt = 1100\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 300\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $I_{RM}$           |      | 20,0<br>26,0<br>28,0 |      | A<br>A<br>A                                     |
| 恢复电荷<br>Recovered charge                              | $I_F = 30\text{ A}, -di_F/dt = 1100\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 300\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $Q_r$              |      | 1,20<br>2,10<br>2,50 |      | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| 反向恢复损耗 (每脉冲)<br>Reverse recovery energy               | $I_F = 30\text{ A}, -di_F/dt = 1100\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 300\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{rec}$          |      | 0,22<br>0,45<br>0,53 |      | mJ<br>mJ<br>mJ                                  |
| 结 - 散热器热阻<br>Thermal resistance, junction to heatsink | 每个二极管 / per diode                                                                                                                         |                                                                                                   | $R_{thJH}$         |      | 2,60                 |      | K/W                                             |
| 在开关状态下温度<br>Temperature under switching conditions    |                                                                                                                                           |                                                                                                   | $T_{vj\text{ op}}$ | -40  |                      | 150  | $^{\circ}\text{C}$                              |

## IGBT, 三电平 / IGBT, 3-Level

## 最大额定值 / Maximum Rated Values

|                                                |                                                              |                   |       |   |
|------------------------------------------------|--------------------------------------------------------------|-------------------|-------|---|
| 集电极 - 发射极电压<br>Collector-emitter voltage       | $T_{vj} = 25^{\circ}\text{C}$                                | $V_{CES}$         | 650   | V |
| 连续集电极直流电流<br>Continuous DC collector current   | $T_H = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$ | 30    | A |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                          | $I_{CRM}$         | 60    | A |
| 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 | $I_C = 30\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 30\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 30\text{ A}, V_{GE} = 15\text{ V}$                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,55<br>1,80<br>1,85    | 1,95 | V<br>V<br>V                                     |
| 栅极阈值电压<br>Gate threshold voltage                      | $I_C = 0,80\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                      |                                                                                                   | $V_{GEth}$         | 5,00                    | 5,80 | 6,50 V                                          |
| 栅极电荷<br>Gate charge                                   | $V_{GE} = -15\text{ V} \dots +15\text{ V}$                                                                                                                                                |                                                                                                   | $Q_G$              | 0,30                    |      | $\mu\text{C}$                                   |
| 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                             | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                |                                                                                                   | $C_{ies}$          | 1,65                    |      | nF                                              |
| 反向传输电容<br>Reverse transfer capacitance                | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                |                                                                                                   | $C_{res}$          | 0,051                   |      | nF                                              |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current      | $V_{CE} = 650\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                 |                                                                                                   | $I_{CES}$          |                         | 1,0  | mA                                              |
| 栅极-发射极漏电流<br>Gate-emitter leakage current             | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                  |                                                                                                   | $I_{GES}$          |                         | 100  | nA                                              |
| 开通延迟时间(电感负载)<br>Turn-on delay time, inductive load    | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 20\ \Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{don}$          | 0,03<br>0,03<br>0,031   |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 上升时间(电感负载)<br>Rise time, inductive load               | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 20\ \Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$              | 0,035<br>0,036<br>0,05  |      | $\mu\text{s}$<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   | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 20\ \Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{doff}$         | 0,175<br>0,19<br>0,20   |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 下降时间(电感负载)<br>Fall time, inductive load               | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 20\ \Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$              | 0,019<br>0,038<br>0,043 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 开通损耗能量(每脉冲)<br>Turn-on energy loss per pulse          | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 830\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 20\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$           | 0,38<br>0,42<br>0,42    |      | mJ<br>mJ<br>mJ                                  |
| 关断损耗能量(每脉冲)<br>Turn-off energy loss per pulse         | $I_C = 30\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 5400\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 20\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$          | 0,42<br>0,64<br>0,71    |      | mJ<br>mJ<br>mJ                                  |
| 短路数据<br>SC data                                       | $V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$                                                                                           | $t_P \leq 5\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                                           | $I_{SC}$           | 160                     |      | A                                               |
| 结 - 散热器热阻<br>Thermal resistance, junction to heatsink | 每个 IGBT / per IGBT                                                                                                                                                                        |                                                                                                   | $R_{thJH}$         | 2,15                    |      | K/W                                             |
| 在开关状态下温度<br>Temperature under switching conditions    |                                                                                                                                                                                           |                                                                                                   | $T_{vj\text{op}}$  | -40                     | 150  | $^{\circ}\text{C}$                              |

## 二极管, 三电平 / Diode, 3-Level

### 最大额定值 / Maximum Rated Values

|                                             |                                                                            |           |      |                      |
|---------------------------------------------|----------------------------------------------------------------------------|-----------|------|----------------------|
| 反向重复峰值电压<br>Repetitive peak reverse voltage | $T_{vj} = 25^{\circ}\text{C}$                                              | $V_{RRM}$ | 650  | 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                    |
| $I_{2t}$ -值<br>$I_{2t}$ - value             | $V_R = 0\text{ V}$ , $t_P = 10\text{ ms}$ , $T_{vj} = 125^{\circ}\text{C}$ | $I_{2t}$  | 4,50 | $\text{A}^2\text{s}$ |

### 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>$T_{vj} = 150^{\circ}\text{C}$ | $V_F$              |      | 1,45<br>1,60<br>1,65 | 1,85 | V<br>V<br>V                                     |
| 反向恢复峰值电流<br>Peak reverse recovery current             | $I_F = 10\text{ A}$ , $-di_F/dt = 400\text{ A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ )<br>$V_R = 300\text{ V}$<br>$V_{GE} = 15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $I_{RM}$           |      | 6,30<br>6,80<br>6,90 |      | A<br>A<br>A                                     |
| 恢复电荷<br>Recovered charge                              | $I_F = 10\text{ A}$ , $-di_F/dt = 400\text{ A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ )<br>$V_R = 300\text{ V}$<br>$V_{GE} = 15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $Q_r$              |      | 0,22<br>0,37<br>0,40 |      | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| 反向恢复损耗 (每脉冲)<br>Reverse recovery energy               | $I_F = 10\text{ A}$ , $-di_F/dt = 400\text{ A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ )<br>$V_R = 300\text{ V}$<br>$V_{GE} = 15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{rec}$          |      | 0,01<br>0,01<br>0,01 |      | mJ<br>mJ<br>mJ                                  |
| 结 - 散热器热阻<br>Thermal resistance, junction to heatsink | 每个二极管 / per diode                                                                                                                              |                                                                                                   | $R_{thJH}$         |      | 3,92                 |      | 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    | $T_{NTC} = 25^{\circ}\text{C}$                                  | $R_{25}$     |    |      | 5,00 |      | $\text{k}\Omega$ |
| R100 偏差<br>Deviation of R100 | $T_{NTC} = 100^{\circ}\text{C}$ , $R_{100} = 493\text{ }\Omega$ | $\Delta R/R$ | -5 |      |      | 5    | %                |
| 耗散功率<br>Power dissipation    | $T_{NTC} = 25^{\circ}\text{C}$                                  | $P_{25}$     |    |      |      | 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.

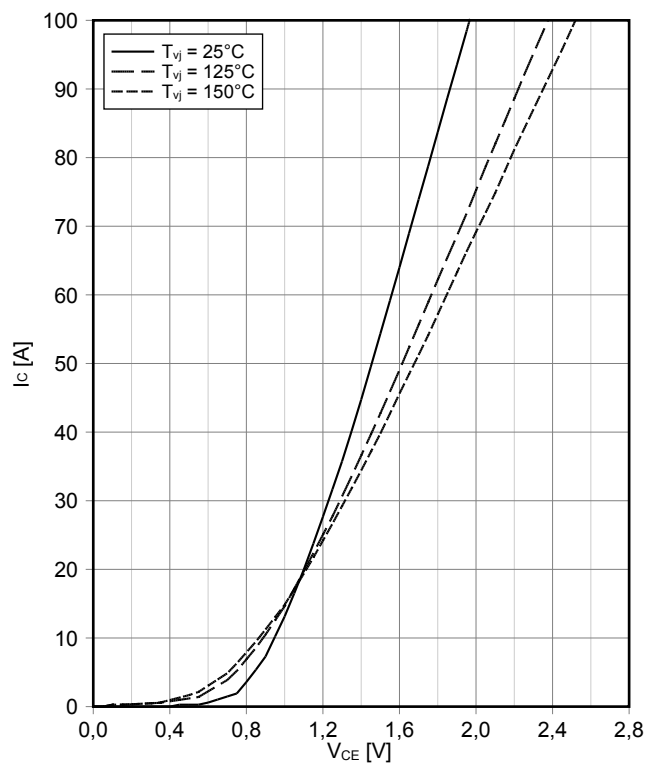
**模块 / Module**

|                                                                   |                                                                    |                   |                                |        |
|-------------------------------------------------------------------|--------------------------------------------------------------------|-------------------|--------------------------------|--------|
| 绝缘测试电压<br>Isolation test voltage                                  | RMS, f = 50 Hz, t = 1 min.                                         | V <sub>ISOL</sub> | 3,0                            | 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                                         | 端子至散热器 / terminal to heatsink<br>端子至端子 / terminal to terminal      |                   | 11,5<br>6,3                    | mm     |
| 电气间隙<br>Clearance                                                 | 端子至散热器 / terminal to heatsink<br>端子至端子 / 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>  | 45                             | nH     |
| 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 25A effektiv pro Anschlusspin begrenzt.  
The current under continuous operation is limited to 25A rms per connector pin

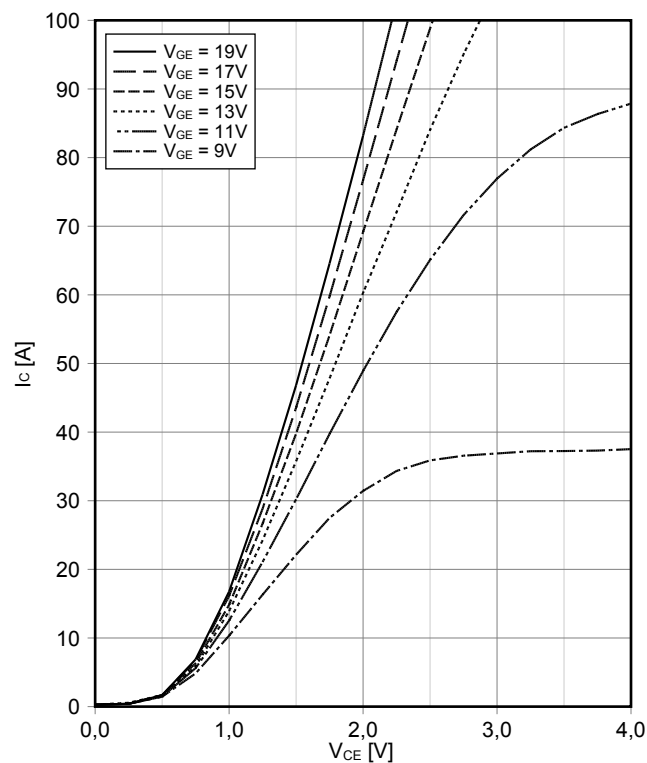
输出特性 IGBT, 逆变器 (典型)  
output characteristic IGBT, Inverter (typical)

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



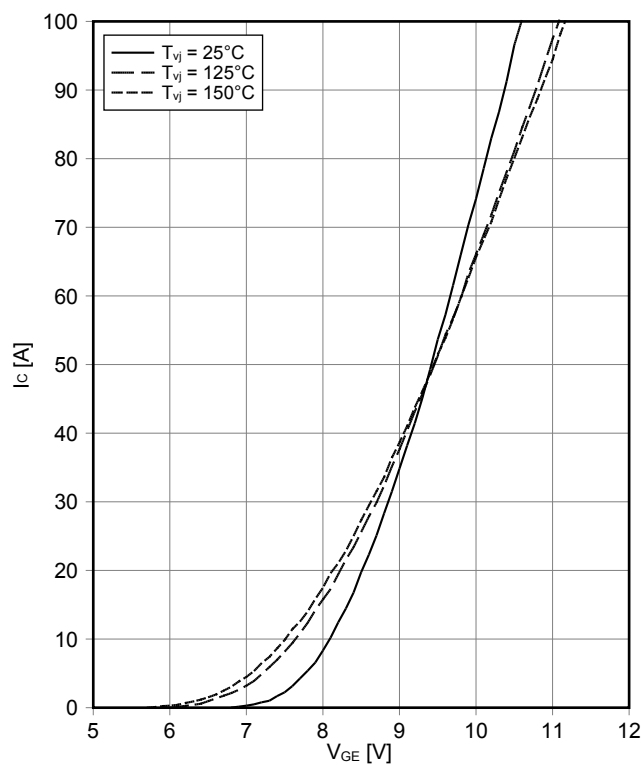
输出特性 IGBT, 逆变器 (典型)  
output characteristic IGBT, Inverter (typical)

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



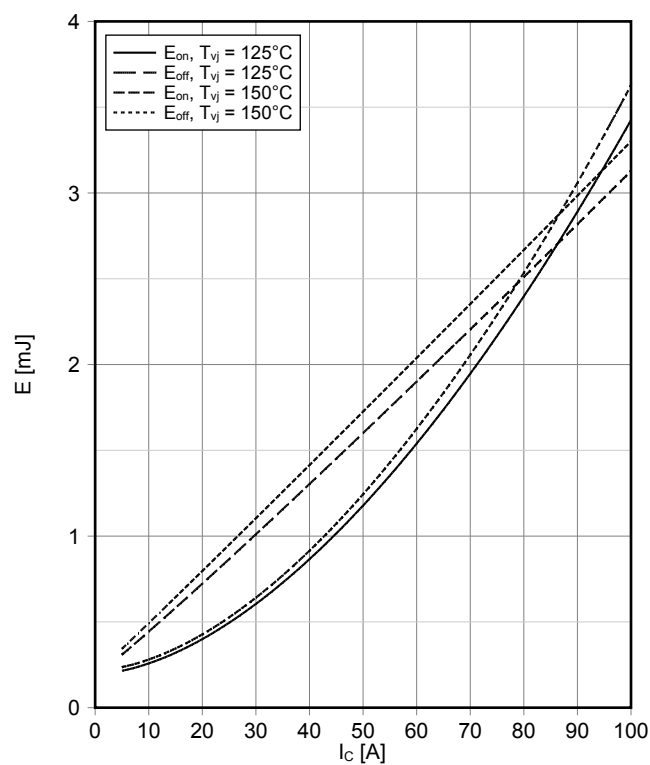
传输特性 IGBT, 逆变器 (典型)  
transfer characteristic IGBT, Inverter (typical)

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



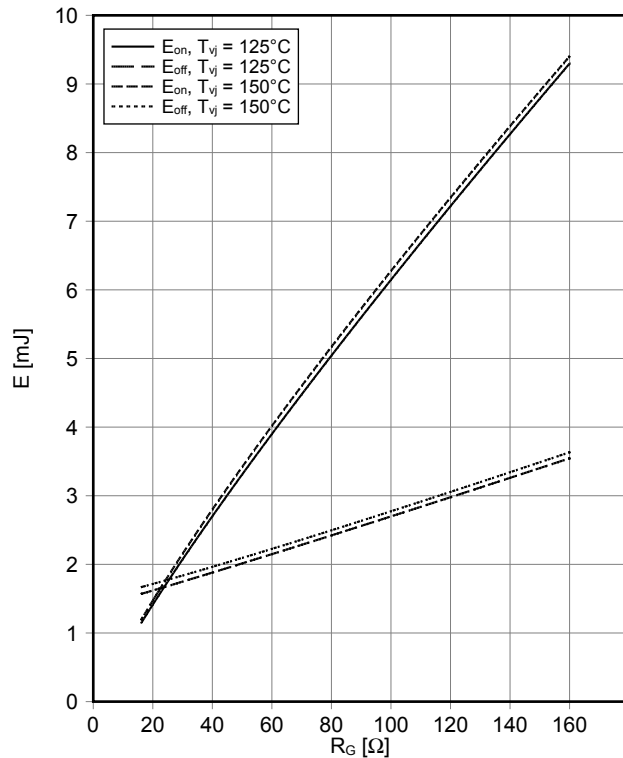
开关损耗 IGBT, 逆变器 (典型)  
switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15\text{ V}$ ,  $R_{Gon} = 16\ \Omega$ ,  $R_{Goff} = 16\ \Omega$ ,  $V_{CE} = 300\text{ V}$



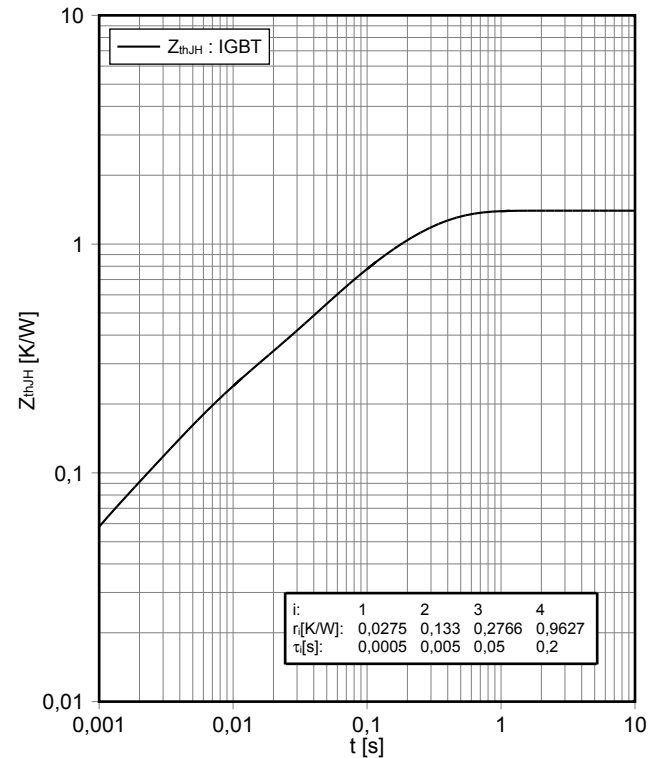
## 开关损耗 IGBT, 逆变器 (典型) switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 50 \text{ A}$ ,  $V_{CE} = 300 \text{ V}$



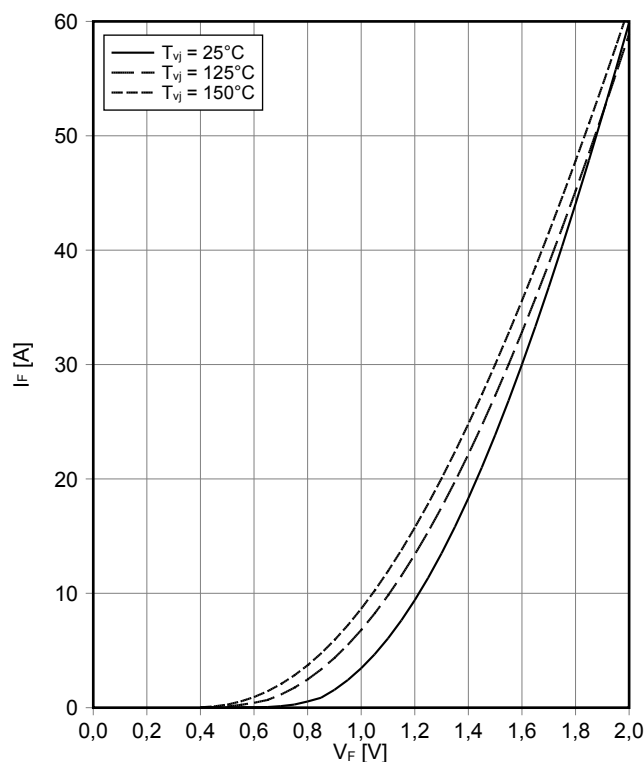
## 瞬态热阻抗 IGBT, 逆变器 transient thermal impedance IGBT, Inverter

$Z_{thJH} = f(t)$



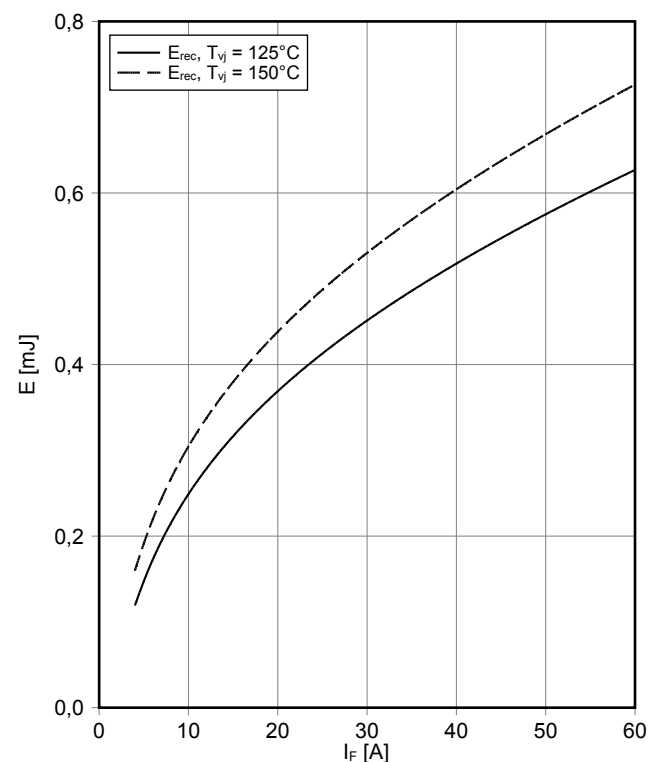
## 正向偏压特性 二极管, 逆变器 (典型) forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$

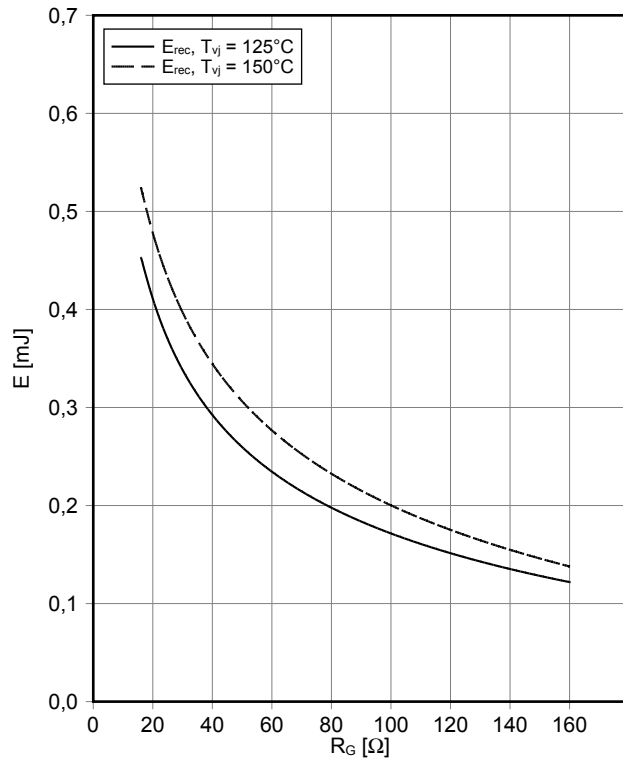


## 开关损耗 二极管, 逆变器 (典型) switching losses Diode, Inverter (typical)

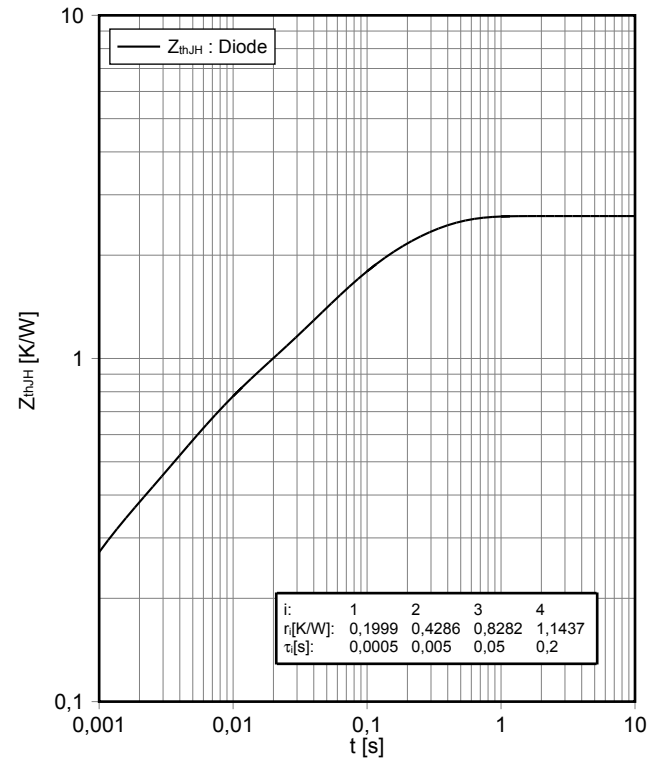
$E_{rec} = f(I_F)$   
 $R_{Gon} = 16 \Omega$ ,  $V_{CE} = 300 \text{ V}$



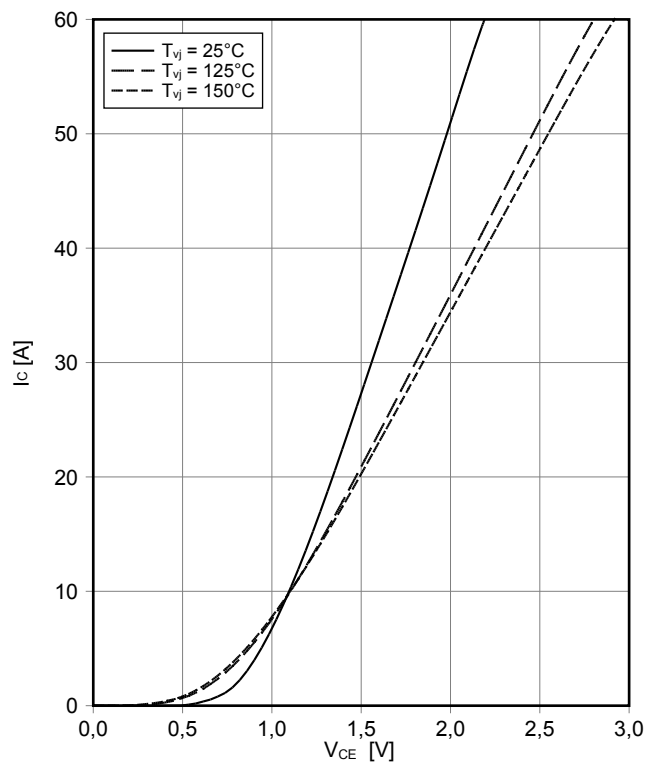
开关损耗 二极管,逆变器 (典型)  
switching losses Diode, Inverter (typical)  
 $E_{rec} = f(R_G)$   
 $I_F = 30\text{ A}$ ,  $V_{CE} = 300\text{ V}$



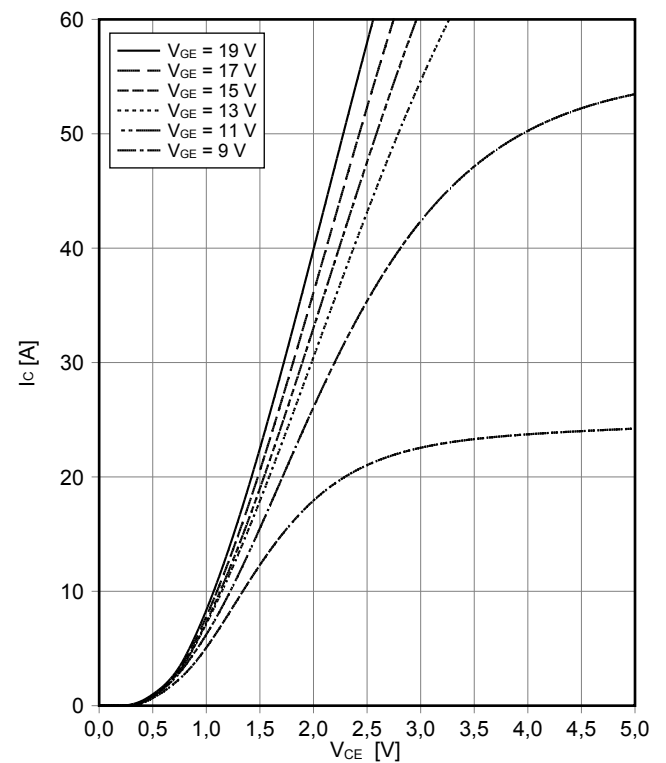
瞬态热阻抗 二极管,逆变器  
transient thermal impedance Diode, Inverter  
 $Z_{thJH} = f(t)$



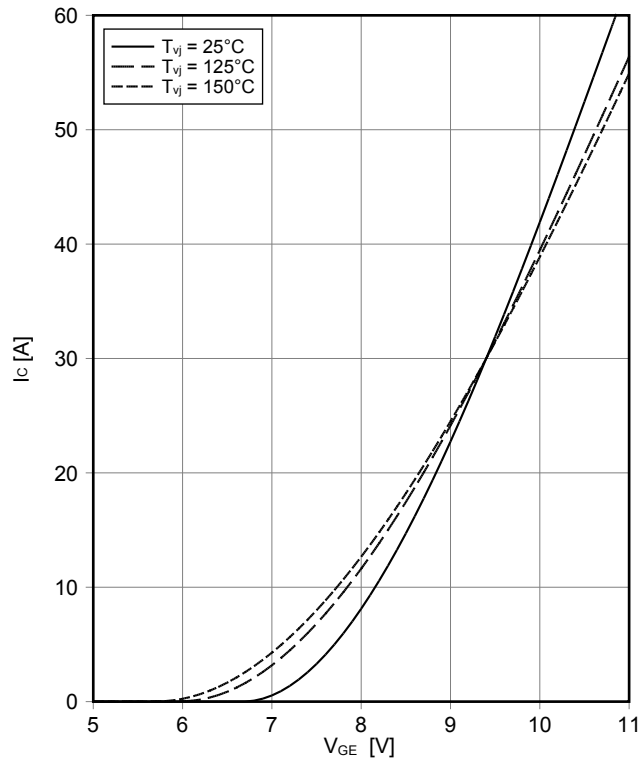
输出特性 IGBT, 三电平 (典型)  
output characteristic IGBT,3-Level (typical)  
 $I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$



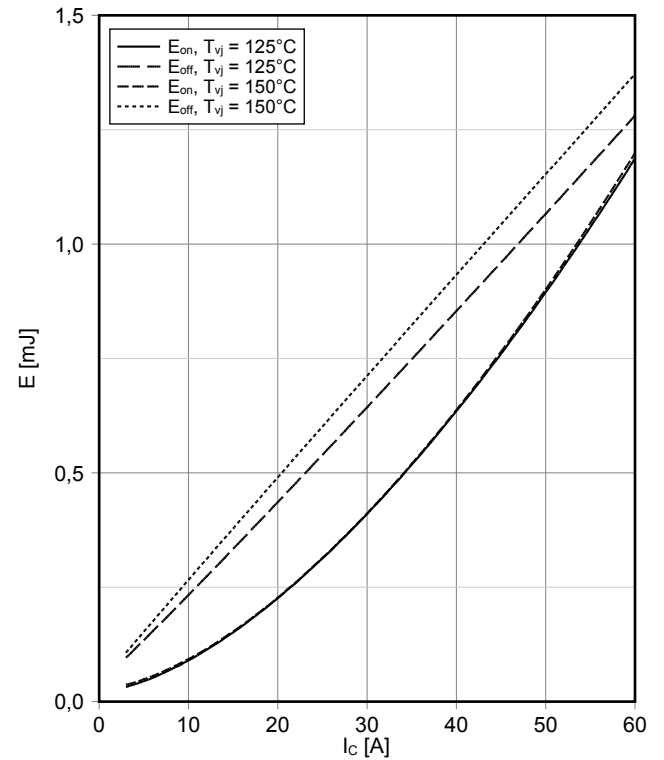
输出特性 IGBT, 三电平 (典型)  
output characteristic IGBT,3-Level (typical)  
 $I_C = f(V_{CE})$   
 $T_{vj} = 150^\circ\text{C}$



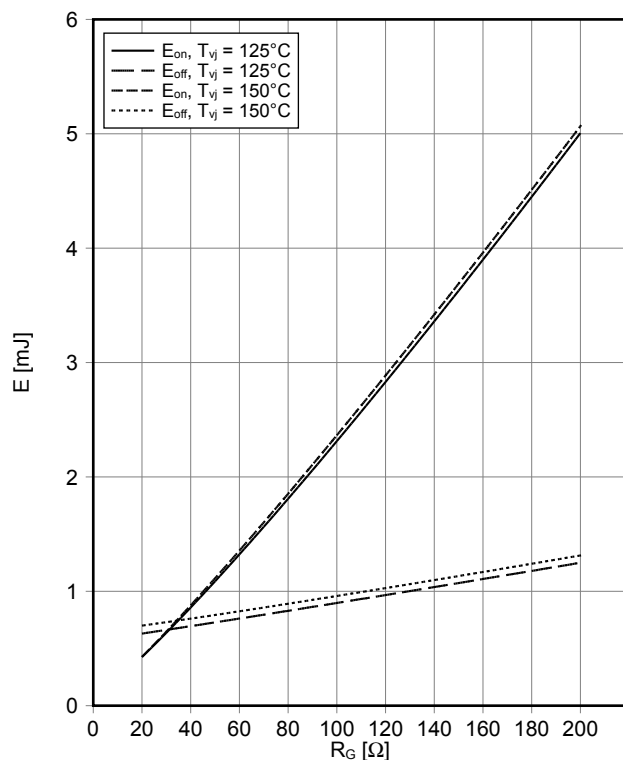
**传输特性 IGBT, 三电平 (典型)**  
**transfer characteristic IGBT, 3-Level (typical)**  
 $I_C = f(V_{GE})$   
 $V_{CE} = 20 \text{ V}$



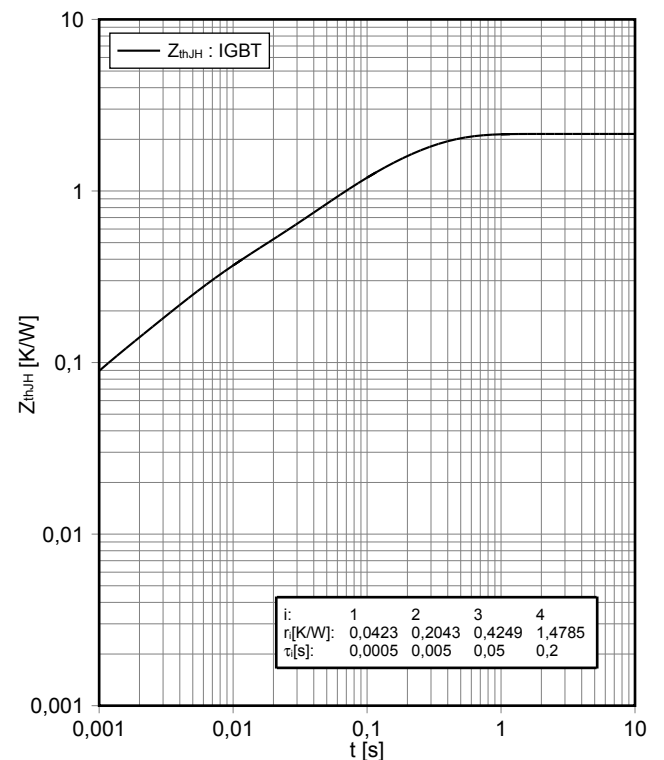
**开关损耗 IGBT, 三电平 (典型)**  
**switching losses IGBT, 3-Level (typical)**  
 $E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Gon} = 20 \Omega$ ,  $R_{Goff} = 20 \Omega$ ,  $V_{CE} = 300 \text{ V}$



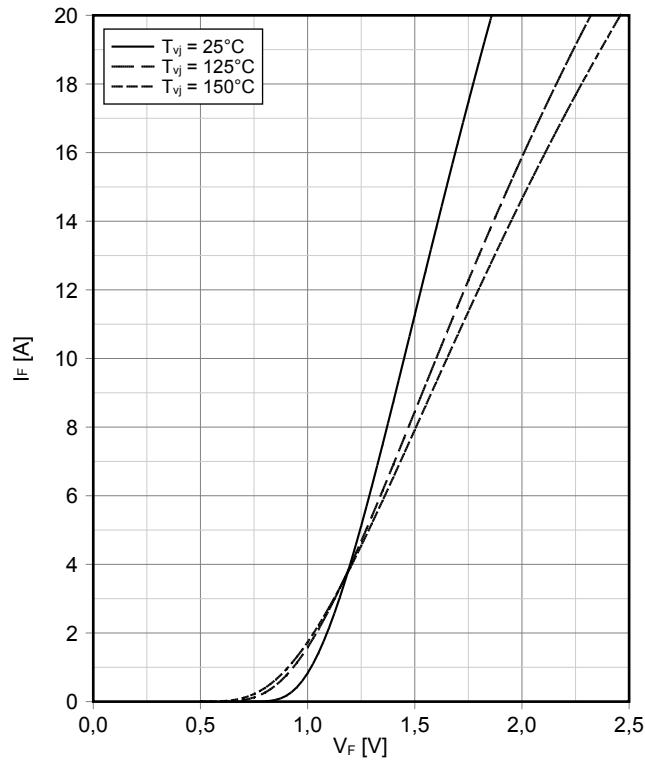
**开关损耗 IGBT, 三电平 (典型)**  
**switching losses IGBT, 3-Level (typical)**  
 $E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 30 \text{ A}$ ,  $V_{CE} = 300 \text{ V}$



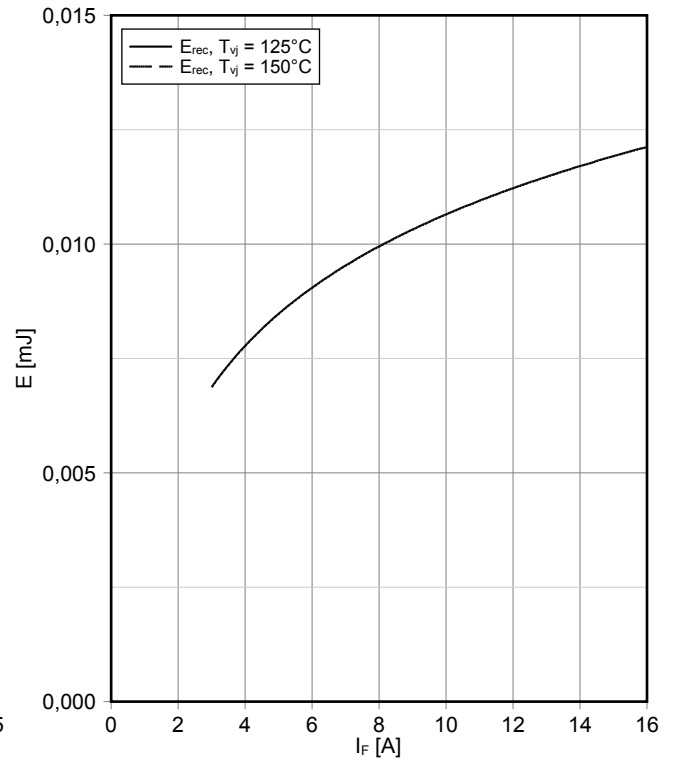
**瞬态热阻抗 IGBT, 三电平**  
**transient thermal impedance IGBT, 3-Level**  
 $Z_{thJH} = f(t)$



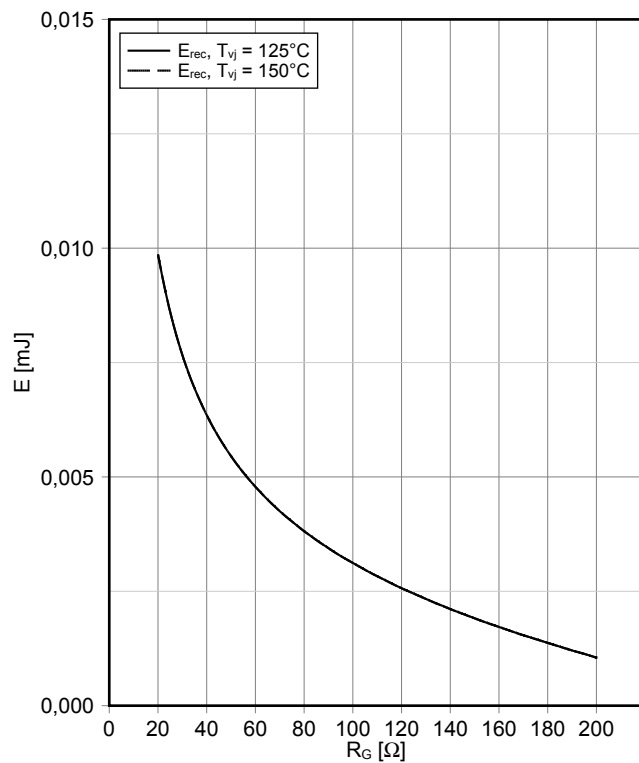
正向偏压特性 二极管, 三电平 (典型)  
forward characteristic of Diode, 3-Level (typical)  
 $I_F = f(V_F)$



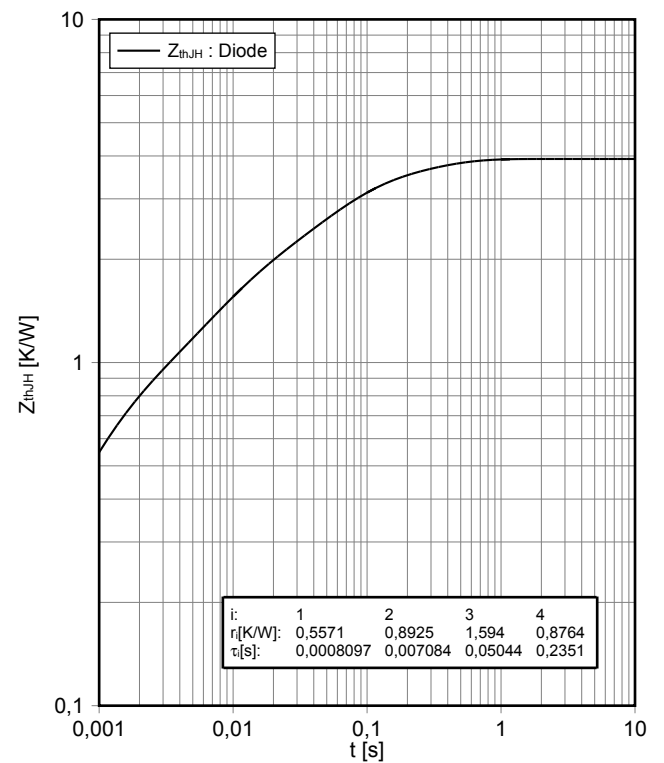
开关损耗 二极管, 三电平 (典型)  
switching losses Diode, 3-Level (typical)  
 $E_{rec} = f(I_F)$   
 $R_{Gon} = 20\ \Omega$ ,  $V_{CE} = 300\ \text{V}$



开关损耗 二极管, 三电平 (典型)  
switching losses Diode, 3-Level (typical)  
 $E_{rec} = f(R_G)$   
 $I_F = 8\ \text{A}$ ,  $V_{CE} = 300\ \text{V}$



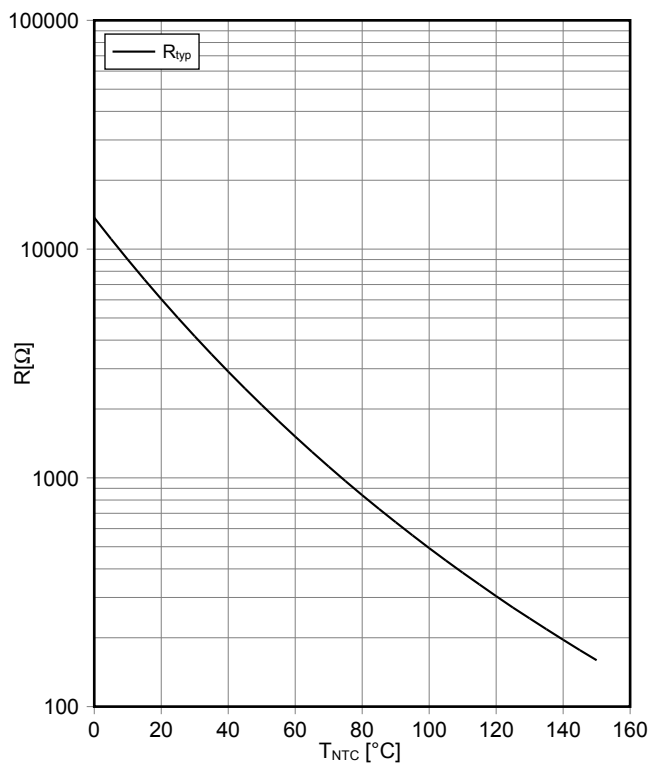
瞬态热阻抗 二极管, 三电平  
transient thermal impedance Diode, 3-Level  
 $Z_{thJH} = f(t)$



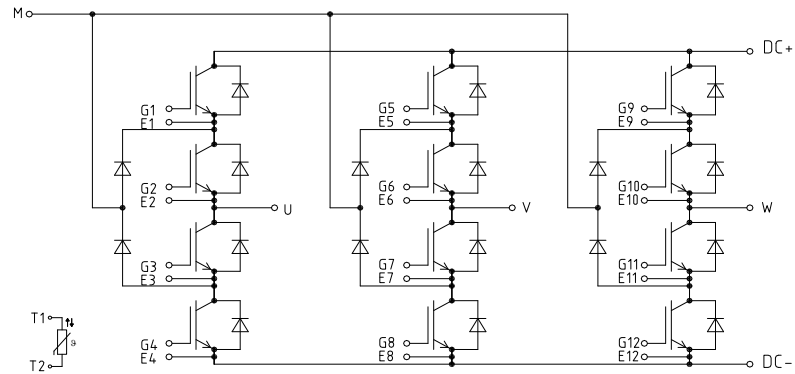
负温度系数热敏电阻 温度特性

NTC-Thermistor-temperature characteristic (typical)

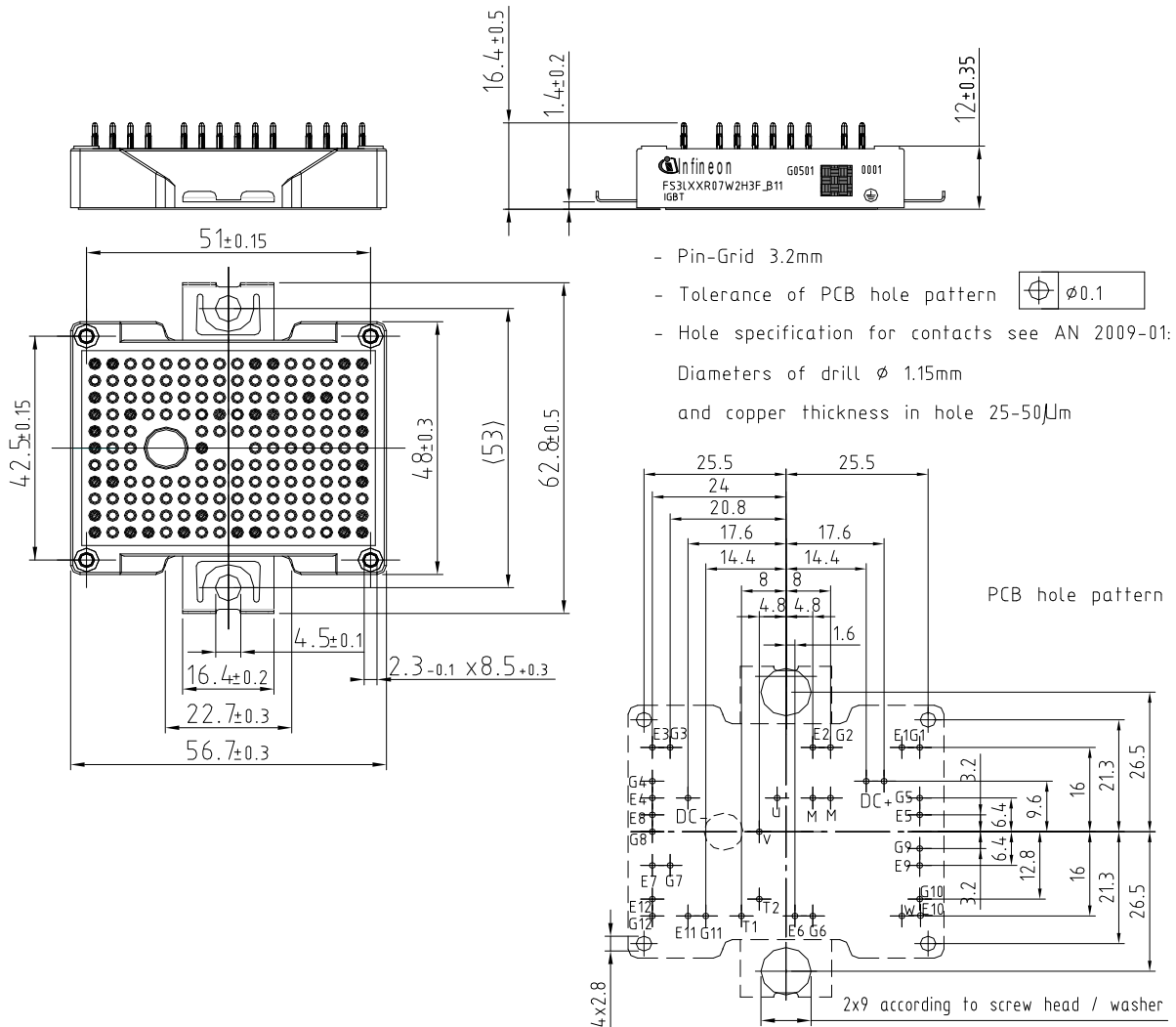
$R = f(T)$



## 接线图 / Circuit diagram



## 封装尺寸 / Package outlines



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