

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

初步数据 / Preliminary Data



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

典型应用

- 辅助逆变器
- 空调
- 电机传动

Typical Applications

- Auxiliary Inverters
- Air Conditioning
- Motor Drives

电气特性

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

Electrical Features

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

机械特性

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

Mechanical Features

- Al_2O_3 Substrate with Low Thermal Resistance
- Compact design
- Solder 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 |

| | | |
|-----------------|---------------------------------|----------------------|
| prepared by: DK | date of publication: 2013-10-03 | |
| approved by: MB | revision: 2.2 | UL approved (E83335) |

初步数据
Preliminary Data

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 | $T_{vj} = 25^{\circ}\text{C}$ | V_{CES} | 1200 | V |
| 连续集电极直流电流 Continuous DC collector current | $T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$ I_C | 15 28 | A A |
| 集电极重复峰值电流 Repetitive peak collector current | $t_P = 1\text{ ms}$ | I_{CRM} | 30 | A |
| 总功率损耗 Total power dissipation | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175$ | P_{tot} | 130 | W |
| 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 | $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,85 2,15 2,25 | 2,25 | V V V | |
| 栅极阈值电压 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 Gate charge | $V_{GE} = -15\text{ V} \dots +15\text{ V}$ | | Q_G | 0,12 | | | μC |
| 内部栅极电阻 Internal gate resistor | $T_{vj} = 25^{\circ}\text{C}$ | | R_{Gint} | 0,0 | | | Ω |
| 输入电容 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 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 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 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) Turn-on delay time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_{don} | 0,055 0,055 0,055 | | | μs μs μs |
| 上升时间(电感负载) Rise time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_r | 0,059 0,065 0,065 | | | μs μs μs |
| 关断延迟时间(电感负载) Turn-off delay time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_{doff} | 0,195 0,275 0,28 | | | μs μs μs |
| 下降时间(电感负载) Fall time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_f | 0,145 0,19 0,215 | | | μs μs μs |
| 开通损耗能量(每脉冲) Turn-on energy loss per pulse | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}, di/dt = 550\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Gon} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{on} | 1,30 1,75 1,95 | | | mJ mJ mJ |
| 关断损耗能量(每脉冲) Turn-off energy loss per pulse | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}, du/dt = 3500\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Goff} = 39\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{off} | 0,83 1,20 1,35 | | | mJ mJ mJ |
| 短路数据 SC data | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$ | | I_{SC} | 55 | | | A |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个 IGBT / per IGBT | | R_{thJC} | 1,05 | 1,15 | | K/W |
| 外壳 - 散热器热阻 Thermal resistance, case to heatsink | 每个 IGBT / per IGBT $\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$ | | R_{thCH} | 1,05 | | | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\text{op}}$ | -40 | | 150 | $^{\circ}\text{C}$ |

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| prepared by: DK | date of publication: 2013-10-03 |
| approved by: MB | revision: 2.2 |

初步数据
Preliminary Data

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 | $T_{vj} = 25^{\circ}\text{C}$ | V_{RRM} | 1200 | V |
| 连续正向直流电流 Continuous DC forward current | | I_F | 15 | A |
| 正向重复峰值电流 Repetitive peak forward current | $t_p = 1\text{ ms}$ | I_{FRM} | 30 | A |
| I ² t-值 I ² t - value | $V_R = 0\text{ V}, t_p = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | I^2t | 16,0 14,0 | A ² s A ² s |

特征值 / Characteristic Values

| | | | min. | typ. | max. | |
|--|--|---|--------------------|----------------------|------|---|
| 正向电压 Forward voltage | $I_F = 15\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 15\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 15\text{ A}, V_{GE} = 0\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | V_F | 2,00 2,10 2,10 | 2,65 | V V V |
| 反向恢复峰值电流 Peak reverse recovery current | $I_F = 15\text{ A}, -di_F/dt = 550\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | I_{RM} | 13,0 12,0 12,0 | | A A A |
| 恢复电荷 Recovered charge | $I_F = 15\text{ A}, -di_F/dt = 550\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | Q_r | 1,20 2,05 2,40 | | μC μC μC |
| 反向恢复损耗 (每脉冲) Reverse recovery energy | $I_F = 15\text{ A}, -di_F/dt = 550\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{rec} | 0,37 0,68 0,80 | | mJ mJ mJ |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个二极管 / per diode | | R_{thJC} | 1,75 | 1,90 | K/W |
| 外壳 - 散热器热阻 Thermal resistance, case to heatsink | 每个二极管 / per diode $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ | | R_{thCH} | 1,30 | | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\text{ op}}$ | -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 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) 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 Maximum RMS current at rectifier output | $T_C = 80^{\circ}\text{C}$ | I_{RMSM} | 30 | A |
| 正向浪涌电流 Surge forward current | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | I_{FSM} | 300 245 | A A |
| I ² t-值 I ² t - value | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | I^2t | 450 300 | A ² s A ² s |

特征值 / Characteristic Values

| | | | min. | typ. | max. | |
|--|---|--|--------------------|------|------|--------------------|
| 正向电压 Forward voltage | $T_{vj} = 150^{\circ}\text{C}, I_F = 15\text{ A}$ | | V_F | 0,85 | | V |
| 反向电流 Reverse current | $T_{vj} = 150^{\circ}\text{C}, V_R = 1600\text{ V}$ | | I_R | 1,00 | | mA |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个二极管 / per diode | | R_{thJC} | 1,20 | 1,35 | K/W |
| 外壳 - 散热器热阻 Thermal resistance, case to heatsink | 每个二极管 / per diode $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ | | R_{thCH} | 1,15 | | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\text{ op}}$ | -40 | 150 | $^{\circ}\text{C}$ |

| | |
|-----------------|---------------------------------|
| prepared by: DK | date of publication: 2013-10-03 |
| approved by: MB | revision: 2.2 |

初步数据
Preliminary Data

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 Collector-emitter voltage | $T_{vj} = 25^{\circ}\text{C}$ | V_{CES} | 1200 | V |
| 连续集电极直流电流 Continuous DC collector current | $T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$ I_C | 15 28 | A A |
| 集电极重复峰值电流 Repetitive peak collector current | $t_P = 1\text{ ms}$ | I_{CRM} | 30 | A |
| 总功率损耗 Total power dissipation | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175$ | P_{tot} | 130 | W |
| 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 | $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 15\text{ A}, V_{GE} = 15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,85 2,15 2,25 | 2,25 | V V V | |
| 栅极阈值电压 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 Gate charge | $V_{GE} = -15\text{ V} \dots +15\text{ V}$ | | Q_G | 0,12 | | | μC |
| 内部栅极电阻 Internal gate resistor | $T_{vj} = 25^{\circ}\text{C}$ | | R_{Gint} | 0,0 | | | Ω |
| 输入电容 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 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 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 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) Turn-on delay time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_{don} | 0,065 0,065 0,065 | | | μs μs μs |
| 上升时间(电感负载) Rise time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_r | 0,06 0,065 0,065 | | | μs μs μs |
| 关断延迟时间(电感负载) Turn-off delay time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_{doff} | 0,21 0,28 0,285 | | | μs μs μs |
| 下降时间(电感负载) Fall time, inductive load | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | t_f | 0,17 0,20 0,225 | | | μs μs μs |
| 开通损耗能量(每脉冲) Turn-on energy loss per pulse | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{on} | 1,35 1,80 2,00 | | | mJ mJ mJ |
| 关断损耗能量(每脉冲) Turn-off energy loss per pulse | $I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 43\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{off} | 0,85 1,20 1,35 | | | mJ mJ mJ |
| 短路数据 SC data | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$ | | I_{SC} | 55 | | | A |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个 IGBT / per IGBT | | R_{thJC} | 1,05 | 1,15 | | K/W |
| 外壳 - 散热器热阻 Thermal resistance, case to heatsink | 每个 IGBT / per IGBT $\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$ | | R_{thCH} | 1,05 | | | K/W |
| 在开关状态下温度 Temperature under switching conditions | | | $T_{vj\text{op}}$ | -40 | | 150 | $^{\circ}\text{C}$ |

| | |
|-----------------|---------------------------------|
| prepared by: DK | date of publication: 2013-10-03 |
| approved by: MB | revision: 2.2 |

初步数据
Preliminary Data

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

特征值 / Characteristic Values

| | | | min. | typ. | max. | |
|--|---|---|--------------------|----------------------|------|---|
| 正向电压 Forward voltage | $I_F = 10\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 10\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 10\text{ A}, V_{GE} = 0\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | V_F | 1,75 1,75 1,75 | 2,25 | V V V |
| 反向恢复峰值电流 Peak reverse recovery current | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | I_{RM} | 12,0 10,0 8,00 | | A A A |
| 恢复电荷 Recovered charge | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | Q_r | 0,90 1,70 1,90 | | μC μC μC |
| 反向恢复损耗 (每脉冲) Reverse recovery energy | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$ | E_{rec} | 0,24 0,52 0,59 | | mJ mJ mJ |
| 结 - 外壳热阻 Thermal resistance, junction to case | 每个二极管 / per diode | | R_{thJC} | 1,75 | 1,90 | K/W |
| 外壳 - 散热器热阻 Thermal resistance, case to heatsink | 每个二极管 / per diode $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ | | R_{thCH} | 1,30 | | K/W |
| 在开关状态下温度 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 Rated resistance | $T_C = 25^{\circ}\text{C}$ | R_{25} | | 5,00 | | k Ω |
| R100 偏差 Deviation of R100 | $T_C = 100^{\circ}\text{C}, R_{100} = 493\ \Omega$ | $\Delta R/R$ | -5 | | 5 | % |
| 耗散功率 Power dissipation | $T_C = 25^{\circ}\text{C}$ | P_{25} | | | 20,0 | mW |
| B-值 B-value | $R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$ | $B_{25/50}$ | | 3375 | | K |
| B-值 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 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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初步数据
Preliminary Data

模块 / Module

| | | | | | |
|---|--|--|--------------------------------|--------------|------------------|
| 绝缘测试电压 Isolation test voltage | RMS, f = 50 Hz, t = 1 min | V _{ISOL} | 2,5 | | kV |
| 内部绝缘 Internal isolation | 基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140) | | Al ₂ O ₃ | | |
| 爬电距离 Creepage distance | 端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal | | 11,5 6,3 | | mm |
| 电气间隙 Clearance | 端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal | | 10,0 5,0 | | 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,端子-芯片 Module lead resistance, terminals - chip | T _c = 25°C, 每个开关 / per switch | R _{CC'+EE'} R _{AA'+CC'} | | 8,00 6,00 | mΩ |
| 最大结温 Maximum junction temperature | 逆变器,制动-斩波器 / inverter, brake-chopper 整流器 / rectifier | T _{vj max} | | | 175 °C 150 °C |
| 在开关状态下温度 Temperature under switching conditions | 逆变器,制动-斩波器 / inverter, brake-chopper 整流器 / rectifier | T _{vj op} | -40 -40 | | 150 °C 150 °C |
| 储存温度 Storage temperature | | T _{stg} | -40 | | 125 °C |
| Anpresskraft für mech. Bef. pro Feder mounting force per clamp | | F | 20 | - | 50 N |
| 重量 Weight | | G | | 24 | 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.

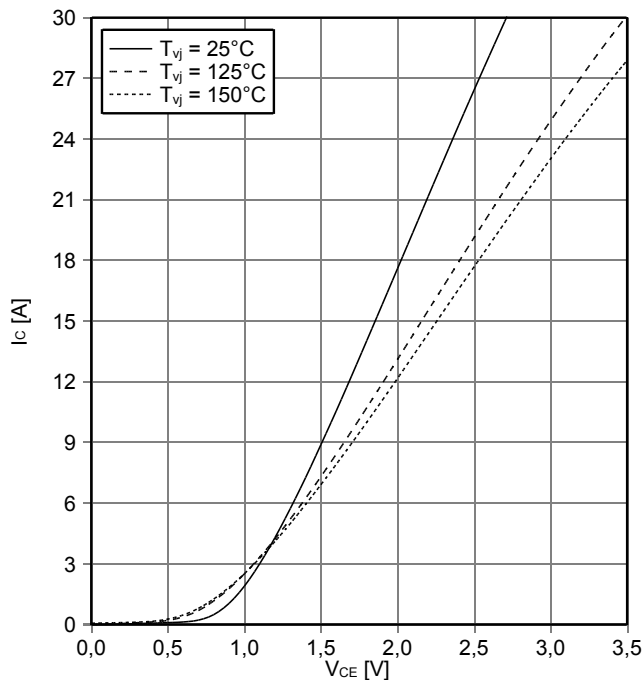
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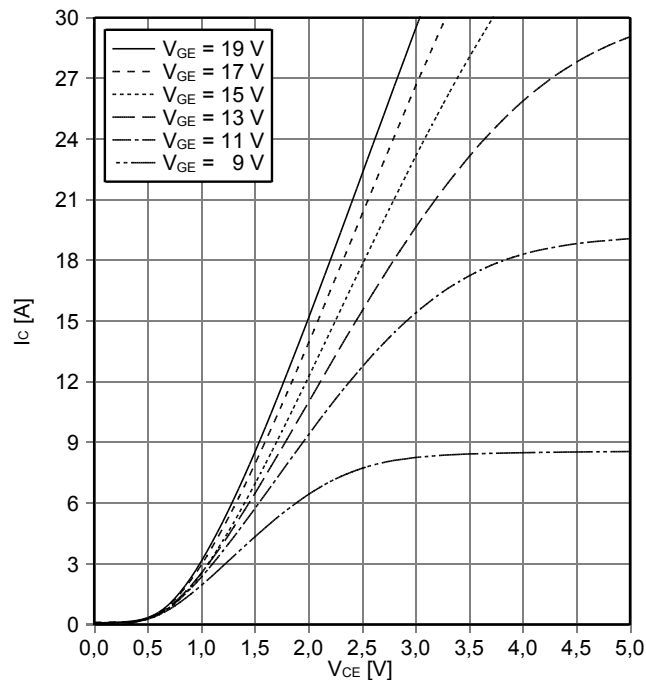
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)

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



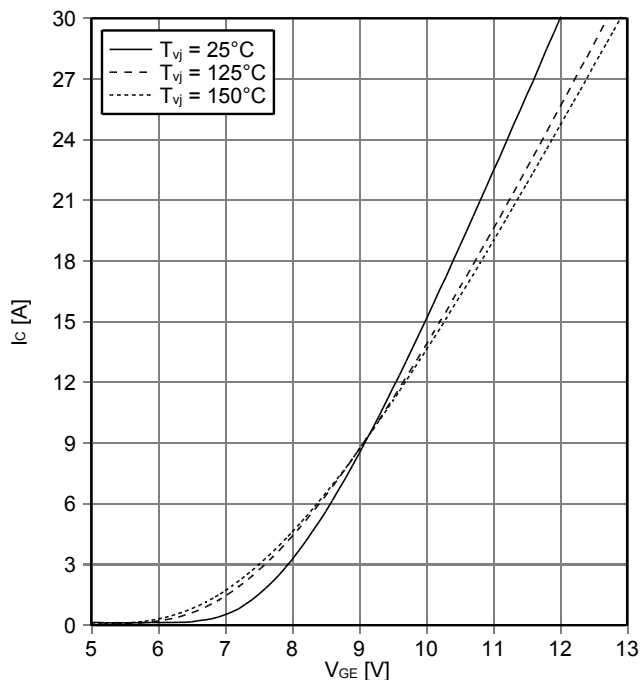
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)

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



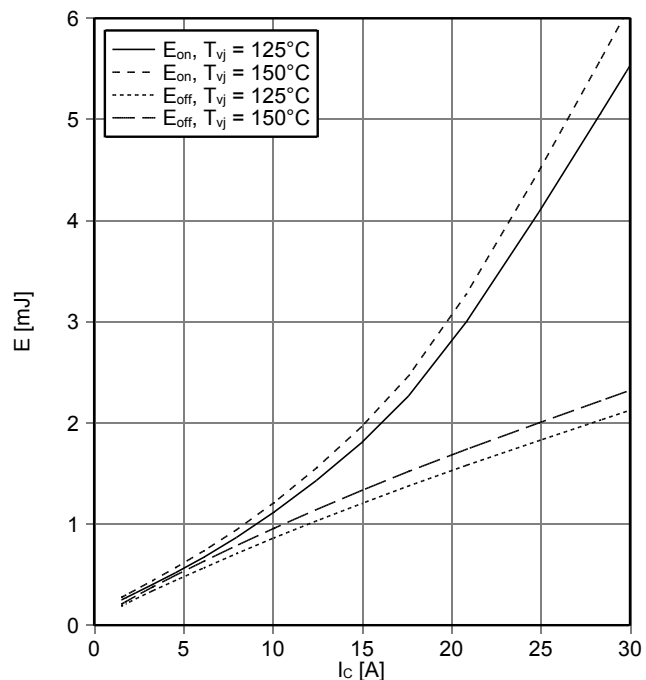
传输特性 IGBT, 逆变器 (典型)
transfer characteristic IGBT, Inverter (typical)

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



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

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

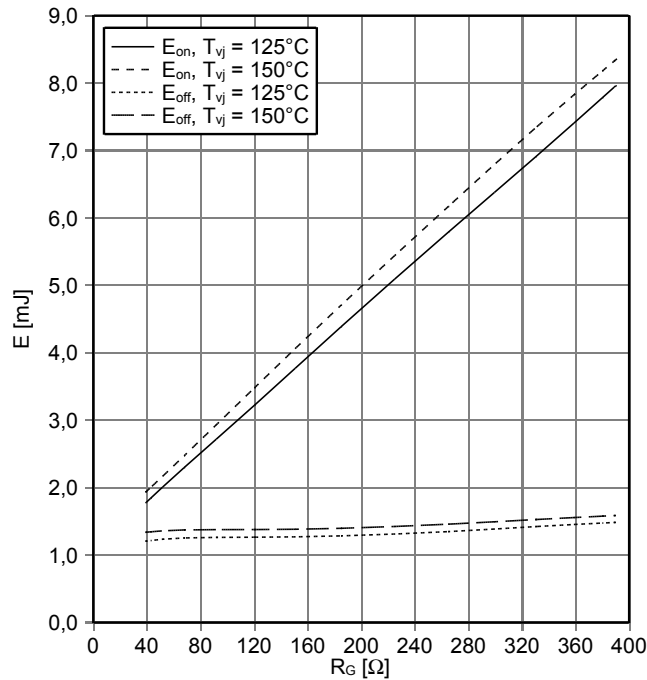


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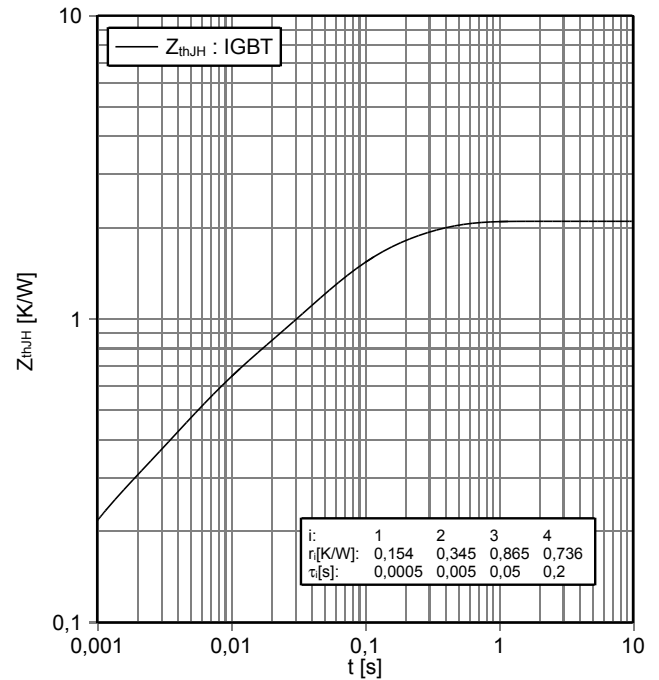
开关损耗 IGBT, 逆变器 (典型)
switching losses IGBT, Inverter (typical)

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



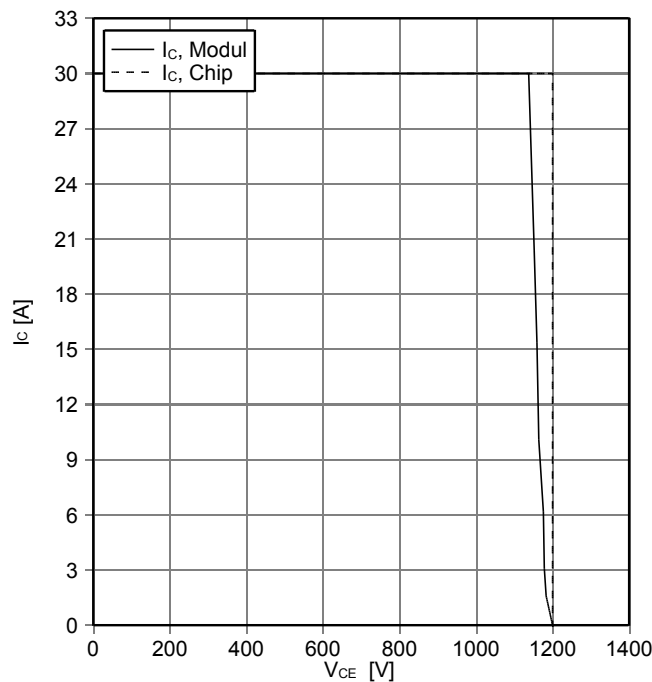
瞬态热阻抗 IGBT, 逆变器
transient thermal impedance IGBT, Inverter

$Z_{thJH} = f(t)$



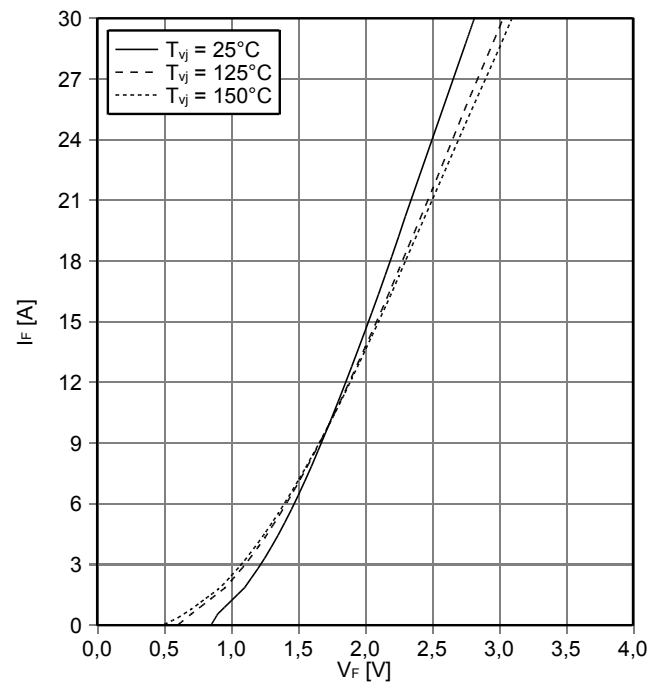
反偏安全工作区 IGBT, 逆变器 (RBSOA)
reverse bias safe operating area IGBT, Inverter (RBSOA)

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



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

$I_F = f(V_F)$

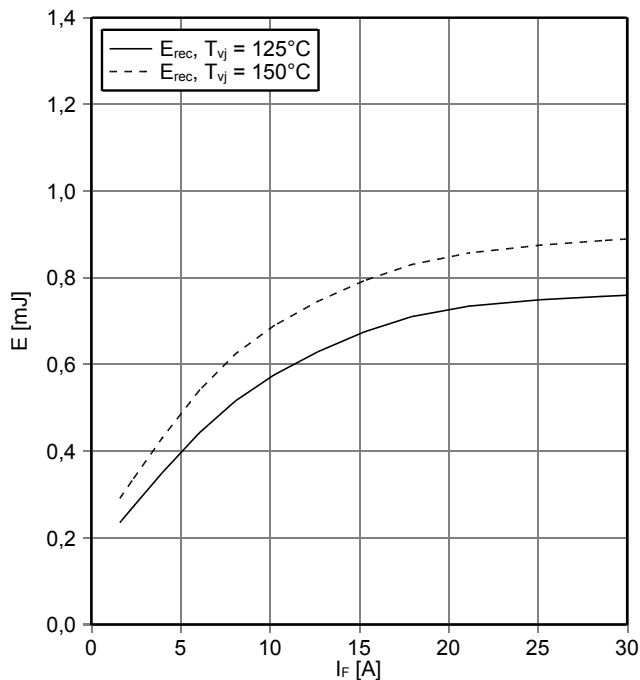


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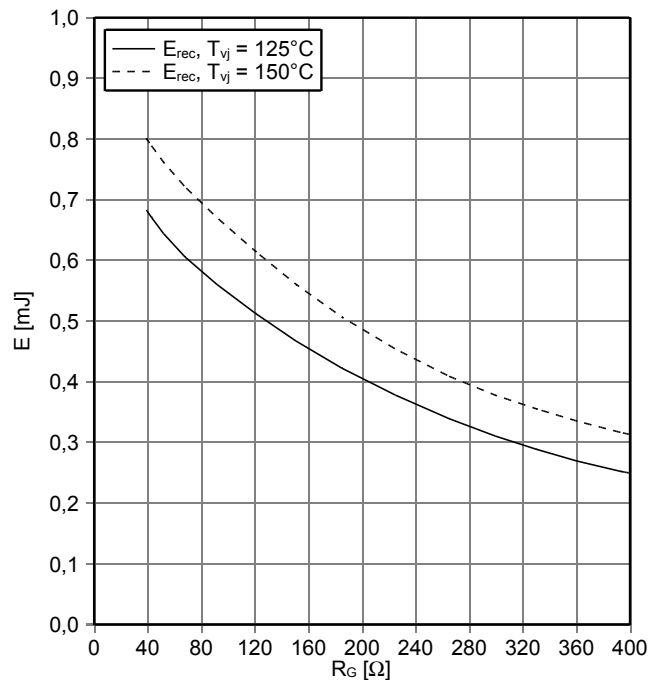
开关损耗 二极管, 逆变器 (典型)
switching losses Diode, Inverter (typical)

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



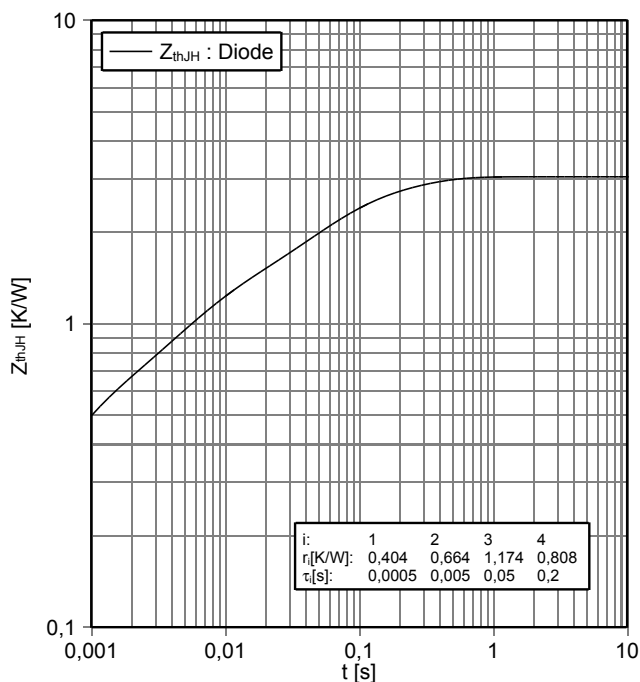
开关损耗 二极管, 逆变器 (典型)
switching losses Diode, Inverter (typical)

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



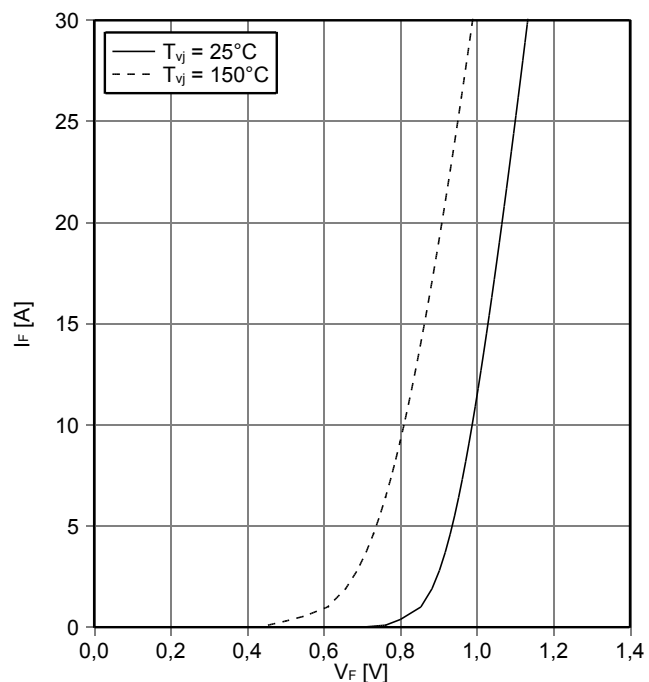
瞬态热阻抗 二极管, 逆变器
transient thermal impedance Diode, Inverter

$Z_{thJH} = f(t)$



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

$I_F = f(V_F)$

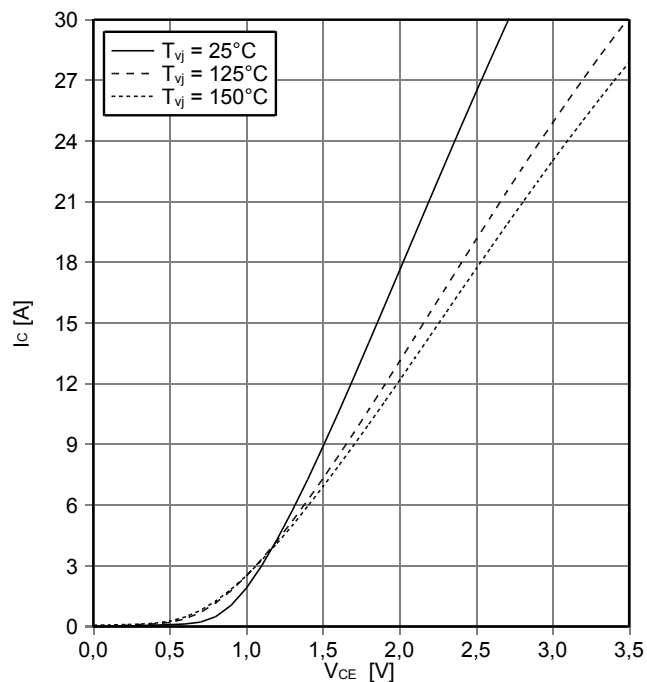


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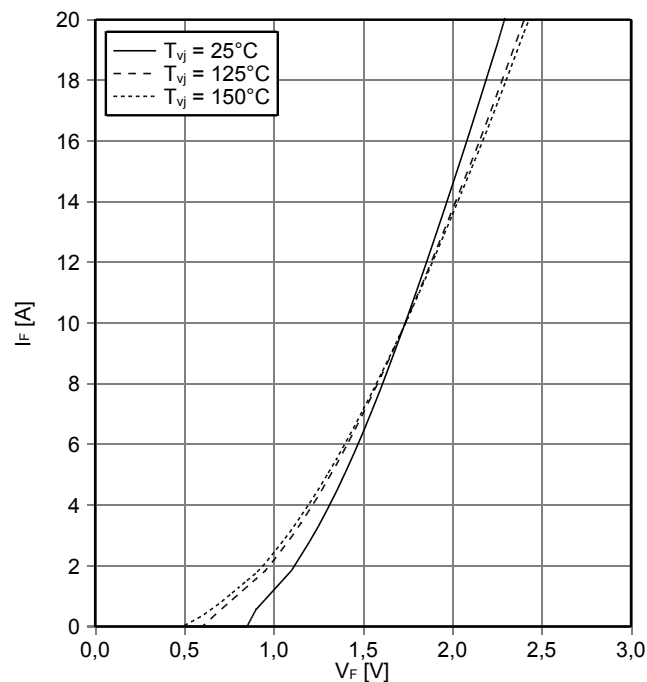
输出特性 IGBT, 制动-斩波器 (典型)
output characteristic IGBT, Brake-Chopper (typical)

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



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

$I_F = f(V_F)$



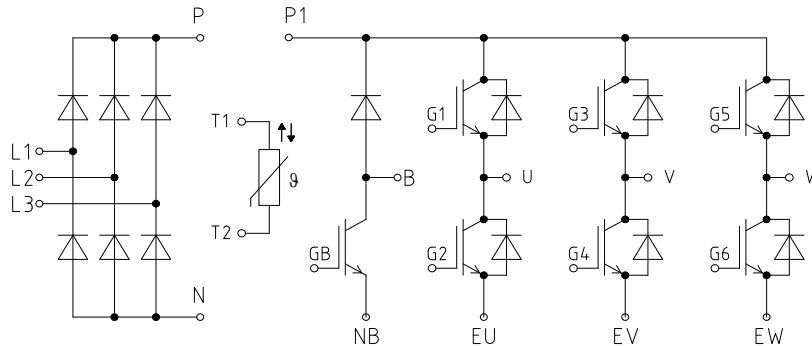
负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$

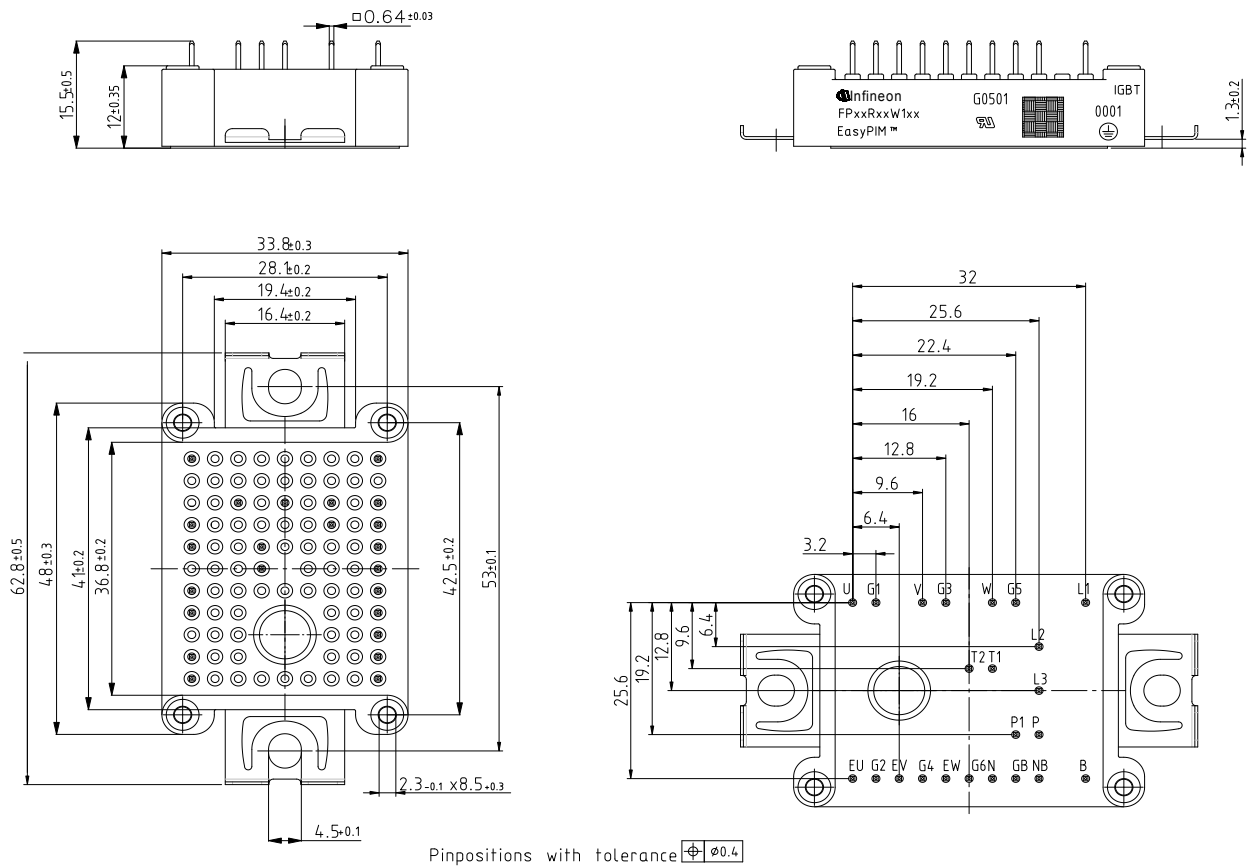


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接线图 / circuit_diagram_headline



封装尺寸 / package outlines



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使用条件和条款

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