

PrimePACK™2 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  
PrimePACK™2 module with Trench/Fieldstop IGBT4 and Emitter Controlled 4 diode and NTC

## 初步数据 / Preliminary Data



$V_{CES} = 1200V$   
 $I_{C\ nom} = 450A / I_{CRM} = 900A$

## 典型应用

- 电机传动
- 谐振逆变器应用
- 牵引变流器
- UPS系统
- 风力发电机

## Typical Applications

- Motor Drives
- Resonant Inverter Applications
- Traction Drives
- UPS Systems
- Wind Turbines

## 电气特性

- 提高工作结温  $T_{vj\ op}$
- 高直流电压稳定性
- 高短路能力，自限制短路电流
- 低开关损耗
- 无与伦比的坚固性
- $V_{CESat}$  带正温度系数

## Electrical Features

- Extended Operation Temperature  $T_{vj\ op}$
- High DC Stability
- High Short Circuit Capability, Self Limiting Short Circuit Current
- Low Switching Losses
- Unbeatable Robustness
- $V_{CESat}$  with positive Temperature Coefficient

## 机械特性

- 4 kV 交流 1分钟 绝缘
- 封装的 CTI > 400
- 高爬电距离和电气间隙
- 高功率循环和温度循环能力
- 高功率密度
- 低热阻衬底

## Mechanical Features

- 4 kV AC 1min Insulation
- Package with CTI > 400
- High Creepage and Clearance Distances
- High Power and Thermal Cycling Capability
- High Power Density
- Substrate for Low Thermal Resistance

## Module Label Code

### Barcode Code 128



### DMX - 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: AC | date of publication: 2013-11-05 |  |
| approved by: MS | revision: 2.4                   |  |

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<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   | $T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{ nom}}$ | 450   | A  |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                           | $I_{CRM}$          | 900   | A  |
| 总功率损耗<br>Total power dissipation               | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$  | $P_{\text{tot}}$   | 2,55  | kW |
| 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 | $I_C = 450\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 450\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 450\text{ A}, V_{GE} = 15\text{ V}$                                                            | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{ sat}}$ | 1,75<br>2,05<br>2,10 | 2,05 | V<br>V<br>V                                     |
| 栅极阈值电压<br>Gate threshold voltage                      | $I_C = 16,0\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                              |                                                                                                   | $V_{GEth}$          | 5,2                  | 5,8  | 6,4 V                                           |
| 栅极电荷<br>Gate charge                                   | $V_{GE} = -15\text{ V} \dots +15\text{ V}$                                                                                                                                                        |                                                                                                   | $Q_G$               | 3,20                 |      | $\mu\text{C}$                                   |
| 内部栅极电阻<br>Internal gate resistor                      | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                                                     |                                                                                                   | $R_{Gint}$          | 2,4                  |      | $\Omega$                                        |
| 输入电容<br>Input capacitance                             | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                        |                                                                                                   | $C_{ies}$           | 27,0                 |      | nF                                              |
| 反向传输电容<br>Reverse transfer capacitance                | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                        |                                                                                                   | $C_{res}$           | 1,50                 |      | nF                                              |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current      | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                        |                                                                                                   | $I_{CES}$           |                      | 5,0  | 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    | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 2,5\text{ }\Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{ on}}$   | 0,22<br>0,25<br>0,26 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 上升时间(电感负载)<br>Rise time, inductive load               | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 2,5\text{ }\Omega$                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$               | 0,09<br>0,10<br>0,10 |      | $\mu\text{s}$<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   | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 3,1\text{ }\Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{d\text{ off}}$  | 0,60<br>0,70<br>0,74 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 下降时间(电感负载)<br>Fall time, inductive load               | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 3,1\text{ }\Omega$                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$               | 0,09<br>0,14<br>0,16 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| 开通损耗能量(每脉冲)<br>Turn-on energy loss per pulse          | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}, L_S = 45\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 3700\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 2,5\text{ }\Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$            | 42,0<br>59,0<br>64,0 |      | mJ<br>mJ<br>mJ                                  |
| 关断损耗能量(每脉冲)<br>Turn-off energy loss per pulse         | $I_C = 450\text{ A}, V_{CE} = 600\text{ V}, L_S = 45\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 3100\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 3,1\text{ }\Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$           | 40,0<br>52,0<br>59,0 |      | mJ<br>mJ<br>mJ                                  |
| 短路数据<br>SC data                                       | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$<br>$t_P \leq 10\text{ }\mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                                 |                                                                                                   | $I_{SC}$            | 1800                 |      | A                                               |
| 结 - 外壳热阻<br>Thermal resistance, junction to case      | 每个 IGBT / per IGBT                                                                                                                                                                                |                                                                                                   | $R_{thJC}$          |                      | 59,0 | K/kW                                            |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink    | 每个 IGBT / per IGBT<br>$\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$                                                |                                                                                                   | $R_{thCH}$          | 14,0                 |      | K/kW                                            |
| 在开关状态下温度<br>Temperature under switching conditions    |                                                                                                                                                                                                   |                                                                                                   | $T_{vj\text{ op}}$  | -40                  | 150  | $^{\circ}\text{C}$                              |

prepared by: AC

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approved by: MS

revision: 2.4

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<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   |                                                                                                                                                  | $I_F$     | 450          | A                                              |
| 正向重复峰值电流<br>Repetitive peak forward current | $t_P = 1 \text{ ms}$                                                                                                                             | $I_{FRM}$ | 900          | 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>$V_R = 0 \text{ V}, t_P = 10 \text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I_{2t}$  | 29,0<br>28,0 | $\text{kA}^2\text{s}$<br>$\text{kA}^2\text{s}$ |

特征值 / Characteristic Values

|                                                    |                                                                                                                                                |                                                                                                   | min.        | typ.                 | max. |                                                 |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------|----------------------|------|-------------------------------------------------|
| 正向电压<br>Forward voltage                            | $I_F = 450 \text{ A}, V_{GE} = 0 \text{ V}$<br>$I_F = 450 \text{ A}, V_{GE} = 0 \text{ V}$<br>$I_F = 450 \text{ A}, V_{GE} = 0 \text{ V}$      | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_F$       | 1,90<br>1,85<br>1,80 | 2,30 | V<br>V<br>V                                     |
| 反向恢复峰值电流<br>Peak reverse recovery current          | $I_F = 450 \text{ A}, -di_F/dt = 3800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<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>$T_{vj} = 150^{\circ}\text{C}$ | $I_{RM}$    | 240<br>305<br>335    |      | A<br>A<br>A                                     |
| 恢复电荷<br>Recovered charge                           | $I_F = 450 \text{ A}, -di_F/dt = 3800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<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>$T_{vj} = 150^{\circ}\text{C}$ | $Q_r$       | 40,0<br>80,0<br>90,0 |      | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| 反向恢复损耗 (每脉冲)<br>Reverse recovery energy            | $I_F = 450 \text{ A}, -di_F/dt = 3800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<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>$T_{vj} = 150^{\circ}\text{C}$ | $E_{rec}$   | 19,0<br>33,0<br>36,0 |      | mJ<br>mJ<br>mJ                                  |
| 结 - 外壳热阻<br>Thermal resistance, junction to case   | 每个二极管 / per diode                                                                                                                              |                                                                                                   | $R_{thJC}$  |                      | 105  | K/kW                                            |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink | 每个二极管 / per diode<br>$\lambda_{Paste} = 1 \text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1 \text{ W}/(\text{m}\cdot\text{K})$          |                                                                                                   | $R_{thCH}$  | 25,5                 |      | K/kW                                            |
| 在开关状态下温度<br>Temperature under switching conditions |                                                                                                                                                |                                                                                                   | $T_{vj op}$ | -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 |      | $\text{k}\Omega$ |
| 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.

|                 |                                 |
|-----------------|---------------------------------|
| prepared by: AC | date of publication: 2013-11-05 |
| approved by: MS | revision: 2.4                   |

初步数据  
Preliminary Data

模块 / Module

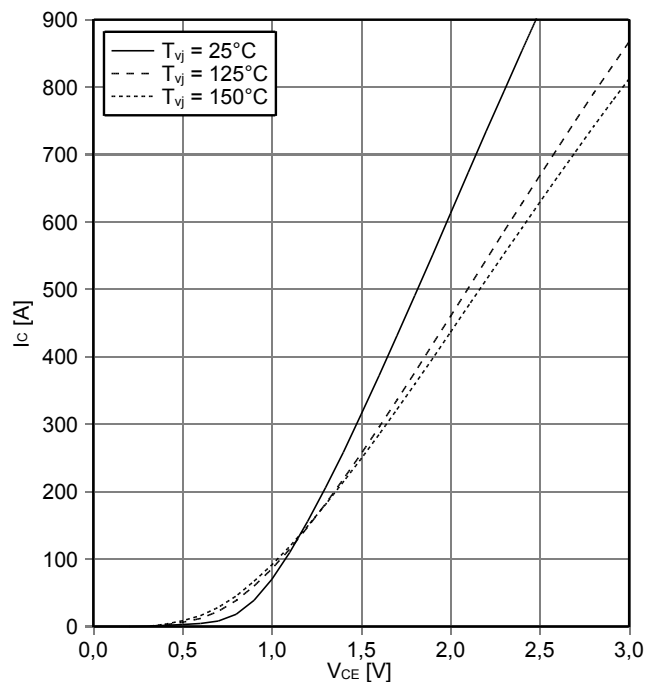
|                                                          |                                                                                                                                                                  |                      |                                |                |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|----------------|
| 绝缘测试电压<br>Isolation test voltage                         | RMS, f = 50 Hz, t = 1 min.                                                                                                                                       | V <sub>ISOL</sub>    | 4,0                            | kV             |
| 模块基板材料<br>Material of module baseplate                   |                                                                                                                                                                  |                      | Cu                             |                |
| 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                                                                                                  |                      | 33,0<br>33,0                   | mm             |
| 电气间隙<br>Clearance                                        | 端子- 散热片 / terminal to heatsink<br>端子- 端子 / terminal to terminal                                                                                                  |                      | 19,0<br>19,0                   | mm             |
| 相对电痕指数<br>Comperative tracking index                     |                                                                                                                                                                  | CTI                  | > 400                          |                |
|                                                          |                                                                                                                                                                  |                      |                                |                |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink       | 每个模块 / per module<br>$\lambda_{\text{Paste}} = 1 \text{ W/(m}\cdot\text{K)} / \lambda_{\text{grease}} = 1 \text{ W/(m}\cdot\text{K)}$                            | R <sub>thCH</sub>    | min. 4,50                      | typ. max. K/kW |
| 杂散电感,模块<br>Stray inductance module                       |                                                                                                                                                                  | L <sub>sCE</sub>     | 18                             | 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> | 0,30                           | mΩ             |
| 储存温度<br>Storage temperature                              |                                                                                                                                                                  | T <sub>stg</sub>     | -40                            | 150 °C         |
| 模块安装的安装扭矩<br>Mounting torque for modul mounting          | 螺丝 M5 根据相应的应用手册进行安装<br>Screw M5 - Mounting according to valid application note                                                                                   | M                    | 3,00                           | - 6,00 Nm      |
| 端子联接扭矩<br>Terminal connection torque                     | 螺丝 M4 根据相应的应用手册进行安装<br>Screw M4 - Mounting according to valid application note<br>螺丝 M8 根据相应的应用手册进行安装<br>Screw M8 - Mounting according to valid application note | M                    | 1,8<br>8,0                     | - 2,1<br>10 Nm |
| 重量<br>Weight                                             |                                                                                                                                                                  | G                    | 825                            | g              |

## 初步数据 Preliminary Data

### 输出特性 IGBT, 逆变器 (典型)

output characteristic IGBT, Inverter (typical)

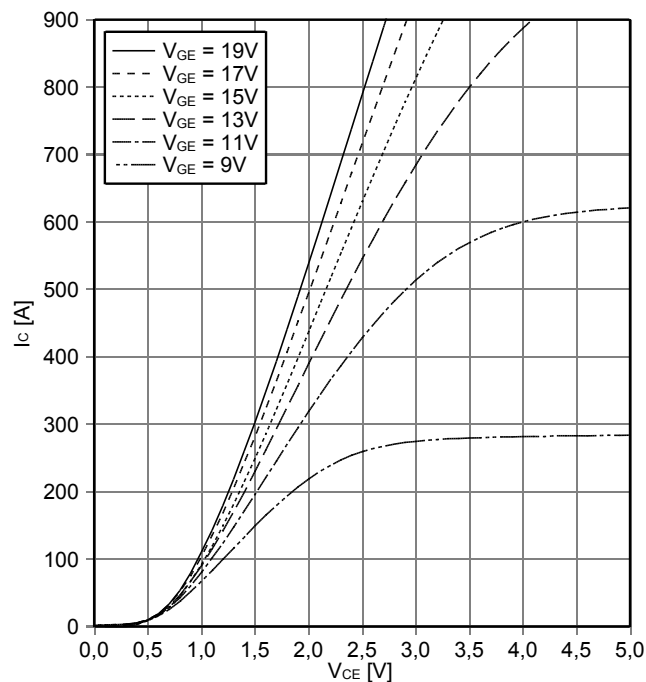
$I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$



### 输出特性 IGBT, 逆变器 (典型)

output characteristic IGBT, Inverter (typical)

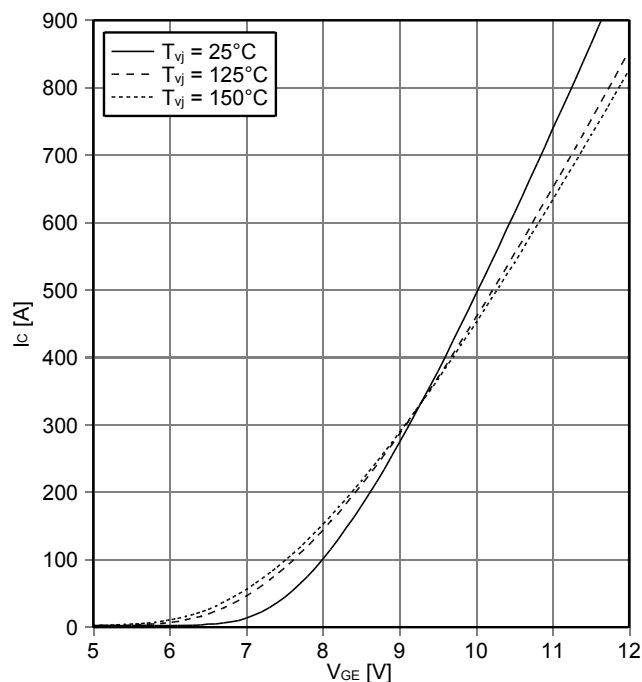
$I_C = f(V_{CE})$   
 $T_{vj} = 150^\circ\text{C}$



### 传输特性 IGBT, 逆变器 (典型)

transfer characteristic IGBT, Inverter (typical)

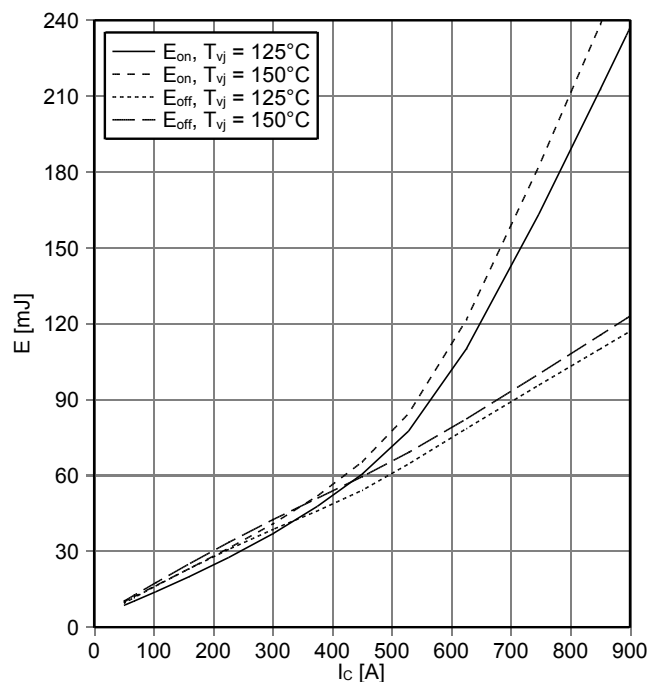
$I_C = f(V_{GE})$   
 $V_{CE} = 20\text{ V}$



### 开关损耗 IGBT, 逆变器 (典型)

switching losses IGBT, Inverter (typical)

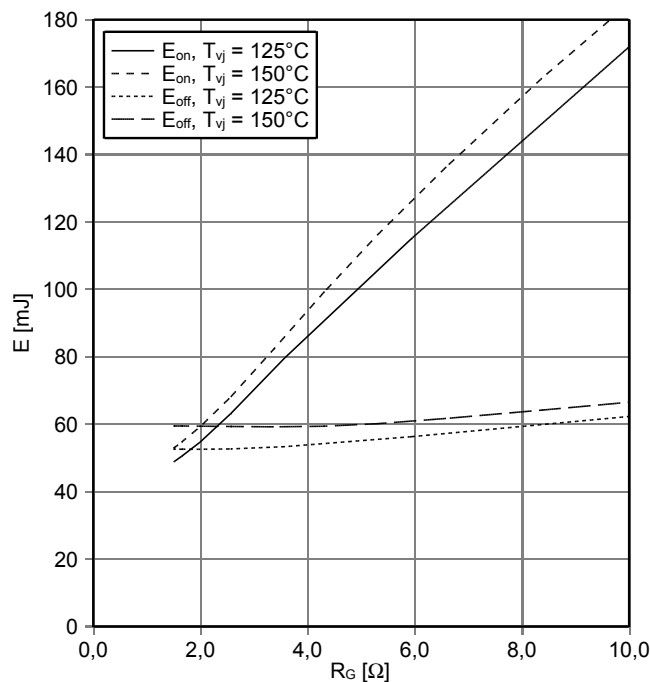
$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15\text{ V}$ ,  $R_{Gon} = 2.5\ \Omega$ ,  $R_{Goff} = 3.1\ \Omega$ ,  $V_{CE} = 600\text{ V}$



初步数据  
Preliminary Data

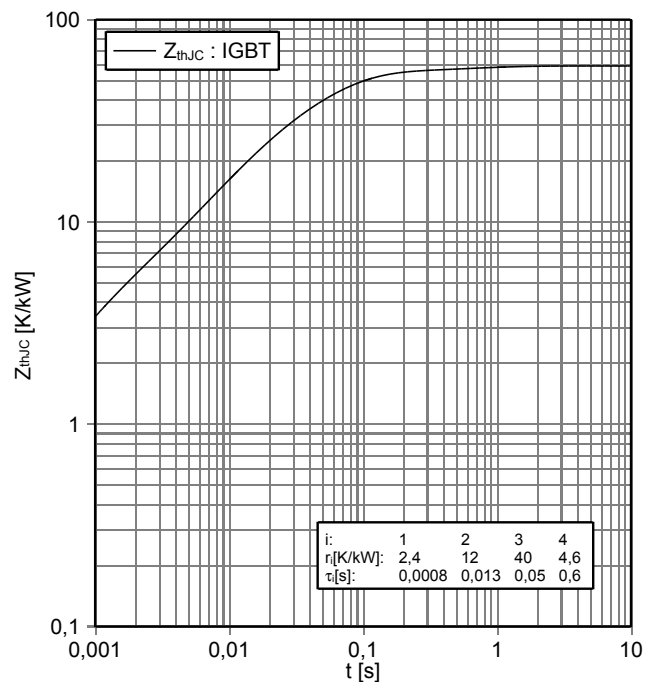
开关损耗 IGBT, 逆变器 (典型)  
switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 450 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$



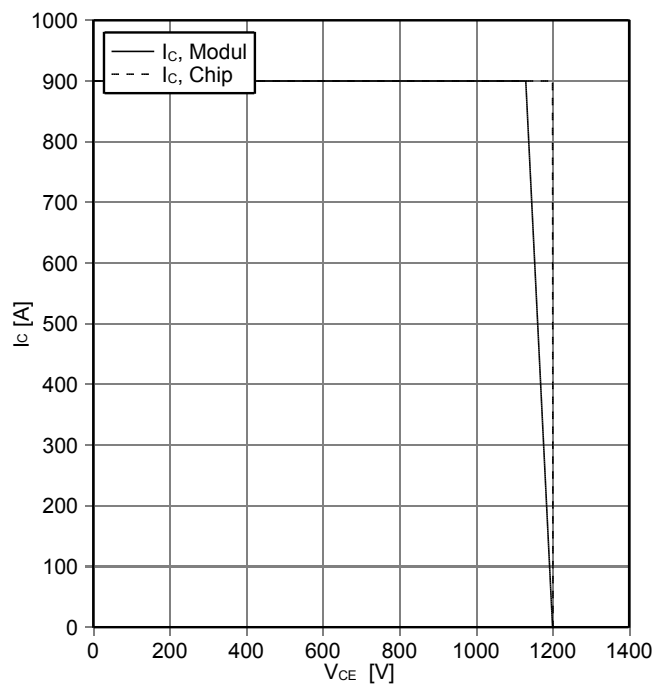
瞬态热阻抗 IGBT, 逆变器  
transient thermal impedance IGBT, Inverter

$Z_{thJC} = f(t)$



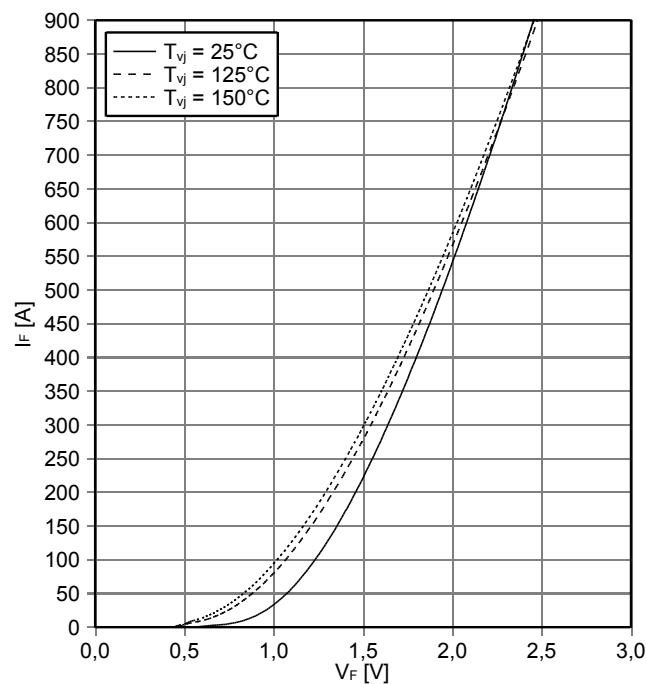
反偏安全工作区 IGBT, 逆变器 (RBSOA)  
reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C = f(V_{CE})$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Goff} = 3.1 \Omega$ ,  $T_{vj} = 150^\circ\text{C}$



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

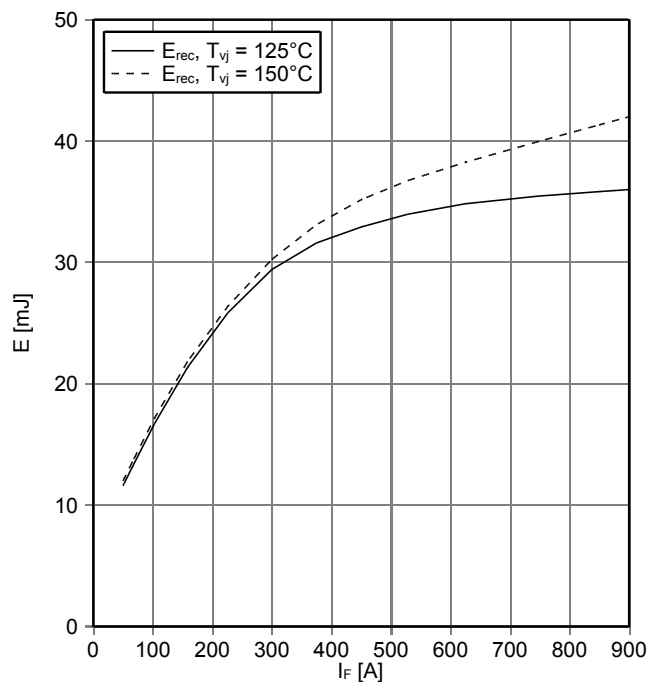
$I_F = f(V_F)$



## 初步数据 Preliminary Data

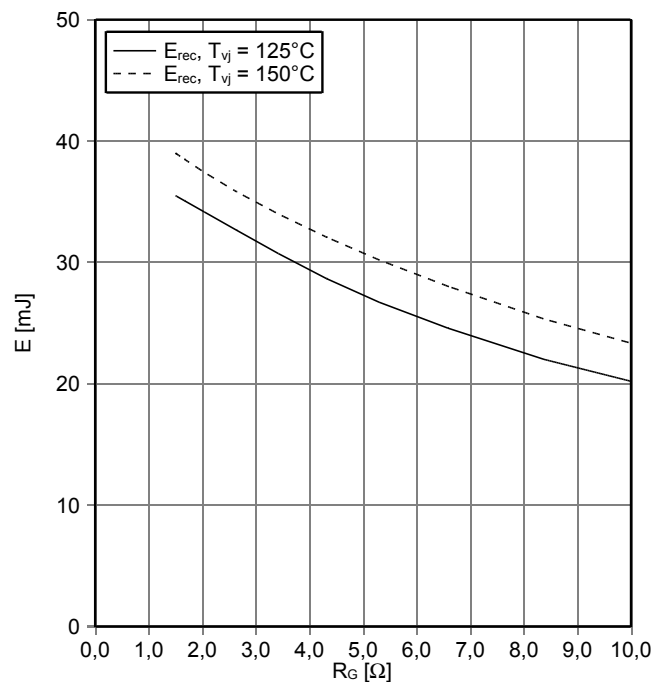
开关损耗 二极管, 逆变器 (典型)  
switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$   
 $R_{Gon} = 2.5 \Omega$ ,  $V_{CE} = 600 V$



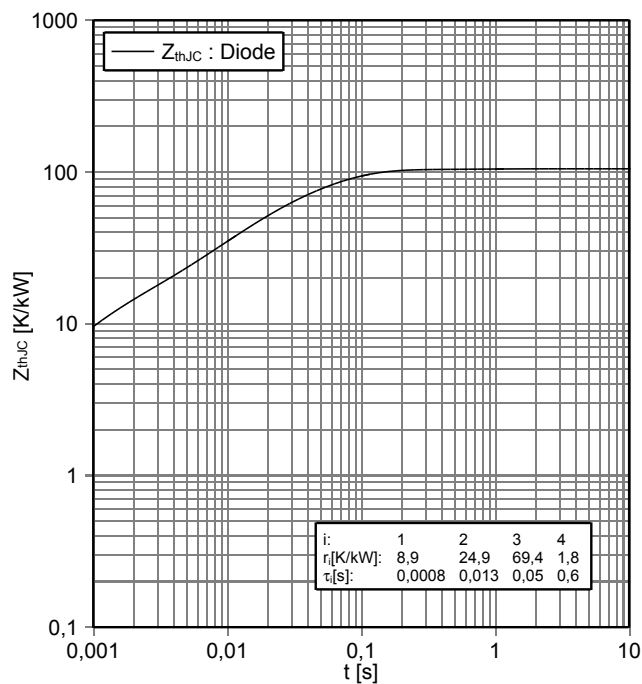
开关损耗 二极管, 逆变器 (典型)  
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$   
 $I_F = 450 A$ ,  $V_{CE} = 600 V$



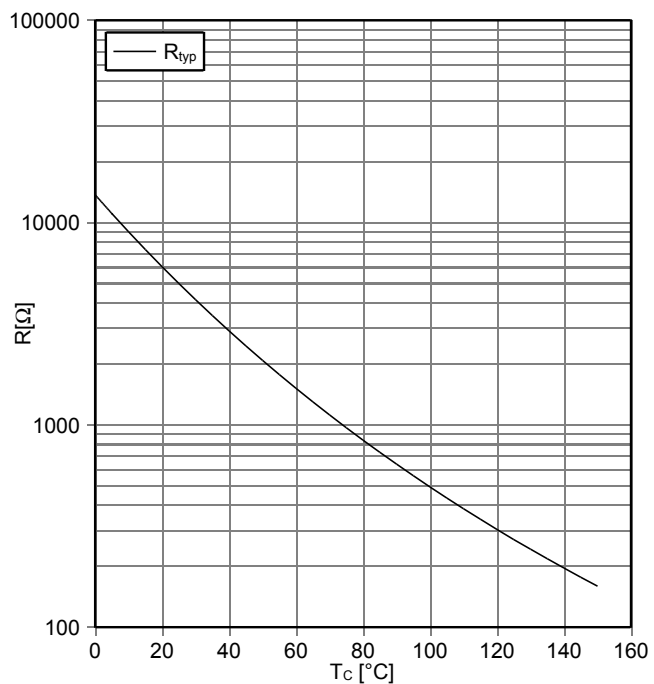
瞬态热阻抗 二极管, 逆变器  
transient thermal impedance Diode, Inverter

$Z_{thJC} = f(t)$



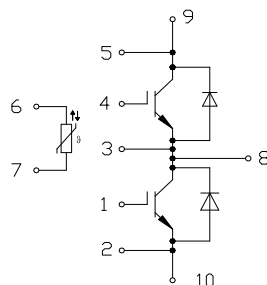
负温度系数热敏电阻 温度特性  
NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$

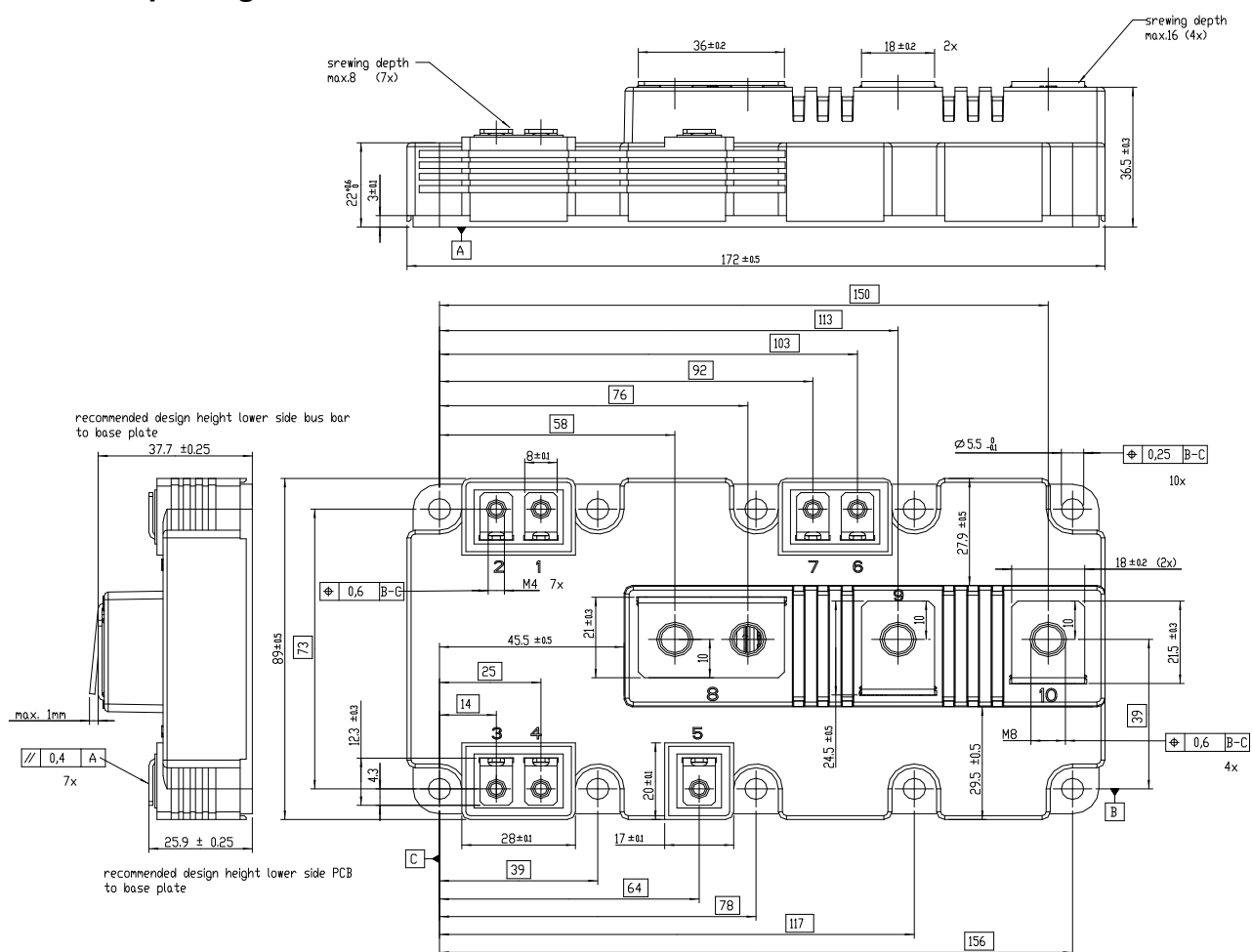


## 初步数据 Preliminary Data

### 接线图 / circuit\_diagram\_headline



## 封裝尺寸 / package outlines



|                 |                                 |
|-----------------|---------------------------------|
| prepared by: AC | date of publication: 2013-11-05 |
| approved by: MS | revision: 2.4                   |

### 初步数据 Preliminary Data

#### 使用条件和条款

##### 使用条件和条款

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-建立联合的测试和出厂产品检查，我们可以根据测试的实际情况供货

如果有必要，请根据实际需要将类似的说明给你的客户

保留产品规格书的修改权

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- to perform joint Risk and Quality Assessments;

- the conclusion of Quality Agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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