



## JT075N120F7PC1E

### 主要参数 MAIN CHARACTERISTICS

|                                      |       |
|--------------------------------------|-------|
| $I_C$                                | 75A   |
| $V_{CES}$                            | 1200V |
| $V_{cesat\_typ}$<br>( $V_{ge}=15V$ ) | 1.9V  |

### 用途

- 辅助逆变器
- 电机传动
- 空调

### APPLICATIONS

- Auxiliary inverter
- Motor Drives
- air conditioning

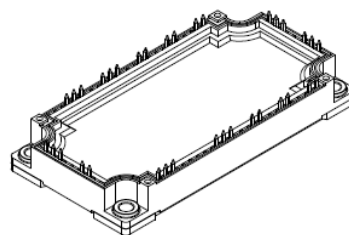
### 产品特性

- FS 技术
- 低通态压降,  $V_{CE(sat)}$ ,  
 $typ = 1.9V, I_C = 75A$  and  
 $T_C = 25^\circ C$
- $V_{CEsat}$  正温度系数
- 低开关损耗

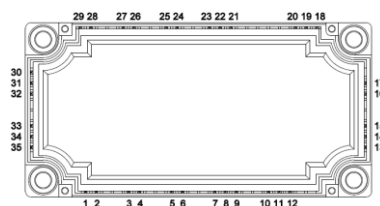
### FEATURES

- FS Technology
- Low saturation voltage:  
 $V_{CE(sat)}, typ = 1.9V, I_C =$   
 $75A$  and  $T_C = 25^\circ C$
- $V_{CEsat}$  with positive  
Temperature Coefficient
- Low Switching Losses

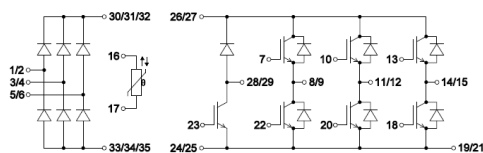
### 封装 Package



外形示意图



引脚示意图



电路示意图

### 订货信息 ORDER MESSAGE

| 订货型号<br>Order codes | 印记<br>Marking   | 封装<br>Package | 包装<br>Packaging | 器件重量<br>Device Weight |
|---------------------|-----------------|---------------|-----------------|-----------------------|
| JT075N120F7PB1E     | JT075N120F7PB1E | EconoPIM3 模块  | 盒装              | 300g(typ)             |



绝对最大额定值 ABSOLUTE RATINGS ( $T_c=25^{\circ}\text{C}$ )

IGBT, 逆变器/ IGBT, Inverter

| 项 目<br>Parameter                                          | 条件                                                   | 符 号<br>Symbol | 数 值<br>Value    | 单 位<br>Unit        |
|-----------------------------------------------------------|------------------------------------------------------|---------------|-----------------|--------------------|
| 最高集电极—发射极直流电压<br>Collector-Emmitter Voltage               | $T_{vj}=25^{\circ}\text{C}$                          | $V_{ces}$     | 1200            | V                  |
| 连续集电极极电流<br>Collector Current-continuous                  | $T_c=95^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$ | $I_C$         | 75              | A                  |
| 最大脉冲集电极极电流 (注 1)<br>Collector Current – pulse<br>(note 1) | $t_P = 1 \text{ ms}$                                 | $I_{CM}$      | 150             | A                  |
| 最高栅极发射极电压<br>Gate-Emmitter Voltage                        |                                                      | $V_{GES}$     | $\pm 20$        | V                  |
| 短路时间<br>short circuit time                                |                                                      | $t_{sc}$      | 10              | $\mu\text{s}$      |
| 耗散功率<br>Power Dissipation                                 | $T_c=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$ | $P_D$         | 385             | W                  |
| 结温范围<br>Junction Temperature                              |                                                      | $T_{vjmax}$   | 175             | $^{\circ}\text{C}$ |
|                                                           |                                                      | $T_{vjop}$    | $-40 \sim +150$ |                    |

## IGBT, 制动、斩波/IGBT, Brake-Chopper

| 项 目<br>Parameter                                          | 条件                                                   | 符 号<br>Symbol | 数 值<br>Value    | 单 位<br>Unit        |
|-----------------------------------------------------------|------------------------------------------------------|---------------|-----------------|--------------------|
| 最高集电极—发射极直流电压<br>Collector-Emmitter Voltage               | $T_{vj}=25^{\circ}\text{C}$                          | $V_{ces}$     | 1200            | V                  |
| 连续集电极极电流<br>Collector Current-continuous                  | $T_c=95^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$ | $I_C$         | 50              | A                  |
| 最大脉冲集电极极电流 (注 1)<br>Collector Current – pulse<br>(note 1) | $t_P = 1 \text{ ms}$                                 | $I_{CM}$      | 100             | A                  |
| 最高栅极发射极电压<br>Gate-Emmitter Voltage                        |                                                      | $V_{GES}$     | $\pm 20$        | V                  |
| 短路时间<br>short circuit time                                |                                                      | $t_{sc}$      | 10              | $\mu\text{s}$      |
| 耗散功率<br>Power Dissipation                                 | $T_c=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$ | $P_D$         | 280             | W                  |
| 结温范围<br>Junction Temperature                              |                                                      | $T_{vjmax}$   | 175             | $^{\circ}\text{C}$ |
|                                                           |                                                      | $T_{vjop}$    | $-40 \sim +150$ |                    |



绝对最大额定值 ABSOLUTE RATINGS ( $T_c=25^{\circ}\text{C}$ )

## 二极管, 逆变器/FRD, Inverter

| 项 目<br>Parameter                            | 条件                                                                           | 符 号<br>Symbol | 数 值<br>Value | 单 位<br>Unit          |
|---------------------------------------------|------------------------------------------------------------------------------|---------------|--------------|----------------------|
| 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   |                                                                              | $I_F$         | 75           | A                    |
| 正向重复峰值电流<br>Repetitive peak forward current | $t_p = 1 \text{ ms}$                                                         | $I_{FRM}$     | 150          | A                    |
| $I^2t$ -值<br>$I^2t$ value                   | $V_R = 0 \text{ V}$ , $t_p = 10 \text{ ms}$ , $T_{vj} = 125^{\circ}\text{C}$ | $I^2t$        | 960          | $\text{A}^2\text{S}$ |

## 二极管, 制动、斩波/IGBT, Brake-Chopper

| 项 目<br>Parameter                            | 条件                                                                           | 符 号<br>Symbol | 数 值<br>Value | 单 位<br>Unit          |
|---------------------------------------------|------------------------------------------------------------------------------|---------------|--------------|----------------------|
| 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   |                                                                              | $I_F$         | 25           | A                    |
| 正向重复峰值电流<br>Repetitive peak forward current | $t_p = 1 \text{ ms}$                                                         | $I_{FRM}$     | 50           | A                    |
| $I^2t$ -值<br>$I^2t$ value                   | $V_R = 0 \text{ V}$ , $t_p = 10 \text{ ms}$ , $T_{vj} = 125^{\circ}\text{C}$ | $I^2t$        | 90           | $\text{A}^2\text{S}$ |

## 二极管, 整流器/Diode, Rectifier

| 项 目<br>Parameter                                        | 条件                                                                                                              | 符 号<br>Symbol | 数 值<br>Value | 单 位<br>Unit          |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------|----------------------|
| 反向重复峰值电压<br>Repetitive peak reverse voltage             | $T_{vj} = 25^{\circ}\text{C}$                                                                                   | $V_{RRM}$     | 1600         | V                    |
| 最大正向均方根电流(每芯片)<br>Maximum RMS forward current per chip  | $T_c=80^{\circ}\text{C}$                                                                                        | $I_{FRMSM}$   | 80           | A                    |
| 最大整流器输出均方根电流<br>Maximum RMS current at rectifier output | $T_c=80^{\circ}\text{C}$                                                                                        | $I_{RMSM}$    | 140          | A                    |
| 正向浪涌电流<br>Surge forward current                         | $t_p = 10 \text{ ms}$ , $T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10 \text{ ms}$ , $T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$     | 600<br>470   | A                    |
| $I^2t$ -值<br>$I^2t$ value                               | $V_R = 0 \text{ V}$ , $t_p = 10 \text{ ms}$ , $T_{vj} = 25^{\circ}\text{C}$                                     | $I^2t$        | 1800         | $\text{A}^2\text{S}$ |





## 电特性 ELECTRICAL CHARACTERISTICS

## IGBT, 逆变器/ IGBT, Inverter

| 项 目<br>Parameter                                  | 符 号<br>Symbol | 测试条件<br>Tests conditions                                         | 最小<br>Min   | 典型<br>Typ  | 最大<br>Max     | 单位<br>Unit |
|---------------------------------------------------|---------------|------------------------------------------------------------------|-------------|------------|---------------|------------|
| 关态特性 Off –Characteristics                         |               |                                                                  |             |            |               |            |
| 集电极—发射极击穿电压<br>Collector-Emmitter Voltage         | $BV_{CES}$    | $I_C=1mA, V_{GE}=0V$                                             | 1200        | -          | -             | V          |
| 零栅压下集电极漏电流<br>Zero Gate Voltage Collector Current | $I_{CES}$     | $V_{CE}=650V, V_{GE}=0V, T_C=25^{\circ}C$                        | -           | -          | 1             | mA         |
| 正向栅极体漏电流<br>Gate-body leakage current, forward    | $I_{GESF}$    | $V_{CE}=0V, V_{GE}=20V$                                          | -           | -          | 100           | nA         |
| 反向栅极体漏电流<br>Gate-body leakage current, reverse    | $I_{GESR}$    | $V_{CE}=0V, V_{GE}=-20V$                                         | -           | -          | -100          | nA         |
| 通态特性 On-Characteristics                           |               |                                                                  |             |            |               |            |
| 阈值电压<br>Gate-Emmitter Threshold Voltage           | $V_{GE(th)}$  | $V_{CE} = V_{GE}, I_C=0.25mA$                                    | 5.2         | 5.85       | 6.5           | V          |
| 饱和压降<br>Collector-Emmitter saturation Voltage     | $V_{CESAT}$   | $V_{GE}=15V, I_C=75A$<br>$T_C=25^{\circ}C$<br>$T_C=150^{\circ}C$ | -<br>-<br>- | 1.9<br>2.2 | 2.3<br>-<br>- | V          |
| 短路电流（注2）<br>Short Collector current（Note 2）       | $I_C(SC)$     | $V_{GE}=15V, V_{CE}=600V, t_{sc} < 10\mu s, T_C=25^{\circ}C$     |             | 330        |               | A          |
| 动态特性 Dynamic Characteristics                      |               |                                                                  |             |            |               |            |
| 输入电容<br>Input capacitance                         | $C_{ies}$     | $V_{CE}=25V, V_{GE}=0V, f=1.0MHz$                                | -           | 9          |               | nF         |
| 输出电容<br>Output capacitance                        | $C_{oes}$     |                                                                  | -           | 0.28       |               | nF         |
| 反向传输电容<br>Reverse transfer capacitance            | $C_{res}$     |                                                                  | -           | 0.150      |               | nF         |





## 电特性 ELECTRICAL CHARACTERISTICS

## IGBT, 逆变器/IGBT, Inverter

| 项 目<br>Parameter                                 | 符 号<br>Symbol | 测试条件<br>Tests conditions                                                                                                               | 最小<br>Min         | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|--------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|-----------|------------|
| 开关特性 Switching Characteristics                   |               |                                                                                                                                        |                   |           |           |            |
| 开启延迟时间 Turn-On delay time                        | $t_{d(on)}$   | $V_{CC}=600V, I_c=75A, R_G=13\Omega$<br>$V_{GE}=15V$ , 感性负载<br>(200uH)                                                                 | $T_C=25^\circ C$  | 69        |           | ns         |
| 上升时间 Turn-On rise time                           | $t_r$         |                                                                                                                                        | $T_C=25^\circ C$  | 56        |           | ns         |
| 关断延迟时间 Turn-Off delay time                       | $t_{d(off)}$  |                                                                                                                                        | $T_C=25^\circ C$  | 119       |           | ns         |
| 下降时间 Turn-Off Fall time                          | $t_f$         |                                                                                                                                        | $T_C=25^\circ C$  | 170       |           | ns         |
| 开通损耗 Turn-On energy                              | $E_{on}$      |                                                                                                                                        | $T_C=25^\circ C$  | 5.1       |           | mJ         |
| 关断损耗 Turn-off energy                             | $E_{off}$     |                                                                                                                                        | $T_C=25^\circ C$  | 3.7       |           | mJ         |
| 总开关损耗 Total switching energy                     | $E_{tot}$     |                                                                                                                                        | $T_C=25^\circ C$  | 8.8       |           | mJ         |
| 开启延迟时间 Turn-On delay time                        | $t_{d(on)}$   | $V_{CC}=600V, I_c=75A, R_G=13\Omega$<br>$V_{GE}=15V$ , 感性负载<br>(200uH)                                                                 | $T_C=150^\circ C$ | 65        |           | ns         |
| 上升时间 Turn-On rise time                           | $t_r$         |                                                                                                                                        | $T_C=150^\circ C$ | 59        |           | ns         |
| 关断延迟时间 Turn-Off delay time                       | $t_{d(off)}$  |                                                                                                                                        | $T_C=150^\circ C$ | 120       |           | ns         |
| 下降时间 Turn-Off Fall time                          | $t_f$         |                                                                                                                                        | $T_C=150^\circ C$ | 230       |           | ns         |
| 开通损耗 Turn-On energy                              | $E_{on}$      |                                                                                                                                        | $T_C=150^\circ C$ | 6.1       |           | mJ         |
| 关断损耗 Turn-off energy                             | $E_{off}$     |                                                                                                                                        | $T_C=150^\circ C$ | 5.2       |           | mJ         |
| 总开关损耗 Total switching energy                     | $E_{tot}$     |                                                                                                                                        | $T_C=150^\circ C$ | 11.3      |           | mJ         |
| 栅极电荷总量 Total Gate Charge                         | $Q_g$         | $V_{GE}=-15V \dots +15V$                                                                                                               | -                 | 278       | -         | nC         |
| 内部栅极电阻<br>Internal gate resistance               | $R_{Gint}$    | $f=1\text{ MHz}$ , open collector                                                                                                      |                   | 5         |           | $\Omega$   |
| 结—外壳热阻<br>Thermal resistance junction to case    | $R_{thJC}$    | 每个IGBT per IGBT                                                                                                                        |                   |           | 0.39      | K/W        |
| 外壳—散热器热阻<br>Thermal resistance case to heatsink  | $R_{thCH}$    | 每个IGBT per IGBT<br>$\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K})$ /<br>$\lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$ |                   | 0.13      |           | K/W        |
| 开关下的温度<br>Temperature under switching conditions | $T_{vjop}$    |                                                                                                                                        | -40               |           | 150       | $^\circ C$ |





## 电特性 ELECTRICAL CHARACTERISTICS

## IGBT 制动、斩波/ IGBT Brake-Chopper

| 项 目<br>Parameter                                  | 符 号<br>Symbol | 测试条件<br>Tests conditions                                         | 最小<br>Min   | 典型<br>Typ  | 最大<br>Max     | 单位<br>Unit |
|---------------------------------------------------|---------------|------------------------------------------------------------------|-------------|------------|---------------|------------|
| <b>关态特性 Off –Characteristics</b>                  |               |                                                                  |             |            |               |            |
| 集电极—发射极击穿电压<br>Collector-Emmitter Voltage         | $BV_{CES}$    | $I_C=1mA, V_{GE}=0V$                                             | 1200        | -          | -             | V          |
| 零栅压下集电极漏电流<br>Zero Gate Voltage Collector Current | $I_{CES}$     | $V_{CE}=1200V, V_{GE}=0V, T_C=25^{\circ}C$                       | -           | -          | 1             | mA         |
| 正向栅极体漏电流<br>Gate-body leakage current, forward    | $I_{GESF}$    | $V_{CE}=0V, V_{GE}=20V$                                          | -           | -          | 100           | nA         |
| 反向栅极体漏电流<br>Gate-body leakage current, reverse    | $I_{GESR}$    | $V_{CE}=0V, V_{GE}=-20V$                                         | -           | -          | -100          | nA         |
| <b>通态特性 On-Characteristics</b>                    |               |                                                                  |             |            |               |            |
| 阈值电压<br>Gate-Emmitter Threshold Voltage           | $V_{GE(th)}$  | $V_{CE} = V_{GE}, I_C=0.25mA$                                    | 5.2         | 5.85       | 6.5           | V          |
| 饱和压降<br>Collector-Emmitter saturation Voltage     | $V_{CESAT}$   | $V_{GE}=15V, I_C=50A$<br>$T_C=25^{\circ}C$<br>$T_C=150^{\circ}C$ | -<br>-<br>- | 1.9<br>2.3 | 2.3<br>-<br>- | V          |
| 短路电流（注2）<br>Short Collector current（Note 2）       | $I_{C(SC)}$   | $V_{GE}=15V, V_{CE}=600V, t_{SC} < 10\mu s, T_C=25^{\circ}C$     |             | 235        |               | A          |
| <b>动态特性 Dynamic Characteristics</b>               |               |                                                                  |             |            |               |            |
| 输入电容<br>Input capacitance                         | $C_{ies}$     | $V_{CE}=25V, V_{GE}=0V, f=1.0MHz$                                | -           | 5.8        |               | nF         |
| 输出电容<br>Output capacitance                        | $C_{oes}$     |                                                                  | -           | 0.26       |               | nF         |
| 反向传输电容<br>Reverse transfer capacitance            | $C_{res}$     |                                                                  | -           | 0.07       |               | nF         |





## 电特性 ELECTRICAL CHARACTERISTICS

## IGBT 制动、斩波/ IGBT Brake-Chopper

| 项 目<br>Parameter                                 | 符 号<br>Symbol | 测试条件<br>Tests conditions                                                                                                               | 最小<br>Min         | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|--------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|-----------|------------|
| 开关特性 Switching Characteristics                   |               |                                                                                                                                        |                   |           |           |            |
| 开启延迟时间 Turn-On delay time                        | $t_{d(on)}$   | $V_{CC}=600V, I_c=50A, R_G=13\Omega, V_{GE}=15V$                                                                                       | $T_C=25^\circ C$  | 92        |           | ns         |
| 上升时间 Turn-On rise time                           | $t_r$         |                                                                                                                                        | $T_C=25^\circ C$  | 60        |           | ns         |
| 关断延迟时间 Turn-Off delay time                       | $t_{d(off)}$  |                                                                                                                                        | $T_C=25^\circ C$  | 128       |           | ns         |
| 下降时间 Turn-Off Fall time                          | $t_f$         |                                                                                                                                        | $T_C=25^\circ C$  | 191       |           | ns         |
| 开通损耗 Turn-On energy                              | $E_{on}$      |                                                                                                                                        | $T_C=25^\circ C$  | 4.8       |           | mJ         |
| 关断损耗 Turn-off energy                             | $E_{off}$     |                                                                                                                                        | $T_C=25^\circ C$  | 2.1       |           | mJ         |
| 总开关损耗 Total switching energy                     | $E_{tot}$     |                                                                                                                                        | $T_C=25^\circ C$  | 6.9       |           | mJ         |
| 开启延迟时间 Turn-On delay time                        | $t_{d(on)}$   | $V_{CC}=600V, I_c=50A, R_G=13\Omega, V_{GE}=15V$                                                                                       | $T_C=150^\circ C$ | 98        |           | ns         |
| 上升时间 Turn-On rise time                           | $t_r$         |                                                                                                                                        | $T_C=150^\circ C$ | 70        |           | ns         |
| 关断延迟时间 Turn-Off delay time                       | $t_{d(off)}$  |                                                                                                                                        | $T_C=150^\circ C$ | 174       |           | ns         |
| 下降时间 Turn-Off Fall time                          | $t_f$         |                                                                                                                                        | $T_C=150^\circ C$ | 280       |           | ns         |
| 开通损耗 Turn-On energy                              | $E_{on}$      |                                                                                                                                        | $T_C=150^\circ C$ | 6.1       |           | mJ         |
| 关断损耗 Turn-off energy                             | $E_{off}$     |                                                                                                                                        | $T_C=150^\circ C$ | 3.1       |           | mJ         |
| 总开关损耗 Total switching energy                     | $E_{tot}$     |                                                                                                                                        | $T_C=150^\circ C$ | 12.2      |           | mJ         |
| 栅极电荷总量 Total Gate Charge                         | $Q_g$         | $V_{GE}=-15V \dots +15V$                                                                                                               | -                 | 200       | -         | nC         |
| 内部栅极电阻<br>Internal gate resistance               | $R_{Gint}$    | $f=1\text{ MHz, open collector}$                                                                                                       |                   | 7         |           | $\Omega$   |
| 结—外壳热阻<br>Thermal resistance junction to case    | $R_{thJC}$    | 每个IGBT per IGBT                                                                                                                        |                   |           | 0.54      | K/W        |
| 外壳—散热器热阻<br>Thermal resistance case to heatsink  | $R_{thCH}$    | 每个IGBT per IGBT<br>$\lambda_{\text{Paste}} = 1\text{ W/(m}\cdot\text{K)} /$<br>$\lambda_{\text{grease}} = 1\text{ W/(m}\cdot\text{K)}$ |                   | 0.3       |           | K/W        |
| 开关下的温度<br>Temperature under switching conditions | $T_{vjop}$    |                                                                                                                                        | -40               |           | 150       | $^\circ C$ |





## 电特性 ELECTRICAL CHARACTERISTICS

## 二极管，逆变器/FRD, Inverter

| 项 目<br>Parameter                                 | 符 号<br>Symbol | 测试条件<br>Tests conditions                                                    | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|--------------------------------------------------|---------------|-----------------------------------------------------------------------------|-----------|-----------|-----------|------------|
| 二极管特性 Diode Characteristics                      |               |                                                                             |           |           |           |            |
| 正向压降<br>Drain-Source Diode Forward Voltage       | $V_F$         | VGE=0V, IF=75A,<br>TC=25°C                                                  | -         | 1.8       | 2.1       | V          |
|                                                  |               | VGE=0V, IF=75A,<br>TC=150°C                                                 | -         | 1.6       | -         | V          |
| 反向恢复时间<br>Diode Reverse recovery time            | $t_{rr}$      | IF = 75 A, - diF/dt =<br>2200 A/μs (Tvj=25°C)<br>VR = 300 V<br>VGE = -15 V  | -         | 320       | -         | ns         |
| 反向恢复电荷<br>Diode Reverse recovery charge          | $Q_{rr}$      |                                                                             | -         | 8.6       | -         | uC         |
| 反向恢复电流<br>Diode Reverse recovery Current         | $I_{RRM}$     |                                                                             | -         | 70        | -         | A          |
| 反向恢复损耗（每脉冲）<br>Reverse recovery energy           | Erec          |                                                                             |           | 3.8       |           | mJ         |
| 反向恢复时间<br>Diode Reverse recovery time            | $t_{rr}$      | IF = 75 A, - diF/dt =<br>2200 A/μs (Tvj=150°C)<br>VR = 300 V<br>VGE = -15 V | -         | 510       | -         | ns         |
| 反向恢复电荷<br>Diode Reverse recovery charge          | $Q_{rr}$      |                                                                             | -         | 14        | -         | uC         |
| 反向恢复电流<br>Diode Reverse recovery Current         | $I_{RRM}$     |                                                                             | -         | 71        | -         | A          |
| 反向恢复损耗（每脉冲）<br>Reverse recovery energy           | Erec          |                                                                             |           | 5.4       |           | mJ         |
| 结—外壳热阻<br>Thermal resistance junction to case    | $R_{thJC}$    | 每个二极管 per diode                                                             |           |           | 0.62      | K/W        |
| 外壳—散热器热阻<br>Thermal resistance case to heatsink  | $R_{thCH}$    | 每个二极管 per diode<br>λPaste = 1 W/(m·K) /<br>λgrease = 1 W/(m·K)              |           | 0.21      |           | K/W        |
| 开关下的温度<br>Temperature under switching conditions | $T_{vjop}$    |                                                                             | -40       |           | 150       | °C         |





## 电特性 ELECTRICAL CHARACTERISTICS

## 二极管制动、斩波/ FRD Brake-Chopper

| 项 目<br>Parameter                                 | 符 号<br>Symbol | 测试条件<br>Tests conditions                                       | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|--------------------------------------------------|---------------|----------------------------------------------------------------|-----------|-----------|-----------|------------|
| 二极管特性 Diode Characteristics                      |               |                                                                |           |           |           |            |
| 正向压降<br>Drain-Source Diode Forward Voltage       | $V_F$         | VGE=0V, IS=50A,<br>TC=25℃                                      | -         | 1.9       | 2.15      | V          |
|                                                  |               | VGE=0V, IS=50A,<br>TC=150℃                                     | -         | 1.7       | -         | V          |
| 反向恢复时间<br>Diode Reverse recovery time            | $t_{rr}$      | VGE=0V, VR=600V<br>IF=50A<br>dIF/dt=900A/μs<br>TC=25℃          | -         | 358       | -         | ns         |
| 反向恢复电荷<br>Diode Reverse recovery charge          | $Q_{rr}$      |                                                                | -         | 4860      | -         | nC         |
| 反向恢复电流<br>Diode Reverse recovery Current         | $I_{RRM}$     |                                                                | -         | 36        | -         | A          |
| 反向恢复损耗（每脉冲）<br>Reverse recovery energy           | Erec          |                                                                |           | 1.7       |           | mJ         |
| 反向恢复时间<br>Diode Reverse recovery time            | $t_{rr}$      | VGE=0V, VR=600V<br>IF=50A<br>dIF/dt=900A/μs<br>TC=150℃         | -         | 520       | -         | ns         |
| 反向恢复电荷<br>Diode Reverse recovery charge          | $Q_{rr}$      |                                                                | -         | 7100      | -         | nC         |
| 反向恢复电流<br>Diode Reverse recovery Current         | $I_{RRM}$     |                                                                | -         | 38        | -         | A          |
| 反向恢复损耗（每脉冲）<br>Reverse recovery energy           | Erec          |                                                                |           | 1.7       |           | mJ         |
| 结—外壳热阻<br>Thermal resistance junction to case    | $R_{thJC}$    | 每个二极管 per diode                                                |           |           | 0.95      | K/W        |
| 外壳—散热器热阻<br>Thermal resistance case to heatsink  | $R_{thCH}$    | 每个二极管 per diode<br>λPaste = 1 W/(m·K) /<br>λgrease = 1 W/(m·K) |           | 0.6       |           | K/W        |
| 开关下的温度<br>Temperature under switching conditions | $T_{vjop}$    |                                                                | -40       |           | 150       | ℃          |





## 电特性 ELECTRICAL CHARACTERISTICS

## 二极管，整流器/Diode, Rectifier

| 项 目<br>Parameter                                | 符 号<br>Symbol | 测试条件<br>Tests conditions                                                                         | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|-------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------|-----------|-----------|-----------|------------|
| 二极管特性 Diode Characteristics                     |               |                                                                                                  |           |           |           |            |
| 正向压降（芯片）<br>Diode Forward Voltage               | $V_F$         | $V_{GE}=0V, I_F=75A$                                                                             | -         | 1.17      | -         | V          |
| 反向电流<br>Reverse current                         | $I_R$         | $T_{vj} = 150^{\circ}C,$<br>$V_R = 1600 V$                                                       |           | 1         |           | mA         |
| 结—外壳热阻<br>Thermal resistance junction to case   | $R_{thJC}$    | 每个二极管 per diode                                                                                  |           |           | 0.65      | K/W        |
| 外壳—散热器热阻<br>Thermal resistance case to heatsink | $R_{thCH}$    | 每个二极管 per diode<br>$\lambda_{Paste} = 1 W/(m \cdot K)$ /<br>$\lambda_{grease} = 1 W/(m \cdot K)$ |           | 0.215     |           | K/W        |

## 负温度系数热敏电阻/NTC-Thermistor

| 项 目<br>Parameter          | 符号<br>Symbol                                                                                          | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Unit  |
|---------------------------|-------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-------------|
| 额定电阻值<br>Rated resistance | $R_{25^{\circ}C}$                                                                                     | 4.75      | 5         | 5.25      | kohm        |
| 时间常数<br>静止空气中             | $\tau$                                                                                                | -         | -         | 10        | Sec         |
| 最大额定功率                    | $P_{max}$                                                                                             | -         | -         | 10        | mW          |
| B-值<br>B-value            | $B = [(T_a \times T_b) / (T_b - T_a)] \times \ln(R_a / R_b)$<br>$T_b = 50^{\circ}C \pm 0.01^{\circ}C$ | 3346.2    | 3380      | 3413.8    | K           |
| 工作温度                      |                                                                                                       | -50       | -         | 200       | $^{\circ}C$ |

注释:

- 1: 脉冲宽度由最高结温限制
- 2: 两次短路之间的间隔大于 1 秒时，允许短路测试的次数最大为 1000 次

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.





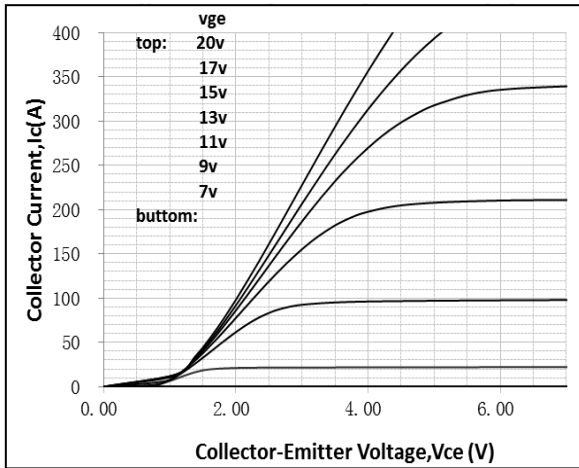
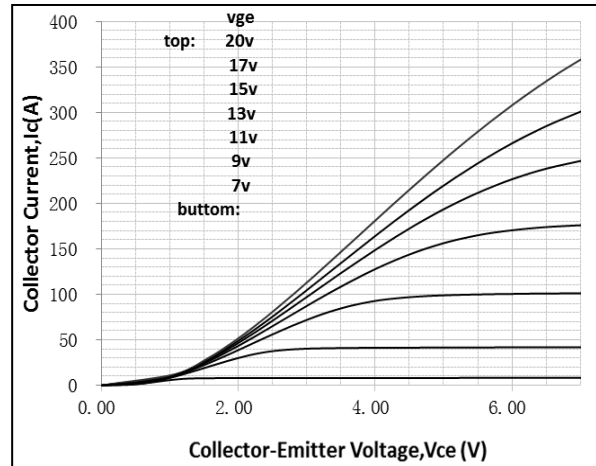
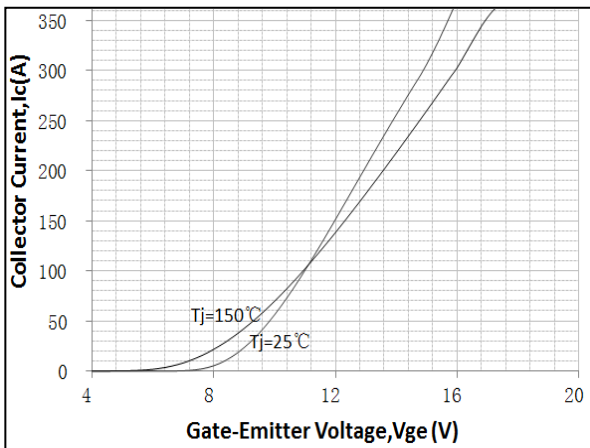
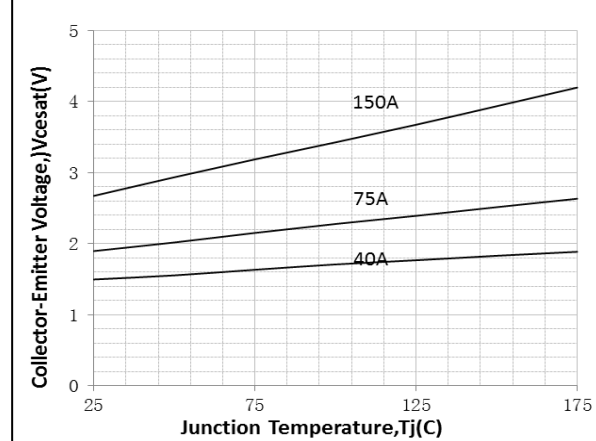
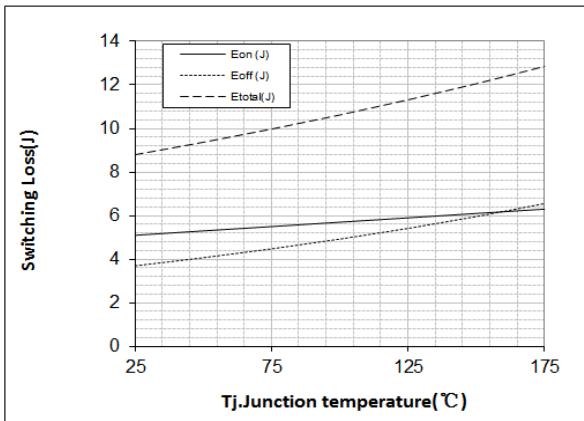
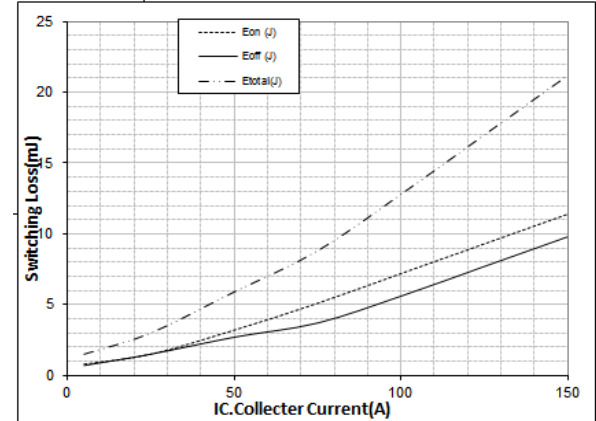
## 模块特性/Module Characteristics

| 项 目<br>Parameter                                         | 符 号<br>Symbol                                                           | 测试条件<br>Tests conditions                                                                    | 最小<br>Min                      | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|----------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------|-----------|-----------|------------|
| 绝缘测试电压<br>Isolation test voltage                         | V <sub>ISOL</sub>                                                       | RMS, f = 50 Hz, t = 1min                                                                    |                                | 2.5       |           | KV         |
| 模块基板材料<br>Material of module baseplate                   | Cu                                                                      |                                                                                             |                                |           |           |            |
| 内部绝缘<br>Internal isolation                               | 基本绝缘<br>(class 1, IEC 61140)<br>Basic insulation<br>(class1, IEC 61140) |                                                                                             | Al <sub>2</sub> O <sub>3</sub> |           |           |            |
| 爬电距离<br>Creepage distance                                |                                                                         | 端子-散热片<br>terminal to heatsink                                                              | -                              | 10        | -         | mm         |
|                                                          |                                                                         | 端子-端子<br>Terminal to terminal                                                               | -                              | 10        | -         |            |
| 电气间隙<br>Clearance                                        |                                                                         | 端子-散热片<br>terminal to heatsink                                                              | -                              | 7.5       | -         | mm         |
|                                                          |                                                                         | 端子-端子<br>Terminal to terminal                                                               | -                              | 7.5       | -         |            |
| 相对电痕指数<br>Comperative tracking index                     | CT1                                                                     |                                                                                             | 200                            |           |           |            |
| 杂散电感,模块<br>Stray inductance module                       | L <sub>sCE</sub>                                                        |                                                                                             |                                | 40        |           | nH         |
| 模块引线电阻,端子-芯片<br>Module lead resistance<br>terminals chip | R <sub>CC'+EE'</sub>                                                    |                                                                                             |                                | 5         |           | mΩ         |
| 储存温度<br>Storage temperature                              | T <sub>stg</sub>                                                        |                                                                                             | -40                            |           | 125       | ℃          |
| 安装扭矩<br>Mounting torque for modul<br>mounting            | M                                                                       | 螺丝 M5 根据相应的<br>应用手册进行安装<br>Screw M5 -<br>Mounting according<br>to valid application<br>note | 3                              |           | 6         | Nm         |
| 重量<br>Weight                                             | G                                                                       |                                                                                             | -                              | 300       | -         | g          |

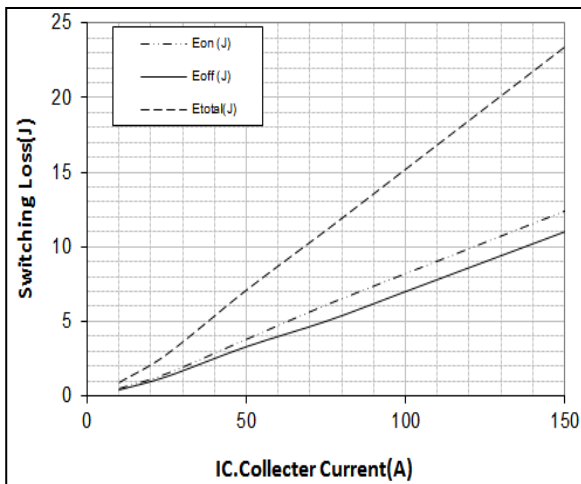




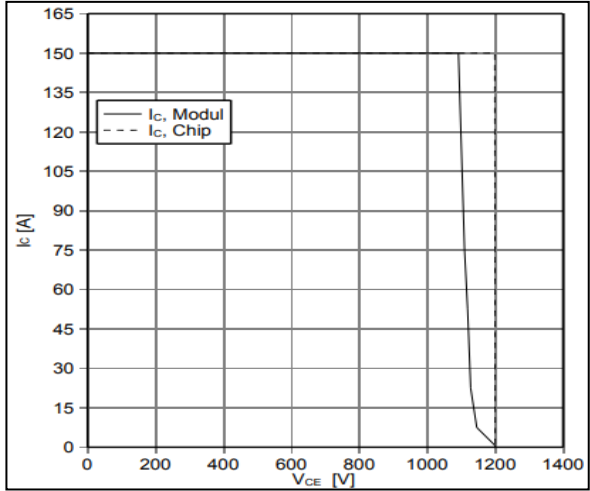
## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Inverter IGBT output characteristic  
 $I_C = f(V_{CE})$  ( $T_{vj}=25^{\circ}\text{C}$ )Inverter IGBT output characteristic  
 $I_C = f(V_{CE})$  ( $T_{vj}=150^{\circ}\text{C}$ )Inverter IGBT Transfer characteristic  
 $I_C = f(V_{GE})$ ,  $V_{CE} = 20\text{V}$ Inverter IGBT  $V_{cesat}$  vs.  $T_j$ Inverter IGBT Switching Loss vs.  $T_j$   
 $V_{GE}=15\text{V}$ ,  $V_{CE}=600\text{V}$ ,  $I_C=75\text{A}$ Inverter IGBT Switching Loss vs.  $I_C$  ( $25^{\circ}\text{C}$ )

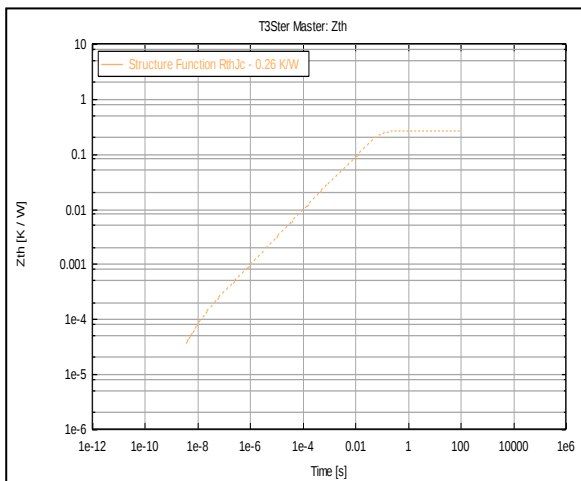
### Inverter IGBT Switching Loss vs. IC(150°C)



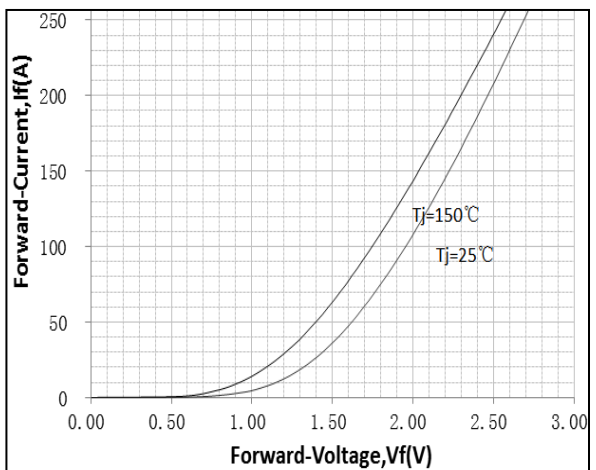
### RBSOA of Inverter IGBT VGE=±15V, Tvj=150°C



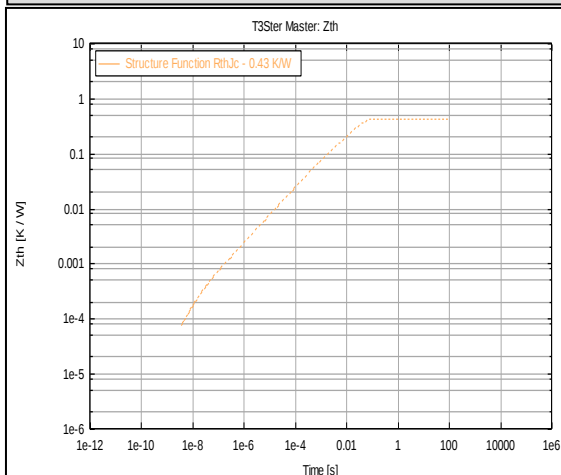
### Inverter IGBT Transient Thermal Impedance



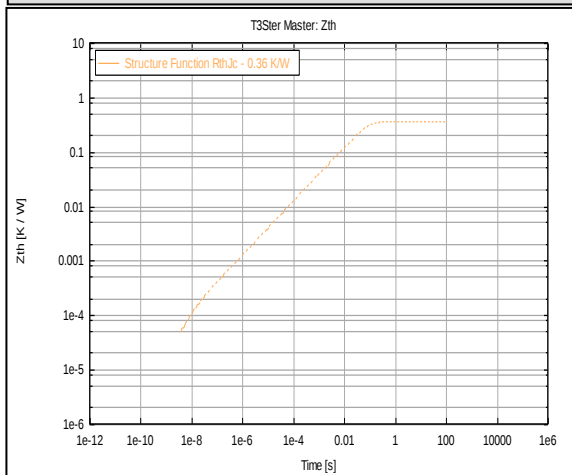
### Inverter FRD Forward Characteristics



### Inverter FRD Transient Thermal Impedance

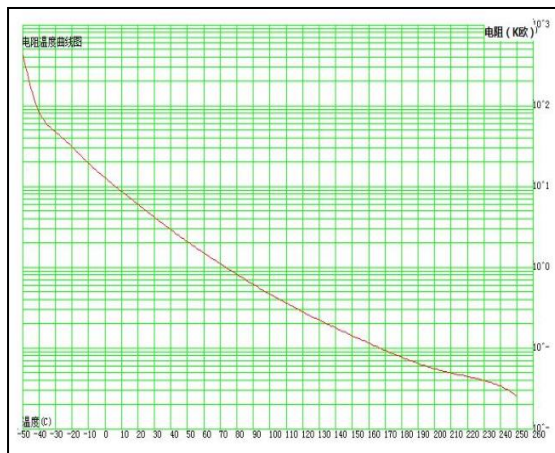


### Rectifier Diode Transient Thermal Impedance





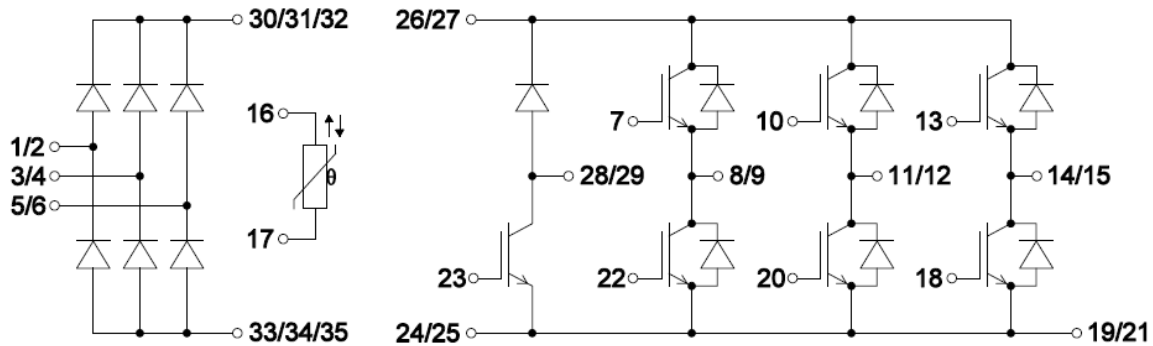
NTC-Thermistor-temperature  
characteristic(typical)





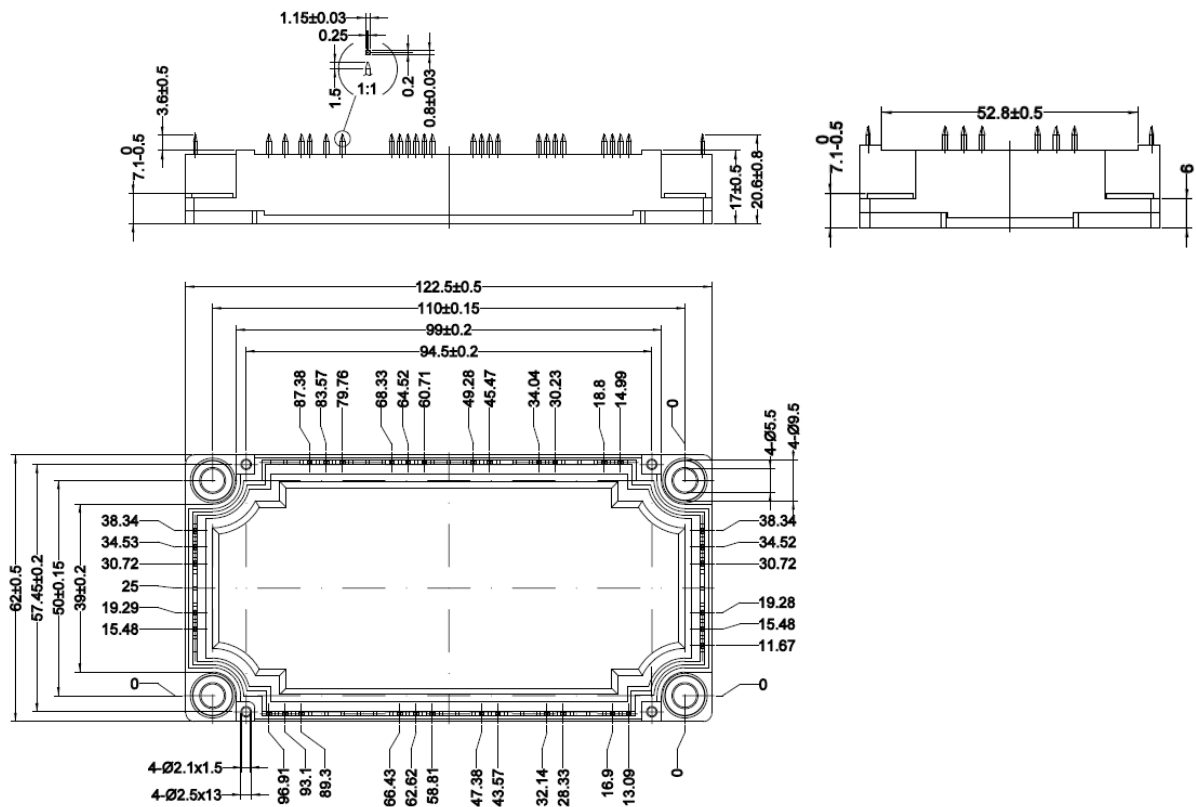
## 外形尺寸 PACKAGE MECHANICAL DATA

## Circuit diagram



## Package outlines

单位 Unit: mm





### 注意事项

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