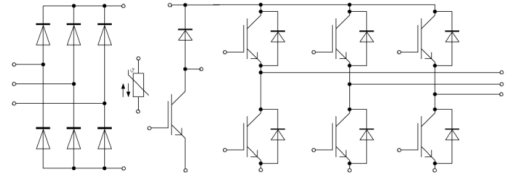


## IGBT 25A 1200V PIM module



### Features

- Trench+ Field Stop Technology / 沟槽栅/场终止工艺
- Low VCEsat / 低饱和压降
- Low Switching Losses / 低开关损耗
- Positive Temperature Coefficient / 正温度系数

### Applications

- Motor Drives / 电机传动
- Auxiliary Inverters / 辅助逆变器
- Frequency Converters / 变频器

### Absolute Maximum Ratings $T_j = 25^\circ\text{C}$ unless otherwise noted

| IGBT-Inverter/ IGBT-逆变器 |  |  |          |      |
|-------------------------|--|--|----------|------|
| Symbol                  | Parameter                                      | Test Conditions  | Value    | Unit |
| $V_{CES}$               | Collector-emitter voltage<br>集电极-发射极电压         | $T_{vj}=25^\circ\text{C}$                                    | 1200     | V    |
| $I_{C\text{ nom}}$      | Continuous DC collector current<br>连续集电极直流电流   | $T_c=100^\circ\text{C}, T_{vj\text{ max}}=175^\circ\text{C}$ | 25       | A    |
| $I_{CRM}$               | Repetitive peak collector current<br>集电极重复峰值电流 | $T_p=1\text{ms}$   | 50       | A    |
| $V_{GES}$               | Gate-emitter peak voltage<br>栅极-发射极峰值电压        |  | $\pm 20$ | V    |
| Diode-Inverter/二极管-逆变器  |  |  |          |      |
| $V_{RRM}$               | Repetitive peak reverse voltage<br>反向重复峰值电压    | $T_{vj}=25^\circ\text{C}$                                    | 1200     | V    |
| $I_F$                   | Continuous DC forward current<br>连续正向直流电流      |  | 30       | A    |
| $I_{FRM}$               | Repetitive peak forward current                | $T_p=1\text{ms}$   | 60       | A    |

### Characteristic Values

| IGBT-Inverter/ IGBT-逆变器 |  |   |                            |      |      |          |
|-------------------------|--|---|----------------------------|------|------|----------|
| Symbol                  | Parameter  | Test Conditions                         | Min.                       | Typ. | Max. | Unit     |
| $V_{CE\text{ sat}}$     | Collector-emitter voltage<br>集电极-发射极饱和电压         | $I_C=25\text{A}, V_{GE}=15\text{V}$     | $T_{vj}=25^\circ\text{C}$  | 2.24 |      | V        |
|                         |  |   | $T_{vj}=125^\circ\text{C}$ | 2.7  |      |          |
|                         |  |   | $T_{vj}=150^\circ\text{C}$ | 2.77 |      |          |
| $V_{GEth}$              | Gate threshold voltage<br>栅极阈值电压                 | $I_C=0.8\text{mA}, V_{CE}=V_{GE}$       | $T_{vj}=25^\circ\text{C}$  | 5.5  |      | V        |
| $I_{GES}$               | Gate-emitter leakage current<br>栅极-发射极漏电流        | $V_{GE}=20\text{V}, V_{CE}=0\text{V}$   | $T_{vj}=25^\circ\text{C}$  |      | 100  | nA       |
| $I_{CES}$               | Collector-emitter leakage current<br>集电极-发射极截止电流 | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}$ | $T_{vj}=25^\circ\text{C}$  |      | 1    | mA       |
| $R_{Gint}$              | Internal gate resistor<br>内部栅极电阻                 |   | $T_{vj}=25^\circ\text{C}$  | /    |      | $\Omega$ |

| Symbol             | Parameter  | Test Conditions   |   | Min. | Typ. | Max. | Unit              |
|--------------------|--|---|---|------|------|------|-------------------|
| $C_{ies}$          | Input capacitance<br>输入电容                          | $f=1\text{ MHz}$ ,<br>$V_{CE}=25\text{ V}$ ,<br>$V_{GE}=0\text{ V}$   | $T_{vj}=25^\circ\text{ C}$                                |      | 1853 |      | pF                |
| $C_{oes}$          | Output capacitance<br>输出电容                         |   |   |      | 145  |      |                   |
| $C_{res}$          | Reverse transfer capacitance<br>反向传输电容             |   |   |      | 61   |      |                   |
| $R_{thJC}$         | Thermal resistance, junction to case<br>结-外壳热阻     | Per IGBT  |   |      |      | 0.98 | K/W               |
| $T_{vj\text{ op}}$ | Temperature under switching conditions<br>在开关状态下温度 |   |   | -40  |      | 150  | $^\circ\text{ C}$ |
| $I_{sc}$           | Short circuit current<br>短路电流                      | $V_{GE}\leq 15\text{ V}$ ,<br>$V_{CC}=800\text{ V}$<br>$V_{CEmax}=V_{CES}$ -<br>$LS_{CE}\cdot di/dt$  | $T_P\leq 10\ \mu\text{ s}$<br>$T_{vj}=150^\circ\text{ C}$ |      | 92   |      | A                 |
| $T_{don}$          | Turn-on delay time<br>开通延迟时间                       | $I_C=25\text{ A}$ ,<br>$V_{CE}=600\text{ V}$<br>$V_{GE}=\pm 15\text{ V}$<br>$R_{Gon}=20\ \Omega$ ,<br>$R_{Goff}=20\ \Omega$<br>电感负载<br>(Inductive load) | $T_{vj}=25^\circ\text{ C}$                                |      | 21   |      | ns                |
| $T_{doff}$         | Turn-off delay time<br>关断延迟时间                      |   | $T_{vj}=125^\circ\text{ C}$                               |      | 20   |      |                   |
|                    |  |   | $T_{vj}=150^\circ\text{ C}$                               |      | 21   |      |                   |
|                    |  |   | $T_{vj}=25^\circ\text{ C}$                                |      | 196  |      | ns                |
| $T_r$              | Turn-on rise time<br>开通上升时间                        |   | $T_{vj}=125^\circ\text{ C}$                               |      | 218  |      |                   |
|                    |  |   | $T_{vj}=150^\circ\text{ C}$                               |      | 224  |      |                   |
|                    |  |   | $T_{vj}=25^\circ\text{ C}$                                |      | 31   |      | ns                |
| $T_f$              | Turn-off fall time<br>关断下降时间                       |   | $T_{vj}=125^\circ\text{ C}$                               |      | 32   |      |                   |
|                    |  |   | $T_{vj}=150^\circ\text{ C}$                               |      | 34   |      |                   |
|                    |  |   | $T_{vj}=25^\circ\text{ C}$                                |      | 267  |      | ns                |
| $E_{on}$           | Turn-on switching loss per pulse<br>开通损耗 (每脉冲)     |   | $T_{vj}=125^\circ\text{ C}$                               |      | 326  |      |                   |
|                    |  |   | $T_{vj}=150^\circ\text{ C}$                               |      | 308  |      |                   |
|                    |  | $T_{vj}=25^\circ\text{ C}$  |   | 1.62 |      | mJ   |                   |
| $E_{off}$          | Turn-off energy loss per pulse<br>关断损耗 (每脉冲)       | $T_{vj}=125^\circ\text{ C}$   |   | 2.62 |      |      |                   |
|                    |  | $T_{vj}=150^\circ\text{ C}$   |   | 3.16 |      |      |                   |
|                    |  | $T_{vj}=25^\circ\text{ C}$  |   | 2.83 |      | mJ   |                   |
|                    |  | $T_{vj}=125^\circ\text{ C}$   |   | 2.86 |      |      |                   |
|                    |  | $T_{vj}=150^\circ\text{ C}$   |   | 4.03 |      |      |                   |

| Diode-Inverter/二极管-逆变器 |  |   |                             |      |      |                |                   |
|------------------------|--|---|-----------------------------|------|------|----------------|-------------------|
| Symbol                 | Parameter  | Test Conditions                         |                             | Min. | Typ. | Max.           | Unit              |
| $V_F$                  | Forward voltage<br>正向电压                            | $I_F=30\text{ A}$ , $V_{GE}=0\text{ V}$ | $T_{vj}=25^\circ\text{ C}$  |      | 2.27 |                | V                 |
| $I_{RM}$               | Peak reverse recovery current<br>反向恢复峰值电流          |   | $T_{vj}=125^\circ\text{ C}$ |      | 1.94 |                |                   |
|                        |  |   | $T_{vj}=150^\circ\text{ C}$ |      | 1.91 |                |                   |
|                        |  | $T_{vj}=25^\circ\text{ C}$              |                             | 38   |      | A              |                   |
| $Q_{rr}$               | Diode reverse recovery charge<br>恢复电荷              | $T_{vj}=125^\circ\text{ C}$             |                             | 49   |      |                |                   |
|                        |  | $T_{vj}=150^\circ\text{ C}$             |                             | 55   |      |                |                   |
|                        |  | $T_{vj}=25^\circ\text{ C}$              |                             | 1.13 |      | $\mu\text{ C}$ |                   |
| $E_{rec}$              | Reverse recovery energy<br>反向恢复损耗 (每脉冲)            | $T_{vj}=125^\circ\text{ C}$             |                             | 4.16 |      |                |                   |
|                        |  | $T_{vj}=150^\circ\text{ C}$             |                             | 5.58 |      |                |                   |
|                        |  | $T_{vj}=25^\circ\text{ C}$              |                             | 0.16 |      | mJ             |                   |
| $R_{thJC}$             | Thermal resistance, junction to case<br>结-外壳热阻     | $T_{vj}=125^\circ\text{ C}$             |                             | 1.44 |      |                |                   |
|                        |  | $T_{vj}=150^\circ\text{ C}$             |                             | 2.00 |      |                |                   |
|                        |  | Per diode                               |                             |      |      | 1.3            | K/W               |
| $T_{vj\text{ op}}$     | Temperature under switching conditions<br>在开关状态下温度 |   |                             | -40  |      | 150            | $^\circ\text{ C}$ |

**Maximum Rated Values**

| IGBT-Brake/ IGBT-制动器    |  |   |          |      |
|-------------------------|--|---|----------|------|
| Symbol                  | Parameter                                      | Test Conditions   | Value    | Unit |
| $V_{CES}$               | Collector-emitter voltage<br>集电极-发射极电压         | $T_{vj}=25^{\circ}\text{C}$                               | 1200     | V    |
| $I_C$                   | Continuous DC collector current<br>连续集电极直流电流   | $T_C=100^{\circ}\text{C}, T_{vj\max}=175^{\circ}\text{C}$ | 25       | A    |
| $I_{CRM}$               | Repetitive peak collector current<br>集电极重复峰值电流 | $T_P=1\text{ms}$  | 50       | A    |
| $V_{GES}$               | Gate-emitter peak voltage<br>栅极-发射极峰值电压        |   | $\pm 20$ | V    |
| Diode-Inverter/ 二极管-逆变器 |  |   |          |      |
| $V_{RRM}$               | Repetitive peak reverse voltage<br>反向重复峰值电压    | $T_{vj}=25^{\circ}\text{C}$                               | 1200     | V    |
| $I_F$                   | Continuous DC forward current<br>连续正向直流电流      |   | 15       | A    |
| $I_{FRM}$               | Repetitive peak forward current<br>正向重复峰值电流    | $T_P=1\text{ms}$  | 30       | A    |

**Characteristic Values**

| IGBT-Brake/ IGBT-制动器 |  |  |  |      |      |          |
|----------------------|--|--|--|------|------|----------|
| Symbol               | Parameter  | Test Conditions  | Min.   | Typ. | Max. | Unit     |
| $V_{CE\text{-sat}}$  | Collector-emitter voltage<br>集电极-发射极饱和电压         | $I_C=25\text{A}, V_{GE}=15\text{V}$  | $T_{vj}=25^{\circ}\text{C}$                            | 2.17 |      | V        |
|                      |  |  | $T_{vj}=125^{\circ}\text{C}$                           | 2.6  |      |          |
|                      |  |  | $T_{vj}=150^{\circ}\text{C}$                           | 2.65 |      |          |
| $V_{GE\text{th}}$    | Gate threshold voltage<br>栅极阈值电压                 | $I_C=0.8\text{mA}, V_{CE}=V_{GE}$  | $T_{vj}=25^{\circ}\text{C}$                            | 5.6  |      | V        |
| $I_{GES}$            | Gate-emitter leakage current<br>栅极-发射极漏电流        | $V_{GE}=20\text{V}, V_{CE}=0\text{V}$  | $T_{vj}=25^{\circ}\text{C}$                            |      | 100  | nA       |
| $I_{CES}$            | Collector-emitter leakage current<br>集电极-发射极截止电流 | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}$  | $T_{vj}=25^{\circ}\text{C}$                            |      | 1    | mA       |
| $R_{G\text{int}}$    | Internal gate resistor<br>内部栅极电阻                 |  | $T_{vj}=25^{\circ}\text{C}$                            | /    |      | $\Omega$ |
| $C_{ies}$            | Input capacitance<br>输入电容                        | $f=1\text{MHz}, V_{CE}=25\text{V}, V_{GE}=0\text{V}$                                   | $T_{vj}=25^{\circ}\text{C}$                            | 1844 |      | pF       |
| $C_{oes}$            | Output capacitance<br>输出电容                       |  |  | 87   |      |          |
| $C_{res}$            | Reverse transfer capacitance<br>反向传输电容           |  |  | 60   |      |          |
| $I_{SC}$             | Short circuit current<br>短路电流                    | $V_{GE}\leq 15\text{V}, V_{CC}=800\text{V}$<br>$V_{CE\max}=V_{CES}-L_{SCE}\cdot di/dt$ | $TP\leq 10\mu\text{s}$<br>$T_{vj}=150^{\circ}\text{C}$ | 92   |      | A        |
| $T_{\text{don}}$     | Turn-on delay time<br>开通延迟时间                     | $I_C=25\text{A}, V_{CE}=600\text{V}$<br>$V_{GE}=\pm 15\text{V}$                        | $T_{vj}=25^{\circ}\text{C}$                            | 20   |      | ns       |
|                      |  |  | $T_{vj}=125^{\circ}\text{C}$                           | 23   |      |          |
|                      |  |  | $T_{vj}=150^{\circ}\text{C}$                           | 22   |      |          |
| $T_{\text{doff}}$    | Turn-off delay time<br>关断延迟时间                    | $R_{Gon}=20\Omega, R_{Goff}=20\Omega$<br>电感负载 (Inductive load)                         | $T_{vj}=25^{\circ}\text{C}$                            | 191  |      | ns       |
|                      |  |  | $T_{vj}=125^{\circ}\text{C}$                           | 210  |      |          |
|                      |  |  | $T_{vj}=150^{\circ}\text{C}$                           | 215  |      |          |
| $T_r$                | Turn-on rise time<br>开通上升时间                      |  | $T_{vj}=25^{\circ}\text{C}$                            | 37   |      | ns       |
|                      |  |  | $T_{vj}=125^{\circ}\text{C}$                           | 37   |      |          |
|                      |  |  | $T_{vj}=150^{\circ}\text{C}$                           | 39   |      |          |

|                    |  |  |                       |     |      |     |    |
|--------------------|--|--|-----------------------|-----|------|-----|----|
| T <sub>f</sub>     | Turn-off fall time<br>关断下降时间                       |  | T <sub>vj</sub> =25℃  |     | 263  |     | ns |
|                    |  |  | T <sub>vj</sub> =125℃ |     | 255  |     |    |
|                    |  |  | T <sub>vj</sub> =150℃ |     | 301  |     |    |
| E <sub>on</sub>    | Turn-on switching loss per pulse<br>开通损耗（每脉冲）      |  | T <sub>vj</sub> =25℃  |     | 1.61 |     | ns |
|                    |  |  | T <sub>vj</sub> =125℃ |     | 2.47 |     |    |
|                    |  |  | T <sub>vj</sub> =150℃ |     | 2.91 |     |    |
| E <sub>off</sub>   | Turn-off energy loss per pulse<br>关断损耗（每脉冲）        |  | T <sub>vj</sub> =25℃  |     | 2.68 |     | ns |
|                    |  |  | T <sub>vj</sub> =125℃ |     | 2.67 |     |    |
|                    |  |  | T <sub>vj</sub> =150℃ |     | 2.75 |     |    |
| T <sub>vj op</sub> | Temperature under switching conditions<br>在开关状态下温度 |  |                       | -40 |      | 150 | ℃  |

| Diode-Brake/二极管-制动器 |  |  |                       |      |      |      |    |
|---------------------|--|--|-----------------------|------|------|------|----|
| Symbol              | Parameter  | Test Conditions  | Min.                  | Typ. | Max. | Unit |    |
| V <sub>F</sub>      | Forward voltage<br>正向电压                            | I <sub>F</sub> =15A, V <sub>GE</sub> =0V                           | T <sub>vj</sub> =25℃  |      | 2.06 |      | V  |
|                     |  |  | T <sub>vj</sub> =125℃ |      | 1.65 |      |    |
|                     |  |  | T <sub>vj</sub> =150℃ |      | 1.62 |      |    |
| I <sub>RM</sub>     | Peak reverse recovery current<br>反向恢复峰值电流          |  | T <sub>vj</sub> =25℃  |      | 18   |      | A  |
|                     |  |  | T <sub>vj</sub> =125℃ |      | 21   |      |    |
|                     |  |  | T <sub>vj</sub> =150℃ |      | 23   |      |    |
| Q <sub>rr</sub>     | Diode reverse recovery charge<br>恢复电荷              | I <sub>F</sub> =15A, V <sub>R</sub> =600V<br>V <sub>GE</sub> =-15V | T <sub>vj</sub> =25℃  |      | 1.8  |      | μC |
|                     |  |  | T <sub>vj</sub> =125℃ |      | 2.9  |      |    |
|                     |  |  | T <sub>vj</sub> =150℃ |      | 4.0  |      |    |
| E <sub>rec</sub>    | Reverse recovery energy<br>反向恢复损耗（每脉冲）             |  | T <sub>vj</sub> =25℃  |      | 0.68 |      | mJ |
|                     |  |  | T <sub>vj</sub> =125℃ |      | 1.06 |      |    |
|                     |  |  | T <sub>vj</sub> =150℃ |      | 1.52 |      |    |
| T <sub>vj op</sub>  | Temperature under switching conditions<br>在开关状态下温度 |  |                       | -40  |      | 150  | ℃  |

### Maximum Rated Values

| Diode-Rectifier/二极管-整流器 |   |  |       |                  |
|-------------------------|---|--|-------|------------------|
| Symbol                  | Parameter                                     | Test Conditions                                      | Value | Unit             |
| V <sub>RRM</sub>        | Repetitive peak reverse voltage<br>反向重复峰值电压   | T <sub>vj</sub> =25℃                                 | 1600  | V                |
| I <sub>F(AV)</sub>      | forward average current<br>正向平均电流             |  | 30    | A                |
| I <sub>FSM</sub>        | Repetitive peak collector current<br>正向浪涌电流   | T <sub>p</sub> =10ms, sin 180°, T <sub>vj</sub> =25℃ | 360   | A                |
| I <sup>2</sup> t        | I <sup>2</sup> t -value<br>I <sup>2</sup> t-值 | T <sub>p</sub> =10ms, sin 180°, T <sub>vj</sub> =25℃ | 648   | A <sup>2</sup> s |

### Characteristic Values

| Diode-Brake/二极管-制动器 |                         |  |      |      |      |      |
|---------------------|-------------------------|--|------|------|------|------|
| Symbol              | Parameter               | Test Conditions  | Min. | Typ. | Max. | Unit |
| V <sub>F</sub>      | Forward voltage<br>正向电压 | I <sub>F</sub> =30A, V <sub>GE</sub> =0V<br>T <sub>vj</sub> =25℃ |      | 1.0  |      | V    |

|                    |  |                                  |                       |     |  |     |    |
|--------------------|--|----------------------------------|-----------------------|-----|--|-----|----|
| I <sub>R</sub>     | Recovered Charge<br>反向漏电流                          | V <sub>R</sub> =V <sub>RRM</sub> | T <sub>vj</sub> =25℃  |     |  | 5   | uA |
|                    |  |                                  | T <sub>vj</sub> =150℃ |     |  | 1   | mA |
| T <sub>vj op</sub> | Temperature under switching conditions<br>在开关状态下温度 |                                  |                       | -40 |  | 150 | ℃  |

**Characteristic Values**

| NTC-Thermistor/负温度系数热敏电阻 |                             |   |      |      |      |      |
|--------------------------|-----------------------------|---|------|------|------|------|
| Symbol                   | Parameter                   | Test Conditions   | Min. | Typ. | Max. | Unit |
| R <sub>25</sub>          | Rated resistance<br>额定电阻值   | T <sub>C</sub> =25℃   |      | 5.00 |      | K Ω  |
| Δ R/R                    | Deviation of R100<br>R100偏差 | T <sub>C</sub> =100℃, R <sub>100</sub> =480 Ω                                     | -5   |      | 5    | %    |
| P <sub>25</sub>          | Power dissipation<br>耗散功率   | T <sub>C</sub> =25℃   |      | 50   |      | mW   |
| B <sub>25/50</sub>       | B-value<br>B-值              | $B = [(T_a * T_b) / (T_b - T_a)] * \ln(R_a / R_b)$<br>T <sub>B</sub> =50℃ ± 0.01℃ |      | 3380 |      | K    |

| Module/模块          |   |                                  |                                |      |      |      |
|--------------------|---|----------------------------------|--------------------------------|------|------|------|
| Symbol             | Parameter   | Test Conditions                  | Value                          |      |      | Unit |
| V <sub>ISOL</sub>  | Isolation test voltage<br>绝缘测试电压                        | RMS, f=50Hz, t=1min              | 3                              |      |      | KV   |
|                    | Internal isolation<br>内部绝缘                              | basicinsulation(class1,IEC61140) | Al <sub>2</sub> O <sub>3</sub> |      |      |      |
|                    | Creepage distance<br>爬电距离                               | Terminal to heatsink<br>端子-散热器   | 11.8                           |      |      | mm   |
|                    |   | Terminal to terminal<br>端子-端子    | 6                              |      |      | mm   |
|                    | Clearance<br>电气间隙                                       | Terminal to heatsink<br>端子-散热器   | 10.2                           |      |      | mm   |
|                    |   | Terminal to terminal<br>端子-端子    | 5.1                            |      |      | mm   |
|                    |   |                                  | Min.                           | Typ. | Max. |      |
| L <sub>sCE</sub>   | Stray inductance module<br>杂散电感, 模块                     |                                  |                                | 30   |      | nH   |
| R <sub>CC+EE</sub> | Module lead resistance, terminals-chip<br>模块引线电阻, 端子-芯片 | T <sub>C</sub> =25℃ Per switch   |                                | 8.0  |      | m Ω  |
| T <sub>stg</sub>   | Storage temperature<br>储存温度                             |                                  | -40                            |      | 125  | ℃    |
| G                  | Weight<br>重量  |                                  |                                | 39   |      | g    |

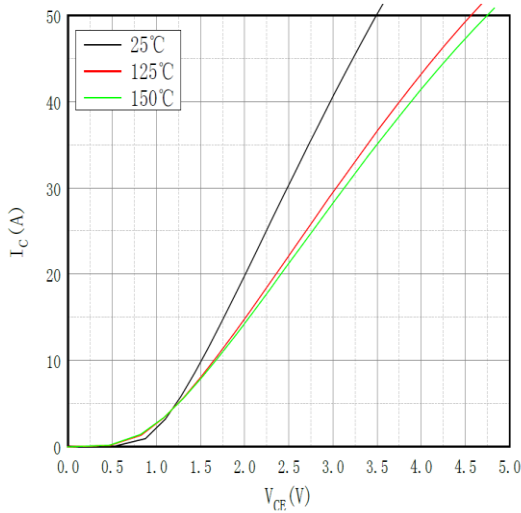


Figure.1 Output characteristic IGBT-Inverter (Typical)

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

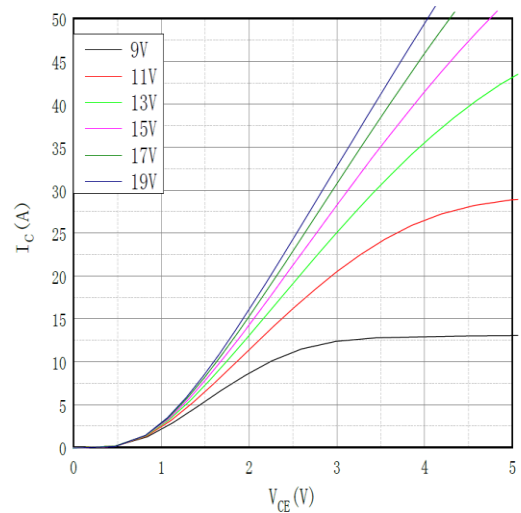


Figure.2 Output characteristic IGBT-Inverter (Typical)

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

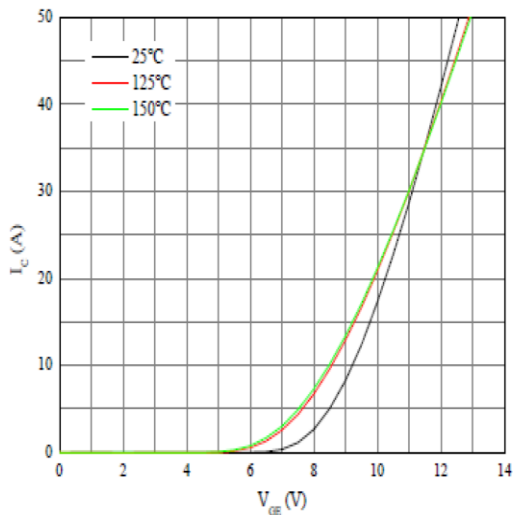


Figure.3 Transfer characteristic IGBT-Inverter (Typical)

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

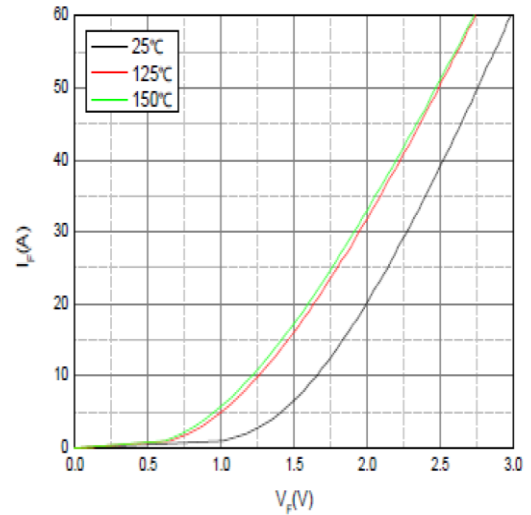


Figure.4 Forward characteristic of Diode-Inverter (Typical)

$$I_F = f(V_F)$$

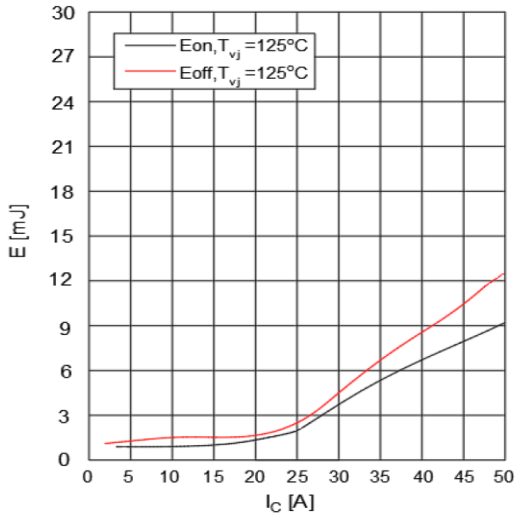


Figure.5 Switching losses IGBT-Inverter (Typical)

$$E_{on}=f(I_C), E_{off}=f(I_C)$$

$$V_{CE}=600V, R_{Gon}=20\Omega, R_{Goff}=20\Omega, V_{GE}=\pm 15V$$

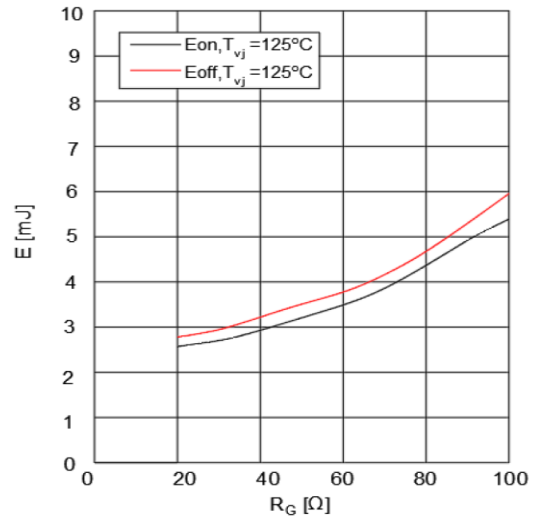


Figure.6 Switching losses IGBT-Inverter (Typical)

$$E_{on}=f(R_G), E_{off}=f(R_G)$$

$$V_{CE}=600V, I_C=25A, V_{GE}=\pm 15V$$

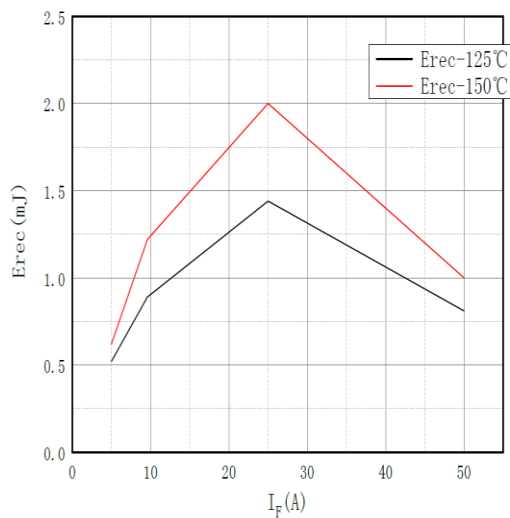


Figure.7 Switching losses Diode-Inverter (Typical)

$$E_{rec}=f(I_F) V_{CE}=600V, R_{Gon}=20\Omega$$

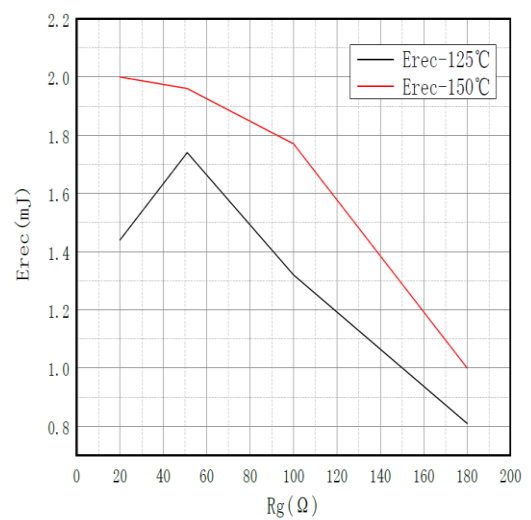


Figure.8 Switching losses Diode-Inverter (Typical)

$$E_{rec}=f(R_g) V_{CE}=600V, I_F=25A$$

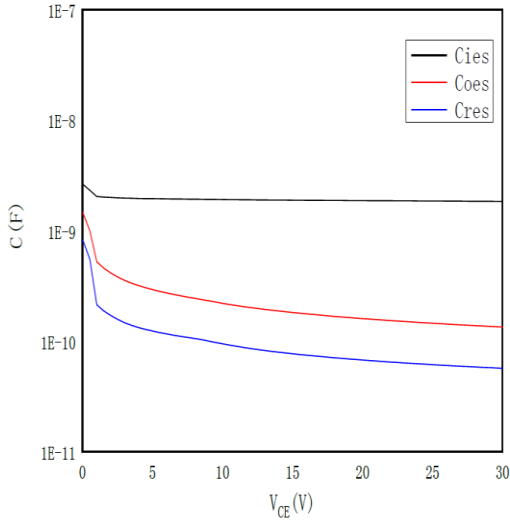


Figure.9 Capacitance characteristic

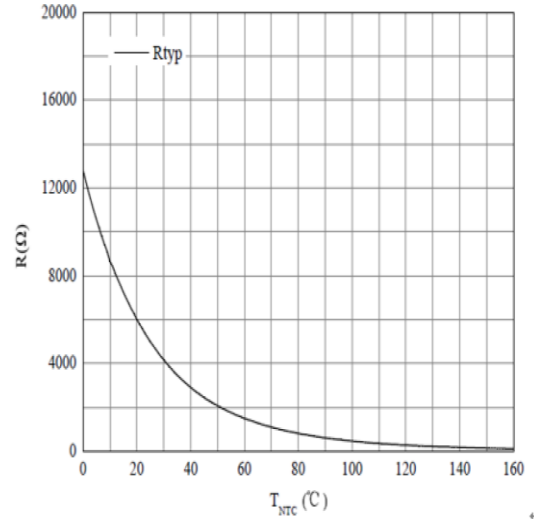
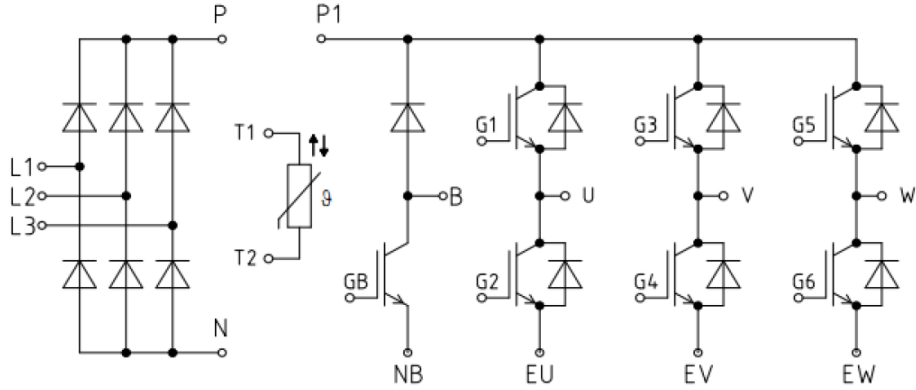


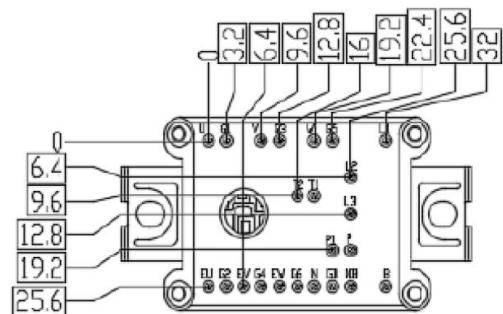
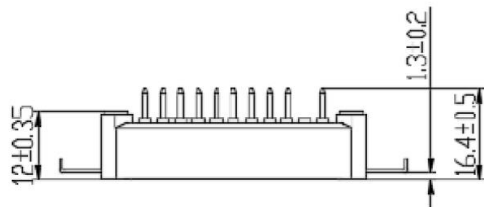
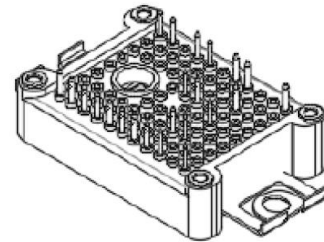
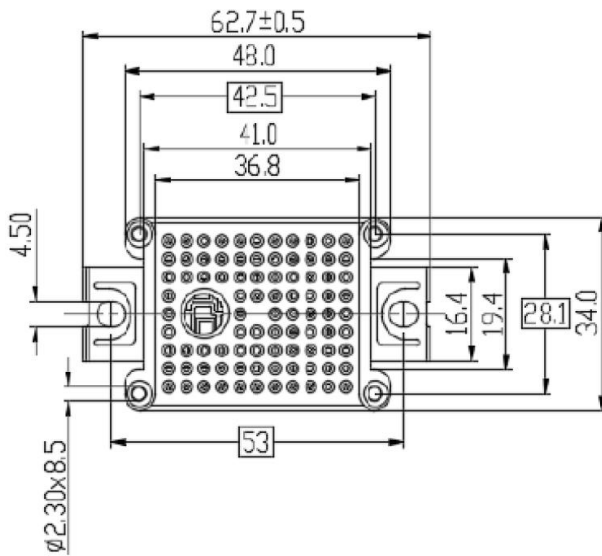
Figure.10 NTC-Themistor-temperature characteristic



## Circuit diagram



## Package outlines



**Disclaimers**

JIAEN Semiconductor Co., Ltd reserves the right to make changes without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to JIAEN's terms and conditions supplied at the time of order acknowledgement.

JIAEN Semiconductor Co., Ltd warrants performance of its hardware products to the specifications at the time of sale, Testing, reliability and quality control are used to the extent JIAEN deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

JIAEN Semiconductor Co., Ltd does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using JIAEN's components. To minimize risk, customers must provide adequate design and operating safeguards.

JIAEN Semiconductor Co., Ltd does not warrant or convey any license either expressed or implied under its parent rights, nor the rights of others. Reproduction of information in JIAEN's datasheets or data books is permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. JIAEN Semiconductor Co., Ltd is not responsible or liable for such altered documentation.

Resale of JIAEN's products with statements different from or beyond the parameters stated by JIAEN Semiconductor Co., Ltd for that product or service voids all express or implied warranties for the associated JIAEN's product or service and is unfair and deceptive business practice. JIAEN Semiconductor Co., Ltd is not responsible or liable for any such statements.