



## IGBT Modules

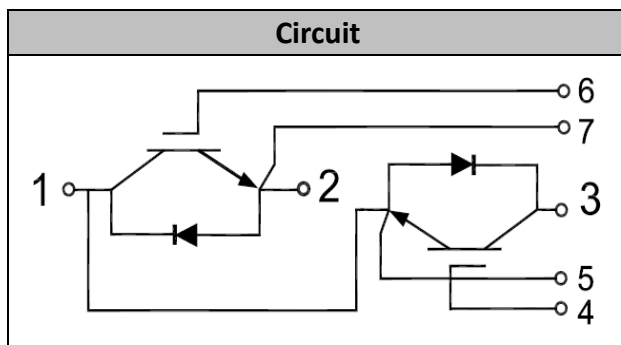
|           |       |
|-----------|-------|
| $V_{CES}$ | 1200V |
| $I_C$     | 100A  |

## Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

## Features

- Low  $V_{CE(sat)}$  with Trench technology
- $V_{CE(sat)}$  with positive temperature coefficient
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 175°C



## ● IGBT

### Absolute Maximum Ratings

| Parameter                         | Symbol    | Conditions                                    | Value    | Unit |
|-----------------------------------|-----------|-----------------------------------------------|----------|------|
| Collector-Emitter Voltage         | $V_{CES}$ | $V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$      | 1200     | V    |
| Continuous Collector Current      | $I_C$     | $T_C=100^{\circ}C$                            | 100      | A    |
| Repetitive Peak Collector Current | $I_{CRM}$ | $t_p=1ms$                                     | 200      | A    |
| Gate-Emitter Voltage              | $V_{GES}$ | $T_{vj}=25^{\circ}C$                          | $\pm 20$ | V    |
| Total Power Dissipation           | $P_{tot}$ | $T_C=25^{\circ}C$<br>$T_{vjmax}=175^{\circ}C$ | 830      | W    |

**Characteristic Values**

| Parameter                               | Symbol        | Conditions                                                                                  | Value |      |      | Unit |
|-----------------------------------------|---------------|---------------------------------------------------------------------------------------------|-------|------|------|------|
|                                         |               |                                                                                             | Min.  | Typ. | Max. |      |
| Gate-Emitter Threshold Voltage          | $V_{GE(th)}$  | $V_{GE}=V_{CE}$ , $I_C=3.8mA$ , $T_{vj}=25^{\circ}C$                                        | 5.0   | 5.8  | 6.5  | V    |
| Collector-Emitter Cut-off Current       | $I_{CES}$     | $V_{CE}=1200V$ , $V_{GE}=0V$ , $T_{vj}=25^{\circ}C$                                         |       |      | 1.0  | mA   |
| Collector-Emitter Saturation Voltage    | $V_{CE(sat)}$ | $I_C=100A$ , $V_{GE}=15V$ , $T_{vj}=25^{\circ}C$                                            |       | 2.00 | 2.6  | V    |
|                                         |               | $I_C=100A$ , $V_{GE}=15V$ , $T_{vj}=125^{\circ}C$                                           |       | 2.15 |      |      |
|                                         |               | $I_C=100A$ , $V_{GE}=15V$ , $T_{vj}=150^{\circ}C$                                           |       | 2.25 |      |      |
| Gate Charge                             | $Q_G$         |                                                                                             |       | 0.68 |      | uC   |
| Input Capacitance                       | $C_{ies}$     | $V_{CE}=25V$ , $V_{GE}=0V$ ,<br>$f=1MHz$ , $T_{vj}=25^{\circ}C$                             |       | 8.39 |      | nF   |
| Reverse Transfer Capacitance            | $C_{res}$     |                                                                                             |       | 0.34 |      | nF   |
| Gate-Emitter leakage current            | $I_{GES}$     | $V_{CE}=0V$ , $V_{GE}=20V$ , $T_{vj}=25^{\circ}C$                                           |       |      | 400  | nA   |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=100A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_G=2.2\Omega$<br>$T_{vj}=25^{\circ}C$  |       | 105  |      | ns   |
| Rise Time                               | $t_r$         |                                                                                             |       | 21   |      | ns   |
| Turn-off Delay Time                     | $t_{d(off)}$  |                                                                                             |       | 201  |      | ns   |
| Fall Time                               | $t_f$         |                                                                                             |       | 103  |      | ns   |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |                                                                                             |       | 2.5  |      | mJ   |
| Energy Dissipation During Turn-off Time | $E_{off}$     |                                                                                             |       | 3.3  |      | mJ   |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=100A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_G=2.2\Omega$<br>$T_{vj}=150^{\circ}C$ |       | 111  |      | ns   |
| Rise Time                               | $t_r$         |                                                                                             |       | 25   |      | ns   |
| Turn-off Delay Time                     | $t_{d(off)}$  |                                                                                             |       | 224  |      | ns   |
| Fall Time                               | $t_f$         |                                                                                             |       | 187  |      | ns   |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |                                                                                             |       | 4.1  |      | mJ   |
| Energy Dissipation During Turn-off Time | $E_{off}$     |                                                                                             |       | 5.4  |      | mJ   |



## ● Diode

### Absolute Maximum Ratings

| Parameter                       | Symbol    | Conditions                  | Value | Unit |
|---------------------------------|-----------|-----------------------------|-------|------|
| Repetitive Peak Reverse Voltage | $V_{RRM}$ | $T_{vj}=25^{\circ}\text{C}$ | 1200  | V    |
| Continuous DC Forward Current   | $I_F$     |                             | 100   | A    |
| Repetitive Peak Forward Current | $I_{FRM}$ | $t_p=1\text{ms}$            | 200   | A    |

### Characteristic Values

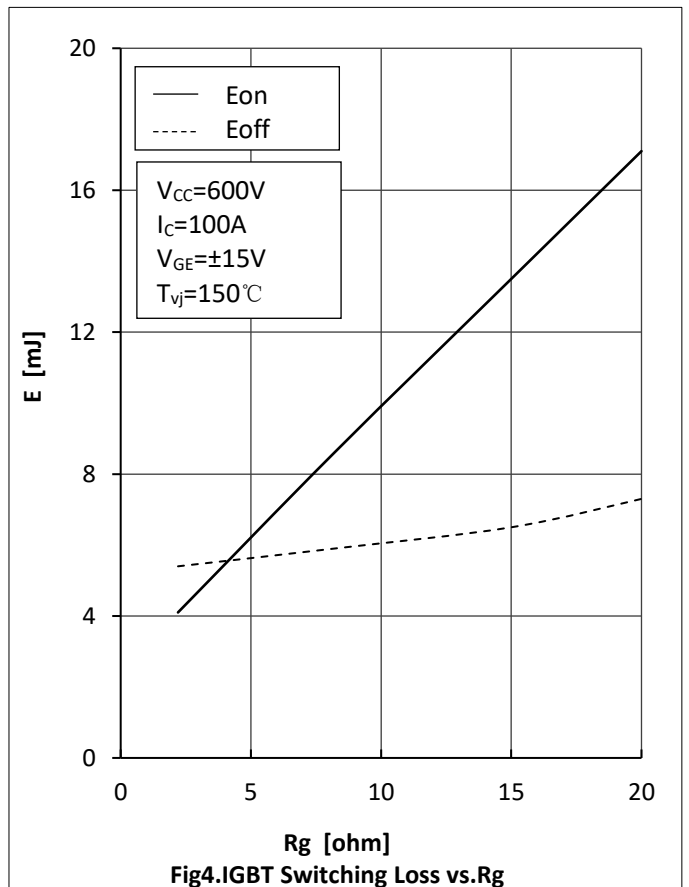
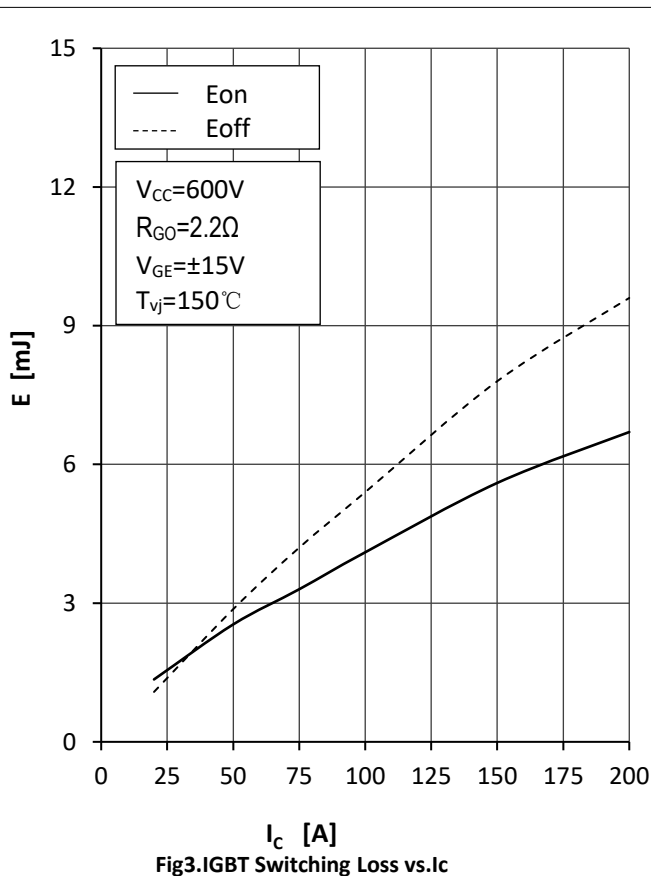
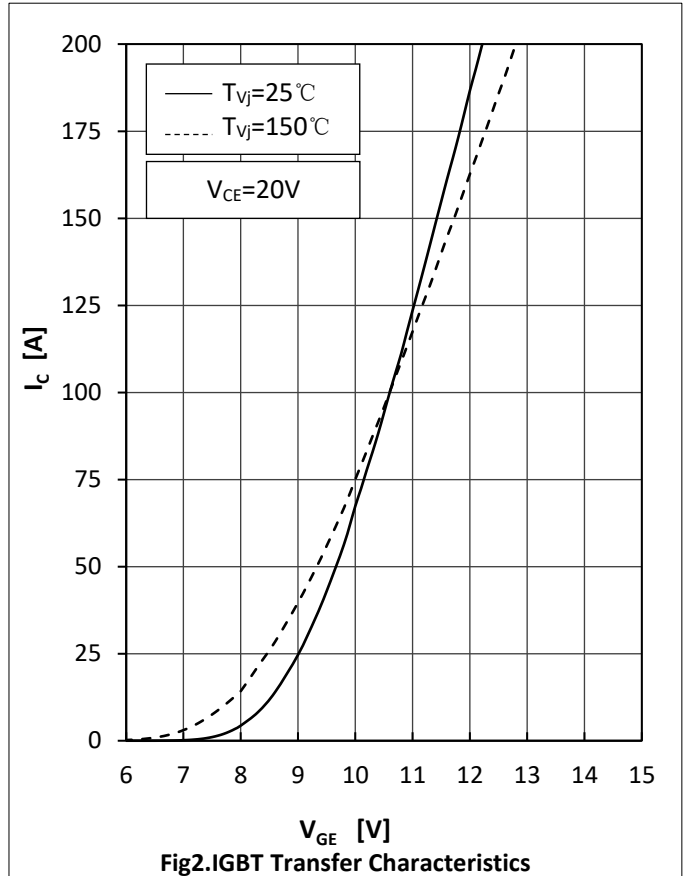
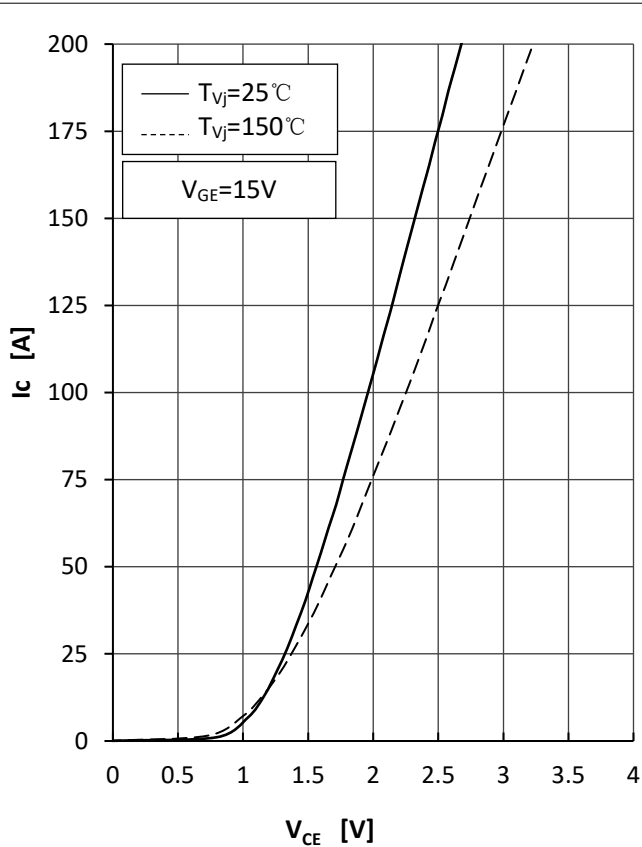
| Parameter                     | Symbol    | Conditions                                                                                           | Value |      |      | Unit          |
|-------------------------------|-----------|------------------------------------------------------------------------------------------------------|-------|------|------|---------------|
|                               |           |                                                                                                      | Min.  | Typ. | Max. |               |
| Forward Voltage               | $V_F$     | $I_F=100\text{A}, T_{vj}=25^{\circ}\text{C}$                                                         |       | 1.9  | 2.8  | V             |
|                               |           | $I_F=100\text{A}, T_{vj}=125^{\circ}\text{C}$                                                        |       | 1.7  |      |               |
|                               |           | $I_F=100\text{A}, T_{vj}=150^{\circ}\text{C}$                                                        |       | 1.6  |      |               |
| Recovered Charge              | $Q_{rr}$  | $I_F=100\text{A}$<br>$V_R=600\text{V}$<br>$-di_F/dt=3000\text{A/us}$<br>$T_{vj}=25^{\circ}\text{C}$  |       | 3.96 |      | $\mu\text{C}$ |
| Peak Reverse Recovery Current | $I_{rr}$  |                                                                                                      |       | 87   |      | A             |
| Reverse Recovery Energy       | $E_{rec}$ |                                                                                                      |       | 1.7  |      | mJ            |
| Recovered Charge              | $Q_{rr}$  | $I_F=100\text{A}$<br>$V_R=600\text{V}$<br>$-di_F/dt=3000\text{A/us}$<br>$T_{vj}=150^{\circ}\text{C}$ |       | 8.88 |      | $\mu\text{C}$ |
| Peak Reverse Recovery Current | $I_{rr}$  |                                                                                                      |       | 117  |      | A             |
| Reverse Recovery Energy       | $E_{rec}$ |                                                                                                      |       | 3.6  |      | mJ            |

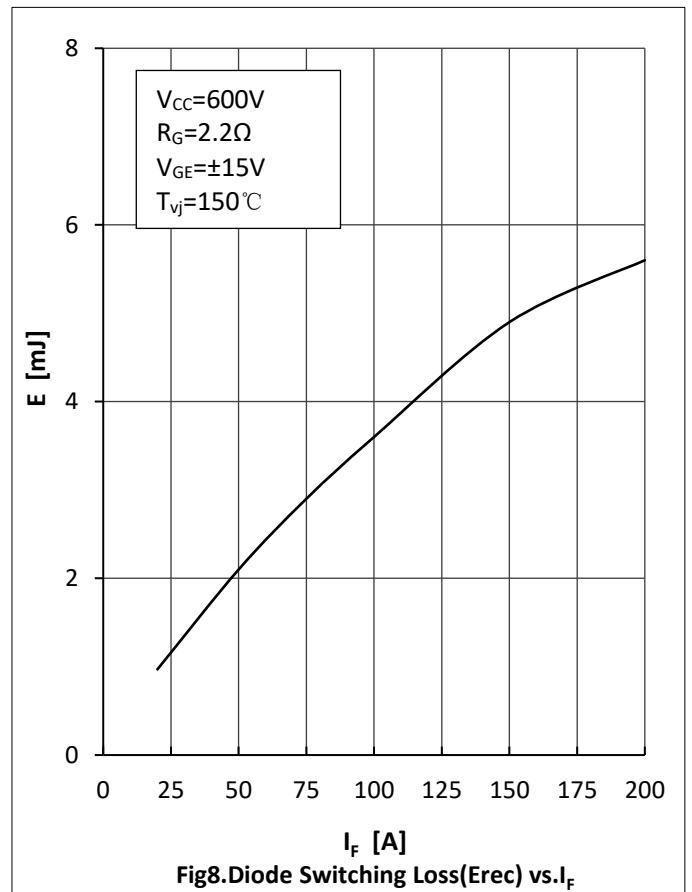
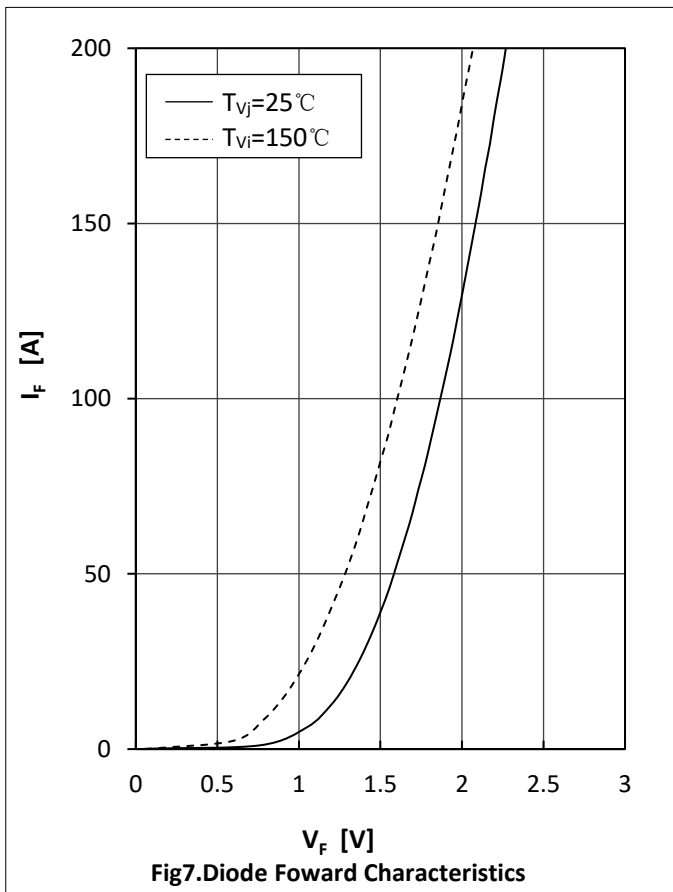
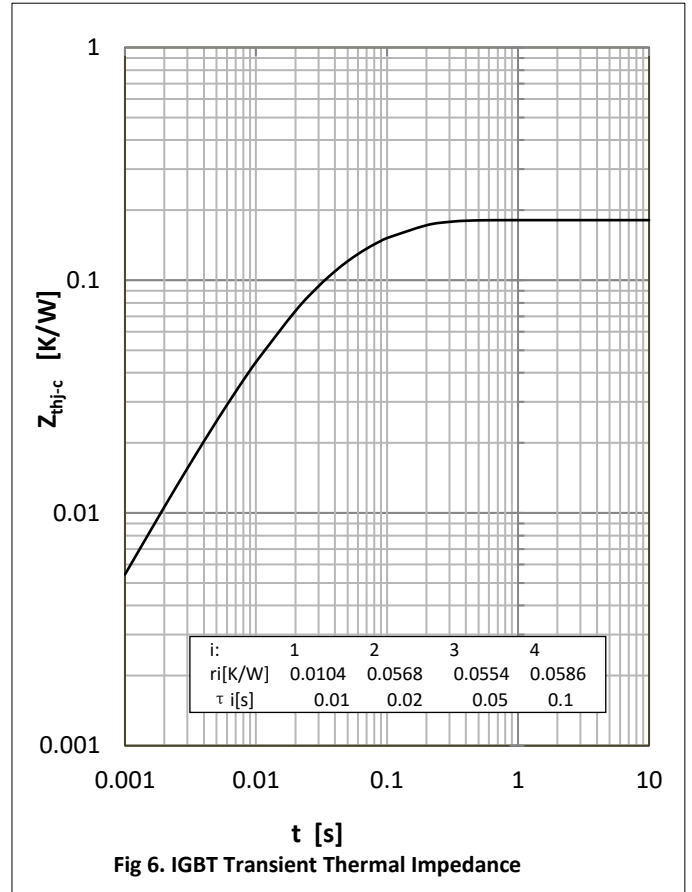
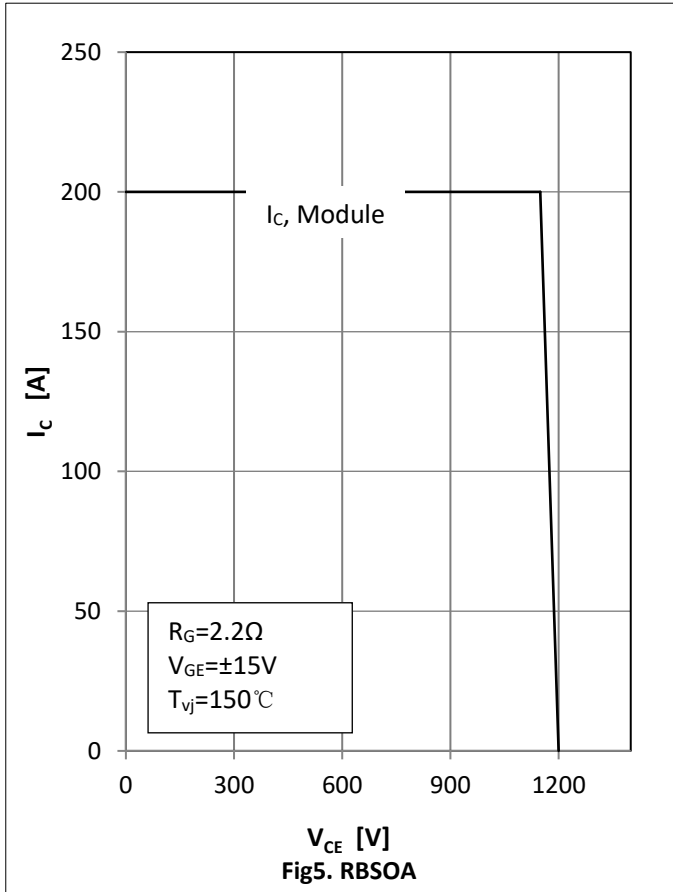


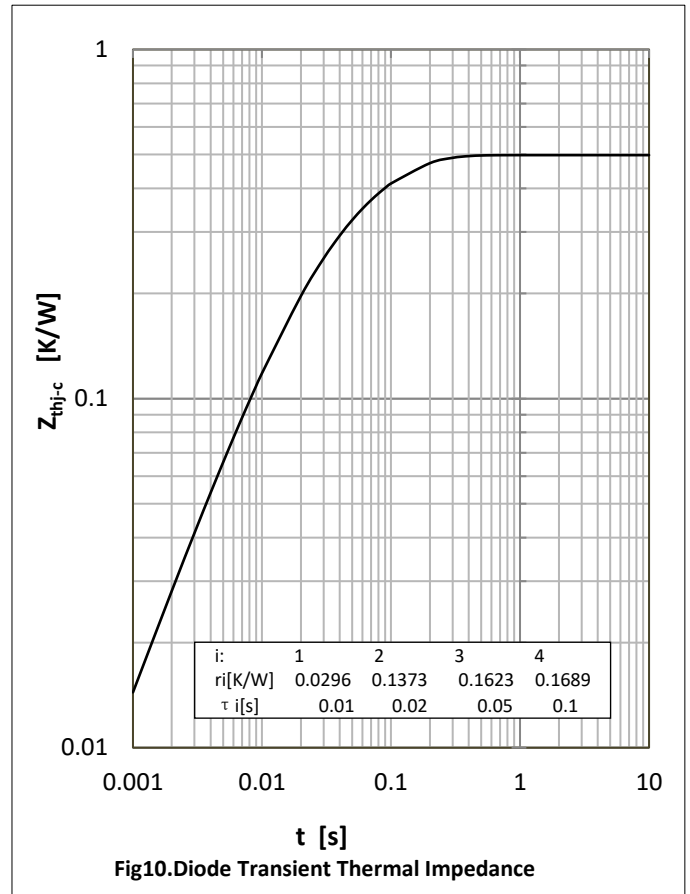
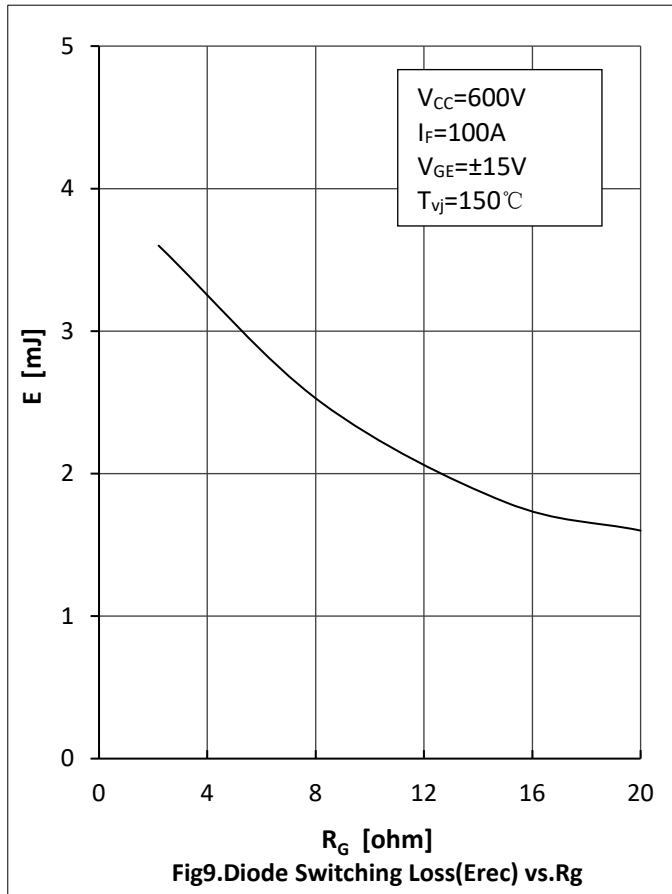
## ● Module Characteristics

 $T_C=25^{\circ}\text{C}$  unless otherwise specified

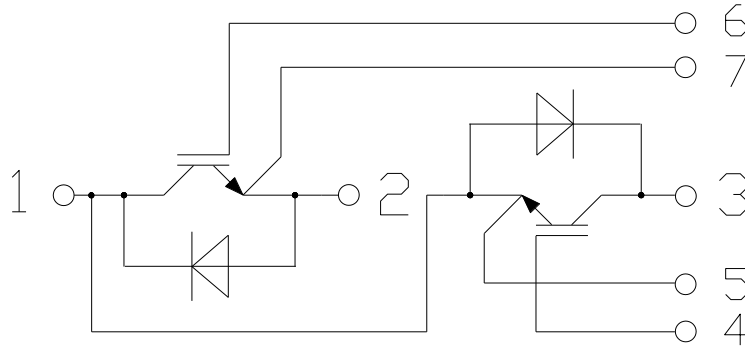
| Parameter                              | Symbol                | Conditions                     | Value |      |      | Unit               |
|----------------------------------------|-----------------------|--------------------------------|-------|------|------|--------------------|
|                                        |                       |                                | Min.  | Typ. | Max. |                    |
| Isolation Voltage                      | $V_{\text{isol}}$     | $t=1\text{min}, f=50\text{Hz}$ | 2500  |      |      | V                  |
| Maximum Junction Temperature           | $T_{\text{jmax}}$     |                                |       |      | 175  | $^{\circ}\text{C}$ |
| Operating Junction Temperature         | $T_{\text{vj op}}$    |                                | -40   |      | 150  | $^{\circ}\text{C}$ |
| Storage Temperature                    | $T_{\text{stg}}$      |                                | -40   |      | 125  | $^{\circ}\text{C}$ |
| Thermal Resistance<br>Junction to Case | $R_{\theta\text{JC}}$ | per IGBT                       |       |      | 0.18 | K/W                |
|                                        |                       | per Diode                      |       |      | 0.50 |                    |
| Thermal Resistance<br>Case to Sink     | $R_{\theta\text{CS}}$ | Conductive grease applied      |       | 0.05 |      | K/W                |
| Module Electrodes Torque               | $M_t$                 | Recommended(M5)                | 2.5   |      | 5.0  | N·m                |
| Module to Sink Torque                  | $M_s$                 | Recommended(M6)                | 3.0   |      | 5.0  | N·m                |
| Weight of Module                       | G                     |                                |       | 150  |      | g                  |





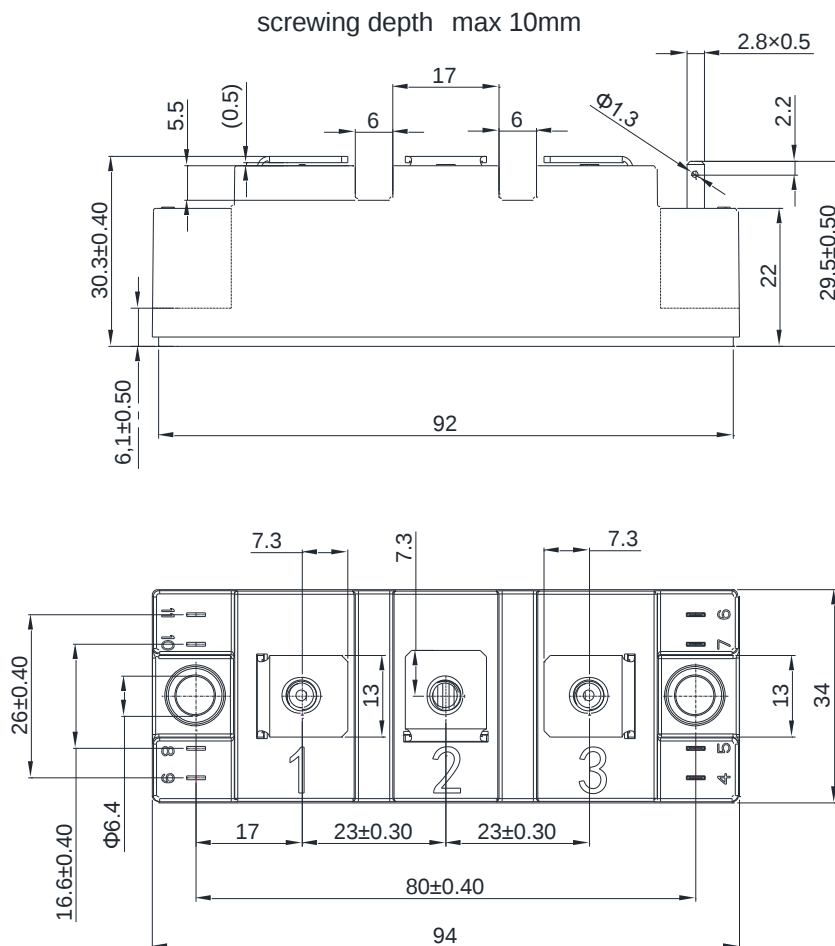


## ● Circuit Diagram



## ● Package Outline Information

Dimensions in Millimeters





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IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.

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