

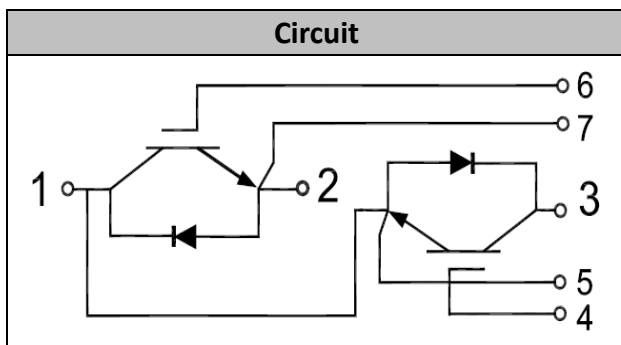


## IGBT Modules

|           |       |
|-----------|-------|
| $V_{CES}$ | 1200V |
| $I_c$     | 150A  |

## Applications

- High frequency drivers
- Solar inverters
- UPS (Uninterruptible Power Supplies)
- Electric welding machine



## Features

- High speed IGBT in NPT technology
- Low switching losses
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 150°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      | $I_c$     | $T_c=80^{\circ}C$                             | 150      | A    |
| Repetitive Peak Collector Current | $I_{CRM}$ | $t_p=1ms$                                     | 300      | 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>$T_{vjmax}=150^{\circ}C$ | 1136     | W    |

**Characteristic values**

| Parameter                               | Symbol        | Conditions   | Value   |      |      | Unit    |    |
|---|---------------|--|---|------|------|---------|----|
|   |               |  | Min.  | Typ. | Max. |         |    |
| Gate-emitter Threshold Voltage          | $V_{GE(th)}$  | $V_{GE}=V_{CE}, I_C=6mA, T_{vj}=25^{\circ}C$   | 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    | $V_{CE(sat)}$ | $I_C=150A, V_{GE}=15V, T_{vj}=25^{\circ}C$   |   | 3.0  | 3.5  | V       |    |
|   |               | $I_C=150A, V_{GE}=15V, T_{vj}=125^{\circ}C$  |   | 3.8  |      |         |    |
| Gate Charge                             | $Q_G$         |  |   | 1.75 |      | $\mu C$ |    |
| Input Capacitance                       | $C_{ies}$     | $V_{CE}=25V, V_{GE}=0V,$<br>$f=1MHz, T_{vj}=25^{\circ}C$   |   | 9.8  |      | nF      |    |
| Reverse Transfer Capacitance            | $C_{res}$     |  |   |      | 0.6  |         | nF |
| Gate-Emitter leakage current            | $I_{GES}$     | $V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$  |   |      | 400  | nA      |    |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=150A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_{GON}=5.1\Omega$<br>$R_{GOFF}=2.5\Omega$<br>$T_{vj}=25^{\circ}C$ |   | 70   |      | ns      |    |
| Rise Time                               | $t_r$         |  |   |      | 60   |         | ns |
| Turn-off Delay Time                     | $t_{d(off)}$  |  |   |      | 230  |         | ns |
| Fall Time                               | $t_f$         |  |   |      | 32   |         | ns |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |  |   |      | 14.4 |         | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$     |  |   |      | 5.5  |         | mJ |
| Turn-on Delay Time                      | $t_{d(on)}$   |  | $I_C=150A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_{GON}=5.1\Omega$<br>$R_{GOFF}=2.5\Omega$<br>$T_{vj}=125^{\circ}C$ |      | 90   |         | ns |
| Rise Time                               | $t_r$         |  |   |      | 70   |         | ns |
| Turn-off Delay Time                     | $t_{d(off)}$  |  |   |      | 280  |         | ns |
| Fall Time                               | $t_f$         |  |   |      | 35   |         | ns |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |  |   |      | 21.6 |         | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$     |  |   |      | 7.8  |         | mJ |
| SC Data                                 | $I_{sc}$      | $T_p \leq 10\mu s, V_{GE}=15V, T_{vj}=125^{\circ}C,$<br>$V_{cc}=600V, V_{CEM} \leq 1200V$                              |   |      | 1100 |         | A  |



## ● Diode

### Absolute Maximum Ratings

| Parameter                       | Symbol    | Conditions           | Value | Unit |
|---------------------------------|-----------|----------------------|-------|------|
| Repetitive Peak Reverse Voltage | $V_{RRM}$ | $T_{vj}=25^{\circ}C$ | 1200  | V    |
| Continuous DC Forward Current   | $I_F$     |                      | 150   | A    |
| Repetitive Peak Forward Current | $I_{FRM}$ | $t_p=1ms$            | 300   | A    |

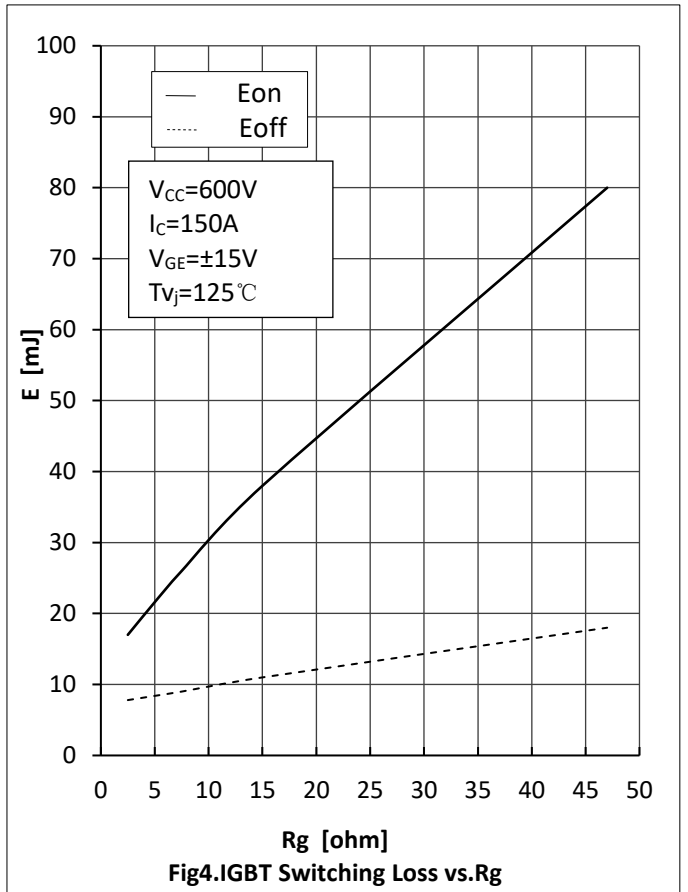
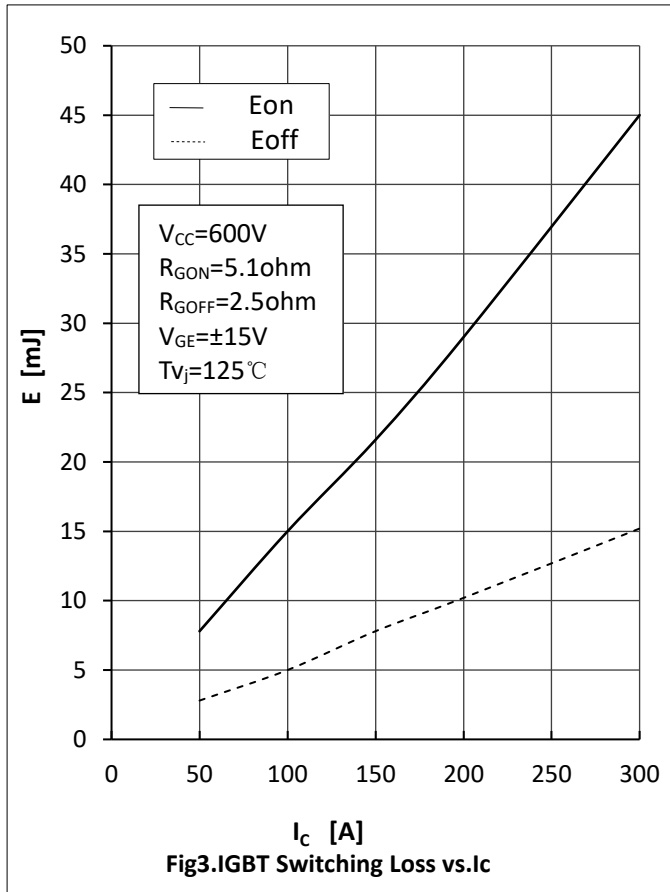
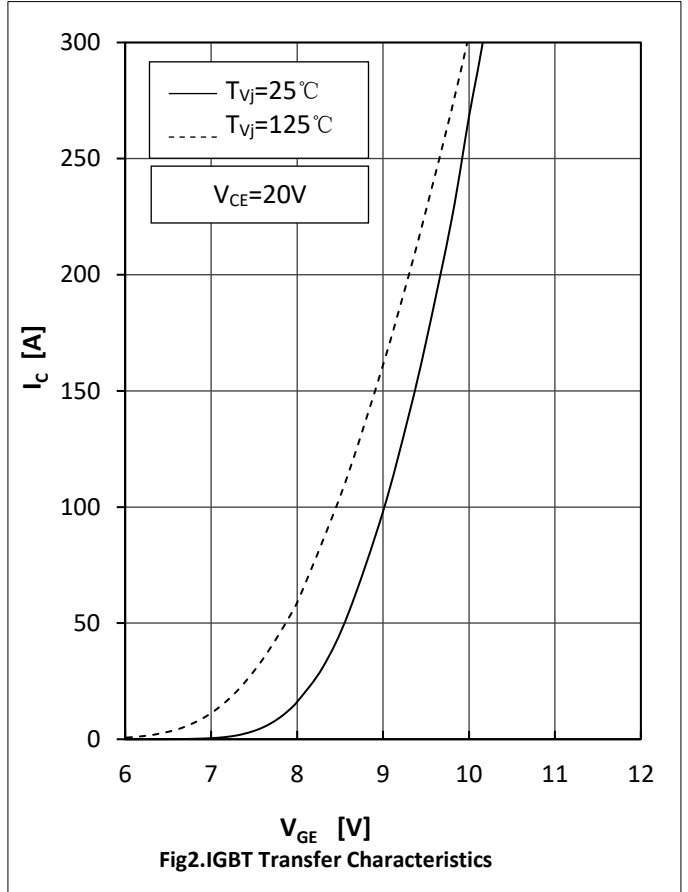
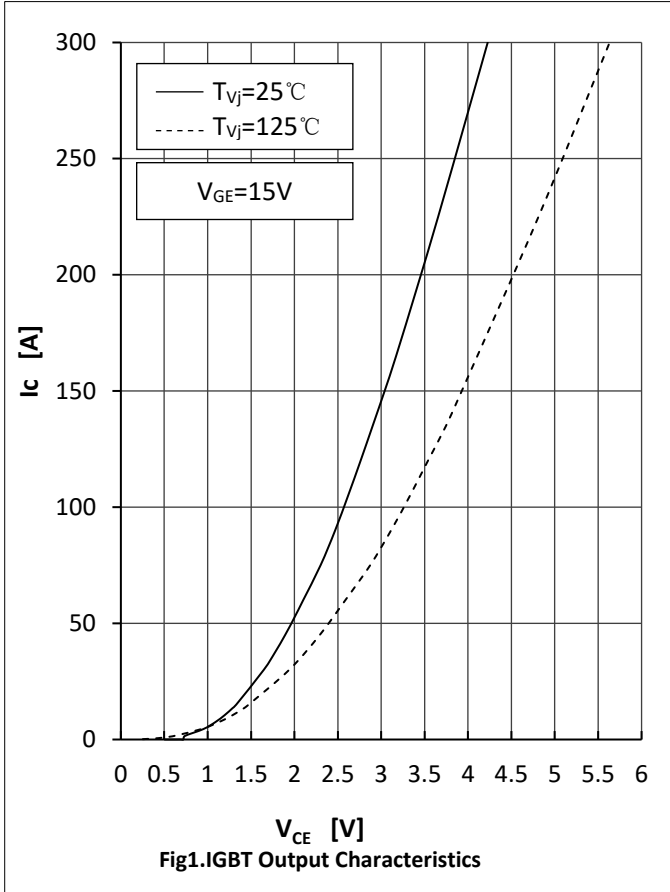
### Characteristic values

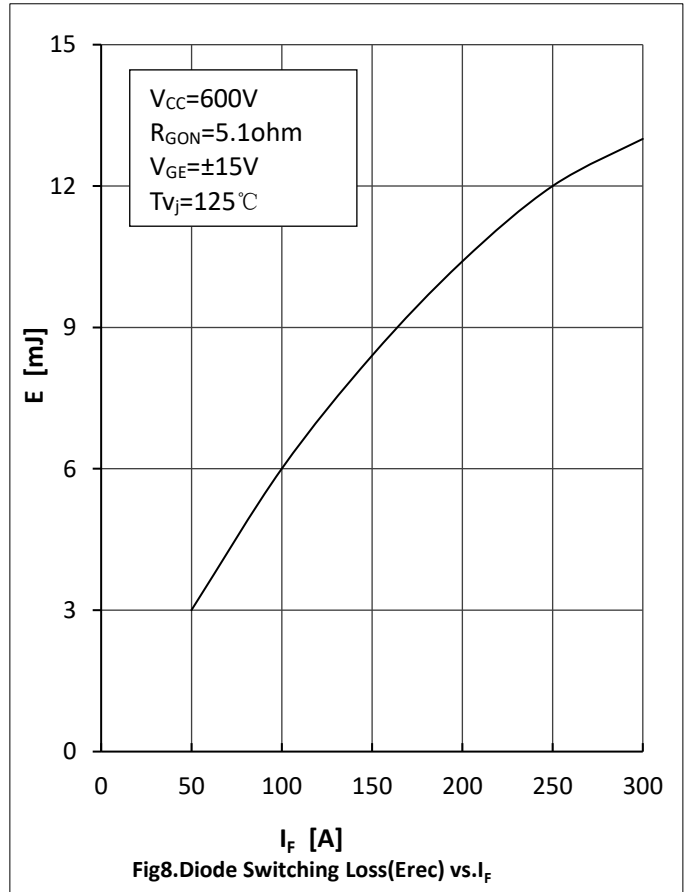
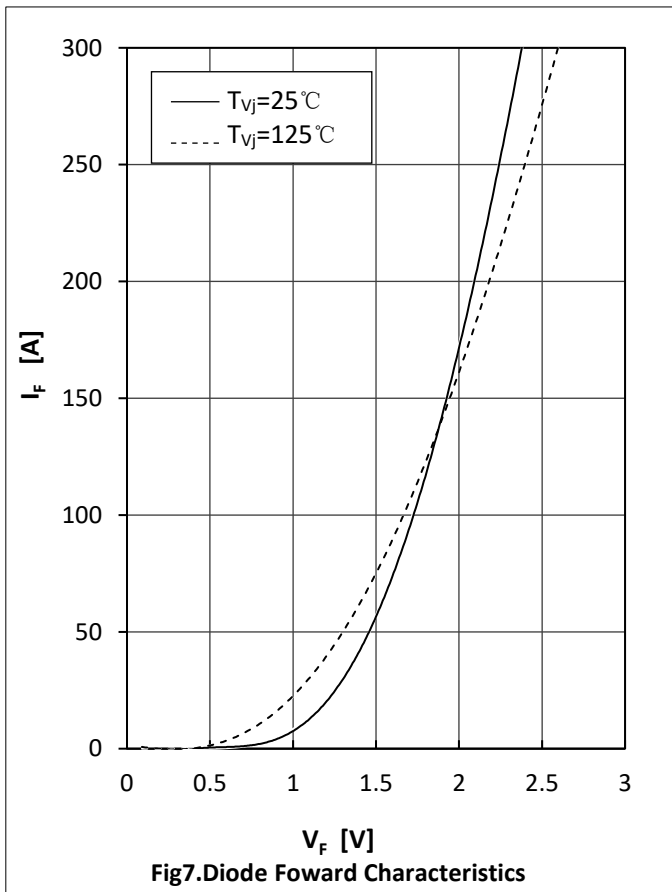
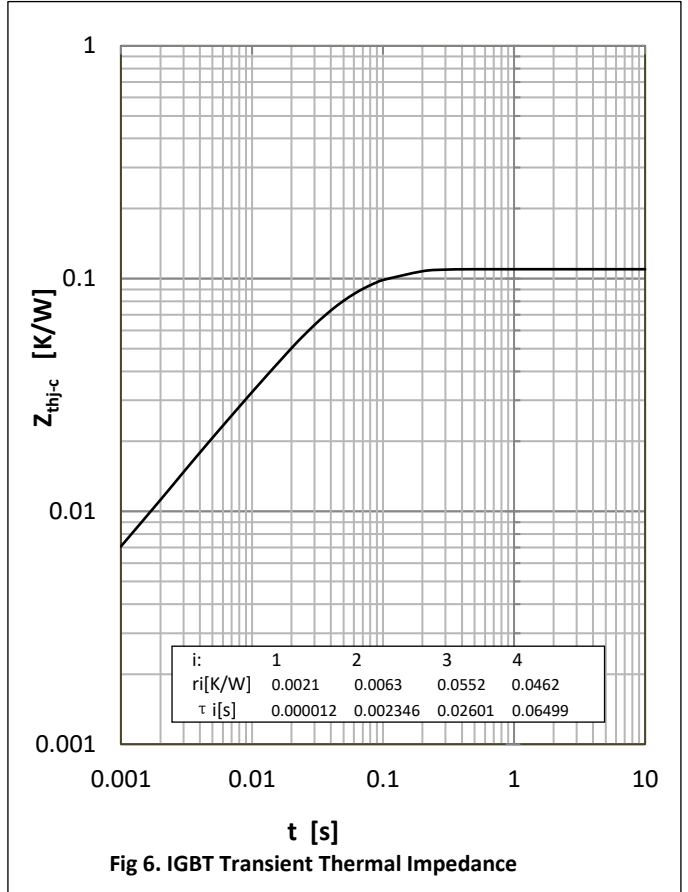
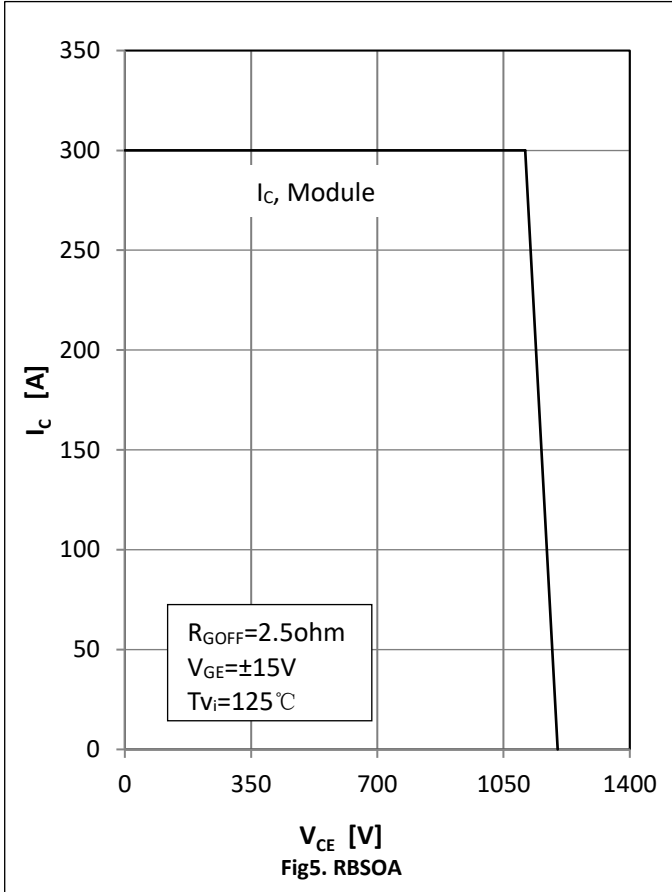
| Parameter                     | Symbol    | Conditions                           | Value |      |      | Unit    |
|-------------------------------|-----------|--------------------------------------|-------|------|------|---------|
|                               |           |                                      | Min.  | Typ. | Max. |         |
| Forward Voltage               | $V_F$     | $I_F=150A, T_{vj}=25^{\circ}C$       |       | 1.90 | 2.40 | V       |
|                               |           | $I_F=150A, T_{vj}=125^{\circ}C$      |       | 1.95 |      |         |
| Recovered Charge              | $Q_{rr}$  | $I_F=150A$                           |       | 6.8  |      | $\mu C$ |
| Peak Reverse Recovery Current | $I_{rr}$  | $V_R=600V$<br>$-di_F/dt=1400A/\mu s$ |       | 145  |      | A       |
| Reverse Recovery Energy       | $E_{rec}$ | $T_{vj}=25^{\circ}C$                 |       | 4.1  |      | mJ      |
| Recovered Charge              | $Q_{rr}$  | $I_F=150A$                           |       | 14.5 |      | $\mu C$ |
| Peak Reverse Recovery Current | $I_{rr}$  | $V_R=600V$<br>$-di_F/dt=1400A/\mu s$ |       | 160  |      | A       |
| Reverse Recovery Energy       | $E_{rec}$ | $T_{vj}=125^{\circ}C$                |       | 8.4  |      | mJ      |

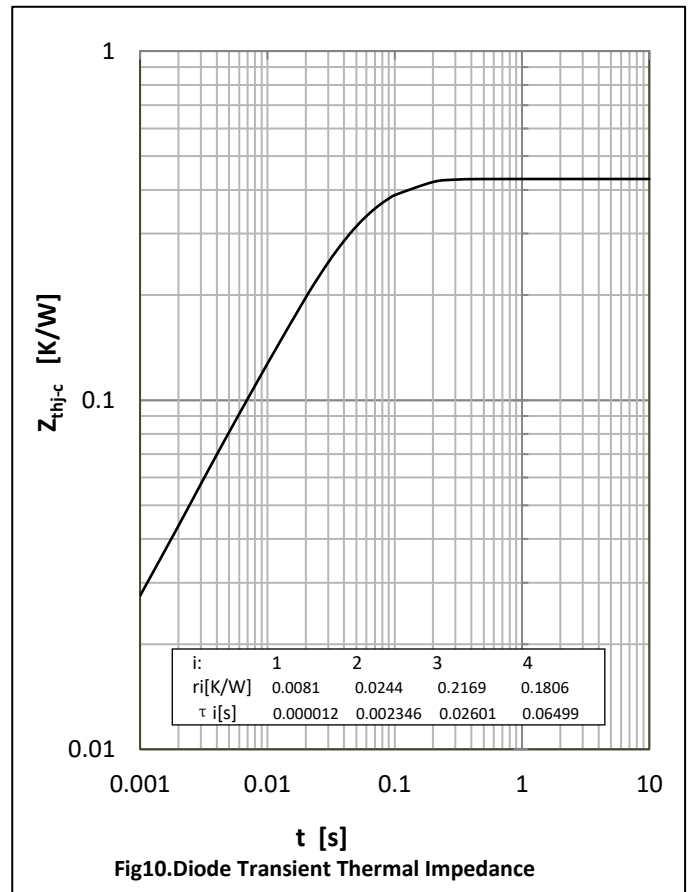
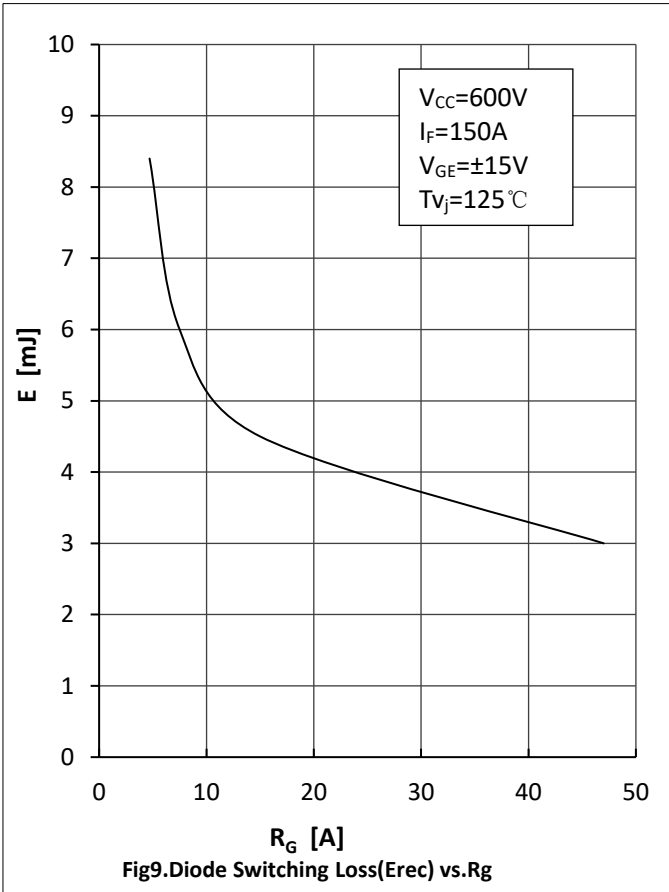


● **Module Characteristics**  $T_C=25^{\circ}\text{C}$  unless otherwise specified

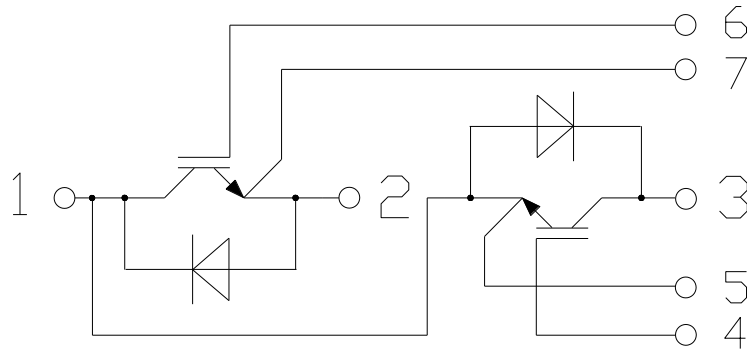
| Parameter                              | Symbol                | Conditions                     | Value |       |      | Unit               |
|--|-----------------------|--------------------------------|-------|-------|------|--------------------|
|  |                       |                                | Min.  | Typ.  | Max. |                    |
| Isolation voltage                      | $V_{\text{isol}}$     | $t=1\text{min}, f=50\text{Hz}$ | 2500  |       |      | V                  |
| Maximum Junction Temperature           | $T_{\text{jmax}}$     |                                |       |       | 150  | $^{\circ}\text{C}$ |
| Operating Junction Temperature         | $T_{\text{vjop}}$     |                                | -40   |       | 125  | $^{\circ}\text{C}$ |
| Storage Temperature                    | $T_{\text{stg}}$      |                                | -40   |       | 125  | $^{\circ}\text{C}$ |
| Thermal Resistance<br>Junction-to Case | $R_{\theta\text{JC}}$ | per IGBT                       |       |       | 0.11 | K/W                |
|  |                       | per Diode                      |       |       | 0.43 |                    |
| Thermal Resistance<br>Case-to Sink     | $R_{\theta\text{CS}}$ | Conductive grease applied      |       | 0.035 |      | K/W                |
| Module Electrodes Torque               | $M_t$                 | Recommended(M6)                | 3.0   |       | 5.0  | N·m                |
| Module-to-Sink Torque                  | $M_s$                 | Recommended(M6)                | 3.0   |       | 5.0  | N·m                |
| Weight of Module                       | G                     |                                |       | 315   |      | g                  |







● **Circuit Diagram**



● **Package Outline Information**

Dimensions in Millimeters

