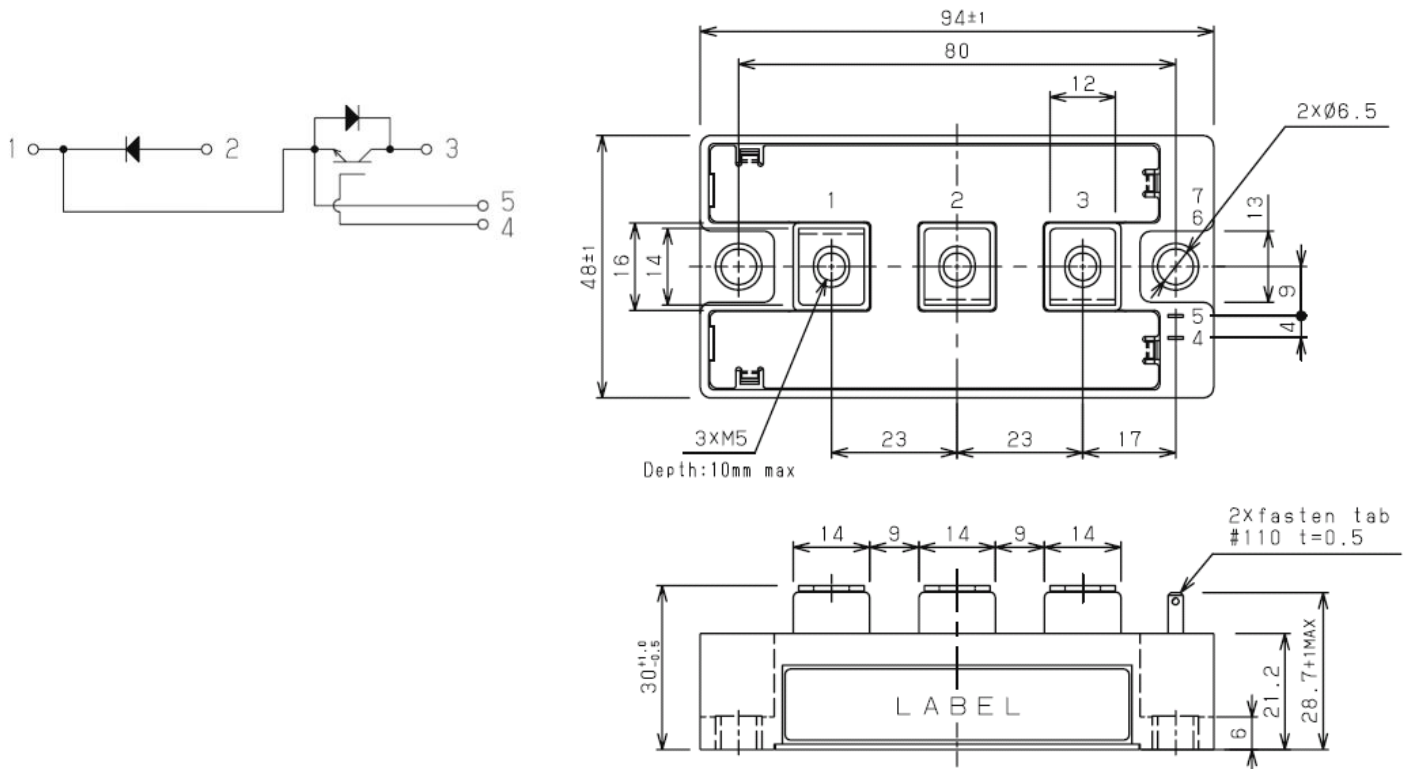


□ 回路図 : *CIRCUIT*

□ 概略図 : *SCHEMATIC DIAGRAM*

Dimension: [mm]



□ 最大定格 : *MAXIMUM RATINGS* (at Tc=25°C unless otherwise specified)

| Item                                        |                                                     | Symbol                  | Condition                           | Rated Value | Unit    |     |
|---------------------------------------------|-----------------------------------------------------|-------------------------|-------------------------------------|-------------|---------|-----|
| IGBT                                        | コレクタ・エミッタ間 電 圧<br>Collector-Emitter Voltage         | V <sub>CES</sub>        | G-E Short                           | 1200        | V       |     |
|                                             | ゲート・エミッタ間 電 圧<br>Gate-Emitter Voltage               | V <sub>GES</sub>        | C-E Short                           | ±20         | V       |     |
|                                             | コ レ ク タ 電 流<br>Collector Current                    | I <sub>C</sub>          | DC T <sub>c</sub> =85℃              | 200         | A       |     |
|                                             |                                                     | I <sub>CP</sub>         | Pulse ≤ 1ms                         | 400         |         |     |
|                                             | コ レ ク タ 損 失<br>Collector Power Dissipation          | P <sub>C</sub>          | T <sub>J</sub> =175℃                | 1153        | W       |     |
| T <sub>J</sub> =150℃                        |                                                     |                         | 961                                 |             |         |     |
| FWD                                         | 繰 り 返 し ピーク逆 電 圧<br>Repetitive peak reverse voltage | V <sub>RRM</sub>        |                                     | 1200        | V       |     |
|                                             | 順 電 流<br>Forward Current                            | I <sub>F</sub>          |                                     | 200         | A       |     |
|                                             |                                                     | I <sub>FM</sub>         | Pulse ≤ 1ms                         | 400         |         |     |
| 最 大 接 合 温 度<br>Maximum Junction Temperature |                                                     | T <sub>JMAX</sub>       | 瞬時動作(過負荷)<br>Instantaneous Overload | 175         | ℃       |     |
| 接 合 温 度<br>Junction Temperature Range       |                                                     | T <sub>J</sub>          |                                     | -40～+150    | ℃       |     |
| 保 存 温 度<br>Storage Temperature Range        |                                                     | T <sub>stg</sub>        |                                     | -40～+125    | ℃       |     |
| 絶 縁 耐 圧<br>Isolation Voltage                |                                                     | V <sub>ISO</sub>        | Terminal to Base AC, 1minute        | 2,500       | V (RMS) |     |
| 締 め 付 け ト ル ク<br>Mounting Torque            |                                                     | Module Base to Heatsink | F <sub>tor</sub>                    | M6          | 3       | N・m |
|                                             |                                                     | Busbar to Main Terminal |                                     | M5          | 2       |     |

□ 電 氣 的 特 性 : **ELECTRICAL CHARACTERISTICS** (at  $T_J=25^\circ\text{C}$  unless otherwise specified)

| Characteristic                     |                                                        | Symbol                        | Test Condition                                                                                                                            | Min.                    | Typ. | Max. | Unit          |
|------------------------------------|--------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------|------|---------------|
| IGBT                               | コレクタ遮断電流<br>Collector-Emitter Cut-Off Current          | $I_{CES}$                     | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}$                                                                                                   | —                       | —    | 1.0  | mA            |
|                                    | ゲート漏れ電流<br>Gate-Emitter Leakage Current                | $I_{GES}$                     | $V_{GE}=\pm 20\text{V}, V_{CE}=0\text{V}$                                                                                                 | —                       | —    | 1.0  | $\mu\text{A}$ |
|                                    | コレクタ・エミッタ間飽和電圧<br>Collector-Emitter Saturation Voltage | $V_{CE(sat.)}$                | $I_C=200\text{A}, V_{GE}=15\text{V}$<br>(chip level)                                                                                      | $T_J=25^\circ\text{C}$  | —    | 1.50 | V             |
|                                    |                                                        |                               |                                                                                                                                           | $T_J=125^\circ\text{C}$ | —    | 1.70 |               |
|                                    |                                                        |                               |                                                                                                                                           | $T_J=150^\circ\text{C}$ | —    | 1.80 |               |
|                                    | ゲートしきい値電圧<br>Gate-Emitter Threshold Voltage            | $V_{GE(th.)}$                 | $V_{CE}=10\text{V}, I_C=6.7\text{mA}$                                                                                                     | 4.8                     | —    | 7.0  | V             |
|                                    | 入力容量 Input Capacitance                                 | $C_{ies}$                     | $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$                                                                                      | —                       | 19.0 | —    | nF            |
|                                    | 出力容量 Output Capacitance                                | $C_{oes}$                     |                                                                                                                                           | —                       | 0.56 | —    |               |
|                                    | 帰還容量 Reverse Transfer Capacitance                      | $C_{res}$                     |                                                                                                                                           | —                       | 0.45 | —    |               |
|                                    | ゲート電荷量<br>Gate Charge                                  | $Q_g$                         | $V_{CC}=600\text{V}, I_C=200\text{A}, V_{GE}=-15\sim+15\text{V}$                                                                          | —                       | 2200 | —    | nC            |
|                                    | スイッチング時間<br>Switching Time                             | 上昇時間 Rise Time                | $V_{CC}=600\text{V}, I_C=200\text{A}, R_g=36\Omega$<br>$V_{GE}=\pm 15\text{V}, T_J=150^\circ\text{C}$<br>$L_s=38\text{nH}$ Inductive Load | —                       | 60   | —    | ns            |
|                                    |                                                        | ターンオン遅延時間 Turn-on Delay Time  |                                                                                                                                           | —                       | 110  | —    |               |
|                                    |                                                        | 下降時間 Fall Time                |                                                                                                                                           | —                       | 200  | —    |               |
|                                    |                                                        | ターンオフ遅延時間 Turn-off Delay Time |                                                                                                                                           | —                       | 500  | —    |               |
| FWD                                | 順電圧<br>Peak Forward Voltage                            | $V_F$                         | $I_F=200\text{A}, V_{GE}=0\text{V}$<br>(chip level)                                                                                       | $T_J=25^\circ\text{C}$  | —    | 2.00 | V             |
|                                    |                                                        |                               |                                                                                                                                           | $T_J=125^\circ\text{C}$ | —    | 1.98 |               |
|                                    |                                                        |                               |                                                                                                                                           | $T_J=150^\circ\text{C}$ | —    | 1.95 |               |
|                                    | 逆回復時間<br>Reverse Recovery Time                         | $t_{rr}$                      | $V_{CC}=600\text{V}, I_C=200\text{A}, R_g=36\Omega$<br>$V_{GE}=\pm 15\text{V}, T_J=150^\circ\text{C}$<br>$L_s=38\text{nH}$ Inductive Load | —                       | 200  | —    | ns            |
| 内部配線抵抗<br>Internal Lead Resistance |                                                        | $R_{CC+EE'}$                  | 主端子—チップ間 / 1素子<br>Main Terminal - Chip / Per 1 Arm                                                                                        | —                       | —    | 1    | m $\Omega$    |
| 内部インダクタンス<br>Stray Inductance      |                                                        | $L_{SCE}$                     | メイン端子3—2間<br>Main Terminal 3 - Main Terminal 2                                                                                            | —                       | 30   | —    | nH            |

□ 熱 的 特 性 : **THERMAL CHARACTERISTICS**

| Characteristic              |      | Symbol        | Test Condition                                                      | Min. | Typ. | Max. | Unit                      |
|-----------------------------|------|---------------|---------------------------------------------------------------------|------|------|------|---------------------------|
| 熱抵抗<br>Thermal Resistance   | IGBT | $R_{th(j-c)}$ | Junction to Case<br>Per 1 Arm (Tc測定点:チップ直下)                         | —    | —    | 0.13 | $^\circ\text{C}/\text{W}$ |
|                             | FWD  |               |                                                                     | —    | —    | 0.21 |                           |
| 接触熱抵抗<br>Thermal Resistance | IGBT | $R_{th(c-f)}$ | Case to heatsink<br>Per 1 Arm Paste=1W/(m $^2$ · $^\circ\text{C}$ ) | —    | 0.05 | —    |                           |
|                             | FWD  |               |                                                                     | —    | 0.10 | —    |                           |

### 特性図 : CHARACTERISTICS CURVES

Fig.1- Output Characteristics (Typical)

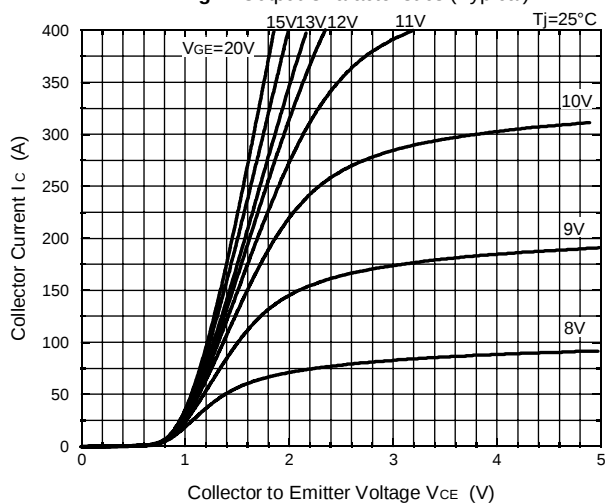


Fig.2- Saturation Voltage Characteristics (Typical)

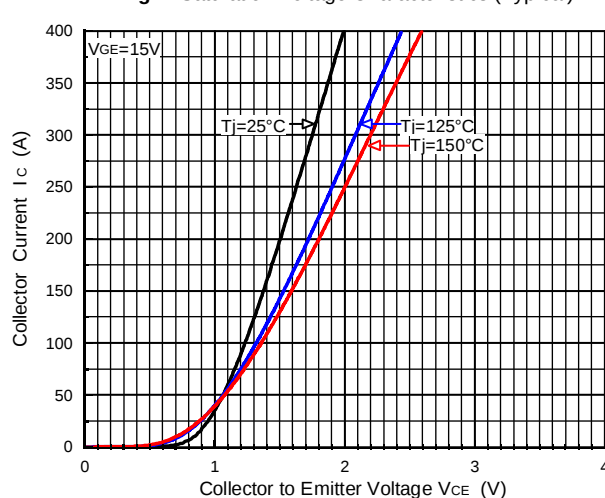


Fig.3- Transfer Characteristics (Typical)

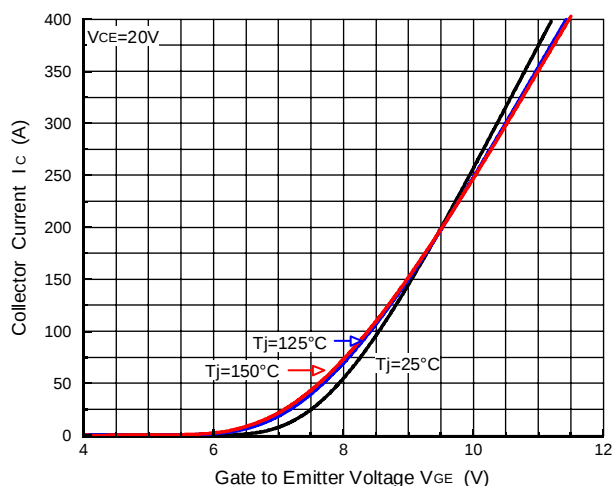


Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)

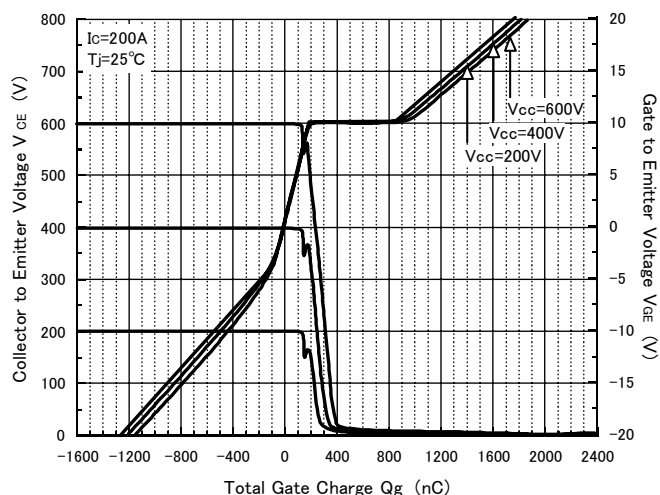


Fig.5- Collector Current vs. Switching Time

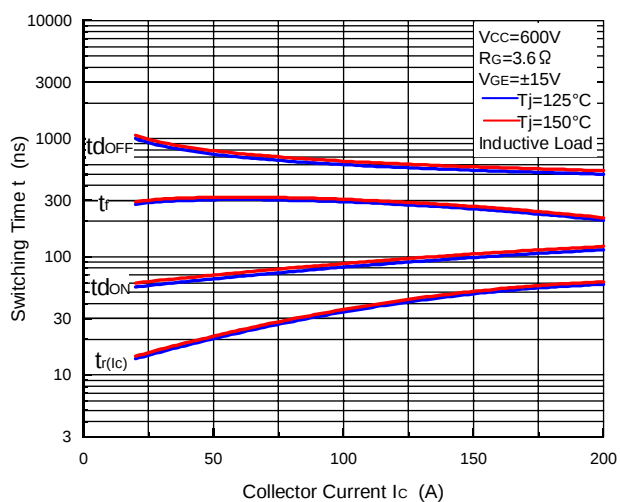
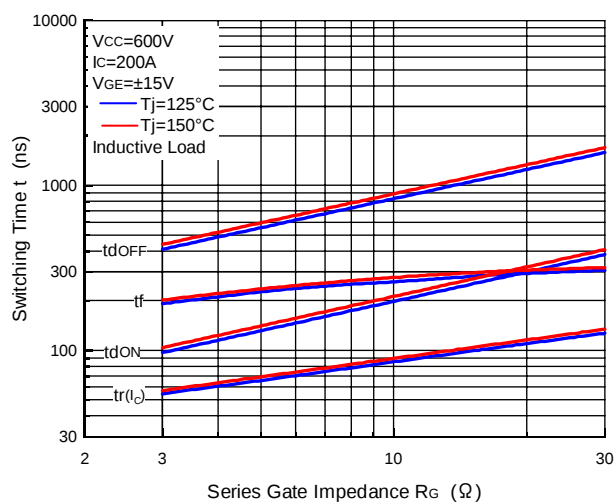


Fig.6- Series Gate Impedance vs. Switching Time



### 特性図 : CHARACTERISTICS CURVES

Fig.7- Collector Current vs. Switching Loss

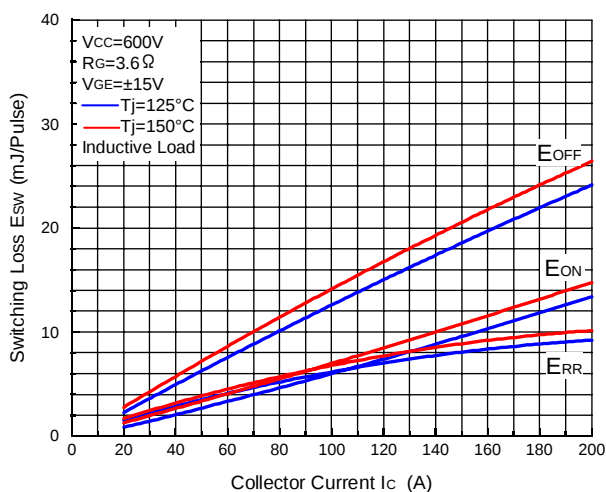


Fig.8- Series Gate Impedance vs. Switching Loss

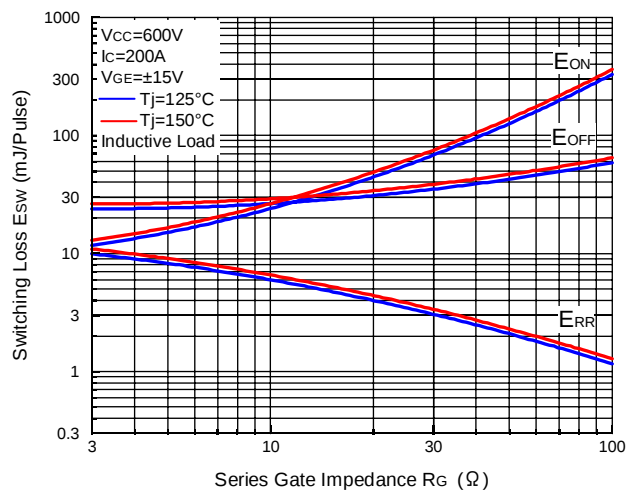


Fig.9- Forward Characteristics of FWD (Typical)

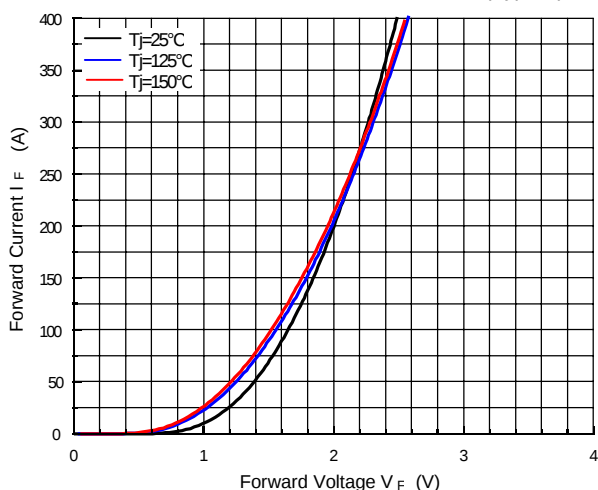


Fig.10- Reverse Recovery Characteristics of FWD & Inverse Diode (Typical)

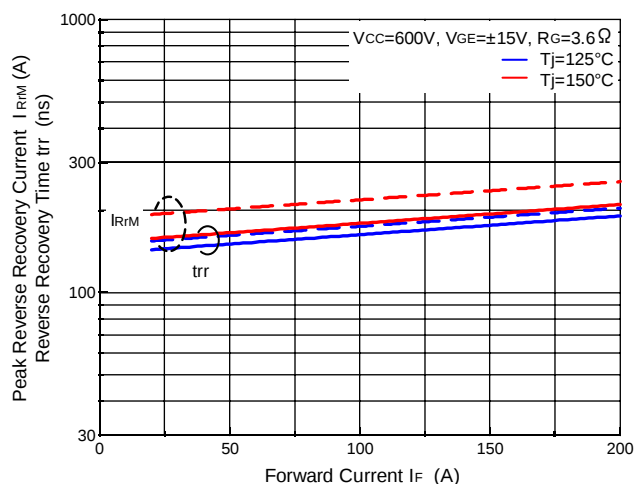


Fig.11- Reverse Bias Safe Operating Area

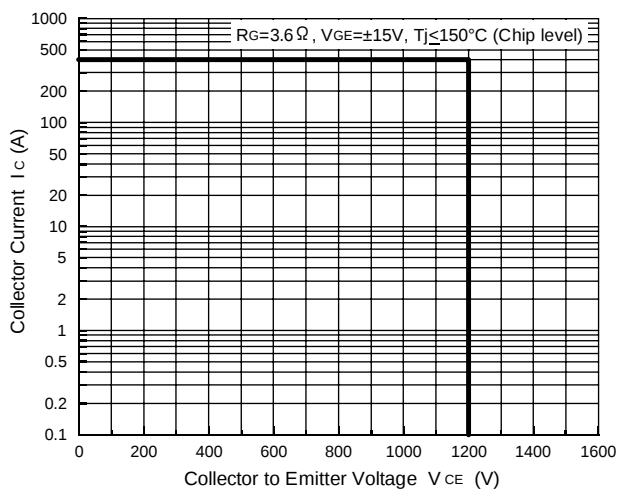
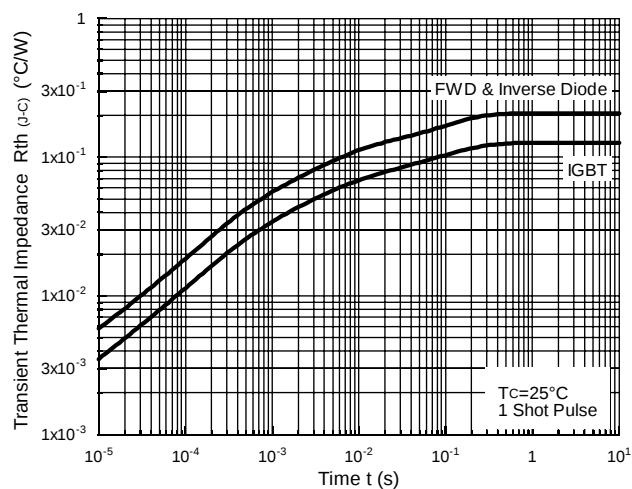


Fig.12- Transient Thermal Impedance



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