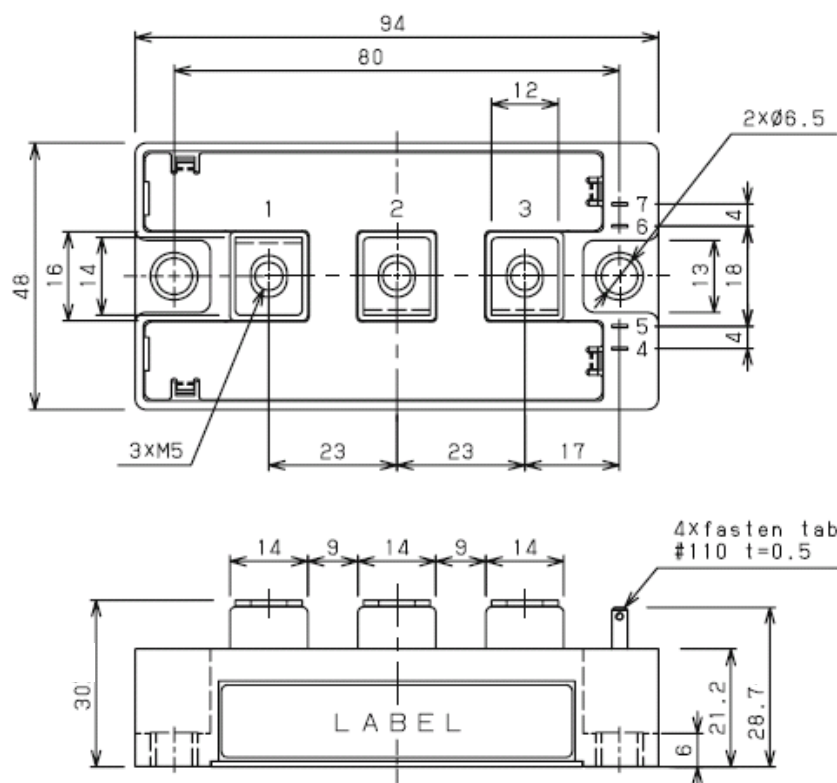
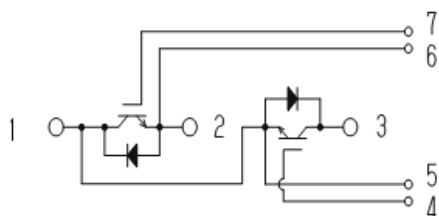


□ 回路図 : *CIRCUIT*

□ 概略図 : *SCHEMATIC DIAGRAM*

Dimension: [mm]



□ 最大定格 : *MAXIMUM RATINGS* (at  $T_c=25^{\circ}\text{C}$  unless otherwise specified)

|                            | Item                                          | Symbol     | Condition                           | Rated Value     | Unit               |
|----------------------------|-----------------------------------------------|------------|-------------------------------------|-----------------|--------------------|
| IGBT                       | コレクタ・エミッタ間電圧<br>Collector-Emmitter Voltage    | $V_{CES}$  | G-E Short                           | 650             | V                  |
|                            | ゲート・エミッタ間電圧<br>Gate-Emmitter Voltage          | $V_{GES}$  | C-E Short                           | $\pm 20$        | V                  |
|                            | コレクタ電流<br>Collector Current                   | $I_C$      | DC $T_c=85^{\circ}\text{C}$         | 300             | A                  |
|                            |                                               | $I_{CP}$   | Pulse $\leq 1\text{ms}$             | 600             |                    |
| FWD                        | 繰り返しピーク逆電圧<br>Repetitive peak reverse voltage | $P_C$      | $T_j=175^{\circ}\text{C}$           | 1153            | W                  |
|                            |                                               |            | $T_j=150^{\circ}\text{C}$           | 961             |                    |
|                            |                                               | $V_{RRM}$  |                                     | 650             | V                  |
|                            | 順電流<br>Forward Current                        | $I_F$      |                                     | 300             | A                  |
|                            |                                               | $I_{FM}$   | Pulse $\leq 1\text{ms}$             | 600             |                    |
|                            | 最大接合温度<br>Maximum Junction Temperature        | $T_{jMAX}$ | 瞬時動作(過負荷)<br>Instantaneous Overload | 175             | $^{\circ}\text{C}$ |
|                            | 接合温度範囲<br>Junction Temperature Range          | $T_j$      |                                     | $-40 \sim +150$ | $^{\circ}\text{C}$ |
|                            | 保存温度範囲<br>Storage Temperature Range           | $T_{stg}$  |                                     | $-40 \sim +125$ | $^{\circ}\text{C}$ |
|                            | 絶縁耐圧<br>Isolation Voltage                     | $V_{ISO}$  | Terminal to Base AC, 1minute        | 2,500           | V (RMS)            |
| 締め付けトルク<br>Mounting Torque | Module Base to Heatsink                       | $F_{tor}$  | M6                                  | 3               | N・m                |
|                            | Busbar to Main Terminal                       |            | M5                                  | 2               |                    |

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

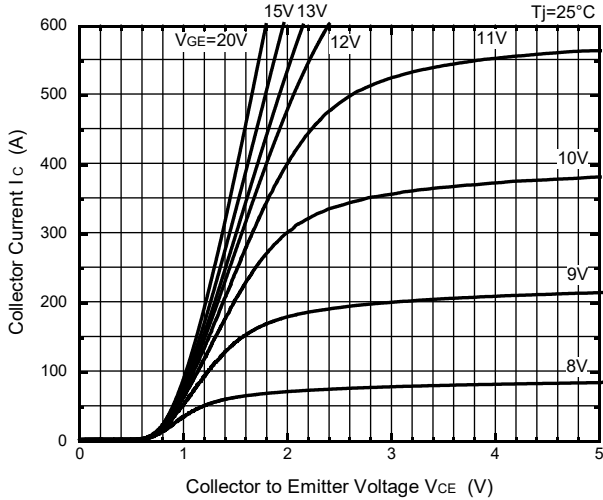
| Characteristic                     |                                                        |         | Symbol                                                                                  | Test Condition                                     | Min.    | Typ. | Max. | Unit |    |
|------------------------------------|--------------------------------------------------------|---------|-----------------------------------------------------------------------------------------|----------------------------------------------------|---------|------|------|------|----|
| IGBT                               | コレクタ遮断電流<br>Collector-Emitter Cut-Off Current          |         | ICES                                                                                    | VCE= 650V,VGE= 0V                                  |         | —    | —    | 1.0  | mA |
|                                    | ゲート漏れ電流<br>Gate-Emitter Leakage Current                |         | IGES                                                                                    | VGE= ±20V,VCE= 0V                                  |         | —    | —    | 1.0  | μA |
|                                    | コレクタ・エミッタ間飽和電圧<br>Collector-Emitter Saturation Voltage |         | VCE(sat.)                                                                               | IC= 300A,VGE= 15V<br>(chip level)                  | TJ=25℃  | —    | 1.45 | 1.95 | V  |
|                                    |                                                        |         |                                                                                         |                                                    | TJ=125℃ | —    | 1.65 | —    |    |
|                                    |                                                        |         |                                                                                         |                                                    | TJ=150℃ | —    | 1.70 | —    |    |
|                                    | ゲートしきい値電圧<br>Gate-Emitter Threshold Voltage            |         | VGE(th.)                                                                                | VCE= 10V,IC= 6mA                                   |         | 4.8  | —    | 7.0  | V  |
|                                    | 入力容量 Input Capacitance                                 |         | Cies                                                                                    | VCE= 25V,VGE= 0V,f= 1MHz                           |         | —    | 25.0 | —    | nF |
|                                    | 出力容量 Output Capacitance                                |         | Coes                                                                                    |                                                    |         | —    | 1.0  | —    |    |
|                                    | 帰還容量 Reverse Transfer Capacitance                      |         | Cres                                                                                    |                                                    |         | —    | 0.8  | —    |    |
|                                    | ゲート電荷量<br>Gate Charge                                  |         | Qg                                                                                      | Vcc=300V, Ic=300A, VGE=-15~+15V                    |         | —    | 2550 | —    | nC |
| スイッチング時間<br>Switching Time         | 上昇時間 Rise Time                                         | tr      | VCC= 300V    LS=20nH<br>IC= 300A    Inductive Load<br>Rg= 3.6Ω<br>VGE= ±15V<br>TJ= 150℃ |                                                    | —       | 90   | —    | ns   |    |
|                                    | ターンオン遅延時間 Turn-on Delay Time                           | td(on)  |                                                                                         |                                                    | —       | 220  | —    |      |    |
|                                    | 下降時間 Fall Time                                         | tf      |                                                                                         |                                                    | —       | 95   | —    |      |    |
|                                    | ターンオフ遅延時間 Turn-off Delay Time                          | td(off) |                                                                                         |                                                    | —       | 400  | —    |      |    |
| FWD                                | 順電圧<br>Peak Forward Voltage                            |         | VF                                                                                      | IF= 300A,VGE=0V<br>(chip level)                    | TJ=25℃  | —    | 1.70 | 2.20 | V  |
|                                    |                                                        |         |                                                                                         |                                                    | TJ=125℃ | —    | 1.60 | —    |    |
|                                    |                                                        |         |                                                                                         |                                                    | TJ=150℃ | —    | 1.55 | —    |    |
| 逆回復時間<br>Reverse Recovery Time     |                                                        | trr     | VCC= 300V    LS=20nH<br>IC= 300A    Inductive Load<br>Rg= 3.6Ω<br>VGE= ±15V<br>TJ= 150℃ |                                                    | —       | 175  | —    | ns   |    |
| 内部配線抵抗<br>Internal Lead Resistance |                                                        |         | RCC+EE'                                                                                 | 主端子—チップ間 / 1素子<br>Main Terminal - Chip / Per 1 Arm |         | —    | —    | 0.6  | mΩ |
| 内部インダクタンス<br>Stray Inductance      |                                                        |         | LSCE                                                                                    | メイン端子3－2間<br>Main Terminal 3 - Main Terminal 2     |         | —    | 27   | —    | nH |

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

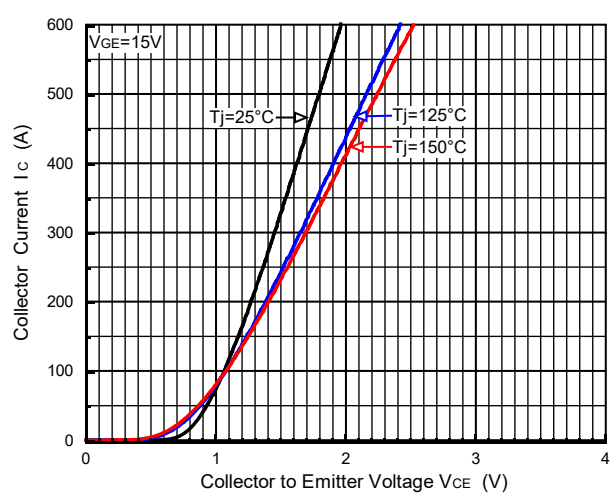
| Characteristic              |         | Symbol   | Test Condition                                             | Min. | Typ. | Max. | Unit |
|-----------------------------|---------|----------|------------------------------------------------------------|------|------|------|------|
| 熱抵抗<br>Thermal Resistance   | I G B T | Rth(j-c) | Junction to Case<br>Per 1 Arm (Tc測定点:チップ直下)                | —    | —    | 0.13 | °C/W |
|                             | F W D   |          |                                                            | —    | —    | 0.33 |      |
| 接触熱抵抗<br>Thermal Resistance | I G B T | Rth(c-f) | Case to heatsink<br>Per 1 Arm Paste=1W/(m <sup>2</sup> °C) | —    | 0.05 | —    |      |
|                             | F W D   |          |                                                            | —    | 0.10 | —    |      |

□ 特性图 : CHARACTERISTICS CURVES

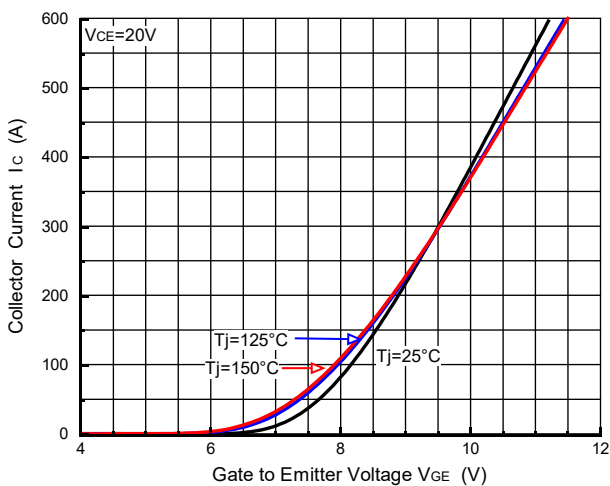
**Fig.1- Output Characteristics (Typical)**



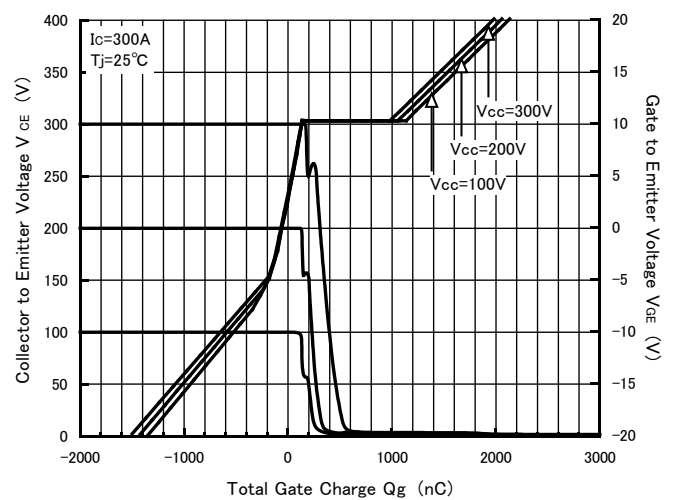
**Fig.2- Saturation Voltage Characteristics (Typical)**



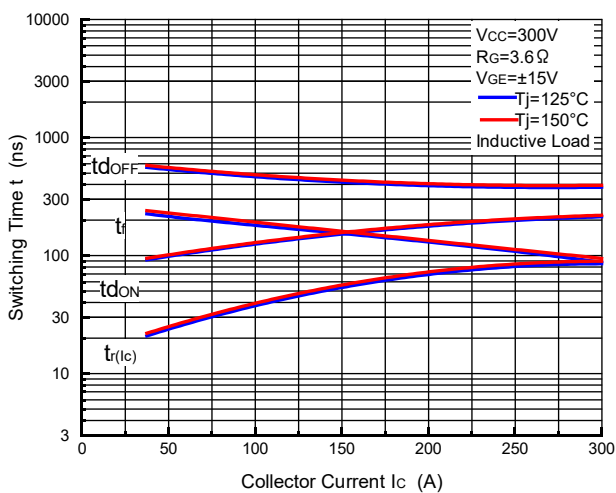
**Fig.3- Transfer Characteristics (Typical)**



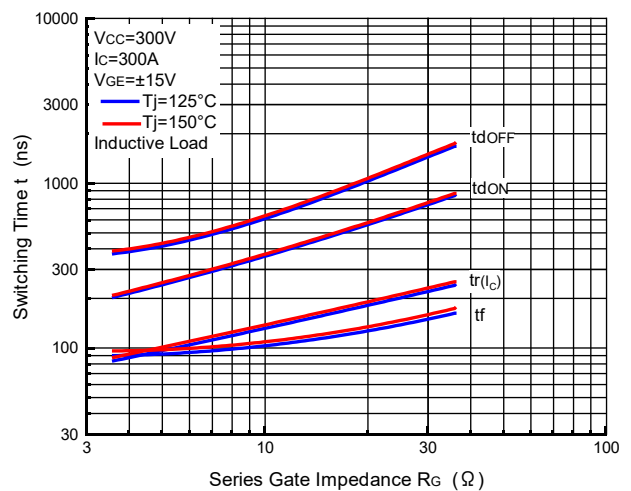
**Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)**



**Fig.5- Collector Current vs. Switching Time (Typical)**

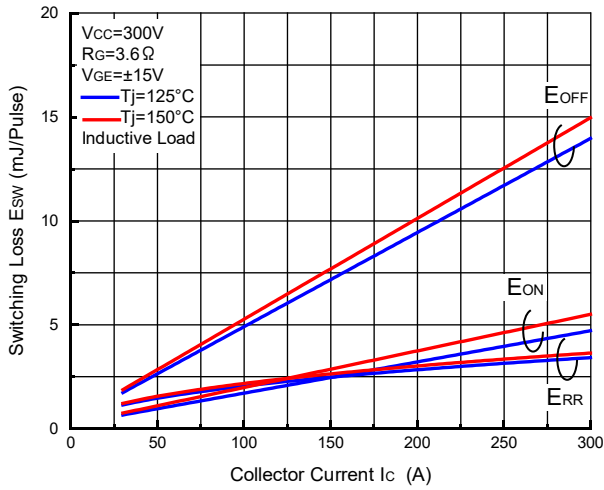


**Fig.6- Series Gate Impedance vs. Switching Time (Typical)**

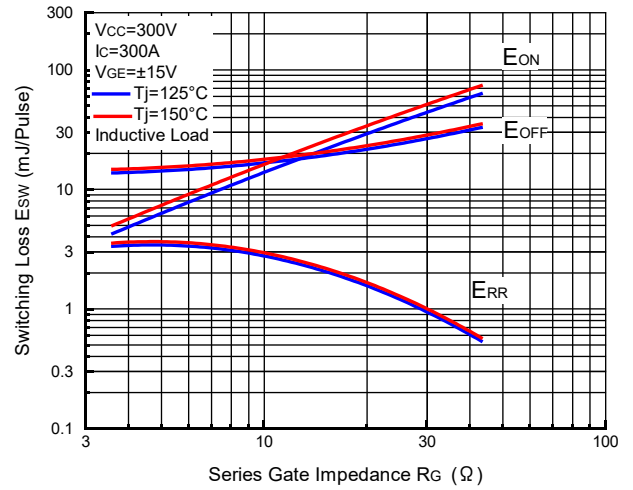


□ 特性図 : **CHARACTERISTICS CURVES**

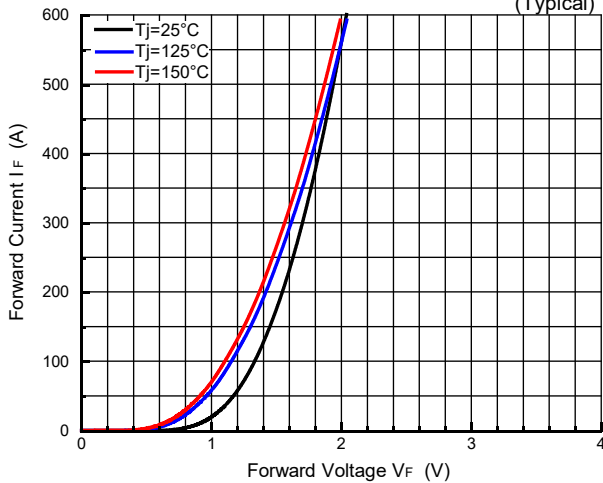
**Fig.7- Collector Current vs. Switching Loss (Typical)**



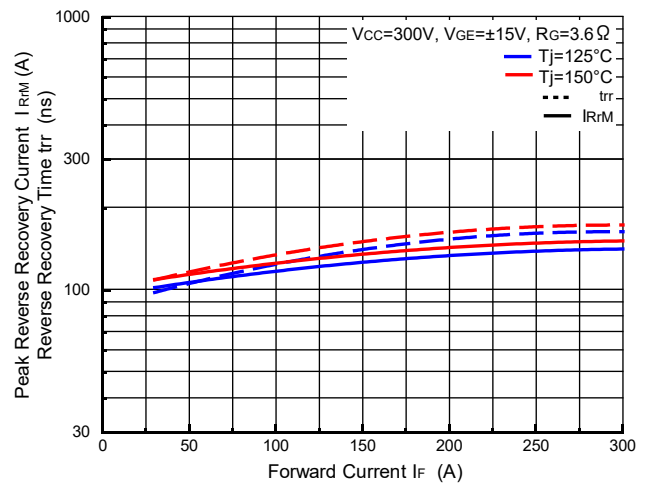
**Fig.8- Series Gate Impedance vs. Switching Loss (Typical)**



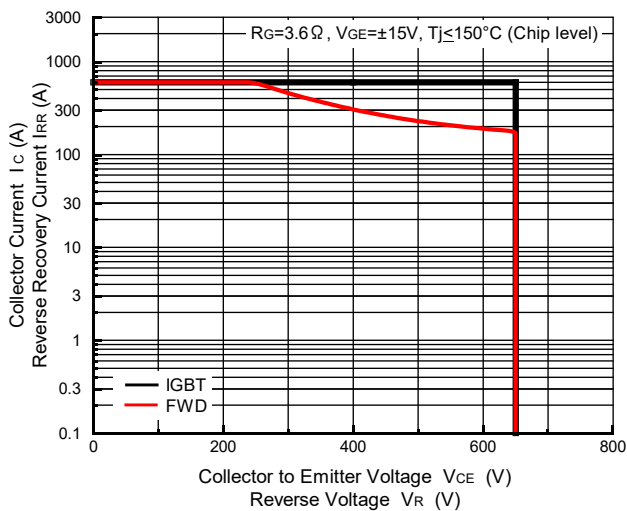
**Fig.9- Forward Characteristics of Free Wheeling Diode (Typical)**



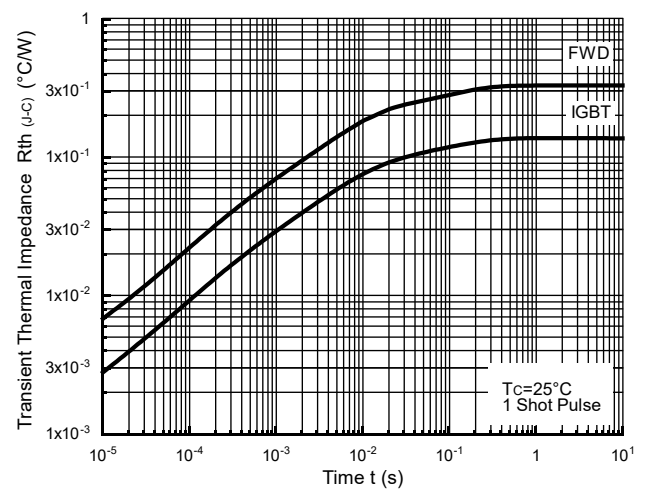
**Fig.10- FWD Reverse Recovery Characteristics (Typical)**



**Fig.11- Reverse Bias Safe Operating Area**



**Fig.12- Transient Thermal Impedance**



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