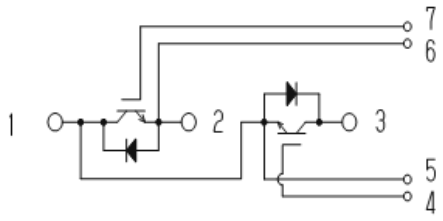
ShinDengen
New power. Your power.

# I G B T Module
150 A／1200V

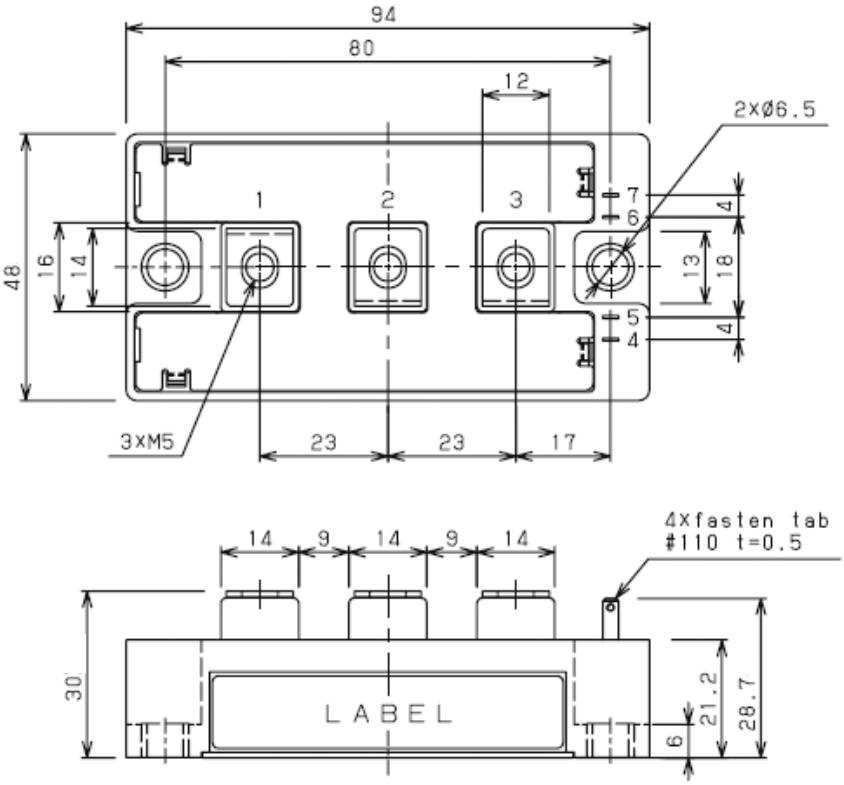
# P D M B 1 5 0 W 1 2

□ 回路図 ： *C I R C U I T*




□ 概略図 ： *S C H E M A T I C  D I A G R A M*

Dimension: [mm]




□ 最 大 定 格 ： *MAXIMUM RATINGS* (at Tc=25℃ unless otherwise specified)

| Item | | Symbol | Condition | Rated Value | Unit |
|---|---|---|---|---|---|
| IGBT | コレクタ・エミッタ間電圧 Collector-Emitter Voltage | $V_{CES}$ | G-E Short | 1200 | V |
| | ゲート・エミッタ間電圧 Gate-Emitter Voltage | $V_{GES}$ | C-E Short | ±20 | V |
| | コレクタ電流 Collector Current | $I_C$ | DC Tc=85℃ | 150 | A |
| | | $I_{CP}$ | Pulse ≦ 1ms | 300 | |
| | コレクタ損失 Collector Power Dissipation | $P_C$ | Tj=175℃ | 789 | W |
| | | | Tj=150℃ | 657 | |
| FWD | 繰り返しピーク逆電圧 Repetitive peak reverse voltage | $V_{RRM}$ | | 1200 | V |
| | 順電流 Forward Current | $I_F$ | | 150 | A |
| | | $I_{FM}$ | Pulse ≦ 1ms | 300 | |
| 最大接合温度 Maximum Junction Temperature | | $T_{jMAX}$ | 瞬時動作(過負荷) Instantaneous Overload | 175 | ℃ |
| 接合温度 Junction Temperature Range | | $T_j$ | | −40～+150 | ℃ |
| 保存温度 Storage Temperature Range | | Tstg | | −40～+125 | ℃ |
| 絶縁耐圧 Isolation Voltage | | $V_{ISO}$ | Terminal to Base AC, 1minute | 2,500 | V (RMS) |
| 締め付けトルク Mounting Torque | Module Base to Heatsink | Ftor | M6 | 3 | N・m |
| | Busbar to Main Terminal | | M5 | 2 | |

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□ 電気的特性 : *ELECTRICAL CHARACTERISTICS* (at $T_j$=25℃ unless otherwise specified)

| | Characteristic | | Symbol | Test Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|---|
| IGBT | コレクタ遮断電流 Collector-Emitter Cut-Off Current | | ICES | VCE= 1200V,VGE= 0V | | — | — | 1.0 | mA |
| | ゲート漏れ電流 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 Collector-Emitter Saturation Voltage | | VCE(sat.) | IC= 150A,VGE= 15V (chip level) | Tj=25℃ | — | 1.50 | 2.00 | V |
| | | | | | Tj=125℃ | — | 1.70 | — | |
| | | | | | Tj=150℃ | — | 1.80 | — | |
| | ゲート しきい値電圧 Gate-Emitter Threshold Voltage | | VGE(th.) | VCE= 10V,IC= 5.0mA | | 4.8 | — | 7.0 | V |
| | 入力容量 Input Capacitance | | Cies | VCE= 25V,VGE= 0V,f= 1MHz | | — | 15.0 | — | nF |
| | 出力容量 Output Capacitance | | Coes | | | — | 0.43 | — | |
| | 帰還容量 Reverse Transfer Capacitance | | Cres | | | — | 0.35 | — | |
| | ゲート電荷量 Gate Charge | | Qg | Vcc=600V, Ic=150A, VGE=-15～+15V | | — | 1650 | — | nC |
| | スイッチング時間 Switching Time | 上昇時間 Rise Time | tr | Vcc= 600V Ls=38nH<br>Ic= 150A Inductive Load<br>RG= 5.1Ω<br>VGE= ±15V<br>Tj= 150℃ | | — | 60 | — | ns |
| | | ターンオン遅延時間 Turn-on Delay Time | td(on) | | | — | 110 | — | |
| | | 下降時間 Fall Time | tf | | | — | 200 | — | |
| | | ターンオフ遅延時間 Turn-off Delay Time | td(off) | | | — | 500 | — | |
| FWD | 順電圧 Peak Forward Voltage | | VF | IF= 150A,VGE=0V (chip level) | Tj=25℃ | — | 2.00 | 2.60 | V |
| | | | | | Tj=125℃ | — | 1.98 | — | |
| | | | | | Tj=150℃ | — | 1.95 | — | |
| | 逆回復時間 Reverse Recovery Time | | trr | Vcc= 600V Ls=38nH<br>Ic= 150A Inductive Load<br>RG= 5.1Ω<br>VGE= ±15V<br>Tj= 150℃ | | — | 190 | — | ns |
| 内部配線抵抗 Internal Lead Resistance | | | RCC'+EE' | 主端子—チップ間 ／ 1素子 Main Terminal - Chip / Per 1 Arm | | — | — | 1 | mΩ |
| 内部インダクタンス Stray Inductance | | | LsCE | メイン端子３－２間 Main Terminal３ - Main Terminal２ | | — | 30 | — | nH |

□ 熱的特性 : *THERMAL CHARACTERISTICS*

| Characteristic | | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| 熱抵抗 Thermal Resistance | IGBT | Rth(j-c) | Junction to Case Per 1 Arm (Tc測定点:チップ直下) | — | — | 0.19 | ℃／W |
| | FWD | | | — | — | 0.30 | |
| 接触熱抵抗 Thermal Resistance | IGBT | Rth(c-f) | Case to heatsink Per 1 Arm Paste=1W/(m･℃) | — | 0.05 | — | |
| | FWD | | | — | 0.10 | — | |

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## □ 特性図 ：*CHARACTERISTICS CURVES*

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

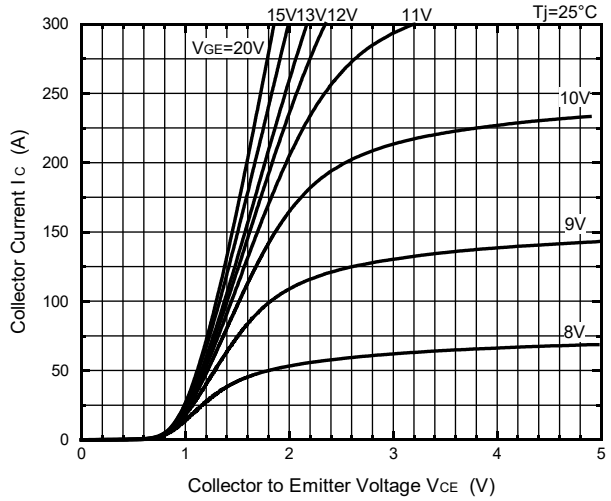



**Fig.2**- Saturation Voltage Characteristics (Typical)

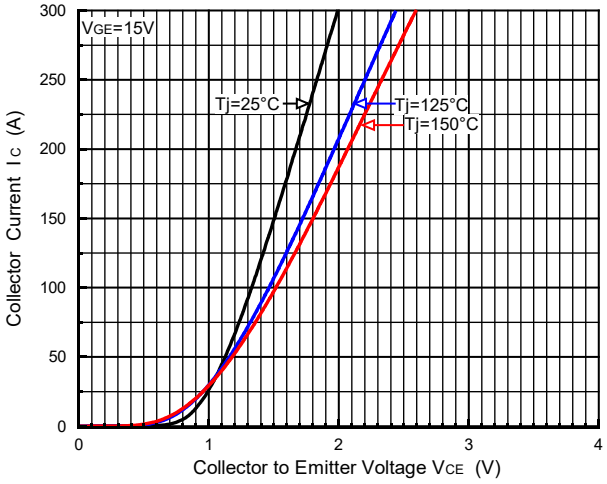



**Fig.3**- Transfer Characteristics (Typical)

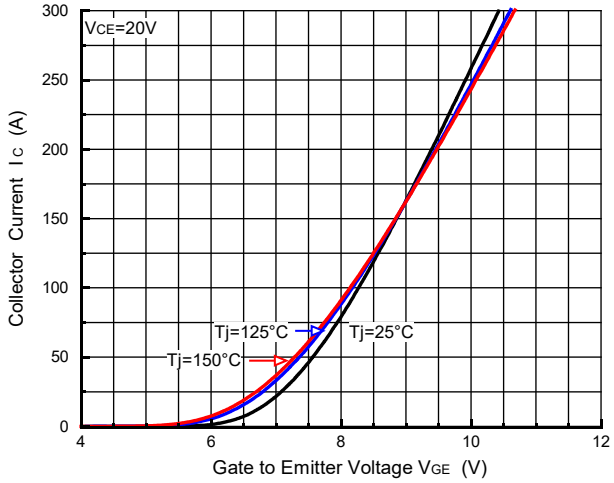



**Fig.4**- Gate Charge vs. Collector to Emitter Voltage (Typical)

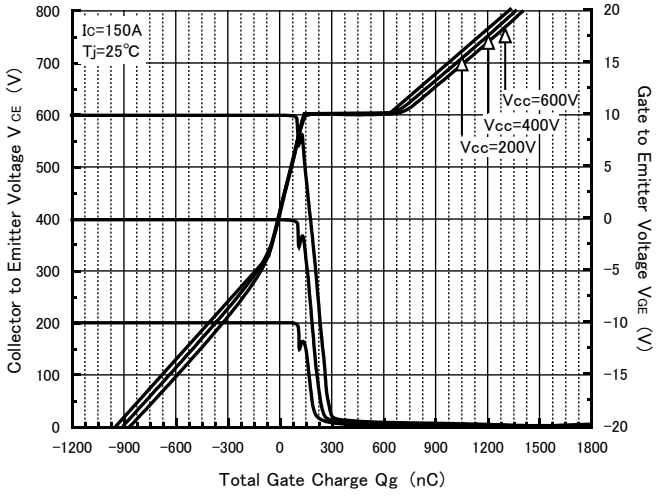



**Fig.5**- Collector Current vs. Switching Time

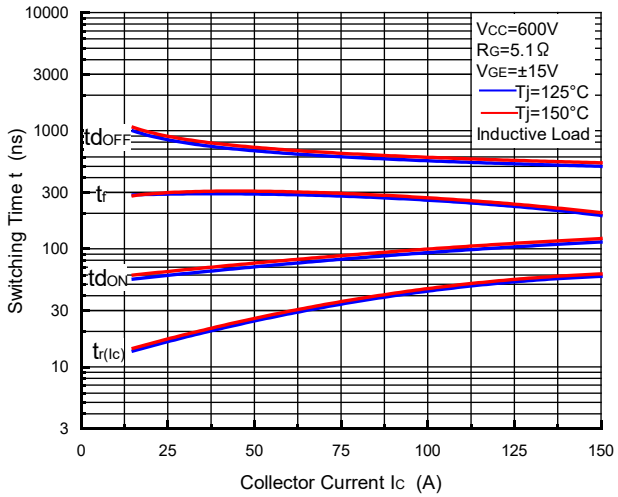
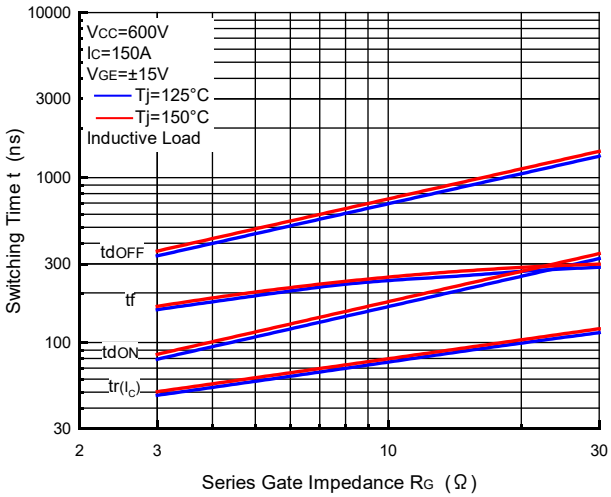



**Fig.6**- Series Gate Impedance vs. Switching Time




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## □ 特性図 ：*CHARACTERISTICS CURVES*

**Fig.7**- Collector Current vs. Switching Loss

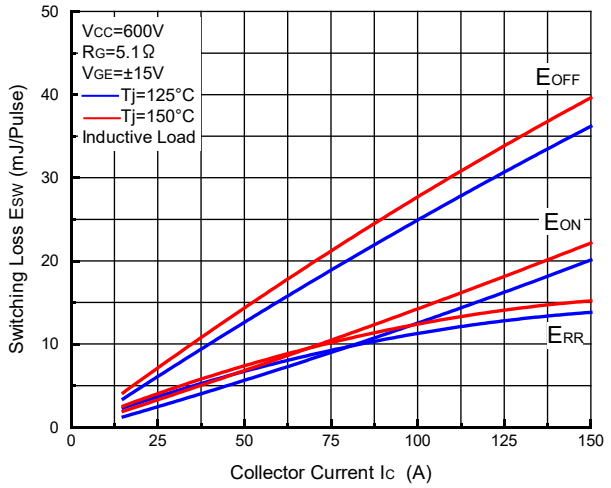



**Fig.8**- Series Gate Impedance vs. Switching Loss

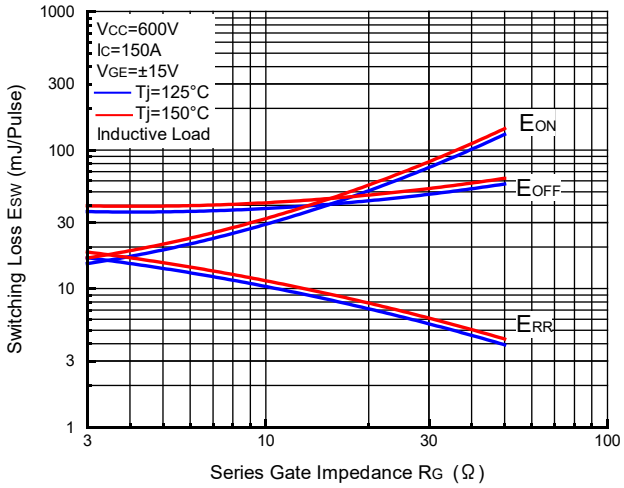



**Fig.9**- Forward Characteristics of FWD (Typical)

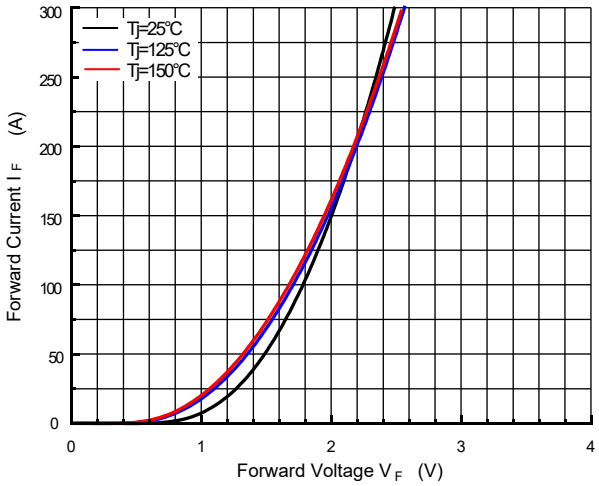



**Fig.10**- FWD Reverse Recovery Characteristics (Typical)

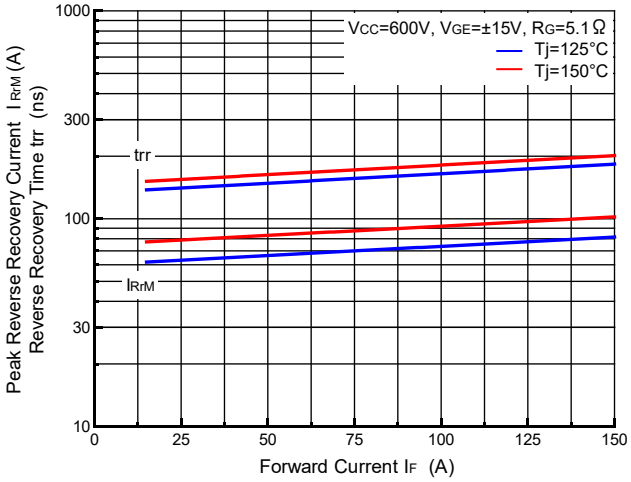



**Fig.11**- Reverse Bias Safe Operating Area

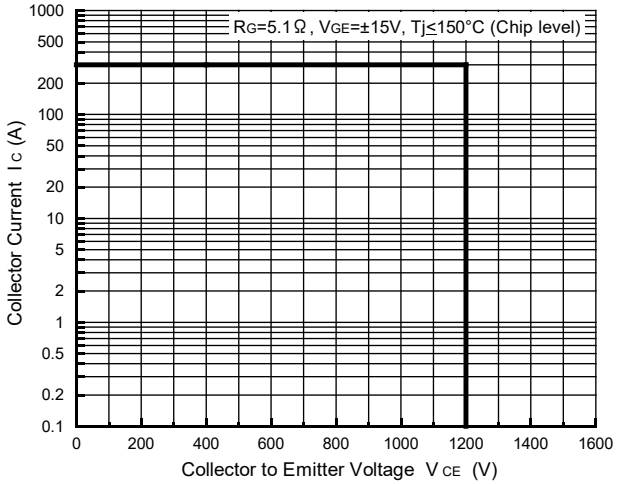
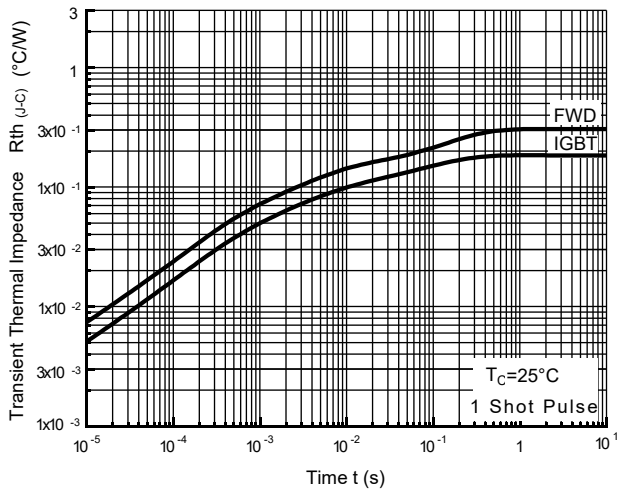



**Fig.12**- Transient Thermal Impedance




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   【特別用途】
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   【特定用途】
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