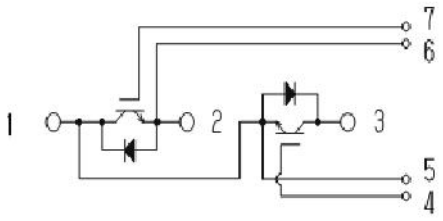
KYOCERA

# IGBT Module
## 50A／1200V

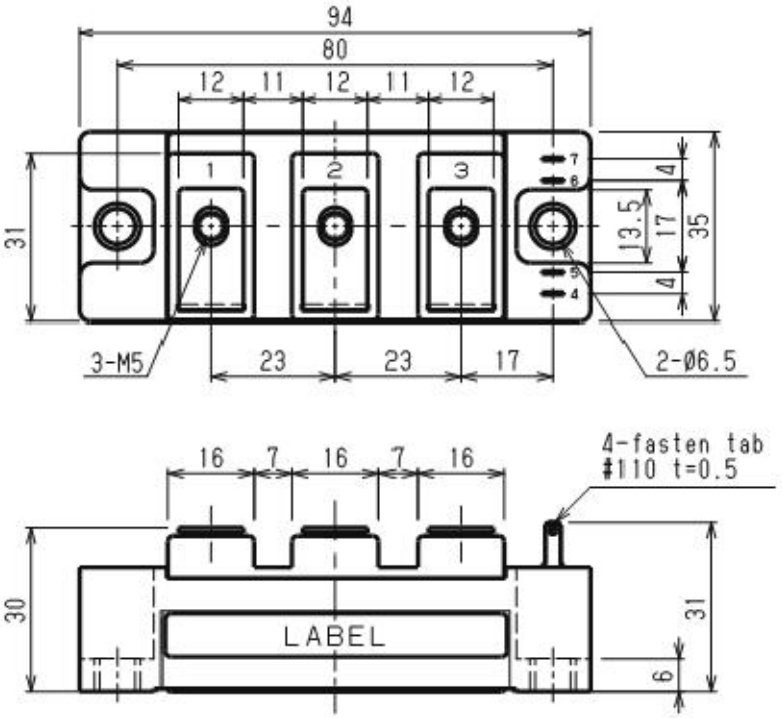
# PDMB50W12

□ 回路図 ： *CIRCUIT*




□ 概略図 ： *SCHEMATIC DIAGRAM*

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℃ | 50 | A |
| | | | $I_{CP}$ | Pulse ≦ 1ms | 100 | |
| | コレクタ損失 Collector Power Dissipation | | $P_C$ | Tj=175℃ | 277 | W |
| | | | | Tj=150℃ | 231 | |
| FWD | 繰り返しピーク逆電圧 Repetitive peak reverse voltage | | $V_{RRM}$ | | 1200 | V |
| | 順電流 Forward Current | | $I_F$ | | 50 | A |
| | | | $I_{FM}$ | Pulse ≦ 1ms | 100 | |
| 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 | |

□ 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<br>Collector-Emitter Cut-Off Current | | ICES | $V_{CE}$= 1200V,$V_{GE}$= 0V | | － | － | １．０ | ｍA |
| | ゲート漏れ電流<br>Gate-Emitter Leakage Current | | IGES | $V_{GE}$= ±20V,$V_{CE}$= 0V | | － | － | １．０ | μA |
| | コレクタ・エミッタ間飽和電圧<br>Collector-Emitter Saturation Voltage | | VCE(sat.) | $I_C$= 50A,$V_{GE}$= 15V<br>(chip level) | $T_j$=25℃ | － | １．５０ | ２．００ | V |
| | | | | | $T_j$=125℃ | － | １．７０ | － | |
| | | | | | $T_j$=150℃ | － | １．８０ | － | |
| | ゲートしきい値電圧<br>Gate-Emitter Threshold Voltage | | VGE(th.) | $V_{CE}$= 10V,$I_C$= 1.7mA | | ４．８ | － | ７．０ | V |
| | 入力容量 Input Capacitance | | Cies | $V_{CE}$= 25V,$V_{GE}$= 0V,f= 1MHz | | － | ５．３ | － | ｎF |
| | 出力容量 Output Capacitance | | Coes | | | － | ０．１６ | － | |
| | 帰還容量 Reverse Transfer Capacitance | | Cres | | | － | ０．１２ | － | |
| | ゲート電荷量<br>Gate Charge | | Qg | Vcc=600V, $I_C$=50A, $V_{GE}$=-15～+15V | | － | ５５０ | － | ｎC |
| | スイッチング時間<br>Switching Time | 上昇時間 Rise Time | tr | Vcc= 600V Ls=38nH<br>$I_C$= 50A Inductive Load<br>$R_G$= 15Ω<br>$V_{GE}$= ±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 | | | － | １８０ | － | |
| | | ターンオフ遅延時間 Turn-off Delay Time | td(off) | | | － | ５００ | － | |
| FWD | 順電圧<br>Peak Forward Voltage | | VF | $I_F$= 50A,$V_{GE}$=0V<br>(chip level) | $T_j$=25℃ | － | ２．００ | ２．６０ | V |
| | | | | | $T_j$=125℃ | － | １．９８ | － | |
| | | | | | $T_j$=150℃ | － | １．９５ | － | |
| | 逆回復時間<br>Reverse Recovery Time | | trr | Vcc= 600V Ls=38nH<br>$I_C$= 50A Inductive Load<br>$R_G$= 15Ω<br>$V_{GE}$= ±15V<br>Tj= 150℃ | | － | １３０ | － | 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 | | － | － | １ | ｍΩ |
| 内部インダクタンス<br>Stray Inductance | | | LsCE | メイン端子３－２間<br>Main Terminal３ - Main Terminal２ | | － | ３０ | － | ｎH |

□ 熱的特性 : *THERMAL CHARACTERISTICS*

| Characteristic | | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| 熱抵抗<br>Thermal Resistance | IGBT | Rth(j-c) | Junction to Case<br>Per 1 Arm （Tc測定点:チップ直下） | － | － | ０．５４ | ℃／W |
| | FWD | | | － | － | ０．９７ | |
| 接触熱抵抗<br>Thermal Resistance | IGBT | Rth(c-f) | Case to heatsink<br>Per 1 Arm Paste=1W/(m･℃) | － | ０．１０ | － | |
| | FWD | | | － | ０．１７ | － | |

## □ 特性図 ：*CHARACTERISTICS CURVES*

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

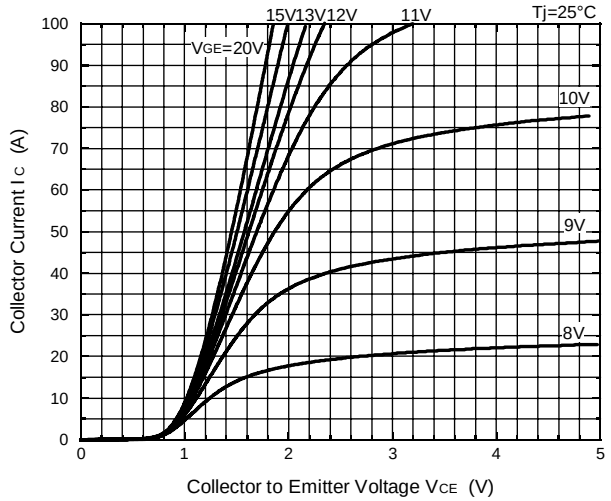



**Fig.2**- Saturation Voltage Characteristics (Typical)

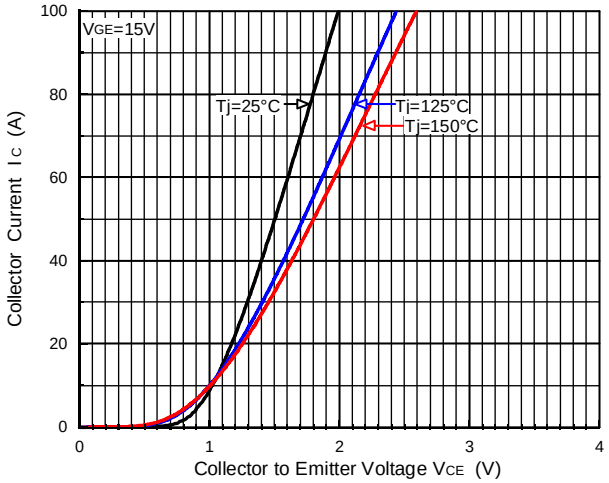



**Fig.3**- Transfer Characteristics (Typical)

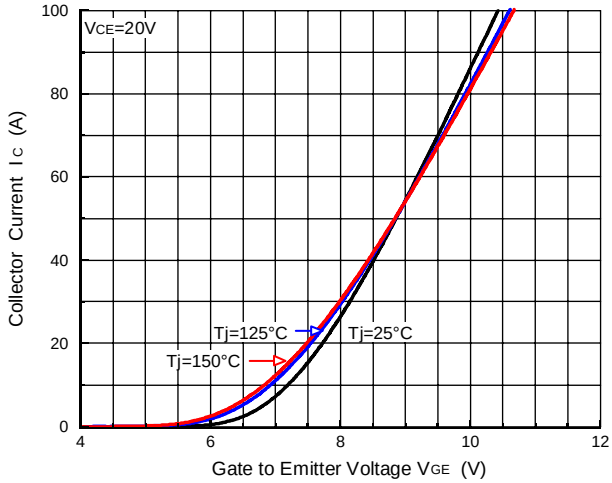



**Fig.4**- Gate Charge vs. Collector to Emitter Voltage (Typical)

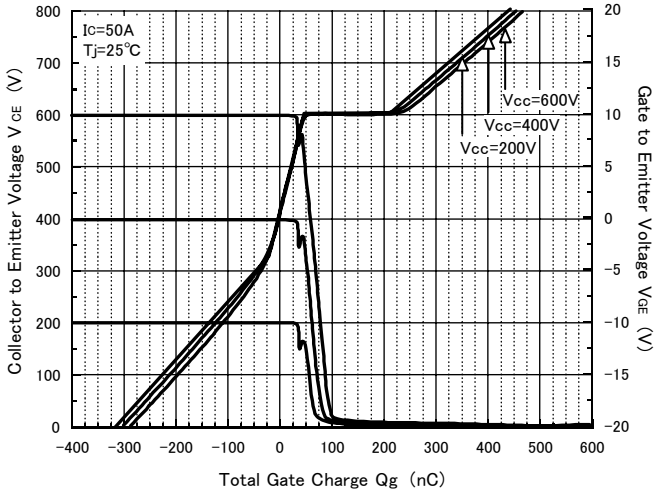



**Fig.5**- Collector Current vs. Switching Time

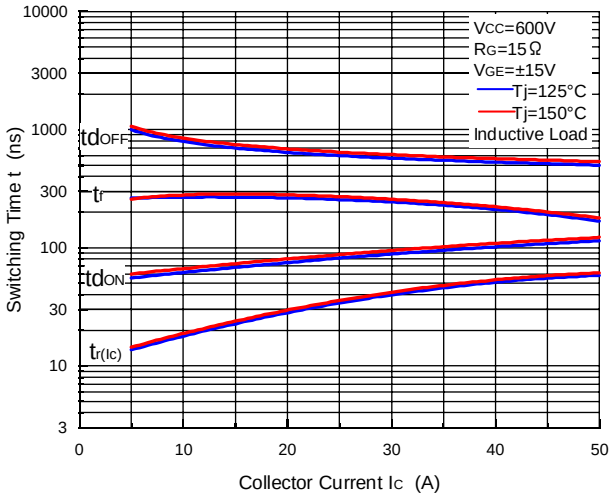
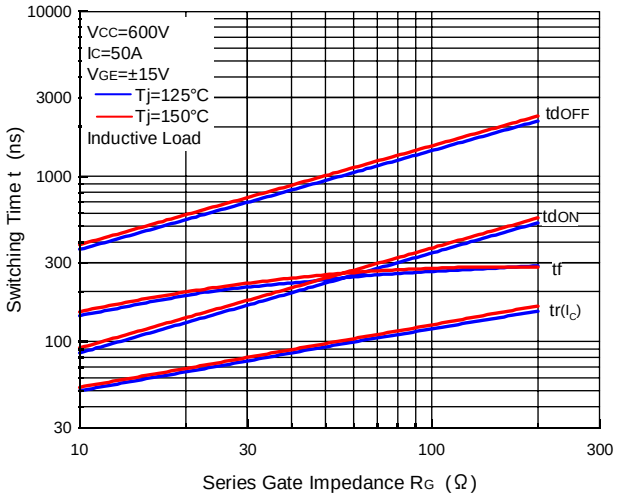



**Fig.6**- Series Gate Impedance vs. Switching Time



□ 特性図 ：*CHARACTERISTICS CURVES*

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

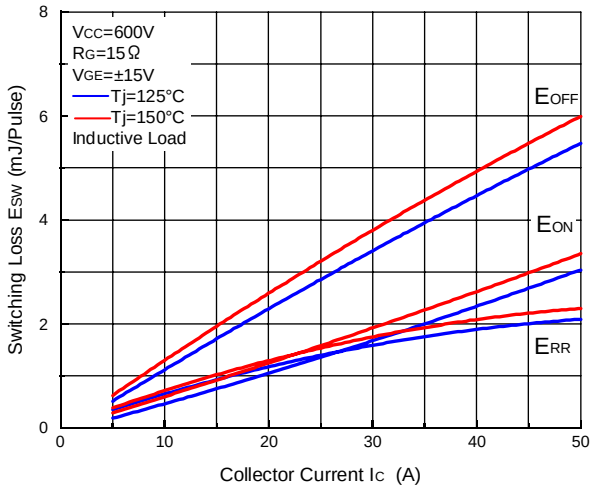



**Fig.8**- Series Gate Impedance vs. Switching Loss

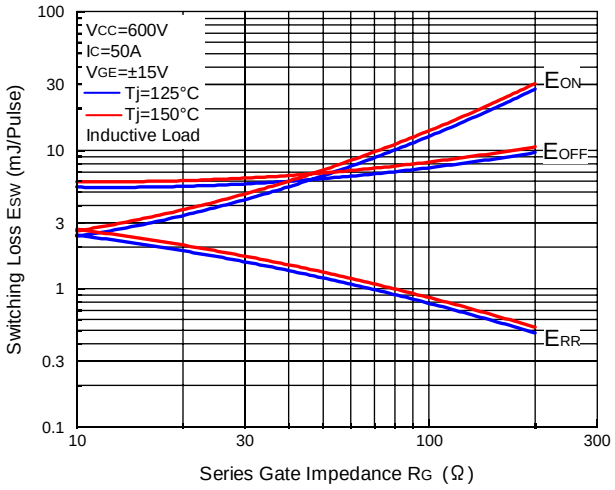



**Fig.9** - Forward Characteristics of FWD (Typical)

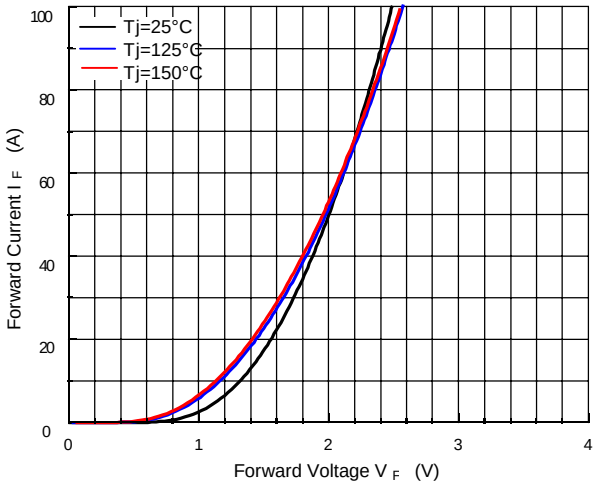



**Fig.10**- FWD Reverse Recovery Characteristics (Typical)

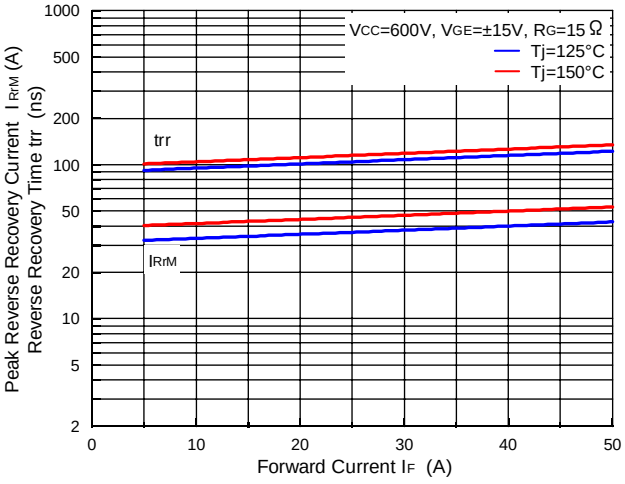



**Fig.11**- Reverse Bias Safe Operating Area

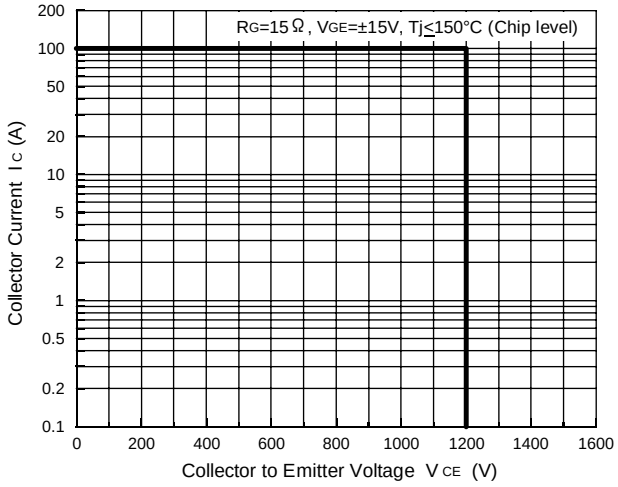
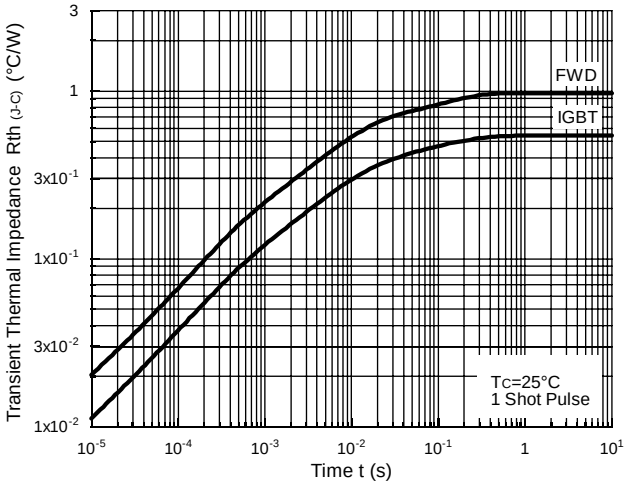



**Fig.12**- Transient Thermal Impedance



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