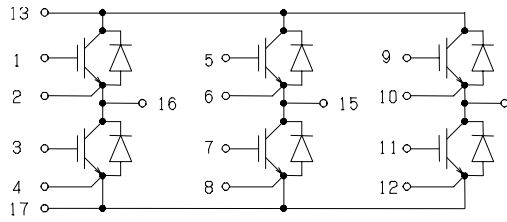
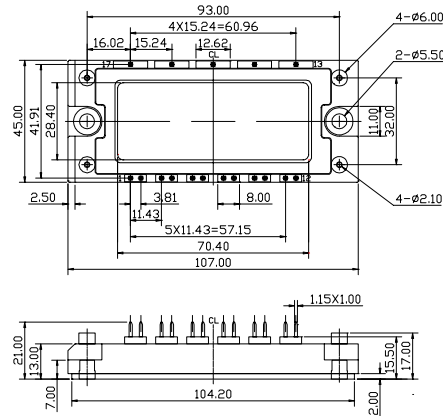


**CIRCUIT**

**OUTLINE DRAWING**


Dimension(mm)

Approximate Weight : 190g

**MAXMUM RATINGS (T<sub>c</sub>=25°C)**

| Item                                           |                           | Symbol           | PTMB50B12C  | Unit |
|------------------------------------------------|---------------------------|------------------|-------------|------|
| Collector-Emitter Voltage                      |                           | V <sub>CES</sub> | 1200        | V    |
| Gate - Emitter Voltage                         |                           | V <sub>GES</sub> | +/- 20      | V    |
| Collector Current                              | DC                        | I <sub>C</sub>   | 50          | A    |
|                                                | 1 ms                      | I <sub>CP</sub>  | 100         |      |
| Collector Power Dissipation                    |                           | P <sub>C</sub>   | 250         | W    |
| Junction Temperature Range                     |                           | T <sub>j</sub>   | -40 to +150 | °C   |
| Storage Temperature Range                      |                           | T <sub>stg</sub> | -40 to +125 | °C   |
| Isolation Voltage Terminal to Base AC, 1 min.) |                           | V <sub>ISO</sub> | 2500        | V    |
| Mounting Torque                                | Module Base to Heatsink   | F <sub>TOR</sub> | 2           | N•m  |
|                                                | Bus Bar to Main Terminals |                  | -           |      |

**ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C)**

| Characteristic                       |               | Symbol               | Test Condition                                                                                            | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|----------------------|-----------------------------------------------------------------------------------------------------------|------|------|------|------|
| Collector-Emitter Cut-Off Current    |               | I <sub>CES</sub>     | V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V                                                               | -    | -    | 1.0  | mA   |
| Gate-Emitter Leakage Current         |               | I <sub>GES</sub>     | V <sub>GE</sub> =+/- 20V, V <sub>CE</sub> =0V                                                             | -    | -    | 1.0  | μA   |
| Collector-Emitter Saturation Voltage |               | V <sub>CE(sat)</sub> | I <sub>C</sub> =50A, V <sub>GE</sub> =15V                                                                 | -    | 1.9  | 2.4  | V    |
| Gate-Emitter Threshold Voltage       |               | V <sub>GE(th)</sub>  | V <sub>CE</sub> =5V, I <sub>C</sub> =50mA                                                                 | 4.0  | -    | 8.0  | V    |
| Input Capacitance                    |               | C <sub>ies</sub>     | V <sub>CE</sub> =10V, V <sub>GE</sub> =0V, f=1MHz                                                         | -    | 4200 | -    | pF   |
| Switching Time                       | Rise Time     | t <sub>r</sub>       | V <sub>CC</sub> = 600V<br>R <sub>L</sub> = 12 ohm<br>R <sub>G</sub> = 20 ohm<br>V <sub>GE</sub> = +/- 15V | -    | 0.25 | 0.45 | μs   |
|                                      | Turn-on Time  | t <sub>on</sub>      |                                                                                                           | -    | 0.40 | 0.70 |      |
|                                      | Fall Time     | t <sub>f</sub>       |                                                                                                           | -    | 0.25 | 0.35 |      |
|                                      | Turn-off Time | t <sub>off</sub>     |                                                                                                           | -    | 0.80 | 1.10 |      |

**FREE WHEELING DIODES RATINGS & CHARACTERISTICS (T<sub>c</sub>=25°C)**

| Item            |      | Symbol          | Rated Value | Unit |
|-----------------|------|-----------------|-------------|------|
| Forward Current | DC   | I <sub>F</sub>  | 50          | A    |
|                 | 1 ms | I <sub>FM</sub> | 100         |      |

| Characteristic        | Symbol          | Test Condition                                            | Min. | Typ. | Max. | Unit |
|-----------------------|-----------------|-----------------------------------------------------------|------|------|------|------|
| Peak Forward Voltage  | V <sub>F</sub>  | I <sub>F</sub> =50A, V <sub>GE</sub> =0V                  | -    | 1.9  | 2.4  | V    |
| Reverse Recovery Time | t <sub>rr</sub> | I <sub>F</sub> =50A, V <sub>GE</sub> =-10V, di/dt=100A/μs | -    | 0.2  | 0.3  | μs   |

**THERMAL CHARACTERISTICS**

| Characteristic    |       | Symbol               | Test Condition   | Min. | Typ. | Max. | Unit |
|-------------------|-------|----------------------|------------------|------|------|------|------|
| Thermal Impedance | IGBT  | R <sub>th(j-c)</sub> | Junction to Case | -    | -    | 0.5  | °C/W |
|                   | DIODE |                      |                  | -    | -    | 0.1  |      |

# PTMB50B12C

Fig.1- Output Characteristics (Typical)

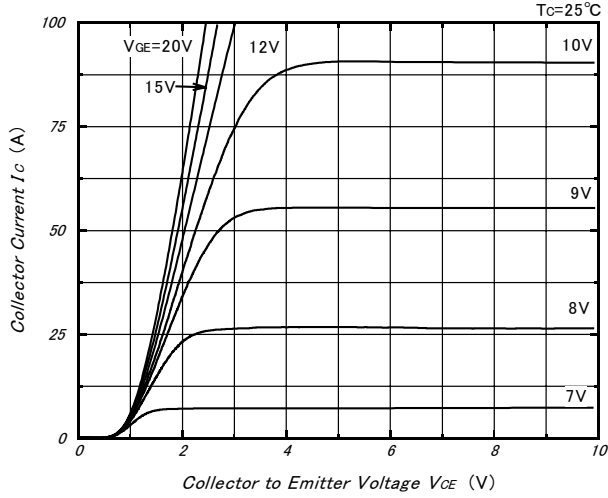


Fig.2- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

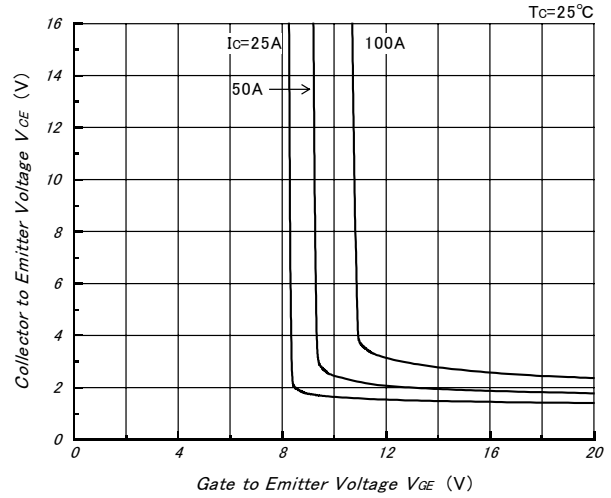


Fig.3- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

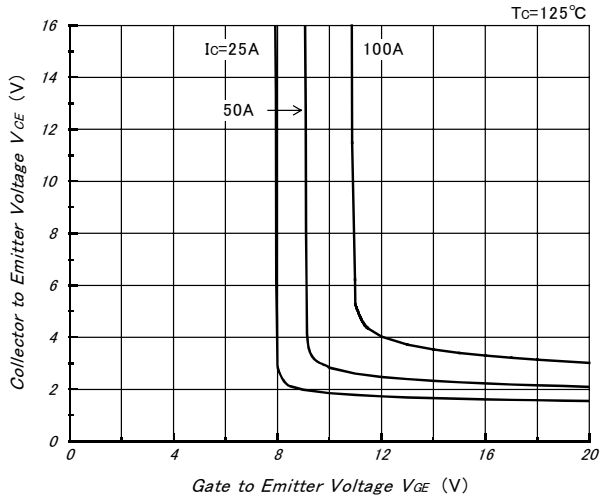


Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)

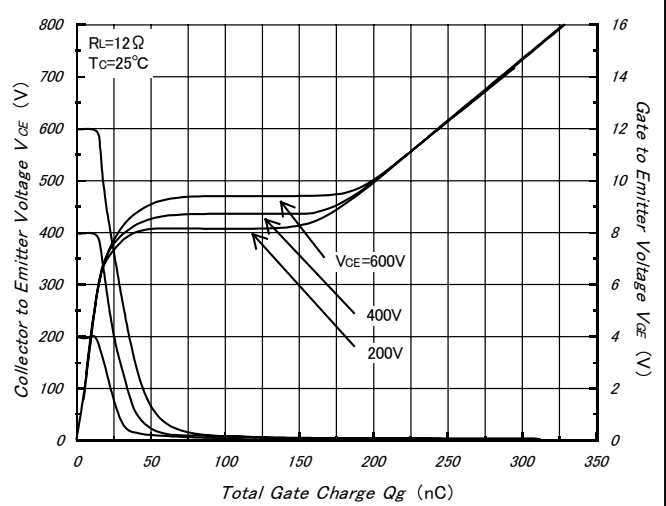


Fig.5- Capacitance vs. Collector to Emitter Voltage (Typical)

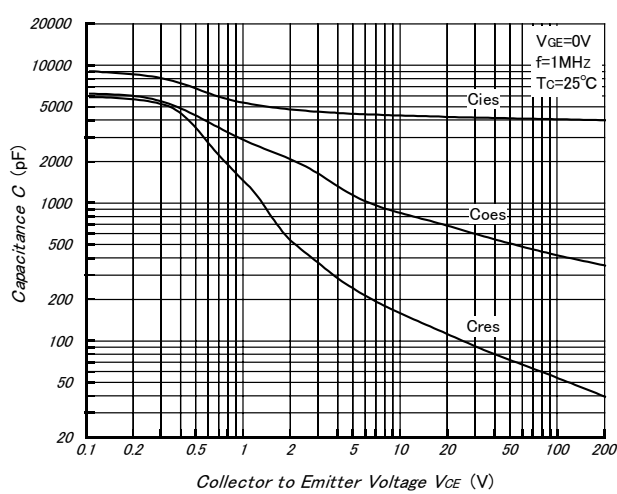
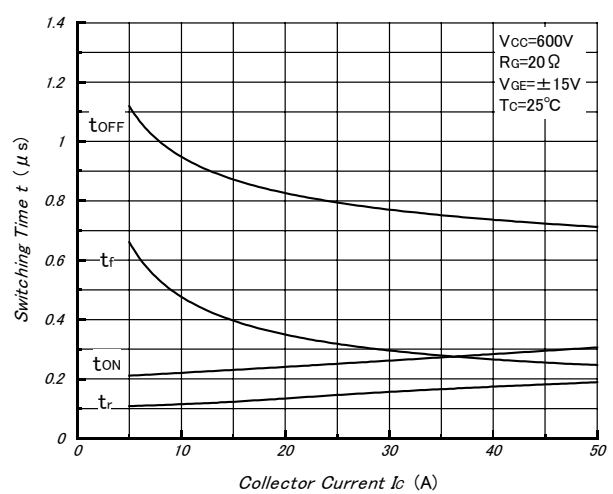


Fig.6- Collector Current vs. Switching Time (Typical)



# PTMB50B12C

Fig.7- Series Gate Impedance vs. Switching Time (Typical)

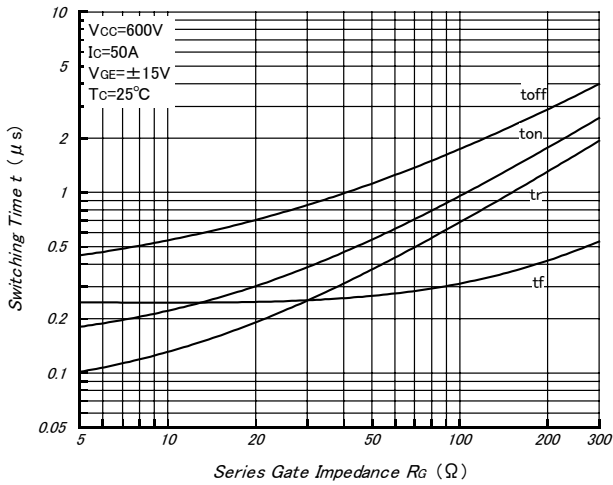


Fig.8- Forward Characteristics of Free Wheeling Diode (Typical)

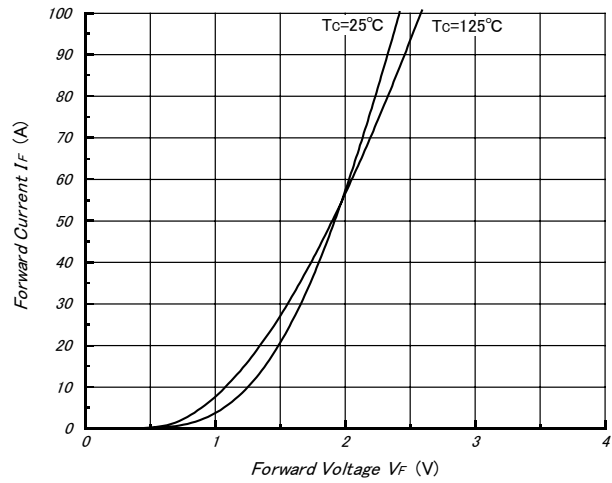


Fig.9- Reverse Recovery Characteristics (Typical)

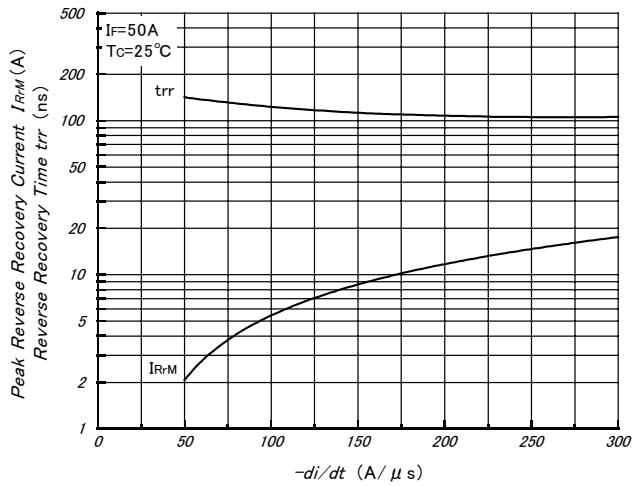


Fig.10- Reverse Bias Safe Operating Area (Typical)

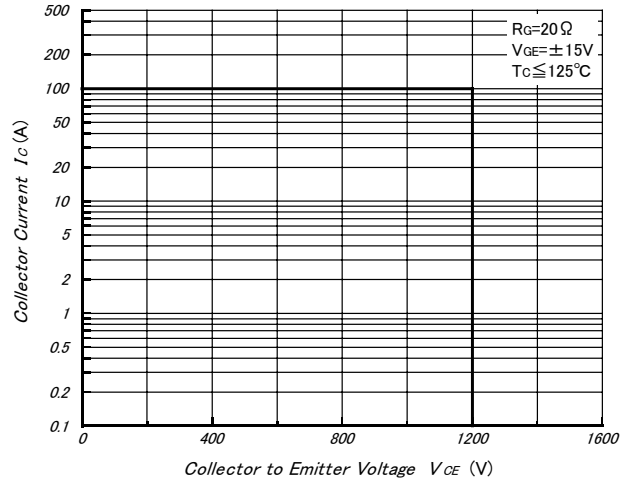


fig11-Transient Thermal Impedance

