

## IGBT MODULE ( L series)

### ■ Features

- High Speed Switching
- Low Saturation Voltage
- Voltage Drive

### ■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial Machines, such as Welding Machines

### ■ Maximum Ratings and Characteristics

#### ● Absolute Maximum Ratings

| Items                     | Symbols          | Ratings               | Units |
|---------------------------|------------------|-----------------------|-------|
| Collector-Emitter Voltage | V <sub>CEs</sub> | 600                   | V     |
| Gate-Emitter Voltage      | V <sub>GES</sub> | ±20                   | V     |
| Collector Current         | Continuous       | I <sub>c</sub>        | 300   |
|                           | 1ms              | I <sub>c pulse</sub>  | 600   |
|                           | Continuous       | -I <sub>c</sub>       | 300   |
|                           | 1ms              | -I <sub>c pulse</sub> | 600   |
| Max. Power Dissipation    | P <sub>c</sub>   | 1200                  | W     |
| Operating Temperature     | T <sub>j</sub>   | +150                  | °C    |
| Storage Temperature       | T <sub>stg</sub> | -40 to +125           | °C    |
| Net. Weight               |                  | 410                   | g     |
| Isolation Voltage         | AC. 1min.        | V <sub>isol</sub>     | 2500  |
| Screw Torque              | Mounting *1      | 35                    | kg*cm |
|                           | Terminals *2     | 45                    |       |

\*1 Recommendable Value 25 to 35kg\*cm (M5)  
\*2 Recommendable Value 35 to 40kg\*cm (M4)

#### ● Electrical Characteristics (T<sub>j</sub>=25°C)

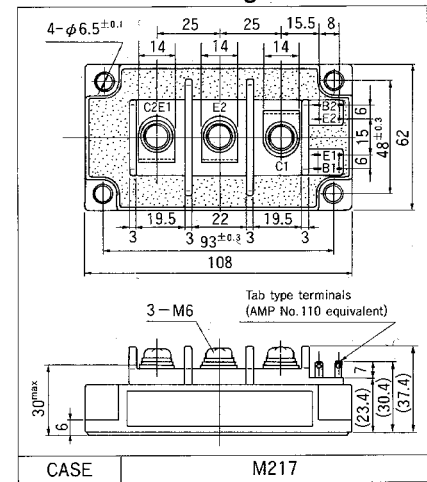
| Items                                | Symbols              | Test Conditions  | Min. | Typ.  | Max. | Units |
|--------------------------------------|----------------------|--|------|-------|------|-------|
| Zero Gate Voltage Collector Current  | I <sub>CEs</sub>     | V <sub>GE</sub> =0V V <sub>CE</sub> =600V T <sub>j</sub> =25°C |      |       | 4.0  | mA    |
| Gate-Emitter Leakage Current         | I <sub>GES</sub>     | V <sub>CE</sub> =0V V <sub>GE</sub> =±20V                      |      |       | 200  | nA    |
| Gate-Emitter Threshold Voltage       | V <sub>GE(th)</sub>  | V <sub>CE</sub> =20V I <sub>c</sub> =300mA                     | 3.0  |       | 6.0  | V     |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | V <sub>GE</sub> =15V I <sub>c</sub> =300A                      |      | 2.7   | 3.5  | V     |
| Input Capacitance                    | C <sub>ies</sub>     | V <sub>GE</sub> =0V  |      | 28500 |      | pF    |
| Output Capacitance                   | C <sub>oes</sub>     | V <sub>CE</sub> =10V   |      | -     |      |       |
| Reverse Transfer Capacitance         | C <sub>res</sub>     | f=1MHz   |      | -     |      |       |
| Turn-on Time *3                      | t <sub>on</sub>      | V <sub>CC</sub> =300V  |      | 0.7   | 0.8  | μs    |
|                                      | t <sub>r</sub>       | I <sub>c</sub> =300A   |      | 0.4   | 0.6  |       |
| Turn-off Time *4                     | t <sub>off</sub>     | V <sub>GE</sub> =±15V  |      | 0.7   | 1.0  |       |
|                                      | t <sub>f</sub>       | R <sub>G</sub> =6.8Ω   |      | 0.2   | 0.35 |       |
| Diode Forward On-Voltage             | V <sub>F</sub>       | I <sub>F</sub> =300A V <sub>GE</sub> =0V                       |      |       | 2.5  | V     |
| Reverse Recovery Time                | t <sub>rr</sub>      | I <sub>F</sub> =300A -di/dt=900A/μs V <sub>GE</sub> =-10V      |      |       | 300  | ns    |

\*3 Resistive load      \*4 Inductive load

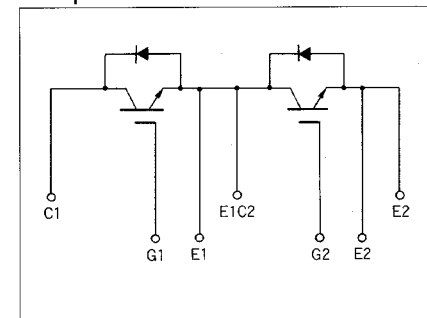
#### ● Thermal Characteristics

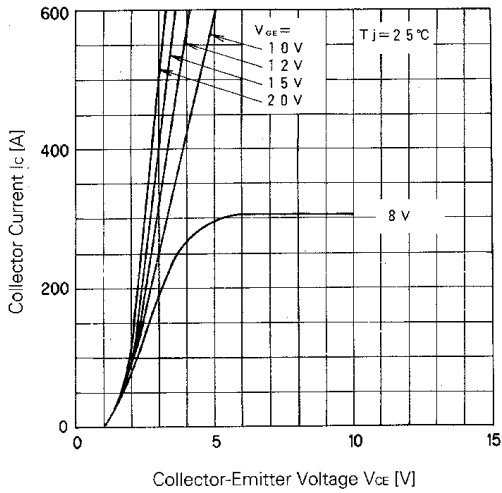
| Items              | Symbols              | Test Conditions       | Min. | Typ.  | Max.  | Units |
|--------------------|----------------------|-----------------------|------|-------|-------|-------|
| Thermal Resistance | R <sub>th(j-c)</sub> | IGBT                  |      |       | 0.104 | °C/W  |
|                    | R <sub>th(j-e)</sub> | Diode                 |      |       | 0.20  |       |
|                    | R <sub>th(c-f)</sub> | With Thermal compound |      | 0.025 |       |       |

### ■ Outline Drawings

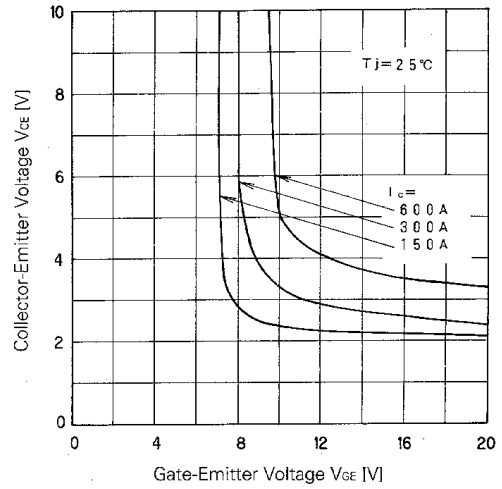


### ■ Equilavelent Circuit Schematic

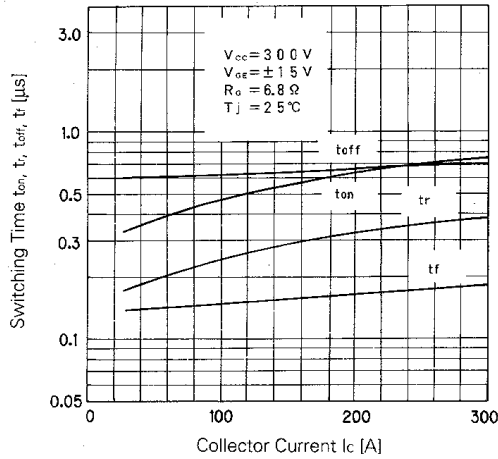




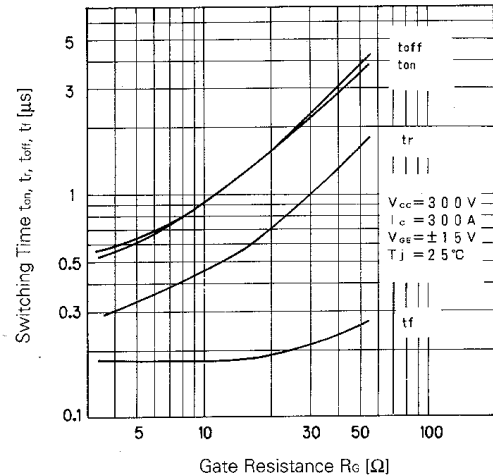
Collector Current vs. Collector-Emitter Voltage



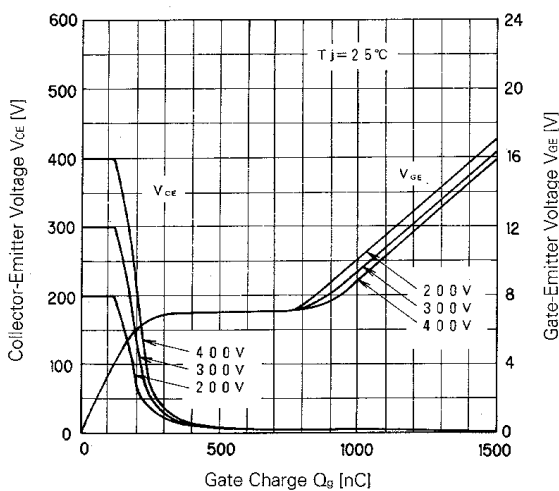
Collector-Emitter Voltage vs. Gate-Emitter Voltage



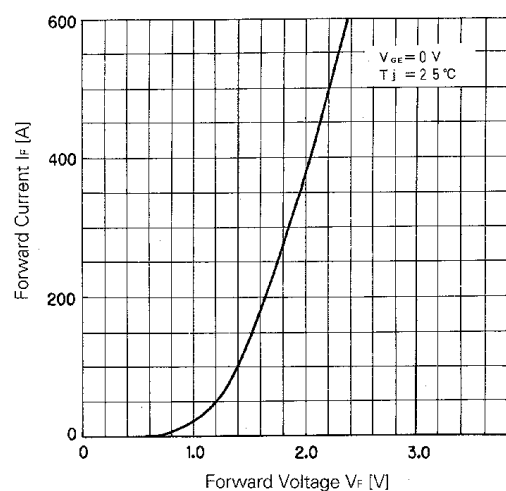
Switching Time



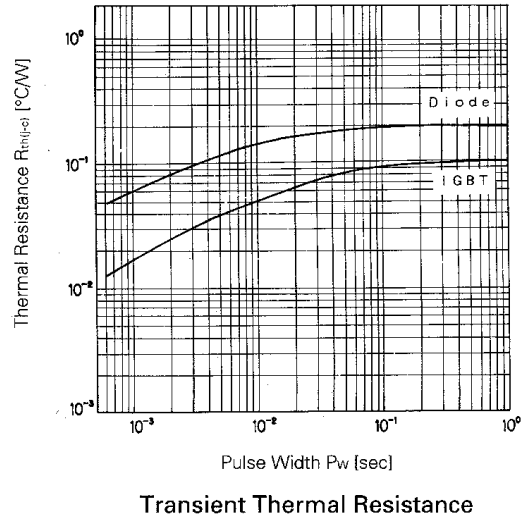
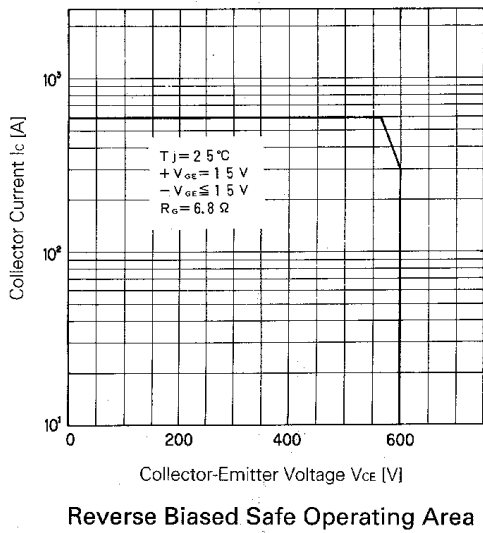
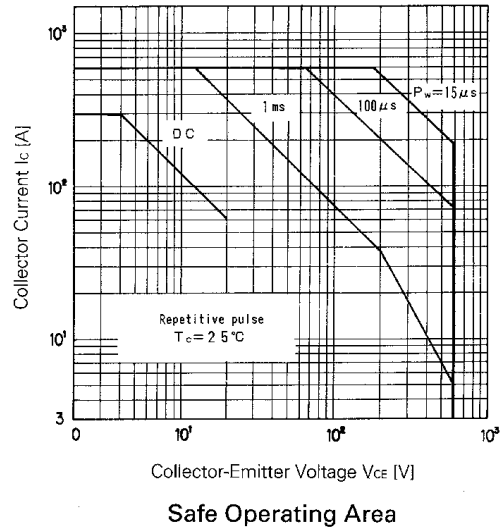
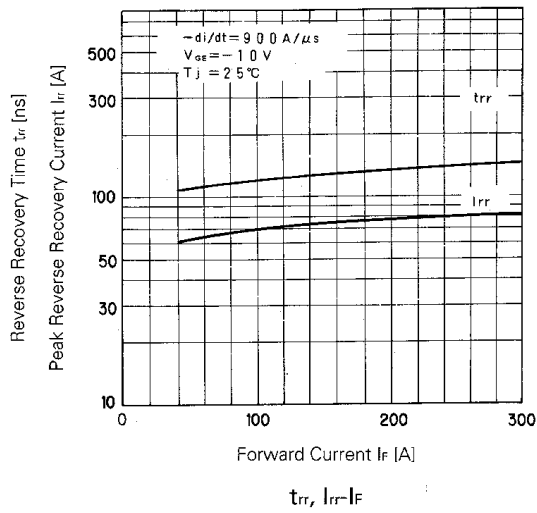
Switching Time-Gate Resistance



Dynamic Input Characteristic



Forward Voltage of Free Wheel Diode



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