

## 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> | 1200                  | V     |
| Gate-Emitter Voltage      | V <sub>GES</sub> | ±20                   | V     |
| Collector Current         | Continuous       | I <sub>c</sub>        | 25    |
|                           | 1ms              | I <sub>c</sub> pulse  | 50    |
|                           | Continuous       | -I <sub>c</sub>       | 25    |
|                           | 1ms              | -I <sub>c</sub> pulse | 50    |
| Max. Power Dissipation    | P <sub>c</sub>   | 250                   | W     |
| Operating Temperature     | T <sub>j</sub>   | +150                  | °C    |
| Storage Temperature       | T <sub>stg</sub> | -40 to +125           | °C    |
| Net. Weight               |                  | 510                   | g     |
| Isolation Voltage         | AC, 1min.        | V <sub>isol</sub>     | 2500  |
| Screw Torque              | Mounting *1      | 35                    | kg*cm |
|                           | Terminals *2     | 17                    |       |

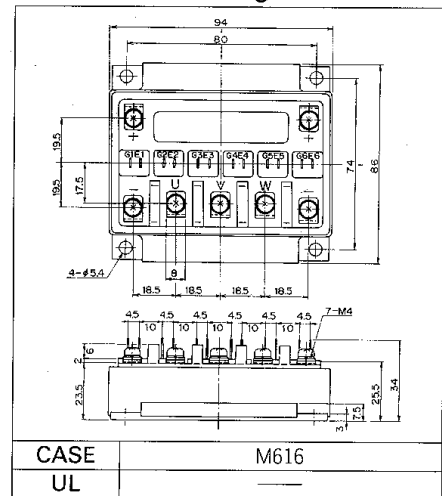
#### ● Electrical Characteristics (T<sub>c</sub>=25°C)

| 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> =1200V T <sub>c</sub> =25°C  |      |      | 1.0  | mA    |
|                                      |                      | V <sub>GE</sub> =0V V <sub>CE</sub> =1200V T <sub>c</sub> =125°C |      |      | -    | mA    |
| Gate-Emitter Leakage Current         | I <sub>GES</sub>     | V <sub>CE</sub> =0V V <sub>GE</sub> =±20V                        |      |      | 100  | nA    |
| Gate-Emitter Threshold Voltage       | V <sub>GE(th)</sub>  | V <sub>CE</sub> =20V I <sub>c</sub> =25mA                        | 3.0  |      | 6.0  | V     |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | V <sub>GE</sub> =15V I <sub>c</sub> =25A                         |      | 2.7  | 3.5  | V     |
| Input Capacitance                    | C <sub>ies</sub>     | V <sub>GE</sub> =0V  |      | 4500 |      | pF    |
| Output Capacitance                   | C <sub>oes</sub>     | V <sub>CE</sub> =10V   |      | -    |      |       |
| Reverse Transfer Capacitance         | C <sub>res</sub>     | f=1MHz   |      | -    |      |       |
| Turn-on Time                         | t <sub>on</sub>      | V <sub>CC</sub> =600V  |      | 0.5  | 0.8  | μs    |
|                                      | t <sub>r</sub>       | I <sub>c</sub> =25A  |      | 0.3  | 0.6  |       |
| Turn-off Time                        | t <sub>off</sub>     | V <sub>GE</sub> =±15V  |      | 0.8  | 1.5  |       |
|                                      | t <sub>f</sub>       | R <sub>G</sub> =50Ω  |      | 0.3  | 0.5  |       |
| Diode Forward On-Voltage             | V <sub>F</sub>       | I <sub>F</sub> =25A V <sub>GE</sub> =0V                          |      |      | 2.5  | V     |
| Reverse Recovery Time                | t <sub>rr</sub>      | I <sub>F</sub> =25A -di/dt=75A/μs V <sub>GE</sub> =-10V          | 200  |      | 350  | ns    |

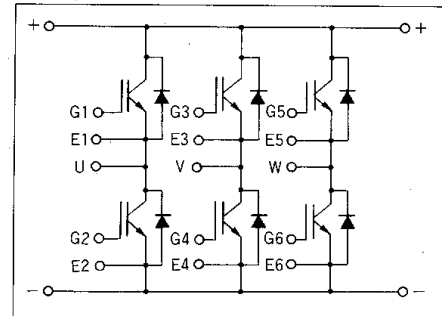
#### ● Thermal Characteristics

| Items              | Symbols              | Test Conditions       | Min. | Typ. | Max. | Units |
|--------------------|----------------------|-----------------------|------|------|------|-------|
| Thermal Resistance | R <sub>th(j-c)</sub> | IGBT                  |      |      | 0.50 | °C/W  |
|                    | R <sub>th(j-e)</sub> | Diode                 |      |      | 1.00 |       |
|                    | R <sub>th(c-f)</sub> | With Thermal compound |      | 0.05 |      |       |

### ■ Outline Drawings

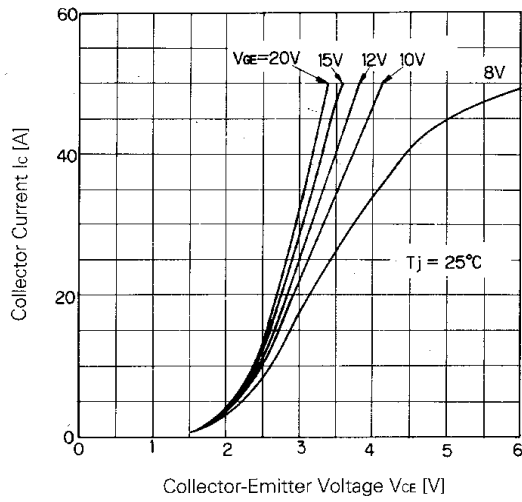


### ■ Equilavelent Circuit Schematic

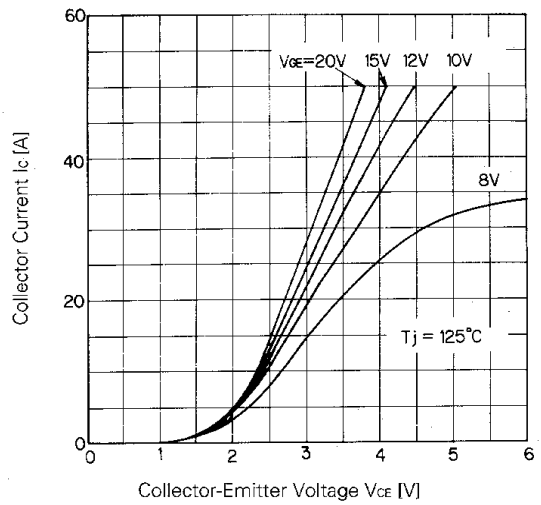


\*1 Recommendable Value 25 to 35kg\*cm (M5)

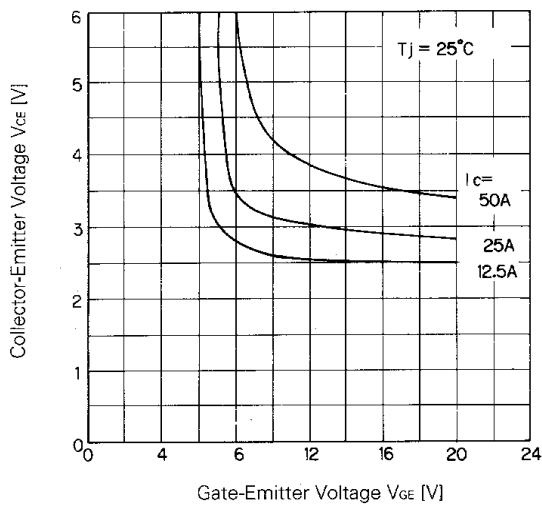
\*2 Recommendable Value 13 to 17kg\*cm (M4)



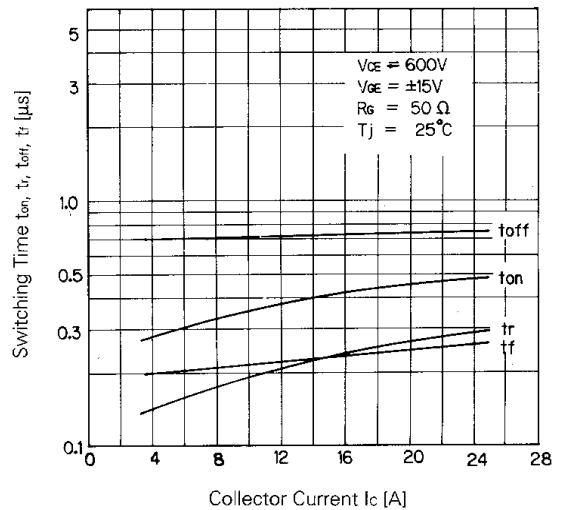
Collector Current vs. Collector-Emitter Voltage



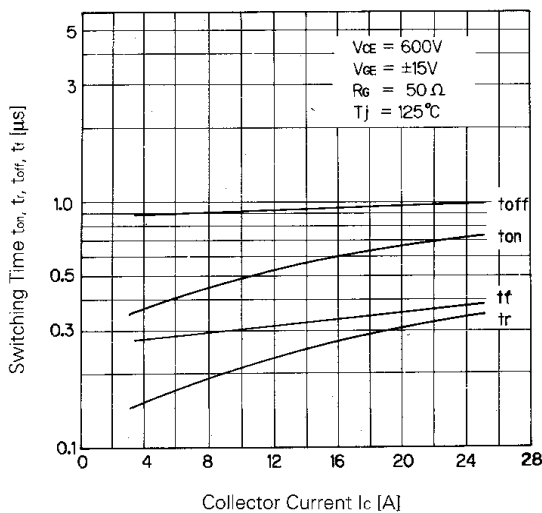
Collector Current vs. Collector-Emitter Voltage



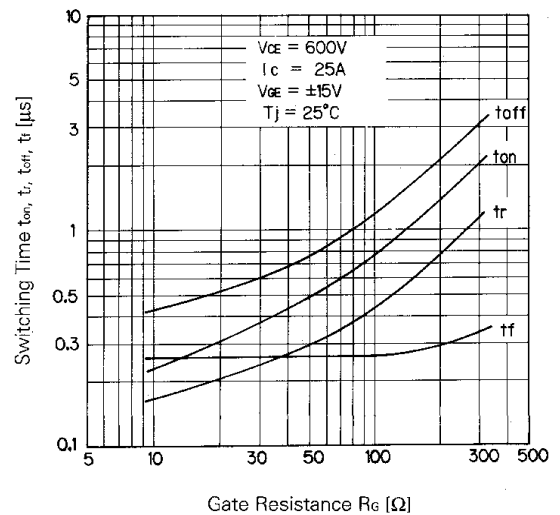
Collector-Emitter Voltage vs. Gate-Emitter Voltage



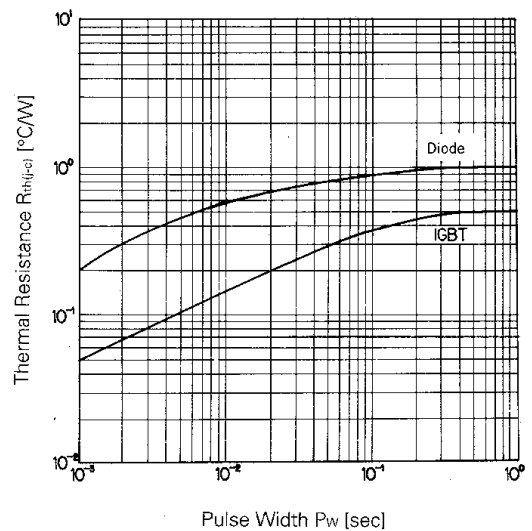
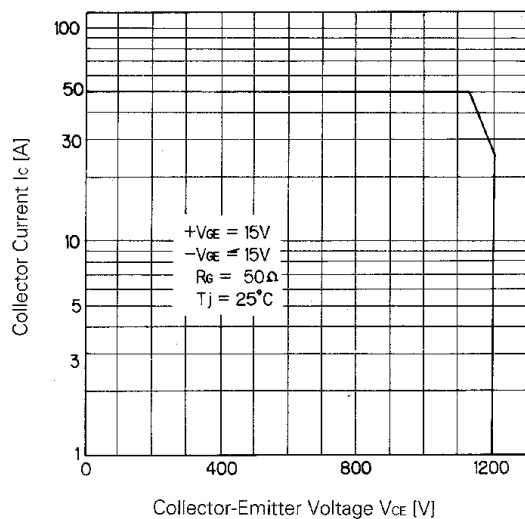
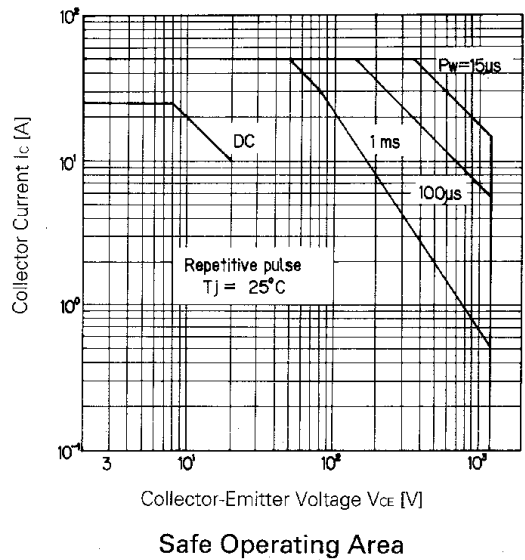
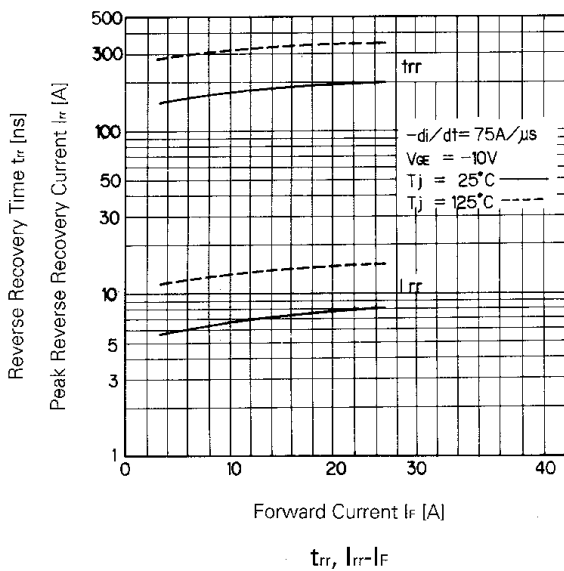
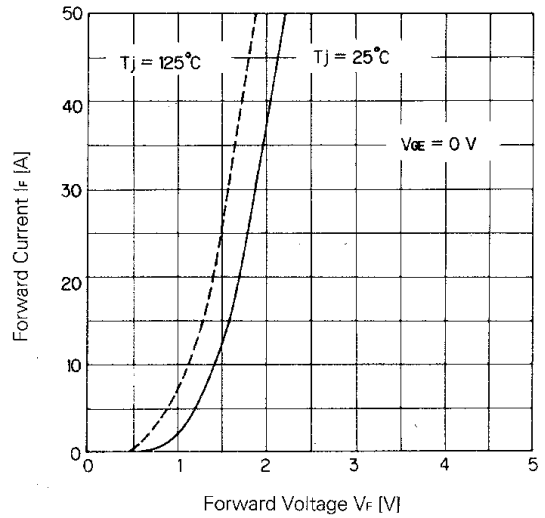
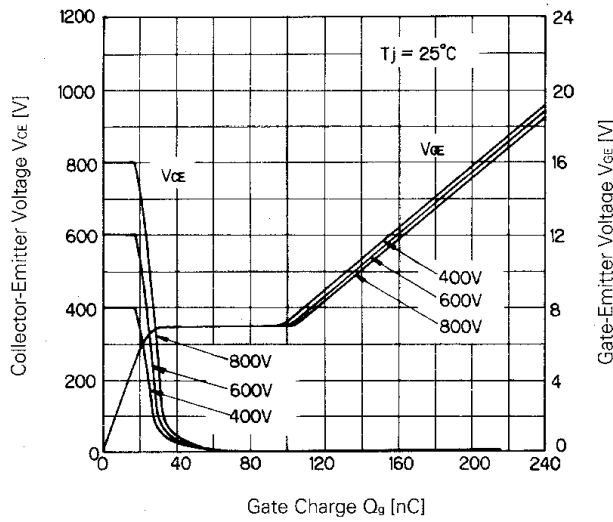
Switching Time



Switching Time



Switching Time-Gate Resistance



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