

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_{CES} | 1200 | V |
| Gate-Emitter Voltage | V_{GES} | ± 20 | V |
| Collector Current | Continuous | I_c | 200 |
| | 1ms | $I_{c\ pulse}$ | 400 |
| | Continuous | $-I_c$ | 200 |
| | 1ms | $-I_{c\ pulse}$ | 400 |
| Max. Power Dissipation | P_c | 1600 | W |
| Operating Temperature | T_j | +150 | °C |
| Storage Temperature | T_{stg} | -40 to +125 | °C |
| Net. Weight | | 415 | g |
| Isolation Voltage | AC. 1min. | V_{isol} | 2500 |
| Screw Torque | Mounting *1 | 35 | kg·cm |
| | Terminals *2 | 45 | |
| | Terminals *3 | 17 | |

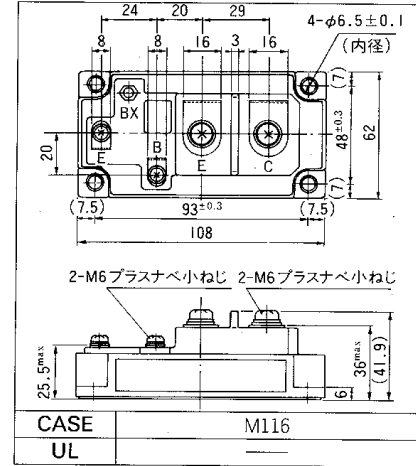
● Electrical Characteristics ($T_c=25^\circ\text{C}$)

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|--|------|-------|------|---------------|
| Zero Gate Voltage Collector Current | I_{CES} | $V_{GE}=0V\ V_{CE}=1200V\ T_c=25^\circ\text{C}$ | | | 4.0 | mA |
| | | $V_{GE}=0V\ V_{CE}=1200V\ T_c=125^\circ\text{C}$ | | | - | mA |
| Gate-Emitter Leakage Current | I_{GES} | $V_{CE}=0V\ V_{GE}=\pm 20V$ | | | 400 | nA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $V_{CE}=20V\ I_c=200mA$ | 3.0 | | 6.0 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}=15V\ I_c=200A$ | | 2.7 | 3.5 | V |
| Input Capacitance | C_{ies} | $V_{GE}=0V$ | | 36000 | | pF |
| Output Capacitance | C_{oes} | $V_{CE}=10V$ | | - | | |
| Reverse Transfer Capacitance | C_{res} | $f=1MHz$ | | - | | |
| Turn-on Time | t_{on} | $V_{CC}=600V$ | | 0.6 | 0.8 | μs |
| | t_r | $I_c=200A$ | | 0.4 | 0.6 | |
| Turn-off Time | t_{off} | $V_{GE}=\pm 15V$ | | 0.8 | 1.5 | |
| | t_f | $R_G=4.7\Omega$ | | 0.3 | 0.5 | |
| Diode Forward On-Voltage | V_F | $I_F=200A\ V_{GE}=0V$ | | | 2.5 | V |
| Reverse Recovery Time | t_{rr} | $I_F=200A\ -di/dt=600A/\mu\text{s}\ V_{GE}=-10V$ | | 200 | 350 | ns |

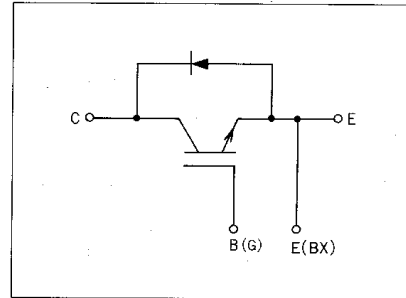
● Thermal Characteristics

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|---------------|-----------------------|------|--------|-------|-------|
| Thermal Resistance | $R_{th(j-c)}$ | IGBT | | | 0.078 | °C/W |
| | $R_{th(j-e)}$ | Diode | | | 0.15 | |
| | $R_{th(c-f)}$ | With Thermal compound | | 0.0125 | | |

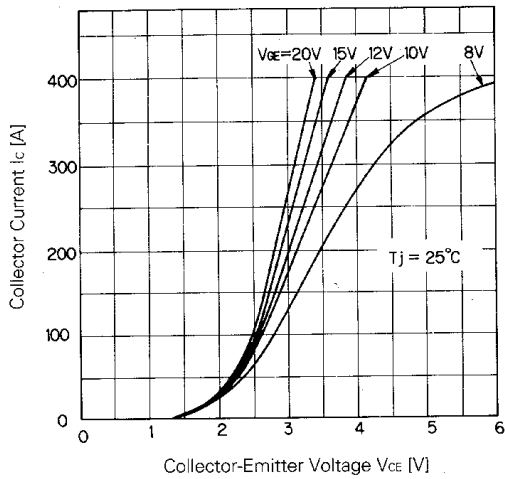
■ Outline Drawings



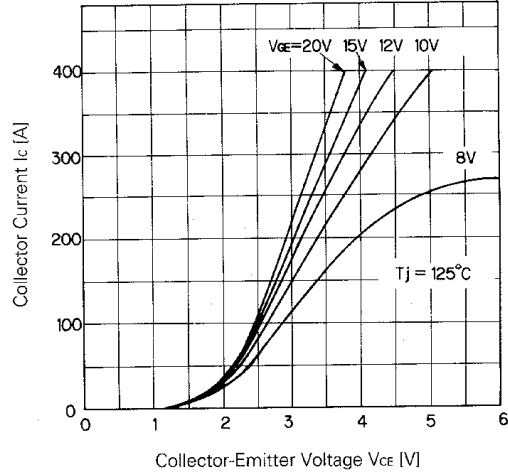
■ Equilavent Circuit Schematic



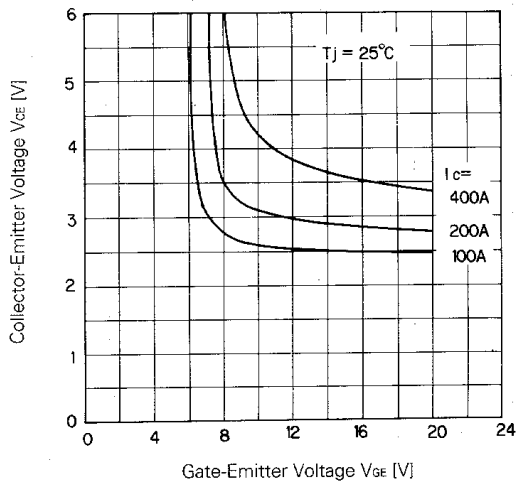
- *1 Recommendable Value 25 to 35kg·cm (M5)
- *2 Recommendable Value 35 to 45kg·cm (M6)
- *3 Recommendable Value 13 to 17kg·cm (M4)



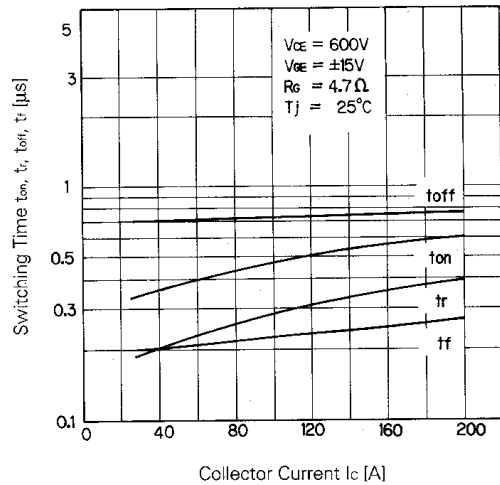
Collector Current vs. Collector-Emitter Voltage



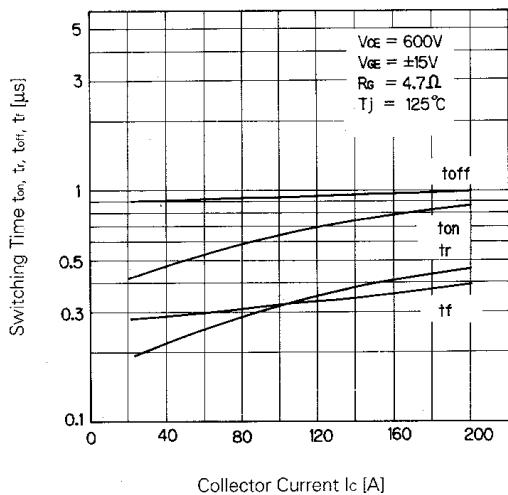
Collector Current vs. Collector-Emitter Voltage



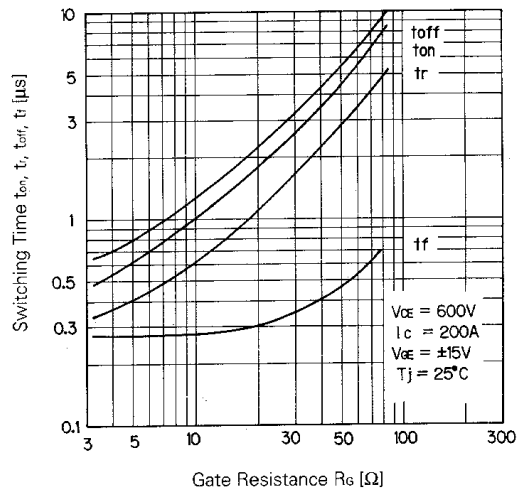
Collector-Emitter Voltage vs. Gate-Emitter Voltage



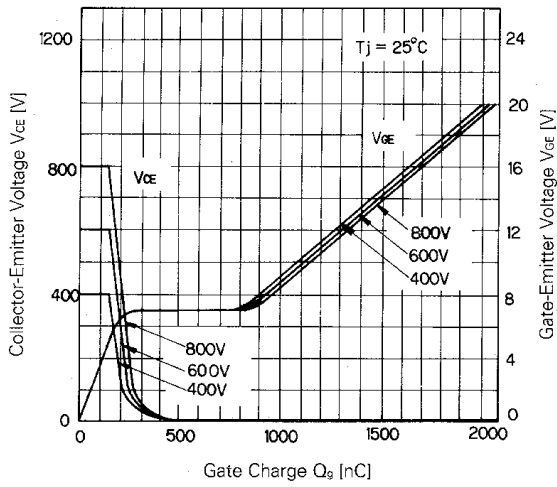
Switching Time



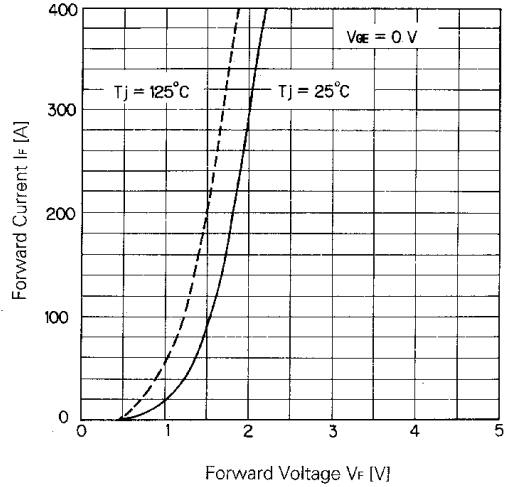
Switching Time



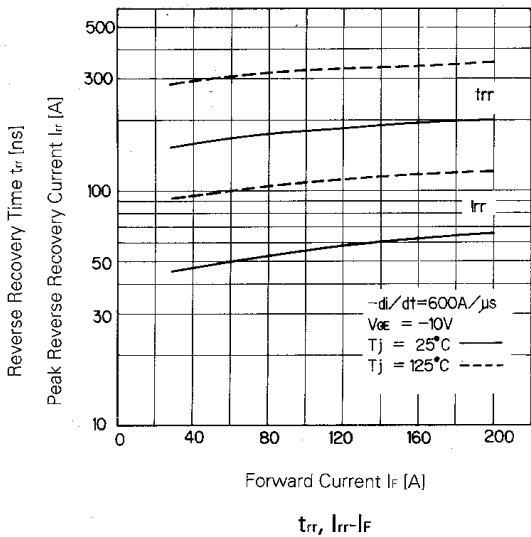
Switching Time-Gate Resistance



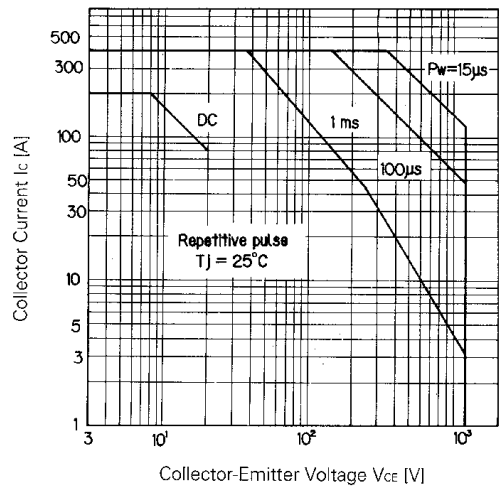
Dynamic Input Characteristic



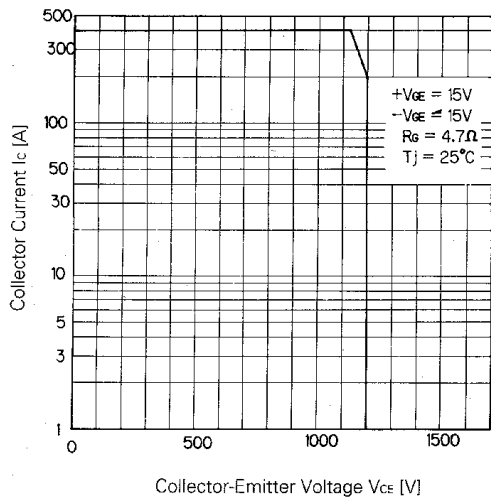
Forward Voltage of Free Wheel Diode



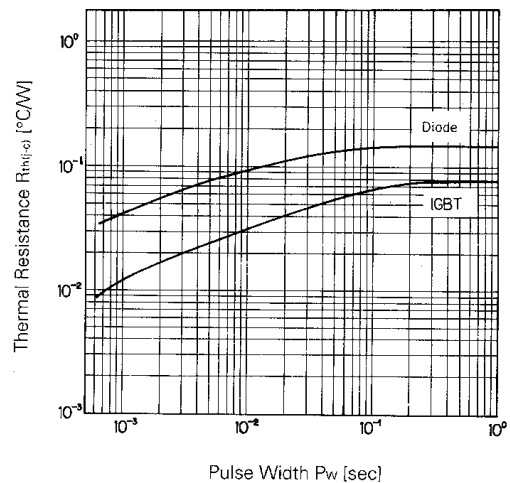
$t_{rr}, I_{rr}-I_F$



Safe Operating Area



Reverse Biased Safe Operating Area



Transient Thermal Resistance

For more information, contact:

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