

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 |
| Isolation Voltage | AC, 1min. | V _{is} | 2500 |
| Screw Torque | Mounting *1 | 3.5 | N•m |
| | Terminals *2 | 4.5 | |
| | Terminals *3 | 1.7 | |

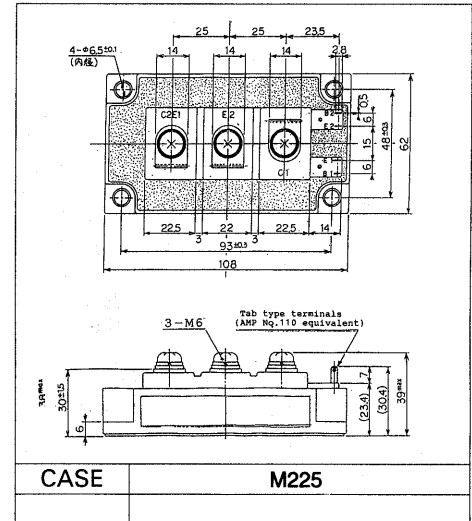
● Electrical Characteristics (T_c=25°C)

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|----------------------|--|------|-------|------|-------|
| Zero Gate Voltage Collector Current | I _{CEs} | V _{GE} =0V V _{CE} =1200V T _c =25°C | | | 4.0 | mA |
| | | V _{GE} =0V V _{CE} =1200V T _c =125°C | | | - | mA |
| Gate-Emitter Leakage Current | I _{GES} | V _{CE} =0V V _{GE} =±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} =±15V | | 0.8 | 1.5 | |
| | t _f | R _G =4.7Ω | | 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/μs V _{GE} =-10V | | 200 | 350 | ns |

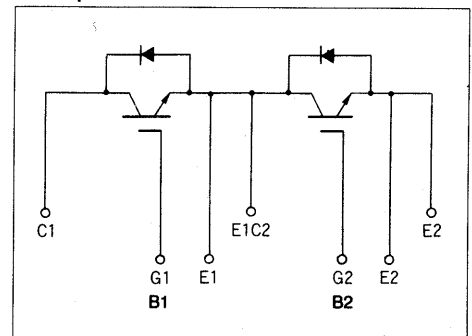
● Thermal Characteristics

| 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



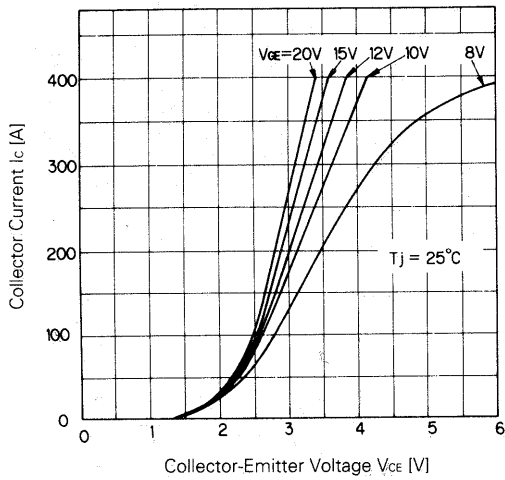
■ Equilavent Circuit Schematic



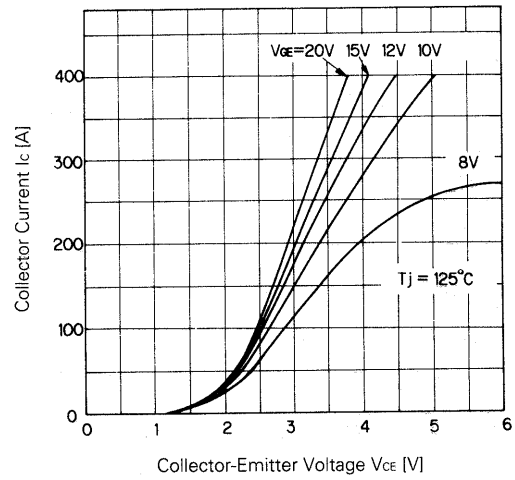
*1 Recommendable Value 2.5 ~ 3.5 N•m (M5) or (M6)

*2 Recommendable Value 3.5 ~ 4.5 N•m (M6)

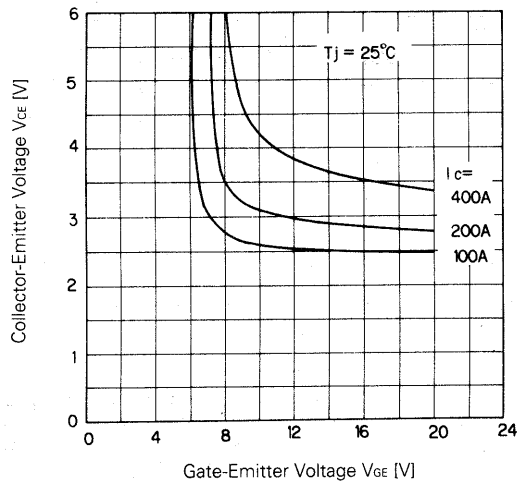
*3 Recommendable Value 1.3 ~ 1.7 N•m (M4)



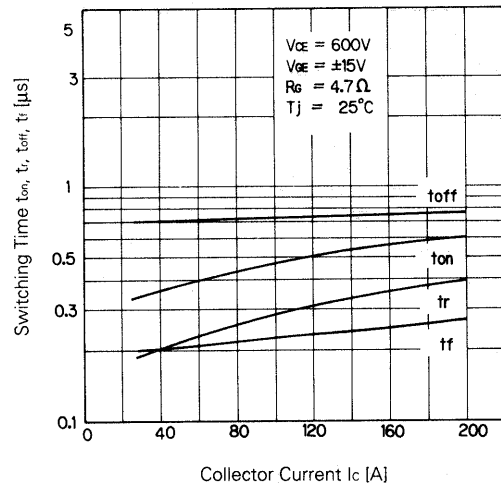
Collector Current vs. Collector-Emitter Voltage



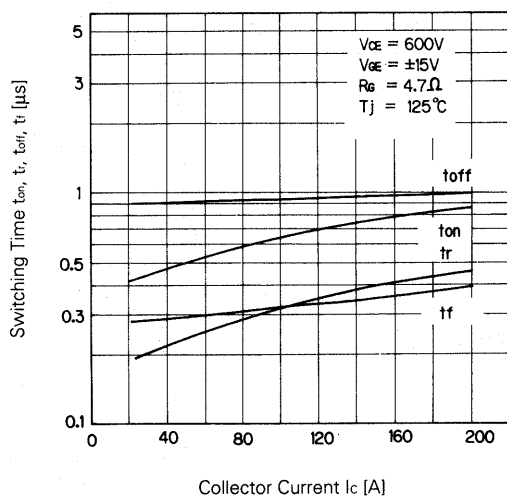
Collector Current vs. Collector-Emitter Voltage



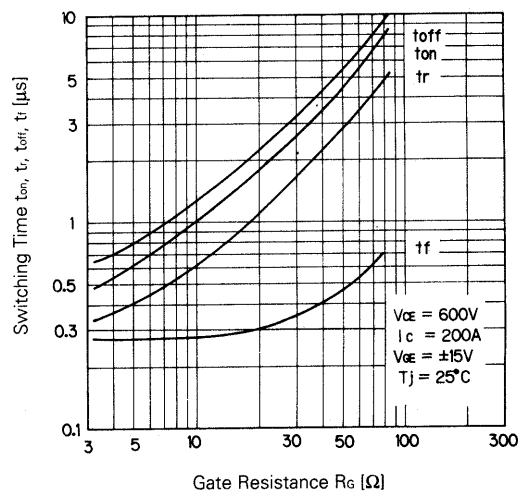
Collector-Emitter Voltage vs. Gate-Emitter Voltage



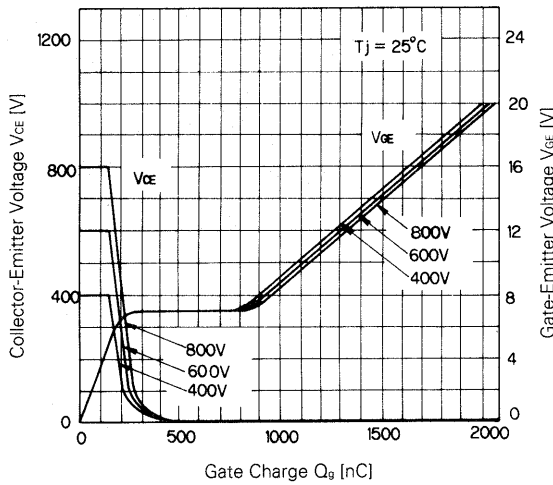
Switching Time



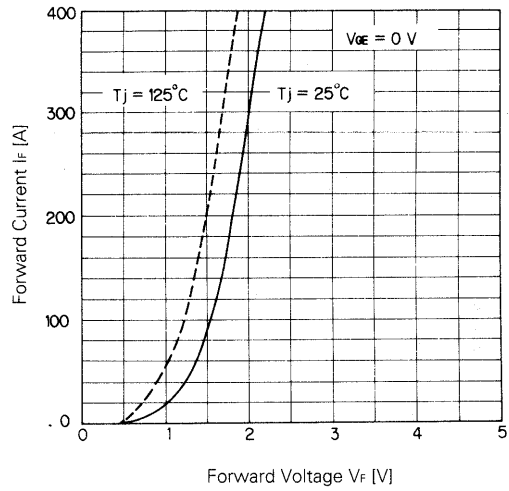
Switching Time



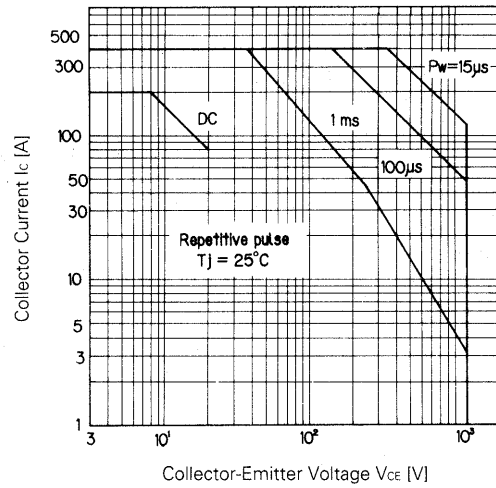
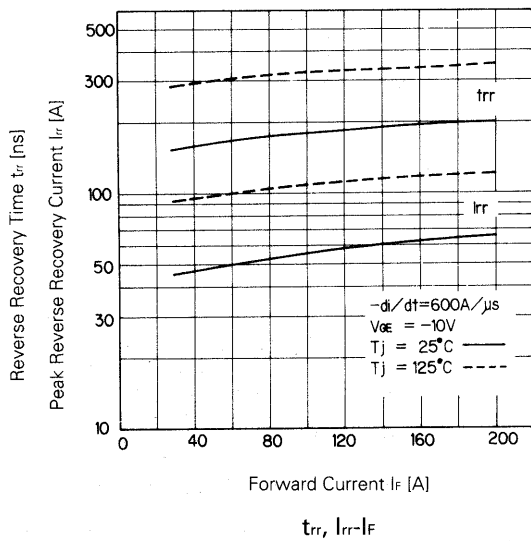
Switching Time-Gate Resistance



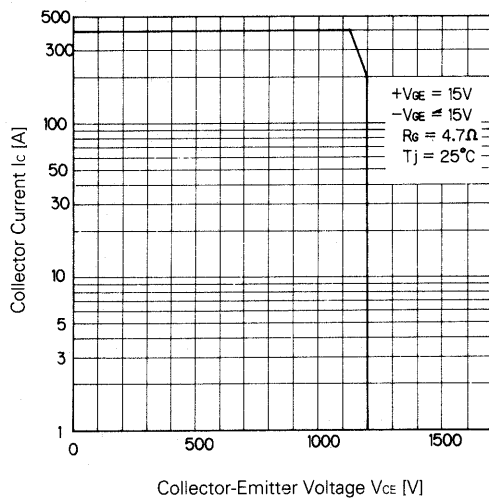
Dynamic Input Characteristic



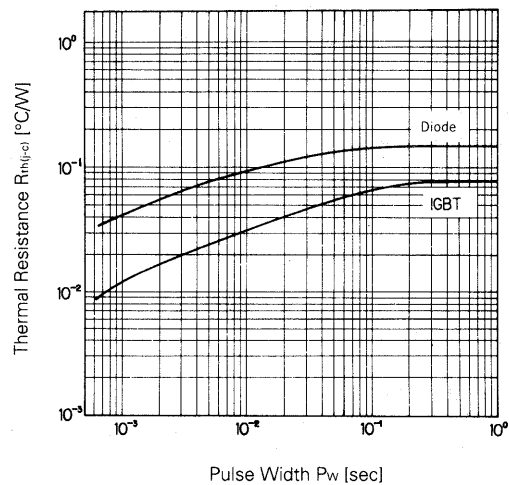
Forward Voltage of Free Wheel Diode



Safe Operating Area



Reverse Biased Safe Operating Area



Transient Thermal Resistance