

IGBT MODULE (S-Series)

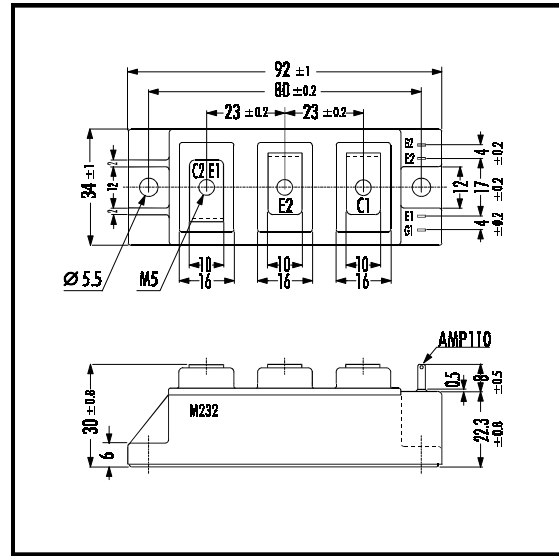
■ Features

- NPT-Technology
- Square SC SOA at $10 \times I_C$
- High Short Circuit Withstand-Capability
- Small Temperature Dependence of the Turn-Off Switching Loss
- Low Losses And Soft Switching

■ Applications

- High Power Switching
- A.C. Motor Controls
- D.C. Motor Controls
- Uninterruptible Power Supply

■ Outline Drawing



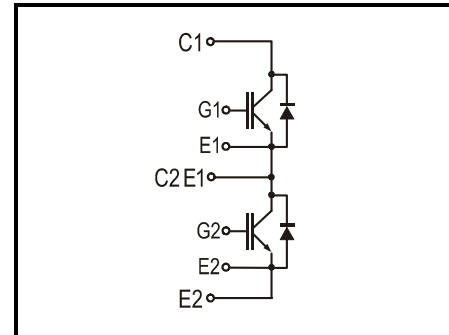
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

| Items | Symbols | Ratings | Units | |
|---------------------------|--------------|---------------|--------------------------|---|
| Collector-Emitter Voltage | V_{CES} | 1200 | V | |
| Gate -Emitter Voltage | V_{GES} | ± 20 | | |
| Collector Current | Continuous | 25°C / 80°C | I_C 100 / 75 | A |
| | 1ms | 25°C / 80°C | $I_{C\ PULSE}$ 200 / 150 | |
| | Continuous | | $-I_C$ 75 | |
| | 1ms | | $-I_{C\ PULSE}$ 150 | |
| Max. Power Dissipation | P_C | 600 | W | |
| Operating Temperature | T_j | +150 | °C | |
| Storage Temperature | T_{stg} | -40 ~ +125 | | |
| Isolation Voltage *1 | A.C. 1min. | V_{is} 2500 | V | |
| Screw Torque | Mounting *2 | 3.5 | Nm | |
| | Terminals *2 | 3.5 | | |

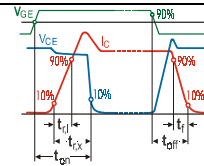
Note: 1*: All Terminals should be connected together when isolation test will be done.
2*: Recommendable Value; 2.5 ~ 3.5 Nm (M5)

■ Equivalent Circuit



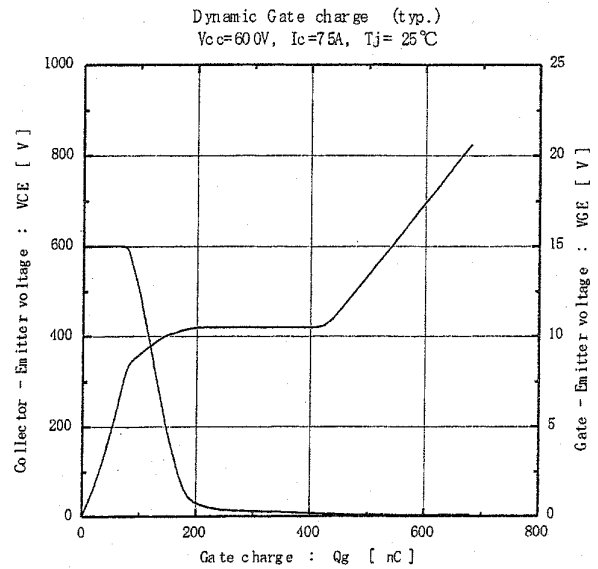
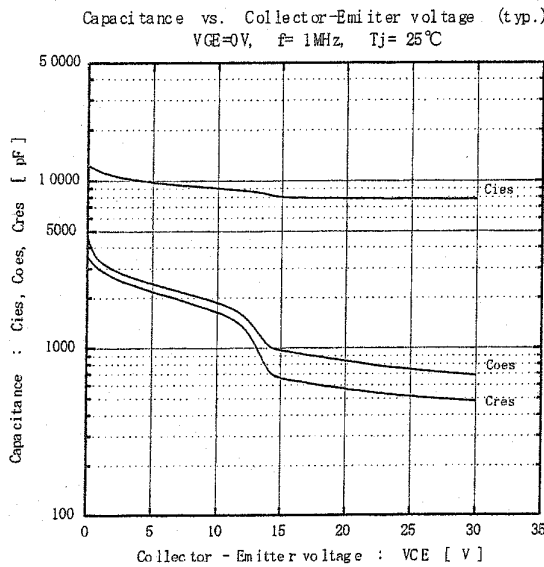
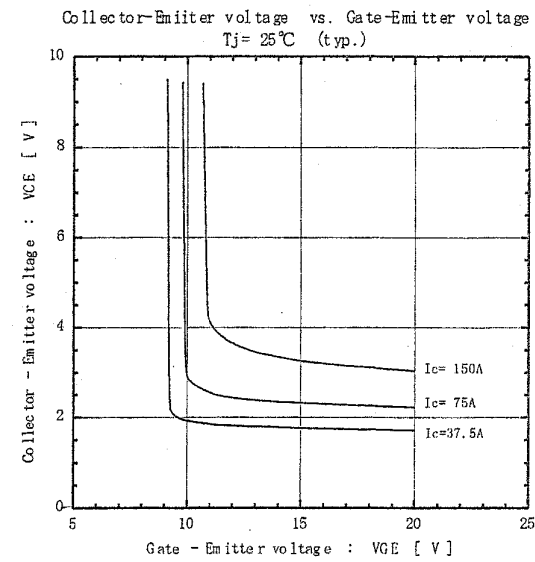
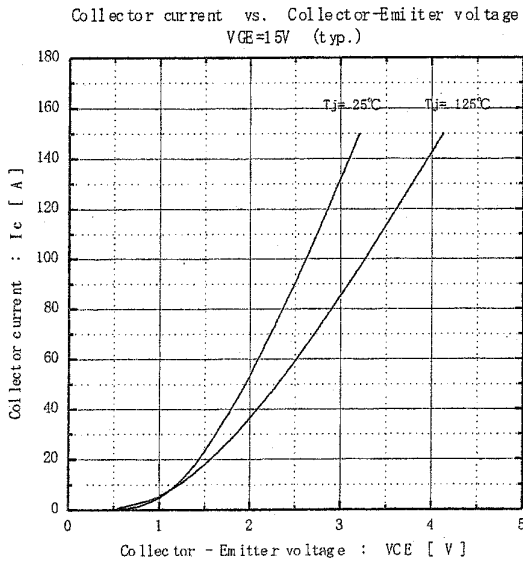
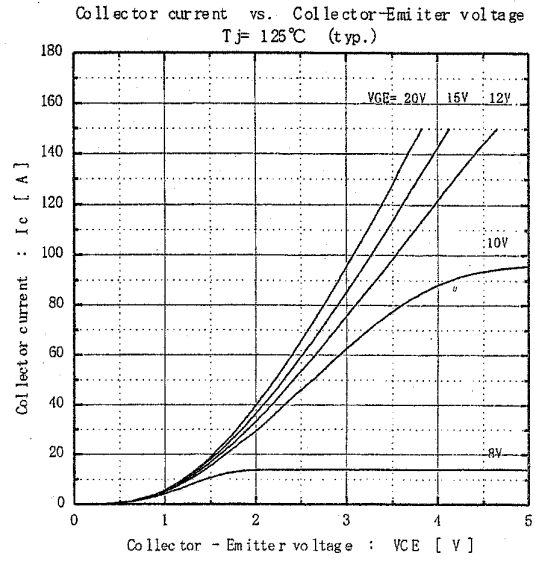
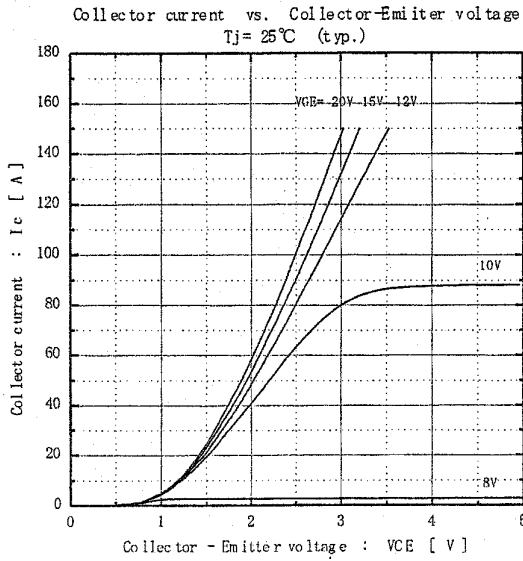
• Electrical Characteristics (at $T_j=25^\circ\text{C}$)

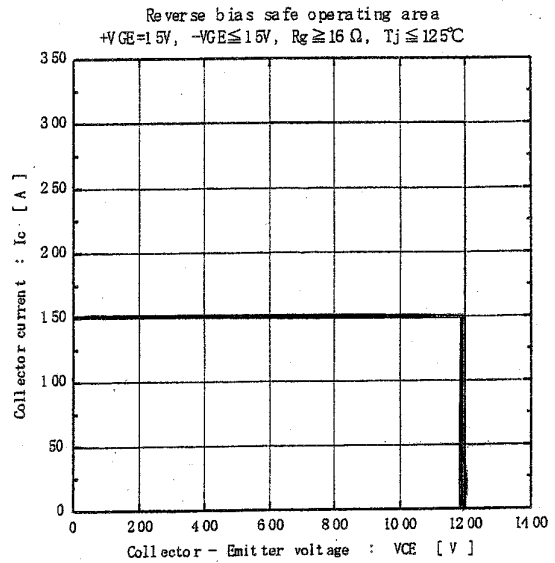
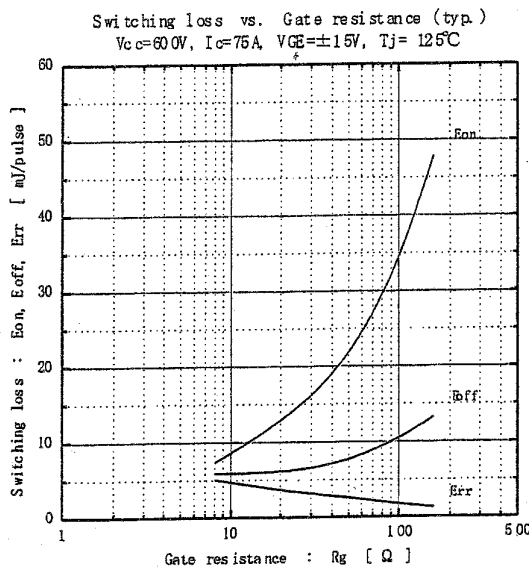
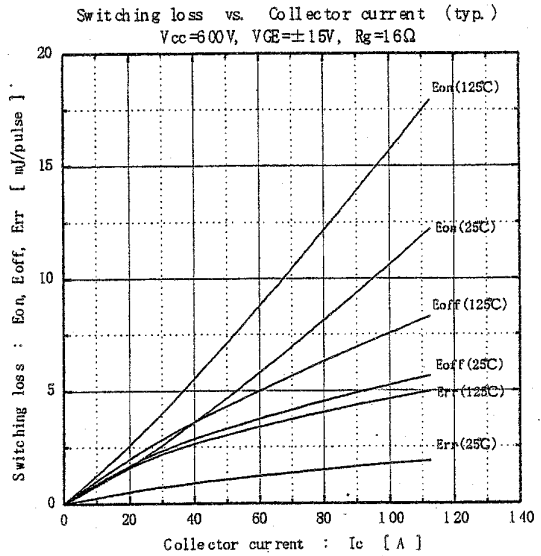
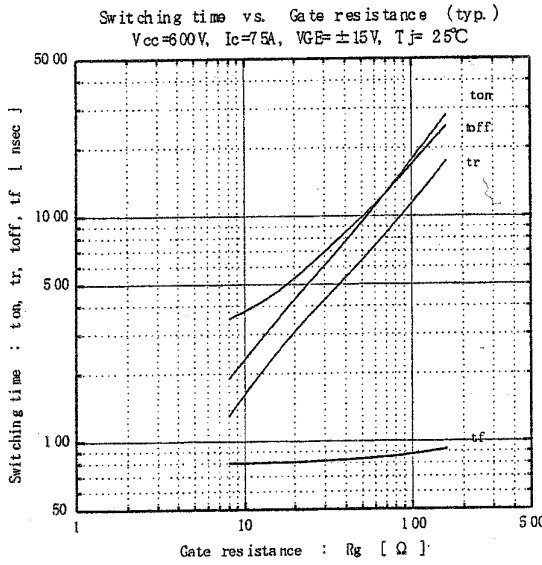
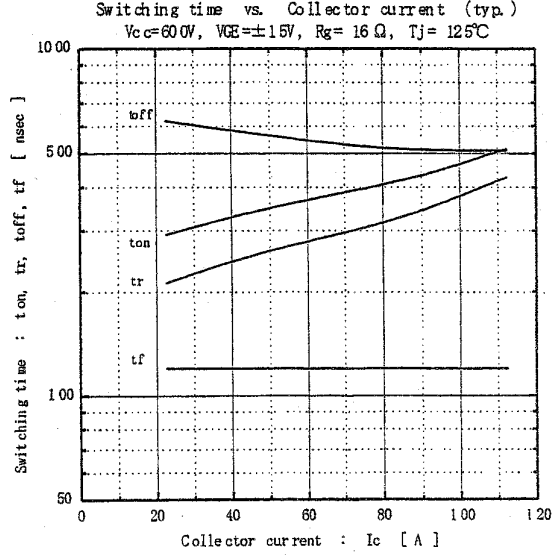
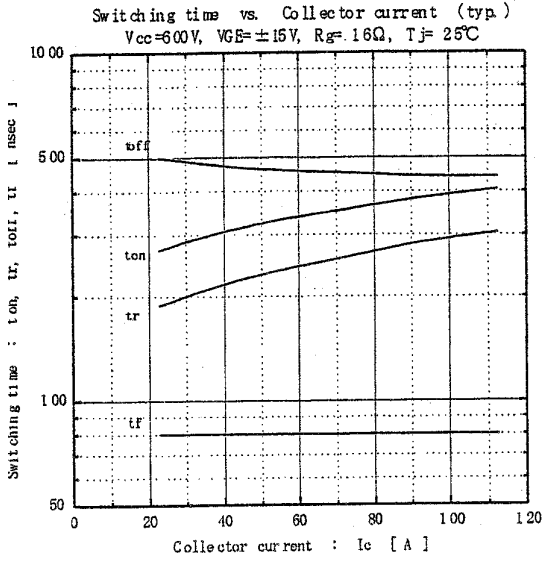
| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|--|---------------------------|-------|------|---------------|
| Zero Gate Voltage Collector Current | I_{CES} | $V_{GE}=0V$ $V_{CE}=1200V$ | | | 1.0 | mA |
| Gate-Emitter Leakage Current | I_{GES} | $V_{CE}=0V$ $V_{GE}=\pm 20V$ | | | 200 | nA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $V_{GE}=20V$ $I_C=75mA$ | 5.5 | 7.2 | 8.5 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}=15V$ $I_C=75A$ | $T_j = 25^\circ\text{C}$ | 2.3 | 2.6 | |
| | | | $T_j = 125^\circ\text{C}$ | 2.8 | | |
| Input Capacitance | C_{ies} | $V_{GE}=0V$ | | 9'000 | | pF |
| Output Capacitance | C_{oes} | $V_{CE}=10V$ | | 1'875 | | |
| Reverse Transfer Capacitance | C_{res} | $f=1MHz$ | | 1'650 | | |
| Turn-on Time | t_{ON} | $V_{CC} = 600V$ $I_C = 75A$ $V_{GE} = \pm 15V$ $R_G = 16\Omega$ Inductive Load | | 0.35 | 1.2 | μs |
| | $t_{r,x}$ | | | 0.25 | 0.6 | |
| | $t_{r,i}$ | | | 0.10 | | |
| Turn-off Time | t_{OFF} | | | 0.45 | 1.0 | μs |
| | t_f | | | 0.08 | 0.3 | |
| Diode Forward On-Voltage | V_F | $I_F=75A$; $V_{GE}=0V$ | | 2.3 | 3.0 | V |
| | | | $T_j = 25^\circ\text{C}$ | 2.0 | | |
| Reverse Recovery Time | t_{rr} | $I_F=75A$ | | | 350 | ns |



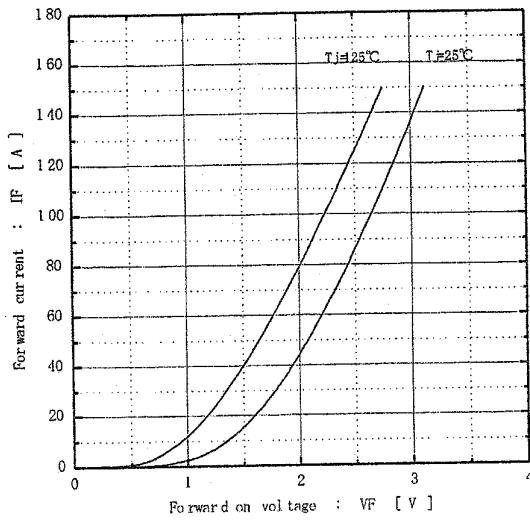
• Thermal Characteristics

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|---------------|-----------------------|------|------|------|-------|
| Thermal Resistance | $R_{th(j-c)}$ | IGBT | | | 0.21 | °C/W |
| | $R_{th(j-c)}$ | Diode | | | 0.47 | |
| | $R_{th(c-f)}$ | With Thermal Compound | | 0.05 | | |

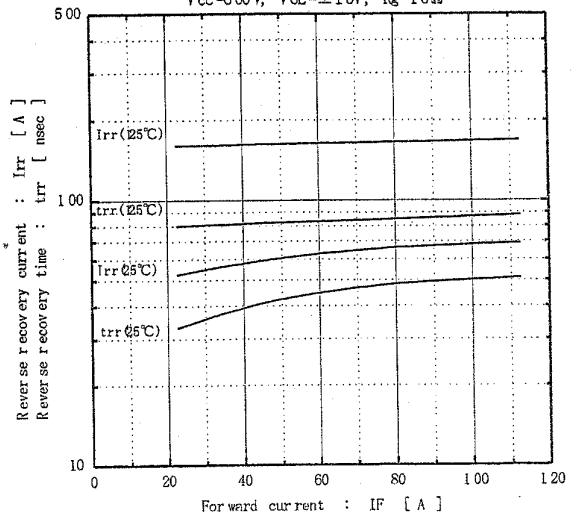




Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)



Transient thermal resistance

