

## 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      |            | $V_{GES}$       | $\pm 20$    | V     |
| Collector Current         | Continuous | $I_C$           | 25          | A     |
|                           | 1ms        | $I_{C\ pulse}$  | 50          |       |
|                           | Continuous | $-I_C$          | 25          |       |
|                           | 1ms        | $-I_{C\ pulse}$ | 50          |       |
| Max. Power Dissipation    |            | $P_C$           | 250         | W     |
| Operating Temperature     |            | $T_j$           | +150        | °C    |
| Storage Temperature       |            | $T_{stg}$       | -40 to +125 | °C    |
| Net. Weight               |            |                 | 185         | g     |
| Isolation Voltage         | AC. 1min.  | $V_{isol}$      | 2500        | V     |
| Screw Torque              |            | Mounting *1     | 35          | kg*cm |
|                           |            | Terminals *2    | 35          |       |

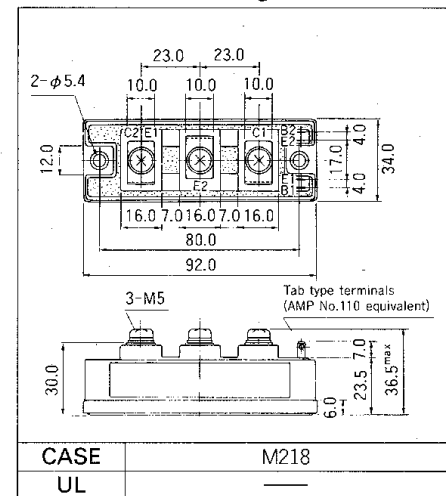
#### ● Electrical Characteristics ( $T_c=25^\circ\text{C}$ )

| Items                                | Symbols       | Test Conditions                                    | Min. | Typ. | Max. | Units   |
|--------------------------------------|---------------|----------------------------------------------------|------|------|------|---------|
| Zero Gate Voltage Collector Current  | $I_{CES}$     | $V_{GE}=0V$ $V_{CE}=1200V$ $T_c=25^\circ\text{C}$  |      |      | 1.0  | mA      |
|                                      |               | $V_{GE}=0V$ $V_{CE}=1200V$ $T_c=125^\circ\text{C}$ |      |      | —    | mA      |
| Gate-Emitter Leakage Current         | $I_{GES}$     | $V_{CE}=0V$ $V_{GE}=\pm 20V$                       |      |      | 100  | nA      |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $V_{CE}=20V$ $I_C=25mA$                            | 3.0  |      | 6.0  | V       |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}=15V$ $I_C=25A$                             |      | 2.7  | 3.5  | V       |
| Input Capacitance                    | $C_{ies}$     | $V_{GE}=0V$                                        |      | 4500 |      | pF      |
| Output Capacitance                   | $C_{oes}$     | $V_{CE}=10V$                                       |      | —    |      |         |
| Reverse Transfer Capacitance         | $C_{res}$     | $f=1MHz$                                           |      | —    |      |         |
| Turn-on Time                         | $t_{on}$      | $V_{CC}=600V$                                      |      | 0.5  | 0.8  | $\mu s$ |
|                                      | $t_r$         | $I_C=25A$                                          |      | 0.3  | 0.6  |         |
| Turn-off Time                        | $t_{off}$     | $V_{GE}=\pm 15V$                                   |      | 0.8  | 1.5  |         |
|                                      | $t_f$         | $R_G=50\Omega$                                     |      | 0.3  | 0.5  |         |
| Diode Forward On-Voltage             | $V_F$         | $I_F=25A$ $V_{GE}=0V$                              |      |      | 2.5  | V       |
| Reverse Recovery Time                | $t_{rr}$      | $I_F=25A$ $-di/dt=75A/\mu s$ $V_{GE}=-10V$         |      | 200  | 350  | ns      |

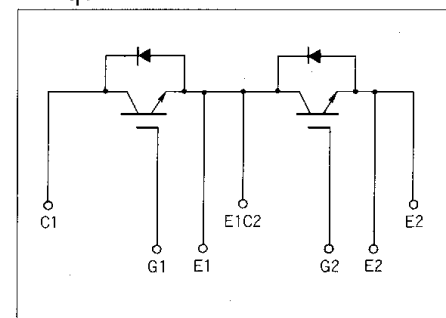
#### ● Thermal Characteristics

| Items              | Symbols       | Test Conditions       | Min. | Typ. | Max. | Units |
|--------------------|---------------|-----------------------|------|------|------|-------|
| Thermal Resistance | $R_{th(j-c)}$ | IGBT                  |      |      | 0.50 | °C/W  |
|                    | $R_{th(j-e)}$ | Diode                 |      |      | 1.00 |       |
|                    | $R_{th(c-f)}$ | With Thermal compound |      | 0.05 |      |       |

### ■ Outline Drawings

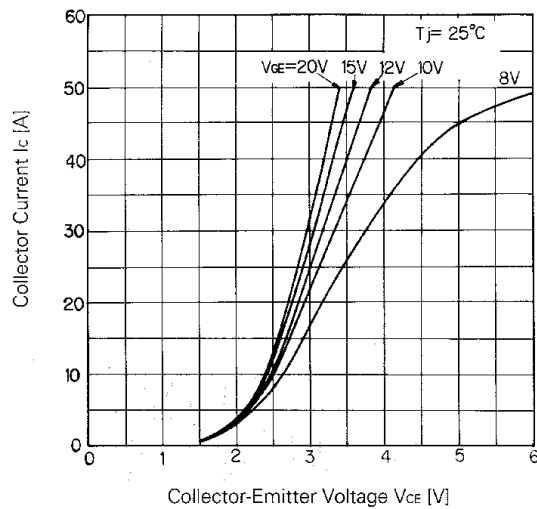


### ■ Equilavelent Circuit Schematic

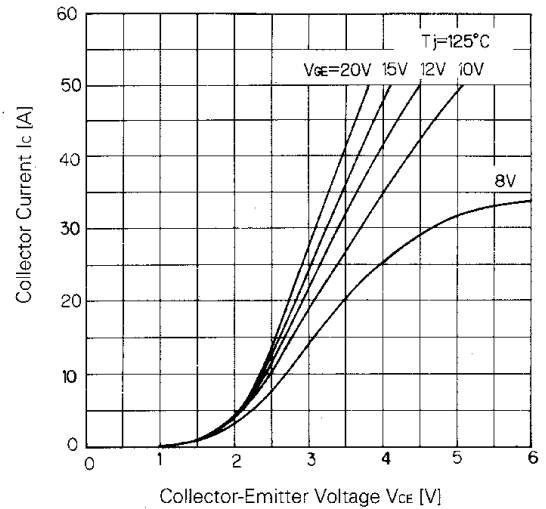


\*1 Recommendable Value 25 to 35kg\*cm (M5)

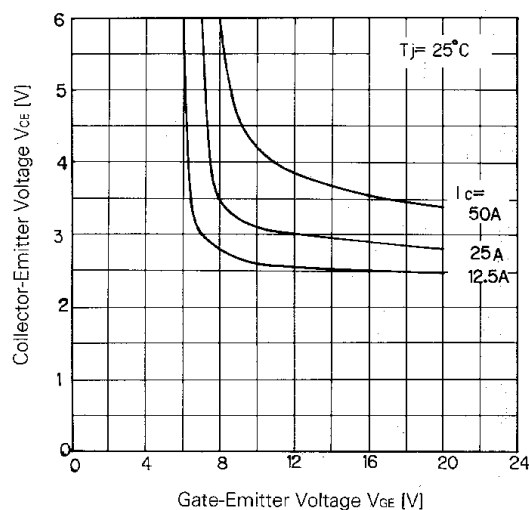
\*2 Recommendable Value 25 to 35kg\*cm (M5)



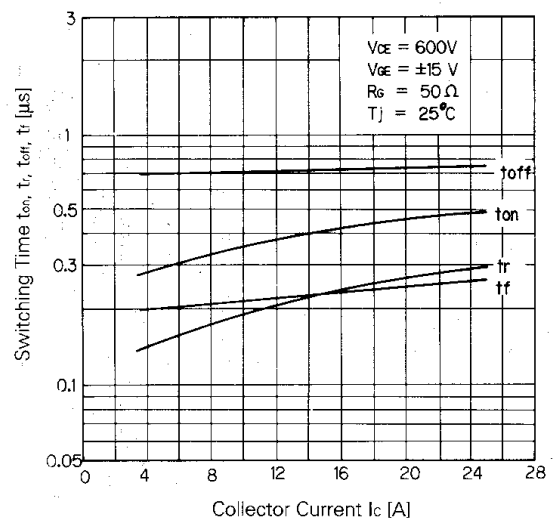
Collector Current vs. Collector-Emitter Voltage



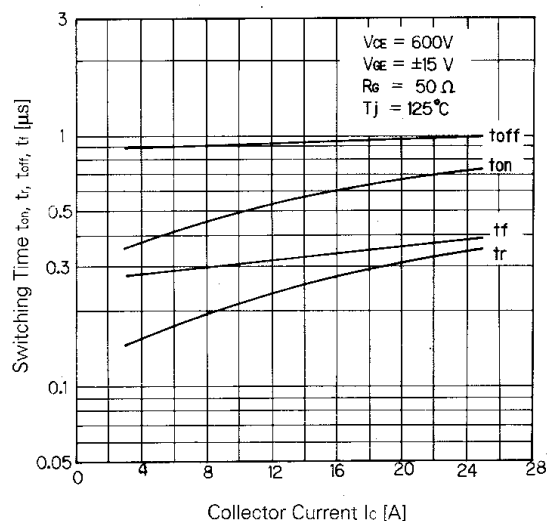
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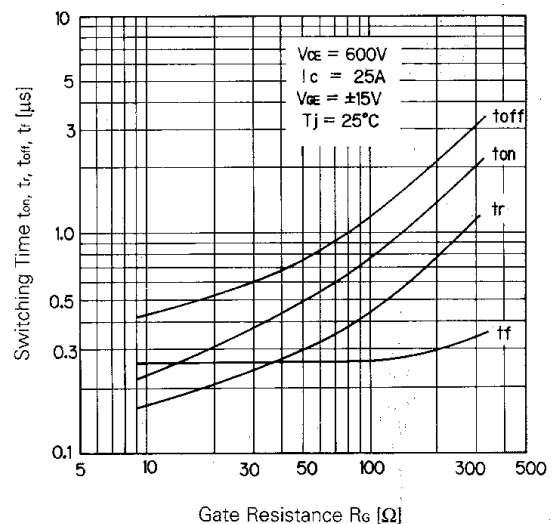
Collector-Emitter Voltage vs. Gate-Emitter Voltage



Switching Time



Switching Time



Switching Time-Gate Resistance

