## GTR Module

## Silicon N Channel IGBT

## High Power Switching Applications

## Motor Control Applications

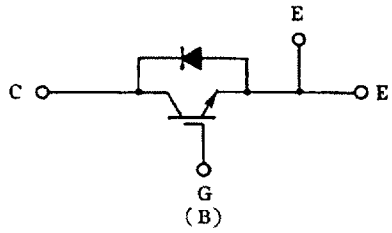
### Features

- High input impedance
- High speed: $t_f$ = 1.0μs (Max.) $t_{rr}$ = 0.5μs (Max.)
- Low saturation voltage: $V_{CE\ (sat)}$ = 2.7V (Max.)
- Enhancement mode
- The electrodes are isolated from case

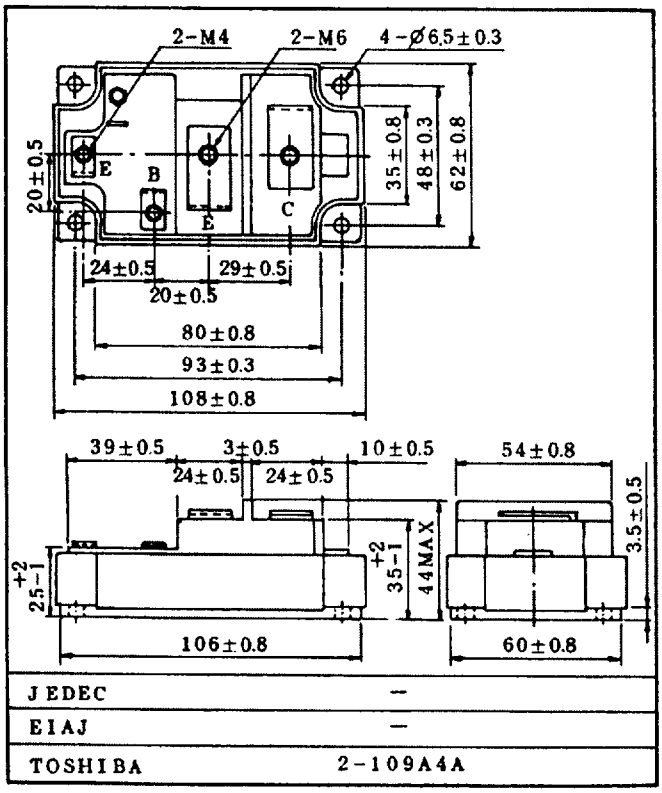
### Maximum Ratings (Ta = 25°C)

| CHARACTERISTICS | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Collector-Emitter Voltage | | $V_{CES}$ | 1200 | V |
| Gate-Emitter Voltage | | $V_{GES}$ | ± 20 | V |
| Collector Current | DC | $I_C$ | 300 | A |
| | 1ms | $I_{CP}$ | 600 | |
| Forward Current | DC | $I_F$ | 300 | A |
| | 1ms | $I_{FM}$ | 600 | |
| Collector Power Dissipation (Tc = 25°C) | | $P_C$ | 2000 | W |
| Junction Temperature | | $T_j$ | 150 | °C |
| Storage Temperature Range | | $T_{stg}$ | -40 ~ 125 | °C |
| Isolation Voltage | | $V_{Isol}$ | 2500 (AC 1 Minute) | V |
| Screw Torque (Terminal: M4/M6/Mounting) | | — | 2/3/3 | N ¥ m |

### Equivalent Circuit (MG300Q1US11)



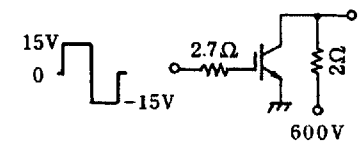
Unit in mm



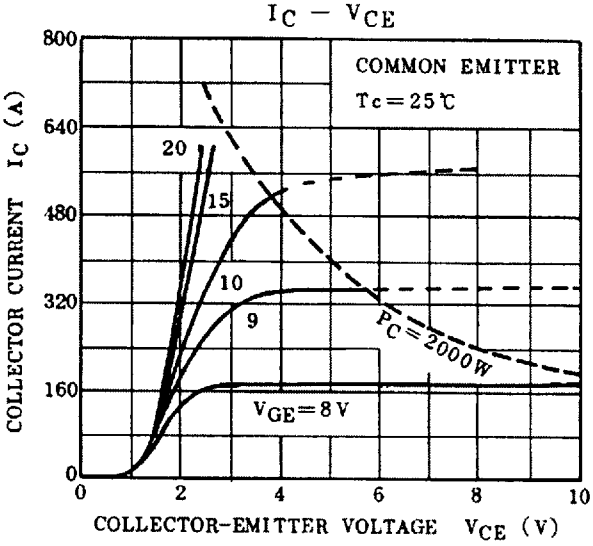

| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-109A4A |

Weight : 465g

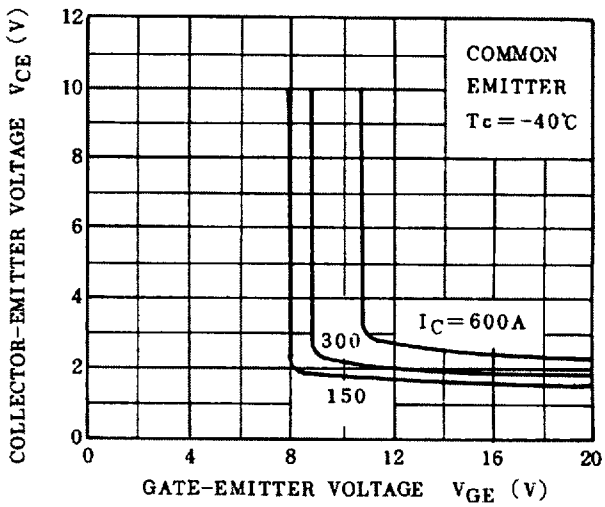
## Electrical Characteristics (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Gate Leakage Current | | $I_{GES}$ | $V_{GE}$ = ± 20V, $V_{CE}$ = 0 | — | — | ± 500 | nA |
| Collector Cut-off Current | | $I_{CES}$ | $V_{CE}$ = 1200V, $V_{GE}$ = 0 | — | — | 4 | mA |
| Gate-Emitter Cut-off Voltage | | $V_{GE (OFF)}$ | $I_C$ = 300mA, $V_{CE}$ = 5V | 3.0 | — | 6.0 | V |
| Collector-Emitter Saturation Voltage | | $V_{CE (sat)}$ | $I_C$ = 300A, $V_{GE}$ = 15V | — | 2.2 | 2.7 | V |
| Input Capacitance | | $C_{ies}$ | $V_{CE}$ = 10V, $V_{GE}$ = 0, f = 1MHz | — | 42000 | — | pF |
| Switching Time | Rise Time | $t_r$ |  | — | 0.3 | 0.6 | µs |
| | Turn-on Time | $t_{on}$ | | — | 0.4 | 0.8 | |
| | Fall Time | $t_f$ | | — | 0.6 | 1.0 | |
| | Turn-off Time | $t_{off}$ | | — | 1.2 | 1.8 | |
| Forward Voltage | | $V_F$ | $I_F$ = 300A, $V_{GE}$ = 0 | — | 2.0 | 3.0 | V |
| Reverse Recovery Time | | $t_{rr}$ | $I_F$ = 300A, $V_{GE}$ = -10V<br>di/dt = 300A/µs | — | 0.25 | 0.5 | µs |
| Thermal Resistance | | $R_{th (j-c)}$ | Transistor | — | — | 0.062 | °C/W |
| | | | Diode | — | — | 0.2 | |

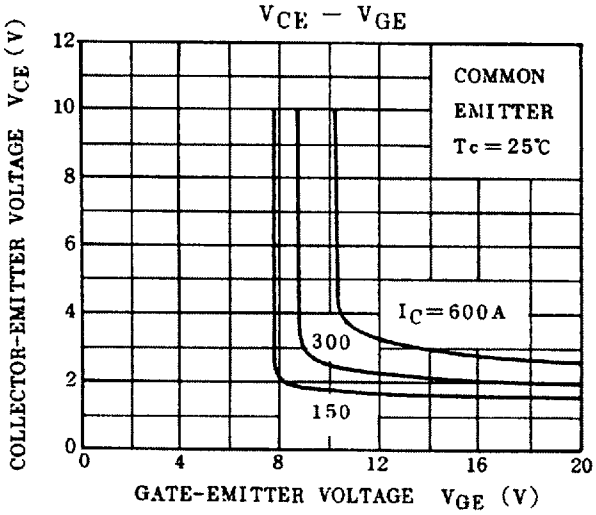
$I_C - V_{CE}$



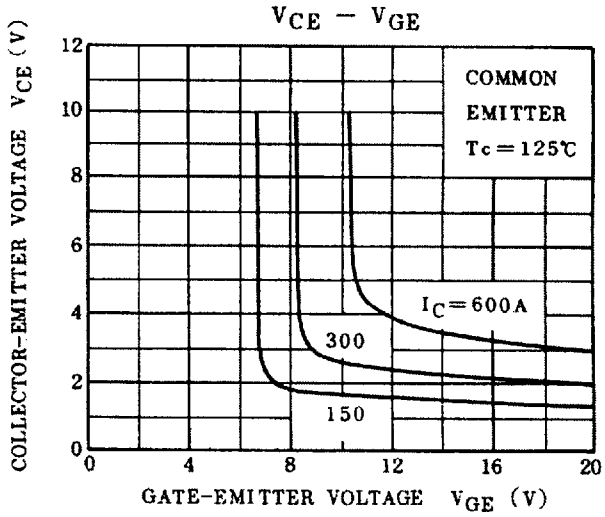

$V_{CE} - V_{GE}$



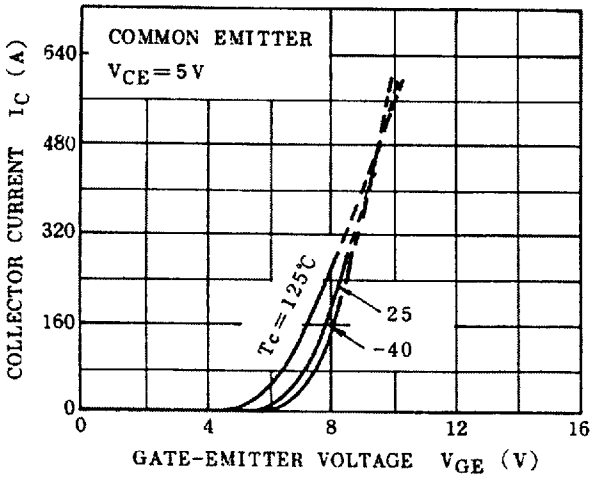

$V_{CE} - V_{GE}$



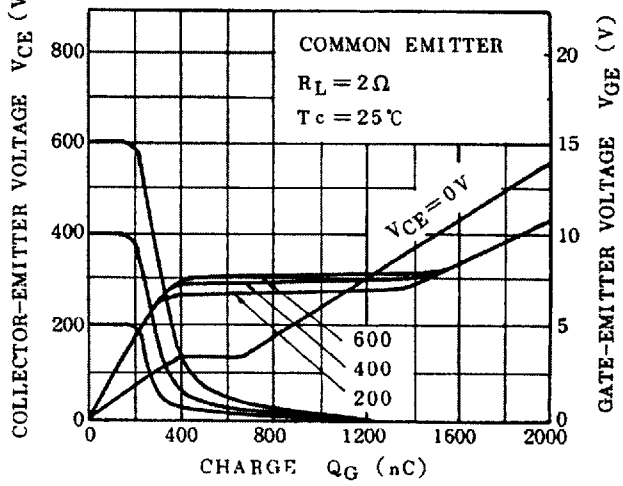

$V_{CE} - V_{GE}$



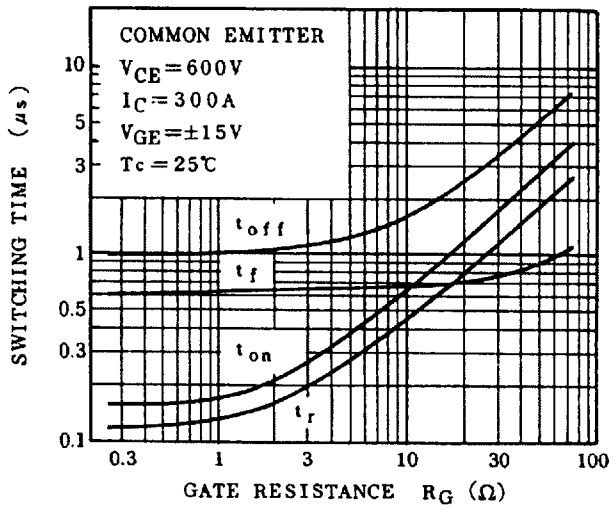

$I_C - V_{GE}$



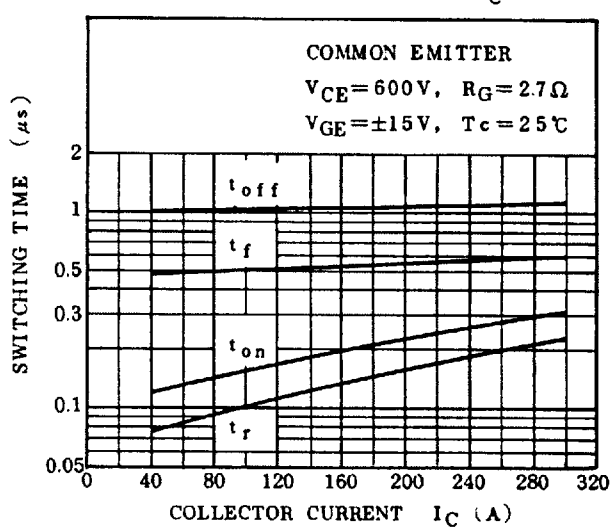

$V_{CE}$, $V_{GE} - Q_G$



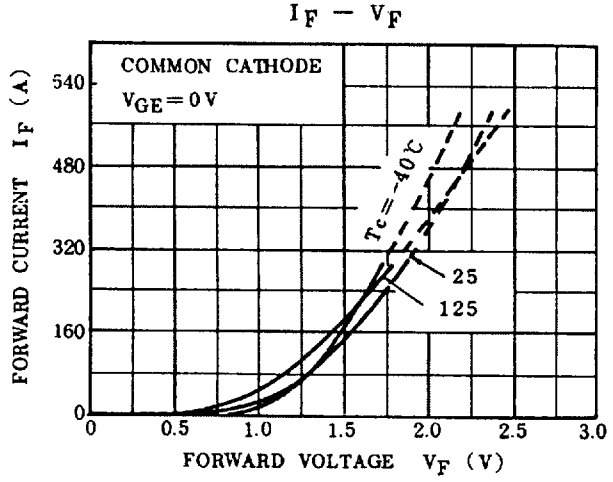
SWITCHING TIME — $R_G$



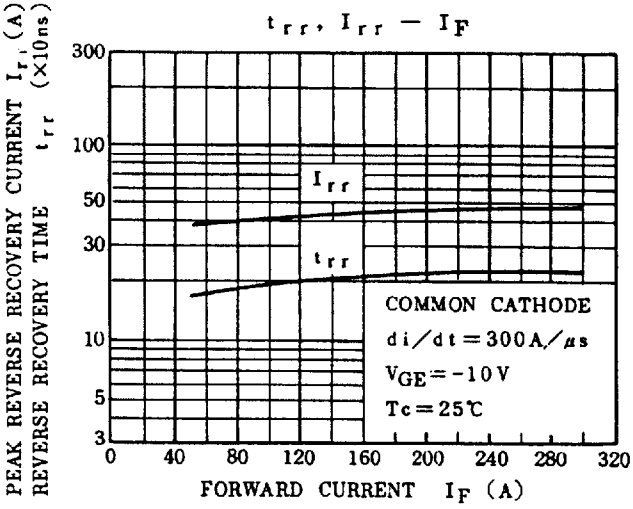

SWITCHING TIME — $I_C$



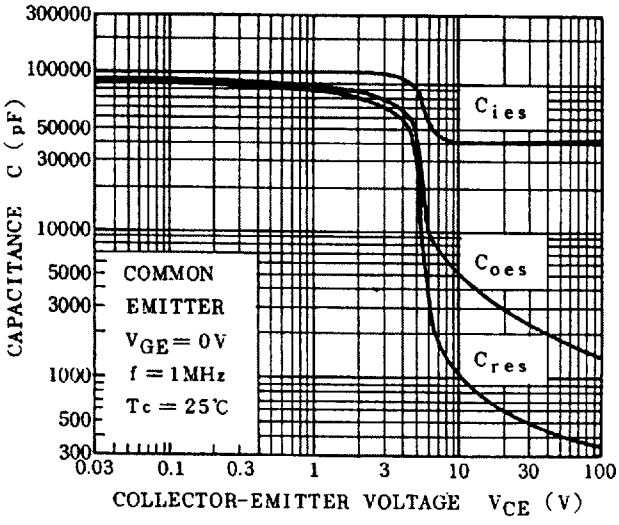

$I_F$ — $V_F$



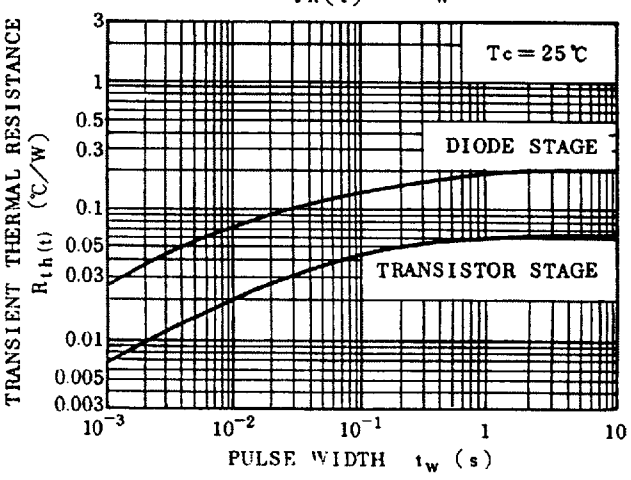

$t_{rr}$, $I_{rr}$ — $I_F$



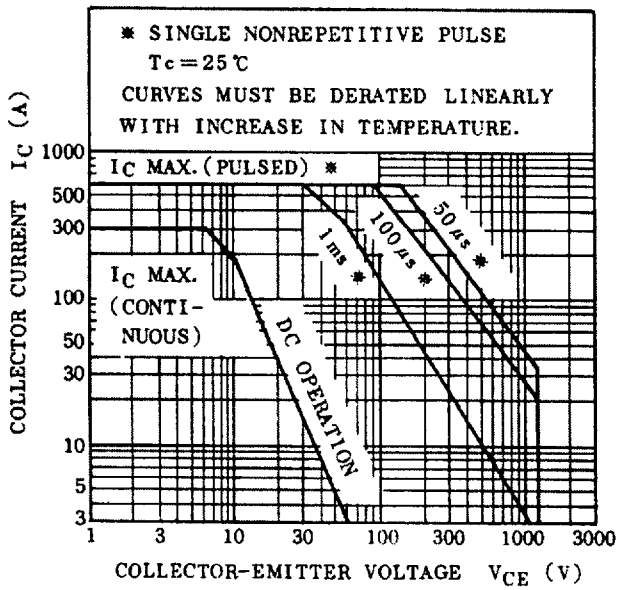

C — $V_{CE}$




$R_{th(t)}$ — $t_w$



SAFE OPERATING AREA




REVERSE BIAS SOA