

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

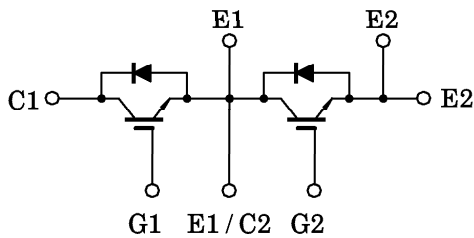
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HIGH POWER SWITCHING APPLICATIONS

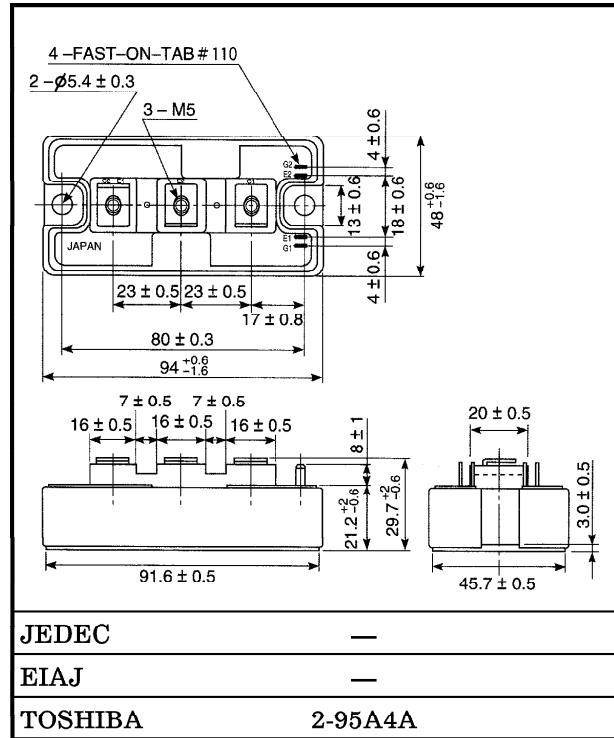
MOTOR CONTROL APPLICATIONS

- High Input Impedance
- High Speed : $t_f = 0.3 \mu s$ (Max.)
@Inductive Load
- Low Saturation Voltage
: $V_{CE(sat)} = 3.6V$ (Max.)
- Enhancement-Mode
- Includes a Complete Half Bridge in One Package.
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT



Unit in mm



Weight : 255g

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|--|------------|---------------------------|-----------|
| Collector-Emitter Voltage | V_{CES} | 1200 | V |
| Gate-Emitter Voltage | V_{GES} | ±20 | V |
| Collector Current | DC | I_C (25°C / 80°C) | 200 / 150 |
| | 1ms | I_{CP} (25°C / 80°C) | 400 / 300 |
| Forward Current | DC | I_F | 150 |
| | 1ms | I_{FM} | 300 |
| Collector Power Dissipation (Tc = 25°C) | P_C | 1250 | 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 / Mounting) | — | 3 / 3 | N·m |

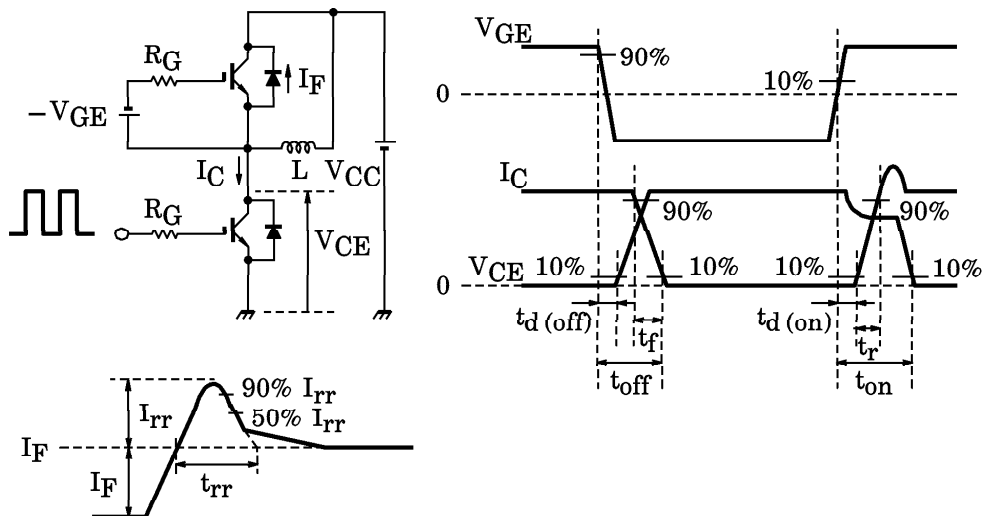
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

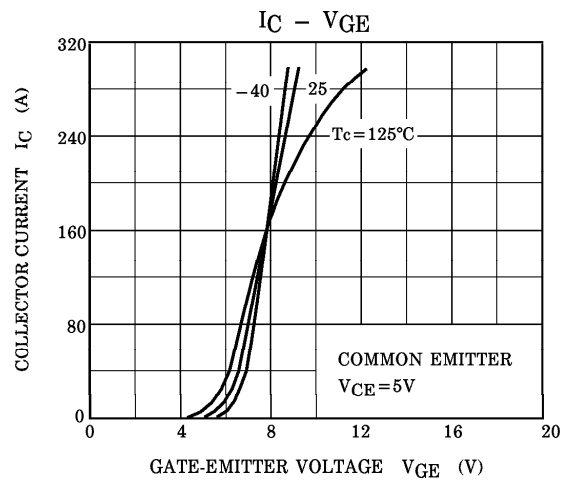
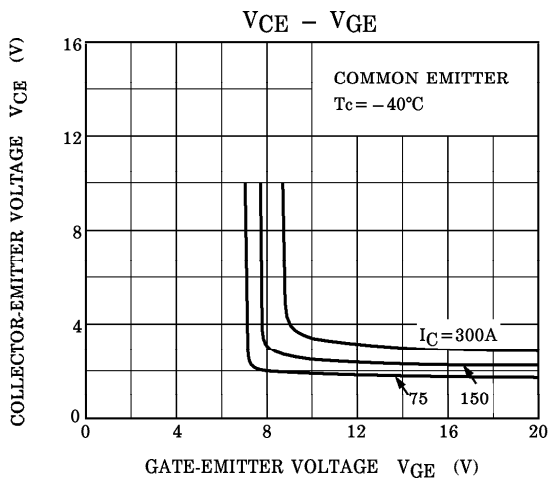
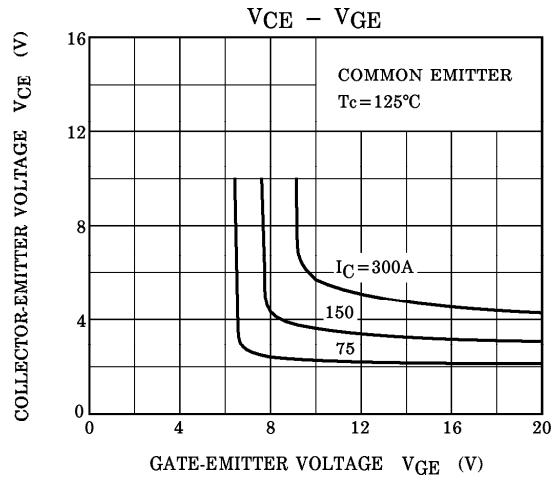
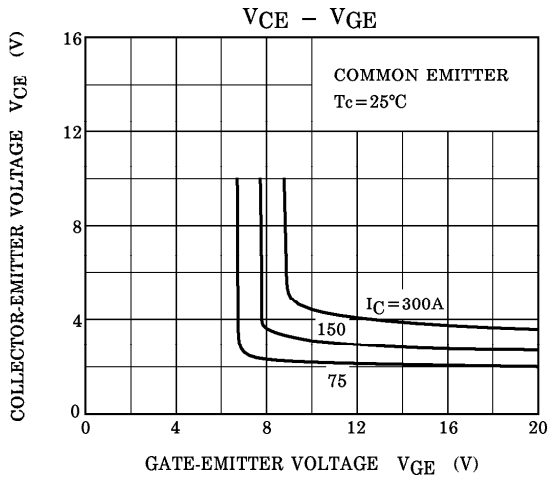
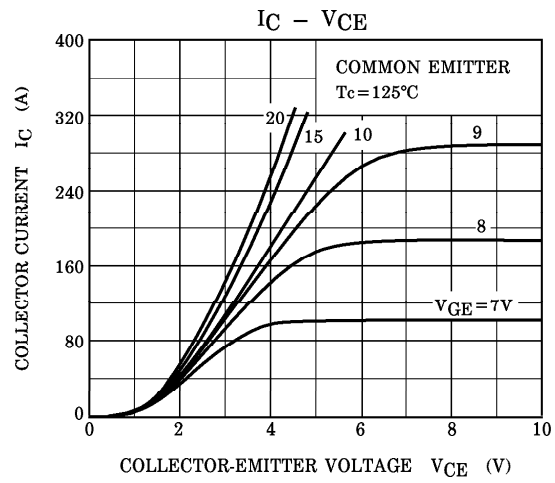
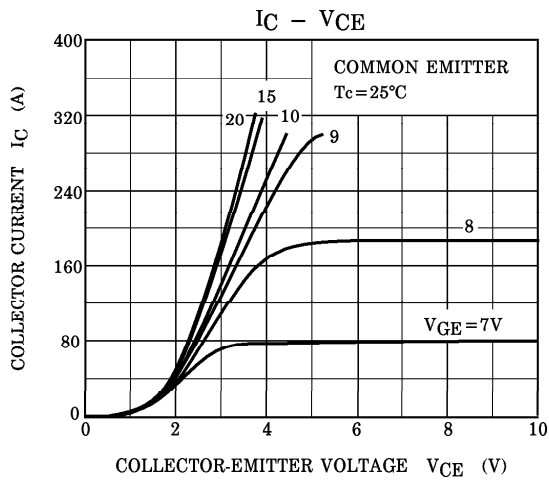
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|--------------------------------------|---------------------|----------------|--|---------------------|------|-----------|----------------|---|
| Gate Leakage Current | | I_{GES} | $V_{GE} = \pm 20V, V_{CE} = 0$ | — | — | ± 500 | nA | |
| Collector Cut-off Current | | I_{CES} | $V_{CE} = 1200V, V_{GE} = 0$ | — | — | 2.0 | mA | |
| Gate-Emitter Cut-off Voltage | | $V_{GE} (off)$ | $I_C = 150mA, V_{CE} = 5V$ | 3.0 | — | 6.0 | V | |
| Collector-Emitter Saturation Voltage | | $V_{CE} (sat)$ | $I_C = 150A, V_{GE} = 15V$ | $T_j = 25^\circ C$ | — | 2.8 | 3.6 | V |
| | | | | $T_j = 125^\circ C$ | — | 3.1 | 4.0 | |
| Input Capacitance | | C_{ies} | $V_{CE} = 10V, V_{GE} = 0, f = 1MHz$ | — | 18.0 | — | nF | |
| Switching Time | Turn-on Delay Time | $t_d (on)$ | Inductive Load $V_{CC} = 600V$ $I_C = 150A$ $V_{GE} = \pm 15V$ $R_G = 5.6\Omega$ (Note 1) | — | 0.05 | — | μs | |
| | Rise Time | t_r | | — | 0.05 | — | | |
| | Turn-on Time | t_{on} | | — | 0.2 | — | | |
| | Turn-off Delay Time | $t_d (off)$ | | — | 0.5 | — | | |
| | Fall Time | t_f | | — | 0.1 | 0.3 | | |
| | Turn-off Time | t_{off} | | — | 0.6 | — | | |
| Forward Voltage | | V_F | $I_F = 150A, V_{GE} = 0$ | — | 2.4 | 3.5 | V | |
| Reverse Recovery Time | | t_{rr} | $I_F = 150A, V_{GE} = -10V$ $di / dt = 700A / \mu s$ (Note 1) | — | 0.1 | 0.25 | μs | |
| Thermal Resistance | | $R_{th} (j-c)$ | Transistor Stage | — | — | 0.1 | $^\circ C / W$ | |
| | | | Diode Stage | — | — | 0.32 | | |

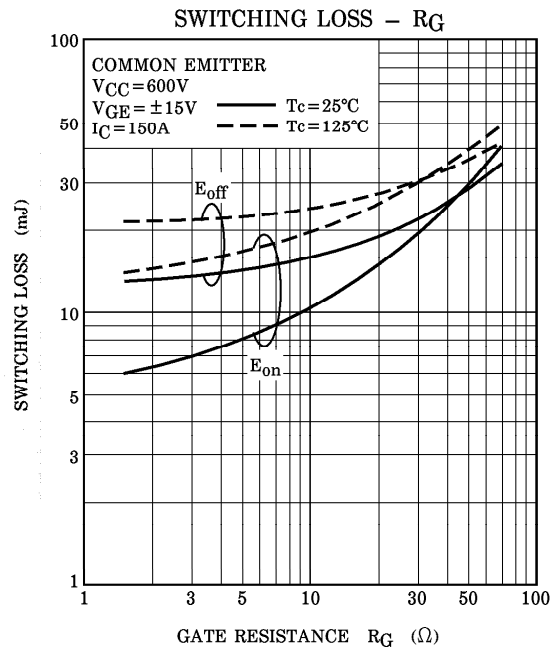
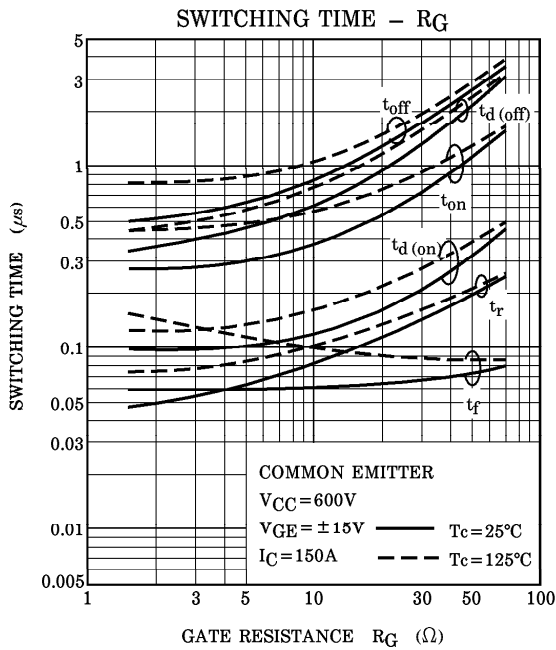
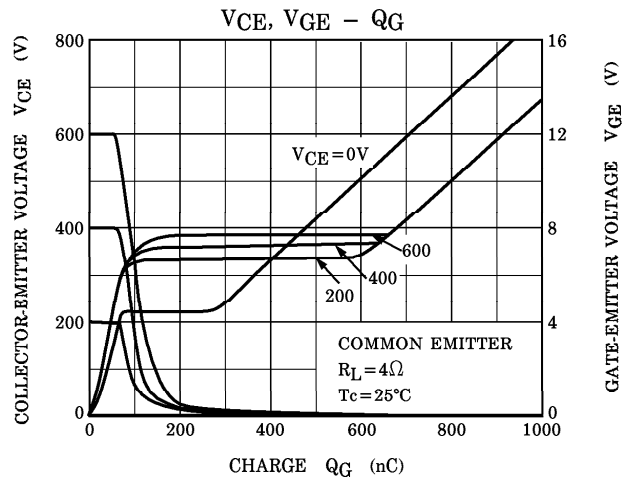
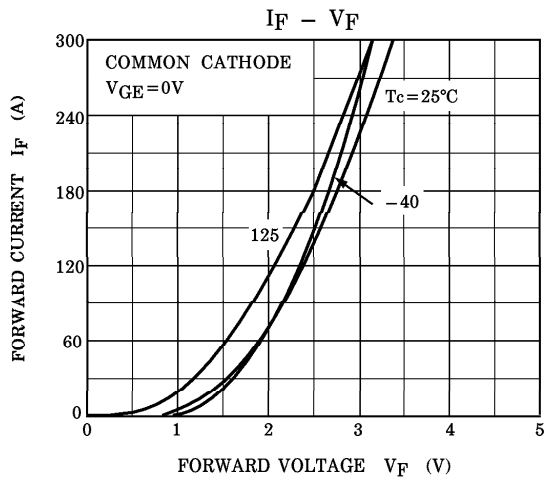
Note 1 : Switching Time and Reverse Recovery Time Test Circuit & Timing Chart



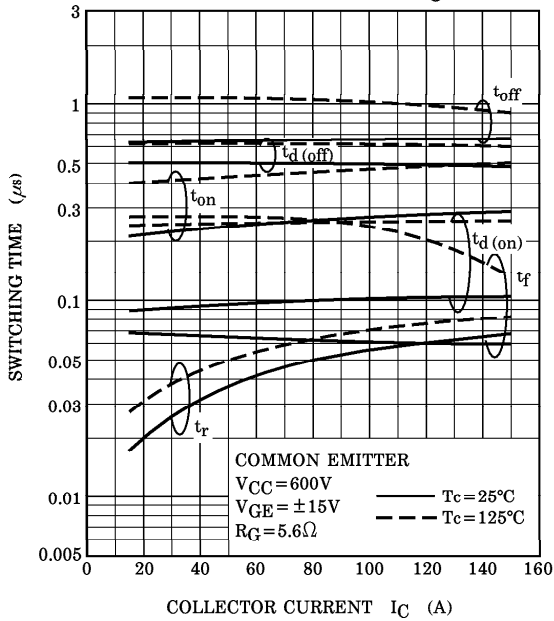
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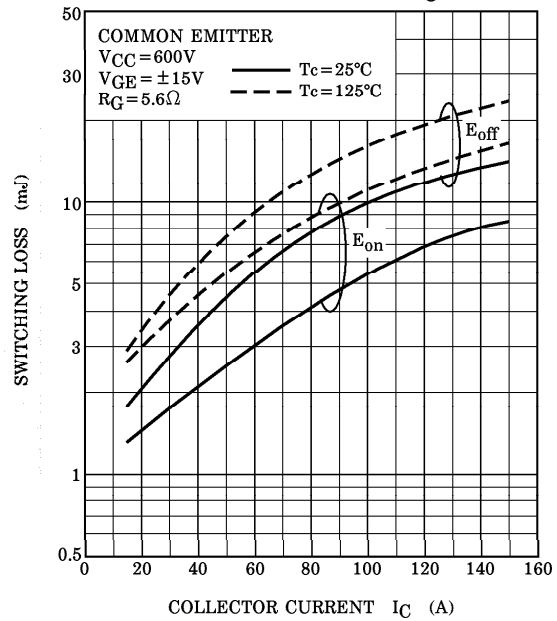




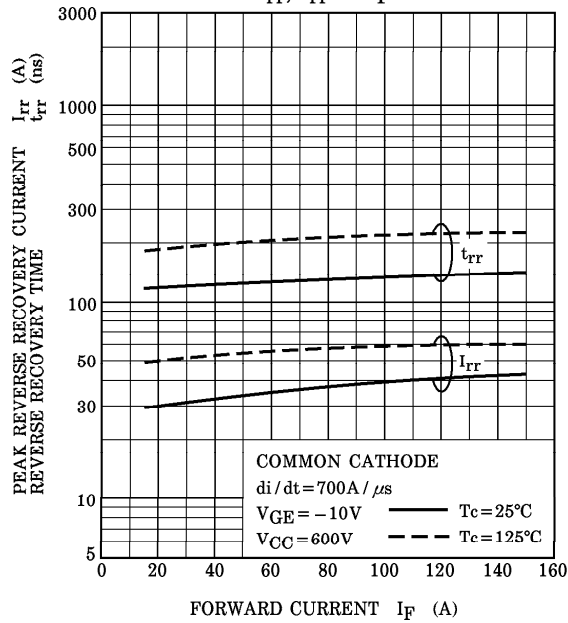
SWITCHING TIME - I_C



SWITCHING LOSS - I_C



I_{rr}, t_{rr} - I_F



E_{dsw} - I_F

