

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG150Q2YS50

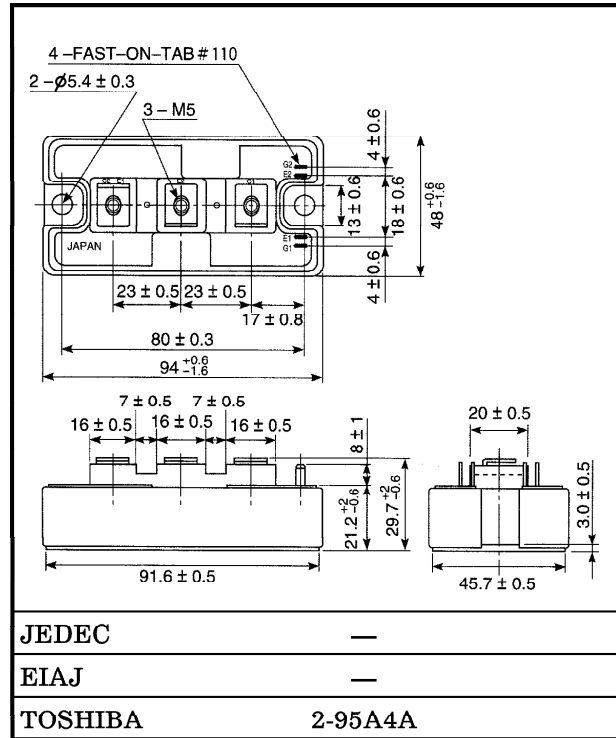
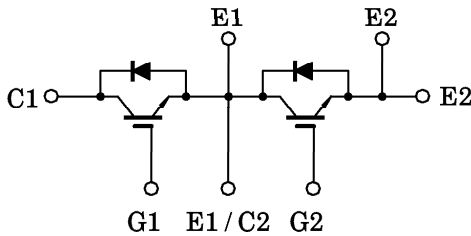
HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

Unit in mm

- 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



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 |

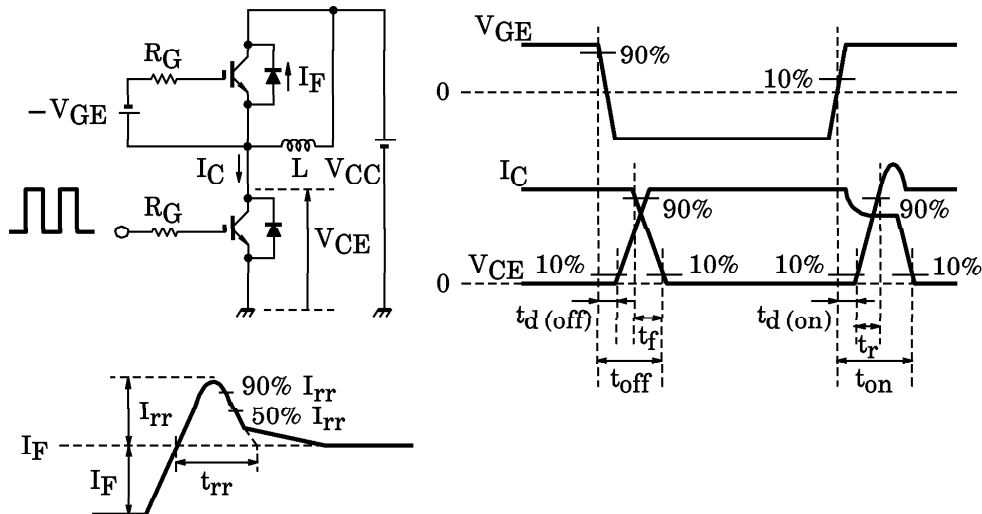
961001EAA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

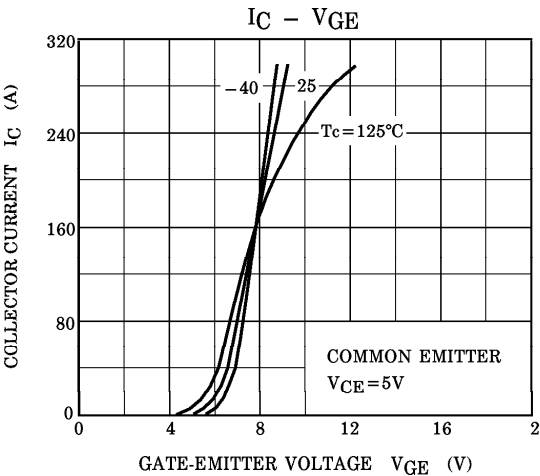
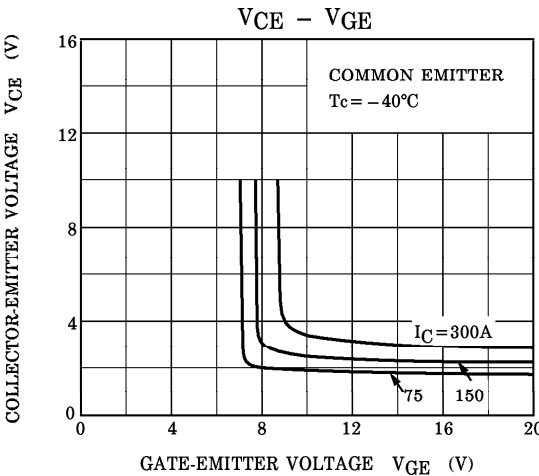
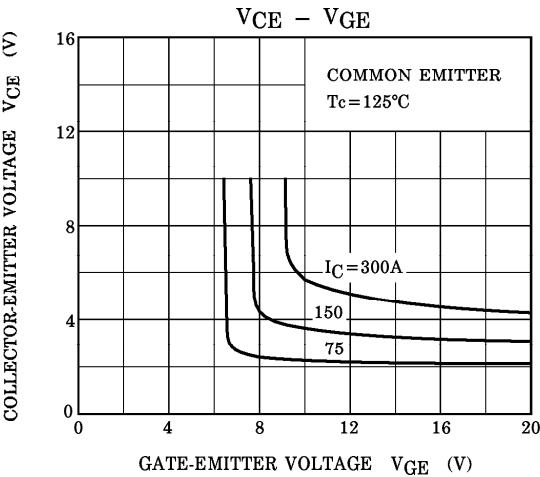
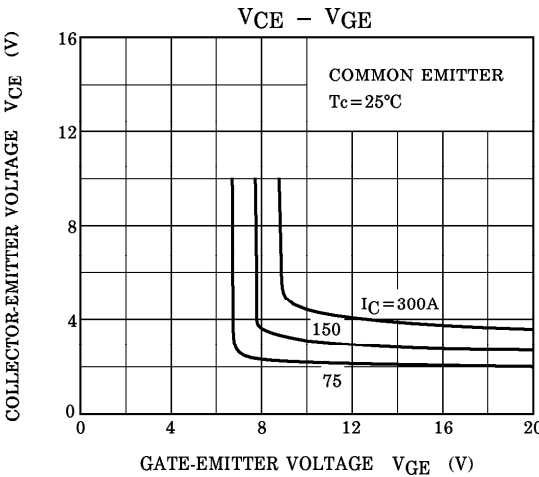
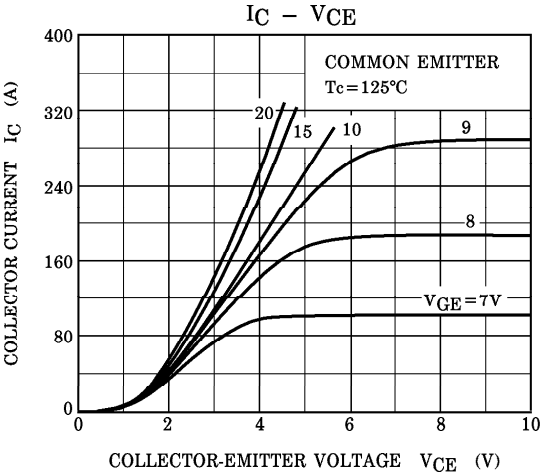
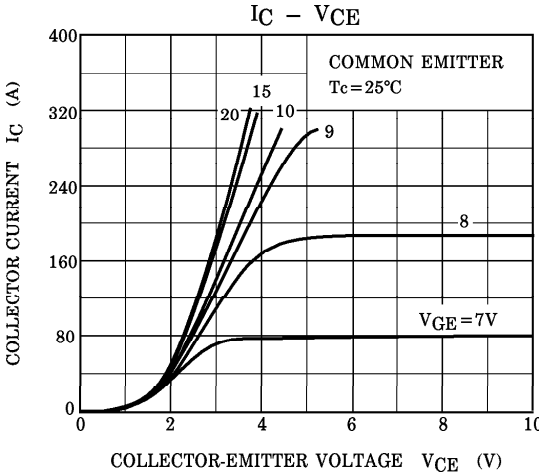
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|--------------------------------------|---------------------|----------------|--|---------------------|------|-----------|----------------|---|
| Gate Leakage Current | | I_{GES} | $V_{GE} = \pm 20V, V_{CE} = 0$ | — | — | ± 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 | | |

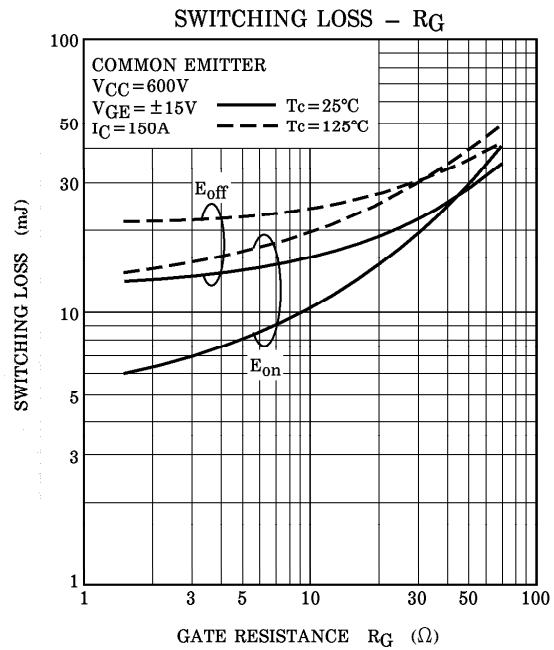
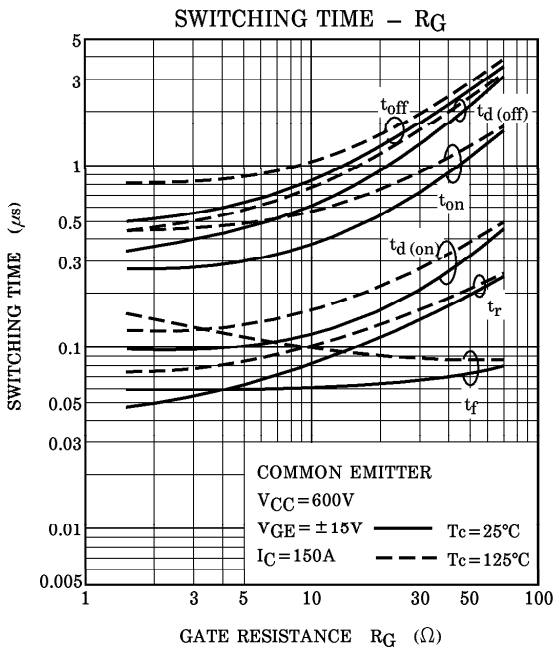
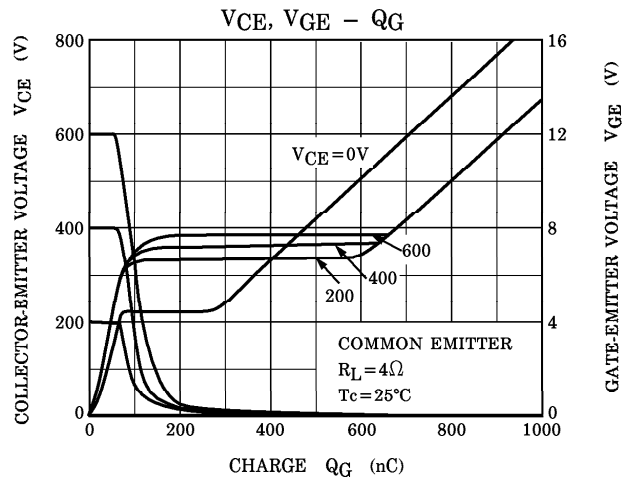
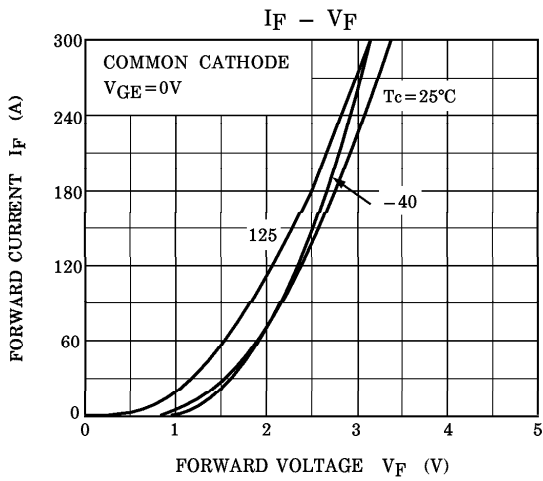
Note 1 : Switching Time and Reverse Recovery Time Test Circuit & Timing Chart



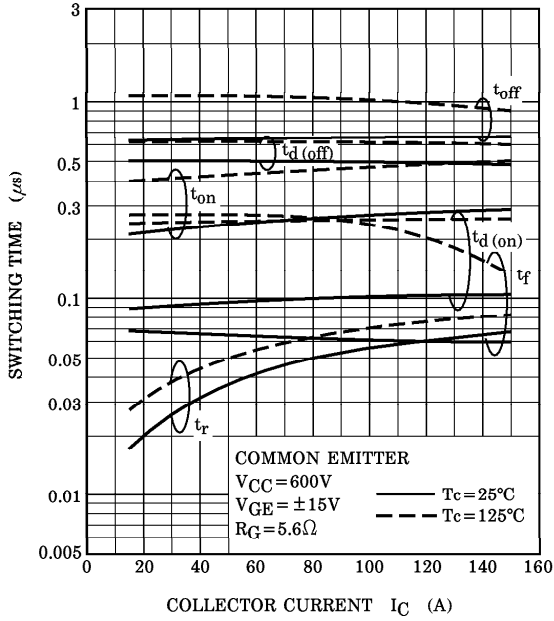
961001EAA2'

- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

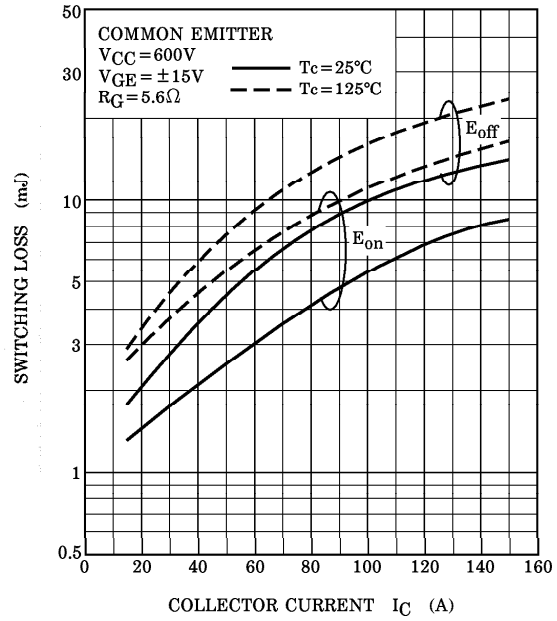




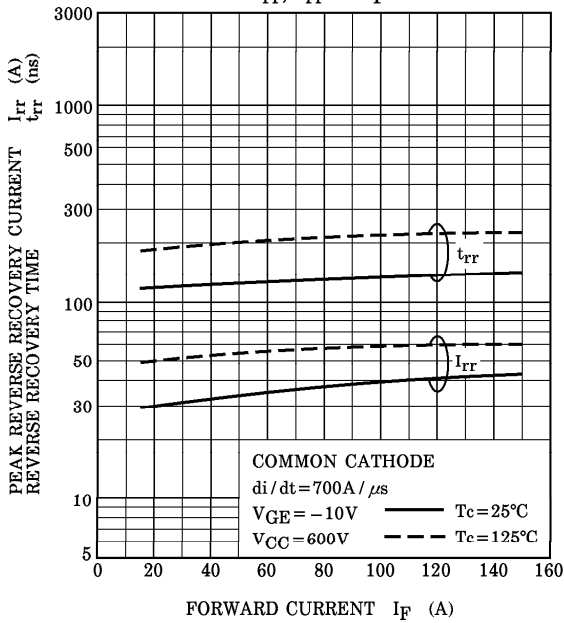
SWITCHING TIME - I_C



SWITCHING LOSS - I_C



I_{rr}, t_{rr} - I_F



E_{dsw} - I_F

