

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG150Q2YS50

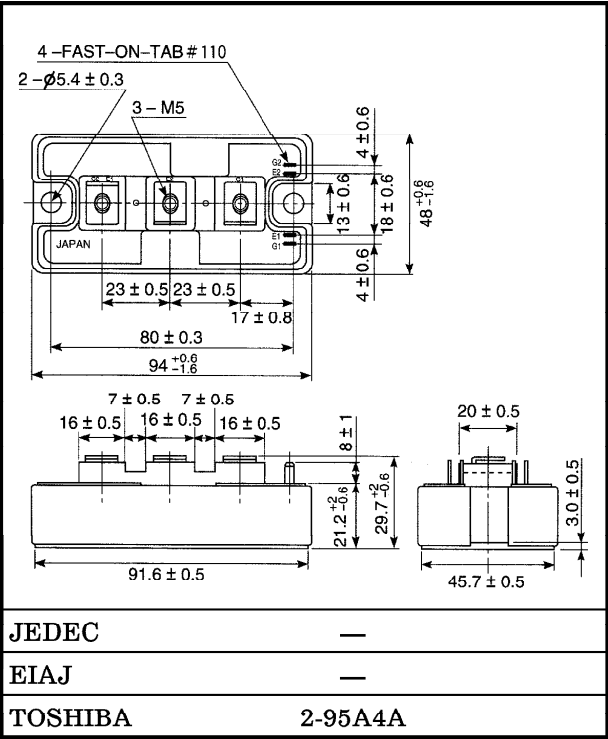
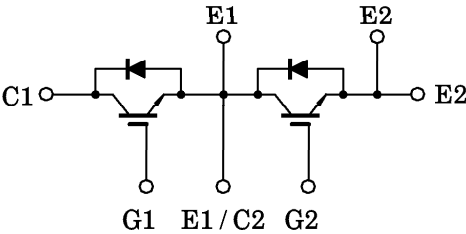
HIGH POWER SWITCHING APPLICATIONS

Unit in mm

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



Weight : 255g

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC                             |     | SYMBOL                    | RATING                | UNIT |
|--------------------------------------------|-----|---------------------------|-----------------------|------|
| Collector-Emitter Voltage                  |     | $V_{CES}$                 | 1200                  | V    |
| Gate-Emitter Voltage                       |     | $V_{GES}$                 | $\pm 20$              | V    |
| Collector Current                          | DC  | $I_C$<br>(25°C / 80°C)    | 200 / 150             | A    |
|                                            | 1ms | $I_{CP}$<br>(25°C / 80°C) | 400 / 300             |      |
| Forward Current                            | DC  | $I_F$                     | 150                   | A    |
|                                            | 1ms | $I_{FM}$                  | 300                   |      |
| Collector Power Dissipation<br>(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<br>(AC 1 minute) | V    |
| Screw Torque (Terminal / Mounting)         |     | —                         | 3 / 3                 | N·m  |

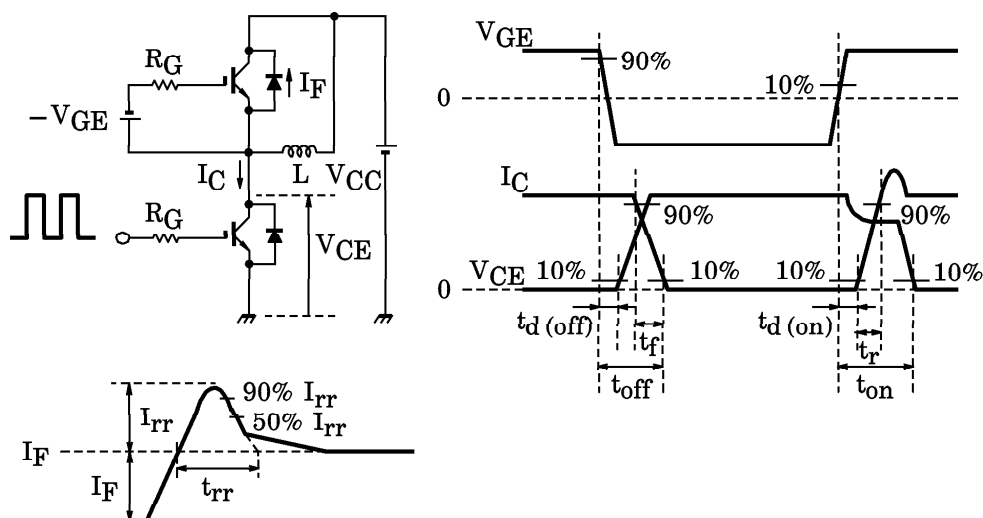
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## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

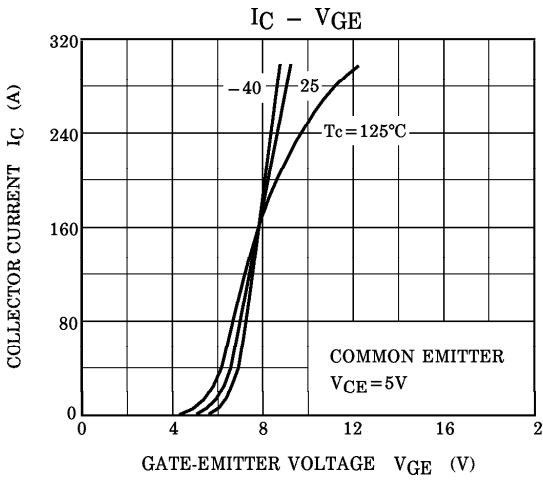
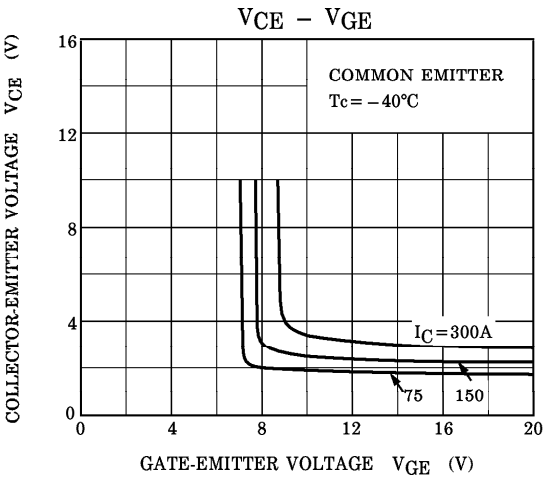
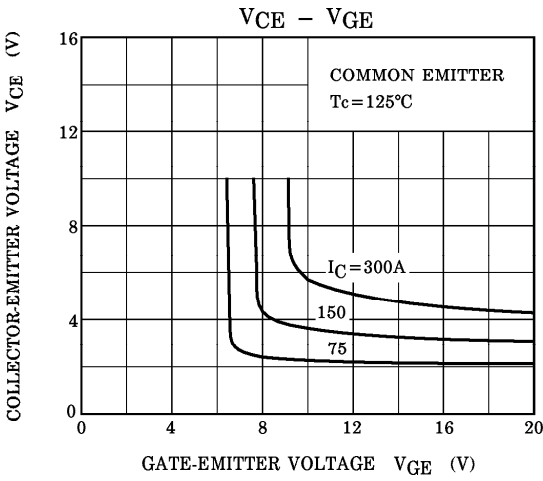
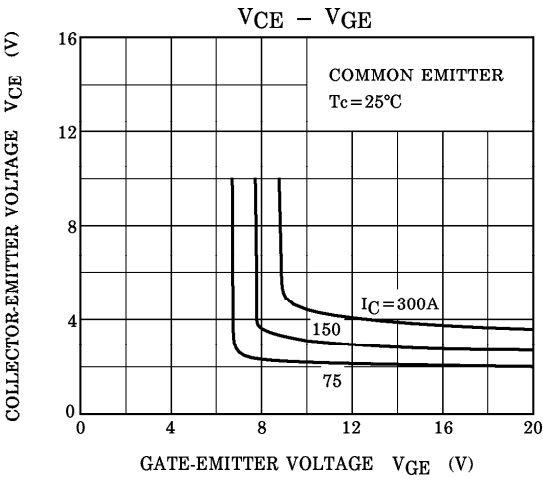
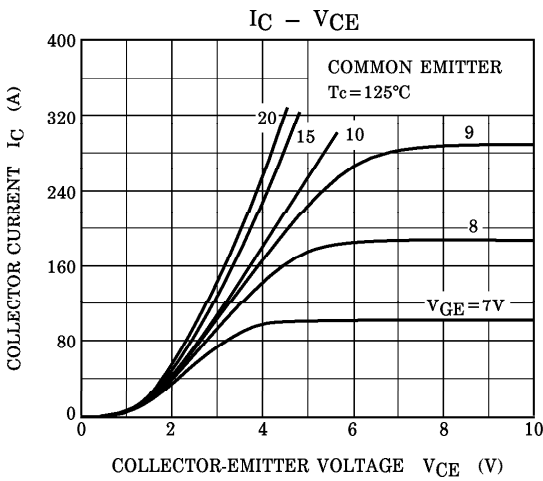
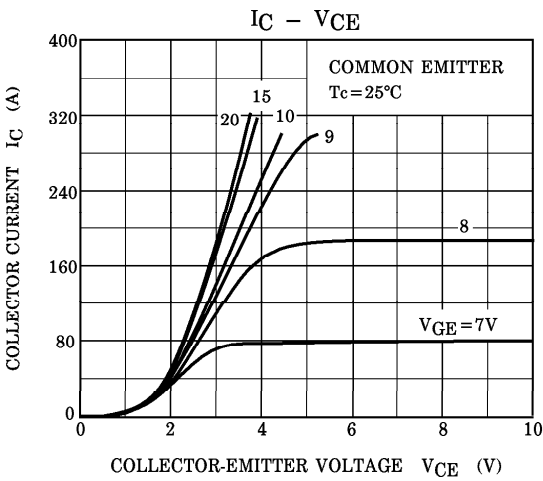
| CHARACTERISTIC                       |                     | SYMBOL        | TEST CONDITION                                                                                           | MIN.                | TYP. | MAX.      | UNIT         |
|--------------------------------------|---------------------|---------------|----------------------------------------------------------------------------------------------------------|---------------------|------|-----------|--------------|
| Gate Leakage Current                 |                     | $I_{GES}$     | $V_{GE} = \pm 20V, V_{CE} = 0$                                                                           | —                   | —    | $\pm 500$ | 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<br>$V_{CC} = 600V$<br>$I_C = 150A$<br>$V_{GE} = \pm 15V$<br>$R_G = 5.6\Omega$<br>(Note 1) | —                   | 0.05 | —         | $\mu s$      |
|                                      | 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                |                     | $t_{rr}$      | $I_F = 150A, V_{GE} = -10V$<br>$di/dt = 700A/\mu s$ (Note 1)                                             | —                   | 0.1  | 0.25      | $\mu s$      |
| Thermal Resistance                   |                     | $R_{th(j-c)}$ | Transistor Stage                                                                                         | —                   | —    | 0.1       | $^\circ C/W$ |
|                                      |                     |               | Diode Stage                                                                                              | —                   | —    | 0.32      |              |

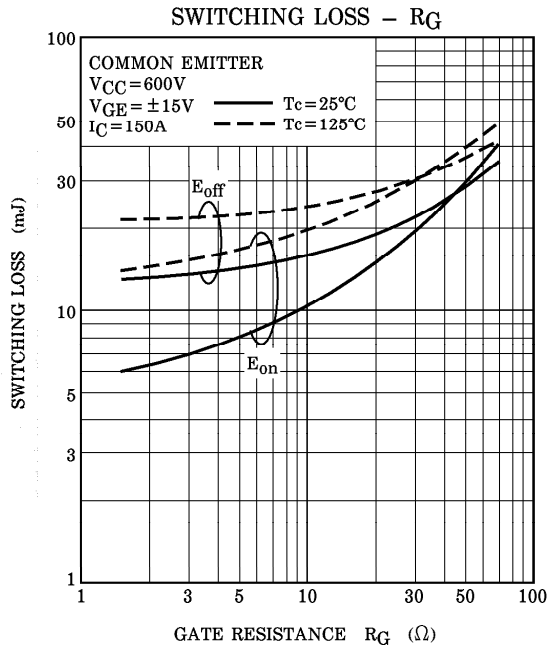
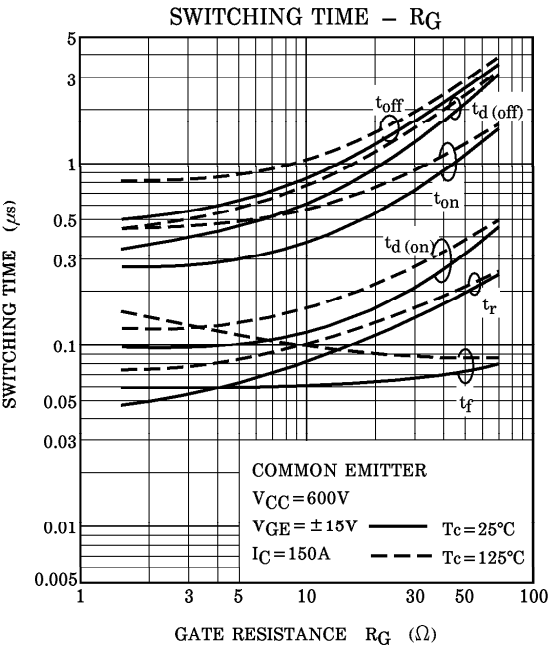
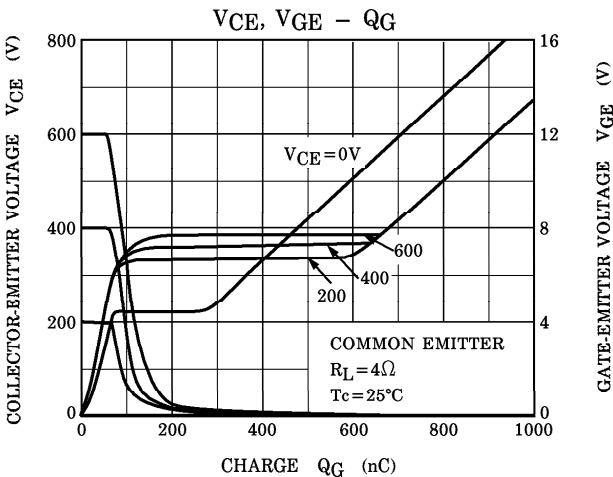
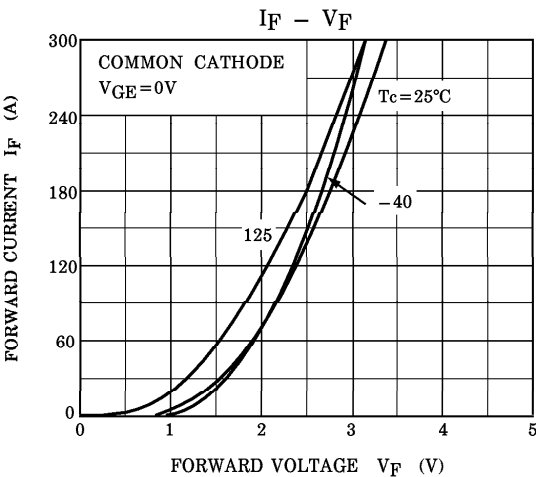
Note 1 : Switching Time and Reverse Recovery Time Test Circuit &amp; Timing Chart

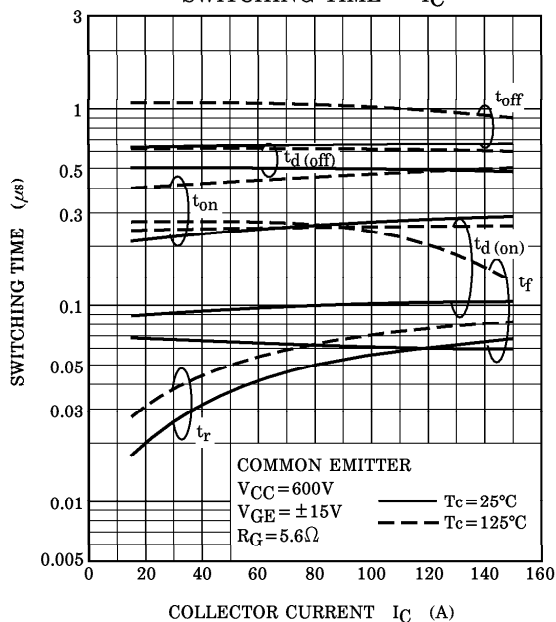
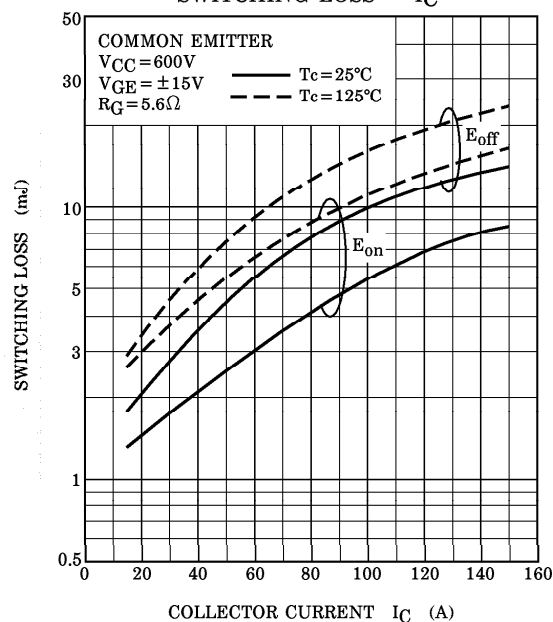
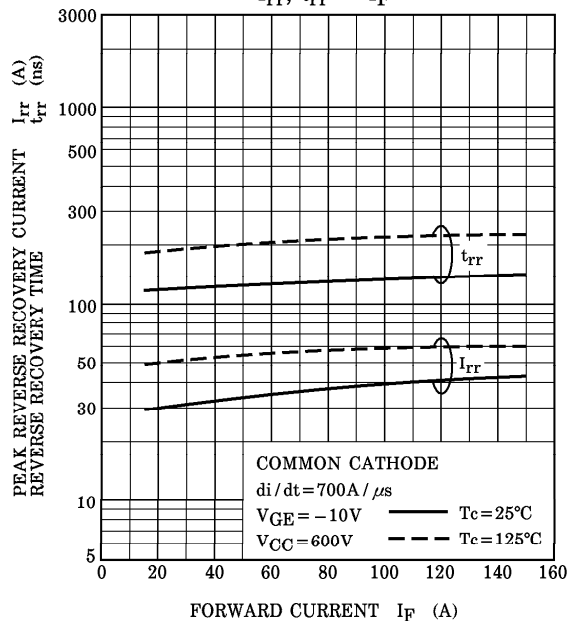


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SWITCHING TIME -  $I_C$ SWITCHING LOSS -  $I_C$  $I_{rr}$ ,  $t_{rr}$  -  $I_F$  $E_{dsw}$  -  $I_F$ 