

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

# MG200Q1US51

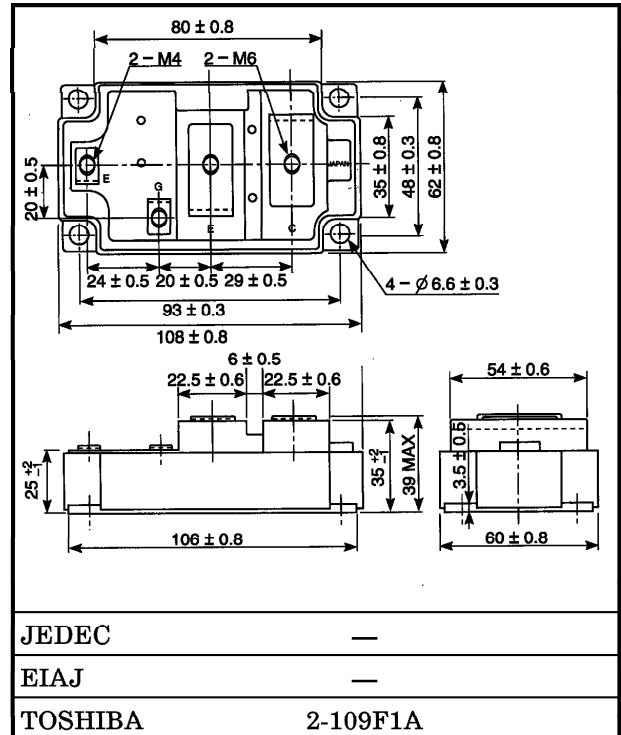
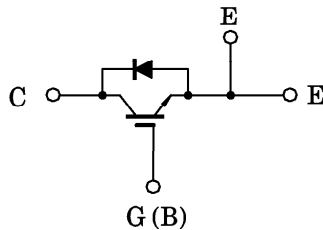
HIGH POWER SWITCHING APPLICATIONS

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
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT



Weight : 465g

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         | $I_C$<br>(25°C / 80°C)    | 300 / 200 |
|  | 1ms        | $I_{CP}$<br>(25°C / 80°C) | 600 / 400 |
| Forward Current                              | DC         | $I_F$                     | 200       |
|  | 1ms        | $I_{FM}$                  | 400       |
| Collector Power Dissipation (Tc = 25°C)      | $P_C$      | 1500                      | 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 : M4 / M6 / Mounting) | —          | 2 / 3 / 3                 | N·m       |

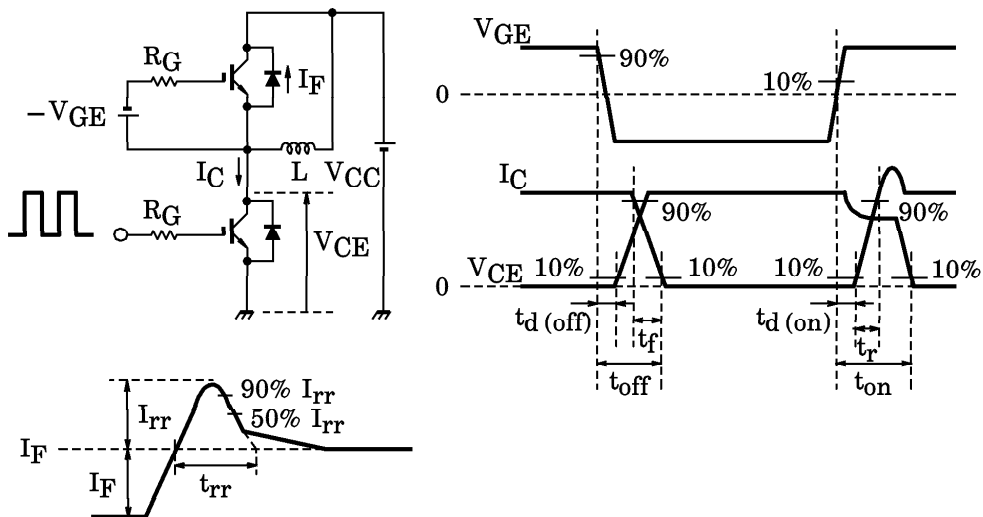
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| 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             | $I_{CES}$           | $V_{CE} = 1200V, V_{GE} = 0$   | —                   | —    | 4.0       | mA           |   |
| Gate-Emmitter Cut-off Voltage         | $V_{GE} (off)$      | $I_C = 200mA, V_{CE} = 5V$   | 3.0                 | —    | 6.0       | V            |   |
| Collector-Emmitter Saturation Voltage | $V_{CE} (sat)$      | $I_C = 200A, V_{GE} = 15V$   | $T_j = 25^\circ C$  | —    | 2.8       | 3.6          | V |
|                                       |                     |  | $T_j = 125^\circ C$ | —    | 3.1       | 4.0          |   |
| Input Capacitance                     | $C_{ies}$           | $V_{CE} = 10V, V_{GE} = 0, f = 1MHz$   | —                   | 24.0 | —         | nF           |   |
| Switching Time                        | Turn-on Delay Time  | Inductive Load<br>$V_{CC} = 600V$<br>$I_C = 200A$<br>$V_{GE} = \pm 15V$<br>$R_G = 4.7\Omega$<br>(Note 1) | —                   | 0.05 | —         | $\mu s$      |   |
|                                       | Rise Time           |  | —                   | 0.05 | —         |              |   |
|                                       | Turn-on Time        |  | —                   | 0.2  | —         |              |   |
|                                       | Turn-off Delay Time |  | —                   | 0.5  | —         |              |   |
|                                       | Fall Time           |  | —                   | 0.1  | 0.3       |              |   |
|                                       | Turn-off Time       |  | —                   | 0.6  | —         |              |   |
| Forward Voltage                       | $V_F$               | $I_F = 200A, V_{GE} = 0$   | —                   | 2.4  | 3.5       | V            |   |
| Reverse Recovery Time                 | $t_{rr}$            | $I_F = 200A, V_{GE} = -10V$<br>$di/dt = 700A/\mu s$ (Note 1)   | —                   | 0.15 | 0.3       | $\mu s$      |   |
| Thermal Resistance                    | $R_{th} (j-c)$      | Transistor Stage   | —                   | —    | 0.08      | $^\circ C/W$ |   |
|                                       |                     | Diode Stage  | —                   | —    | 0.24      |              |   |

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



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