

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG400Q1US51

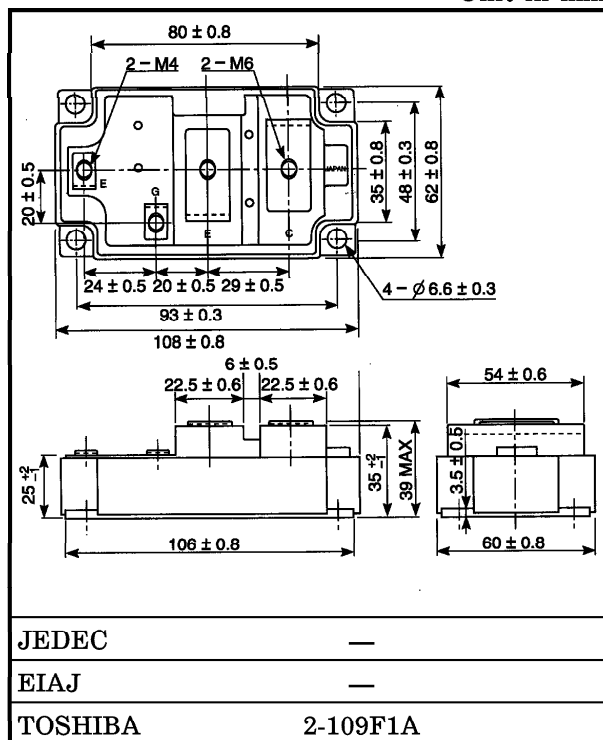
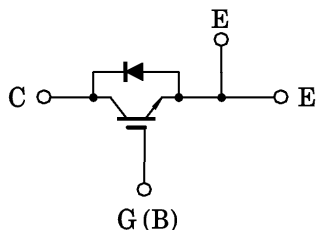
HIGH POWER SWITCHING APPLICATIONS

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 (25°C / 80°C) | 520 / 400 | A |
| | 1ms | I_{CP} (25°C / 80°C) | 1040 / 800 | |
| Forward Current | DC | I_F | 400 | A |
| | 1ms | I_{FM} | 800 | |
| Collector Power Dissipation (Tc = 25°C) | | P_C | 3000 | 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 |

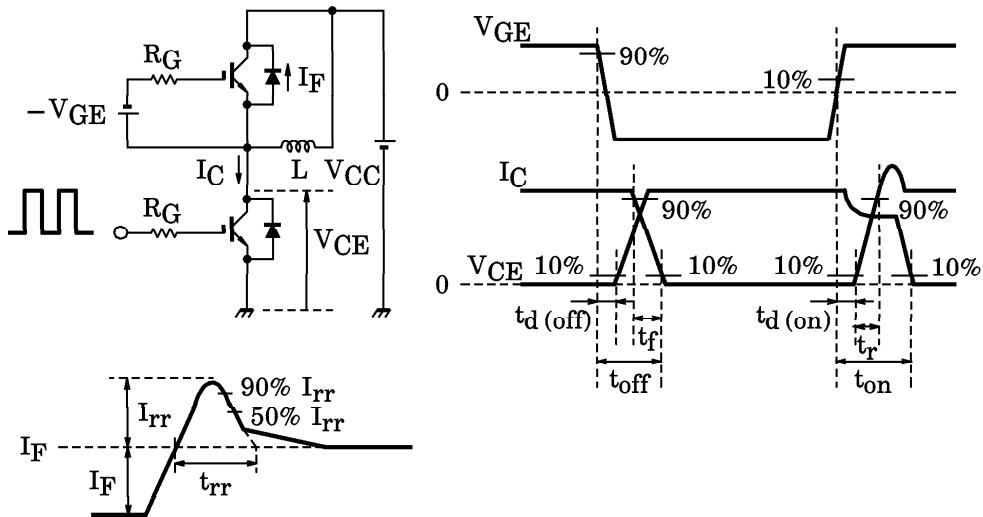
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| 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} | $V_{CE} = 1200V, V_{GE} = 0$ | — | — | 4.0 | mA | |
| Gate-Emmitter Cut-off Voltage | $V_{GE} (off)$ | $I_C = 400mA, V_{CE} = 5V$ | 3.0 | — | 6.0 | V | |
| Collector-Emmitter Saturation Voltage | $V_{CE} (sat)$ | $I_C = 400A, V_{GE} = 15V$ | $T_j = 25^\circ C$ | — | 2.8 | 3.6 | V |
| | | | $T_j = 125^\circ C$ | — | 3.1 | 4.0 | |
| Input Capacitance | C_{ies} | $V_{CE} = 10V, V_{GE} = 0, f = 1MHz$ | — | 44.0 | — | nF | |
| Switching Time | Turn-on Delay Time | Inductive Load $V_{CC} = 600V$ $I_C = 400A$ $V_{GE} = \pm 15V$ $R_G = 2.4\Omega$ (Note 1) | — | 0.05 | — | μs | |
| | 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 | $I_F = 400A, V_{GE} = 0$ | — | 2.4 | 3.5 | V | |
| Reverse Recovery Time | t_{rr} | $I_F = 400A, V_{GE} = -10V$ $di/dt = 1000A/\mu s$ (Note 1) | — | 0.25 | 0.45 | μs | |
| Thermal Resistance | $R_{th} (j-c)$ | Transistor Stage | — | — | 0.042 | $^\circ C/W$ | |
| | | Diode Stage | — | — | 0.12 | | |

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



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