

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG400Q1US41

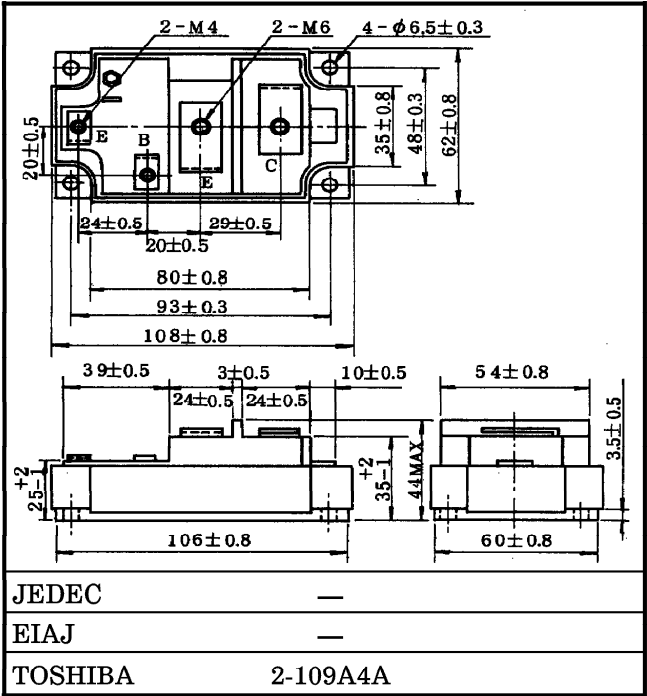
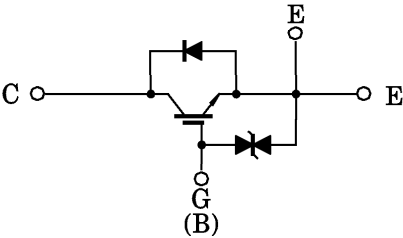
HIGH POWER SWITCHING APPLICATIONS.

Unit in mm

MOTOR CONTROL APPLICATIONS.

- High Input Impedance
- High Speed :  $t_f=0.5\mu s$  (Max.)  
 $t_{rr}=0.5\mu s$  (Max.)
- Low Saturation Voltage :  $V_{CE(sat)}=4.0V$  (Max.)
- Enhancement-Mode
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT



Weight : 465g

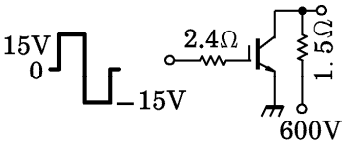
MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC                               |     | SYMBOL     | RATING             | UNIT  |
|----------------------------------------------|-----|------------|--------------------|-------|
| Collector-Emitter Voltage                    |     | $V_{CES}$  | 1200               | V     |
| Gate-Emitter Voltage                         |     | $V_{GES}$  | $\pm 20$           | V     |
| Collector Current                            | DC  | $I_C$      | 400                | A     |
|                                              | 1ms | $I_{CP}$   | 800                |       |
| Forward Current                              | DC  | $I_F$      | 400                | A     |
|                                              | 1ms | $I_{FM}$   | 800                |       |
| Collector Power Dissipation (Tc = 25°C)      |     | $P_C$      | 2400               | 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                 |               | IGES     | VGE = ±20V, VCE = 0                                                                | —    | —     | ±40   | μA     |
| Collector Cut-off Current            |               | ICES     | VCE = 1200V, VGE = 0                                                               | —    | —     | 4     | mA     |
| Gate-Emitter Cut-off Voltage         |               | VGE(OFF) | IC = 400mA, VCE = 5V                                                               | 3.0  | —     | 6.0   | V      |
| Collector-Emitter Saturation Voltage |               | VCE(sat) | IC = 400A, VGE = 15V                                                               | —    | 3.0   | 4.0   | V      |
| Input Capacitance                    |               | Cies     | VCE = 10V, VGE = 0, f = 1MHz                                                       | —    | 48000 | —     | pF     |
| Switching Time                       | Rise Time     | tr       |  | —    | 0.3   | 0.6   | μs     |
|                                      | Turn-on Time  | ton      |                                                                                    | —    | 0.4   | 0.8   |        |
|                                      | Fall Time     | tf       |                                                                                    | —    | 0.2   | 0.5   |        |
|                                      | Turn-off Time | toff     |                                                                                    | —    | 0.8   | 1.5   |        |
| Forward Voltage                      |               | VF       |                                                                                    | —    | 2.0   | 3.0   | V      |
| Reverse Recovery Time                |               | trr      | IF = 400A, VGE = -10V<br>di / dt = 300A / μs                                       | —    | 0.25  | 0.5   | μs     |
| Thermal Resistance                   |               | Rth(j-c) | Transistor                                                                         | —    | —     | 0.052 | °C / W |
|                                      |               |          | Diode                                                                              | —    | —     | 0.2   |        |

