

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

**MG100Q1ZS50**

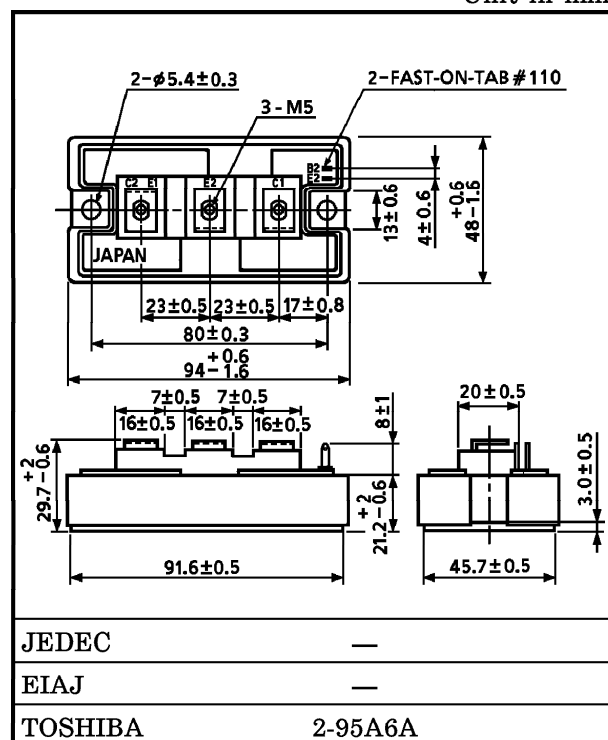
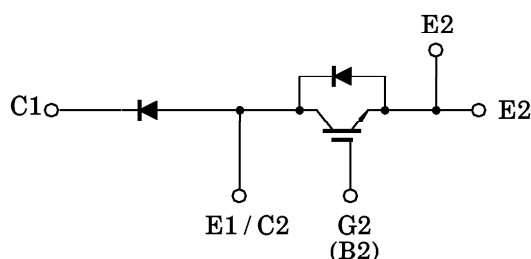
HIGH POWER SWITCHING APPLICATIONS

Unit in mm

MOTOR CONTROL APPLICATIONS

- High Input Impedance
- High Speed :  $t_f = 0.3 \mu s$  (Max.)  
@Inductive Load
- Low Saturation Voltage  
:  $V_{CE(sat)} = 3.6 V$  (Max.)
- Enhancement-Mode
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT

MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

| 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>( $25^\circ C / 80^\circ C$ )    | 150 / 100          | A          |
|                                                    | 1 ms | $I_{CP}$<br>( $25^\circ C / 80^\circ C$ ) | 300 / 200          |            |
| Forward Current                                    | DC   | $I_F$                                     | 100                | A          |
|                                                    | 1 ms | $I_{FM}$                                  | 200                |            |
| Collector Power Dissipation ( $T_c = 25^\circ C$ ) |      | $P_C$                                     | 660                | W          |
| Junction Temperature                               |      | $T_j$                                     | 150                | $^\circ C$ |
| Storage Temperature Range                          |      | $T_{stg}$                                 | $-40 \sim 125$     | $^\circ C$ |
| Isolation Voltage                                  |      | $V_{Isol}$                                | 2500 (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                 |                     | $I_{GES}$            | $V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$                                                                                              | —    | —    | $\pm 500$ | nA                        |
| Collector Cut-off Current            |                     | $I_{CES}$            | $V_{CE} = 1200 \text{ V}, V_{GE} = 0$                                                                                                | —    | —    | 2.0       | mA                        |
| Gate-Emitter Cut-off Voltage         |                     | $V_{GE}(\text{off})$ | $I_C = 100 \text{ mA}, V_{CE} = 5 \text{ V}$                                                                                         | 3.0  | —    | 6.0       | V                         |
| Collector-Emitter Saturation Voltage |                     | $V_{CE}(\text{sat})$ | $I_C = 100 \text{ A}, V_{GE} = 15 \text{ V}$                                                                                         | —    | 2.8  | 3.6       | V                         |
|                                      |                     |                      | $T_j = 125^\circ\text{C}$                                                                                                            | —    | 3.1  | 4.0       |                           |
| Input Capacitance                    |                     | $C_{ies}$            | $V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$                                                                               | —    | 12.0 | —         | nF                        |
| Switching Time                       | Turn-on Delay Time  | $t_d(\text{on})$     | Inductive Load<br>$V_{CC} = 600 \text{ V}$<br>$I_C = 100 \text{ A}$<br>$V_{GE} = \pm 15 \text{ V}$<br>$R_G = 9.1 \Omega$<br>(Note 1) | —    | 0.05 | —         | $\mu\text{s}$             |
|                                      | Rise Time           | $t_r$                |                                                                                                                                      | —    | 0.05 | —         |                           |
|                                      | Turn-on Time        | $t_{on}$             |                                                                                                                                      | —    | 0.2  | —         |                           |
|                                      | Turn-off Delay Time | $t_d(\text{off})$    |                                                                                                                                      | —    | 0.5  | —         |                           |
|                                      | Fall Time           | $t_f$                |                                                                                                                                      | —    | 0.1  | 0.3       |                           |
|                                      | Turn-off Time       | $t_{off}$            |                                                                                                                                      | —    | 0.6  | —         |                           |
| Forward Voltage                      |                     | $V_F$                | $I_F = 100 \text{ A}, V_{GE} = 0$                                                                                                    | —    | 2.4  | 3.5       | V                         |
| Reverse Recovery Time                |                     | $t_{rr}$             | $I_F = 100 \text{ A}, V_{GE} = -10 \text{ V}$<br>$di/dt = 700 \text{ A}/\mu\text{s}$ (Note 1)                                        | —    | 0.1  | 0.25      | $\mu\text{s}$             |
| Thermal Resistance                   |                     | $R_{th(j-c)}$        | Transistor Stage                                                                                                                     | —    | —    | 0.16      | $^\circ\text{C}/\text{W}$ |
|                                      |                     |                      | Diode Stage                                                                                                                          | —    | —    | 0.47      |                           |

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

