

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

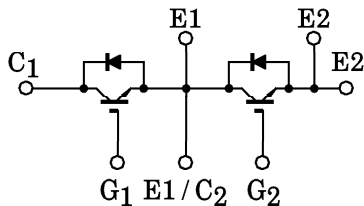
# MG90V2YS40

HIGH POWER SWITCHING APPLICATIONS

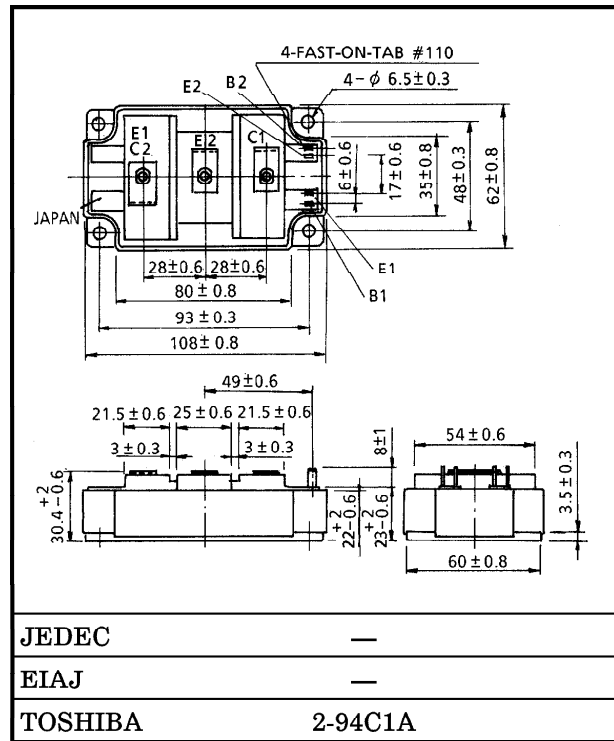
MOTOR CONTROL APPLICATIONS

- The Electrodes are Isolated from Case.
- High Input Impedance
- Includes a Complete Half Bridge in One Package.
- Enhancement-Mode
- High Speed :  $t_f = 1.5 \mu s$  (Max.) ( $I_C = 90A$ )  
 $t_{rr} = 0.3 \mu s$  (Max.) ( $I_F = 90A$ )

EQUIVALENT CIRCUIT



Unit in mm



Weight : 430g (TYP.)

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

| CHARACTERISTIC                                     | SYMBOL     | RATING           | UNIT       |
|--|------------|------------------|------------|
| Collector-Emitter Voltage                          | $V_{CES}$  | 1700             | V          |
| Gate-Emitter Voltage                               | $V_{GES}$  | $\pm 20$         | V          |
| Collector Current                                  | DC         | $I_C$            | 90         |
|  | 1ms        | $I_{CP}$         | 180        |
| Forward Current                                    | DC         | $I_F$            | 90         |
|  | 1ms        | $I_{FM}$         | 180        |
| Collector Power Dissipation ( $T_c = 25^\circ C$ ) | $P_C$      | 1100             | W          |
| Junction Temperature                               | $T_j$      | 150              | $^\circ C$ |
| Storage Temperature Range                          | $T_{stg}$  | -40~125          | $^\circ C$ |
| Isolation Voltage                                  | $V_{Isol}$ | 4000 (AC 1 min.) | 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                 |                     | $I_{GES}$      | $V_{GE} = \pm 20V, V_{CE} = 0$  | —    | —     | $\pm 100$ | nA              |
| Collector Cut-off Current            |                     | $I_{CES}$      | $V_{CE} = 1700V, V_{GE} = 0$  | —    | —     | 1.0       | mA              |
| Gate-Emitter Cut-off Voltage         |                     | $V_{GE} (off)$ | $I_C = 90mA, V_{CE} = 5V$   | 4.0  | —     | 8.0       | V               |
| Collector-Emitter Saturation Voltage |                     | $V_{CE} (sat)$ | $I_C = 90A, V_{GE} = 15V$   | —    | 3.2   | 4.5       | V               |
| Input Capacitance                    |                     | $C_{ies}$      | $V_{CE} = 10V, V_{GE} = 0, f = 1MHz$  | —    | 13000 | —         | pF              |
| Switching Time                       | Turn-on Delay Time  | $t_d (on)$     | Inductive Load<br>$V_{CC} = 900V$<br>$I_C = 90A$<br>$V_{GE} = \pm 15V$<br>$R_G = 5.6\Omega$<br>(Note 1) | —    | 0.1   | —         | $\mu s$         |
|                                      | Rise Time           | $t_r$          |   | —    | 0.1   | —         |                 |
|                                      | Turn-on Time        | $t_{on}$       |   | —    | 0.5   | —         |                 |
|                                      | Turn-off Delay Time | $t_d (off)$    |   | —    | 0.4   | —         |                 |
|                                      | Fall Time           | $t_f$          |   | —    | 0.5   | 1.5       |                 |
|                                      | Turn-off Time       | $t_{off}$      |   | —    | 1.0   | —         |                 |
| Forward Voltage                      |                     | $V_F$          | $I_F = 90A, V_{GE} = 0$   | —    | 3.2   | 4.5       | V               |
| Reverse Recovery Time                |                     | $t_{rr}$       | $I_F = 90A, V_{GE} = -15V$<br>$di / dt = 500A / \mu s$ (Note 1)   | —    | 0.2   | 0.4       | $\mu s$         |
| Thermal Resistance                   |                     | $R_{th (j-c)}$ | Transistor Stage  | —    | —     | 0.114     | $^{\circ}C / W$ |
|                                      |                     |                | Diode Stage   | —    | —     | 0.4       |                 |

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

