

TOSHIBA GTR MODULE SILICON N-CHANNEL IGBT

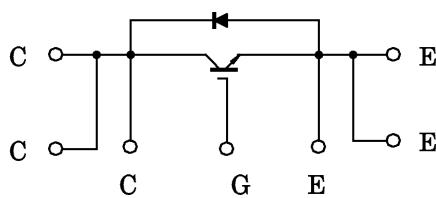
MG1200V1US51

HIGH POWER SWITCHING APPLICATIONS  
MOTOR CONTROL APPLICATIONS

FEATURES

- High Input Impedance
- Enhancement Mode
- Electrodes are isolated from case.

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTICS                         |                    | SYMBOL            | RATING          | UNIT |
|-----------------------------------------|--------------------|-------------------|-----------------|------|
| Collector-Emitter Voltage               |                    | V <sub>CES</sub>  | 1700            | V    |
| Gate-Emitter Voltage                    |                    | V <sub>GES</sub>  | 20              | V    |
| Collector Current                       | DC                 | I <sub>C</sub>    | 1200            | A    |
|                                         | 1ms                | I <sub>CP</sub>   | 2400            |      |
| Forward Current                         | DC                 | I <sub>F</sub>    | 1200            | A    |
|                                         | 1ms                | I <sub>FM</sub>   | 2400            |      |
| Collector Power Dissipation (Tc = 25°C) |                    | P <sub>C</sub>    | 5560            | W    |
| Junction Temperature                    |                    | T <sub>j</sub>    | −20~125         | °C   |
| Storage Temperature Range               |                    | T <sub>stg</sub>  | −40~125         | °C   |
| Isolation Voltage                       |                    | V <sub>Isol</sub> | 5400 (AC 1min.) | V    |
| Screw Torque                            | Terminal : M4 / M8 | —                 | 2 / 7           | N·m  |
|                                         | Mounting           |                   | 4               |      |

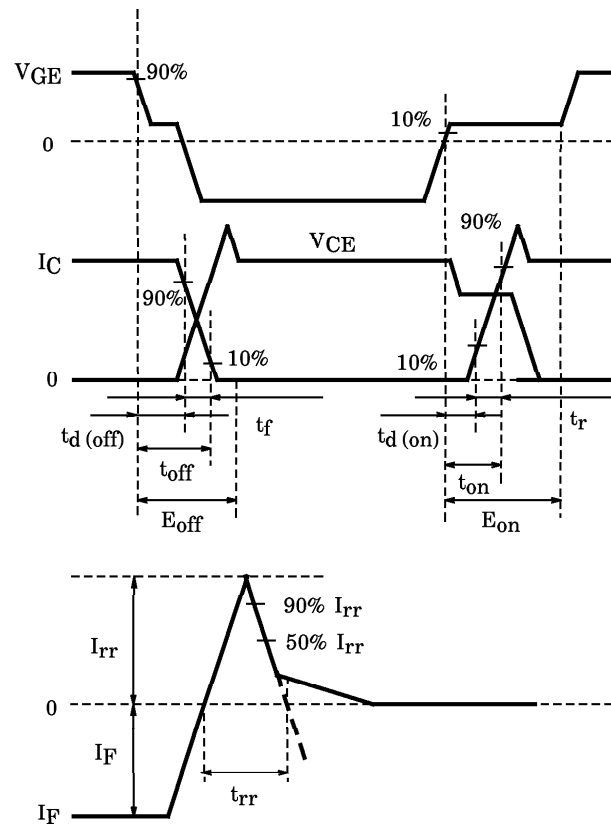
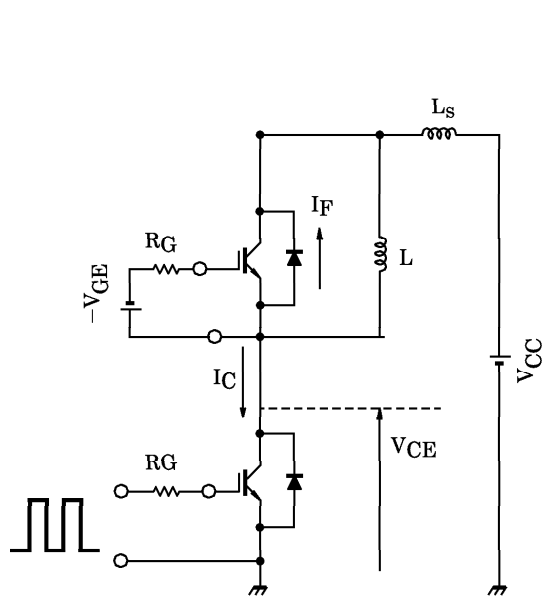
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ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 125°C : except thermal resistance)

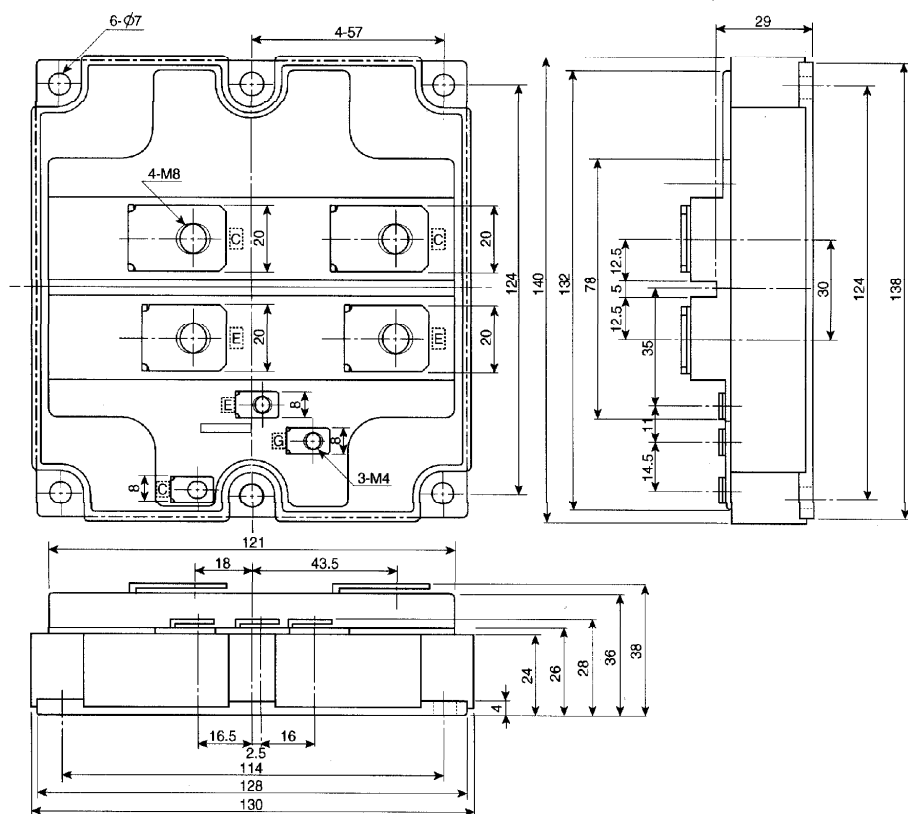
| CHARACTERISTICS                      |               | SYMBOL                | TEST CONDITION                                                                                                                               | MIN. | TYP. | MAX.  | UNIT   |
|--------------------------------------|---------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------|--------|
| Gate Leakage Current                 |               | I <sub>GES</sub>      | V <sub>GE</sub> = ±20V, V <sub>CE</sub> = 0V                                                                                                 | —    | —    | ±50   | nA     |
| Collector Cut-Off Current            |               | I <sub>CES</sub>      | V <sub>CE</sub> = 1700V, V <sub>GE</sub> = 0V                                                                                                | —    | —    | 100   | mA     |
| Gate-Emitter Cut-Off Voltage         |               | V <sub>GE (off)</sub> | V <sub>CE</sub> = 5V, I <sub>C</sub> = 1.2A                                                                                                  | 3.0  | —    | 7.0   | V      |
| Collector-Emitter Saturation Voltage |               | V <sub>CE (sat)</sub> | V <sub>GE</sub> = 15V, I <sub>C</sub> = 1200A                                                                                                | —    | —    | 5.0   | V      |
| Input Capacitance                    |               | C <sub>ies</sub>      | V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V,<br>f = 300kHz                                                                                   | —    | 130  | —     | nF     |
| Switching Time<br>(Note 1)           | Rise Time     | t <sub>r</sub>        | V <sub>CC</sub> = 900V, I <sub>C</sub> = 1200A<br>V <sub>GE</sub> = ±15V, R <sub>G</sub> = 1.8Ω<br>(Inductive load : L <sub>s</sub> = 150nH) | —    | —    | 0.7   | μs     |
|                                      | Turn-On Time  | t <sub>on</sub>       |                                                                                                                                              | —    | —    | 1.0   | μs     |
|                                      | Fall Time     | t <sub>f</sub>        |                                                                                                                                              | —    | —    | 0.8   | μs     |
|                                      | Turn-Off Time | t <sub>off</sub>      |                                                                                                                                              | —    | —    | 1.5   | μs     |
| Forward Voltage                      |               | V <sub>F</sub>        | I <sub>F</sub> = 1200A, V <sub>GE</sub> = 0V                                                                                                 | —    | —    | 3.2   | V      |
| Reverse Recovery Time (Note 1)       |               | t <sub>rr</sub>       | I <sub>F</sub> = 1200A, V <sub>GE</sub> = 15V<br>di / dt = 4000A / μs, V <sub>CC</sub> = 900V                                                | —    | —    | 0.8   | μs     |
| Switching<br>Dissipation<br>(Note 1) | Turn-On Loss  | E <sub>on</sub>       | V <sub>CC</sub> = 900V, I <sub>C</sub> = 1200A                                                                                               | —    | 250  | —     | mJ     |
|                                      | Turn-Off Loss | E <sub>off</sub>      | V <sub>GE</sub> = ±15V, R <sub>G</sub> = 1.8Ω                                                                                                | —    | 500  | —     | mJ     |
|                                      | Diode Loss    | E <sub>dsw</sub>      | I <sub>F</sub> = 1200A, V <sub>GE</sub> = -15V<br>di / dt = 4000A / μs, V <sub>CC</sub> = 900V                                               | —    | 300  | —     | mJ     |
| Thermal Resistance                   |               | R <sub>th (j-c)</sub> | Transistor (IGBT) Stage                                                                                                                      | —    | —    | 0.018 | °C / W |
|                                      |               |                       | Diode Stage                                                                                                                                  | —    | —    | 0.035 | °C / W |

(Note 1) Test circuit and timing chart of switching time, reverse recovery time and switching dissipation.



## OUTLINE DRAWING

Unit : mm



Weight : 900g (Typ.)