TOSHIBA GTR Module Silicon N Channel IGBT

MG300Q1US51

High Power Switching Applications Motor Control Applications

• High input impedance

• High speed : $t_f = 0.3 \mu s$ (Max.)

@Inductive load

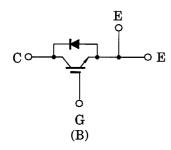
• Low saturation voltage

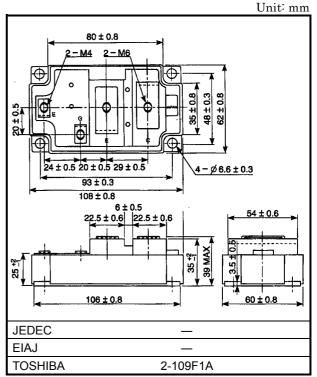
: $V_{CE (sat)} = 3.6V (Max.)$

• Enhancement-mode

• The electrodes are isolated from case.

Equivalent Circuit





Weight: 465g

Maximum Ratings (Ta = 25°C)

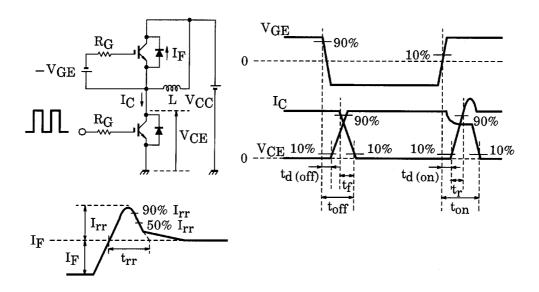
| Characteristic | | Symbol | Rating | Unit | |
|--|-----|---|---------------------|------|--|
| Collector-emitter voltage | | V _{CES} | 1200 | V | |
| Gate-emitter voltage | | V _{GES} | ±20 | ٧ | |
| Collector current | DC | (25°C / 80°C) 400 / 300 | | Α | |
| | 1ms | I _{CP} (25°C / 80°C) 800 / 600 | | | |
| Forward current | DC | l _F | 300 | А | |
| | 1ms | I _{FM} | 600 | | |
| Collector power dissipation (Tc = 25°C) | | PC | 2500 | W | |
| Junction temperature | | Tj | 150 | °C | |
| Storage temperature range | | T _{stg} | − 40 ~ 125 | °C | |
| Isolation voltage | | V _{Isol} | 2500 (AC 1 min.) | V | |
| Screw torque (Terminal : M4 / M6 / mounting) | | _ | 2/3/3 | N·m | |

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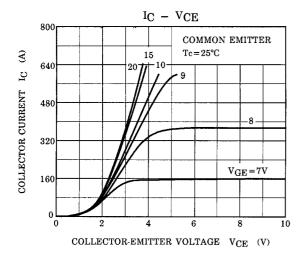
Electrical Characteristics (Ta = 25°C)

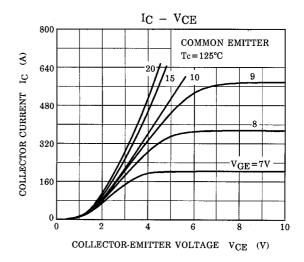
| Characteristic Symbol Test Cor | | Test Condition | on | Min | Тур. | Max | Unit | |
|---|---------------------|-----------------------|---|------------------------|------|------|------|------|
| Gate leakage current | | I _{GES} | V _{GE} = ±20V, V _{CE} = 0 | | _ | _ | ±500 | nA |
| Collector cut-off current | | I _{CES} | V _{CE} = 1200V, V _{GE} = 0 | | _ | _ | 4.0 | mA |
| Gate-emitter cut-off voltage | | V _{GE (off)} | I _C = 300mA, V _{CE} = 5V | | 3.0 | _ | 6.0 | V |
| Collector-emitter saturation voltage | | V _{CE (sat)} | I _C = 300A, V _{GE} = 15V | T _j = 25°C | _ | 2.8 | 3.6 | V |
| | | | | T _j = 125°C | _ | 3.1 | 4.0 | |
| Input capacitance | | C _{ies} | V _{CE} = 10V, V _{GE} = 0, f = 1MHz | | _ | 36.0 | _ | nF |
| Switching time | Turn-on delay time | t _{d (on)} | | | _ | 0.05 | _ | μs |
| | Rise time | t _r | Inductive load V _{CC} = 600V I _C = 300A | | _ | 0.05 | _ | |
| | Turn-on time | t _{on} | | | _ | 0.2 | _ | |
| | Turn-off delay time | t _{d (off)} | $V_{GE} = \pm 15V$ $R_G = 2.7\Omega$ | | _ | 0.5 | _ | |
| | Fall time | t _f | | (Note 1) | _ | 0.1 | 0.3 | |
| | Turn-off time | t _{off} | | | _ | 0.6 | _ | |
| Forward voltage $V_F = I_F = 300 \text{ A}, V_{GE} = 0$ | | | _ | 2.4 | 3.5 | V | | |
| Reverse recovery time | | t _{rr} | $I_F = 300 \text{ A}, \ V_{GE} = -10 \text{ V}, \ di / dt = 1000 \text{ A} / \mu s $ (Note 1) | | _ | 0.25 | 0.4 | μs |
| Thermal resistance | | R _{th (j-c)} | Transistor stage | | _ | _ | 0.05 | °C/W |
| | | | Diode stage | | _ | _ | 0.12 | |

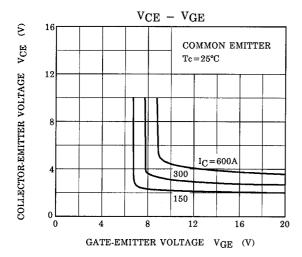
Note 1: Switching time and reverse recovery time test circuit & timing chart

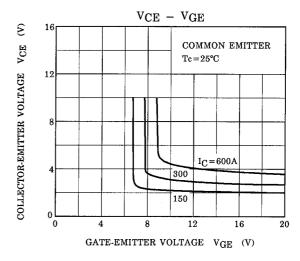


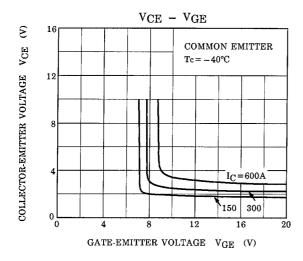
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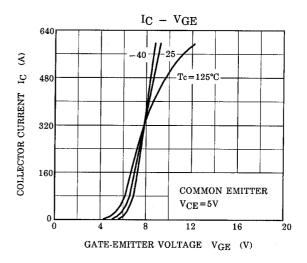


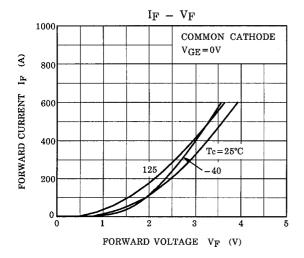


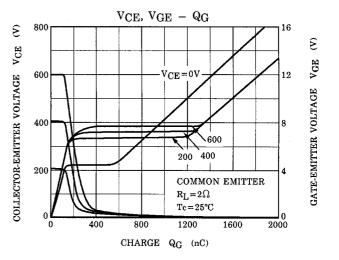


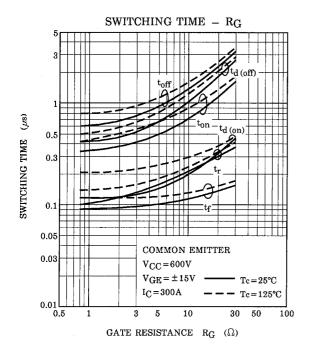


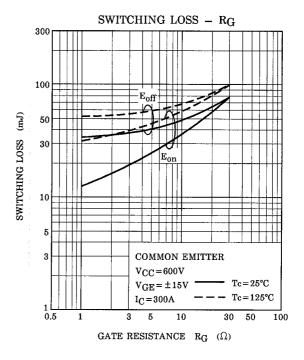




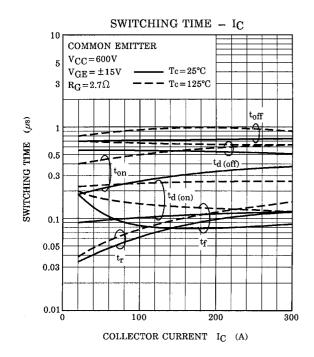


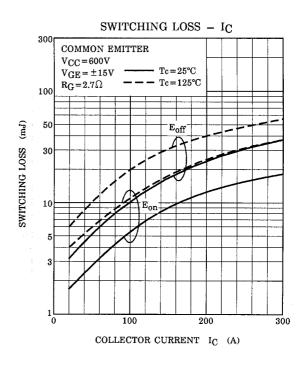


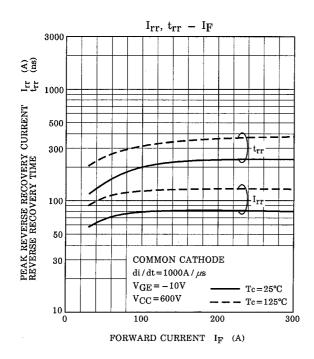


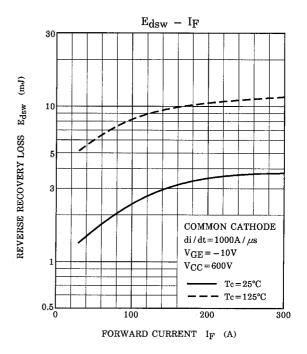


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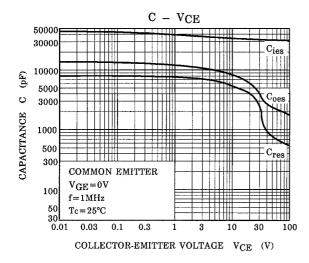


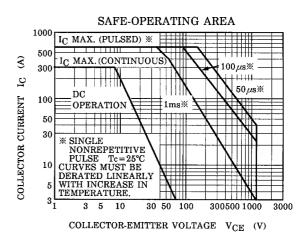


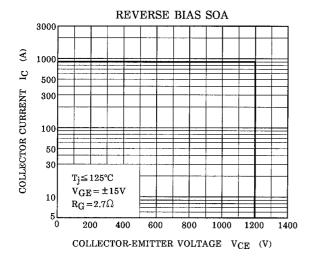


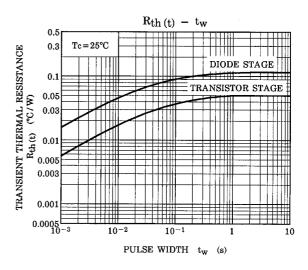


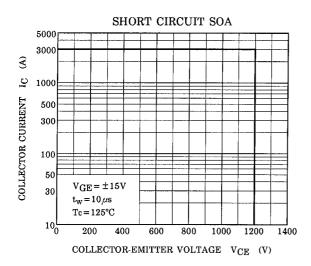
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