

TOSHIBA IGBT Module Silicon N Channel IGBT

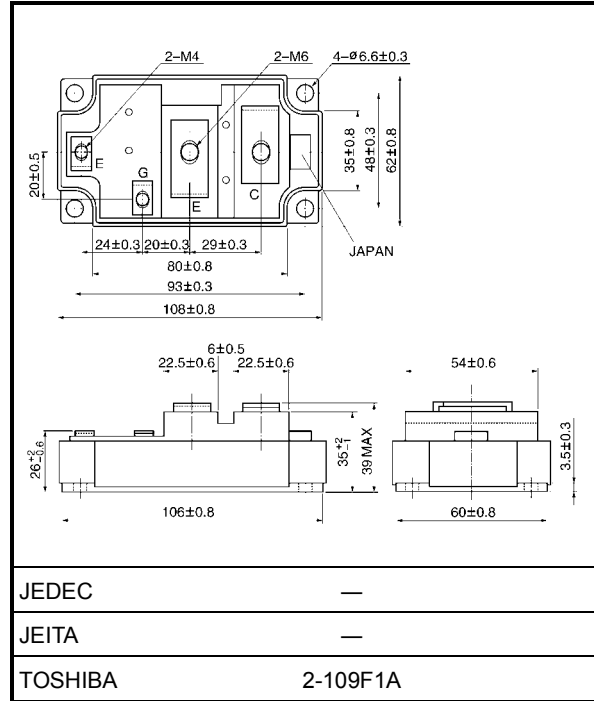
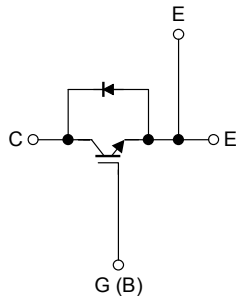
MG400Q1US65H

High Power & High Speed Switching Applications

Unit: mm

- High input impedance
- Enhancement-mode
- The electrodes are isolated from case.

Equivalent Circuit



Weight: 465 g (typ.)

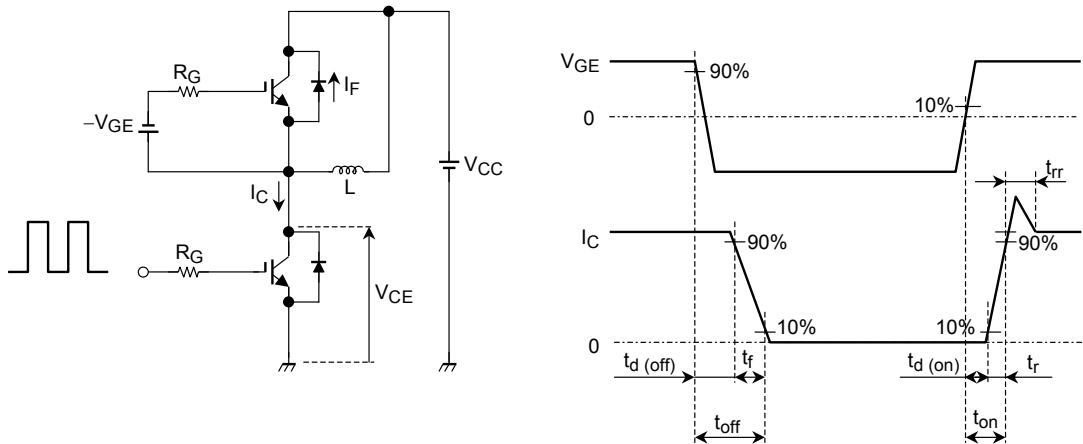
Maximum Ratings (Ta = 25°C)

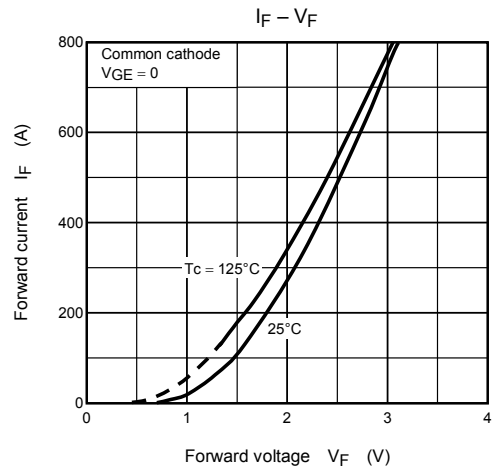
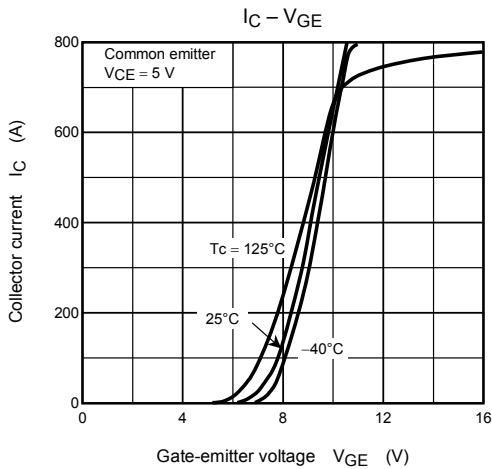
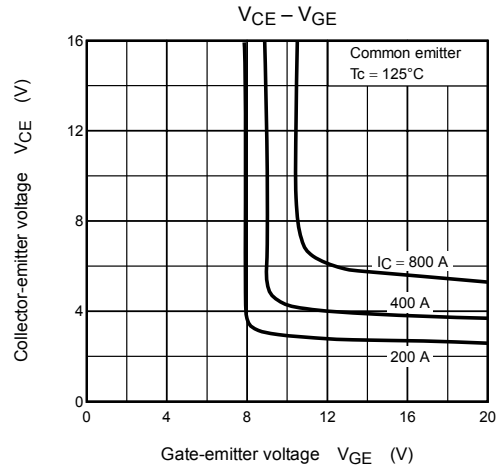
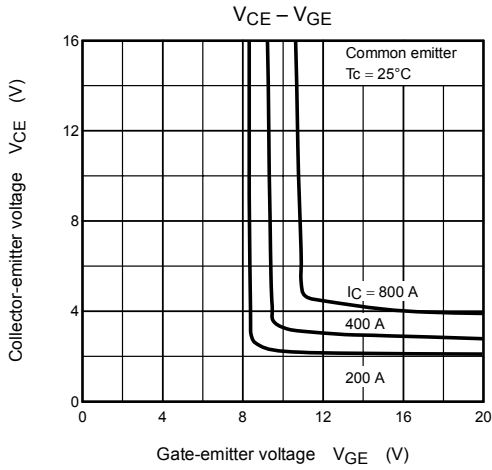
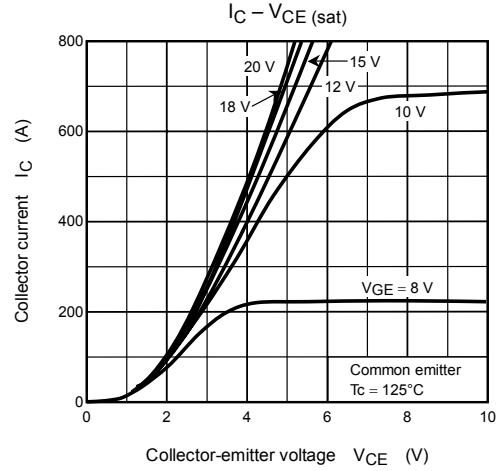
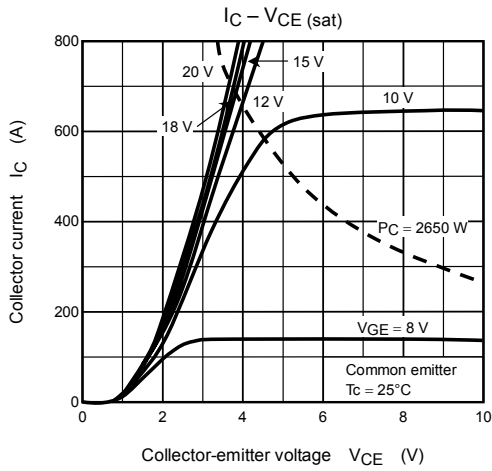
| Characteristics | Symbol | Rating | Unit |
|---|------------|--------------------|------|
| Collector-emitter voltage | V_{CES} | 1200 | V |
| Gate-emitter voltage | V_{GES} | ±20 | V |
| Collector current | DC | I_C | 400 |
| | 1 ms | I_{CP} | 800 |
| Forward current | DC | I_F | 400 |
| | 1 ms | I_{FM} | 800 |
| Collector power dissipation (Tc = 25°C) | P_C | 2650 | W |
| Junction temperature | T_j | 150 | °C |
| Storage temperature range | T_{stg} | -40 to 125 | °C |
| Isolation voltage | V_{isol} | 2500 (AC 1 minute) | V |
| Screw torque | Terminal | — | 3 |
| | Mounting | — | 3 |

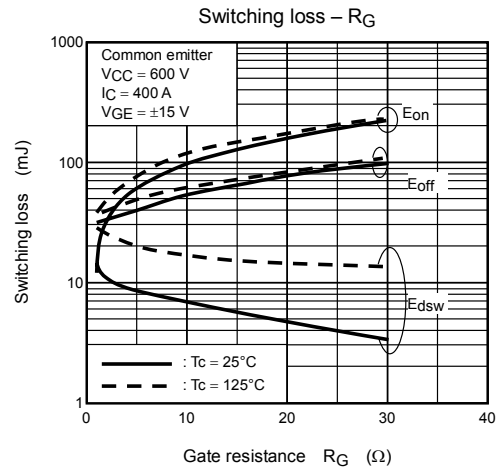
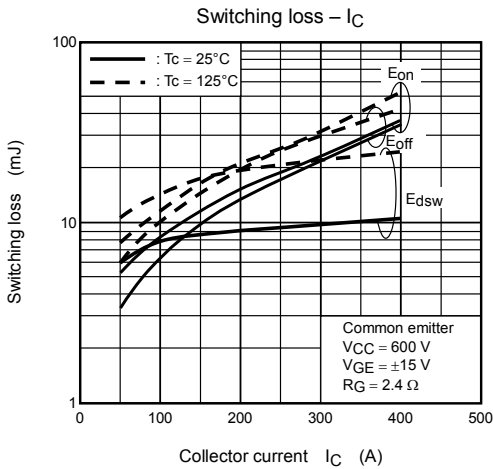
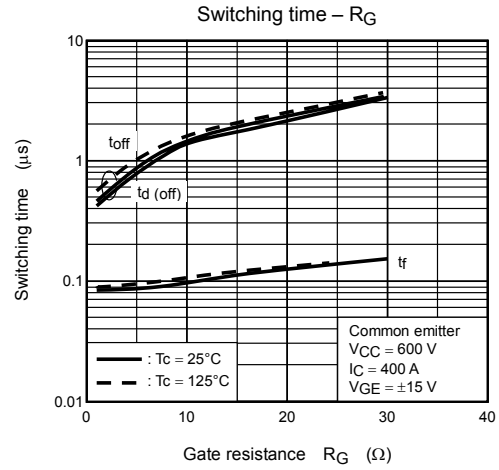
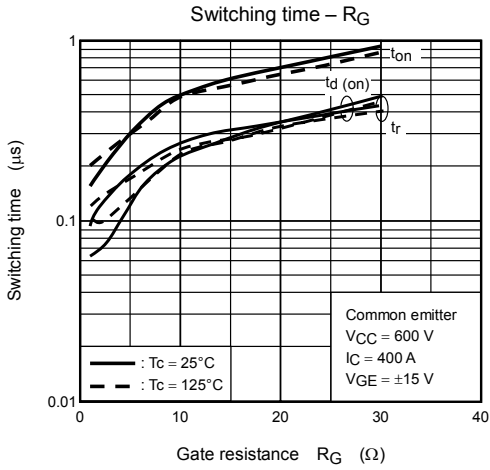
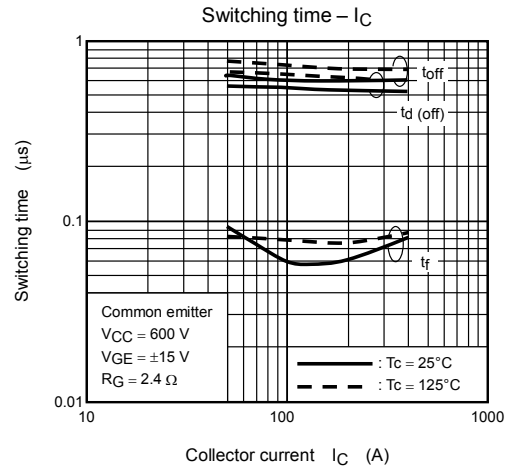
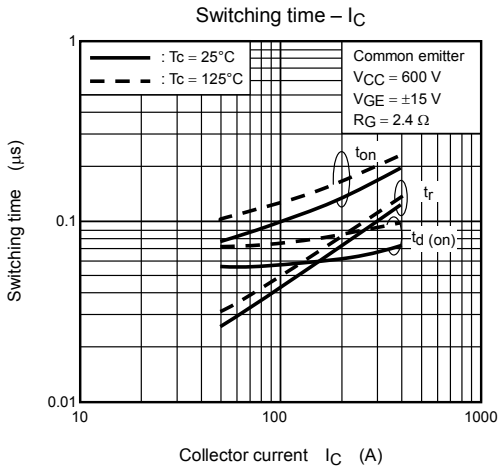
Electrical Characteristics (Ta = 25°C)

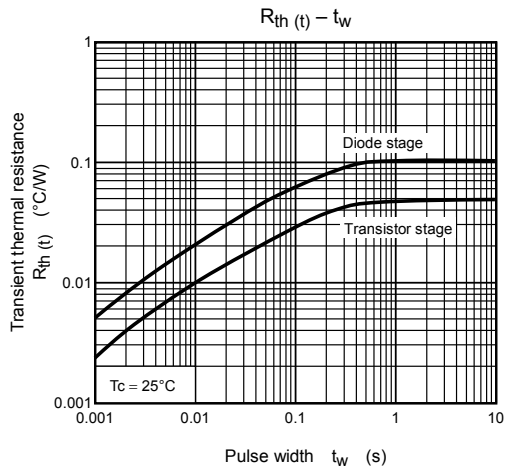
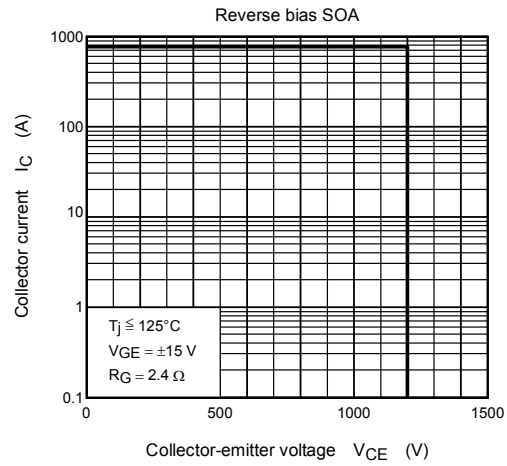
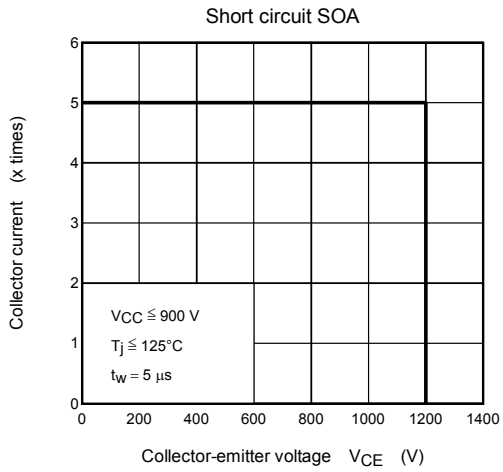
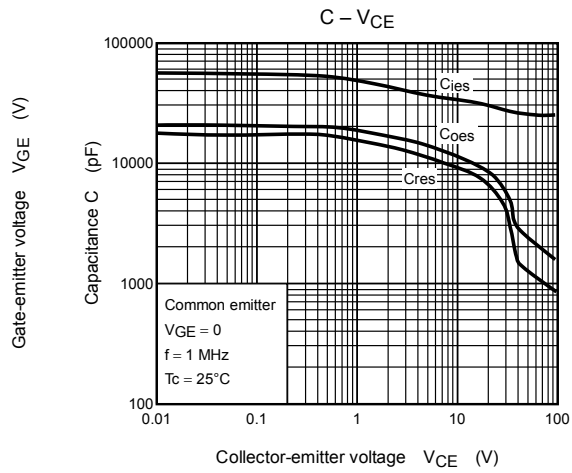
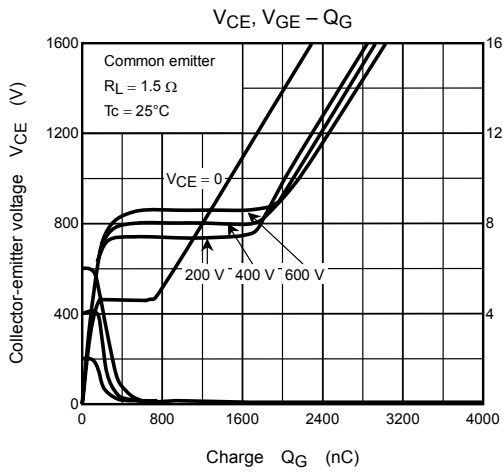
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit | |
|--------------------------------------|---------------------|------------------------|---|---------------------------|-------|-----------|--------------------|---|
| Gate leakage current | | I_{GES} | $V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$ | — | — | ± 500 | nA | |
| Collector cut-off current | | I_{CES} | $V_{CE} = 1200 \text{ V}, V_{GE} = 0$ | — | — | 4.0 | mA | |
| Gate-emitter cut-off voltage | | $V_{GE} \text{ (off)}$ | $I_C = 400 \text{ mA}, V_{CE} = 5 \text{ V}$ | 4.0 | — | 7.0 | V | |
| Collector-emitter saturation voltage | | $V_{CE} \text{ (sat)}$ | $I_C = 400 \text{ A}, V_{GE} = 15 \text{ V}$ | $T_c = 25^\circ\text{C}$ | — | 3.0 | 4.0 | V |
| | | | | $T_c = 125^\circ\text{C}$ | — | 3.6 | — | |
| Input capacitance | | C_{ies} | $V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$ | — | 34000 | — | pF | |
| Switching time | Turn-on delay time | $t_d \text{ (on)}$ | Inductive load $V_{CC} = 600 \text{ V}, I_C = 400 \text{ A}$ $V_{GE} = \pm 15 \text{ V}, R_G = 2.4 \Omega$ | — | 0.05 | — | μs | |
| | Rise time | t_r | | — | 0.05 | — | | |
| | Turn-on time | t_{on} | | — | 0.10 | — | | |
| | Turn-off delay time | $t_d \text{ (off)}$ | | — | 0.55 | — | | |
| | Fall time | t_f | | — | 0.05 | 0.15 | | |
| | Turn-off time | t_{off} | | — | 0.60 | — | | |
| Forward voltage | | V_F | $I_F = 400 \text{ A}, V_{GE} = 0$ | — | 2.4 | 3.5 | V | |
| Reverse recovery time | | t_{rr} | $I_F = 400 \text{ A}, V_{GE} = -10 \text{ V}$ | — | 0.25 | — | μs | |
| Thermal resistance | | $R_{th} \text{ (j-c)}$ | Transistor stage | — | — | 0.047 | $^\circ\text{C/W}$ | |
| | | | Diode stage | — | — | 0.1 | | |
| Switching loss | Turn-on | E_{on} | Inductive load $V_{CC} = 600 \text{ V}, I_C = 400 \text{ A}$ $V_{GE} = \pm 15 \text{ V}, R_G = 2.4 \Omega$ $T_c = 125^\circ\text{C}$ | — | 40 | — | mJ | |
| | Turn-off | E_{off} | | — | 40 | — | | |

Note: Switching time measurement circuit and input/output waveforms









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