

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

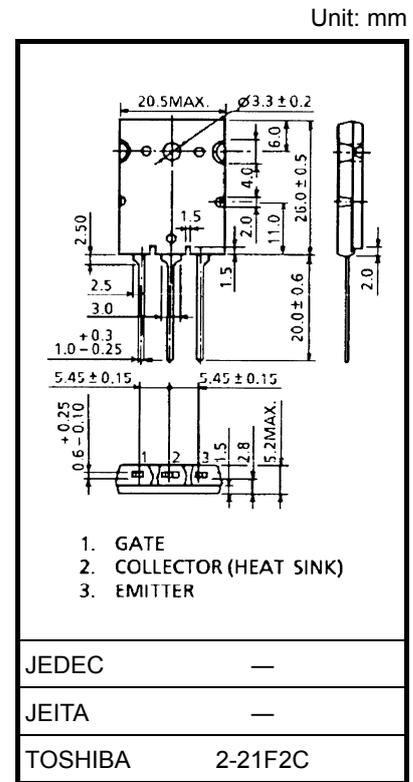
GT60N322

Voltage Resonance Inverter Switching Application

- Enhancement mode type
- High speed : $t_f = 0.11 \mu\text{s}$ (typ.) ($I_C = 60 \text{ A}$)
- Low saturation voltage : $V_{CE(sat)} = 2.4 \text{ V}$ (typ.) ($I_C = 60 \text{ A}$)
- FRD included between emitter and collector
- TO-3P(LH) (Toshiba package name)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

| Characteristics | Symbol | Rating | Unit |
|------------------------------|-----------------------------|------------|------------------|
| Collector-emitter voltage | V_{CES} | 1000 | V |
| Gate-emitter voltage | V_{GES} | ± 25 | V |
| Continuous collector current | @ $T_c = 100^\circ\text{C}$ | 29 | A |
| | @ $T_c = 25^\circ\text{C}$ | 57 | |
| Pulsed collector current | I_{CP} | 120 | A |
| Diode forward current | DC | I_F | A |
| | Pulsed | I_{FP} | |
| Collector power dissipation | @ $T_c = 100^\circ\text{C}$ | P_C | W |
| | @ $T_c = 25^\circ\text{C}$ | 200 | |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -55 to 150 | $^\circ\text{C}$ |



Weight: 9.75 g (typ.)

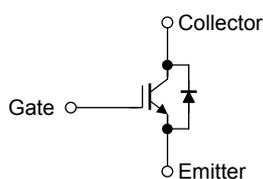
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

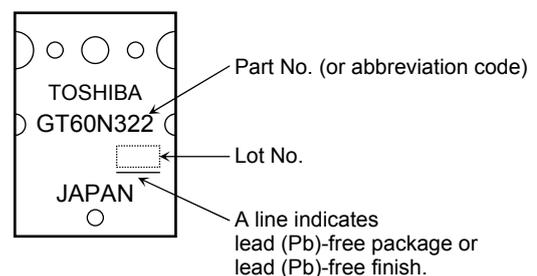
Thermal Characteristics

| Characteristics | Symbol | Max | Unit |
|----------------------------|---------------|-------|--------------------|
| Thermal resistance (IGBT) | $R_{th(j-c)}$ | 0.625 | $^\circ\text{C/W}$ |
| Thermal resistance (diode) | $R_{th(j-c)}$ | 4.0 | $^\circ\text{C/W}$ |

Equivalent Circuit



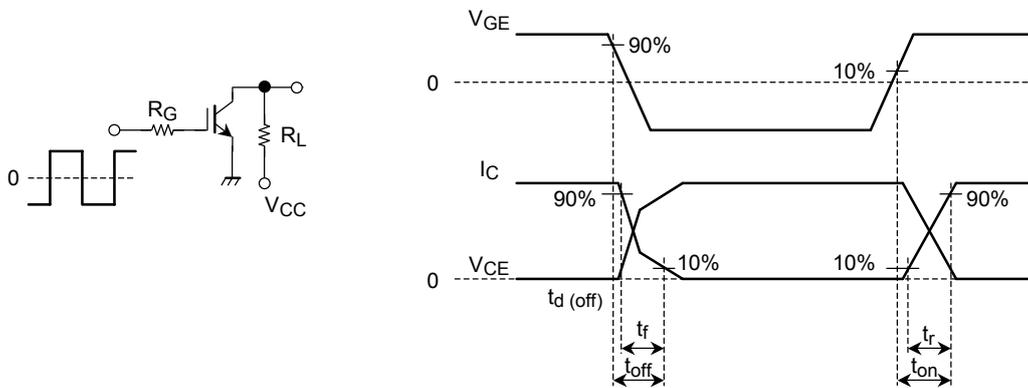
Marking

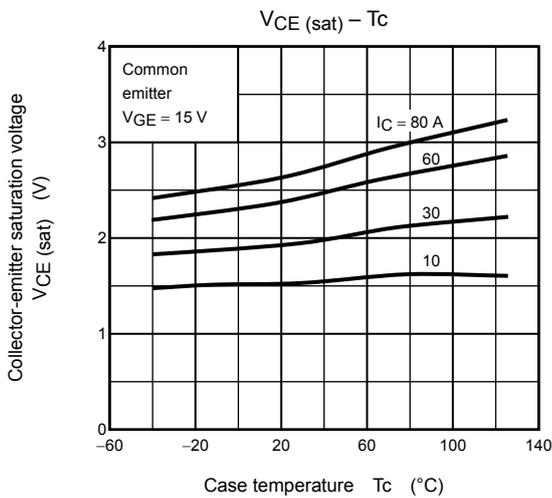
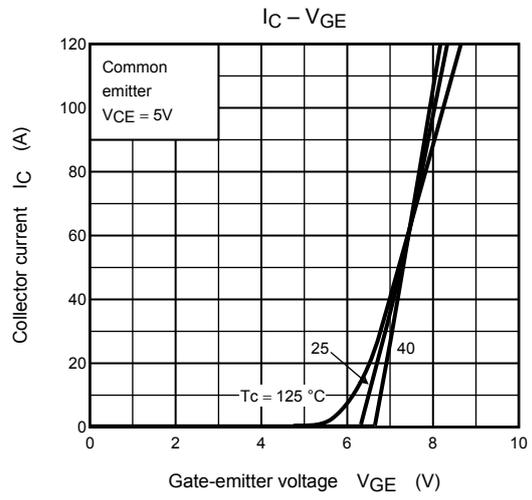
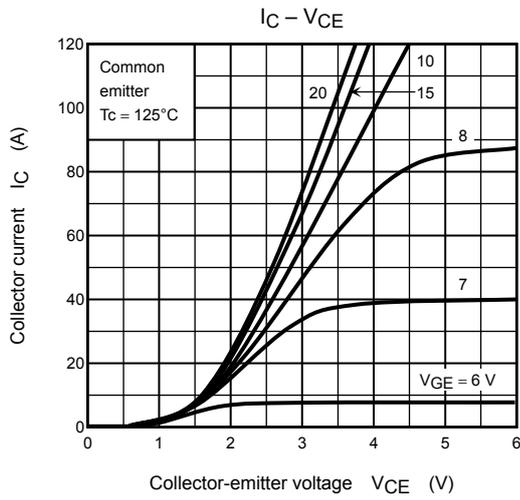
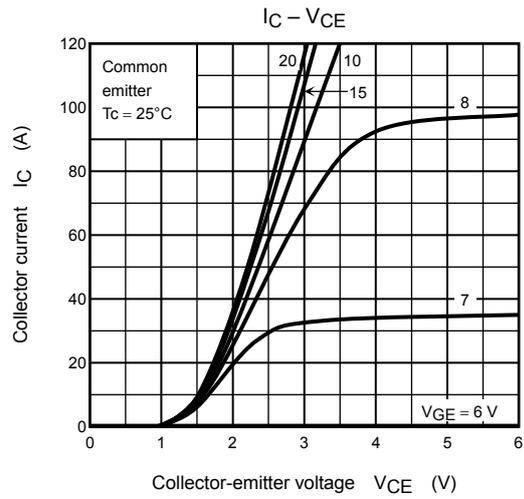
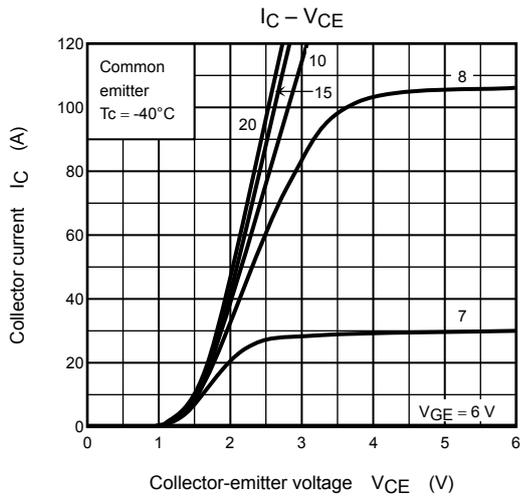


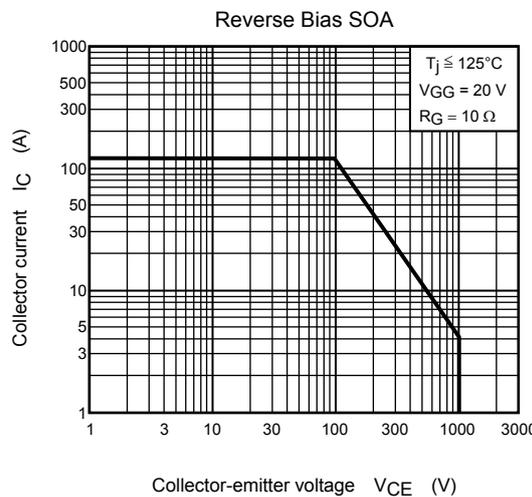
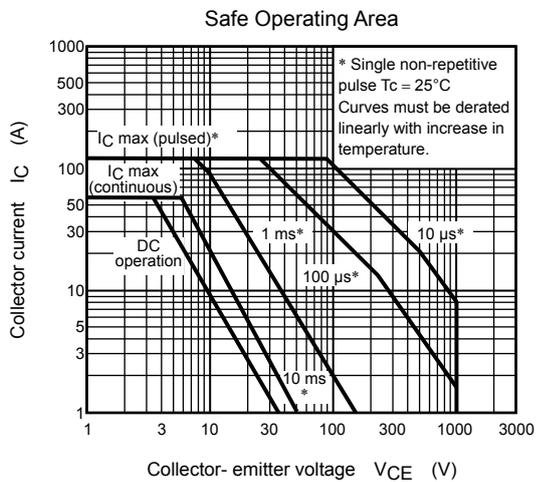
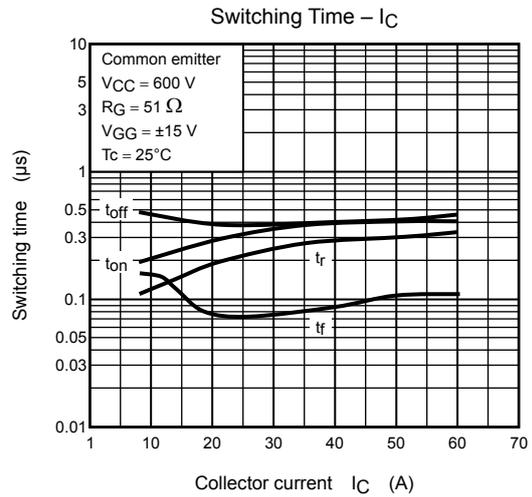
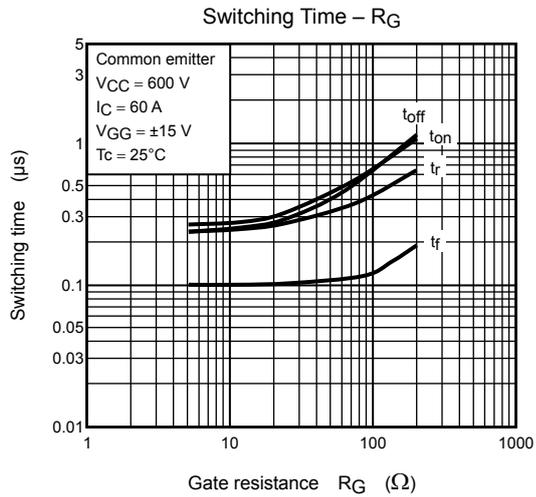
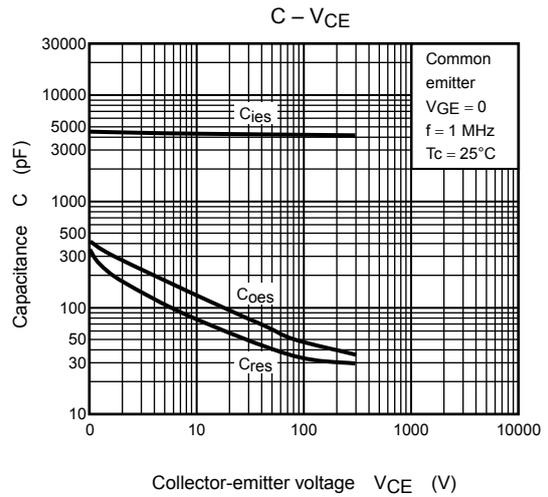
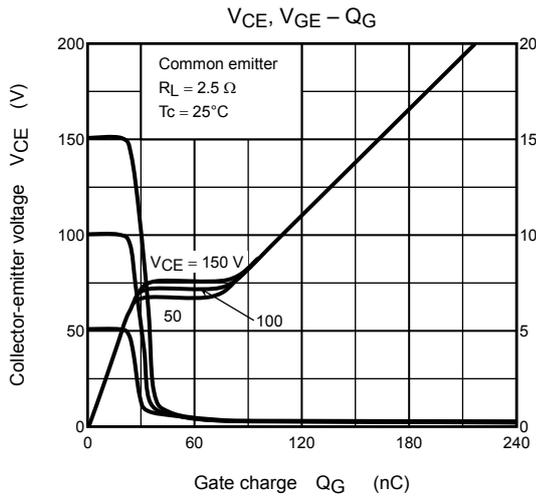
Electrical Characteristics (Ta = 25°C)

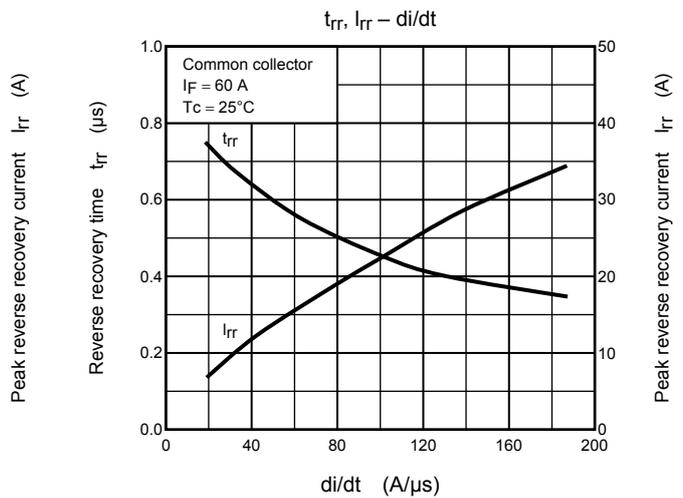
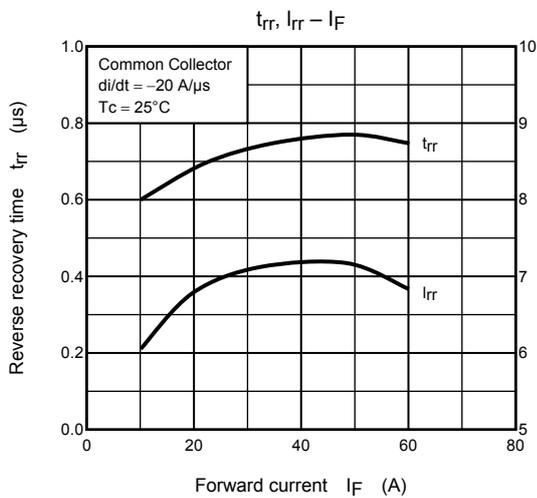
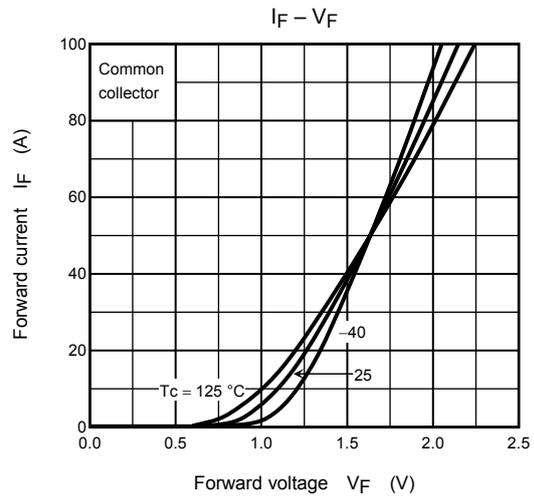
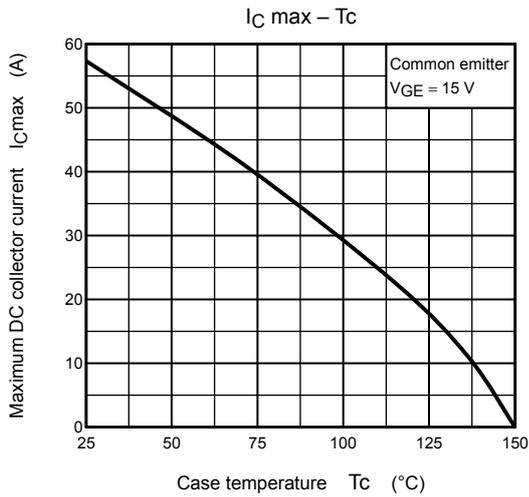
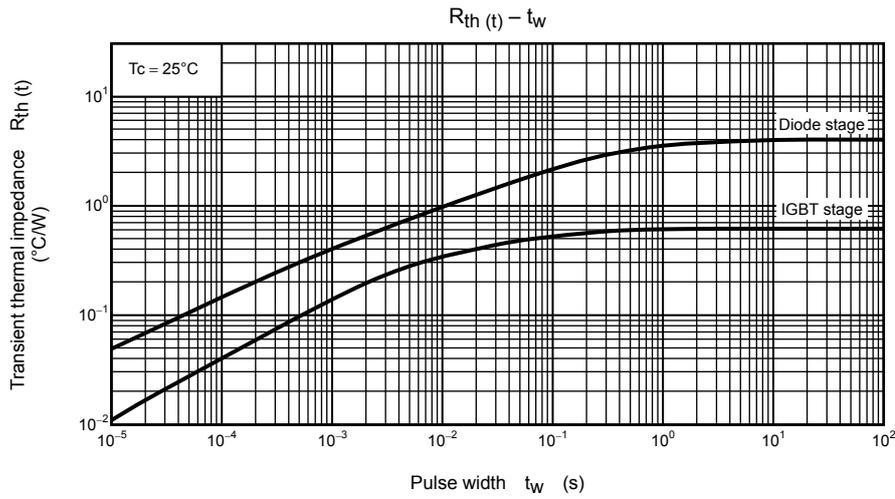
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|---------------|---------------|--|-----|------|-----------|---------------|
| Gate leakage current | | I_{GES} | $V_{GE} = \pm 25\text{ V}, V_{CE} = 0$ | — | — | ± 500 | nA |
| Collector cut-off current | | I_{CES} | $V_{CE} = 1000\text{ V}, V_{GE} = 0$ | — | — | 0.1 | mA |
| Gate-emitter cut-off voltage | | $V_{GE(OFF)}$ | $I_C = 60\text{ mA}, V_{CE} = 5\text{ V}$ | 4.0 | — | 7.0 | V |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | $I_C = 60\text{ A}, V_{GE} = 15\text{ V}$ | — | 2.4 | 2.9 | V |
| Input capacitance | | C_{ies} | $V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$ | — | 4200 | — | pF |
| Switching time | Rise time | t_r | Resistive Load $V_{CC} = 600\text{ V}, I_C = 60\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 51\ \Omega$ (Note 1) | — | 0.33 | — | μs |
| | Turn-on time | t_{on} | | — | 0.45 | — | |
| | Fall time | t_f | | — | 0.11 | 0.22 | |
| | Turn-off time | t_{off} | | — | 0.41 | — | |
| Diode forward voltage | | V_F | $I_F = 15\text{ A}, V_{GE} = 0$ | — | 1.2 | 1.9 | V |
| Reverse recovery time | | t_{rr} | $I_F = 60\text{ A}, di/dt = -20\text{ A}/\mu\text{s}$ | — | 0.75 | 1.7 | μs |

Note 1: Switching time measurement circuit and input/output waveforms









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