

TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC5738

High-Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 400$ to 1000 ($I_C = 0.5$ A)
- Low collector-emitter saturation voltage: $V_{CE(sat)} = 0.15$ V (max)
- High-speed switching: $t_f = 90$ ns (typ.)

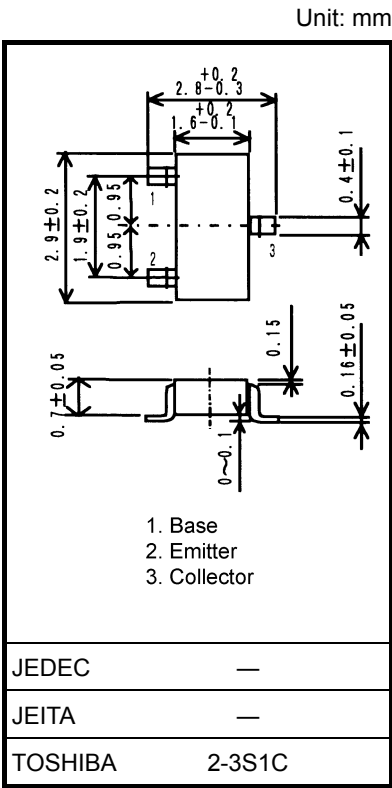
Absolute Maximum Ratings ($T_a = 25^{\circ}\text{C}$)

| Characteristics | | Symbol | Rating | Unit |
|-----------------------------|------------|-------------------|----------------|--------------------|
| Collector-base voltage | | V_{CBO} | 40 | V |
| Collector-emitter voltage | | V_{CEX} | 30 | V |
| Collector-emitter voltage | | V_{CEO} | 20 | V |
| Emitter-base voltage | | V_{EBO} | 7 | V |
| Collector current | DC | I_C | 3.5 | A |
| | Pulse | I_{CP} | 6.0 | |
| Base current | | I_B | 350 | mA |
| Collector power dissipation | DC | P_C (Note 1) | 625 | mW |
| | $t = 10$ s | | 1000 | |
| Junction temperature | | T_j | 150 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | -55 to 150 | $^{\circ}\text{C}$ |

Note 1: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm²)

Note 2: 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).



Weight: 0.01 g (typ.)

Start of commercial production
2000-08

Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|---------------------|-----------------------|---|-----|------|------|------|
| Collector cut-off current | | ICBO | V _{CB} = 40 V, I _E = 0 | — | — | 100 | nA |
| Emitter cut-off current | | IEBO | V _{EB} = 7 V, I _C = 0 | — | — | 100 | nA |
| Collector-emitter breakdown voltage | | V (BR) CEO | I _C = 10 mA, I _B = 0 | 20 | — | — | V |
| DC current gain | h _{FE} (1) | | V _{CE} = 2 V, I _C = 0.5 A | 400 | — | 1000 | |
| | h _{FE} (2) | | V _{CE} = 2 V, I _C = 1.6 A | 200 | — | — | |
| Collector-emitter saturation voltage | | V _{CE} (sat) | I _C = 1.6 A, I _B = 32 mA | — | — | 0.15 | V |
| Base-emitter saturation voltage | | V _{BE} (sat) | I _C = 1.6 A, I _B = 32 mA | — | — | 1.10 | V |
| Collector output capacitance | | C _{ob} | V _{CB} = 10 V, I _E = 0, f = 1 MHz | — | 18 | — | pF |
| Switching time | Rise time | t _r | See Figure 1. V _{CC} ≈ 12 V, R _L = 7.5 Ω I _{B1} = -I _{B2} = 53 mA | — | 100 | — | ns |
| | Storage time | t _{stg} | | — | 350 | — | |
| | Fall time | t _f | | — | 90 | — | |

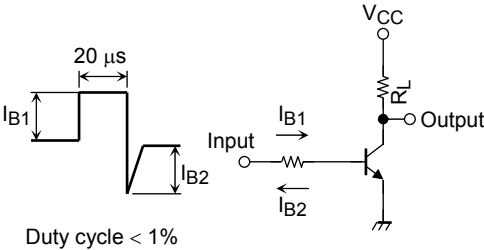
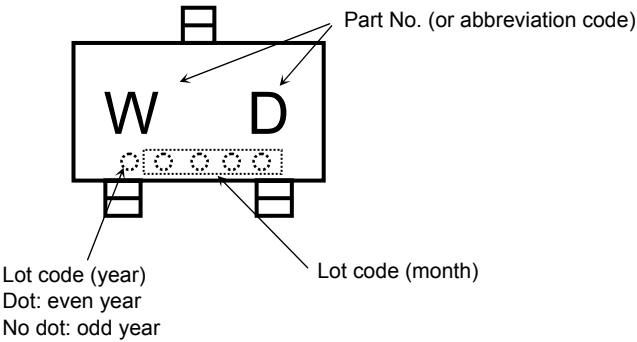
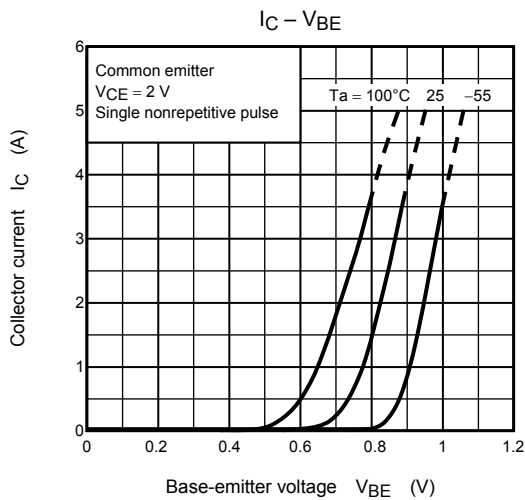
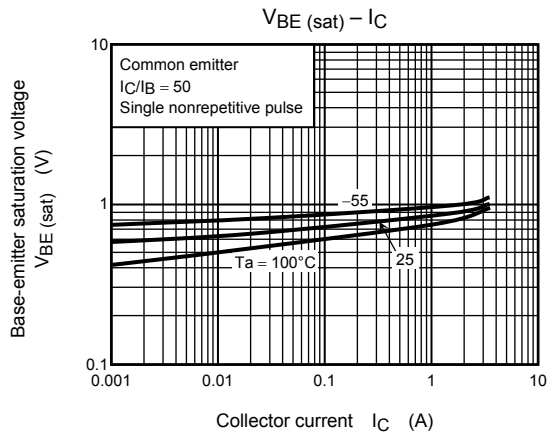
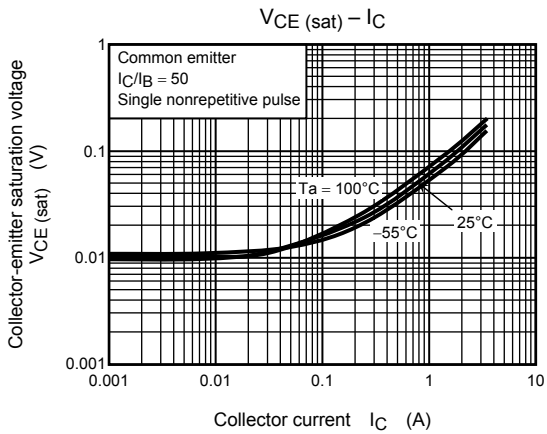
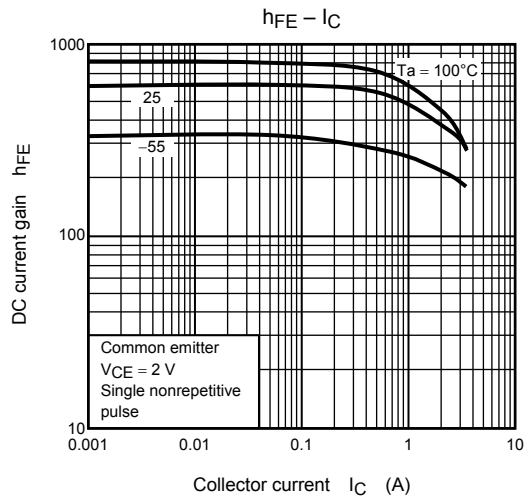
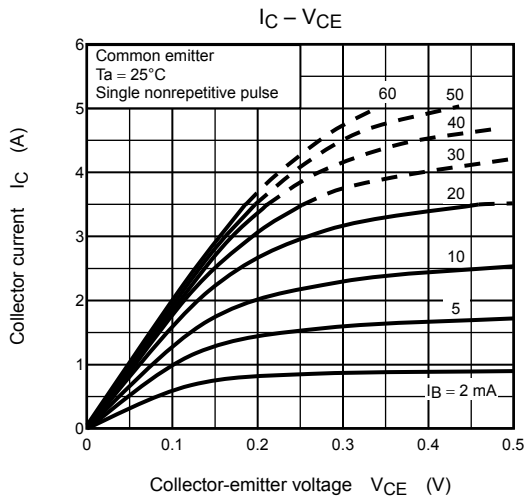
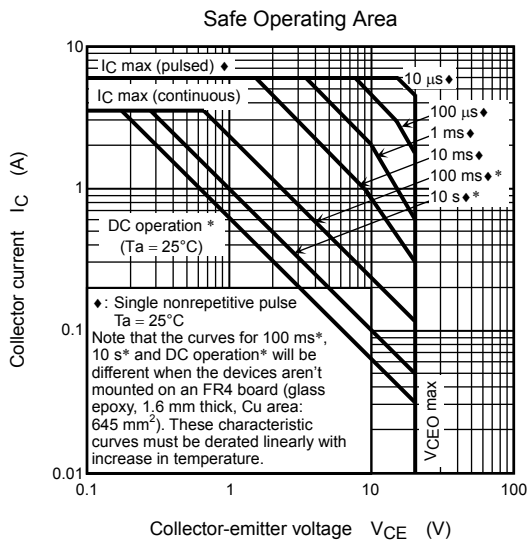
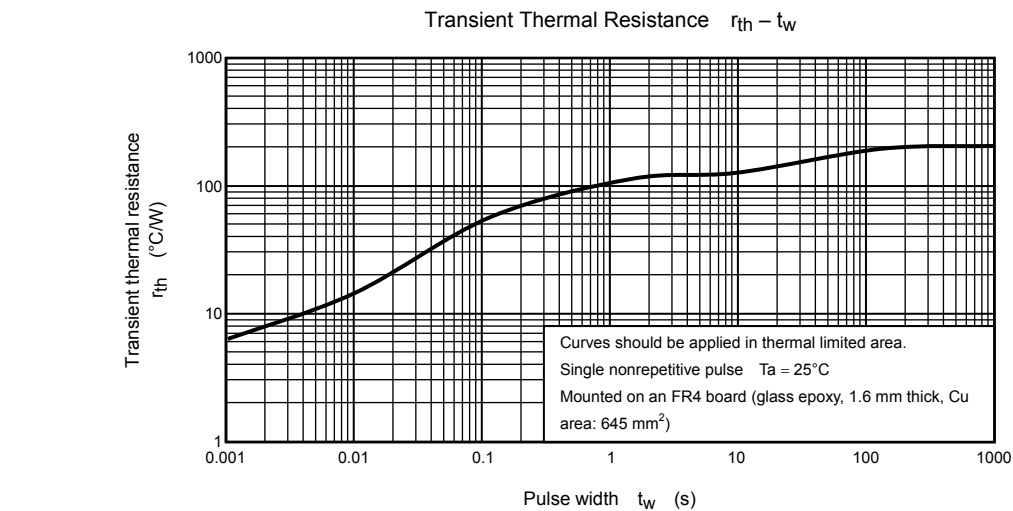


Figure 1 Switching Time Test Circuit & Timing Chart

Marking







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