

TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC5976

High-Speed Switching Applications
 DC-DC Converter Applications
 Strobe Flash Applications

- High DC current gain: $h_{FE} = 250$ to 400 ($I_C = 0.3$ A)
- Low collector-emitter saturation voltage: $V_{CE(sat)} = 0.14$ V (max)
- High-speed switching: $t_f = 25$ ns (typ.)

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

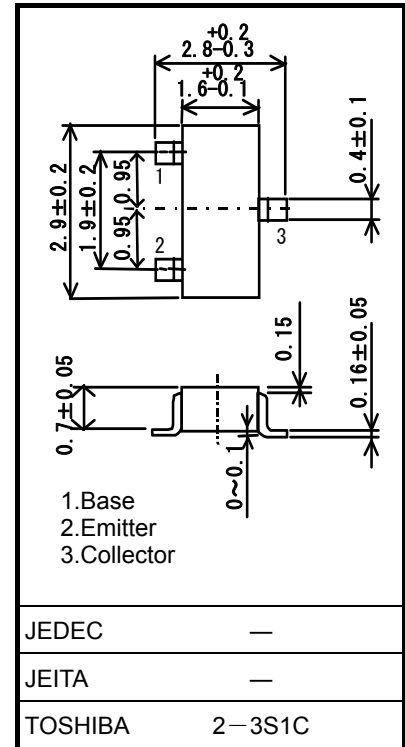
| Characteristics | Symbol | Rating | Unit |
|--|----------------|------------|------------------|
| Collector-base voltage | V_{CBO} | 50 | V |
| Collector-emitter voltage | V_{CEX} | 50 | V |
| Collector-emitter voltage | V_{CEO} | 30 | V |
| Emitter-base voltage | V_{EBO} | 6 | V |
| Collector current | DC | I_C | 3.0 |
| | Pulse | I_{CP} | 5.0 |
| Base current | I_B | 0.3 | A |
| Collector power dissipation ($t=10\text{s}$) | P_C (Note.1) | 1.00 | W |
| Total collector power dissipation (DC) | | 0.625 | |
| 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).

Unit: mm



Start of commercial production
 2004-01

Electrical Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit | |
|--------------------------------------|---------------|---|--|------|------|----------------|----|
| Collector cut-off current | I_{CBO} | $V_{CB} = 50\text{ V}, I_E = 0$ | — | — | 0.1 | $\mu\text{ A}$ | |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 6\text{ V}, I_C = 0$ | — | — | 0.1 | $\mu\text{ A}$ | |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C = 10\text{ mA}, I_B = 0$ | 30 | — | — | V | |
| DC current gain | $h_{FE} (1)$ | $V_{CE} = 2\text{ V}, I_C = 0.3\text{ A}$ | 250 | — | 400 | | |
| | $h_{FE} (2)$ | $V_{CE} = 2\text{ V}, I_C = 1.0\text{ A}$ | 120 | — | — | | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 1.0\text{ A}, I_B = 33\text{ mA}$ | — | — | 0.14 | V | |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C = 1.0\text{ A}, I_B = 33\text{ mA}$ | — | — | 1.10 | V | |
| Collector output capacitance | C_{ob} | $V_{CB} = 10\text{ V}, I_E = 0, f=1\text{ MHz}$ | | 18 | | pF | |
| Switching time | Rise time | t_r | See Figure 1. | | — | 40 | ns |
| | Storage time | t_{stg} | $V_{CC} \approx 12\text{ V}, R_L = 12\ \Omega$ | | — | 320 | |
| | Fall time | t_f | $I_{B1} = -I_{B2} = 33\text{ mA}$ | | — | 25 | |

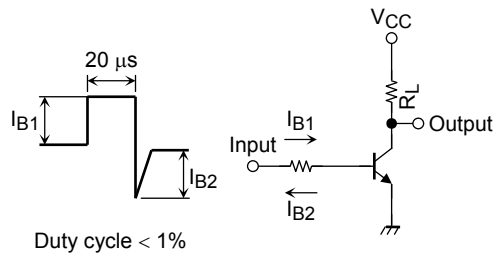
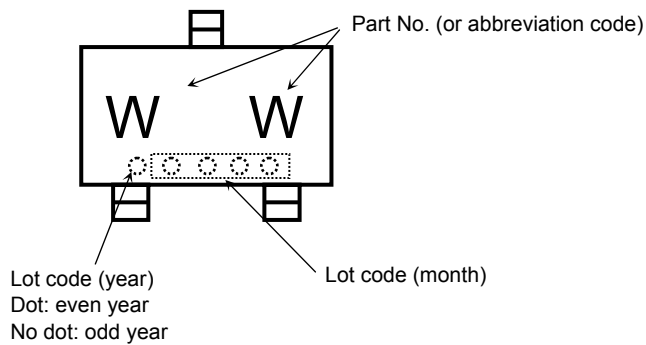
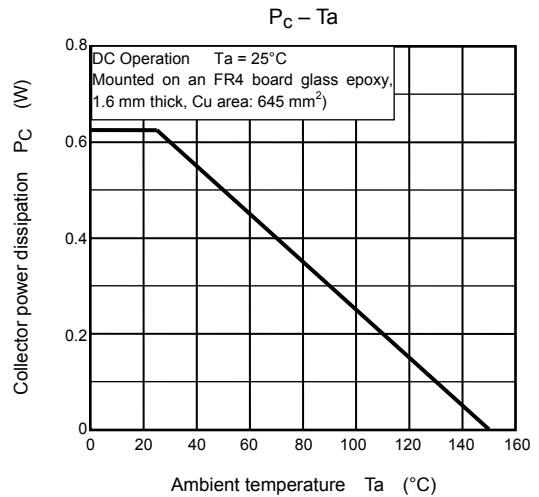
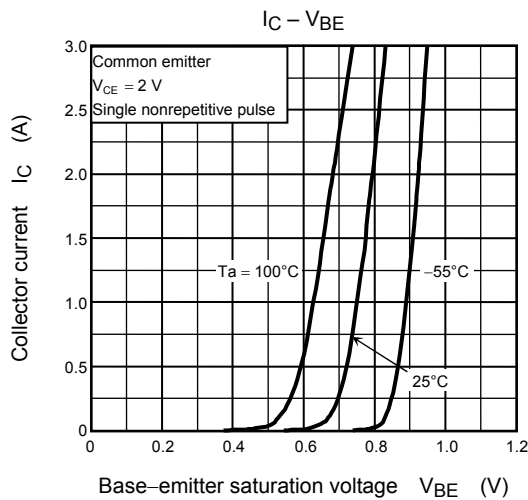
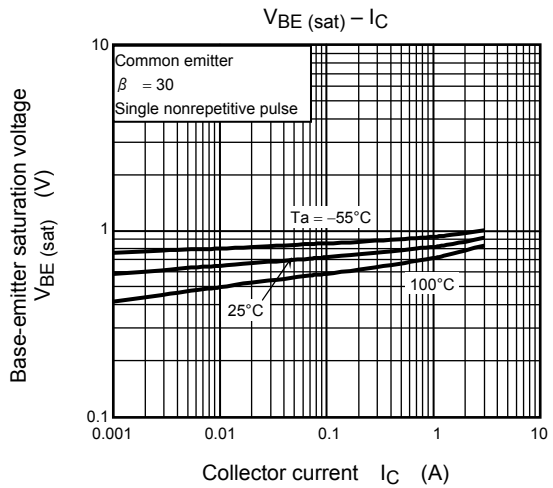
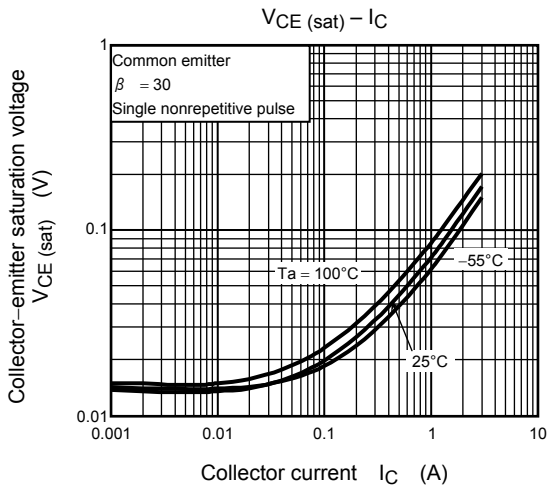
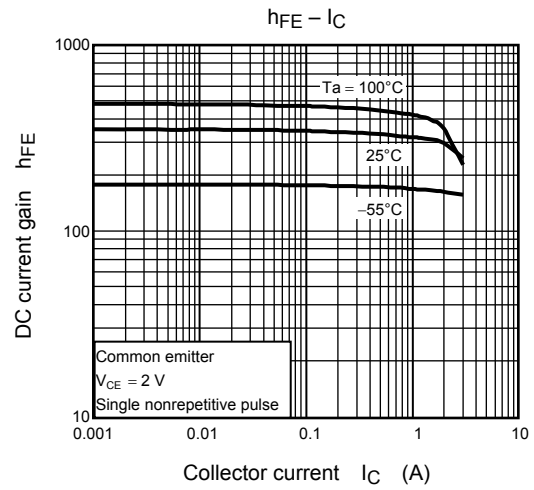
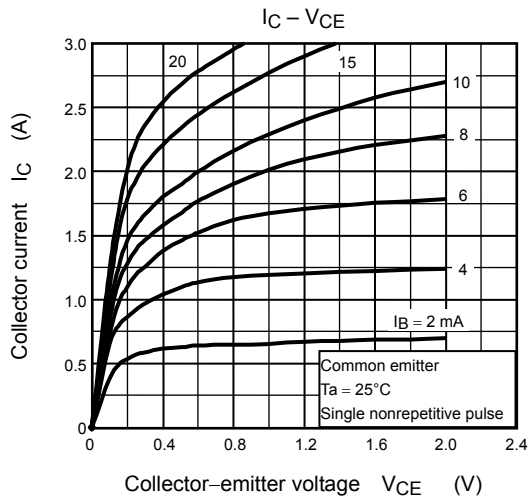
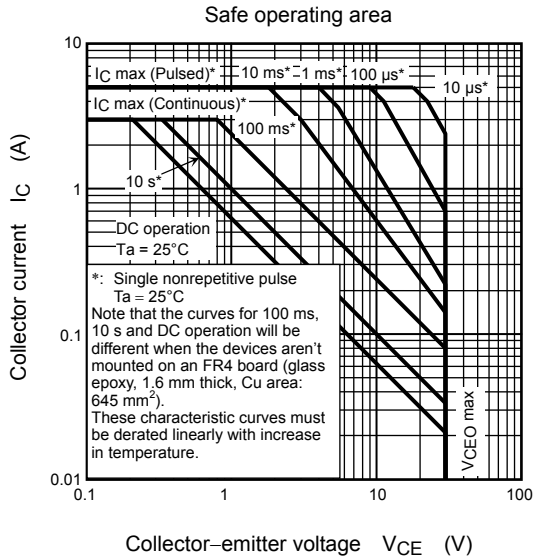
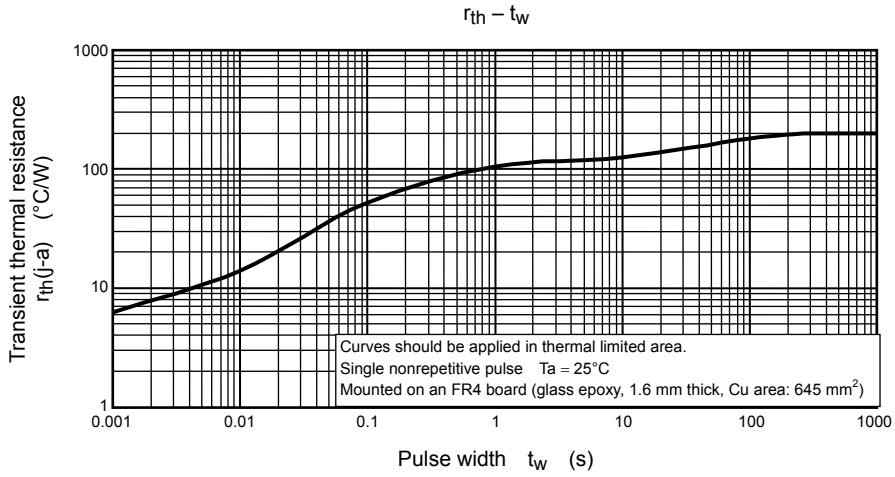


Figure 1 Switching Time Test Circuit & Timing Chart

Marking







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