

TOSHIBA Transistor Silicon NPN Epitaxial Type

# 2SC5784

High-Speed Switching Applications  
DC-DC Converter Applications

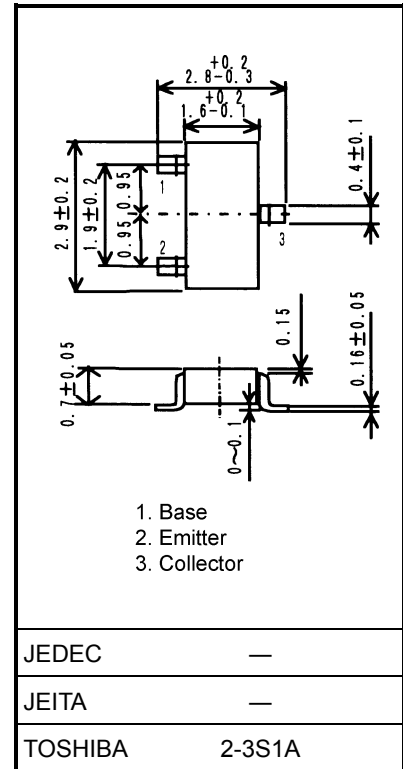
Industrial Applications

Unit: mm

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.15$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.12$  V (max)
- High-speed switching:  $t_f = 45$  ns (typ.)

### 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         | $I_C$     | 1.5        | A                |
|                             | Pulse      | $I_{CP}$  | 2.5        |                  |
| Base current                |            | $I_B$     | 150        | mA               |
| Collector power dissipation | $t = 10$ s | $P_C$     | 750        | mW               |
|                             | DC         | (Note 1)  | 500        |                  |
| Junction temperature        |            | $T_j$     | 150        | $^\circ\text{C}$ |
| Storage temperature range   |            | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |



Weight: 0.01 g (typ.)

Note 1: Mounted on FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)

### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

| Characteristics                      | Symbol        | Test Condition                           | Min | Typ. | Max  | Unit |
|--------------------------------------|---------------|------------------------------------------|-----|------|------|------|
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 40$ V, $I_E = 0$               | —   | —    | 100  | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 7$ 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, $I_C = 0.15$ A           | 400 | —    | 1000 |      |
|                                      | $h_{FE(2)}$   | $V_{CE} = 2$ V, $I_C = 0.5$ A            | 200 | —    | —    |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 0.5$ A, $I_B = 10$ mA             | —   | —    | 0.12 | V    |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C = 0.5$ A, $I_B = 10$ 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     | $t_r$                                    | —   | 43   | —    | ns   |
|                                      | Storage time  | $t_{stg}$                                | —   | 295  | —    |      |
|                                      | Fall time     | $t_f$                                    | —   | 45   | —    |      |

Marking

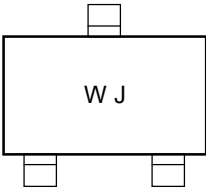
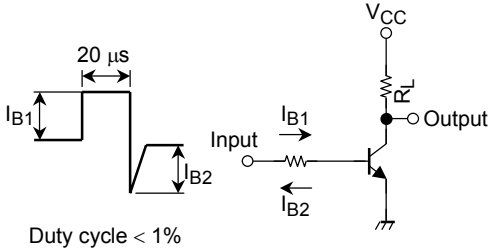
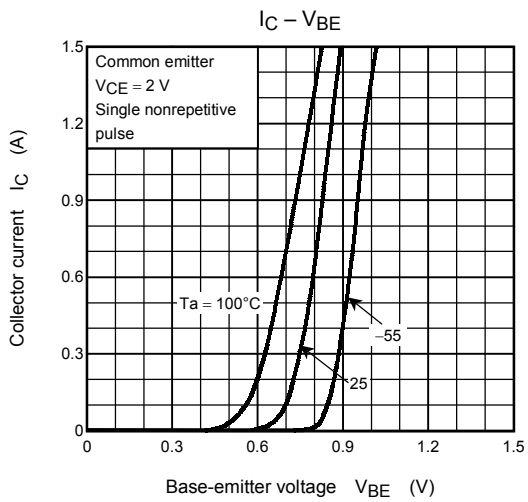
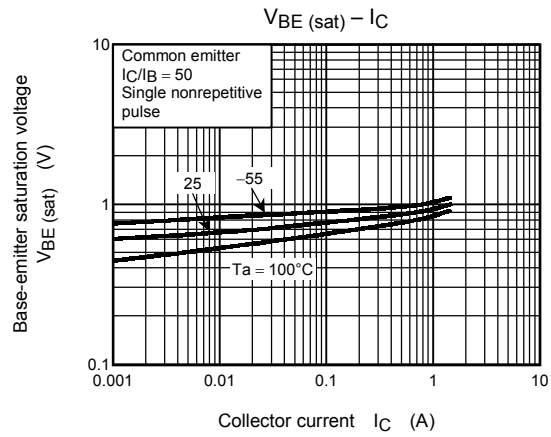
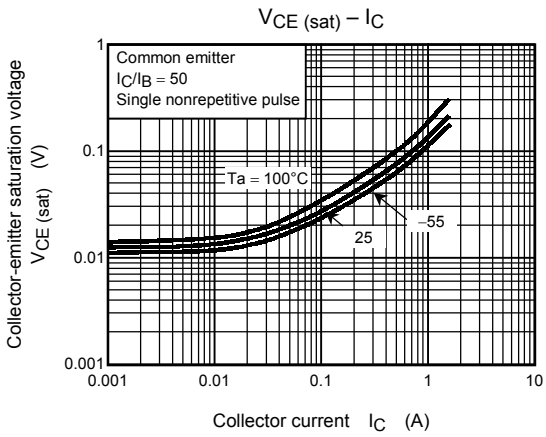
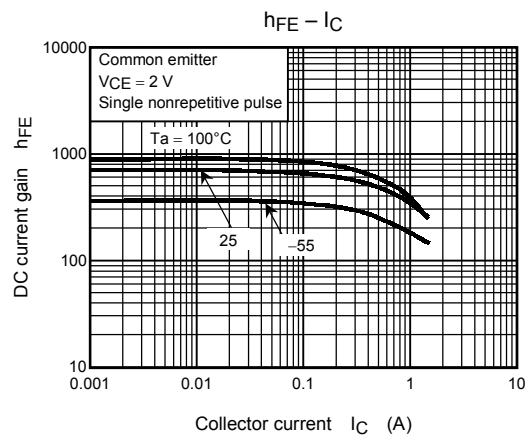
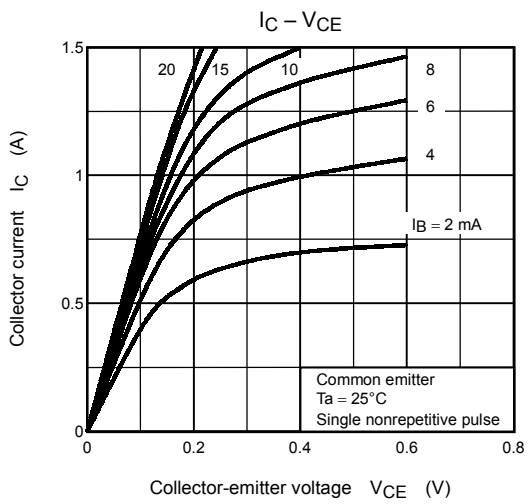
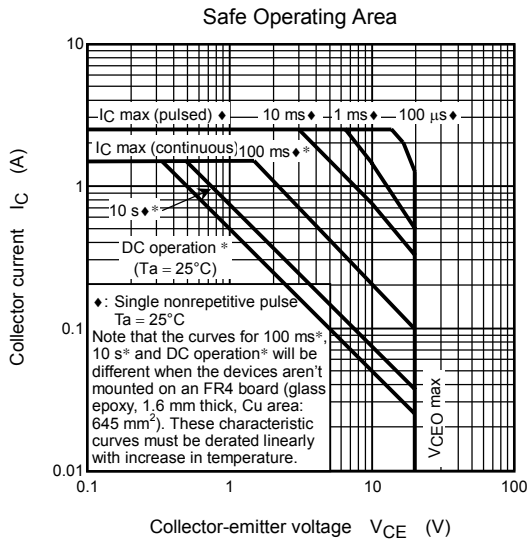
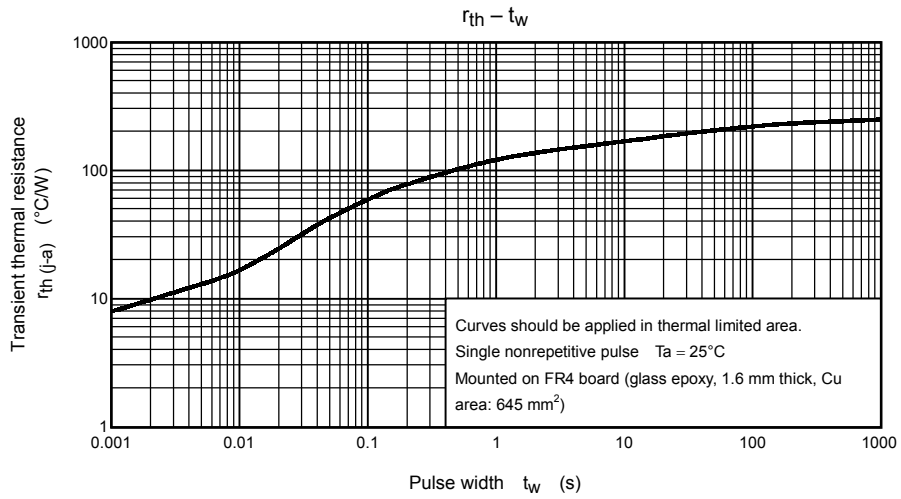


Figure 1 Switching Time Test Circuit & Timing Chart





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