

TOSHIBA Transistor Silicon PNP Epitaxial Type

# 2SA2061

High-Speed Switching Applications

DC-DC Converter Applications

Strobe Applications

- High DC current gain:  $h_{FE} = 200$  to  $500$  ( $I_C = -0.5$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = -0.19$  V (max)
- High-speed switching:  $t_f = 40$  ns (typ.)

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

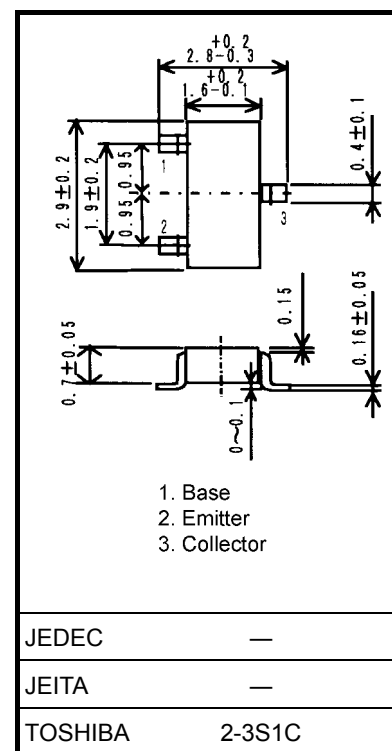
| Characteristics             |            | Symbol            | Rating     | Unit             |
|-----------------------------|------------|-------------------|------------|------------------|
| Collector-base voltage      |            | $V_{CBO}$         | -20        | V                |
| Collector-emitter voltage   |            | $V_{CEO}$         | -20        | V                |
| Emitter-base voltage        |            | $V_{EBO}$         | -7         | V                |
| Collector current           | DC         | $I_C$             | -2.5       | A                |
|                             | Pulse      | $I_{CP}$          | -4         |                  |
| Base current                |            | $I_B$             | -250       | mA               |
| Collector power dissipation | $t = 10$ s | $P_C$<br>(Note 1) | 1          | W                |
|                             | 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:  $645\text{ mm}^2$ )

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



Weight: 0.01 g (typ.)

Start of commercial production  
2001-02

Electrical Characteristics (Ta = 25°C)

| Characteristics                      |              | Symbol                | Test Condition   | Min | Typ. | Max   | Unit |
|--------------------------------------|--------------|-----------------------|--|-----|------|-------|------|
| Collector cut-off current            |              | ICBO                  | V <sub>CB</sub> = -20 V, I <sub>E</sub> = 0  | —   | —    | -100  | nA   |
| Emitter cut-off current              |              | IEBO                  | V <sub>EB</sub> = -7 V, I <sub>C</sub> = 0   | —   | —    | -100  | nA   |
| Collector-emitter breakdown voltage  |              | V (BR) CEO            | I <sub>C</sub> = -10 mA, I <sub>B</sub> = 0  | -20 | —    | —     | V    |
| DC current gain                      |              | h <sub>FE</sub> (1)   | V <sub>CE</sub> = -2 V, I <sub>C</sub> = -0.5 A  | 200 | —    | 500   |      |
|                                      |              | h <sub>FE</sub> (2)   | V <sub>CE</sub> = -2 V, I <sub>C</sub> = -1.6 A  | 100 | —    | —     |      |
| Collector-emitter saturation voltage |              | V <sub>CE</sub> (sat) | I <sub>C</sub> = -1.6 A, I <sub>B</sub> = -53 mA   | —   | —    | -0.19 | V    |
| Base-emitter saturation voltage      |              | V <sub>BE</sub> (sat) | I <sub>C</sub> = -1.6 A, I <sub>B</sub> = -53 mA   | —   | —    | -1.1  | V    |
| Collector output capacitance         |              | C <sub>ob</sub>       | V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1 MHz   | —   | 28   | —     | pF   |
| Switching time                       | Rise time    | t <sub>r</sub>        | See Figure 1 circuit diagram.<br>V <sub>CC</sub> ≈ -12 V, R <sub>L</sub> = 7.5 Ω<br>I <sub>B1</sub> = 53 mA, I <sub>B2</sub> = 53 mA | —   | 70   | —     | ns   |
|                                      | Storage time | t <sub>stg</sub>      |  | —   | 150  | —     |      |
|                                      | Fall time    | t <sub>f</sub>        |  | —   | 40   | —     |      |

Marking

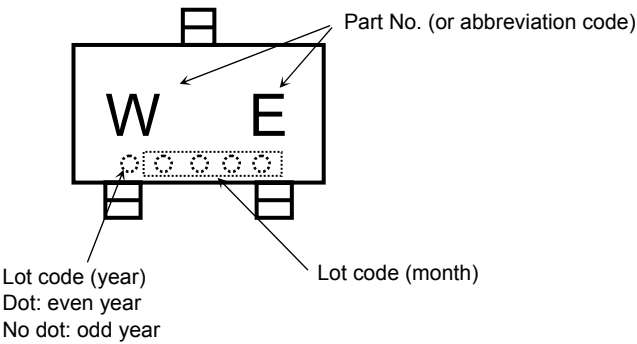
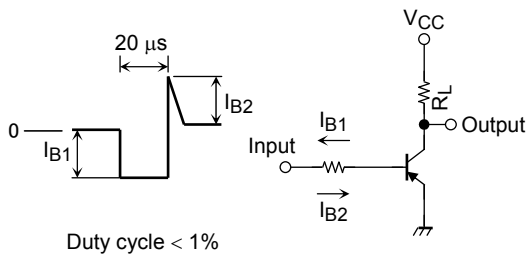
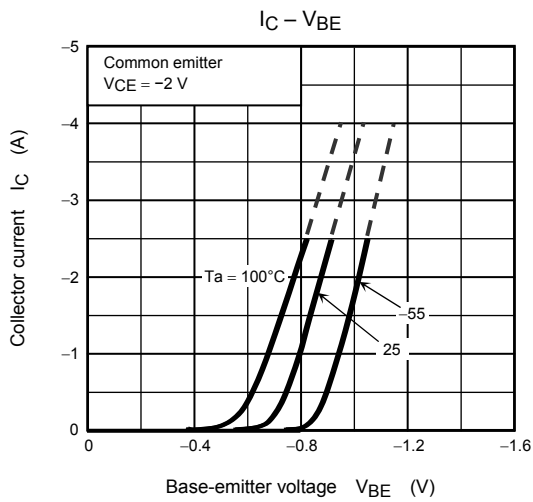
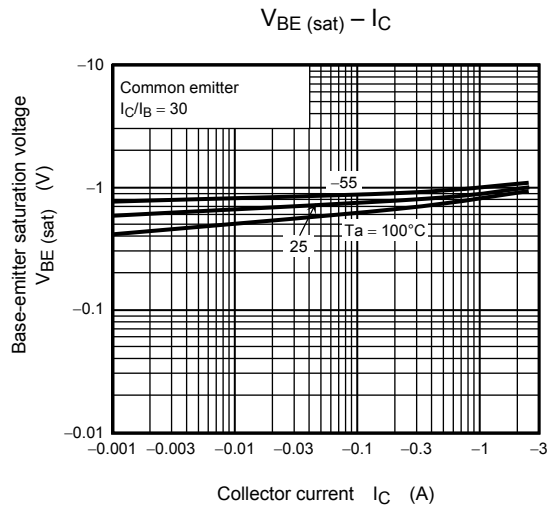
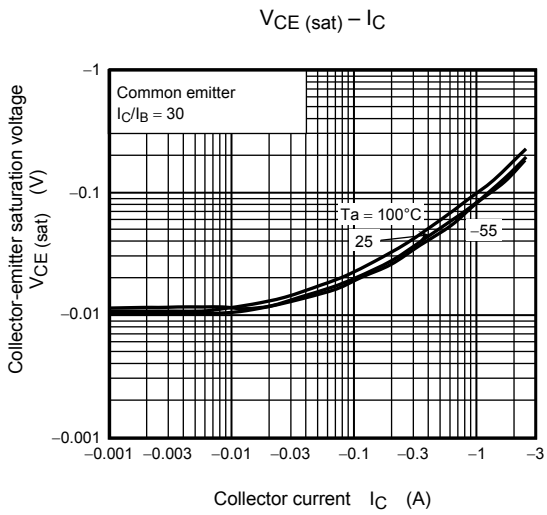
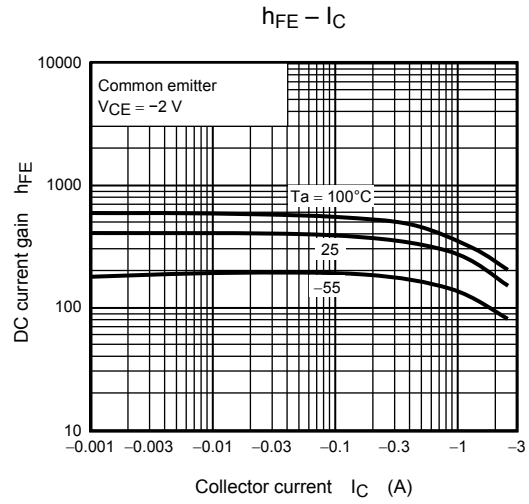
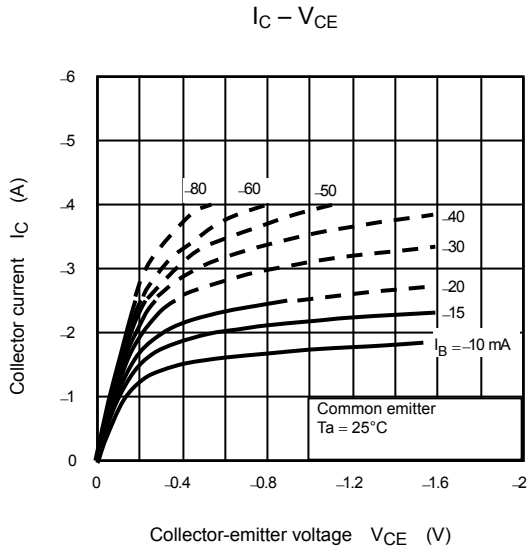
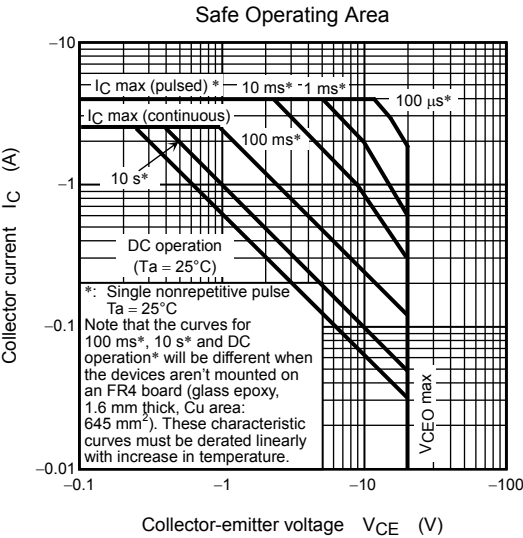
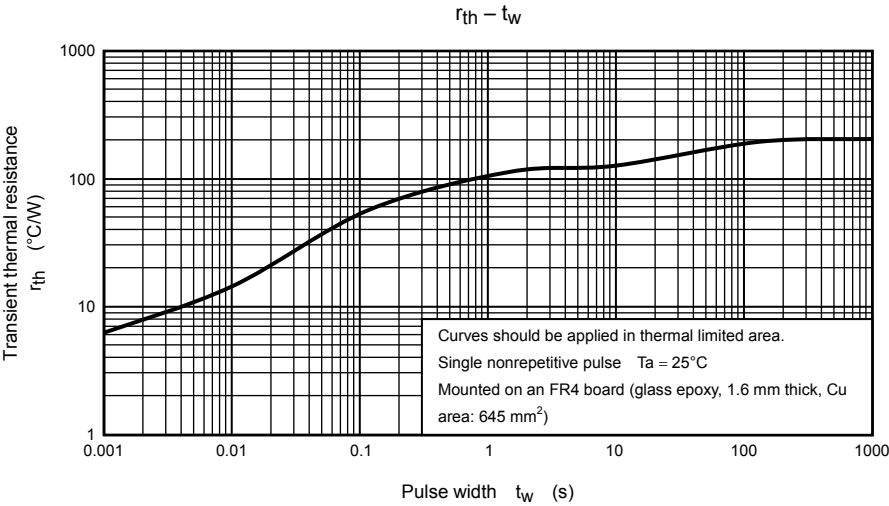


Figure 1 Switching Time Test Circuit & Timing Chart





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