

TOSHIBA Transistor Silicon PNP Epitaxial Type

2SA2059

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

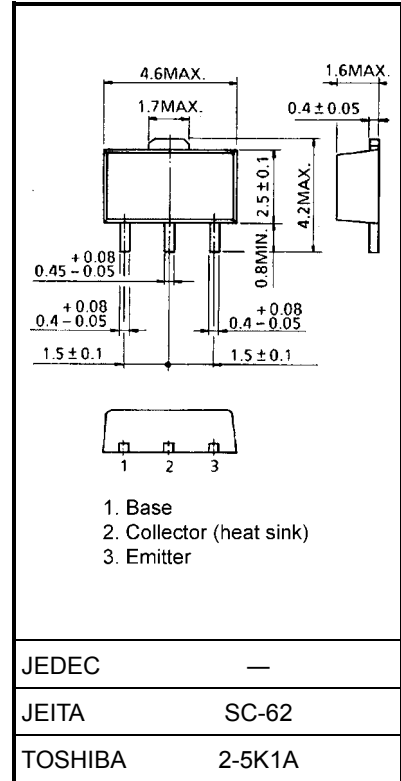
- High DC current gain: $h_{FE} = 200$ to 500 ($I_C = -0.5$ A)
- Low collector-emitter saturation voltage: $V_{CE(sat)} = -0.19$ V (max)
- High-speed switching: $t_f = 40$ ns (typ.)

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 | -3.0 | A |
| | Pulse | I_{CP} | -5.0 | |
| Base current | | I_B | -300 | mA |
| Collector power dissipation | DC | P_C (Note) | 1.0 | W |
| | $t = 10$ s | | 2.5 | |
| Junction temperature | | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -55 to 150 | $^\circ\text{C}$ |

Note: Mounted on FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm^2)

Unit: mm



Weight: 0.05 g (typ.)

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

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------|---------------|--|-----|------|-------|------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = -20$ 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, $I_C = -0.5$ A | 200 | — | 500 | |
| | | $h_{FE(2)}$ | $V_{CE} = -2$ V, $I_C = -1.6$ A | 100 | — | — | |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | $I_C = -1.6$ A, $I_B = -53$ mA | — | — | -0.19 | V |
| Base-emitter saturation voltage | | $V_{BE(sat)}$ | $I_C = -1.6$ A, $I_B = -53$ mA | — | — | -1.10 | V |
| Collector output capacitance | | C_{ob} | $V_{CB} = -10$ V, $I_E = 0$, $f = 1$ MHz | — | 28 | — | pF |
| Switching time | Rise time | t_r | See Figure 1 circuit diagram. | — | 70 | — | ns |
| | Storage time | t_{stg} | $V_{CC} \approx -12$ V, $R_L = 7.5$ Ω | — | 150 | — | |
| | Fall time | t_f | $-I_{B1} = I_{B2} = -53.3$ mA | — | 40 | — | |

Marking

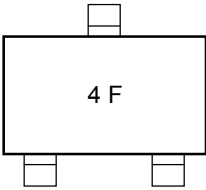
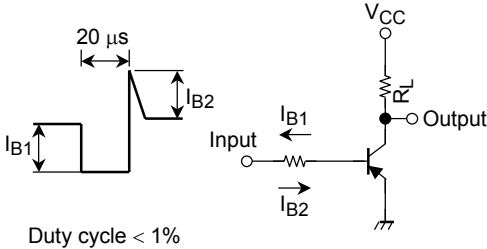
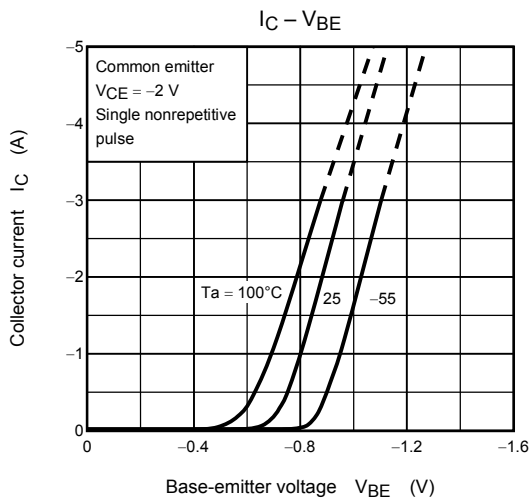
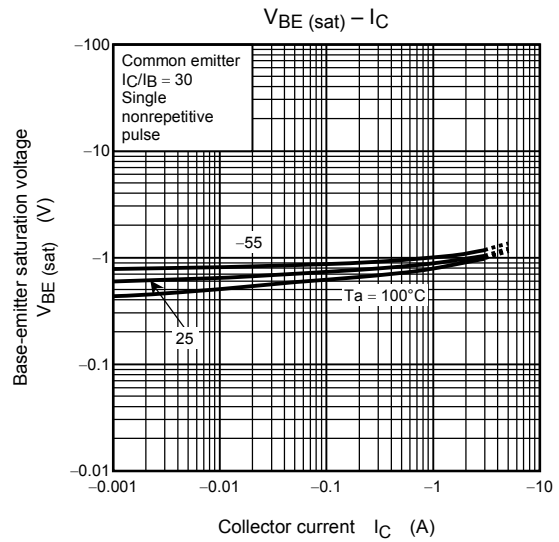
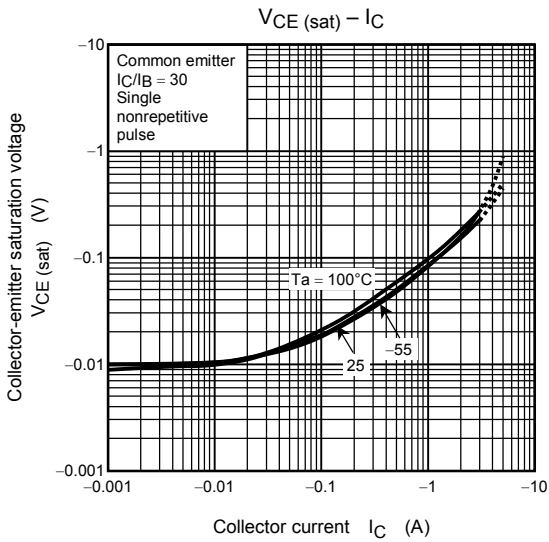
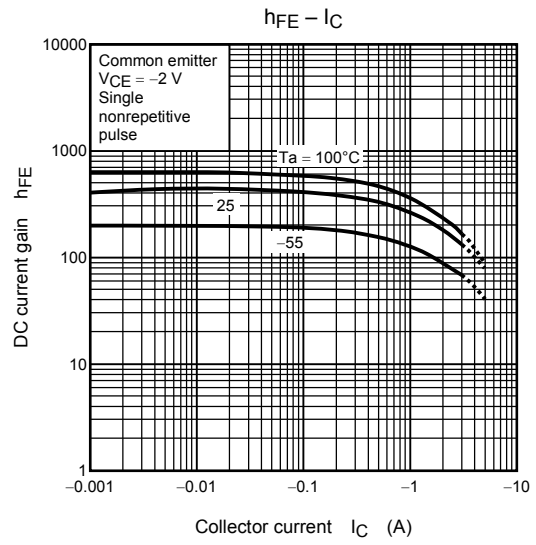
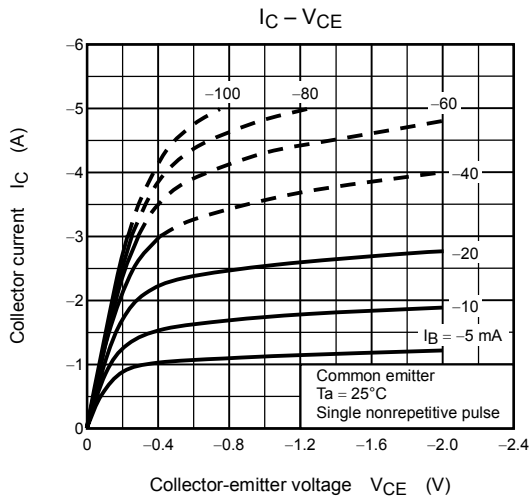
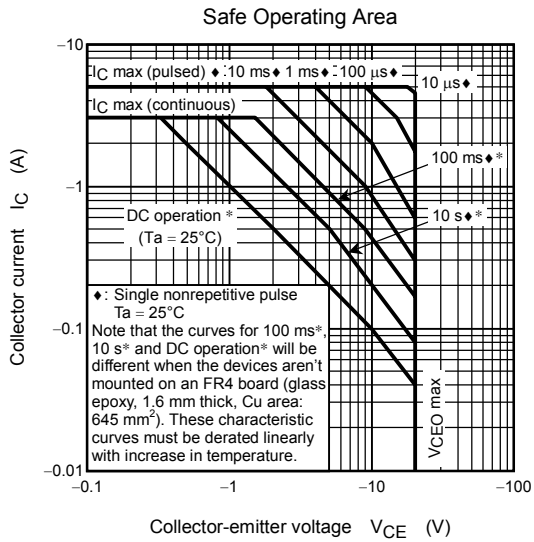
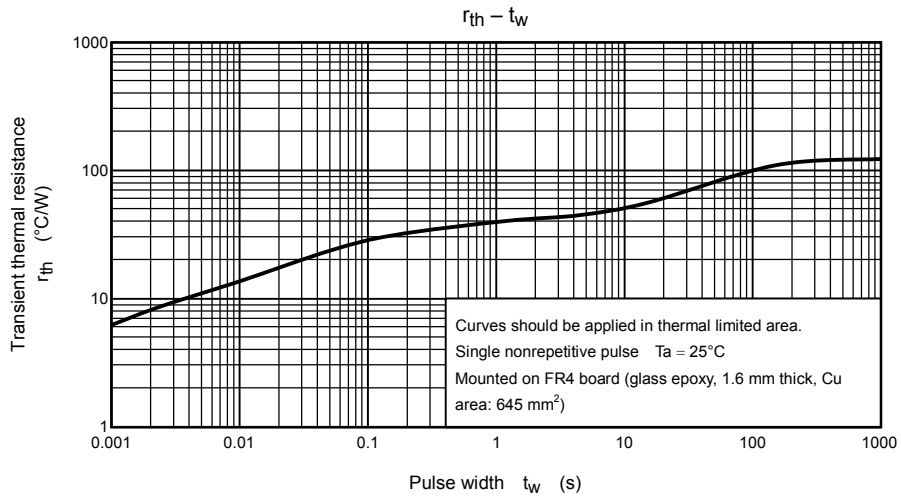


Figure 1 Switching Time Test Circuit & Timing Chart





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