

TOSHIBA Transistor Silicon PNP Epitaxial Type

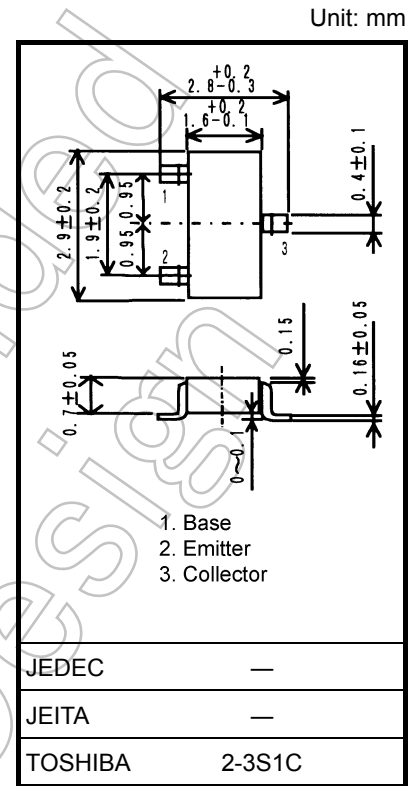
2SA2061

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 | 1 | W |
| | DC | P_C (Note 1) | 0.625 | |
| 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 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).

Start of commercial production
 2001-02

Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------|---------------|--|-----|------|-------|------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = -20\text{ V}, I_E = 0$ | — | — | -100 | nA |
| Emitter cut-off current | | I_{EBO} | $V_{EB} = -7\text{ V}, I_C = 0$ | — | — | -100 | nA |
| Collector-emitter breakdown voltage | | $V_{(BR)CEO}$ | $I_C = -10\text{ mA}, I_B = 0$ | -20 | — | — | V |
| DC current gain | | $h_{FE(1)}$ | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$ | 200 | — | 500 | |
| | | $h_{FE(2)}$ | $V_{CE} = -2\text{ V}, I_C = -1.6\text{ A}$ | 100 | — | — | |
| Collector-emitter saturation voltage | | $V_{CE(sat)}$ | $I_C = -1.6\text{ A}, I_B = -53\text{ mA}$ | — | — | -0.19 | V |
| Base-emitter saturation voltage | | $V_{BE(sat)}$ | $I_C = -1.6\text{ A}, I_B = -53\text{ mA}$ | — | — | -1.1 | V |
| Collector output capacitance | | C_{ob} | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 28 | — | pF |
| Switching time | Rise time | t_r | See Figure 1 circuit diagram. | — | 70 | — | ns |
| | Storage time | t_{stg} | $V_{CC} \approx -12\text{ V}, R_L = 7.5\ \Omega$ | — | 150 | — | |
| | Fall time | t_f | $I_{B1} = 53\text{ mA}, I_{B2} = 53\text{ mA}$ | — | 40 | — | |

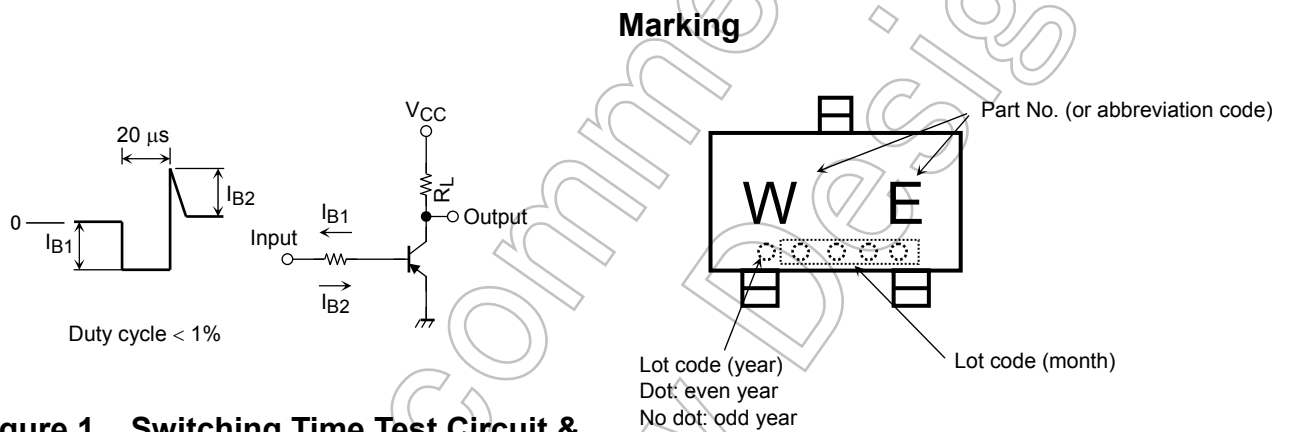
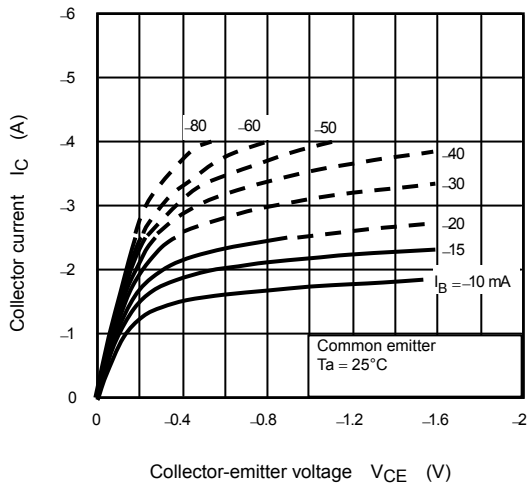


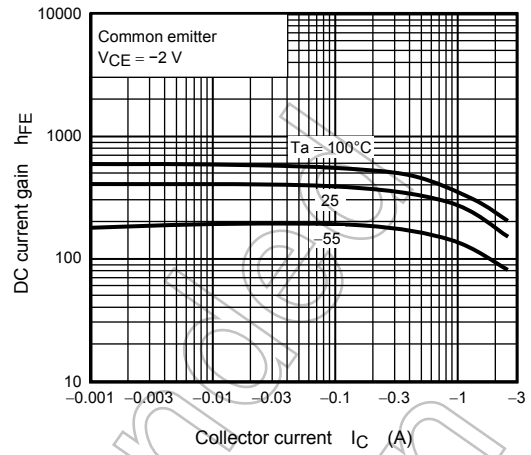
Figure 1 Switching Time Test Circuit & Timing Chart

Not Recommended for New

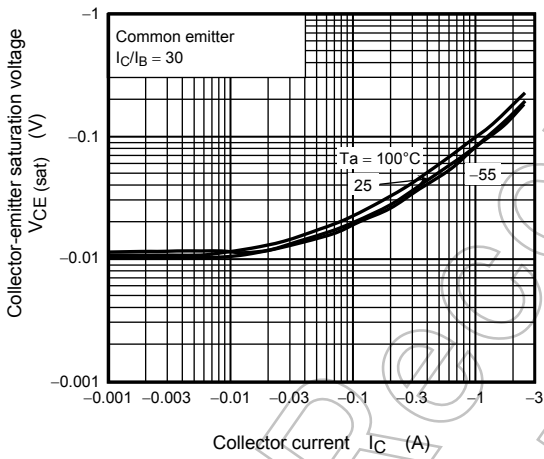
$I_C - V_{CE}$



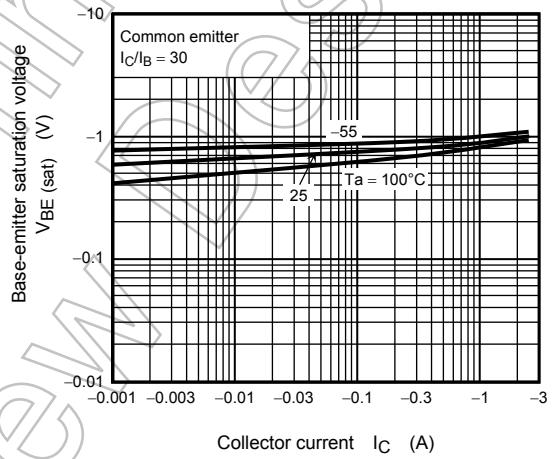
$h_{FE} - I_C$



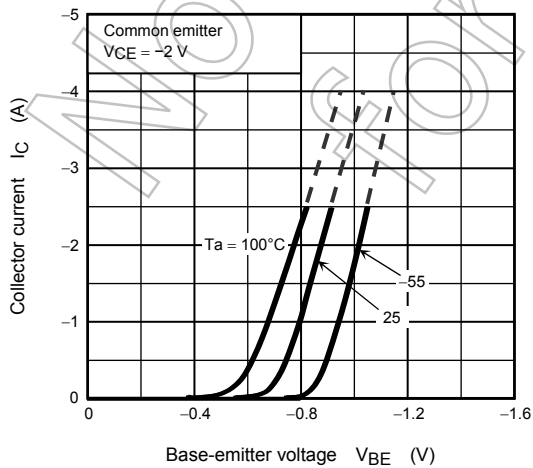
$V_{CE(sat)} - I_C$

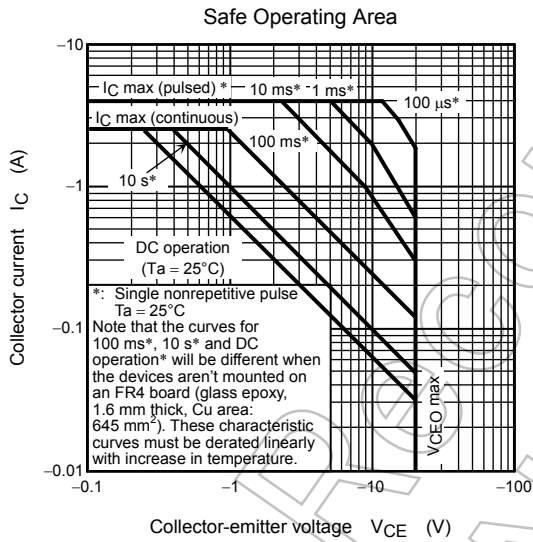
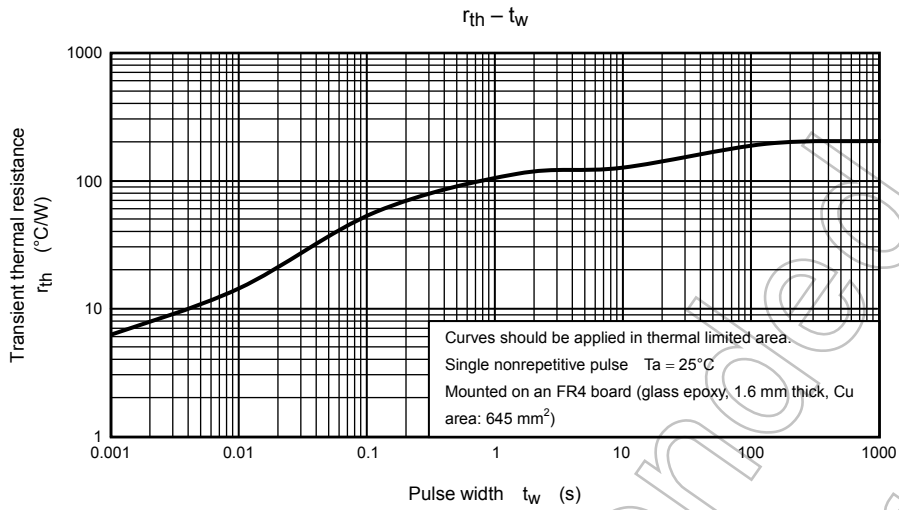


$V_{BE(sat)} - I_C$



$I_C - V_{BE}$





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