

TOSHIBA Transistor Silicon PNP Epitaxial Type

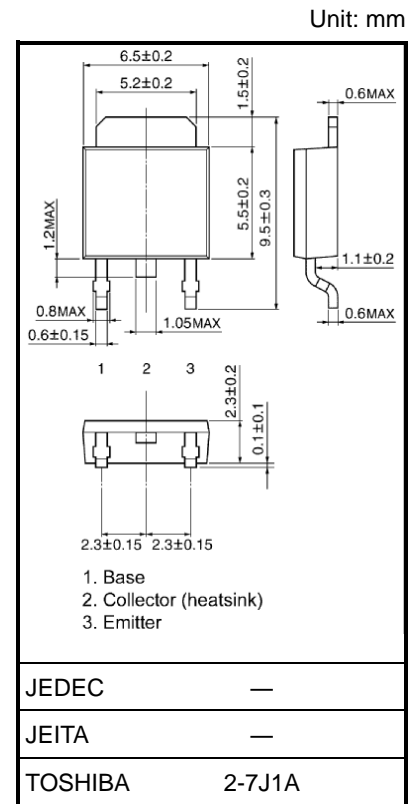
2SA2097

High-Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 200$ to 500 ($I_C = -0.5$ A)
- Low collector-emitter saturation: $V_{CE(sat)} = -0.27$ V (max)
- High-speed switching: $t_f = 55$ 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_{CEO} | -50 | V |
| Emitter-base voltage | | V_{EBO} | -7 | V |
| Collector current | DC | I_C | -5 | A |
| | Pulse | I_{CP} | -10 | |
| Base current | | I_B | -0.5 | A |
| Collector power dissipation | $T_a = 25^\circ\text{C}$ | P_C | 1 | W |
| | $T_c = 25^\circ\text{C}$ | | 20 | |
| Junction temperature | | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -55 to 150 | $^\circ\text{C}$ |



Weight: 0.36 g (typ.)

Note: 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).

Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------|---------------|---|-----|------|-------|------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = -50\text{ V}, I_E = 0$ | — | — | -100 | nA |
| Emitter cut-off current | | I_{EBO} | $V_{EB} = -7\text{ V}, I_C = 0$ | — | — | -100 | nA |
| Collector-emitter breakdown voltage | | $V_{(BR)CEO}$ | $I_C = -10\text{ mA}, I_B = 0$ | -50 | — | — | 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 | | $V_{CE(sat)}$ | $I_C = -1.6\text{ A}, I_B = -53\text{ mA}$ | — | — | -0.27 | V |
| Base-emitter saturation voltage | | $V_{BE(sat)}$ | $I_C = -1.6\text{ A}, I_B = -53\text{ mA}$ | — | — | -1.10 | V |
| Switching time | Rise time | t_r | See Figure 1. $V_{CC} \approx -24\text{ V}, R_L = 15\ \Omega, I_{B1} = -I_{B2} = -53\text{ mA}$ | — | 63 | — | ns |
| | Storage time | t_{stg} | | — | 280 | — | |
| | Fall time | t_f | | — | 55 | — | |

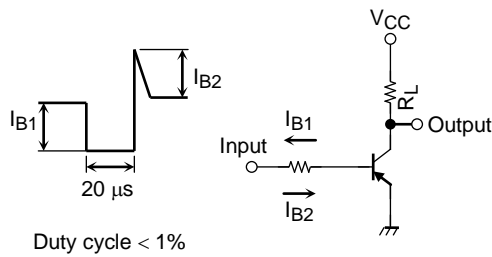
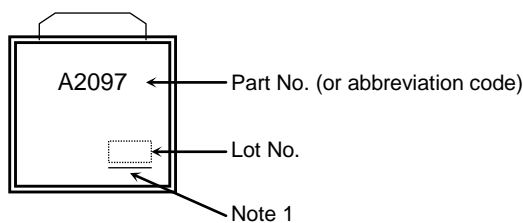


Figure 1 Switching Time Test Circuit & Timing Chart

Marking



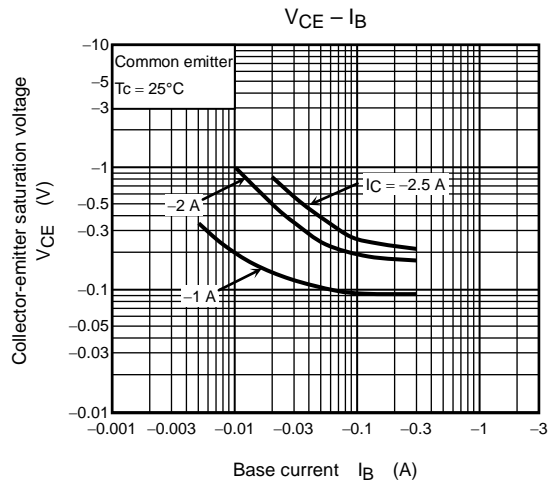
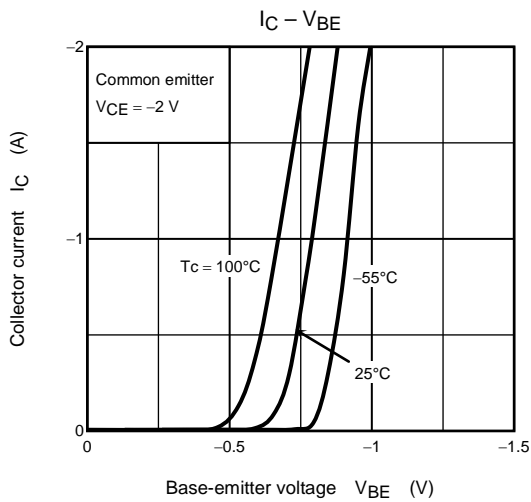
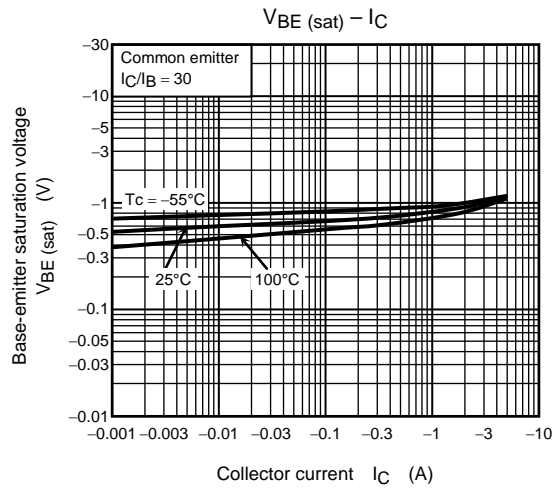
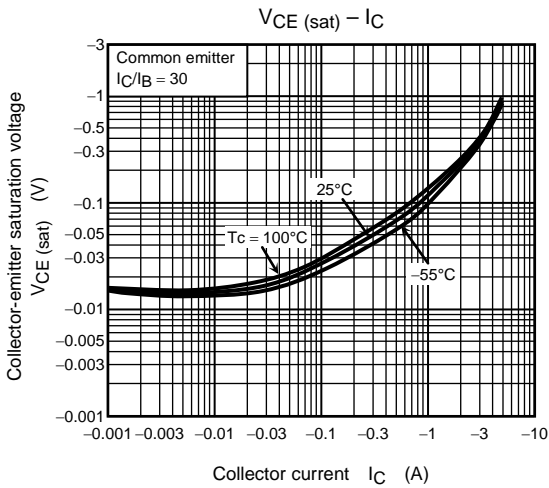
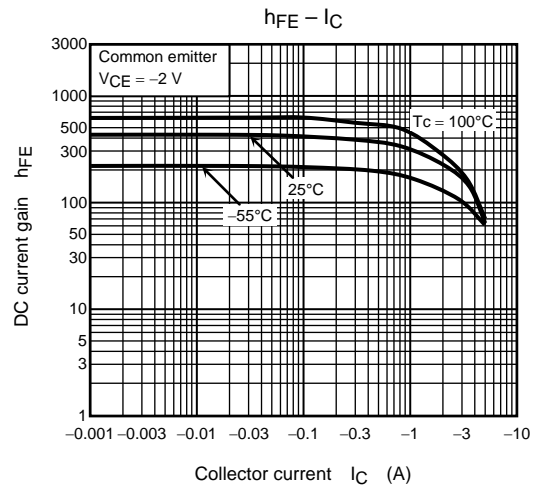
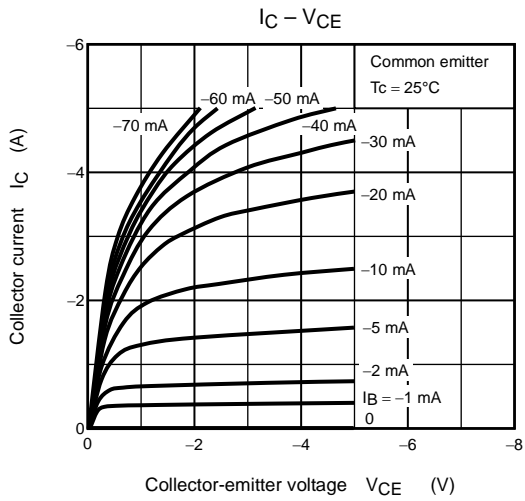
Note 1: A line under a Lot No. identifies the indication of product Labels.

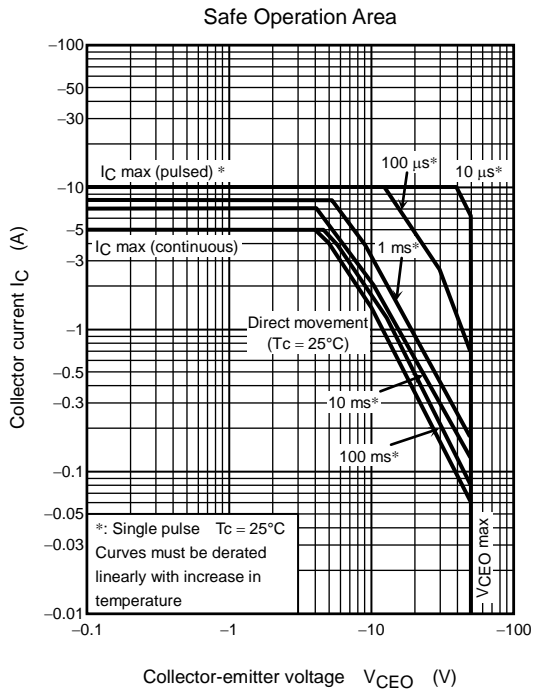
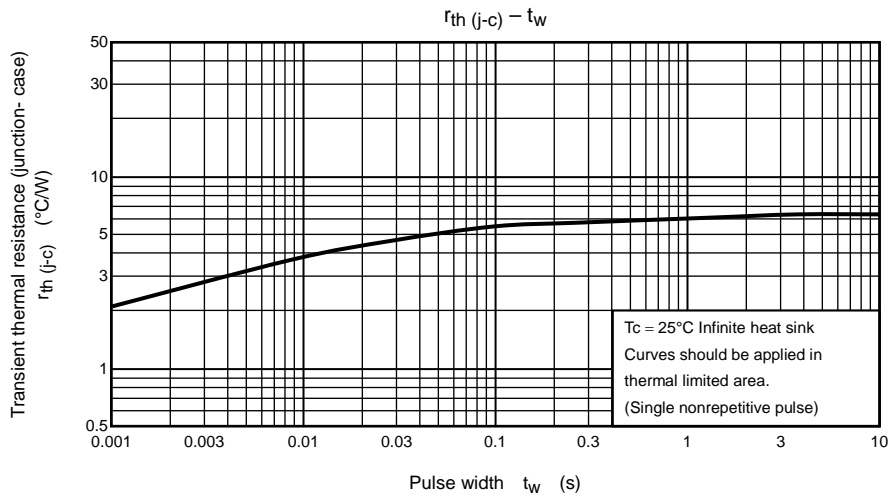
Not underlined : [[Pb]]/INCLUDES > MCV

Underlined : [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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