

TOSHIBA Transistor Silicon NPN Epitaxial Type

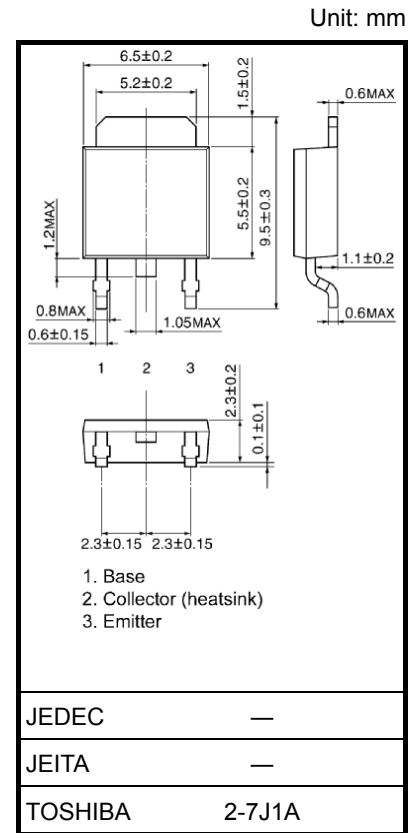
2SC6000

High Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 250$ to 400 ($I_C = 2.5$ A)
- Low collector-emitter saturation: $V_{CE(sat)} = 0.18$ V (max)
- High speed switching: $t_f = 13$ ns (typ)

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

| Characteristics | | Symbol | Rating | Unit |
|-----------------------------|--------------------------|-----------|------------|------------------|
| Collector-base voltage | | V_{CBO} | 120 | V |
| Collector-emitter voltage | | V_{CEX} | 120 | V |
| Collector-emitter voltage | | V_{CEO} | 50 | V |
| Emitter-base voltage | | V_{EBO} | 6 | V |
| Collector current | DC | I_C | 7.0 | A |
| | Pulse | I_{CP} | 10.0 | |
| Base current | | I_B | 0.5 | A |
| Collector power dissipation | $T_c = 25^\circ\text{C}$ | P_C | 20 | W |
| Junction temperature | | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -55 to 150 | $^\circ\text{C}$ |



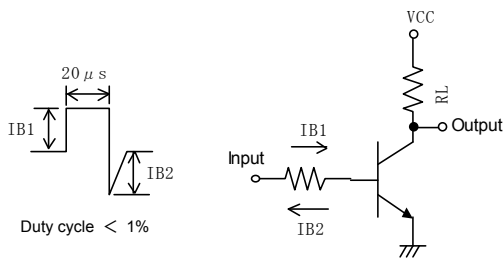
Weight: 0.36 g (typ.)

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).

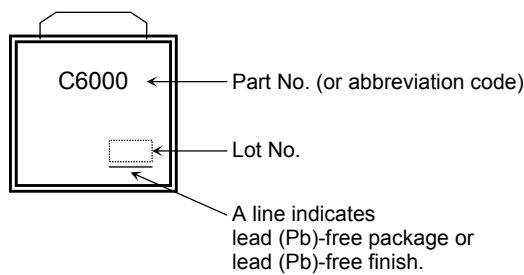
Electrical Characteristics (Ta = 25°C)

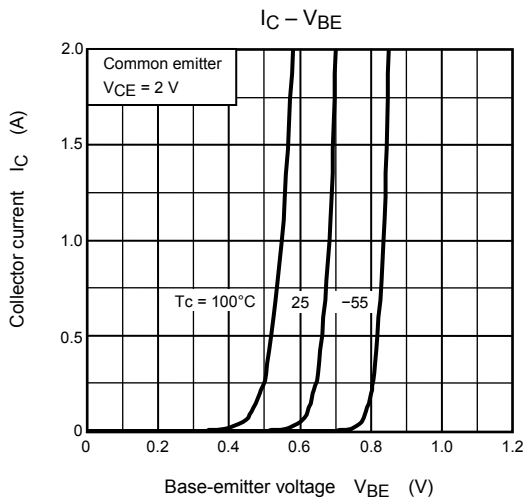
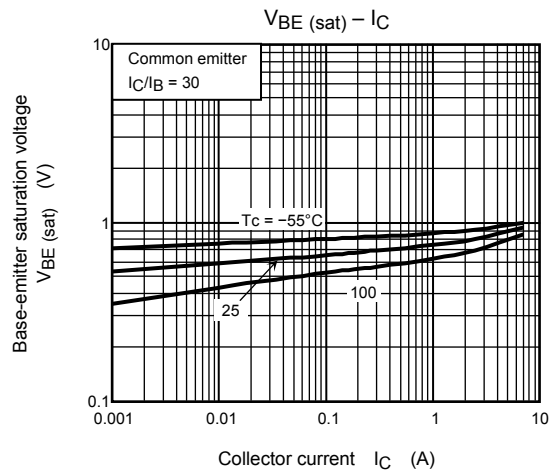
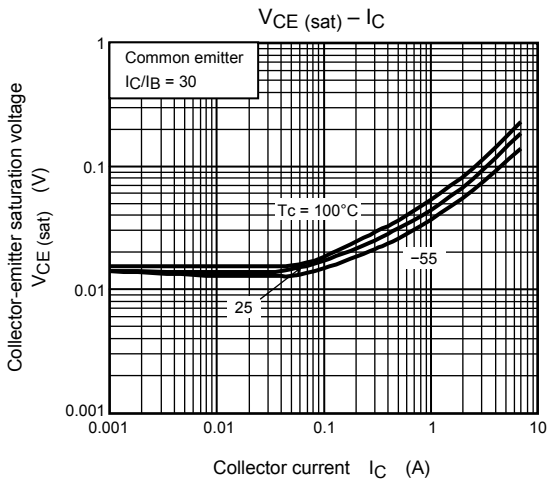
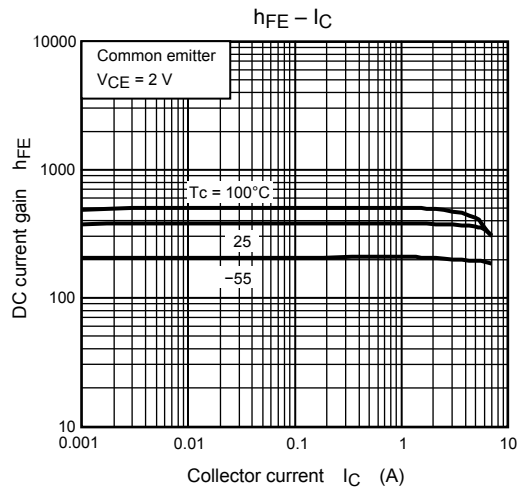
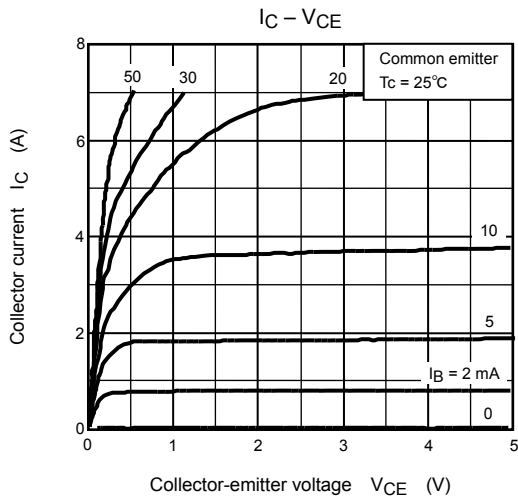
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------|----------------|---|-----|------|------|------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = 120\text{ V}, I_E = 0$ | — | — | 100 | nA |
| Emitter cut-off current | | I_{EBO} | $V_{EB} = 6\text{ V}, I_C = 0$ | — | — | 100 | nA |
| Collector-emitter breakdown voltage | | $V_{(BR) CEO}$ | $I_C = 10\text{ mA}, I_B = 0$ | 50 | — | — | V |
| DC current gain | | $h_{FE} (1)$ | $V_{CE} = 2\text{ V}, I_C = 1\text{ mA}$ | 160 | — | — | |
| | | $h_{FE} (2)$ | $V_{CE} = 2\text{ V}, I_C = 2.5\text{ A}$ | 250 | — | 400 | |
| Collector emitter saturation voltage | | $V_{CE (sat)}$ | $I_C = 2.5\text{ A}, I_B = 83\text{ mA}$ | — | — | 0.18 | V |
| Base-emitter saturation voltage | | $V_{BE (sat)}$ | $I_C = 2.5\text{ A}, I_B = 83\text{ mA}$ | — | — | 1.10 | V |
| Switching time | Rise time | t_r | See Figure 1 circuit diagram $V_{CC} \approx 20\text{ V}, R_L = 8.0\ \Omega$ $I_{B1} = 83\text{ mA}, I_{B2} = -166\text{ mA}$ | — | 45 | — | ns |
| | Storage time | t_{stg} | | — | 450 | — | |
| | Fall time | t_f | | — | 13 | — | |

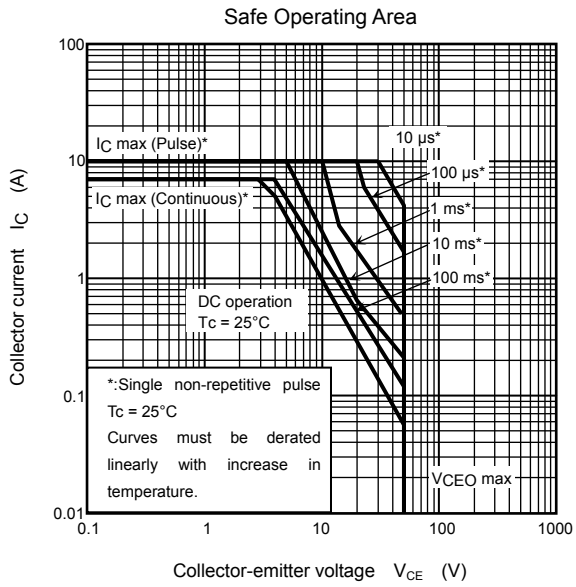
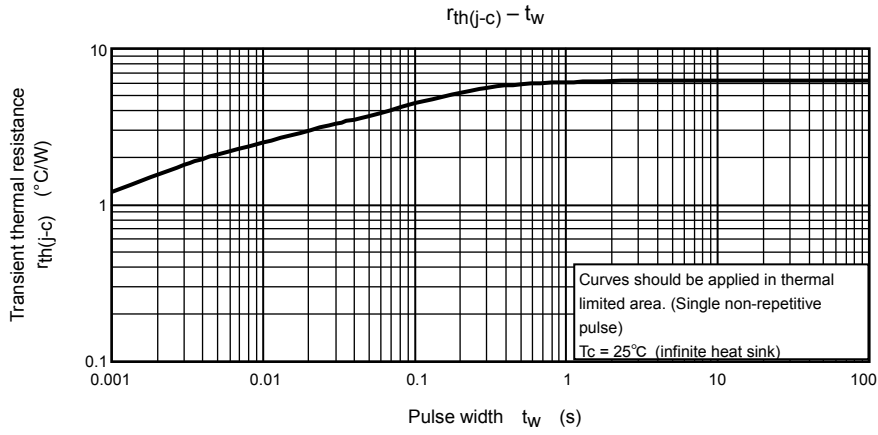
Figure 1 Switching Time Test Circuit & Timing Chart



Marking







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