

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# 2SA1020

Power Amplifier Applications

Power Switching Applications

- Low Collector saturation voltage:  $V_{CE(sat)} = -0.5 \text{ V (max)}$  ( $I_C = -1 \text{ A}$ )
- High-speed switching:  $t_{stg} = 1.0 \mu\text{s}$  (typ.)
- Complementary to 2SC2655

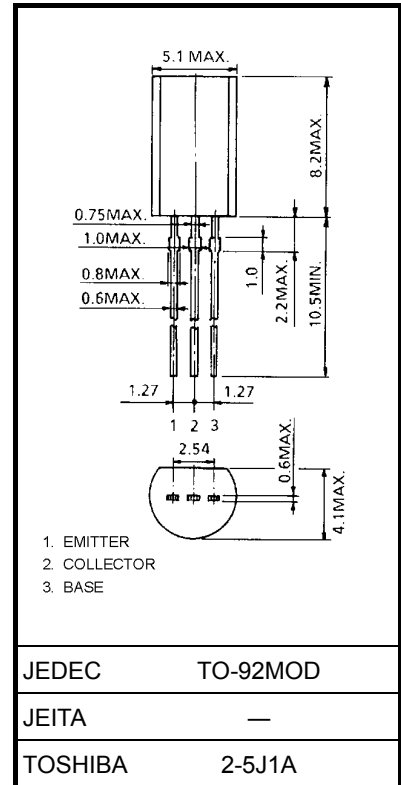
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Characteristics             | Symbol    | Rating     | Unit             |
|-----------------------------|-----------|------------|------------------|
| Collector-base voltage      | $V_{CBO}$ | -50        | V                |
| Collector-emitter voltage   | $V_{CEO}$ | -50        | V                |
| Emitter-base voltage        | $V_{EBO}$ | -5         | V                |
| Collector current           | $I_C$     | -2         | A                |
| Collector power dissipation | $P_C$     | 900        | mW               |
| Junction temperature        | $T_j$     | 150        | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

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.

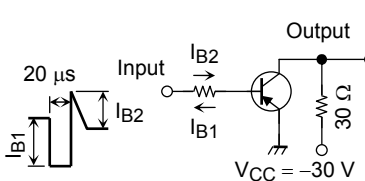
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm



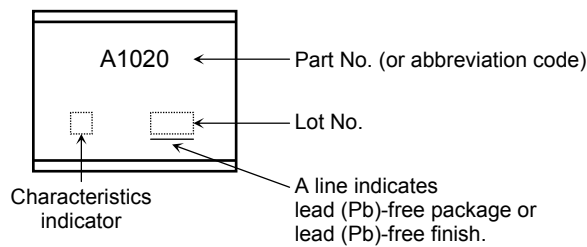
Weight: 0.36 g (typ.)

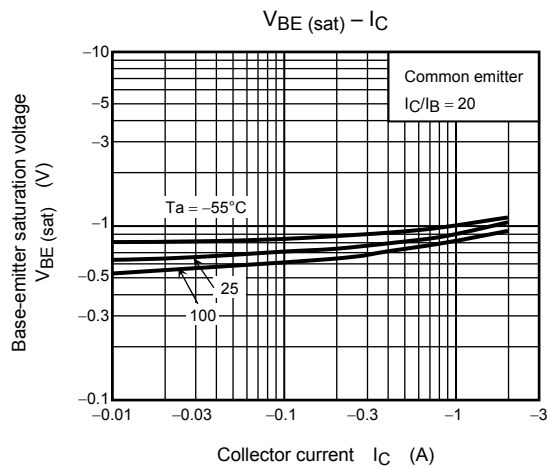
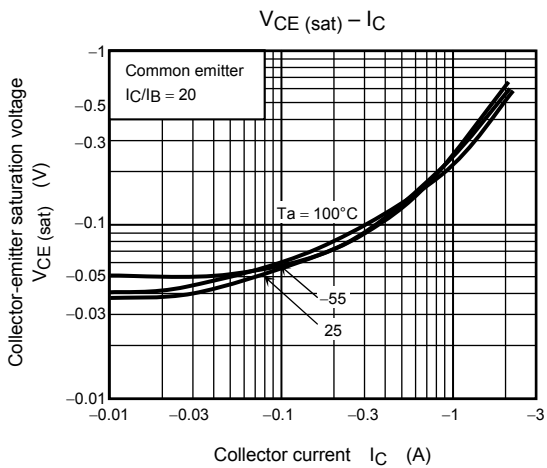
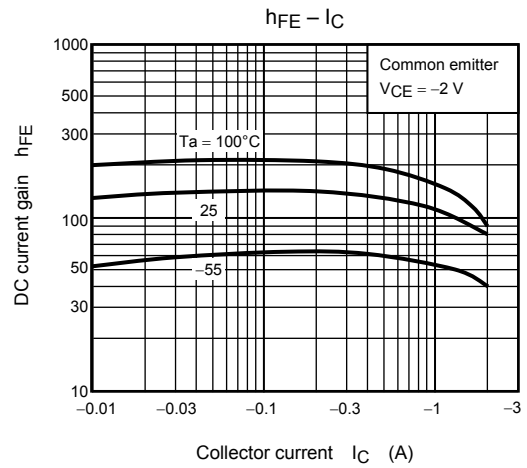
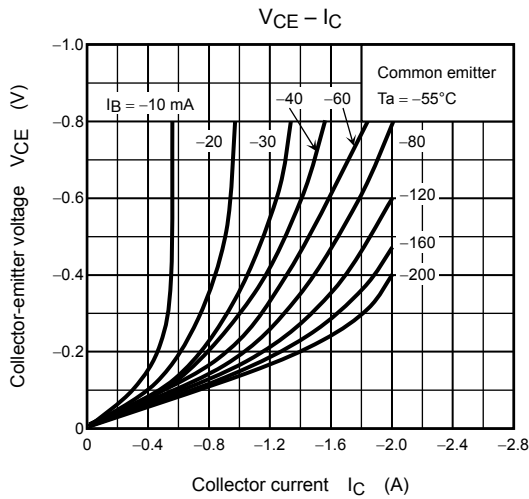
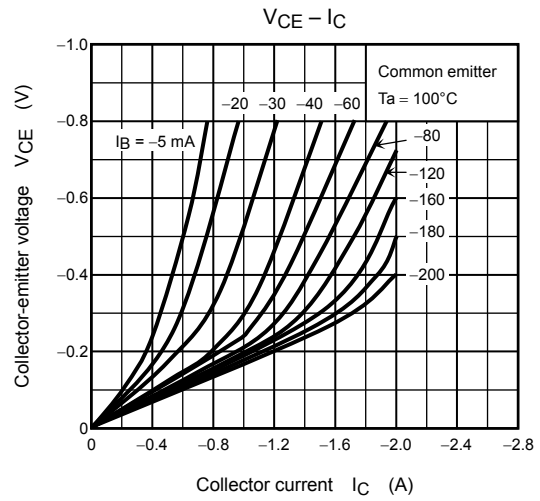
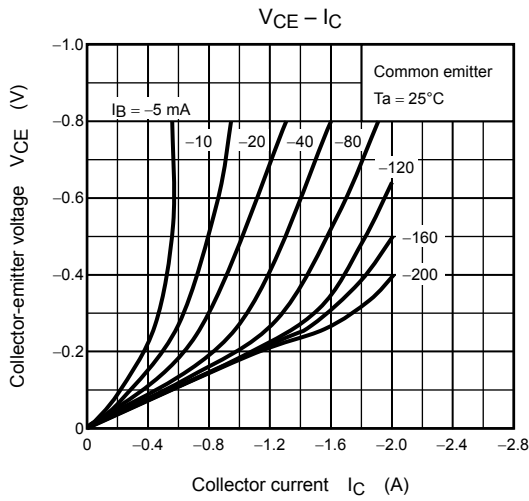
## Electrical Characteristics (Ta = 25°C)

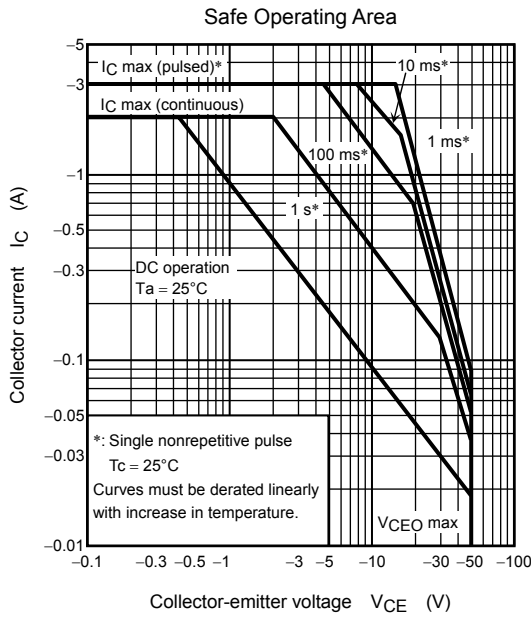
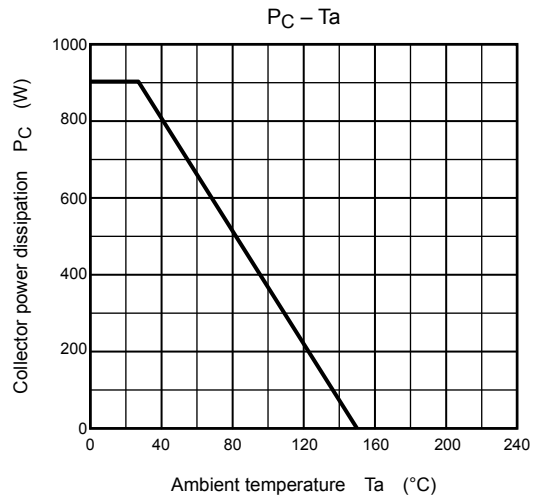
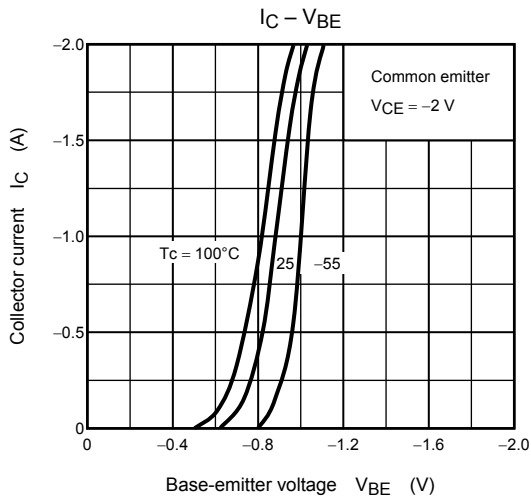
| Characteristics                      |              | Symbol        | Test Condition   | Min   | Typ. | Max  | Unit          |
|--------------------------------------|--------------|---------------|--|---|------|------|---------------|
| Collector cut-off current            |              | $I_{CBO}$     | $V_{CB} = -50\text{ V}, I_E = 0$   | —   | —    | -1.0 | $\mu\text{A}$ |
| Emitter cut-off current              |              | $I_{EBO}$     | $V_{EB} = -5\text{ V}, I_C = 0$  | —   | —    | -1.0 | $\mu\text{A}$ |
| Collector-emitter breakdown voltage  |              | $V_{(BR)CEO}$ | $I_C = -10\text{ mA}, I_B = 0$   | -50   | —    | —    | V             |
| DC current gain                      |              | $h_{FE(1)}$   | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$  | 70  | —    | 240  |               |
|                                      |              | $h_{FE(2)}$   | $V_{CE} = -2\text{ V}, I_C = -1.5\text{ A}$  | 40  | —    | —    |               |
| Collector-emitter saturation voltage |              | $V_{CE(sat)}$ | $I_C = -1\text{ A}, I_B = -0.05\text{ A}$  | —   | —    | -0.5 | V             |
| Base-emitter saturation voltage      |              | $V_{BE(sat)}$ | $I_C = -1\text{ A}, I_B = -0.05\text{ A}$  | —   | —    | -1.2 | V             |
| Transition frequency                 |              | $f_T$         | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$  | —   | 100  | —    | MHz           |
| Collector output capacitance         |              | $C_{ob}$      | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$                                 | —   | 40   | —    | pF            |
| Switching time                       | Turn-on time | $t_{on}$      |  | —   | 0.1  | —    | $\mu\text{s}$ |
|                                      | Storage time | $t_{stg}$     |  | —   | 1.0  | —    |               |
|                                      | Fall time    | $t_f$         |  | $-I_{B1} = I_{B2} = 0.05\text{ A}$<br>DUTY CYCLE $\leq 1\%$ | —    | 0.1  |               |

Note:  $h_{FE(1)}$  classification O: 70 to 140, Y: 120 to 240

## Marking







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