

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# 2SA1020

Power Amplifier Applications

Power Switching Applications

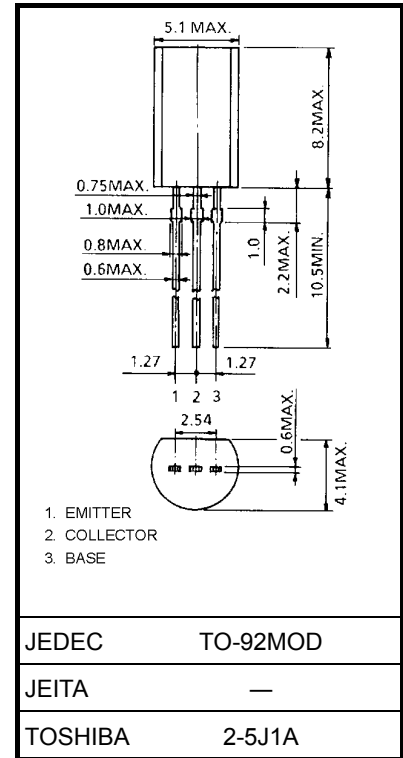
- Low Collector saturation voltage:  $V_{CE(sat)} = -0.5 \text{ V (max)}$  ( $I_C = -1 \text{ A}$ )
- High collector power dissipation:  $P_C = 900 \text{ mW}$
- High-speed switching:  $t_{stg} = 1.0 \mu\text{s (typ.)}$
- Complementary to 2SC2655

### 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                |
| Base current                | $I_B$     | -0.2       | A                |
| Collector power dissipation | $P_C$     | 900        | mW               |
| Junction temperature        | $T_j$     | 150        | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

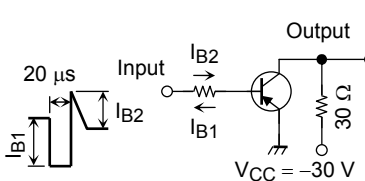
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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



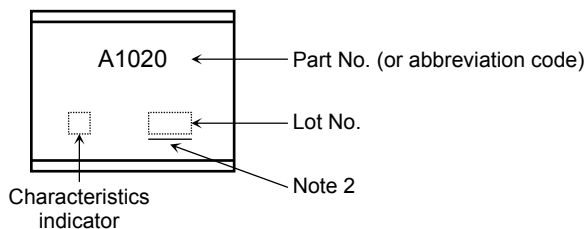
Weight: 0.36 g (typ.)

## Electrical Characteristics (T<sub>a</sub> = 25°C)

| Characteristics                      |              | Symbol                | Test Condition   | Min   | Typ. | Max  | Unit |
|--------------------------------------|--------------|-----------------------|--|---|------|------|------|
| Collector cut-off current            |              | I <sub>CBO</sub>      | V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0  | —   | —    | -1   | μA   |
| Emitter cut-off current              |              | I <sub>EBO</sub>      | V <sub>EB</sub> = -5 V, I <sub>C</sub> = 0   | —   | —    | -1   | μA   |
| Collector-emitter breakdown voltage  |              | V <sub>(BR) CEO</sub> | I <sub>C</sub> = -10 mA, I <sub>B</sub> = 0  | -50   | —    | —    | V    |
| DC current gain                      |              | h <sub>FE</sub> (1)   | V <sub>CE</sub> = -2 V, I <sub>C</sub> = -0.5 A                                    | 70  | —    | 240  |      |
|                                      |              | h <sub>FE</sub> (2)   | V <sub>CE</sub> = -2 V, I <sub>C</sub> = -1.5 A                                    | 40  | —    | —    |      |
| Collector-emitter saturation voltage |              | V <sub>CE (sat)</sub> | I <sub>C</sub> = -1 A, I <sub>B</sub> = -0.05 A                                    | —   | —    | -0.5 | V    |
| Base-emitter saturation voltage      |              | V <sub>BE (sat)</sub> | I <sub>C</sub> = -1 A, I <sub>B</sub> = -0.05 A                                    | —   | —    | -1.2 | V    |
| Transition frequency                 |              | f <sub>T</sub>        | V <sub>CE</sub> = -2 V, I <sub>C</sub> = -0.5 A                                    | —   | 100  | —    | MHz  |
| Collector output capacitance         |              | C <sub>ob</sub>       | V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1 MHz                             | —   | 40   | —    | pF   |
| Switching time                       | Turn-on time | t <sub>on</sub>       |  | —   | 0.1  | —    | μs   |
|                                      | Storage time | t <sub>stg</sub>      |  | —   | 1    | —    |      |
|                                      | Fall time    | t <sub>f</sub>        |  | I <sub>B1</sub> = 0.05 A, I <sub>B2</sub> = 0.05 A<br>DUTY CYCLE ≤ 1% | —    | 0.1  |      |

Note: h<sub>FE</sub> (1) classification O: 70 to 140, Y: 120 to 240

## Marking

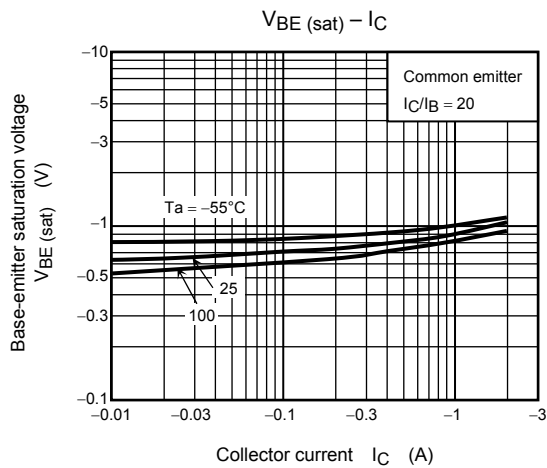
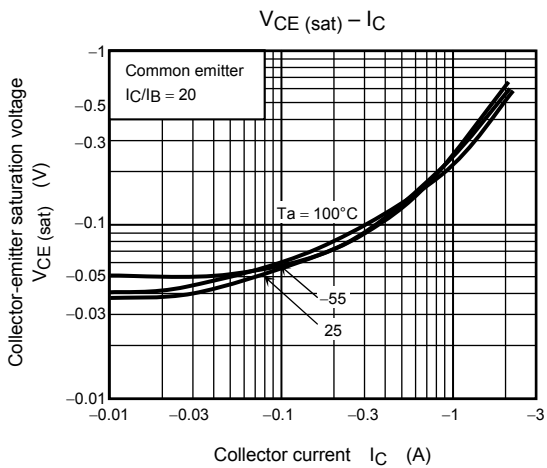
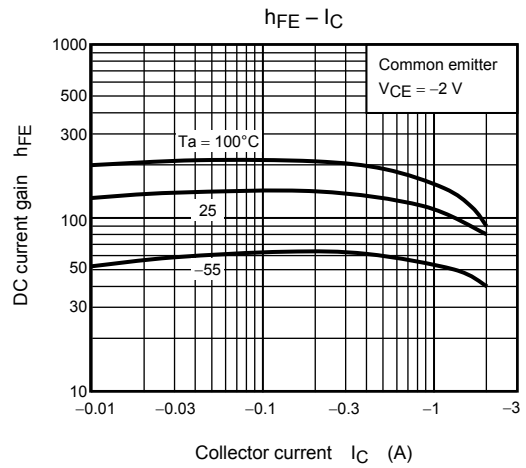
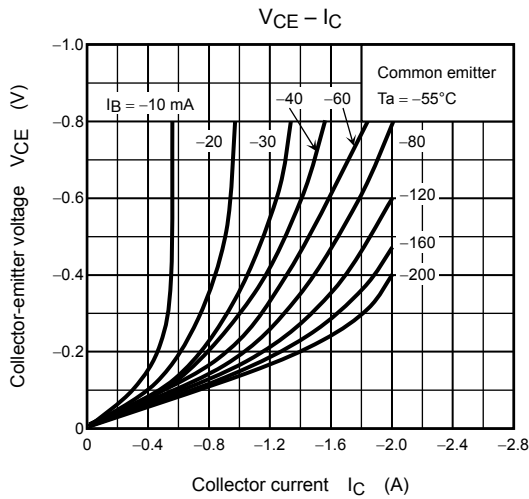
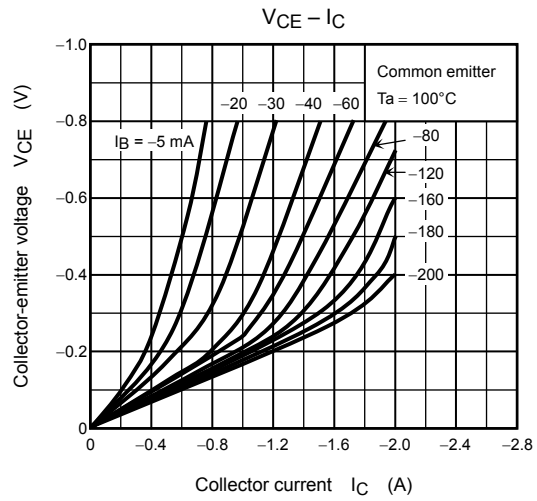
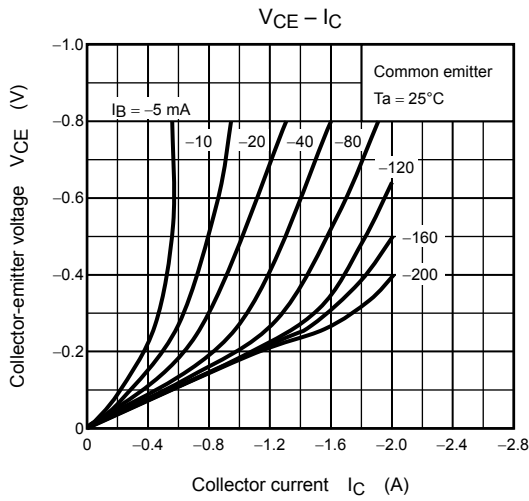


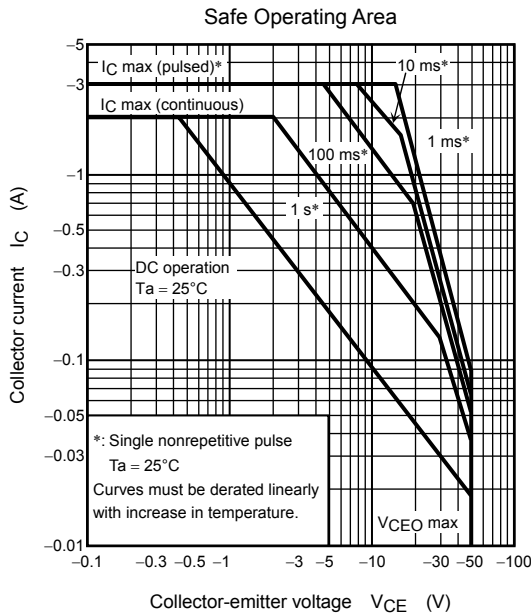
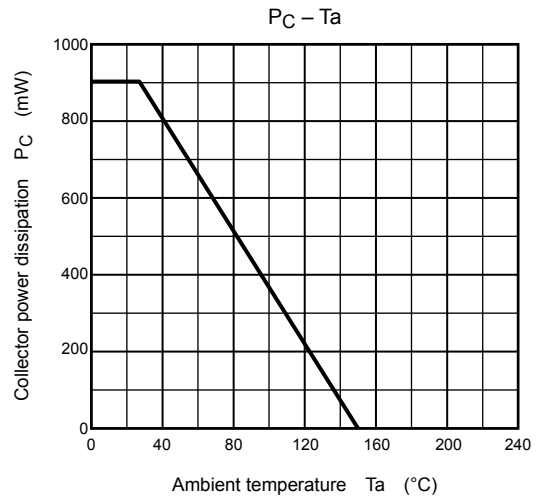
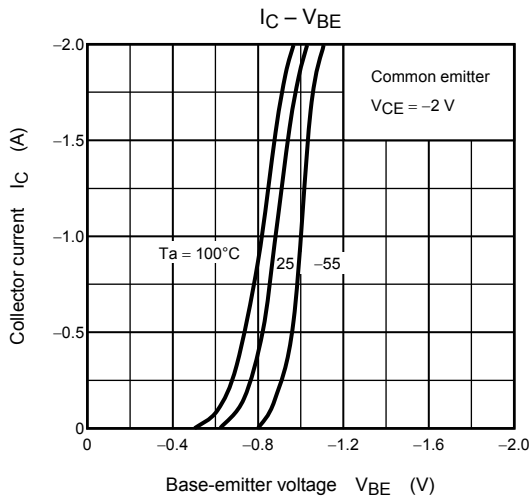
Note 2: A line under a Lot No. identifies the indication of product Labels.

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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