

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

2SA1213

Power Amplifier Applications
Power Switching Applications

- Low saturation voltage: $V_{CE(sat)} = -0.5 \text{ V (max)}$ ($I_C = -1 \text{ A}$)
- High speed switching time: $t_{stg} = 1.0 \mu\text{s (typ.)}$
- Small flat package
- $P_C = 1.0 \text{ to } 2.0 \text{ W}$ (mounted on a ceramic substrate)
- Complementary to 2SC2873

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

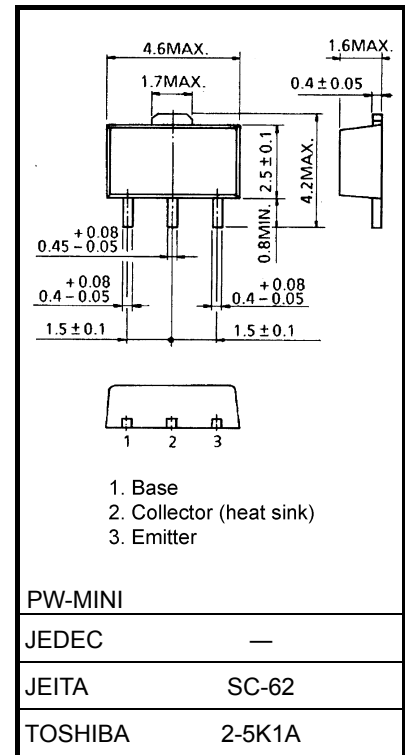
| Characteristics | Symbol | Rating | Unit |
|-----------------------------|-------------------|------------|------------------|
| Collector-base voltage | V_{CBO} | -50 | V |
| Collector-emitter voltage | V_{CEO} | -50 | V |
| Emitter-base voltage | V_{EBO} | -5 | V |
| Collector current | I_C | -2 | A |
| Base current | I_B | -0.4 | A |
| Collector power dissipation | P_C | 500 | mW |
| | P_C (Note 1) | 1000 | |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -55 to 150 | $^\circ\text{C}$ |

Note 1: Mounted on a ceramic substrate ($250 \text{ mm}^2 \times 0.8 \text{ t}$)

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).

Unit: mm



Weight: 0.05 g (typ.)

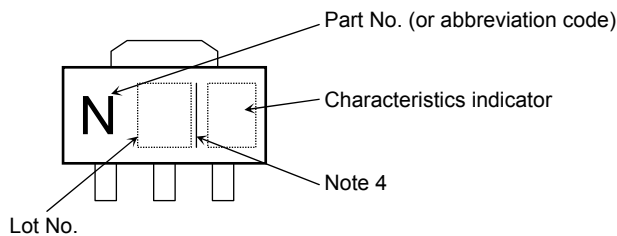
Start of commercial production
1980-07

Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|-------------------------|---------------|---|-----|------|------|---------------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = -50\text{ V}, I_E = 0$ | — | — | -0.1 | μA |
| Emitter cut-off current | | I_{EBO} | $V_{EB} = -5\text{ V}, I_C = 0$ | — | — | -0.1 | μA |
| Collector-emitter breakdown voltage | | $V_{(BR)CEO}$ | $I_C = -10\text{ mA}, I_B = 0$ | -50 | — | — | V |
| DC current gain | $h_{FE(1)}$ (Note 3) | | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$ | 70 | — | 240 | |
| | $h_{FE(2)}$ | | | | | | |
| 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 | $V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$ | — | 120 | — | 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} | <p>$I_{B1} = 0.05\text{ A}, I_{B2} = 0.05\text{ A}$ DUTY CYCLE $\leq 1\%$</p> | — | 0.1 | — | μs |
| | Storage time | t_{stg} | | — | 1.0 | — | |
| | Fall time | t_f | | — | 0.1 | — | |

Note 3: $h_{FE(1)}$ classification O: 70 to 140, Y: 120 to 240

Marking

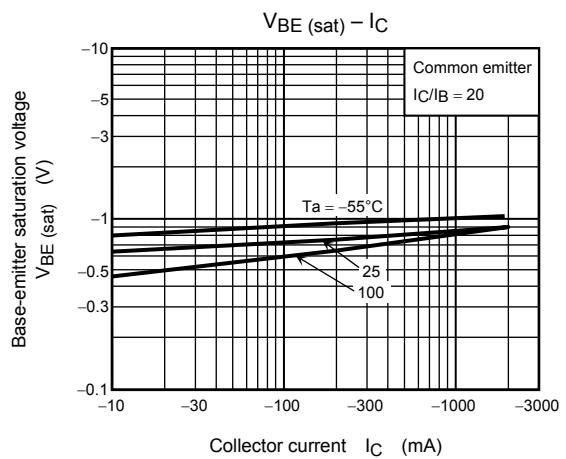
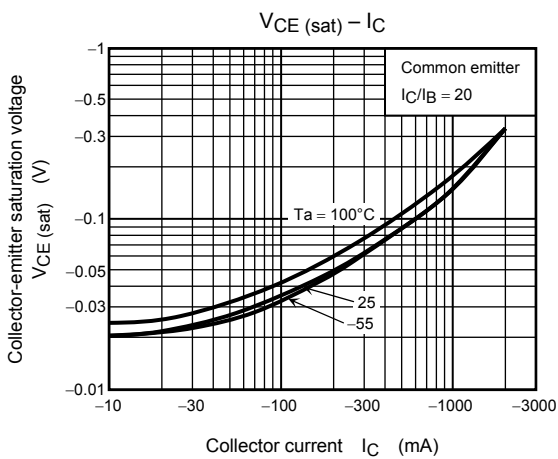
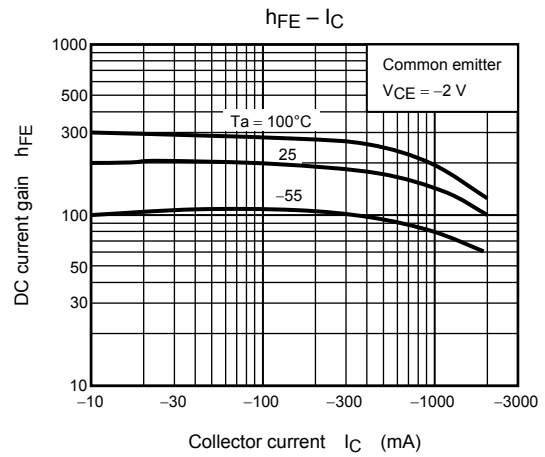
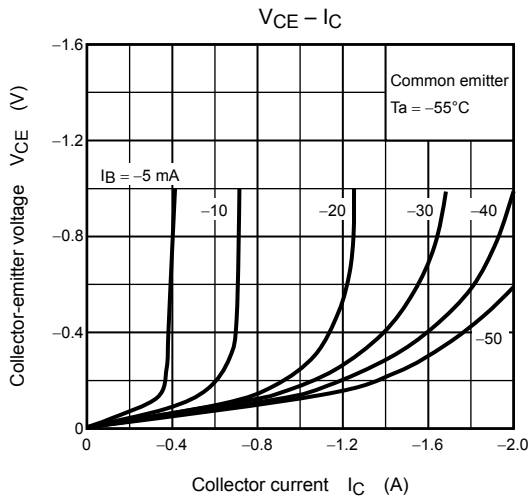
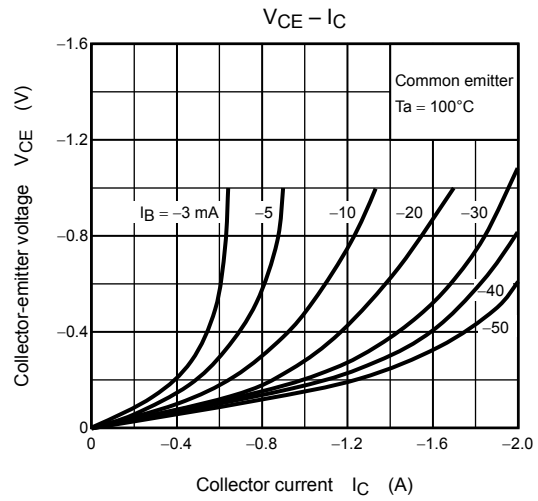
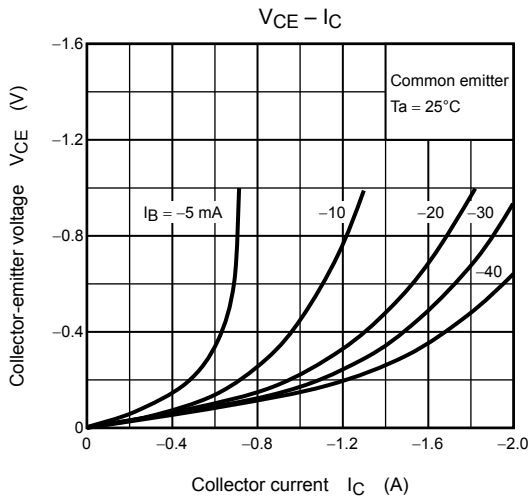


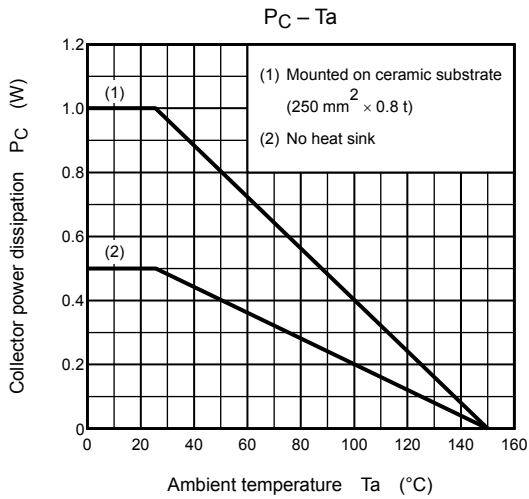
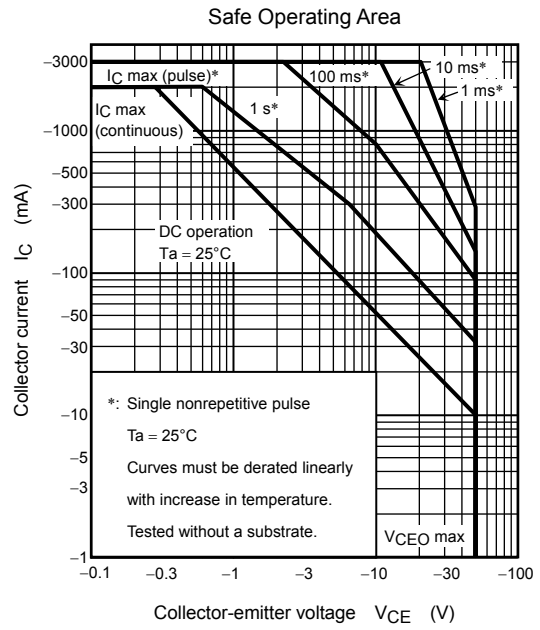
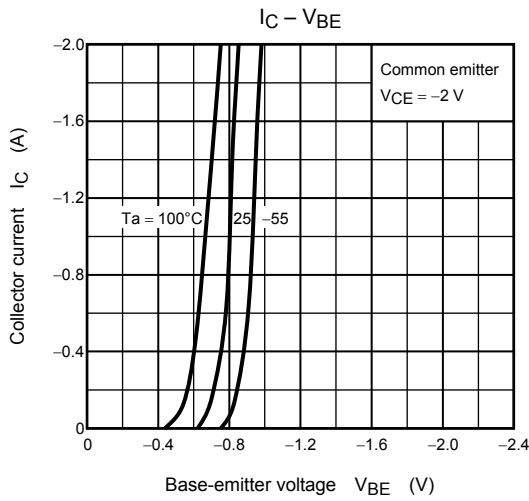
Note 4: A line beside a Lot No. identifies the indication of product Labels.

Without a line: $[[\text{Pb}]]/\text{INCLUDES} > \text{MCV}$

With a line: $[[\text{G}]]/\text{RoHS COMPATIBLE}$ or $[[\text{G}]]/\text{RoHS} [[\text{Pb}]]$

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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