

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Darlington)

2SD1223

Switching Applications

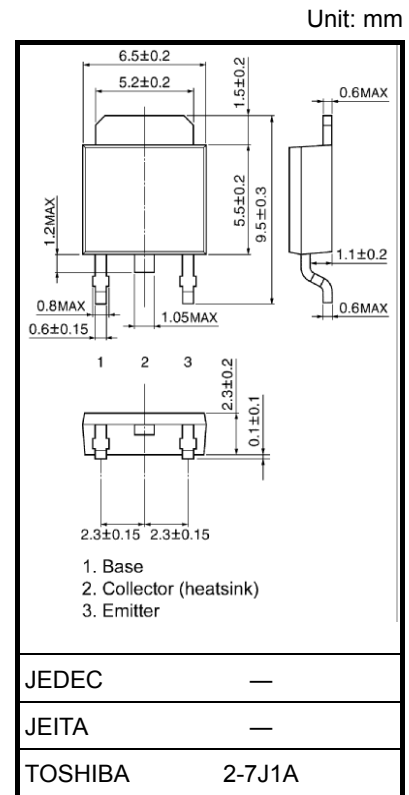
Hammer Drive, Pulse Motor Drive Applications

Power Amplifier Applications

- High DC current gain: $h_{FE} = 2000$ (min) ($V_{CE} = 2$ V, $I_C = 1$ A)
- Low saturation voltage: $V_{CE(sat)} = 1.5$ V (max) ($I_C = 3$ A)
- Complementary to 2SB908.

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

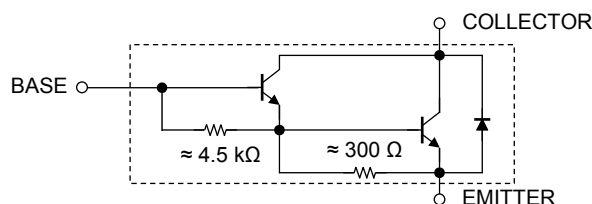
| Characteristics | | Symbol | Rating | Unit |
|-----------------------------|--------------------------|-----------|------------|------------------|
| Collector-base voltage | | V_{CBO} | 100 | V |
| Collector-emitter voltage | | V_{CEO} | 80 | V |
| Emitter-base voltage | | V_{EBO} | 5 | V |
| Collector current | | I_C | 4 | A |
| Base current | | I_B | 0.4 | A |
| Collector power dissipation | $T_a = 25^\circ\text{C}$ | P_C | 1.0 | W |
| | $T_c = 25^\circ\text{C}$ | | 15 | |
| 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).

Equivalent Circuit

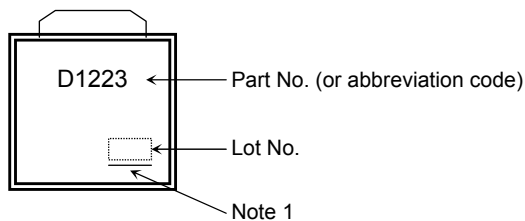


Start of commercial production
1981-09

Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|--------------|----------------|-----------------------------------------|------|------|-----|---------------|
| Collector cut-off current | | I_{CBO} | $V_{CB} = 100\text{ V}, I_E = 0$ | — | — | 20 | μA |
| Emitter cut-off current | | I_{EBO} | $V_{EB} = 5\text{ V}, I_C = 0$ | — | — | 2.5 | mA |
| Collector-emitter breakdown voltage | | $V_{(BR) CEO}$ | $I_C = 10\text{ mA}, I_B = 0$ | 80 | — | — | V |
| DC current gain | | $h_{FE} (1)$ | $V_{CE} = 2\text{ V}, I_C = 1\text{ A}$ | 2000 | — | — | |
| | | $h_{FE} (2)$ | $V_{CE} = 2\text{ V}, I_C = 3\text{ A}$ | 1000 | — | — | |
| Collector-emitter saturation voltage | | $V_{CE (sat)}$ | $I_C = 3\text{ A}, I_B = 6\text{ mA}$ | — | — | 1.5 | V |
| Base-emitter saturation voltage | | $V_{BE (sat)}$ | $I_C = 3\text{ A}, I_B = 6\text{ mA}$ | — | — | 2.0 | V |
| Switching time | Turn-on time | t_{on} | | — | 0.2 | — | μs |
| | Storage time | t_{stg} | | — | 1.5 | — | |
| | Fall time | t_f | | — | 0.6 | — | |

Marking

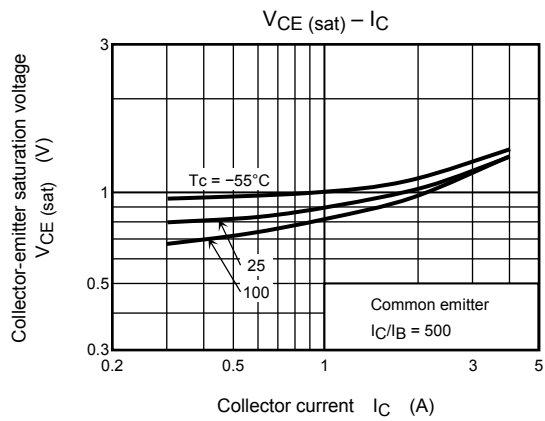
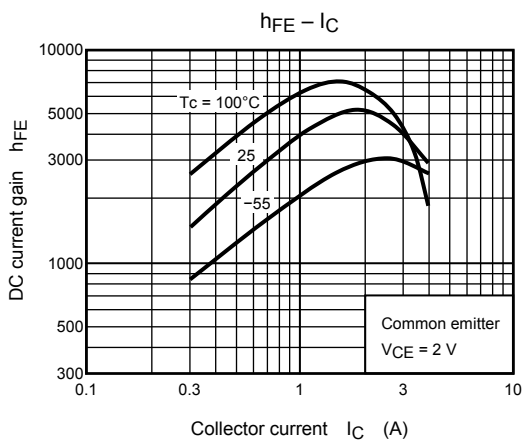
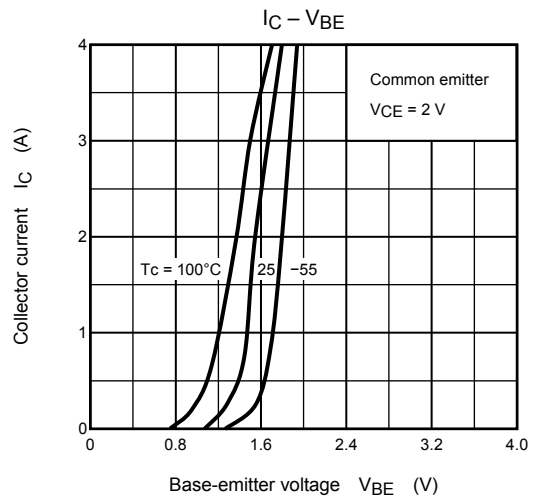
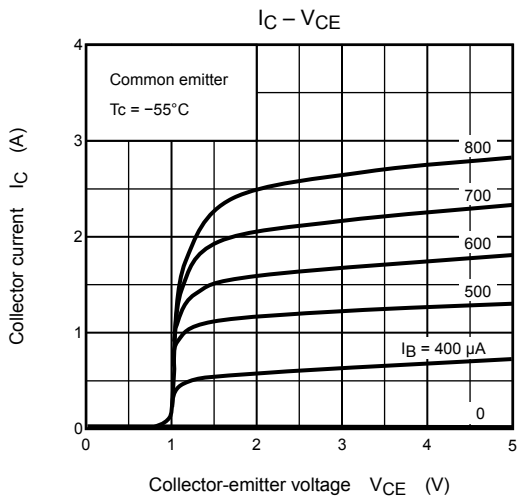
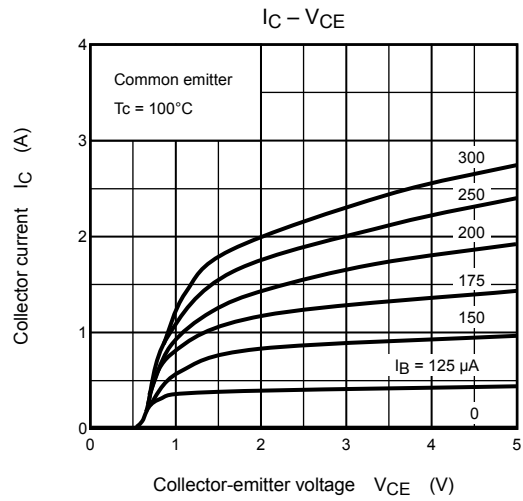
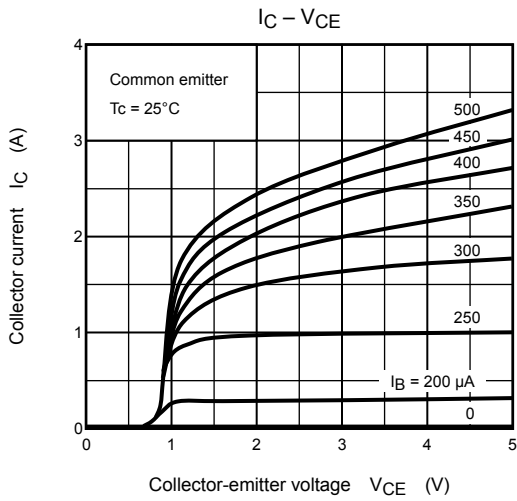


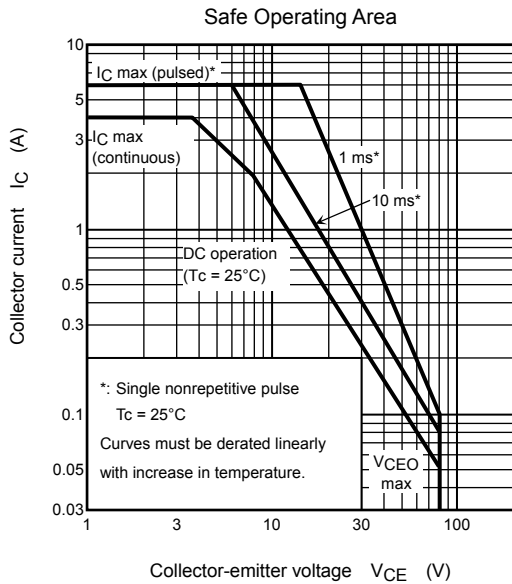
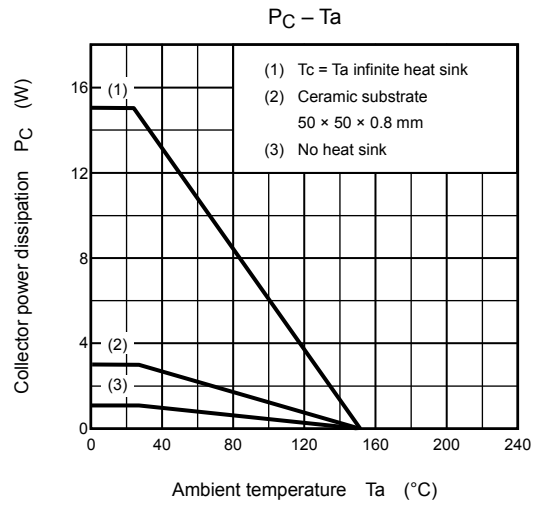
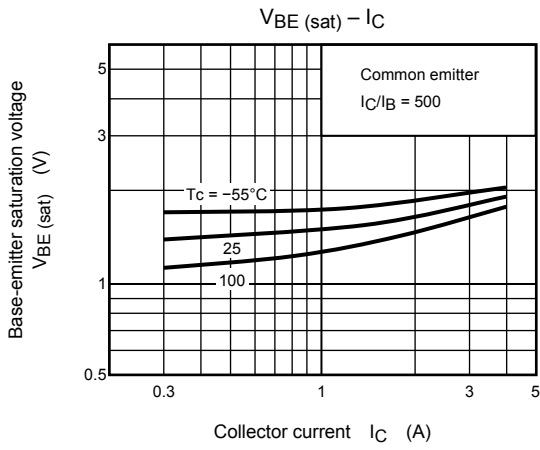
Note 1: A line under a Lot No. identifies the indication of product Labels.

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

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

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