

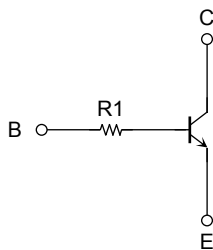
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

## RN1973

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications.

- Two devices are incorporated into an Ultra-Super-Mini (6-pin) package
- Incorporating a bias resistor into a transistor reduces the parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Diverse resistance values are available suited to a range of different circuit designs.

### Equivalent Circuit and Bias Resistor Values



R1: 47 kΩ (Q1, Q2 common)

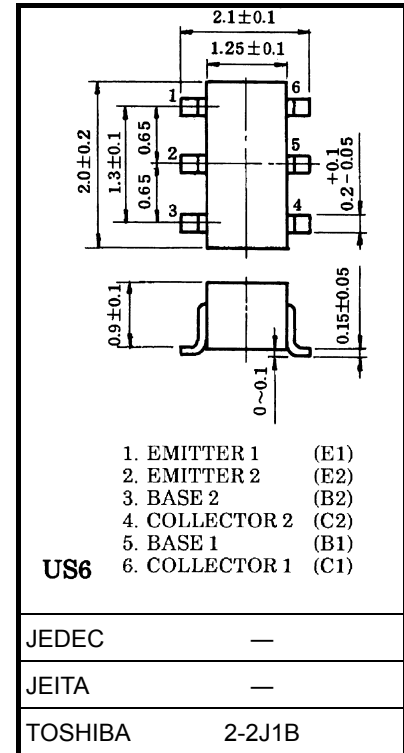
### Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

| 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           | $I_C$          | 100     | mA   |
| Collector power dissipation | $P_C$ (Note 1) | 200     | mW   |
| Junction temperature        | $T_j$          | 150     | °C   |
| Storage temperature range   | $T_{stg}$      | -55~150 | °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).

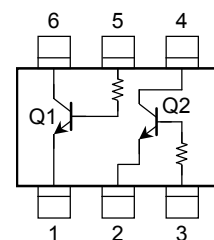
**Note 1:** Total rating

Unit: mm



Weight: 0.0068 g (typ.)

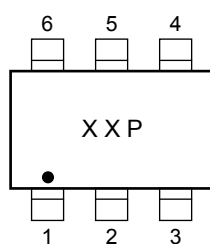
### Equivalent Circuit (top view)



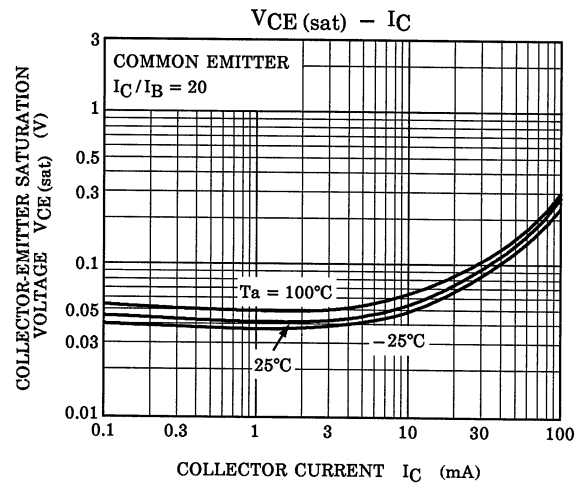
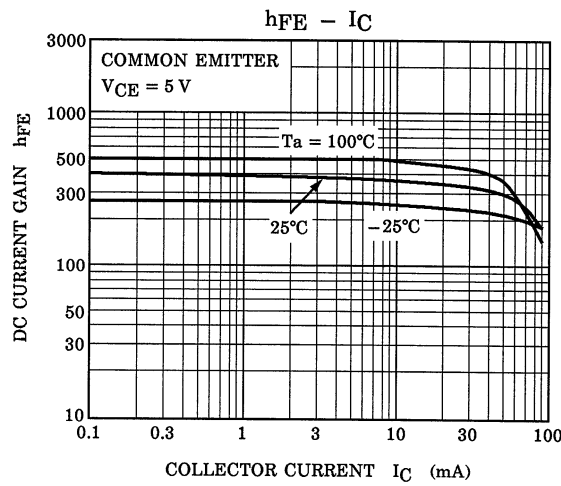
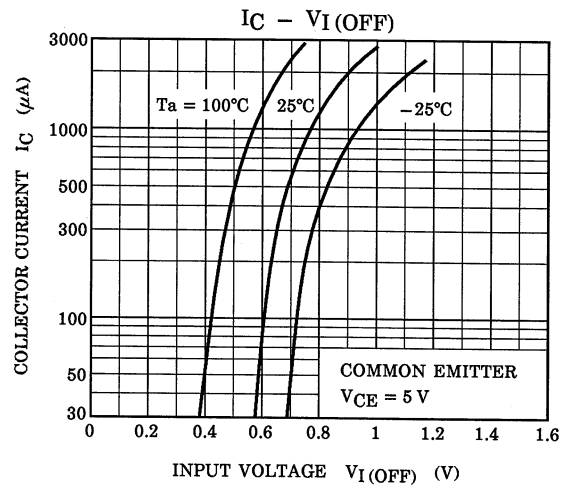
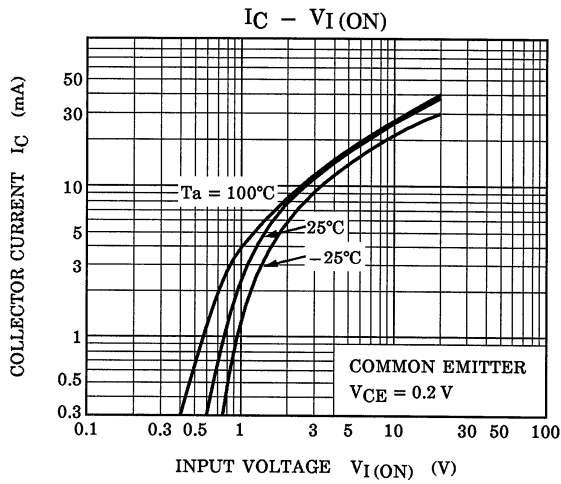
Electrical Characteristics ( $T_a = 25^\circ\text{C}$ ) (Q1, Q2 common)

| Characteristics                      | Symbol        | Test Condition                               | Min  | Typ. | Max  | Unit      |
|--------------------------------------|---------------|----------------------------------------------|------|------|------|-----------|
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 50\text{ V}$ , $I_E = 0$           | —    | —    | 100  | nA        |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 5\text{ V}$ , $I_C = 0$            | —    | —    | 100  | nA        |
| DC current gain                      | $h_{FE}$      | $V_{CE} = 5\text{ V}$ , $I_C = 1\text{ mA}$  | 120  | —    | 700  |           |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 5\text{ mA}$ , $I_B = 0.25\text{ mA}$ | —    | 0.1  | 0.3  | V         |
| Input resistor                       | R1            | —                                            | 32.9 | 47   | 61.1 | $k\Omega$ |

## Marking



Q1, Q2 Common



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