

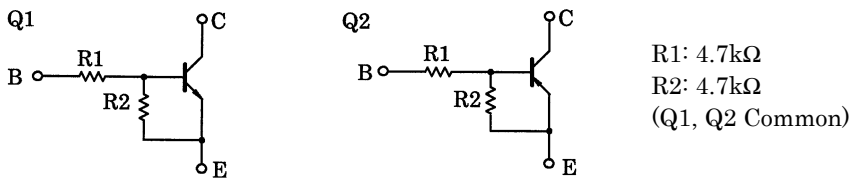
TOSHIBA Transistor
Silicon NPN Epitaxial Type (PCT Process) Silicon PNP Epitaxial Type (PCT Process)

RN4981

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

- Including two devices in US6 (ultra super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process

Equivalent Circuit and Bias Resistor Values



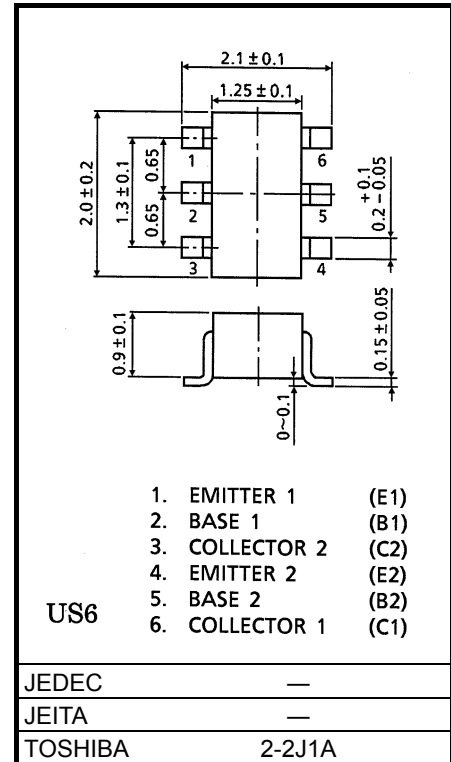
Q1 Absolute Maximum Ratings (Ta = 25°C)

| Characteristic | Symbol | Rating | Unit |
|---------------------------|------------------|--------|------|
| Collector-base voltage | V _{CB0} | 50 | V |
| Collector-emitter voltage | V _{CEO} | 50 | V |
| Emitter-base voltage | V _{EBO} | 10 | V |
| Collector current | I _C | 100 | mA |

Q2 Absolute Maximum Ratings (Ta = 25°C)

| Characteristic | Symbol | Rating | Unit |
|---------------------------|------------------|--------|------|
| Collector-base voltage | V _{CB0} | -50 | V |
| Collector-emitter voltage | V _{CEO} | -50 | V |
| Emitter-base voltage | V _{EBO} | -10 | V |
| Collector current | I _C | -100 | mA |

Unit: mm



Weight: 6.8mg (typ.)

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

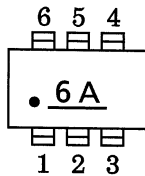
| Characteristic | Symbol | Rating | Unit |
|-----------------------------|-----------|---------|------|
| Collector power dissipation | P_C * | 200 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature range | T_{stg} | -55~150 | °C |

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.

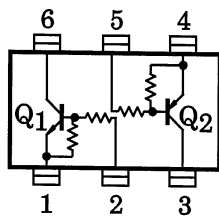
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

* Total rating

Marking



Equivalent Circuit (Top View)



Q1 Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|---------------|--------------|-----------------------------------|------|------|------|------|
| Collector cut-off current | I_{CBO} | — | $V_{CB} = 50V, I_E = 0$ | — | — | 100 | nA |
| | I_{CEO} | — | $V_{CE} = 50V, I_B = 0$ | — | — | 500 | |
| Emitter cut-off current | I_{EBO} | — | $V_{EB} = 10V, I_C = 0$ | 0.82 | — | 1.52 | mA |
| DC current gain | h_{FE} | — | $V_{CE} = 5V, I_C = 10mA$ | 30 | — | — | — |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | — | $I_C = 5mA, I_B = 0.25mA$ | — | 0.1 | 0.3 | V |
| Input voltage (ON) | $V_I(ON)$ | — | $V_{CE} = 0.2V, I_C = 5mA$ | 1.1 | — | 2.0 | V |
| Input voltage (OFF) | $V_I(OFF)$ | — | $V_{CE} = 5V, I_C = 0.1mA$ | 1.0 | — | 1.5 | V |
| Transition frequency | f_T | — | $V_{CE} = 10V, I_C = 5mA$ | — | 250 | — | MHz |
| Collector output capacitance | C_{ob} | — | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | — | 3 | 6 | pF |

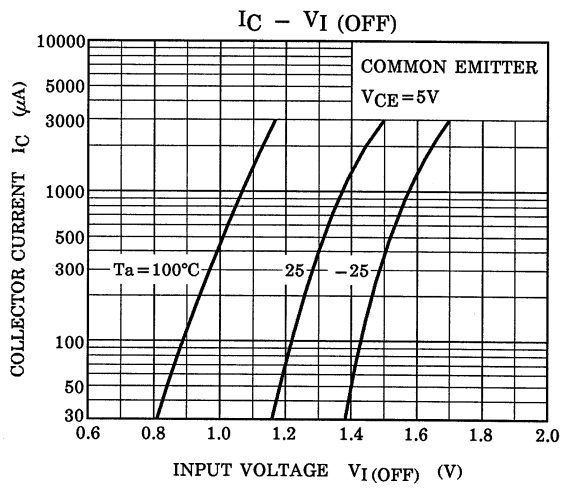
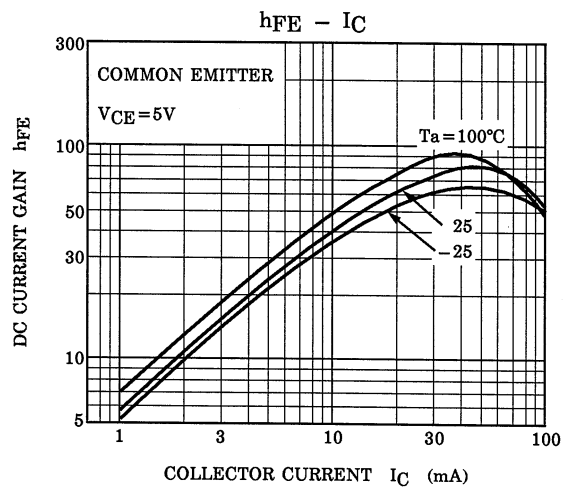
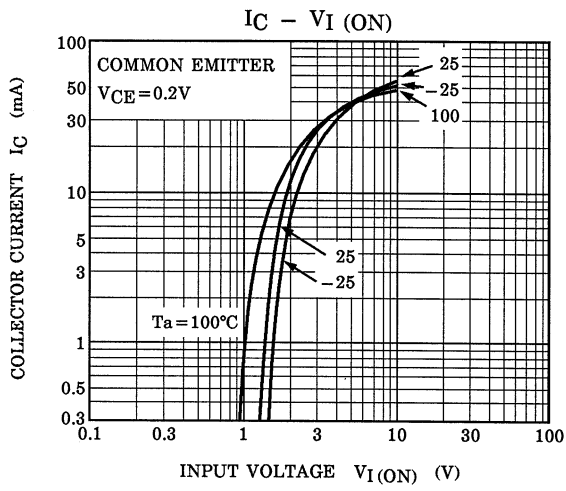
Q2 Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|---------------|--------------|------------------------------------|-------|------|-------|------|
| Collector cut-off current | I_{CBO} | — | $V_{CB} = -50V, I_E = 0$ | — | — | -100 | nA |
| | I_{CEO} | — | $V_{CE} = -50V, I_B = 0$ | — | — | -500 | |
| Emitter cut-off current | I_{EBO} | — | $V_{EB} = -10V, I_C = 0$ | -0.82 | — | -1.52 | mA |
| DC current gain | h_{FE} | — | $V_{CE} = -5V, I_C = -10mA$ | 30 | — | — | — |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | — | $I_C = -5mA, I_B = -0.25mA$ | — | -0.1 | -0.3 | V |
| Input voltage (ON) | $V_I(ON)$ | — | $V_{CE} = -0.2V, I_C = -5mA$ | -1.1 | — | -2.0 | V |
| Input voltage (OFF) | $V_I(OFF)$ | — | $V_{CE} = -5V, I_C = -0.1mA$ | -1.0 | — | -1.5 | V |
| Transition frequency | f_T | — | $V_{CE} = -10V, I_C = -5mA$ | — | 200 | — | MHz |
| Collector output capacitance | C_{ob} | — | $V_{CB} = -10V, I_E = 0, f = 1MHz$ | — | 3 | 6 | pF |

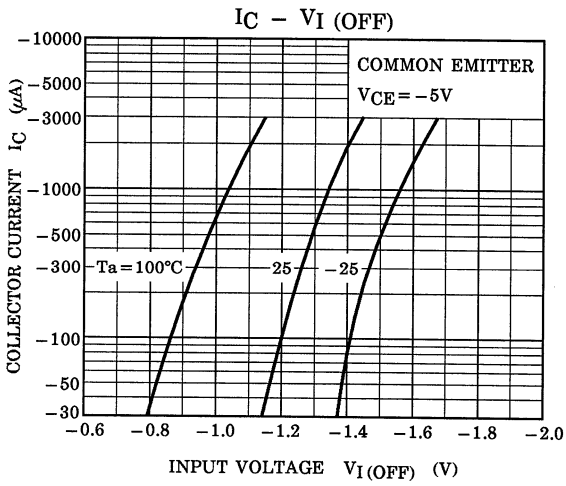
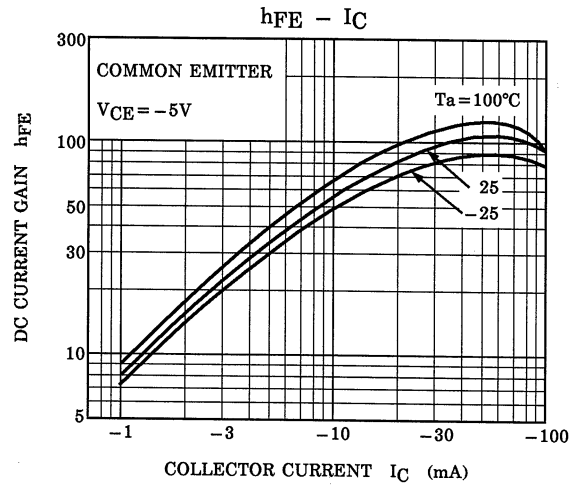
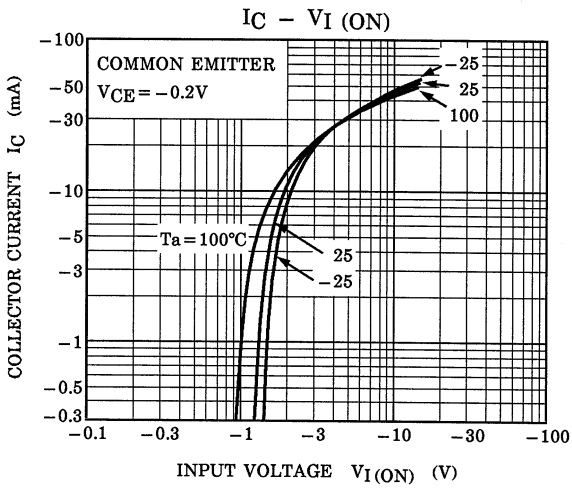
Q1, Q2 Common Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|----------------|--------|--------------|----------------|------|------|------|------|
| Input resistor | R1 | — | — | 3.29 | 4.7 | 6.11 | kΩ |
| Resistor ratio | R1/R2 | — | — | 0.9 | 1.0 | 1.1 | — |

Q1



Q2



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