

TOSHIBA Transistor Silicon PNP · NPN Epitaxial Type
(PCT Process) (Bias Resistor Built-in Transistor)

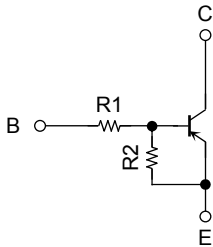
RN4908FE

Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

- Two devices are incorporated into an Extreme-Super-Mini (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.

Equivalent Circuit and Bias Resistor Values

Q1

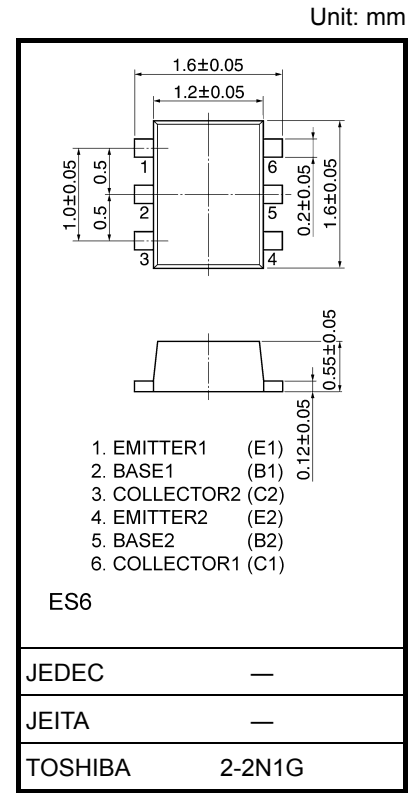
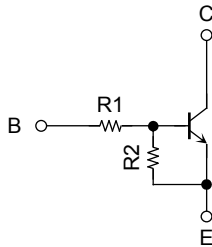


R1: 22 kΩ

R2: 47 kΩ

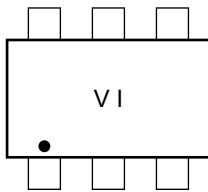
(Q1, Q2 common)

Q2

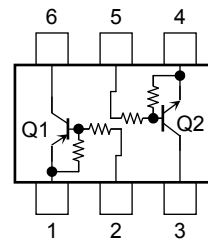


Weight: 0.003g (typ.)

Marking



Equivalent Circuit (top view)



Absolute Maximum Ratings (Ta = 25°C) (Q1)

| Characteristics | Symbol | Rating | Unit |
|---------------------------|------------------|--------|------|
| Collector-base voltage | V _{CB0} | -50 | V |
| Collector-emitter voltage | V _{CEO} | -50 | V |
| Emitter-base voltage | V _{EBO} | -7 | V |
| Collector current | I _C | -100 | mA |

Absolute Maximum Ratings (Ta = 25°C) (Q2)

| Characteristics | Symbol | Rating | Unit |
|---------------------------|------------------|--------|------|
| Collector-base voltage | V _{CB0} | 50 | V |
| Collector-emitter voltage | V _{CEO} | 50 | V |
| Emitter-base voltage | V _{EBO} | 7 | V |
| Collector current | I _C | 100 | mA |

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

| Characteristics | Symbol | Rating | Unit |
|-----------------------------|-------------------------|---------|------|
| Collector power dissipation | P _C (Note 1) | 100 | 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

Electrical Characteristics (Ta = 25°C) (Q1)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|-----------------------|--|--------|------|--------|------|
| Collector cut-off current | I _{CBO} | V _{CB} = -50 V, I _E = 0 | — | — | -100 | nA |
| | I _{CEO} | V _{CE} = -50 V, I _B = 0 | — | — | -500 | |
| Emitter cut-off current | I _{EBO} | V _{EB} = -7 V, I _C = 0 | -0.078 | — | -0.145 | mA |
| DC current gain | h _{FE} | V _{CE} = -5 V, I _C = -10 mA | 80 | — | — | |
| Collector-emitter saturation voltage | V _{CE (sat)} | I _C = -5 mA, I _B = -0.25 mA | — | -0.1 | -0.3 | V |
| Input voltage (ON) | V _{I (ON)} | V _{CE} = -0.2 V, I _C = -5 mA | -1.0 | — | -2.6 | V |
| Input voltage (OFF) | V _{I (OFF)} | V _{CE} = -5 V, I _C = -0.1 mA | -0.6 | — | -1.16 | V |
| Transition frequency | f _T | V _{CE} = -10 V, I _C = -5 mA | — | 200 | — | MHz |
| Collector output capacitance | C _{ob} | V _{CB} = -10 V, I _E = 0, f = 1 MHz | — | 3 | 6 | pF |

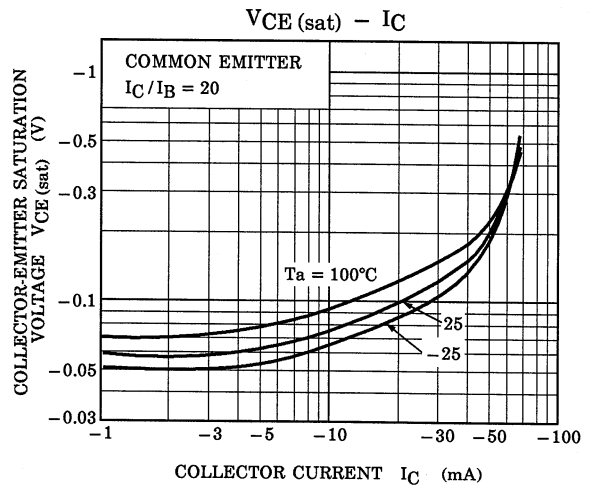
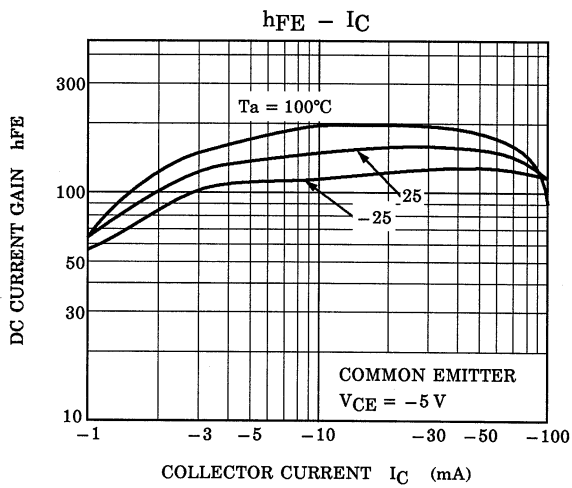
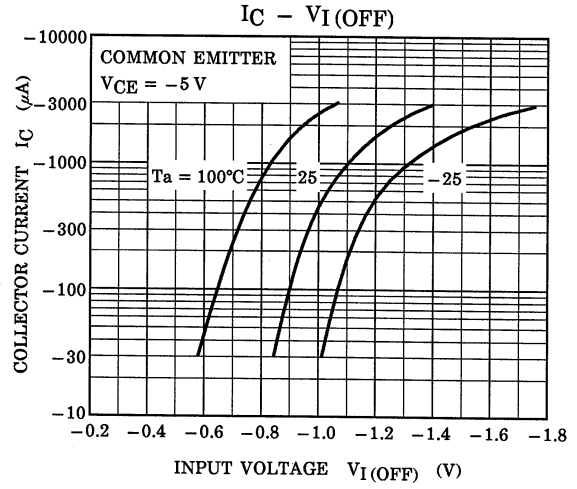
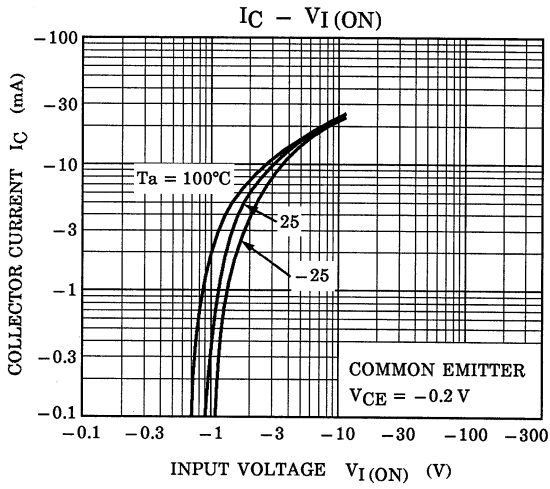
Electrical Characteristics (Ta = 25°C) (Q2)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|-----------------------|---|-------|------|-------|------|
| Collector cut-off current | I _{CBO} | V _{CB} = 50 V, I _E = 0 | — | — | 100 | nA |
| | I _{CEO} | V _{CE} = 50 V, I _B = 0 | — | — | 500 | |
| Emitter cut-off current | I _{EBO} | V _{EB} = 7 V, I _C = 0 | 0.078 | — | 0.145 | mA |
| DC current gain | h _{FE} | V _{CE} = 5 V, I _C = 10 mA | 80 | — | — | |
| Collector-emitter saturation voltage | V _{CE (sat)} | I _C = 5 mA, I _B = 0.25 mA | — | 0.1 | 0.3 | V |
| Input voltage (ON) | V _{I (ON)} | V _{CE} = 0.2 V, I _C = 5 mA | 1.0 | — | 2.6 | V |
| Input voltage (OFF) | V _{I (OFF)} | V _{CE} = 5 V, I _C = 0.1 mA | 0.6 | — | 1.16 | V |
| Transition frequency | f _T | V _{CE} = 10 V, I _C = 5 mA | — | 250 | — | MHz |
| Collector output capacitance | C _{ob} | V _{CB} = 10 V, I _E = 0, f = 1 MHz | — | 3 | 6 | pF |

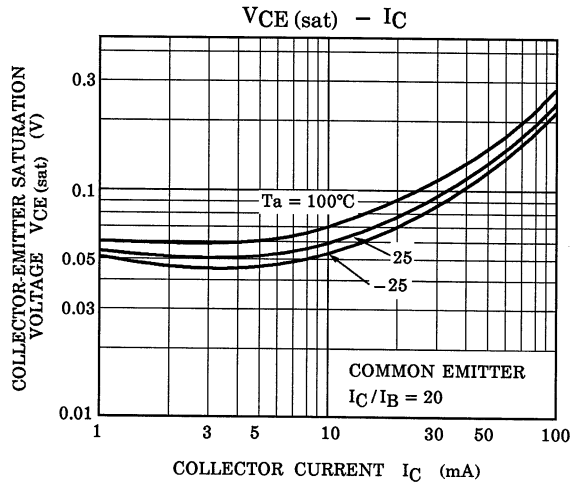
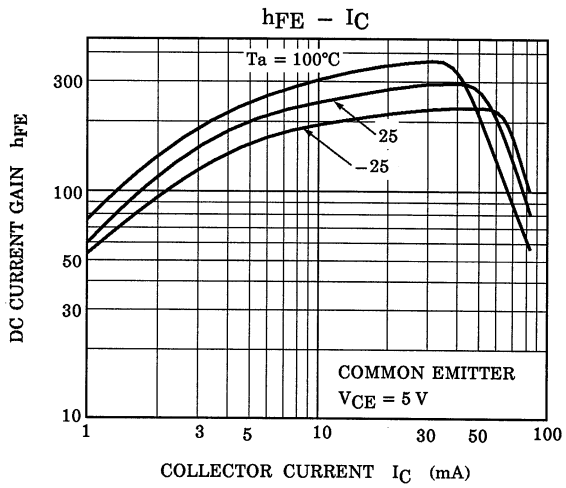
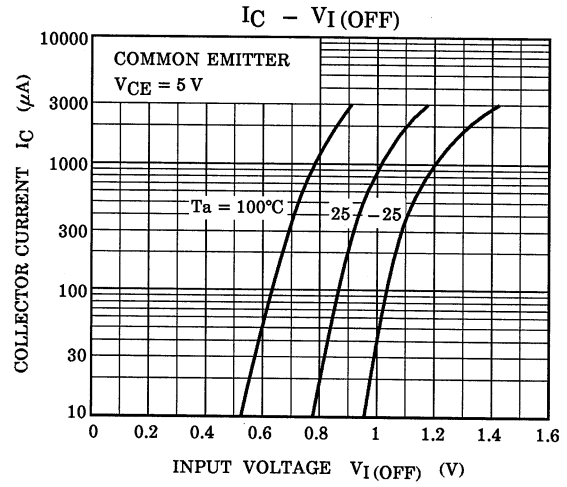
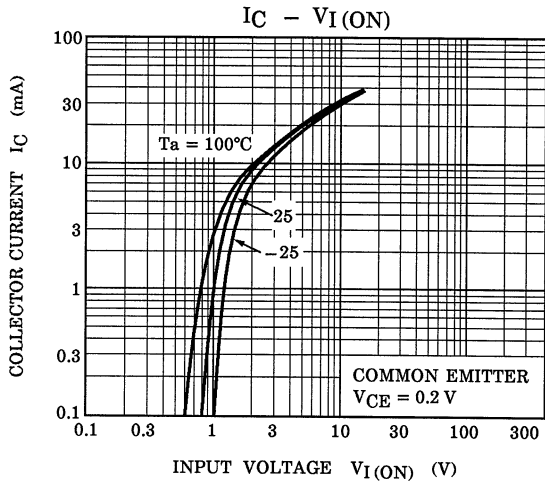
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------|--------|----------------|-------|-------|-------|------|
| Input resistor | R1 | — | 15.4 | 22 | 28.6 | kΩ |
| Resistor ratio | R1/R2 | — | 0.421 | 0.468 | 0.515 | |

Q1



Q2



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