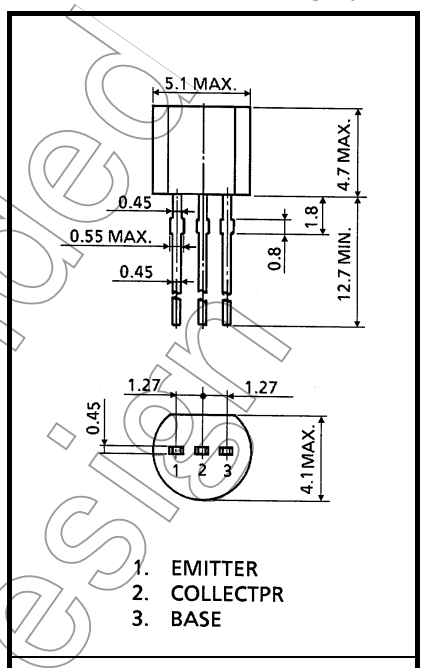
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# RN2010,RN2011

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1010, RN1011

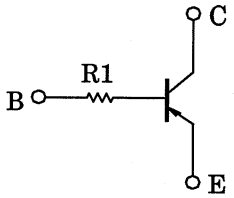
Unit: mm




| | |
|---|---|
| JEDEC | TO−92 |
| JEITA | SC−43 |
| TOSHIBA | 2−5F1B |

Weight: 0.21g (typ.)

## Equivalent Circuit




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

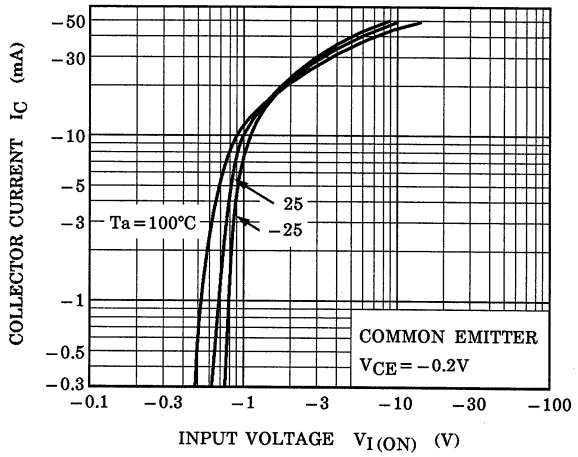
| Characteristic | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-base voltage | $V_{CBO}$ | −50 | V |
| Collector-emitter voltage | $V_{CEO}$ | −50 | V |
| Emitter-base voltage | $V_{EBO}$ | −5 | V |
| Collector current | $I_C$ | −100 | mA |
| Collector power dissipation | $P_C$* | 400 | mW |
| 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).

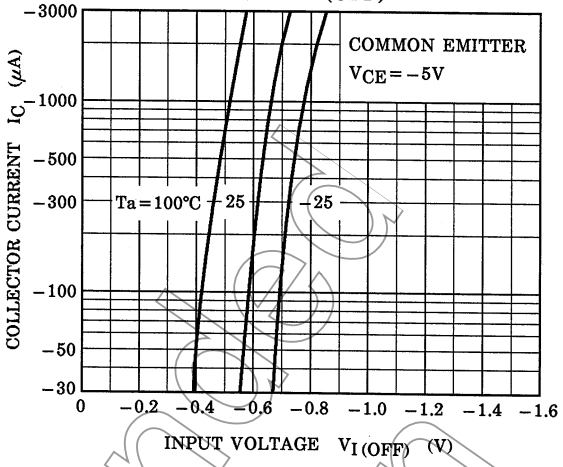
## Electrical Characteristics (Ta = 25°C)

| Characteristic | | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|
| Collector cut-off current | | $I_{CBO}$ | — | $V_{CB}$ = −50V, $I_E$ = 0 | — | — | −100 | nA |
| Emitter cut-off current | | $I_{EBO}$ | — | $V_{EB}$ = −5V, $I_C$ = 0 | — | — | −100 | nA |
| DC current gain | | $h_{FE}$ | — | $V_{CE}$ = −5V, $I_C$ = −1mA | 120 | — | 400 | |
| Collector-emitter saturation voltage | | $V_{CE\ (sat)}$ | — | $I_C$ = −5mA, $I_B$ = −0.25mA | — | −0.1 | −0.3 | 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 |
| Input resistor | RN2010 | R1 | — | | 3.29 | 4.7 | 6.11 | kΩ |
| | RN2011 | | | | 7 | 10 | 13 | |

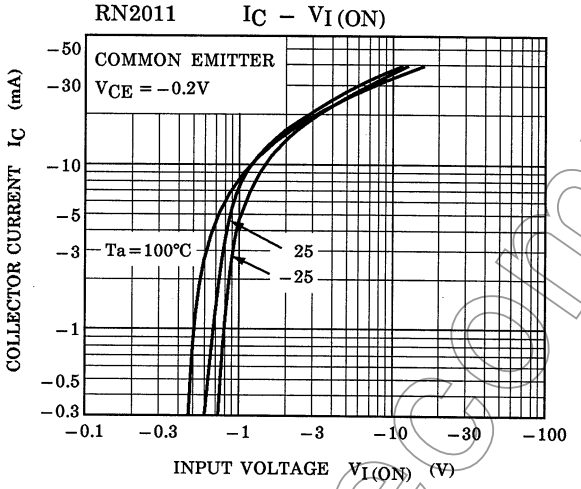
RN2010 $I_C - V_{I(ON)}$



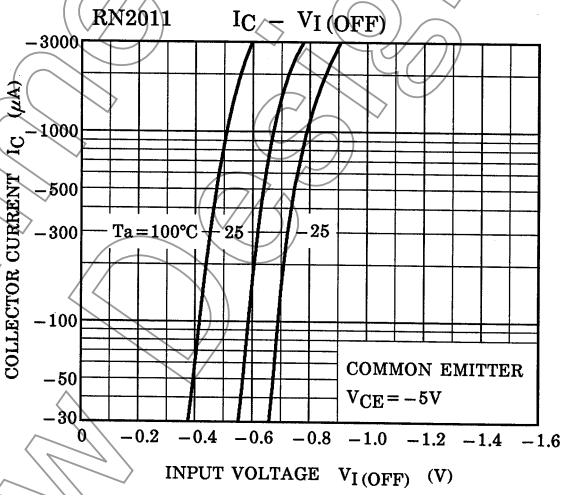

RN2010 $I_C - V_{I(OFF)}$



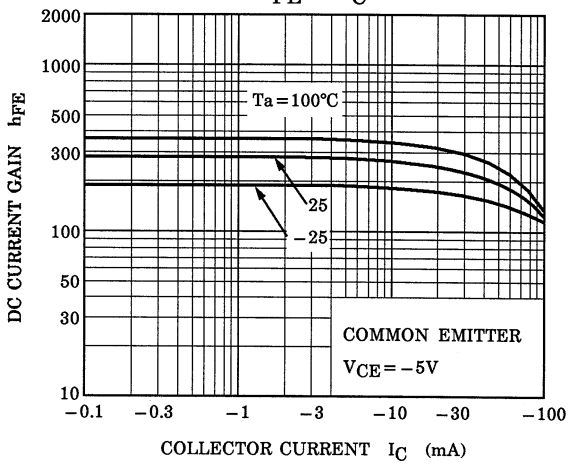

RN2011 $I_C - V_{I(ON)}$



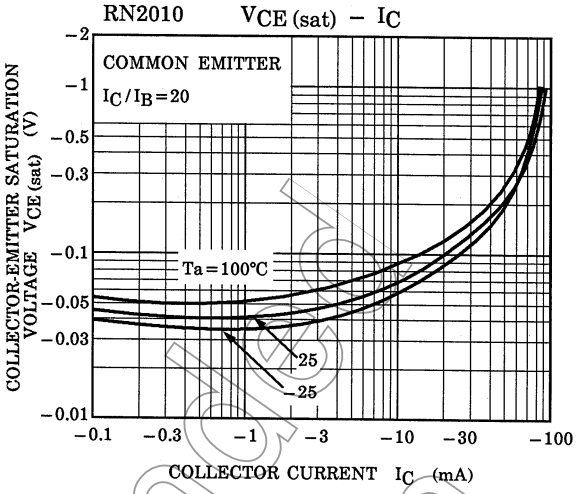

RN2011 $I_C - V_{I(OFF)}$



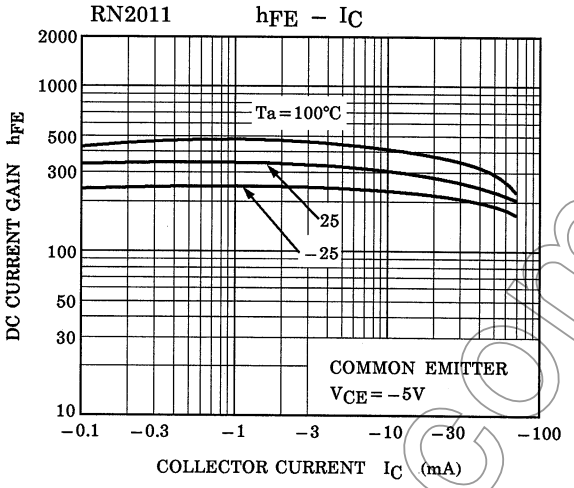
RN2010 $h_{FE}$ – $I_C$



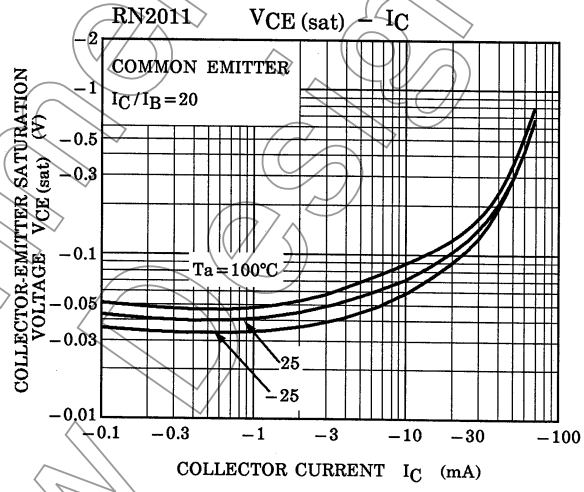

RN2010 $V_{CE\,(sat)}$ – $I_C$




RN2011 $h_{FE}$ – $I_C$




RN2011 $V_{CE\,(sat)}$ – $I_C$



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