

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

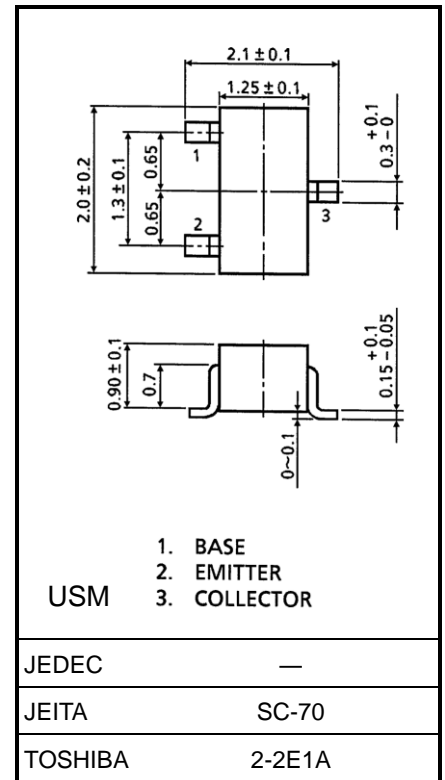
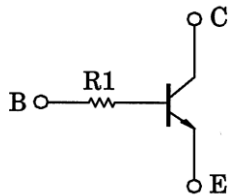
RN1310, RN1311

Switching, Inverter Circuit, Interface Circuit and Driver Circuit

Unit: mm

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN2310 and RN2311

Equivalent Circuit



Weight: 6 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

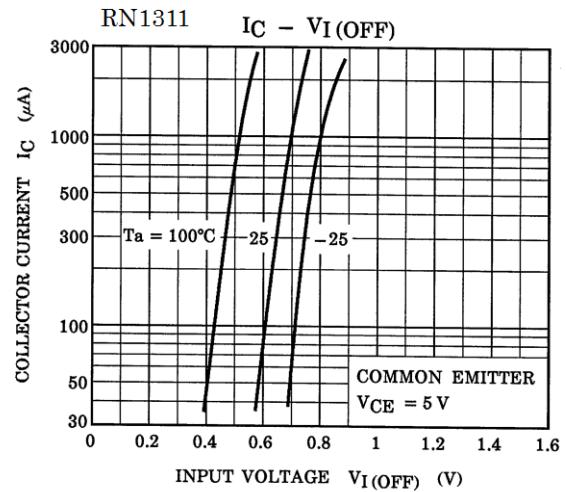
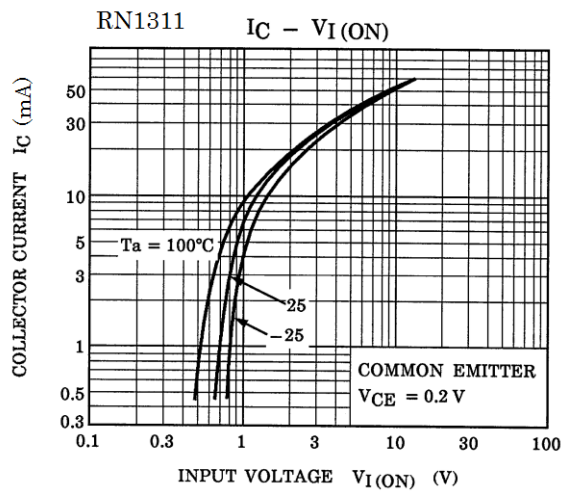
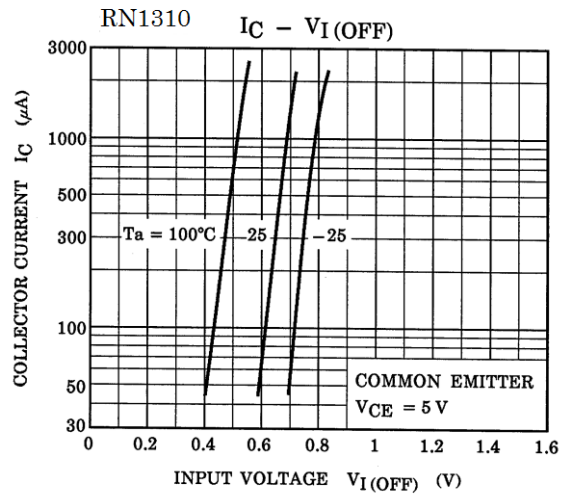
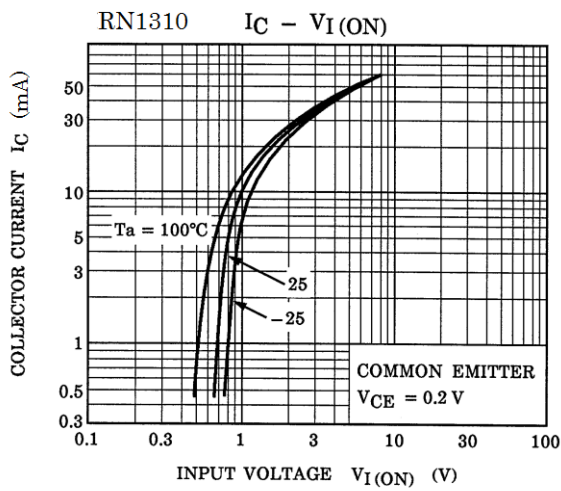
| Characteristic | Symbol | Rating | Unit |
|-----------------------------|------------------|------------|------|
| Collector-base voltage | V _{CB0} | 50 | V |
| Collector-emitter voltage | V _{CE0} | 50 | V |
| Emitter-base voltage | V _{EB0} | 5 | V |
| Collector current | I _C | 100 | mA |
| Collector power dissipation | P _C | 100 | mW |
| Junction temperature | T _j | 150 | °C |
| Storage temperature range | T _{stg} | -55 to 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).

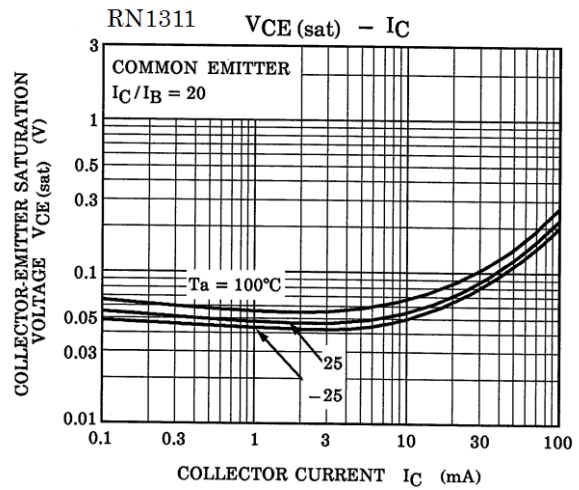
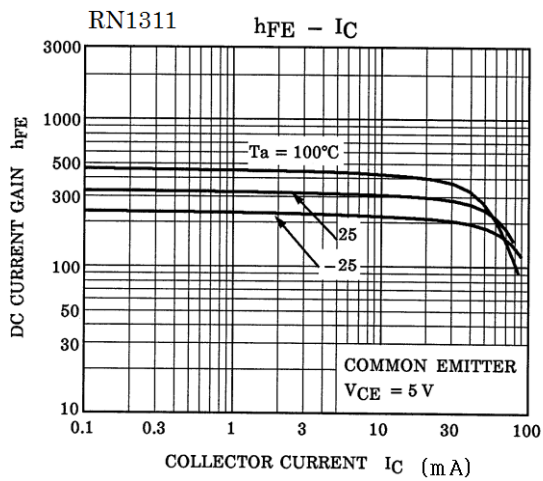
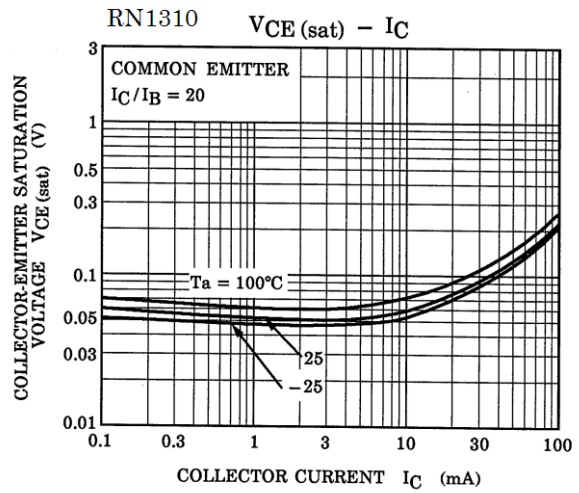
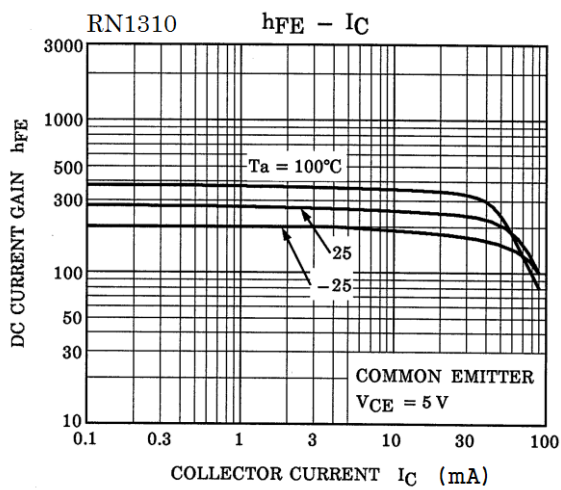
Start of commercial production
1987-07

Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|-----------------------|--------------|--|------|------|------|------|
| Collector cut-off current | ICBO | — | V _{CB} = 50 V, I _E = 0 mA | — | — | 100 | nA |
| Emitter cut-off current | IEBO | — | V _{EB} = 5 V, I _C = 0 mA | — | — | 100 | nA |
| DC current gain | hFE | — | V _{CE} = 5 V, I _C = 1 mA | 120 | — | 700 | — |
| Collector-emitter saturation voltage | V _{CE (sat)} | — | I _C = 5 mA, I _B = 0.25 mA | — | 0.1 | 0.3 | 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 mA, f = 1 MHz | — | 3 | 6 | pF |
| Input resistor | RN1310 | R1 | — | 3.29 | 4.7 | 6.11 | kΩ |
| | RN1311 | | | 7 | 10 | 13 | |

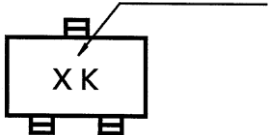
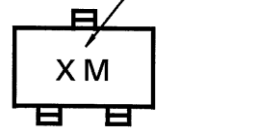
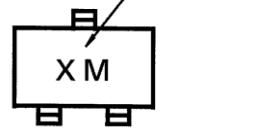


The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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Marking

| Part No | Marking |
|---------|---|
| RN1310 | <p data-bbox="571 353 837 387">Part No.(abbreviation code)</p>  <p data-bbox="571 616 837 649">Part No.(abbreviation code)</p>  |
| RN1311 | <p data-bbox="571 616 837 649">Part No.(abbreviation code)</p>  |

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