

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

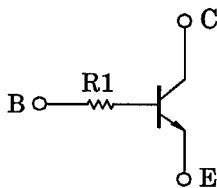
## RN1312,RN1313

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

Unit: mm

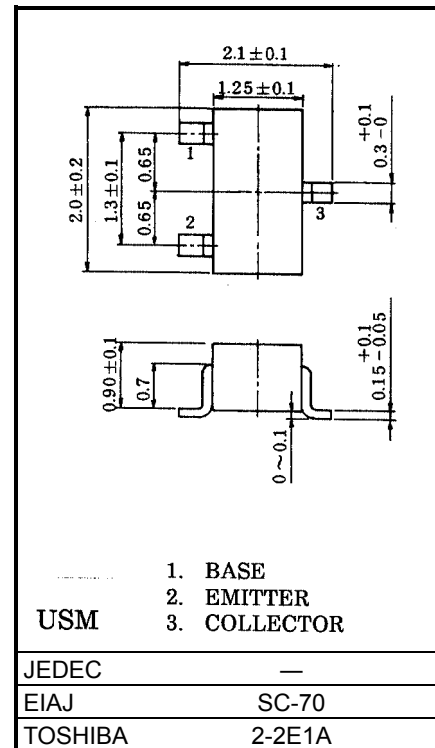
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2312, RN2313

### Equivalent Circuit



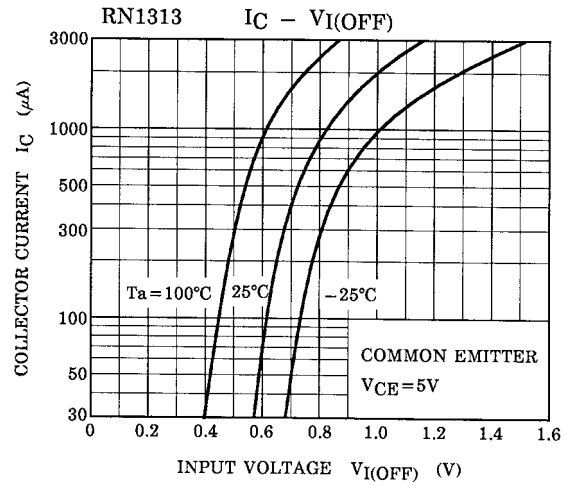
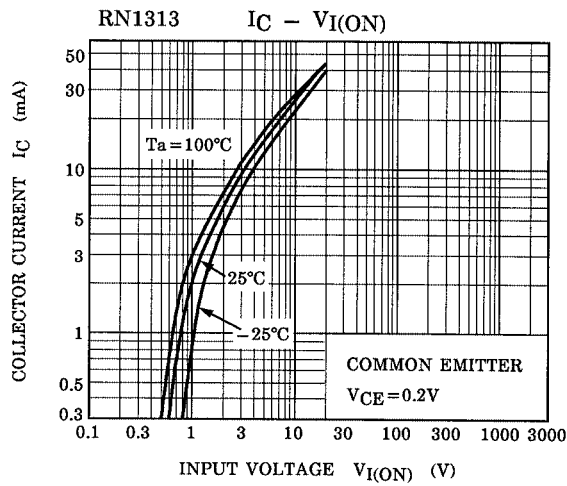
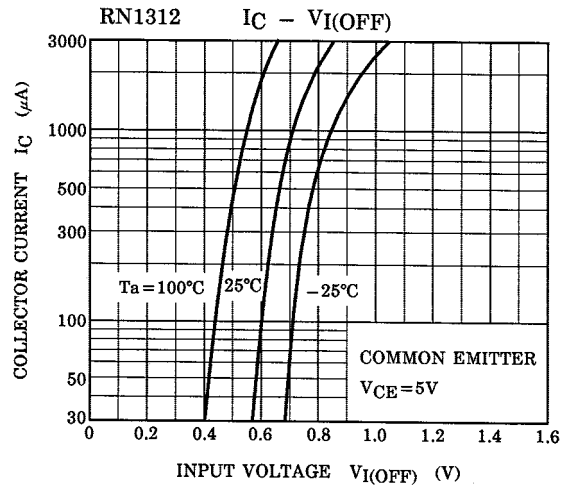
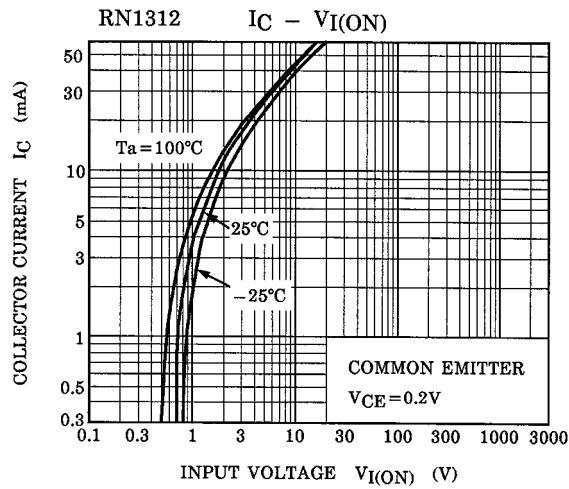
### Maximum Ratings (Ta = 25°C)

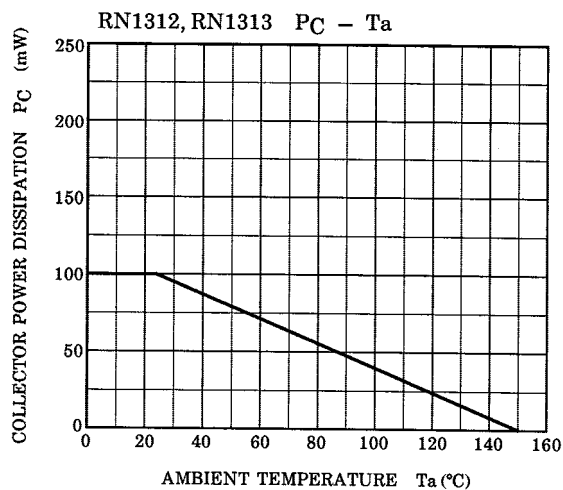
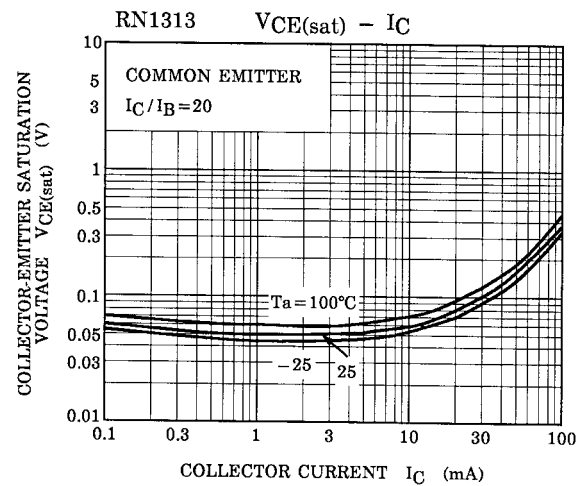
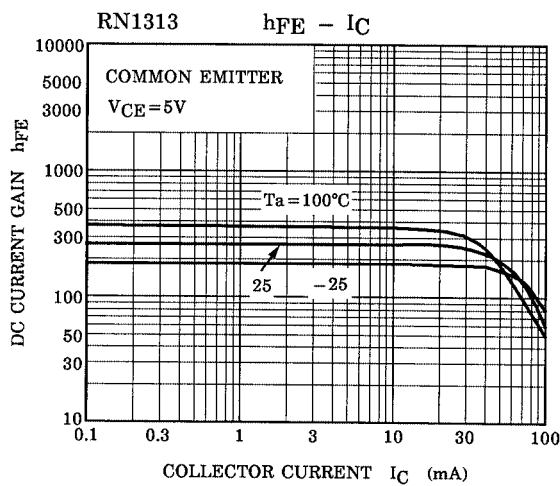
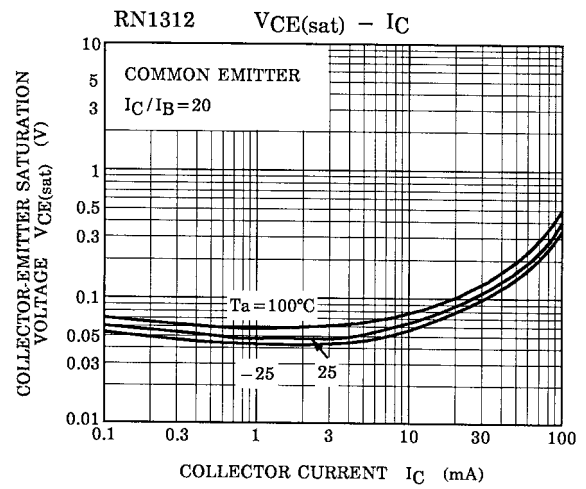
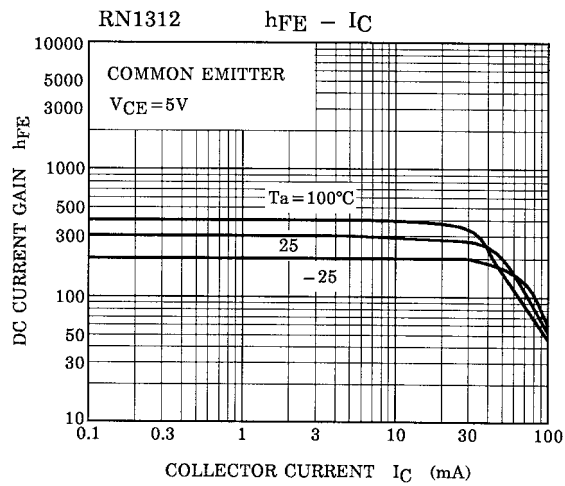
| Characteristic              | Symbol    | Rating  | Unit |
|-----------------------------|-----------|---------|------|
| Collector-base voltage      | $V_{CBO}$ | 50      | V    |
| Collector-emitter voltage   | $V_{CEO}$ | 50      | V    |
| Emitter-base voltage        | $V_{EBO}$ | 5       | V    |
| Collector current           | $I_C$     | 100     | mA   |
| Base current                | $I_B$     | 100     | mA   |
| Collector power dissipation | $P_C$     | 150     | mW   |
| Junction temperature        | $T_j$     | 125     | °C   |
| Storage temperature range   | $T_{stg}$ | -55~125 | °C   |

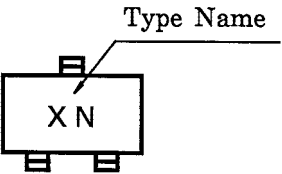
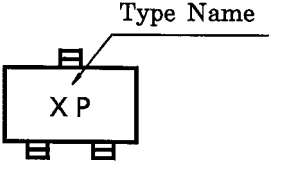


### Electrical Characteristics (Ta = 25°C)

| 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  | —    | 700  |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —            | $I_C = 5mA, I_B = 0.25mA$         | —    | 0.1  | 0.3  | V    |
| Transition frequency                 | $f_T$         | —            | $V_{CE} = 10V, I_C = 5mA$         | —    | 250  | —    | MHz  |
| Collector output capacitance         | $C_{ob}$      | —            | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | —    | 3    | 6    | pF   |
| Input resistor                       | RN1312        | R1           | —                                 | 15.4 | 22   | 28.6 | kΩ   |
|                                      | RN1313        |              |                                   | 32.9 | 47   | 61.1 |      |





| Type Name | Marking                                                                                                                                                                                                                                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RN1312    |  <p>The diagram shows a rectangular component with three pins: one on the top edge and two on the bottom edge. Inside the rectangle, the characters 'X N' are printed. A leader line points from the text 'Type Name' to the top pin.</p> |
| RN1313    |  <p>The diagram shows a rectangular component with three pins: one on the top edge and two on the bottom edge. Inside the rectangle, the characters 'X P' are printed. A leader line points from the text 'Type Name' to the top pin.</p> |

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