

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

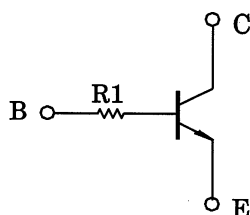
## RN1110F, RN1111F

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

Unit: mm

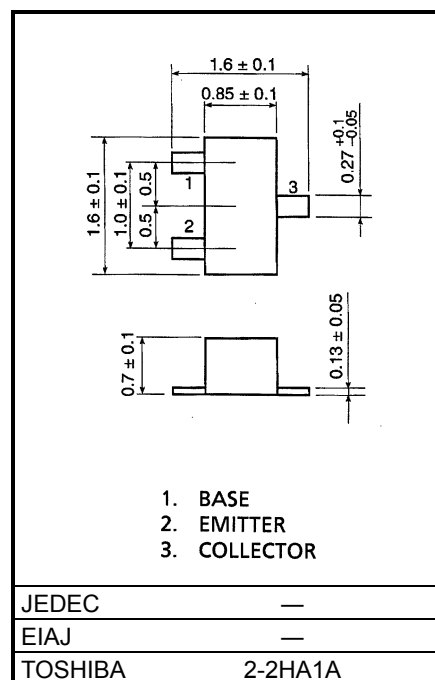
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2110F, RN2111F

### Equivalent Circuit



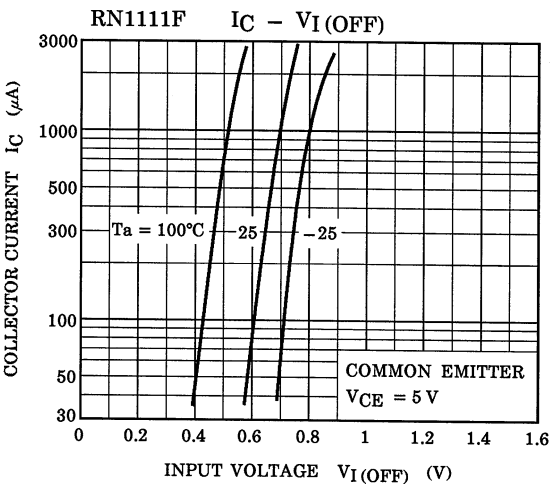
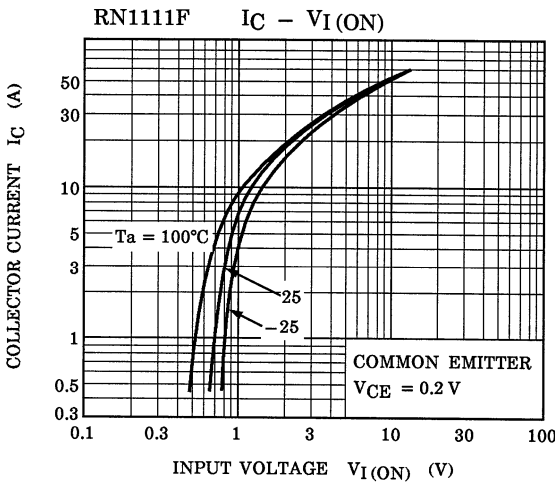
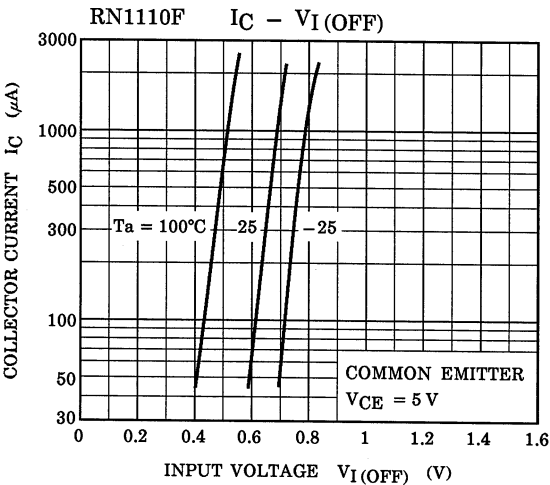
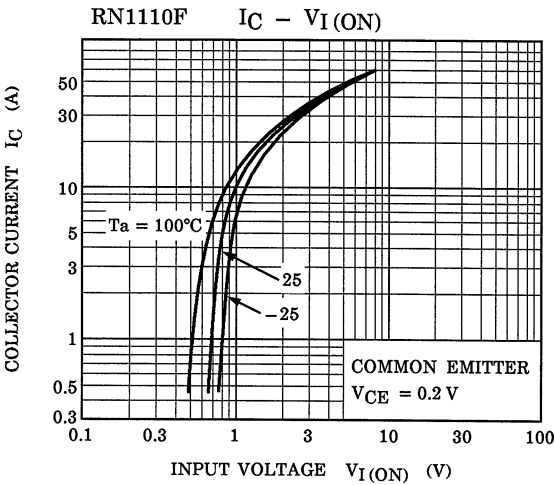
### Maximum Ratings (Ta = 25°C)

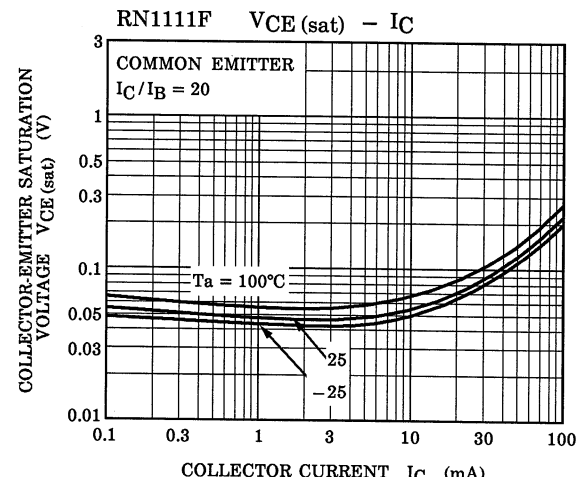
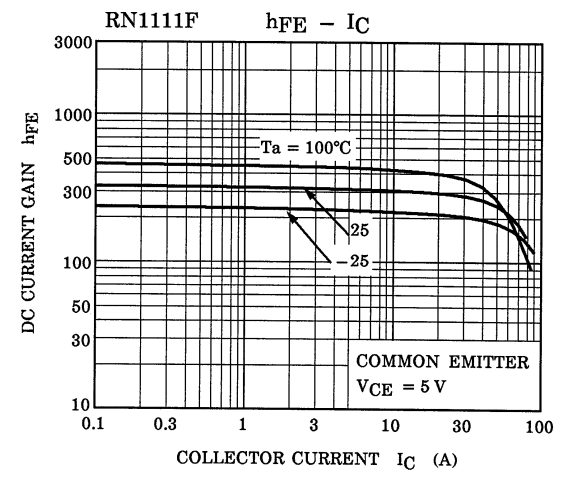
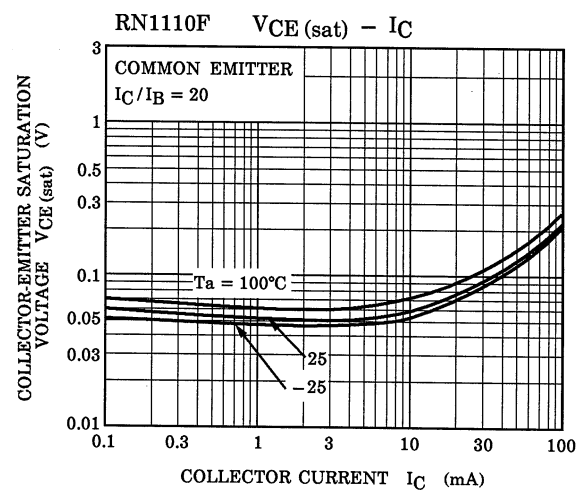
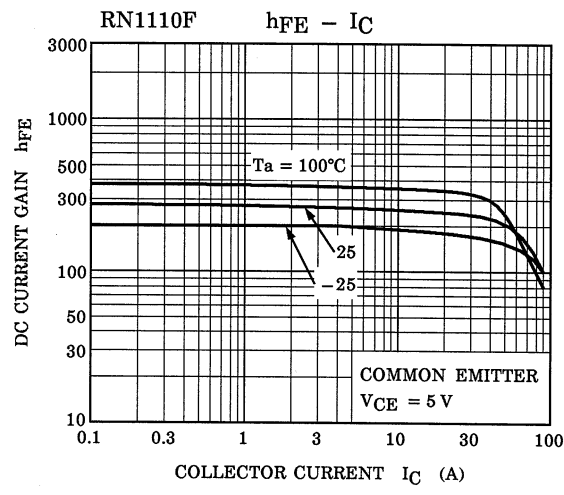
| Characterisitic             | Symbol    | Rating  | Unit |
|-----------------------------|-----------|---------|------|
| Collector-base voltage      | $V_{CBO}$ | 50      | V    |
| Collector-emitter voltage   | $V_{CEO}$ | 50      | V    |
| Emitter-base voltage        | $V_{EBO}$ | 5       | V 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

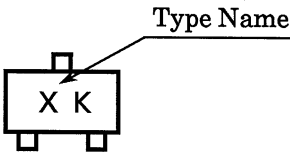
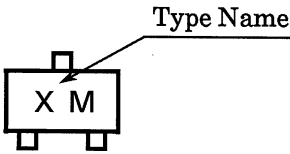


### Electrical Characteristics (Ta = 25°C)

| 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    |
| Translation 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                       | RN1110F       | R1           | —                                 | 3.29 | 4.7  | 6.11 | kΩ   |
|                                      | RN1111F       |              |                                   | 7    | 10   | 13   |      |





| Type Name | Marking                                                                                                                                                                                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RN1110F   |  <p>The diagram shows a rectangular component with two small square mounting tabs at the bottom. Inside the rectangle, the characters 'X' and 'K' are printed. An arrow points from the text 'Type Name' to the 'K' character.</p> |
| RN1111F   |  <p>The diagram shows a rectangular component with two small square mounting tabs at the bottom. Inside the rectangle, the characters 'X' and 'M' are printed. An arrow points from the text 'Type Name' to the 'M' character.</p> |

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