

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

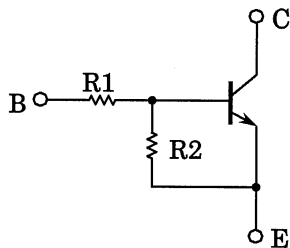
## RN1107,RN1108,RN1109

Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

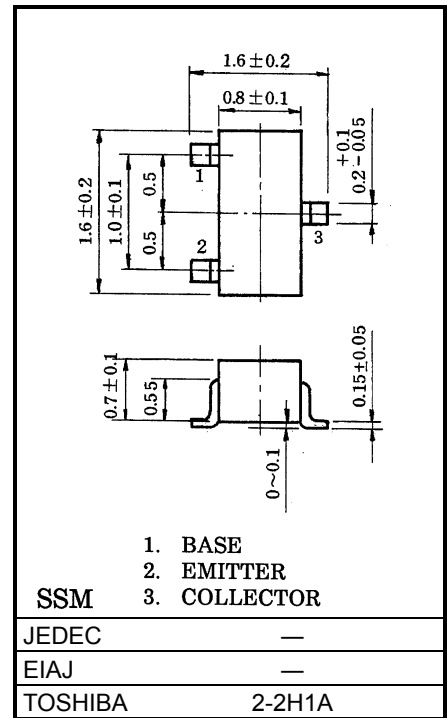
Unit: mm

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2107~2109

### Equivalent Circuit and Bias Resistor Values



| Type No. | R1 (kΩ) | R2 (kΩ) |
|----------|---------|---------|
| RN1107   | 10      | 47      |
| RN1108   | 22      | 47      |
| RN1109   | 47      | 22      |

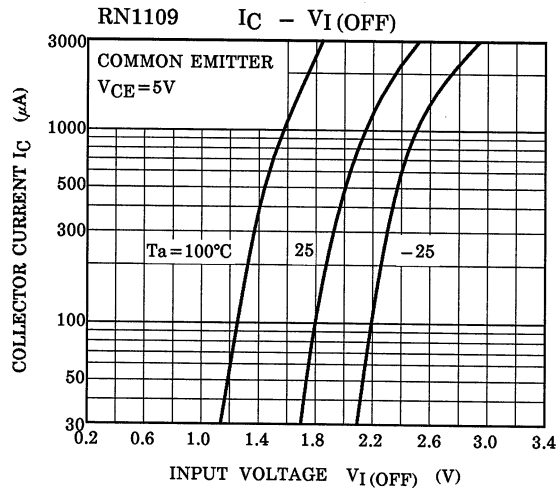
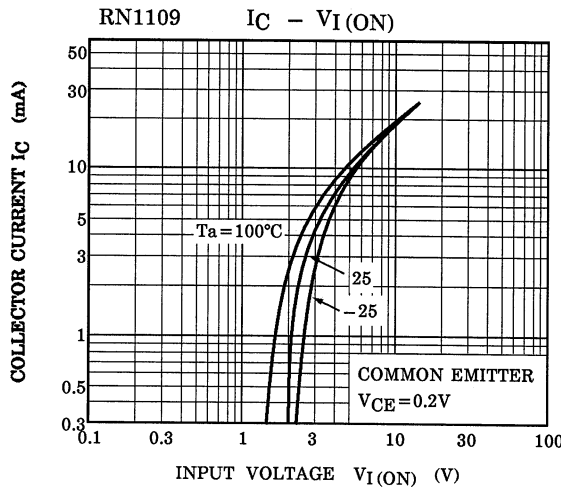
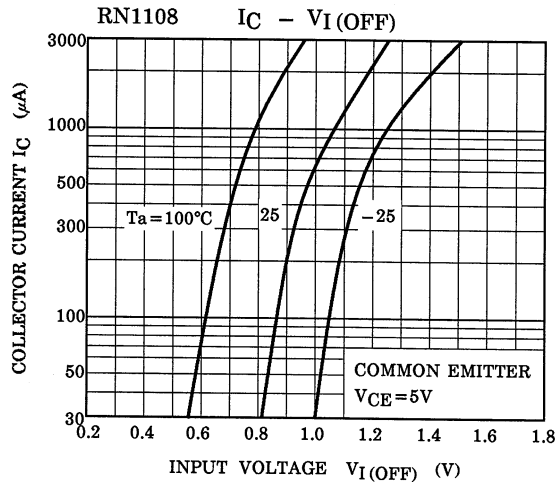
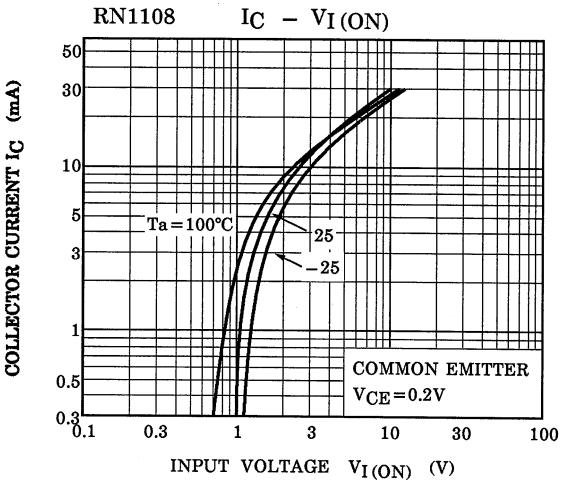
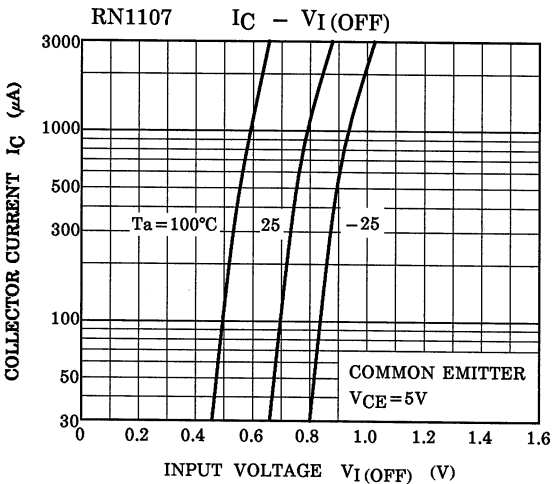
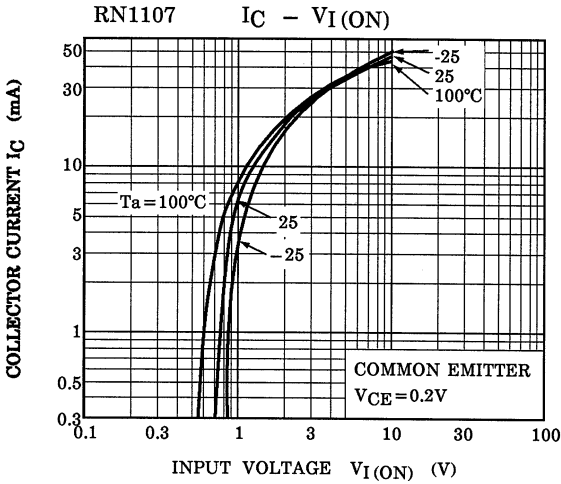


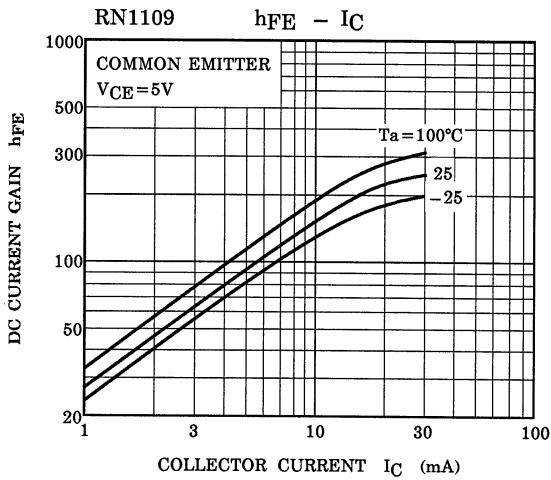
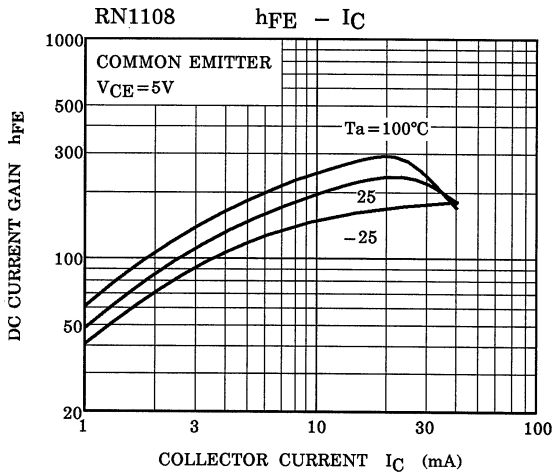
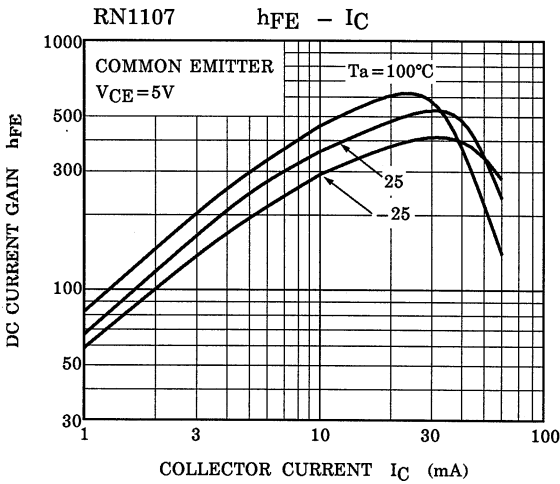
### Maximum Ratings (Ta = 25°C)

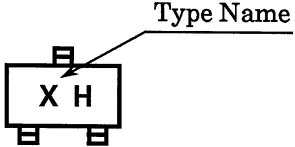
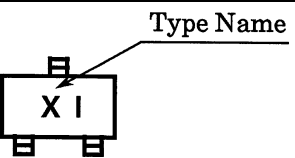
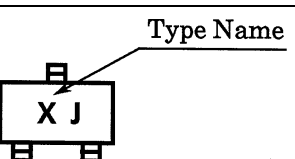
| Characteristic              |             | Symbol           | Rating  | Unit |
|-----------------------------|-------------|------------------|---------|------|
| Collector-base voltage      | RN1107~1109 | V <sub>CBO</sub> | 50      | V    |
| Collector-emitter voltage   | RN1107~1109 | V <sub>CEO</sub> | 50      | V    |
| Emitter-base voltage        | RN1107      | V <sub>EBO</sub> | 6       | V    |
|                             | RN1108      |                  | 7       |      |
|                             | RN1109      |                  | 15      |      |
| Collector current           | RN1107~1109 | I <sub>c</sub>   | 100     | mA   |
| Collector power dissipation | RN1107~1109 | P <sub>c</sub>   | 100     | mW   |
| Junction temperature        | RN1107~1109 | T <sub>j</sub>   | 150     | °C   |
| Storage temperature range   | RN1107~1109 | T <sub>stg</sub> | −55~150 | °C   |

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

| Characteristic                       |             | Symbol        | Test Circuit | Test Condition                    | Min   | Typ.  | Max   | Unit |
|--------------------------------------|-------------|---------------|--------------|-----------------------------------|-------|-------|-------|------|
| Collector cut-off current            | RN1107~1109 | $I_{CBO}$     | —            | $V_{CB} = 50V, I_E = 0$           | —     | —     | 100   | nA   |
|                                      |             | $I_{CEO}$     | —            | $V_{CE} = 50V, I_B = 0$           | —     | —     | 500   | nA   |
| Emitter cut-off current              | RN1107      | $I_{EBO}$     | —            | $V_{EB} = 6V, I_C = 0$            | 0.081 | —     | 0.15  | mA   |
|                                      | RN1108      |               | —            | $V_{EB} = 7V, I_C = 0$            | 0.078 | —     | 0.145 |      |
|                                      | RN1109      |               | —            | $V_{EB} = 15V, I_C = 0$           | 0.167 | —     | 0.311 |      |
| DC current gain                      | RN1107      | $h_{FE}$      | —            | $V_{CE} = 5V, I_C = 10mA$         | 80    | —     | —     | —    |
|                                      | RN1108      |               | —            |                                   | 80    | —     | —     |      |
|                                      | RN1109      |               | —            |                                   | 70    | —     | —     |      |
| Collector-emitter saturation voltage | RN1107~1109 | $V_{CE(sat)}$ | —            | $I_C = 5mA, I_B = 0.25mA$         | —     | 0.1   | 0.3   | V    |
| Input voltage (ON)                   | RN1107      | $V_{I(ON)}$   | —            | $V_{CE} = 0.2V, I_C = 5mA$        | 0.7   | —     | 1.8   | V    |
|                                      | RN1108      |               | —            |                                   | 1.0   | —     | 2.6   |      |
|                                      | RN1109      |               | —            |                                   | 2.2   | —     | 5.8   |      |
| Input voltage (OFF)                  | RN1107      | $V_{I(OFF)}$  | —            | $V_{CE} = 5V, I_C = 0.1mA$        | 0.5   | —     | 1.0   | V    |
|                                      | RN1108      |               | —            |                                   | 0.6   | —     | 1.16  |      |
|                                      | RN1109      |               | —            |                                   | 1.5   | —     | 2.6   |      |
| Translation frequency                | RN1107~1109 | $f_T$         | —            | $V_{CE} = 10V, I_C = 5mA$         | —     | 250   | —     | MHz  |
| Collector output capacitance         | RN1107~1109 | $C_{ob}$      | —            | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | —     | 3     | 6     | pF   |
| Input Resistor                       | RN1107      | R1            | —            | —                                 | 7     | 10    | 13    | kΩ   |
|                                      | RN1108      |               | —            |                                   | 15.4  | 22    | 28.6  |      |
|                                      | RN1109      |               | —            |                                   | 32.9  | 47    | 61.1  |      |
| Resistor Ratio                       | RN1107      | R1/R2         | —            | —                                 | 0.191 | 0.213 | 0.232 | —    |
|                                      | RN1108      |               | —            |                                   | 0.421 | 0.468 | 0.515 |      |
|                                      | RN1109      |               | —            |                                   | 1.92  | 2.14  | 2.35  |      |





| Type Name | Marking   |
|-----------|---|
| RN1107    |  |
| RN1108    |  |
| RN1109    |  |

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