

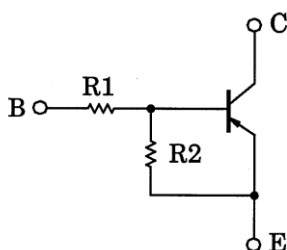
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

# RN2107MFV, RN2108MFV, RN2109MFV

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Ultra-small package, suited to very high density mounting
- Incorporating a bias resistor into the transistor reduces the number of parts, so enabling the manufacture of ever more compact equipment and lowering assembly cost.
- A wide range of resistor values is available for use in various circuits.
- Complementary to the RN1107MFV to RN1109MFV

## Equivalent Circuit and Bias Resistor Values



| Type No.  | R1 (kΩ) | R2 (kΩ) |
|-----------|---------|---------|
| RN2107MFV | 10      | 47      |
| RN2108MFV | 22      | 47      |
| RN2109MFV | 47      | 22      |

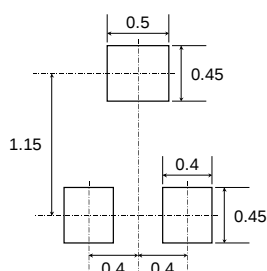
## Absolute Maximum Ratings (Ta = 25°C)

| Characteristic              | Symbol      | Rating     | Unit |
|-----------------------------|-------------|------------|------|
| Collector-base voltage      | VCBO        | -50        | V    |
| Collector-emitter voltage   | VCEO        | -50        | V    |
| Emitter-base voltage        | VEBO        | -6         | V    |
|                             |             | -7         |      |
|                             |             | -15        |      |
| Collector current           | IC          | -100       | mA   |
| Collector power dissipation | PC (Note 1) | 150        | mW   |
| Junction temperature        | Tj          | 150        | °C   |
| Storage temperature range   | Tstg        | -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).

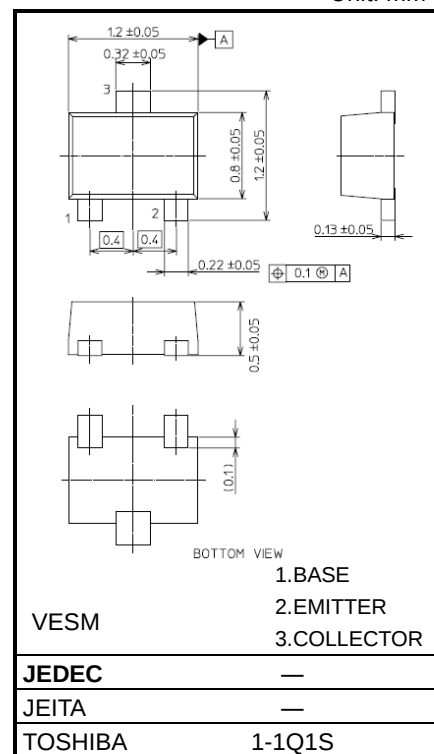
Note 1: Mounted on an FR4 board (25.4 mm × 25.4 mm × 1.6 mm)

## Land Pattern Dimensions (for reference only)



Unit: mm

Unit: mm

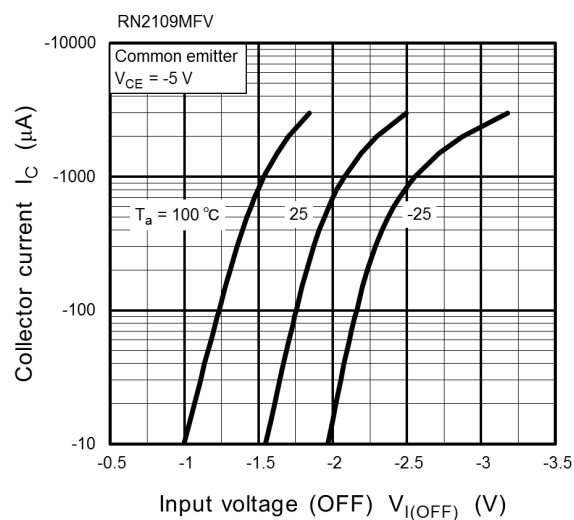
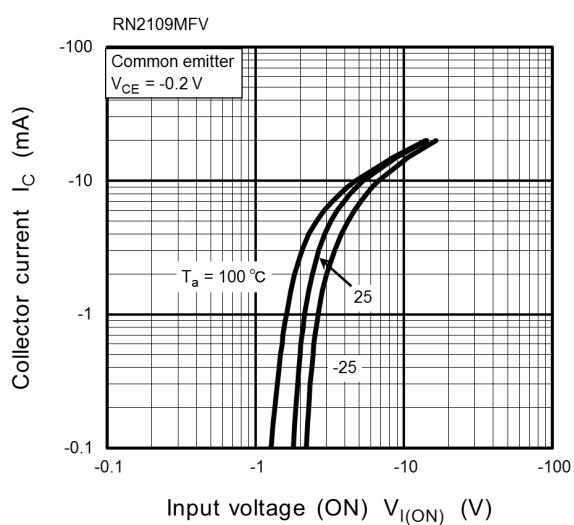
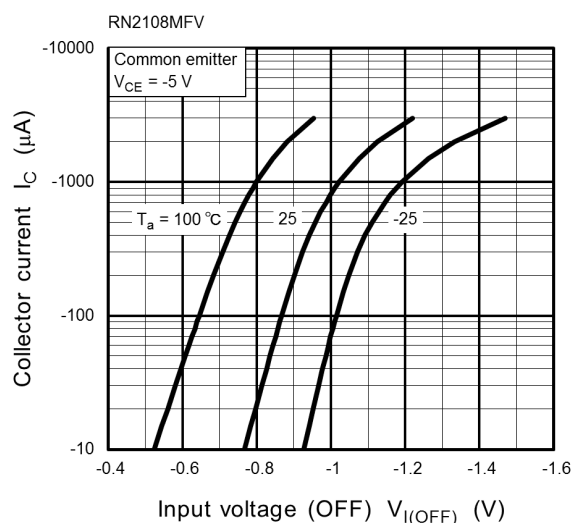
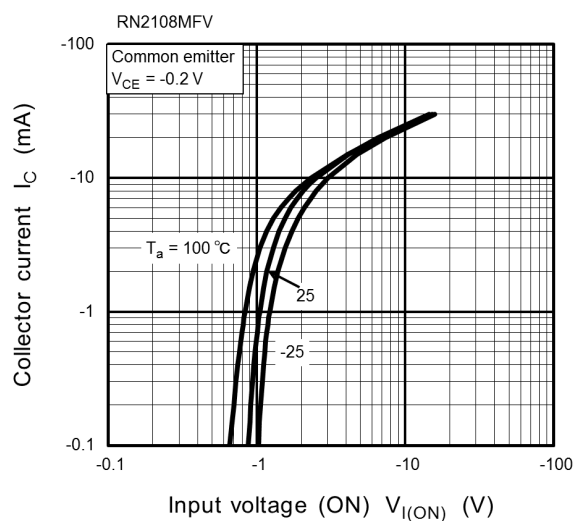
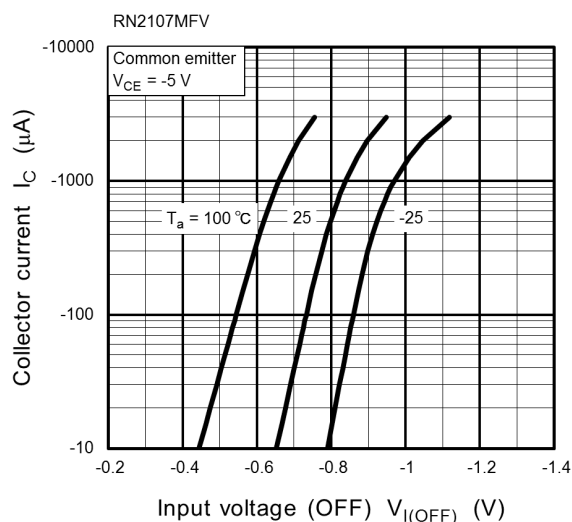
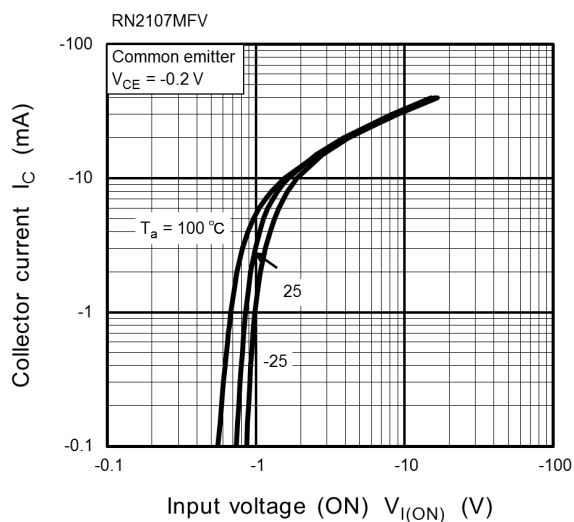


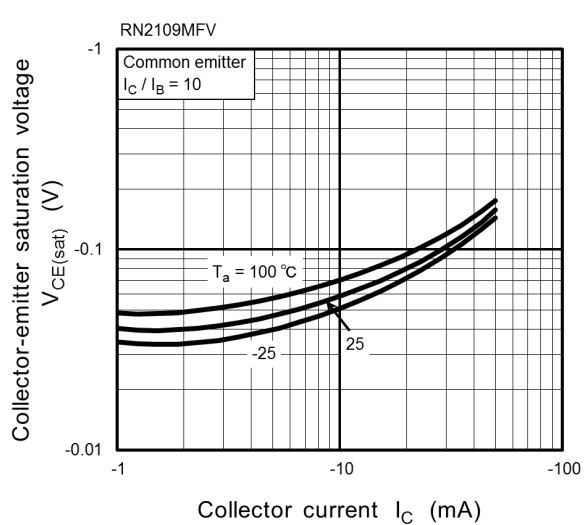
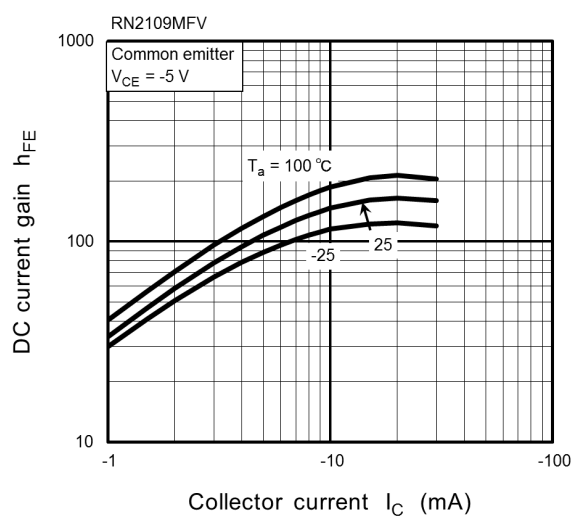
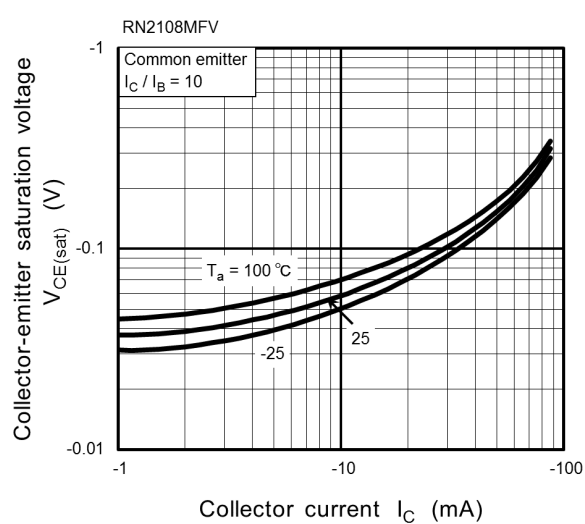
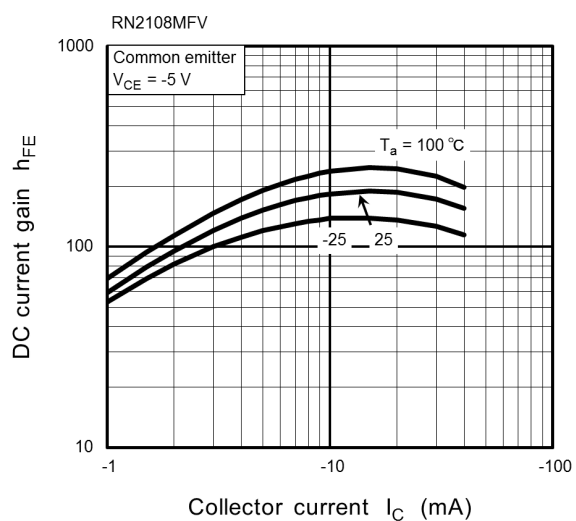
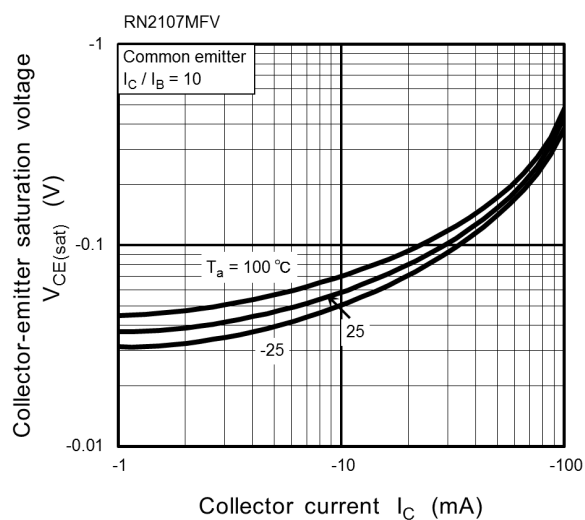
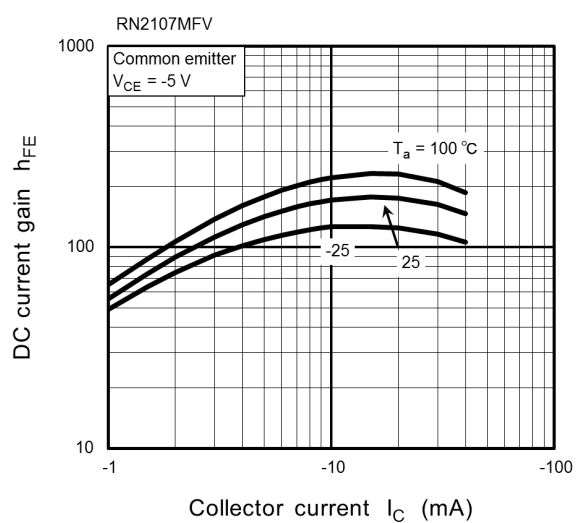
Weight: 1.5 mg (typ.)

Start of commercial production  
2005-02

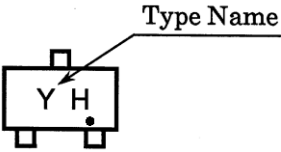
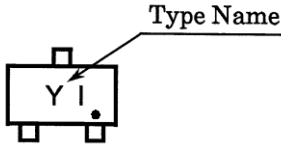
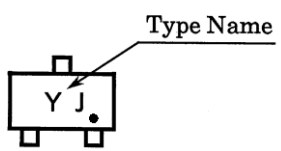
### Electrical Characteristics (Ta = 25°C)

| Characteristic                       |                        | Symbol                | Test Condition                                              | Min    | Typ.  | Max    | Unit |
|--------------------------------------|------------------------|-----------------------|-------------------------------------------------------------|--------|-------|--------|------|
| Collector cutoff current             | RN2107MFV to RN2109MFV | ICBO                  | V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0 A               | —      | —     | -100   | nA   |
|                                      |                        | ICEO                  | V <sub>CE</sub> = -50 V, I <sub>B</sub> = 0 A               | —      | —     | -500   | nA   |
| Emitter cutoff current               | RN2107MFV              | IEBO                  | V <sub>EB</sub> = -6 V, I <sub>C</sub> = 0 A                | -0.081 | —     | -0.15  | mA   |
|                                      | RN2108MFV              |                       | V <sub>EB</sub> = -7 V, I <sub>C</sub> = 0 A                | -0.078 | —     | -0.145 |      |
|                                      | RN2109MFV              |                       | V <sub>EB</sub> = -15 V, I <sub>C</sub> = 0 A               | -0.167 | —     | -0.311 |      |
| DC current gain                      | RN2107MFV              | h <sub>FE</sub>       | V <sub>CE</sub> = -5 V,<br>I <sub>C</sub> = -10 mA          | 80     | —     | —      | —    |
|                                      | RN2108MFV              |                       |                                                             | 80     | —     | —      |      |
|                                      | RN2109MFV              |                       |                                                             | 70     | —     | —      |      |
| Collector-emitter saturation voltage | RN2107MFV to RN2109MFV | V <sub>CE (sat)</sub> | I <sub>C</sub> = -5 mA,<br>I <sub>B</sub> = -0.5 mA         | —      | -0.1  | -0.3   | V    |
| Input voltage (ON)                   | RN2107MFV              | V <sub>I (ON)</sub>   | V <sub>CE</sub> = -0.2 V,<br>I <sub>C</sub> = -5 mA         | -0.7   | —     | -1.8   | V    |
|                                      | RN2108MFV              |                       |                                                             | -1.0   | —     | -2.6   |      |
|                                      | RN2109MFV              |                       |                                                             | -2.2   | —     | -5.8   |      |
| Input voltage (OFF)                  | RN2107MFV              | V <sub>I (OFF)</sub>  | V <sub>CE</sub> = -5 V,<br>I <sub>C</sub> = -0.1 mA         | -0.5   | —     | -1.0   | V    |
|                                      | RN2108MFV              |                       |                                                             | -0.6   | —     | -1.16  |      |
|                                      | RN2109MFV              |                       |                                                             | -1.5   | —     | -2.6   |      |
| Collector output capacitance         | RN2107MFV to RN2109MFV | C <sub>ob</sub>       | V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0 A,<br>f = 1 MHz | —      | 0.9   | —      | pF   |
| Input resistor                       | RN2107MFV              | R <sub>1</sub>        | —                                                           | 7      | 10    | 13     | kΩ   |
|                                      | RN2108MFV              |                       |                                                             | 15.4   | 22    | 28.6   |      |
|                                      | RN2109MFV              |                       |                                                             | 32.9   | 47    | 61.1   |      |
| Resistor ratio                       | RN2107MFV              | R <sub>1/R2</sub>     | —                                                           | 0.17   | 0.213 | 0.255  | —    |
|                                      | RN2108MFV              |                       |                                                             | 0.374  | 0.468 | 0.562  |      |
|                                      | RN2109MFV              |                       |                                                             | 1.71   | 2.14  | 2.56   |      |





Marking

| Type Name | Marking                                                                                                                                                                                                                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RN2107MFV |  <p>The diagram shows a rectangular component with four mounting pins. Inside the rectangle, the characters 'Y H' are printed, followed by a small dot. An arrow points from the text 'Type Name' to the 'Y' character.</p> |
| RN2108MFV |  <p>The diagram shows a rectangular component with four mounting pins. Inside the rectangle, the characters 'Y I' are printed, followed by a small dot. An arrow points from the text 'Type Name' to the 'Y' character.</p> |
| RN2109MFV |  <p>The diagram shows a rectangular component with four mounting pins. Inside the rectangle, the characters 'Y J' are printed, followed by a small dot. An arrow points from the text 'Type Name' to the 'Y' character.</p> |

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