

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

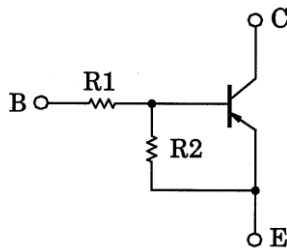
RN2107MFV, RN2108MFV, RN2109MFV

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

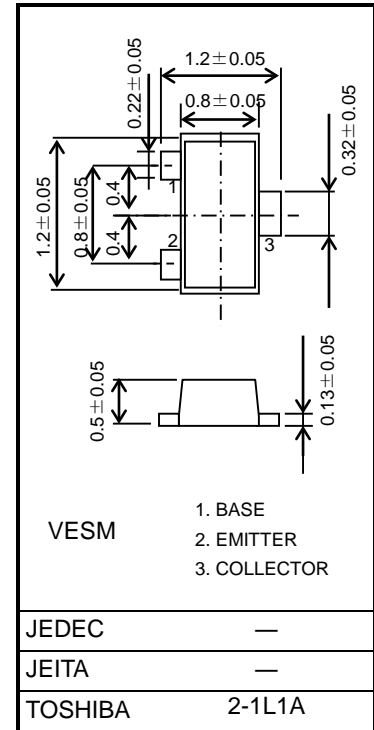
Unit: mm

- 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 |



Weight: 1.5 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

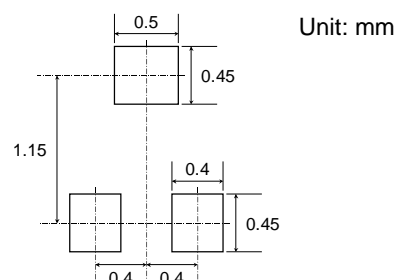
| Characteristic | Symbol | Rating | Unit |
|-----------------------------|------------|------------|------|
| Collector-base voltage | VCBO | -50 | V |
| Collector-emitter voltage | VCEO | -50 | V |
| Emitter-base voltage | VEBO | -6 | V |
| | | -7 | |
| | | -15 | |
| Collector current | IC | -100 | 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)

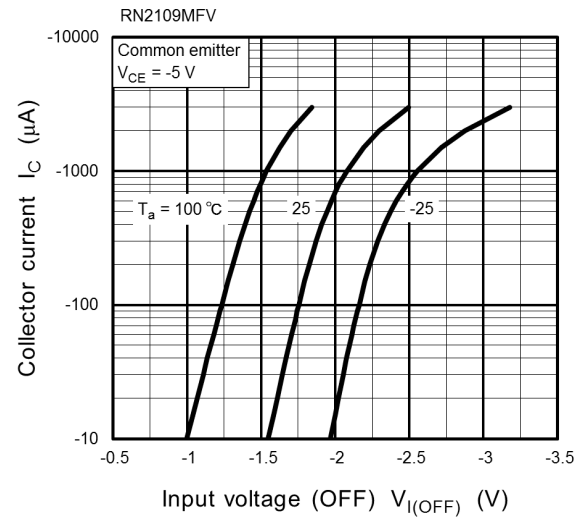
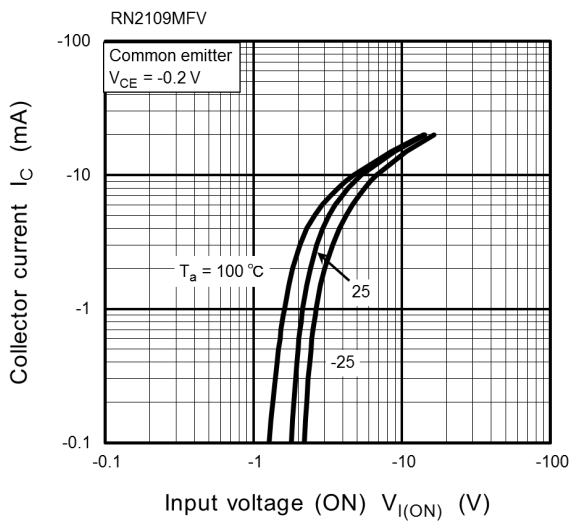
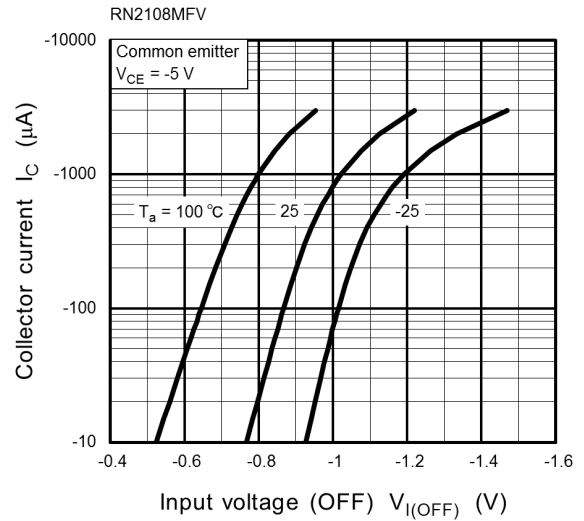
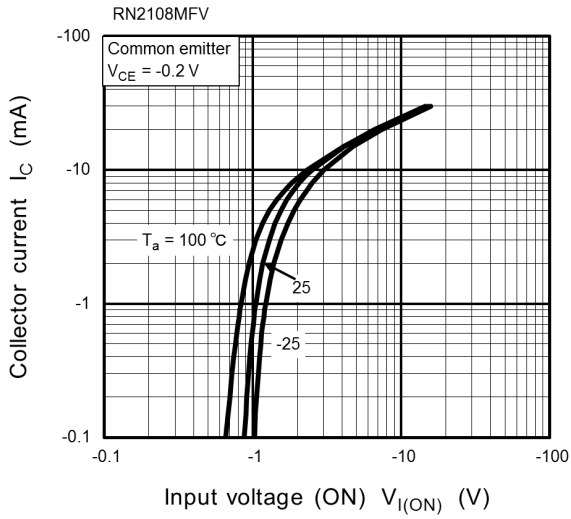
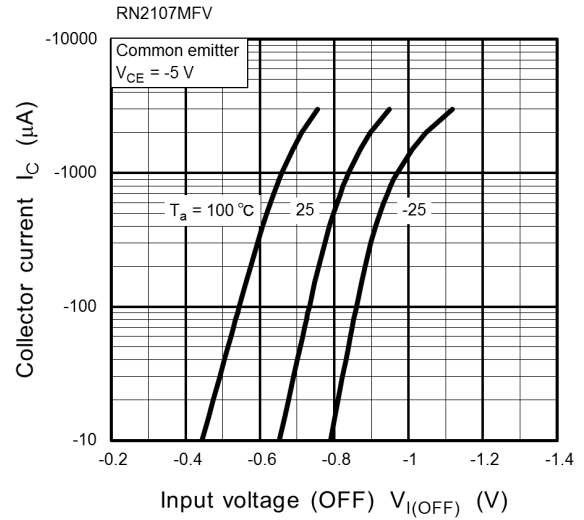
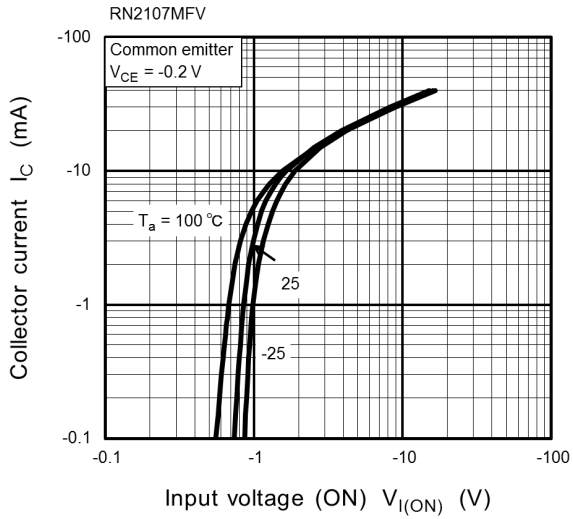
Land Pattern Example

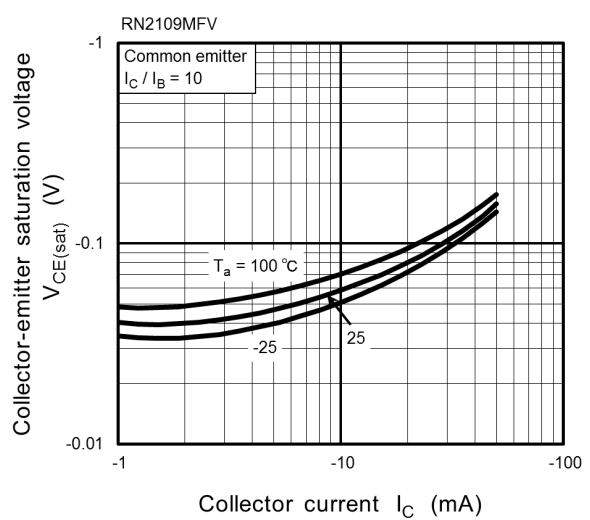
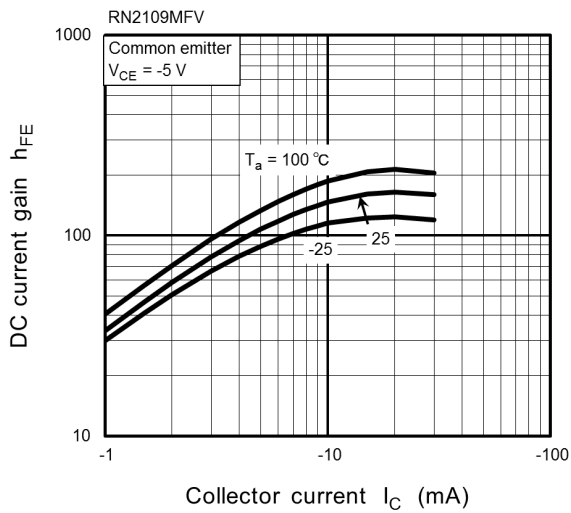
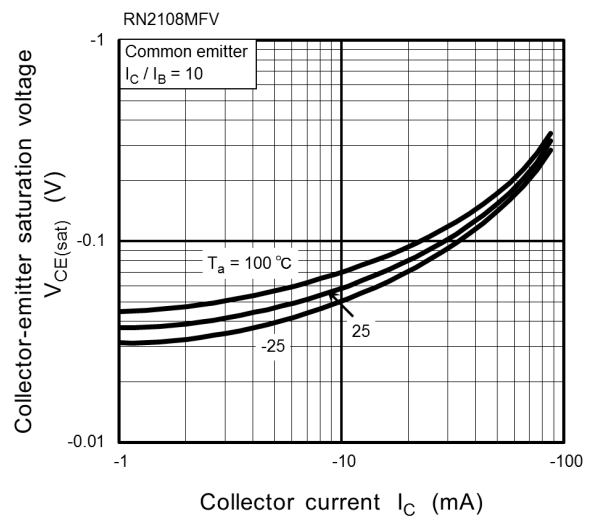
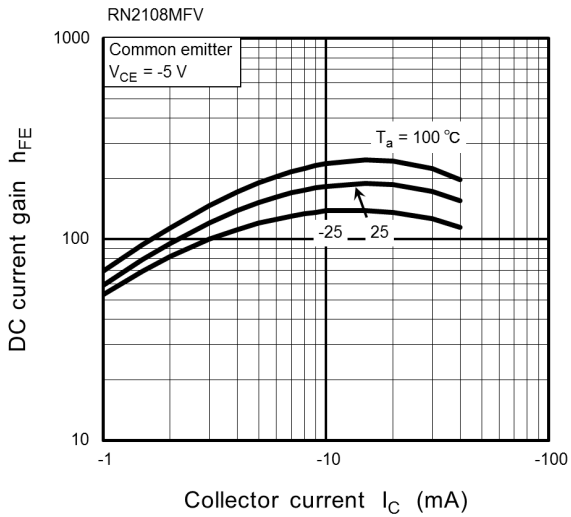
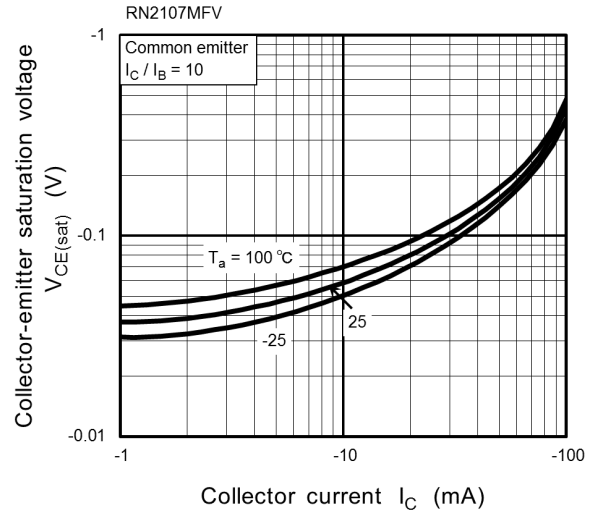
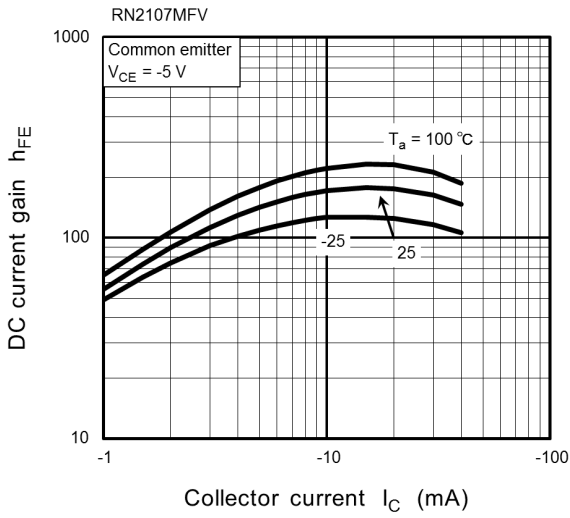


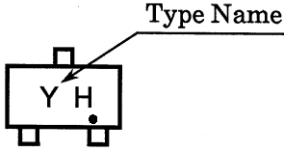
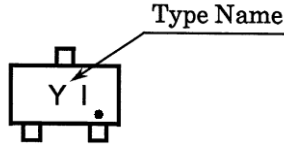
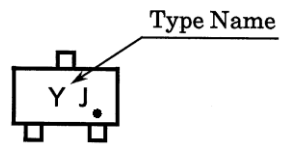
Start of commercial production
2005-02

Electrical Characteristics (Ta = 25°C)

| Characteristic | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|------------------------|-----------------------|---|--------|-------|--------|------|
| Collector cutoff current | RN2107MFV to RN2109MFV | ICBO | V _{CB} = -50 V, I _E = 0 A | — | — | -100 | nA |
| | | ICEO | V _{CE} = -50 V, I _B = 0 A | — | — | -500 | nA |
| Emitter cutoff current | RN2107MFV | IEBO | V _{EB} = -6 V, I _C = 0 A | -0.081 | — | -0.15 | mA |
| | RN2108MFV | | | -0.078 | — | -0.145 | |
| | RN2109MFV | | | -0.167 | — | -0.311 | |
| DC current gain | RN2107MFV | h _{FE} | V _{CE} = -5 V, I _C = -10 mA | 80 | — | — | — |
| | RN2108MFV | | | 80 | — | — | |
| | RN2109MFV | | | 70 | — | — | |
| Collector-emitter saturation voltage | RN2107MFV to RN2109MFV | V _{CE (sat)} | I _C = -5 mA, I _B = -0.5 mA | — | -0.1 | -0.3 | V |
| Input voltage (ON) | RN2107MFV | V _{I (ON)} | V _{CE} = -0.2 V, I _C = -5 mA | -0.7 | — | -1.8 | V |
| | RN2108MFV | | | -1.0 | — | -2.6 | |
| | RN2109MFV | | | -2.2 | — | -5.8 | |
| Input voltage (OFF) | RN2107MFV | V _{I (OFF)} | V _{CE} = -5 V, I _C = -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 _{ob} | V _{CB} = -10 V, I _E = 0 A, f = 1 MHz | — | 0.9 | — | pF |
| Input resistor | RN2107MFV | R1 | — | 7 | 10 | 13 | kΩ |
| | RN2108MFV | | | 15.4 | 22 | 28.6 | |
| | RN2109MFV | | | 32.9 | 47 | 61.1 | |
| Resistor ratio | RN2107MFV | R1/R2 | — | 0.17 | 0.213 | 0.255 | — |
| | RN2108MFV | | | 0.374 | 0.468 | 0.562 | |
| | RN2109MFV | | | 1.71 | 2.14 | 2.56 | |





| Type Name | Marking |
|-----------|---|
| RN2107MFV |  <p>The diagram shows a rectangular component with a small square protrusion at the top center and two small square protrusions at the bottom corners. Inside the rectangle, the characters 'Y H' are printed. A line points from the text 'Type Name' to the 'Y' character.</p> |
| RN2108MFV |  <p>The diagram shows a rectangular component with a small square protrusion at the top center and two small square protrusions at the bottom corners. Inside the rectangle, the characters 'Y I' are printed. A line points from the text 'Type Name' to the 'Y' character.</p> |
| RN2109MFV |  <p>The diagram shows a rectangular component with a small square protrusion at the top center and two small square protrusions at the bottom corners. Inside the rectangle, the characters 'Y J' are printed. A line points from the text 'Type Name' to the 'Y' character.</p> |

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