

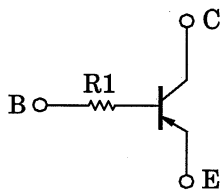
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

## RN2112MFV, RN2113MFV

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 RN1112MFV and RN1113MFV

### Equivalent Circuit



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

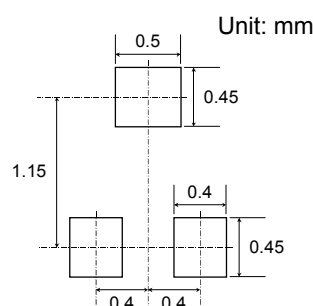
| Characteristic              | Symbol         | Rating     | Unit |
|-----------------------------|----------------|------------|------|
| Collector-base voltage      | $V_{CBO}$      | -50        | V    |
| Collector-emitter voltage   | $V_{CEO}$      | -50        | V    |
| Emitter-base voltage        | $V_{EBO}$      | -5         | V    |
| Collector current           | $I_C$          | -100       | mA   |
| Collector power dissipation | $P_C$ (Note 1) | 150        | mW   |
| Junction temperature        | $T_j$          | 150        | °C   |
| Storage temperature range   | $T_{stg}$      | -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.

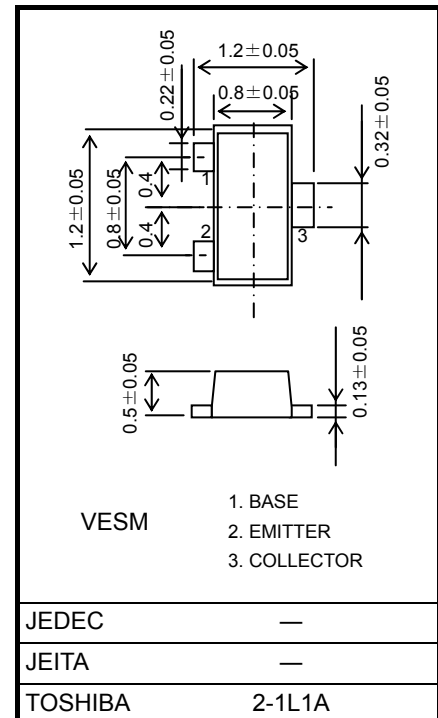
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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

### Land Pattern Example



Unit: mm



JEDEC

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JEITA

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TOSHIBA

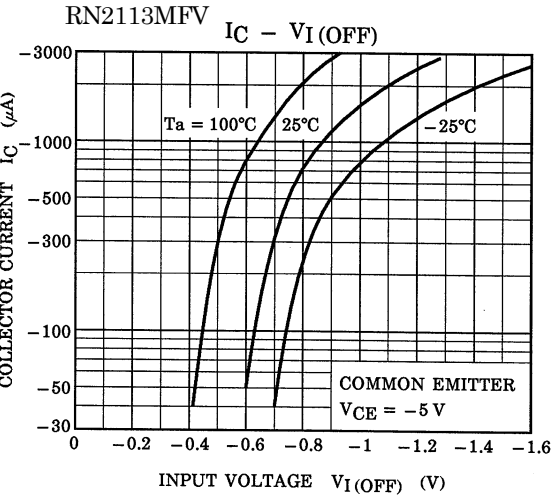
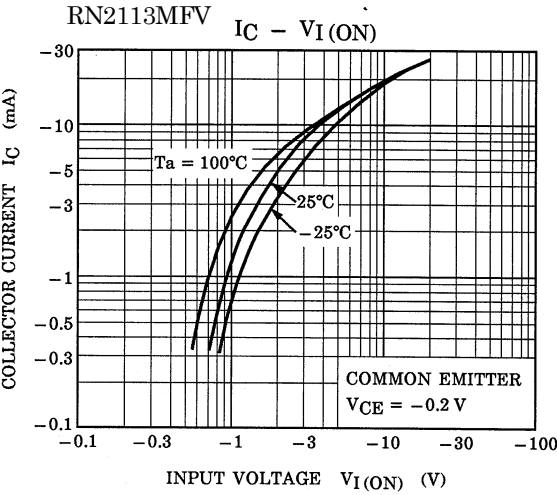
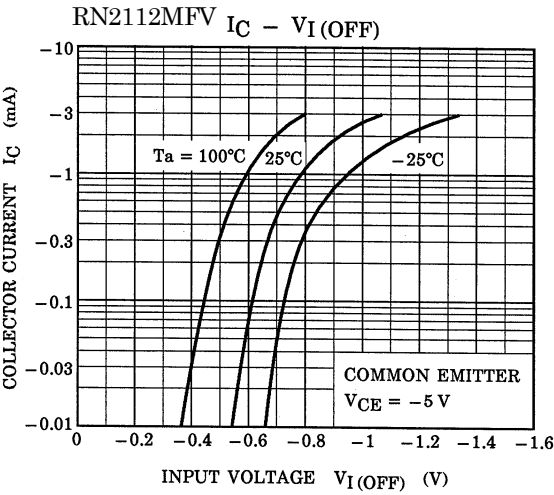
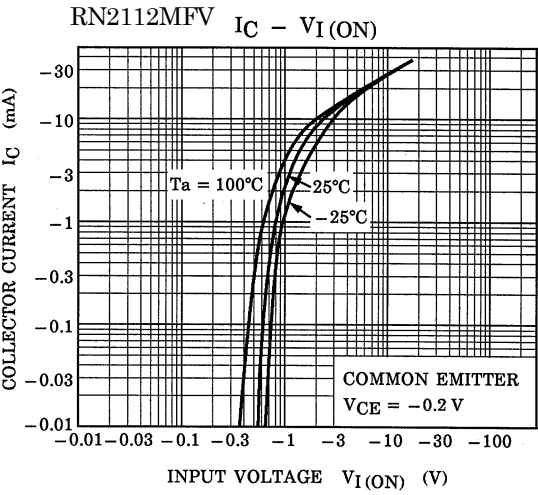
2-1L1A

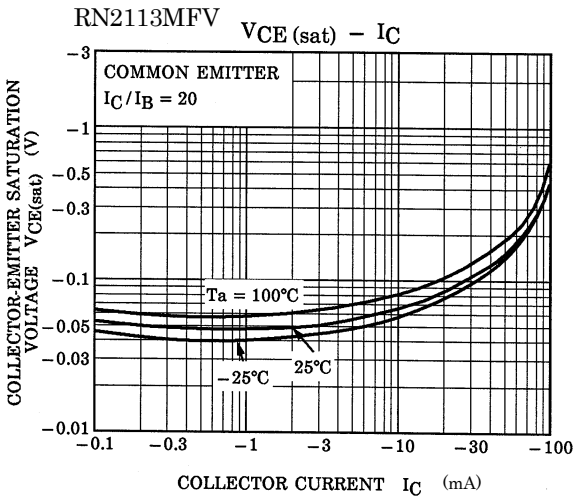
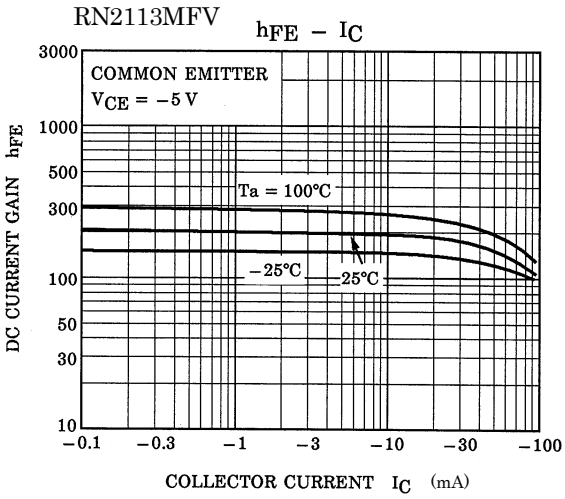
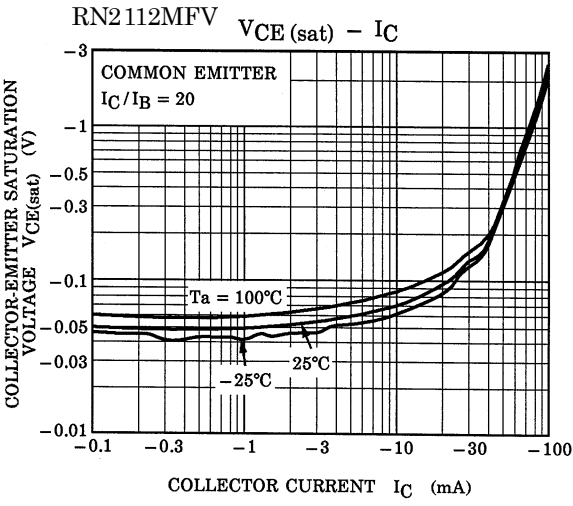
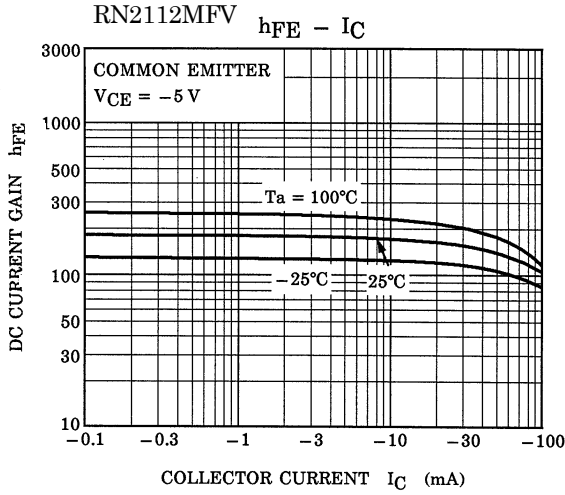
Weight: 1.5 mg (typ.)

Start of commercial production  
2005-02

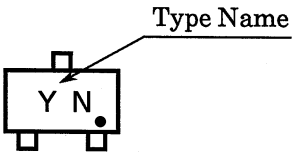
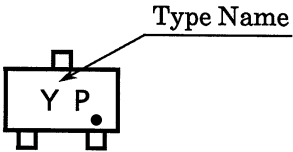
**Electrical Characteristics (Ta = 25°C)**

| Characteristic                       |           | Symbol        | Test Circuit | Test Condition                                     | Min  | Typ. | Max  | Unit      |
|--------------------------------------|-----------|---------------|--------------|----------------------------------------------------|------|------|------|-----------|
| Collector cutoff current             |           | $I_{CBO}$     | —            | $V_{CB} = -50\text{ V}, I_E = 0$                   | —    | —    | -100 | nA        |
| Emitter cutoff current               |           | $I_{EBO}$     | —            | $V_{EB} = -5\text{ V}, I_C = 0$                    | —    | —    | -100 | nA        |
| DC current gain                      |           | $h_{FE}$      | —            | $V_{CE} = -5\text{ V}, I_C = -1\text{ mA}$         | 120  | —    | 400  | —         |
| Collector-emitter saturation voltage |           | $V_{CE(sat)}$ | —            | $I_C = -5\text{ mA}, I_B = -0.5\text{ mA}$         | —    | -0.1 | -0.3 | V         |
| Collector output capacitance         |           | $C_{ob}$      | —            | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | —    | 0.9  | —    | pF        |
| Input resistor                       | RN2112MFV | R1            | —            | —                                                  | 15.4 | 22   | 28.6 | $k\Omega$ |
|                                      | RN2113MFV |               |              |                                                    | 32.9 | 47   | 61.1 |           |





**Marking**

| Type Name | Marking                                                                                                                                                                                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RN2112MFV |  <p>The diagram shows a rectangular component with four mounting pins. The top pin is labeled 'Type Name' with an arrow. The bottom-left pin is labeled 'Y N' with a dot. The bottom-right pin is labeled 'Y N' with a dot.</p> |
| RN2113MFV |  <p>The diagram shows a rectangular component with four mounting pins. The top pin is labeled 'Type Name' with an arrow. The bottom-left pin is labeled 'Y P' with a dot. The bottom-right pin is labeled 'Y P' with a dot.</p> |

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