

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

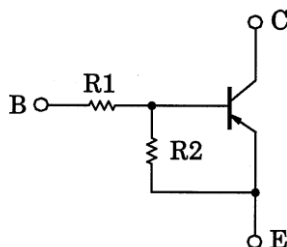
## RN2107MFV, RN2108MFV, RN2109MFV

Switching, Inverter Circuit, Interface Circuit  
and Driver Circuit Applications

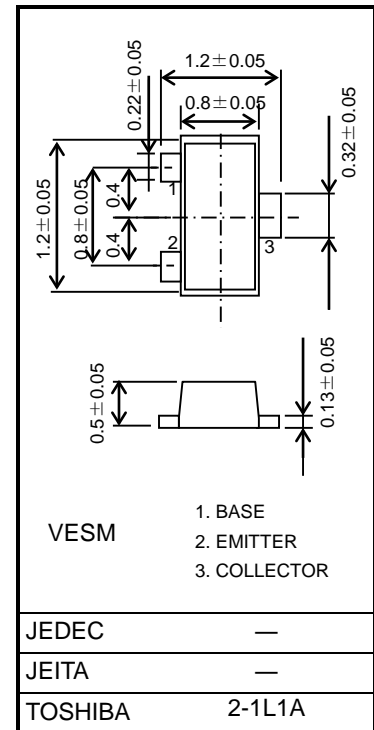
Unit: mm

- 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)

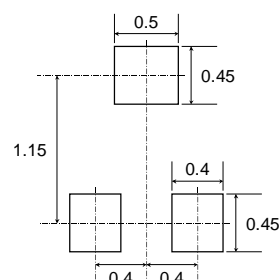
Characteristic	Symbol	Rating	Unit
Collector-base voltage	VCBO	−50	V
Collector-emitter voltage	VCEO	−50	V
Emitter-base voltage	VEBO	−6	V
		−7	
		−15	
Collector current	IC	−100	mA
Collector power dissipation	PC(Note 1)	150	mW
Junction temperature	Tj	150	°C
Storage temperature range	Tstg	−55 to 150	°C

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

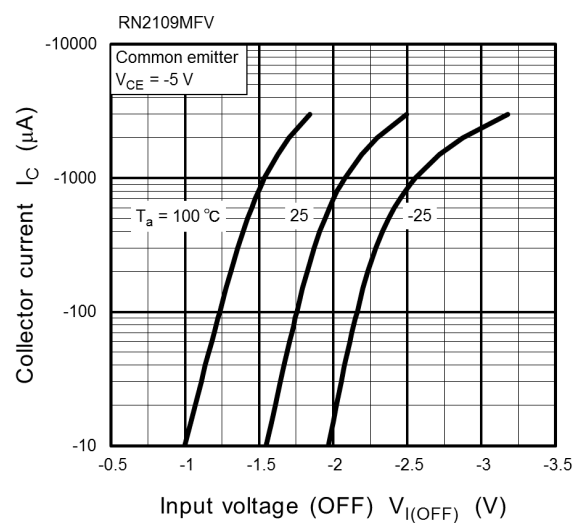
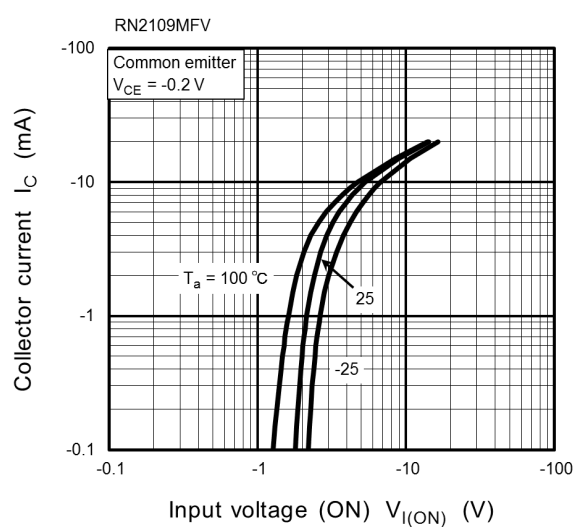
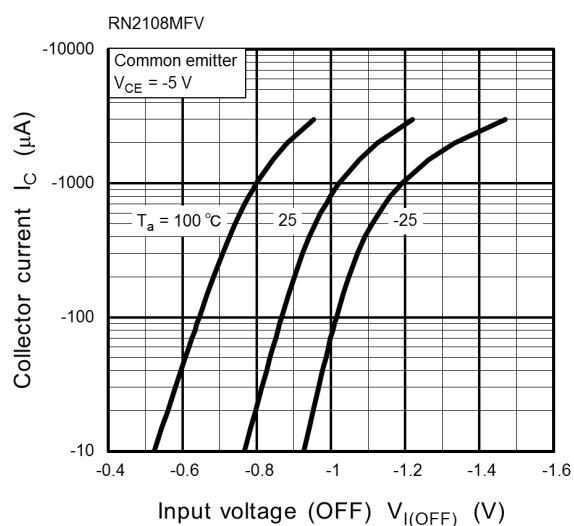
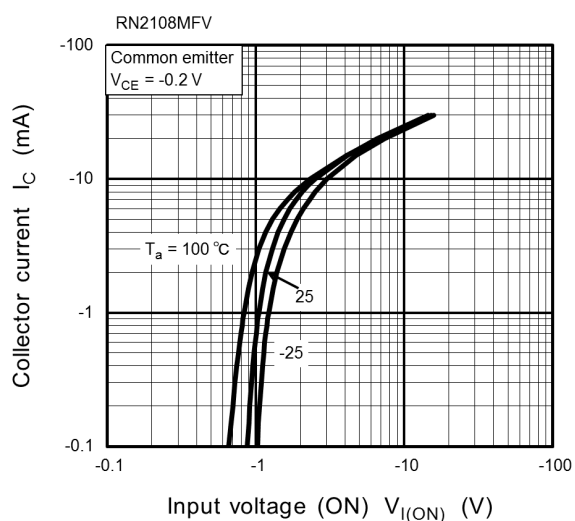
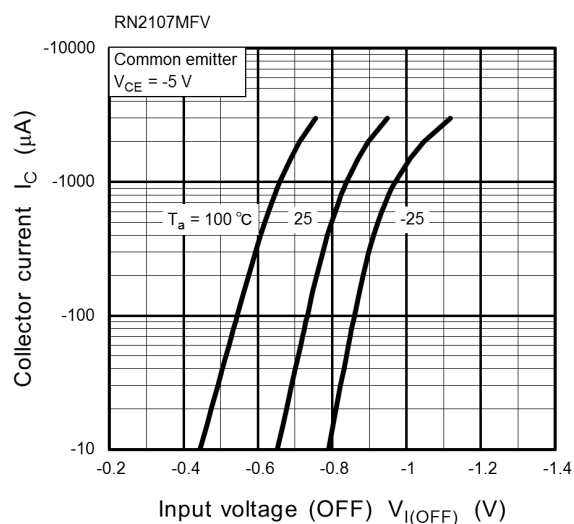
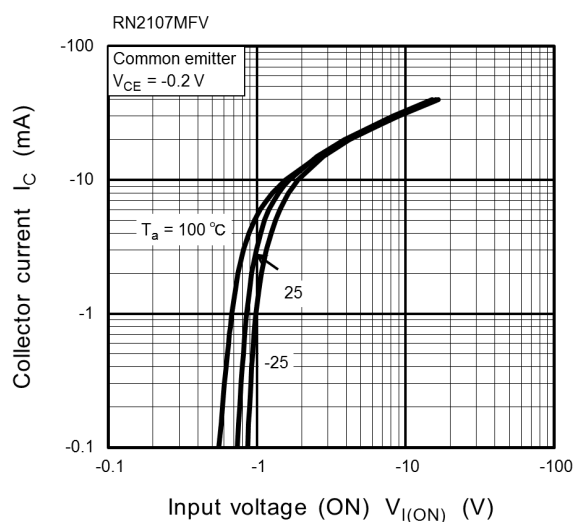


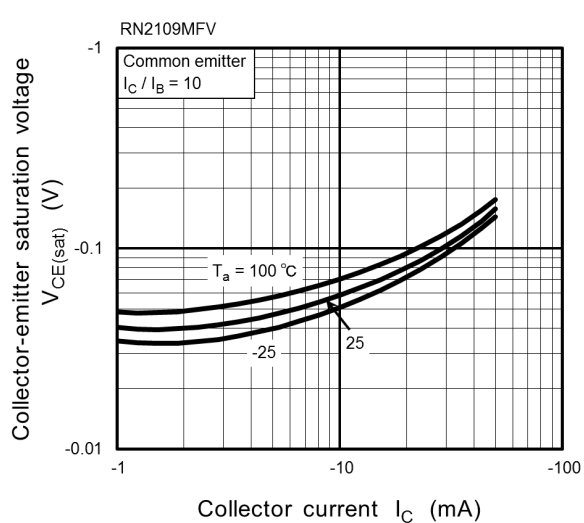
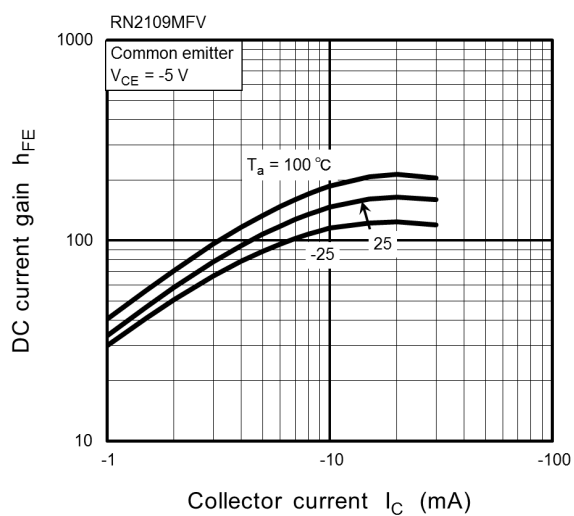
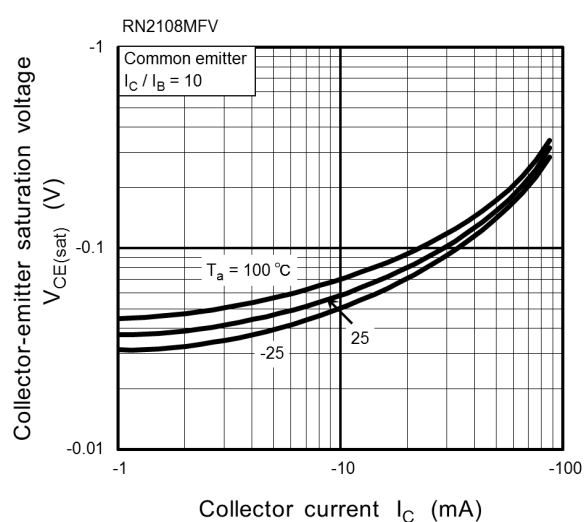
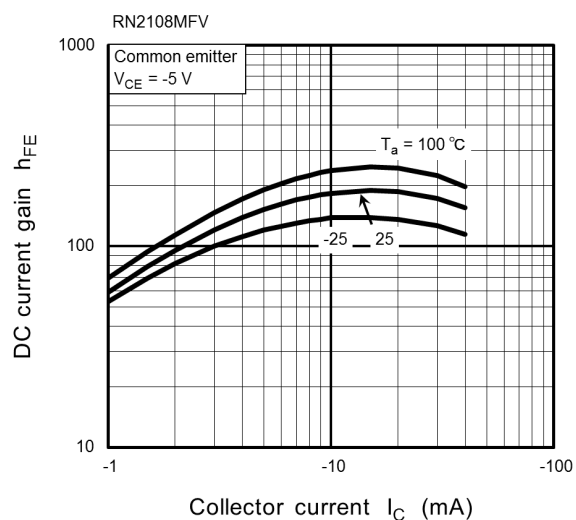
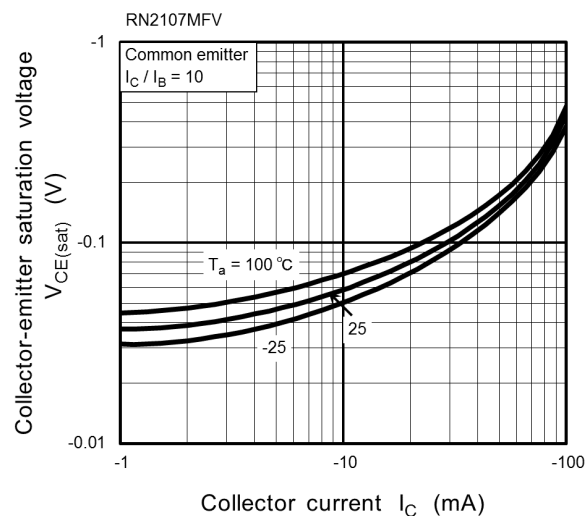
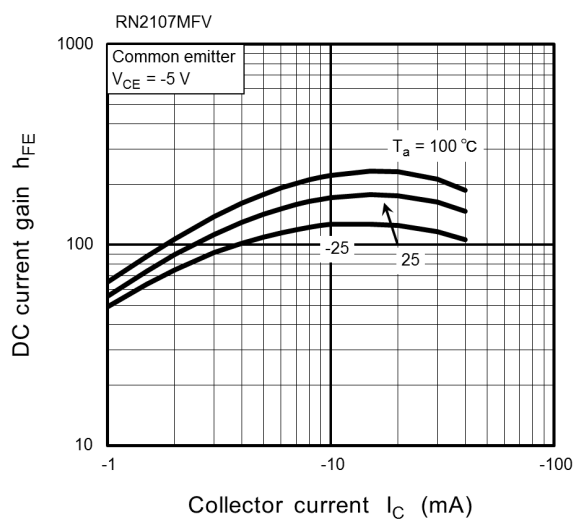
Unit: mm

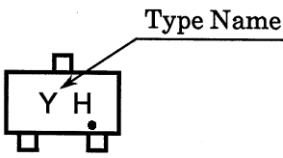
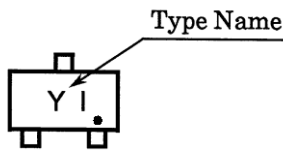
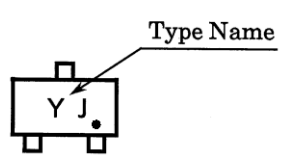
Start of commercial production  
2005-02

**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, 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, 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, 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, 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, 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</sub> /R <sub>2</sub>	—	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 four 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 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 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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