

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

(Bias Resistor built-in Transistor)

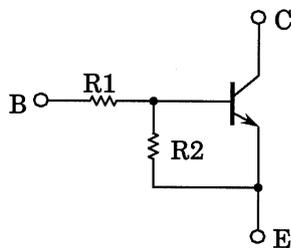
## RN1107MFV, RN1108MFV, RN1109MFV

Unit: mm

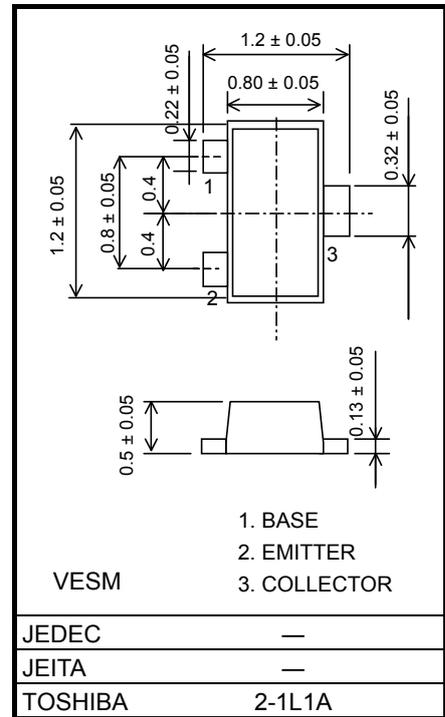
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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 RN2107MFV to RN2109MFV

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107MFV	10	47
RN1108MFV	22	47
RN1109MFV	47	22



Weight: 1.5 mg (typ.)

### 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	$V_{EBO}$	6	V
		7	
		15	
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

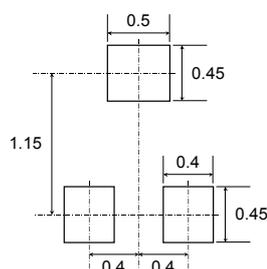
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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)

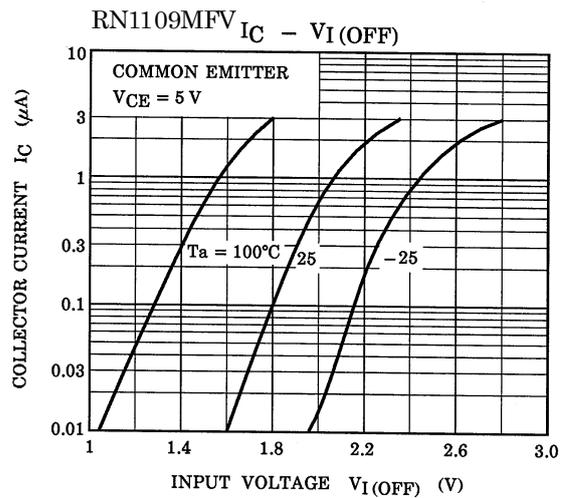
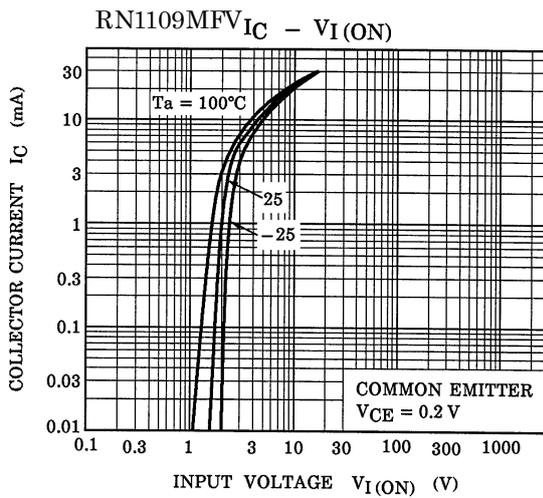
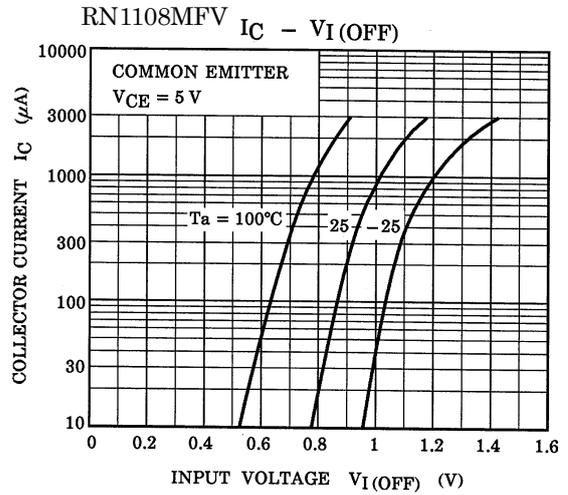
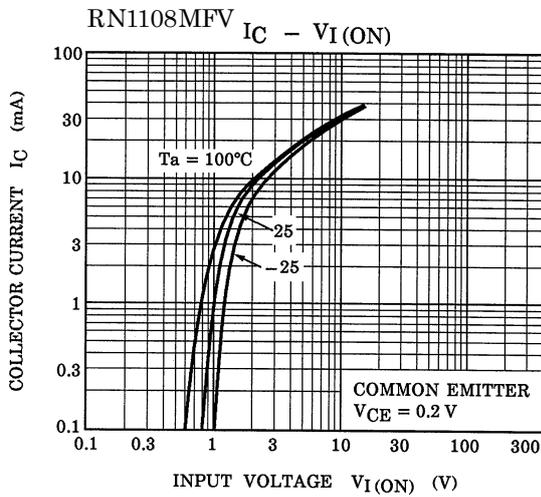
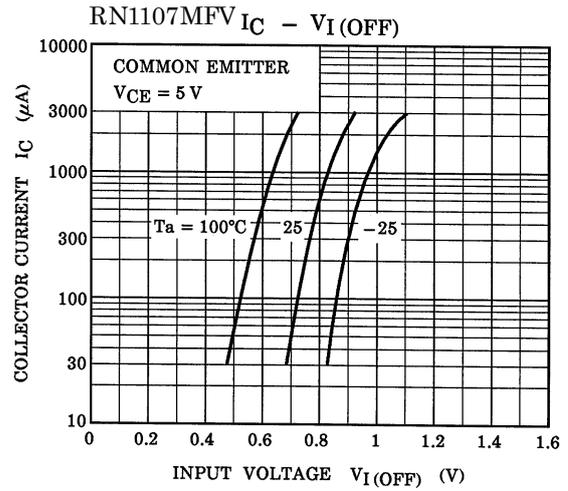
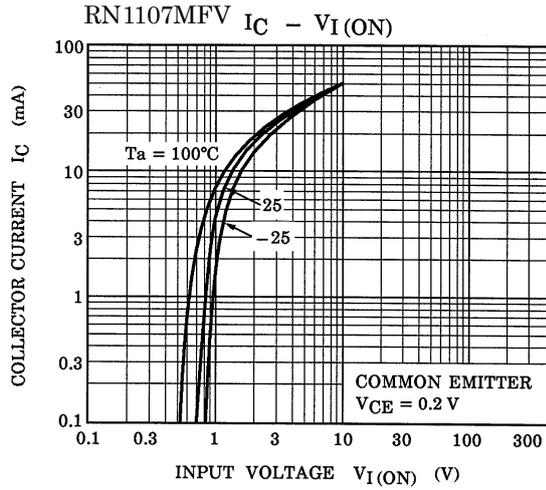
### Pad Dimension (Reference)

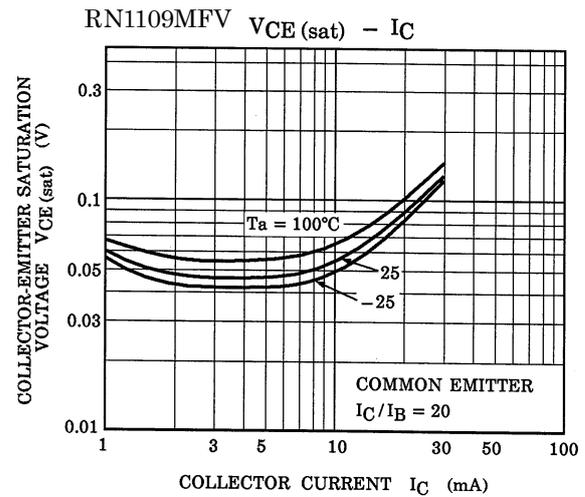
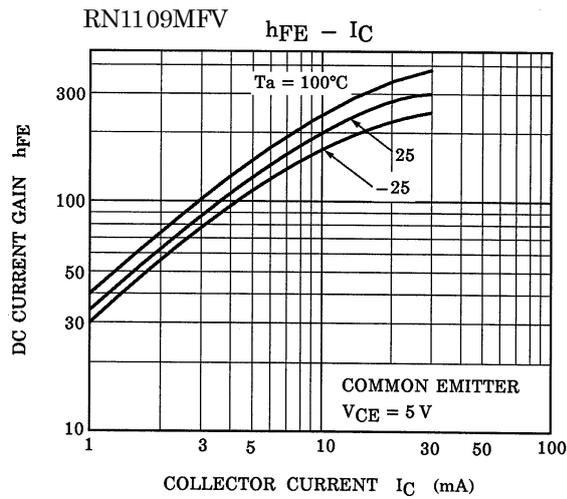
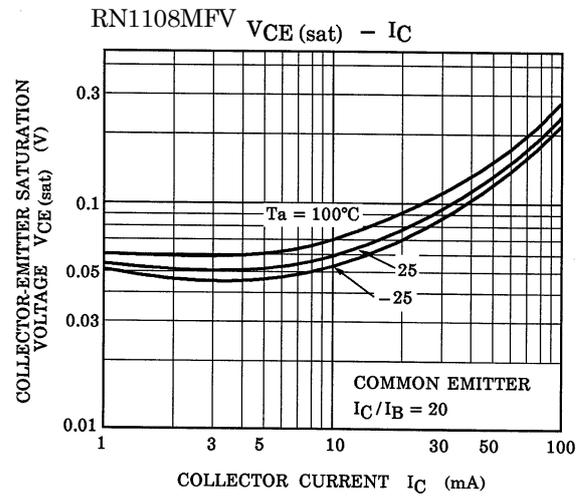
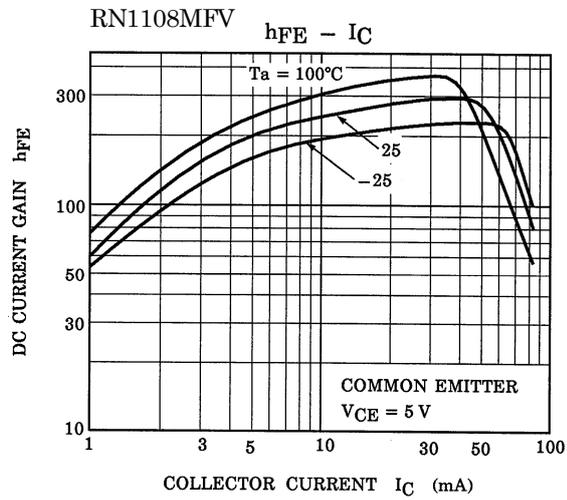
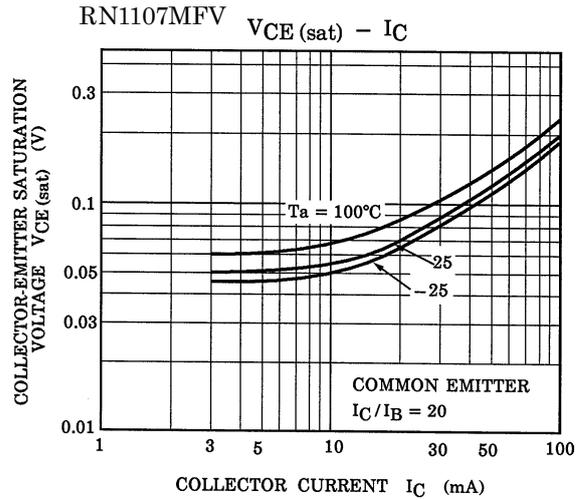
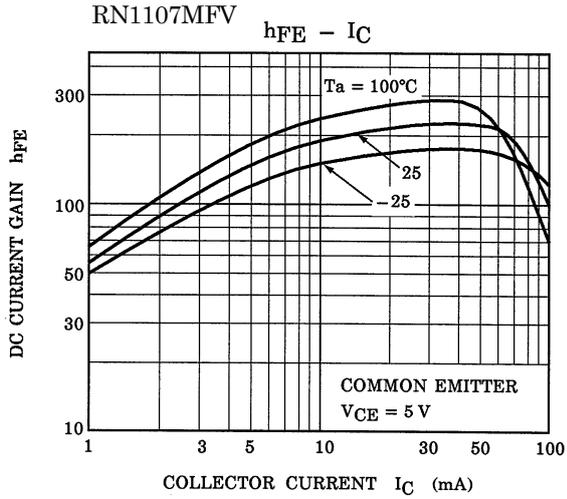
Unit : mm



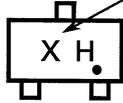
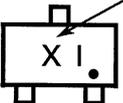
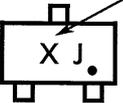
## Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1107MFV to 1109MFV	$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	nA
Emitter cutoff current	RN1107MFV	$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.081	—	0.15	mA
	RN1108MFV		$V_{EB} = 7\text{ V}, I_C = 0$	0.078	—	0.145	
	RN1109MFV		$V_{EB} = 15\text{ V}, I_C = 0$	0.167	—	0.311	
DC current gain	RN1107MFV	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	
	RN1108MFV			80	—	—	
	RN1109MFV			70	—	—	
Collector-emitter saturation voltage	RN1107MFV to 1109MFV	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.5\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1107MFV	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.8	V
	RN1108MFV			1.0	—	2.6	
	RN1109MFV			2.2	—	5.8	
Input voltage (OFF)	RN1107MFV	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
	RN1108MFV			0.6	—	1.16	
	RN1109MFV			1.5	—	2.6	
Collector output capacitance	RN1107MFV to 1109MFV	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.7	—	pF
Input resistor	RN1107MFV	R1	—	7	10	13	k $\Omega$
	RN1108MFV			15.4	22	28.6	
	RN1109MFV			32.9	47	61.1	
Resistor ratio	RN1107MFV	R1/R2	—	0.17	0.213	0.255	
	RN1108MFV			0.374	0.468	0.562	
	RN1109MFV			1.71	2.14	2.56	





## Marking

Type Name	Marking
RN1107MFV	 <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 'X H' are printed, with a small dot to the right of the 'H'. An arrow points from the text 'Type Name' to the top protrusion.</p>
RN1108MFV	 <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 'X I' are printed, with a small dot to the right of the 'I'. An arrow points from the text 'Type Name' to the top protrusion.</p>
RN1109MFV	 <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 'X J' are printed, with a small dot to the right of the 'J'. An arrow points from the text 'Type Name' to the top protrusion.</p>

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