

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

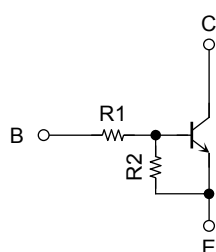
## RN1107ACT, RN1108ACT, RN1109ACT

Switching, Inverter Circuit, Interface Circuit and  
Driver Circuit Applications

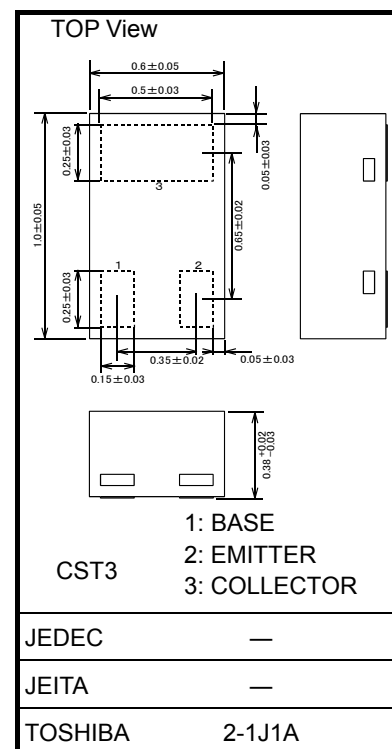
Unit: mm

- Extra small package(CST3) is applicable for extra high density fabrication.
- Incorporating a bias resistor into a transistor reduces the number of parts, which enables the manufacture of ever more compact equipment and saves assembly cost.
- Complementary to RN2107ACT to RN2109ACT

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107ACT	10	47
RN1108ACT	22	47
RN1109ACT	47	22



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

Weight: 0.75 mg (typ.)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1107ACT to RN1109ACT	V <sub>CB0</sub>	50	V
Collector-emitter voltage		V <sub>CE0</sub>	50	V
Emitter-base voltage	RN1107ACT	V <sub>EB0</sub>	6	V
	RN1108ACT		7	
	RN1109ACT		15	
Collector current	RN1107ACT to RN1109ACT	I <sub>C</sub>	80	mA
Collector power dissipation		P <sub>C</sub> (Note1)	100	mW
Junction temperature		T <sub>j</sub>	150	°C
Storage temperature range		T <sub>stg</sub>	−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.

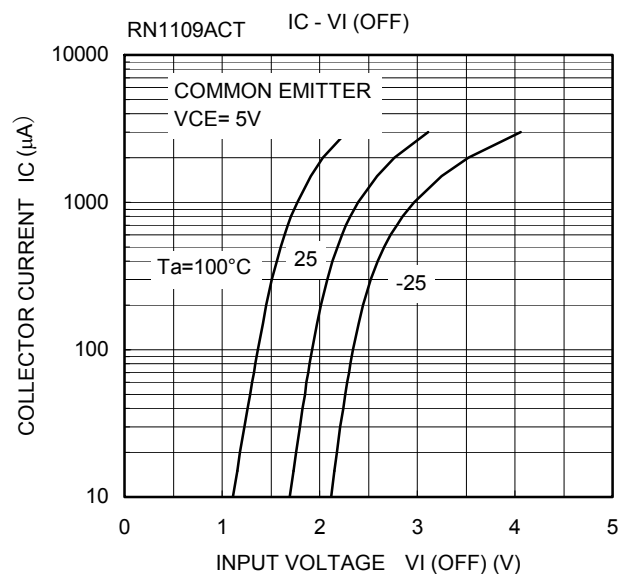
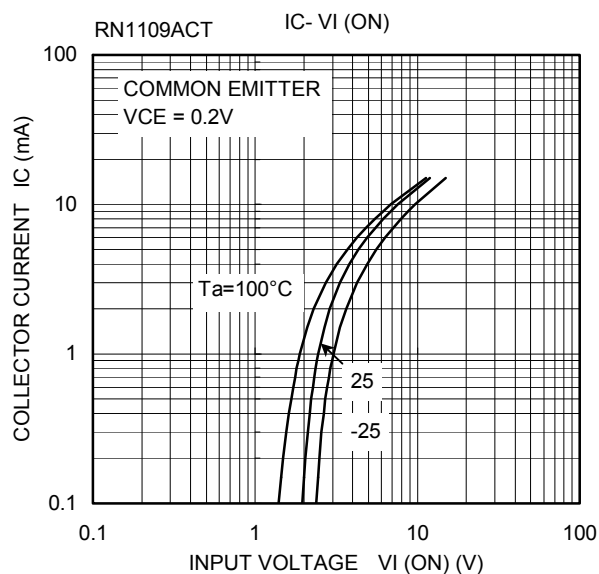
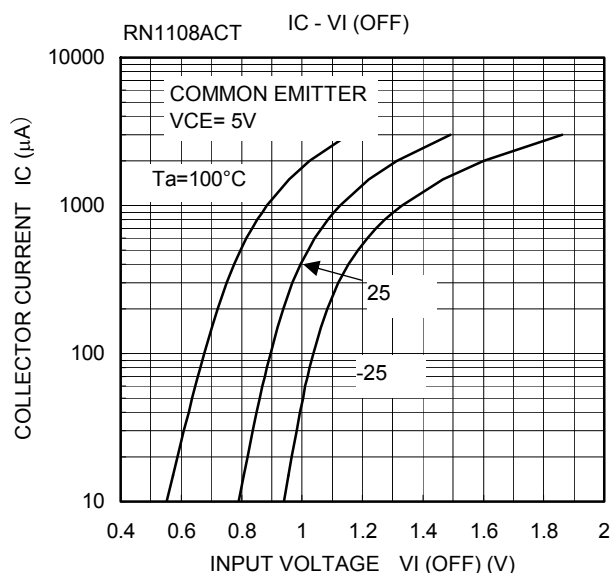
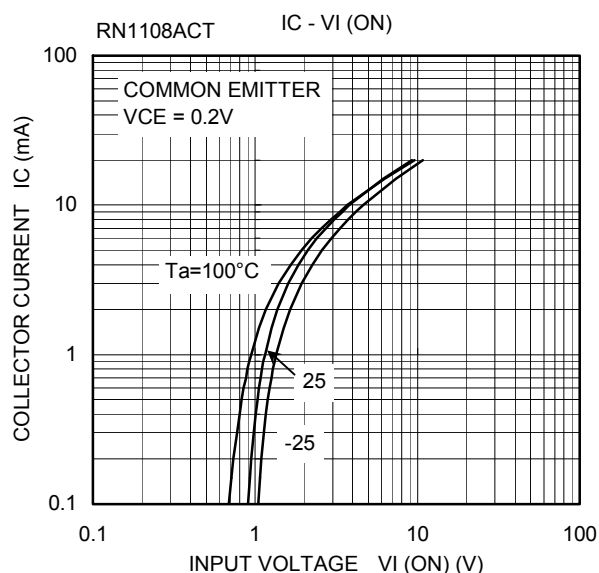
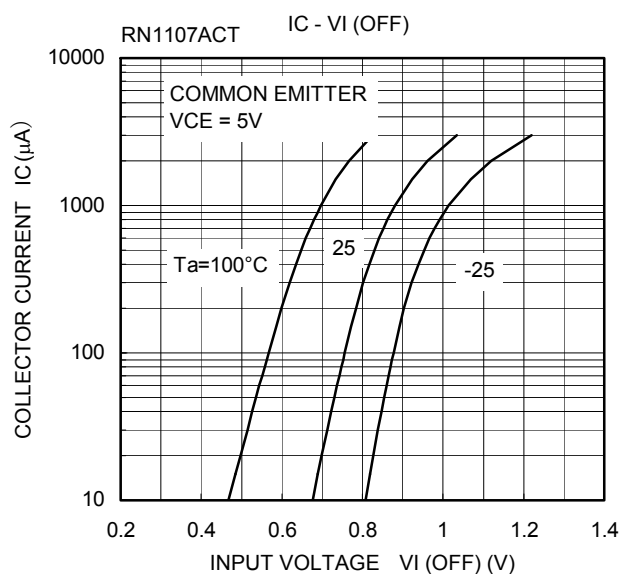
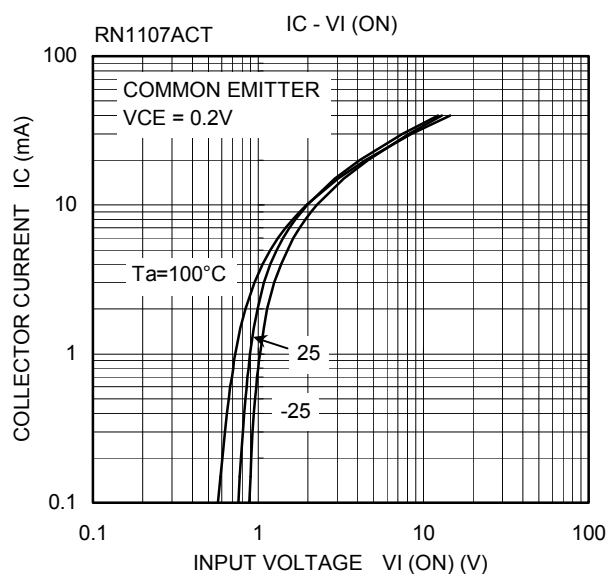
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

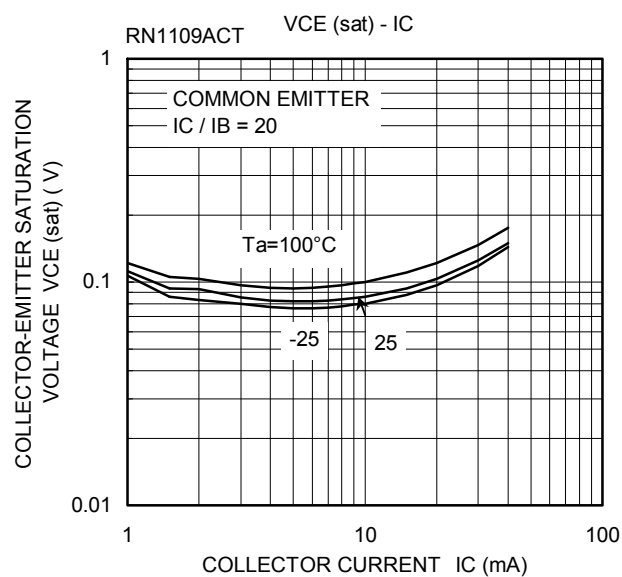
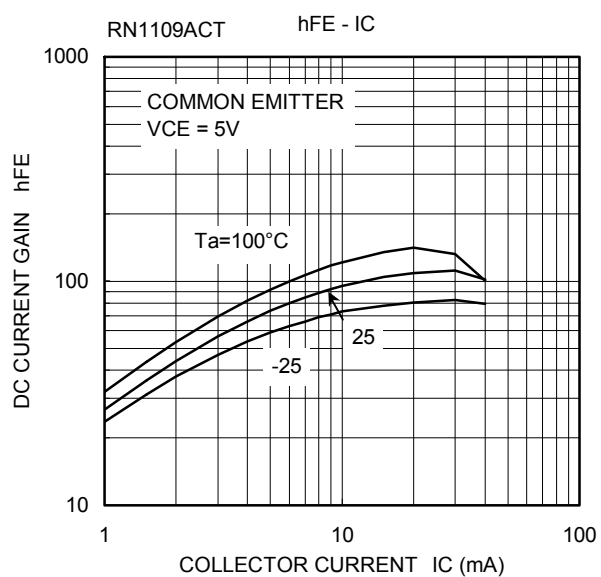
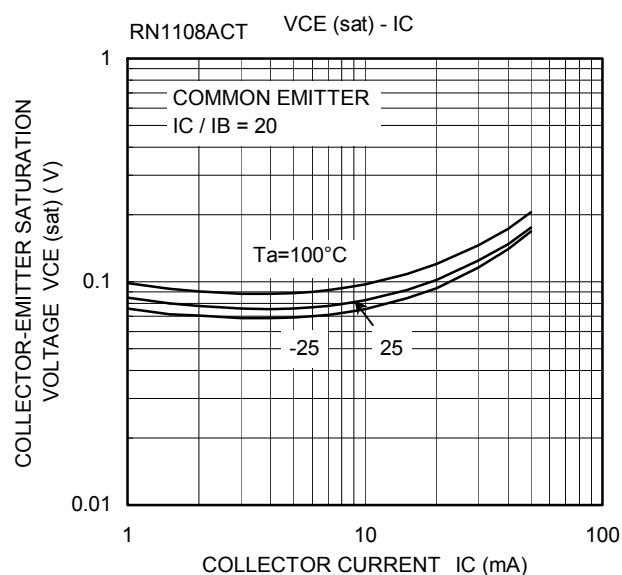
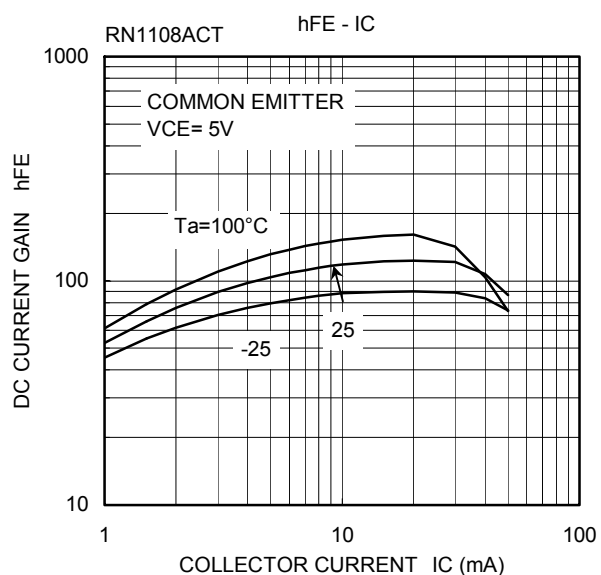
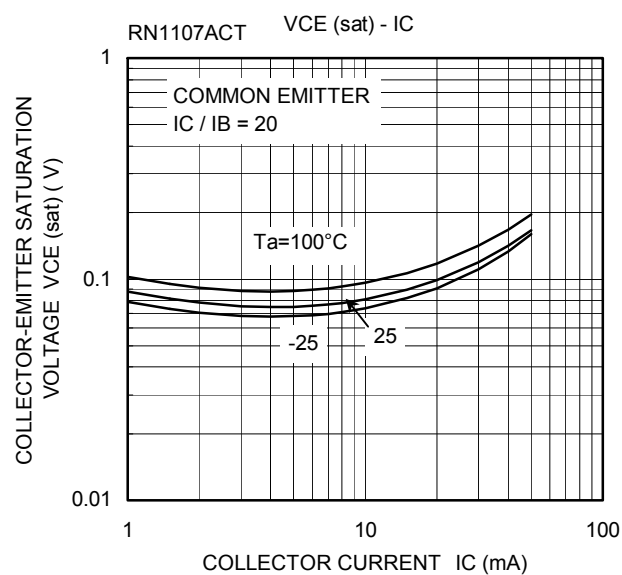
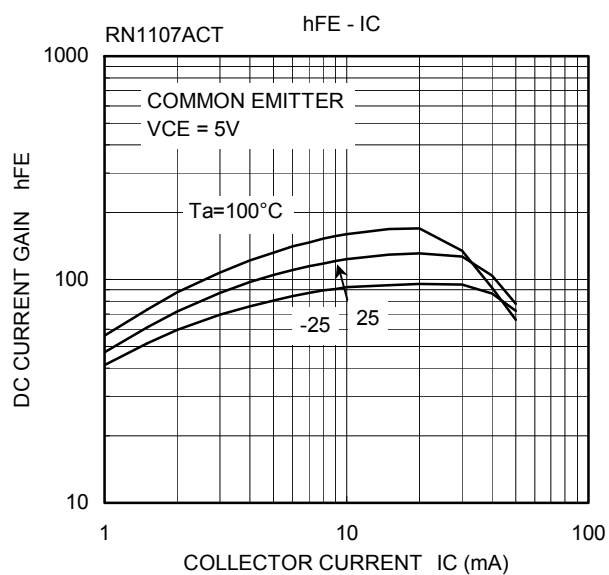
Note1 : Mounted on FR4 board (10 mm × 10 mm × 1 mm)

Start of commercial production  
2004-08

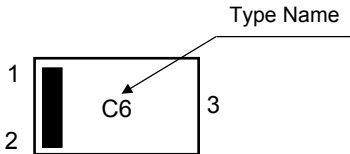
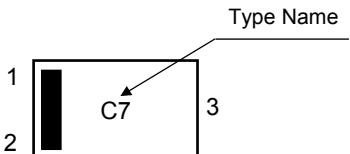
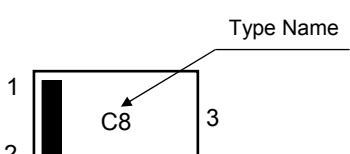
**Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1107ACT to 1109ACT	$I_{CBO}$	$V_{CB} = 50 \text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$	$V_{CE} = 50 \text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1107ACT	$I_{EBO}$	$V_{EB} = 6 \text{ V}, I_C = 0$	0.088	—	0.131	mA
	RN1108ACT		$V_{EB} = 7 \text{ V}, I_C = 0$	0.085	—	0.126	
	RN1109ACT		$V_{EB} = 15 \text{ V}, I_C = 0$	0.182	—	0.271	
DC current gain	RN1107ACT	$h_{FE}$	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	80	—	—	
	RN1108ACT			80	—	—	
	RN1109ACT			70	—	—	
Collector-emitter saturation voltage	RN1107ACT to 1109ACT	$V_{CE(sat)}$	$I_C = 5 \text{ mA}, I_B = 0.25 \text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1107ACT	$V_I(ON)$	$V_{CE} = 0.2 \text{ V}, I_C = 5 \text{ mA}$	0.8	—	1.8	V
	RN1108ACT			1.0	—	3.0	
	RN1109ACT			2.0	—	6.4	
Input voltage (OFF)	RN1107ACT	$V_I(OFF)$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}$	0.6	—	0.9	V
	RN1108ACT			0.7	—	1.2	
	RN1109ACT			1.5	—	2.6	
Collector output capacitance	RN1107ACT to 1109ACT	$C_{ob}$	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	0.7	—	pF
Input resistor	RN1107ACT	R1	—	8	10	12	k $\Omega$
	RN1108ACT			17.6	22	26.4	
	RN1109ACT			37.6	47	56.4	
Resistor ratio	RN1107ACT	R1/R2	—	0.17	0.213	0.255	
	RN1108ACT			0.374	0.468	0.562	
	RN1109ACT			1.71	2.14	2.56	





**Marking**

Type Name	Marking
RN1107ACT	 <p>The diagram shows a rectangular marking area with a thick black vertical bar on the left. The bar is labeled '1' at the top and '2' at the bottom. To the right of the bar is the text 'C6'. A line points from the label 'Type Name' to the top right corner of the rectangle, which is labeled '3'.</p>
RN1108ACT	 <p>The diagram shows a rectangular marking area with a thick black vertical bar on the left. The bar is labeled '1' at the top and '2' at the bottom. To the right of the bar is the text 'C7'. A line points from the label 'Type Name' to the top right corner of the rectangle, which is labeled '3'.</p>
RN1109ACT	 <p>The diagram shows a rectangular marking area with a thick black vertical bar on the left. The bar is labeled '1' at the top and '2' at the bottom. To the right of the bar is the text 'C8'. A line points from the label 'Type Name' to the top right corner of the rectangle, which is labeled '3'.</p>

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