

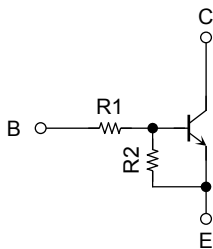
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1107ACT, RN1108ACT, RN1109ACT

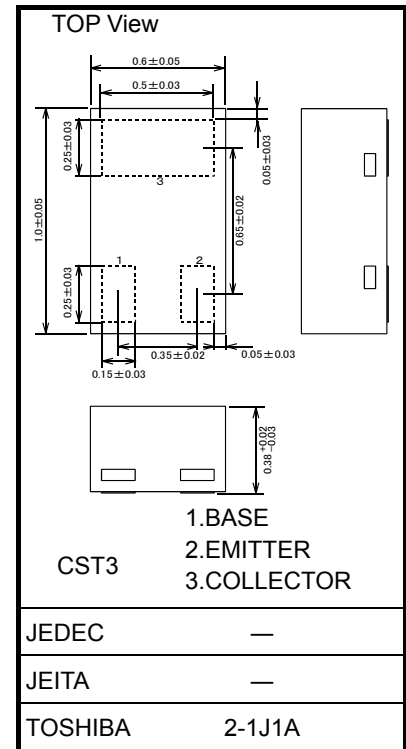
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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 (k Ω)	R2 (k Ω)
RN1107ACT	10	47
RN1108ACT	22	47
RN1109ACT	47	22



Weight: 0.75 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1107ACT to RN1109ACT	V_{CB0}	50	V
Collector-emitter voltage		V_{CE0}	50	V
Emitter-base voltage	RN1107ACT	V_{EB0}	6	V
	RN1108ACT		7	
	RN1109ACT		15	
Collector current	RN1107ACT to RN1109ACT	I_C	80	mA
Collector power dissipation		P_C (Note1)	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-55 to 150	°C

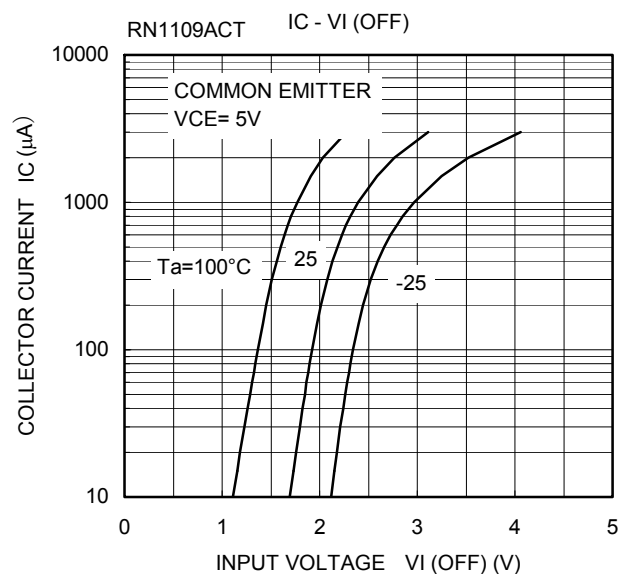
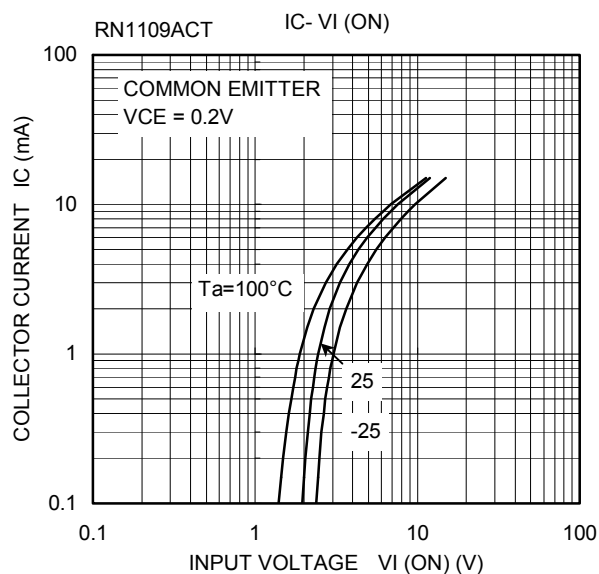
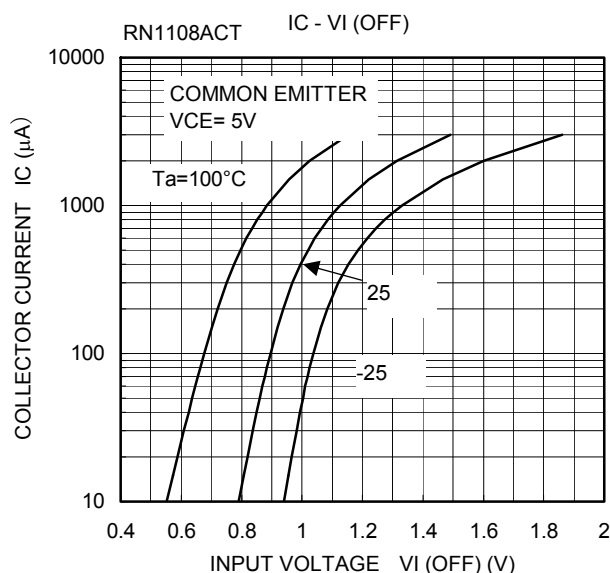
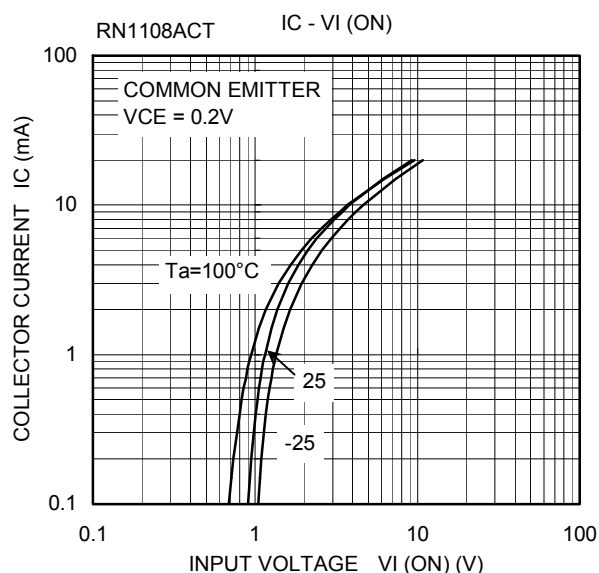
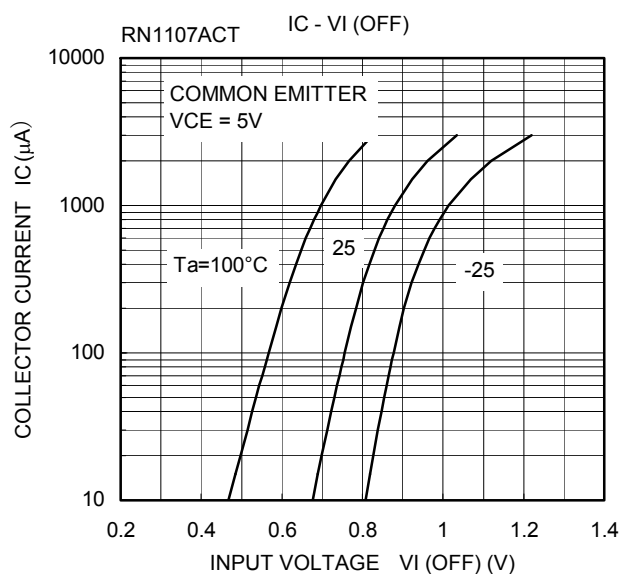
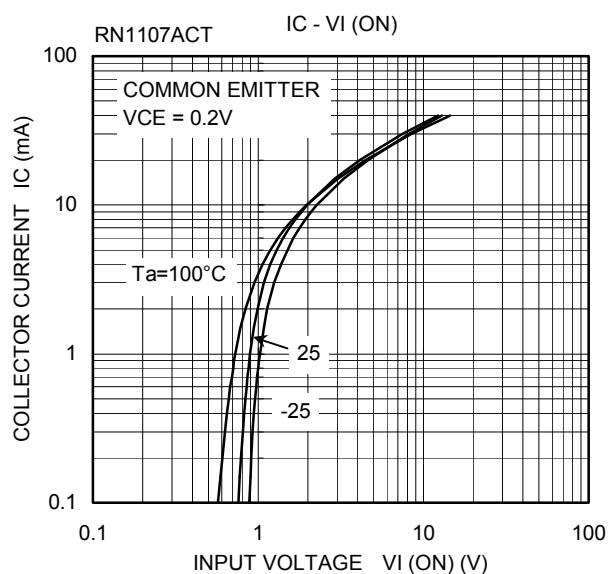
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

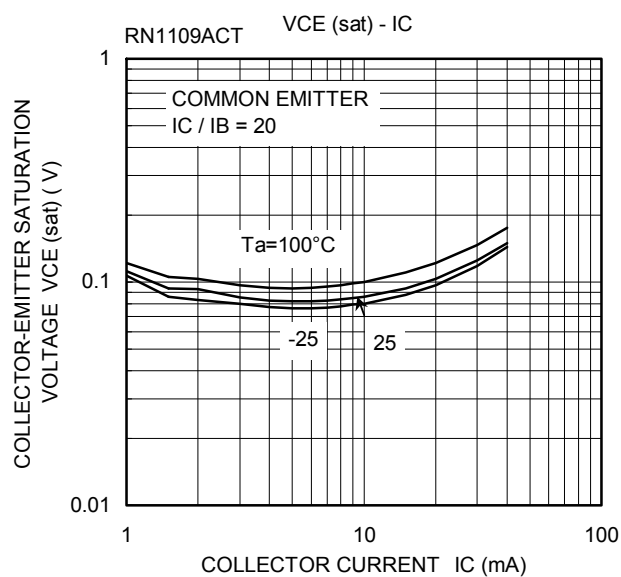
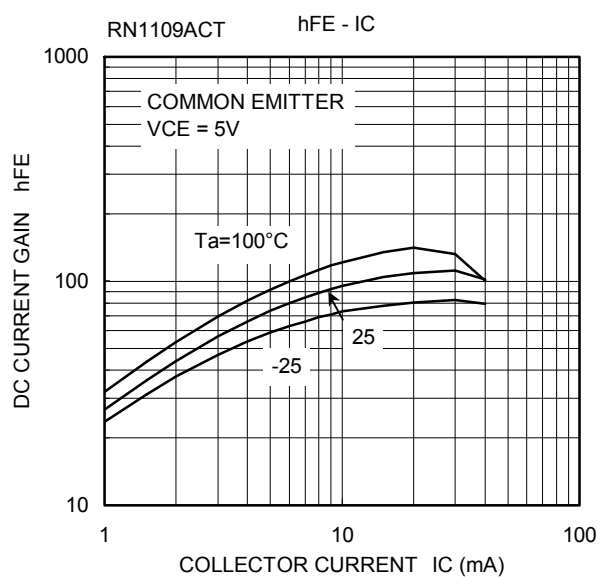
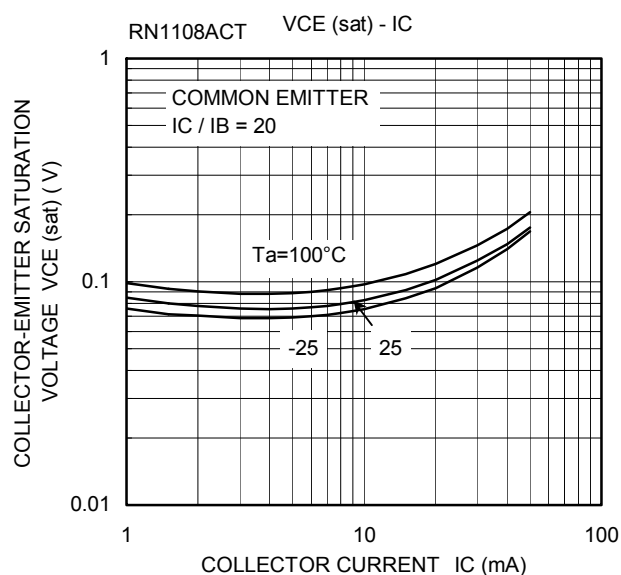
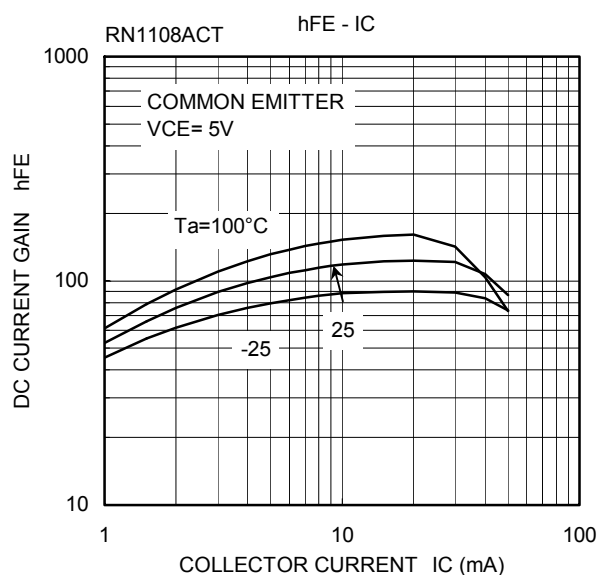
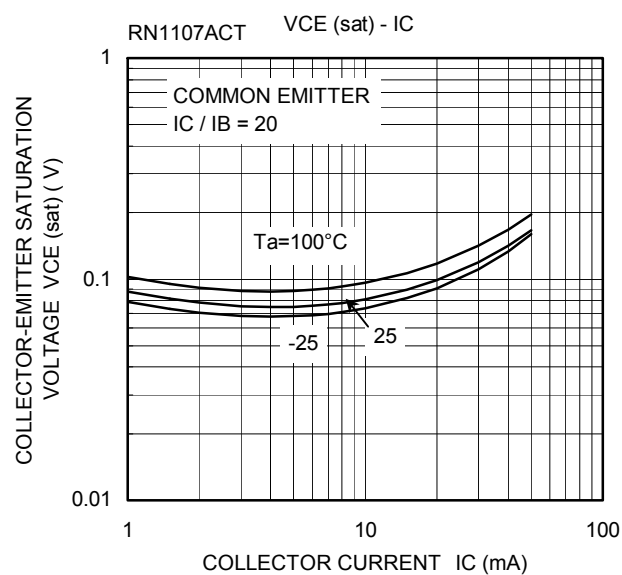
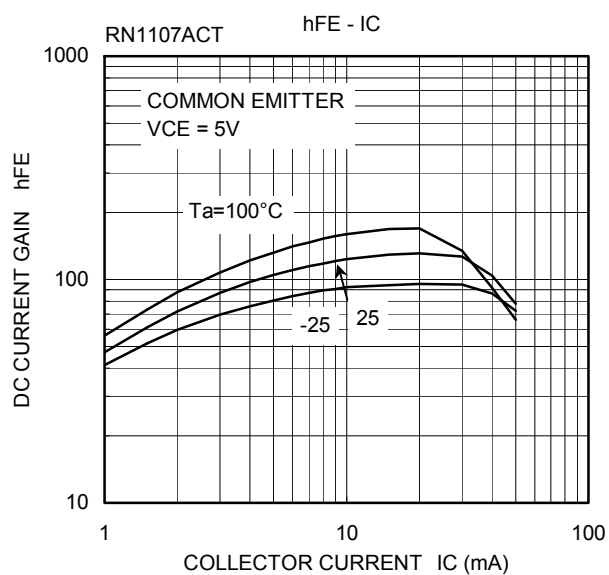
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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

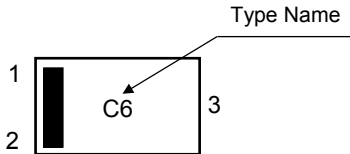
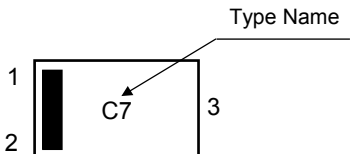
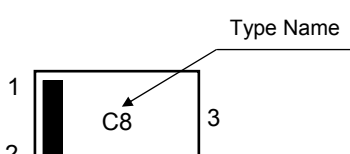
Electrical Characteristics (Ta = 25°C)

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	$V_I(\text{ON})$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.8	—	1.8	V
	RN1108ACT			1.0	—	3.0	
	RN1109ACT			2.0	—	6.4	
Input voltage (OFF)	RN1107ACT	$V_I(\text{OFF})$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	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	kΩ
	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	 The diagram shows a rectangular marking area. On the left side, there are two vertical black bars, labeled '1' and '2' from top to bottom. In the center, the text 'C6' is present. On the right side, the number '3' is located. An arrow points from the text 'Type Name' to the top right corner of the rectangle.
RN1108ACT	 The diagram shows a rectangular marking area. On the left side, there are two vertical black bars, labeled '1' and '2' from top to bottom. In the center, the text 'C7' is present. On the right side, the number '3' is located. An arrow points from the text 'Type Name' to the top right corner of the rectangle.
RN1109ACT	 The diagram shows a rectangular marking area. On the left side, there are two vertical black bars, labeled '1' and '2' from top to bottom. In the center, the text 'C8' is present. On the right side, the number '3' is located. An arrow points from the text 'Type Name' to the top right corner of the rectangle.

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