

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

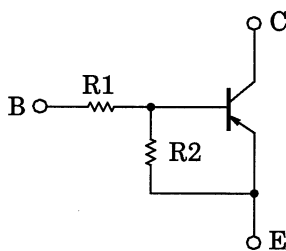
# RN2107, RN2108, RN2109

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

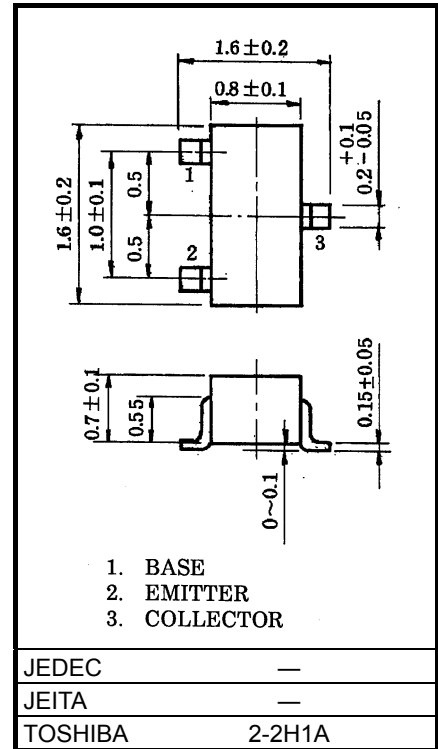
Unit: mm

- Built-in bias resistors
- Simplified circuit design
- Fewer parts and simplified manufacturing process
- Complementary to RN1107 to RN1109

## Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2107	10	47
RN2108	22	47
RN2109	47	22



Weight: 2.4 mg (typ.)

## Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN2107 to 2109	$V_{CB0}$	-50	V
Collector-emitter voltage		$V_{CEO}$	-50	V
Emitter-base voltage	RN2107 to 2109	$V_{EBO}$	-6	V
			-7	
			-15	
Collector current	RN2107 to 2109	$I_C$	-100	mA
Collector power dissipation		$P_C^*$	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.

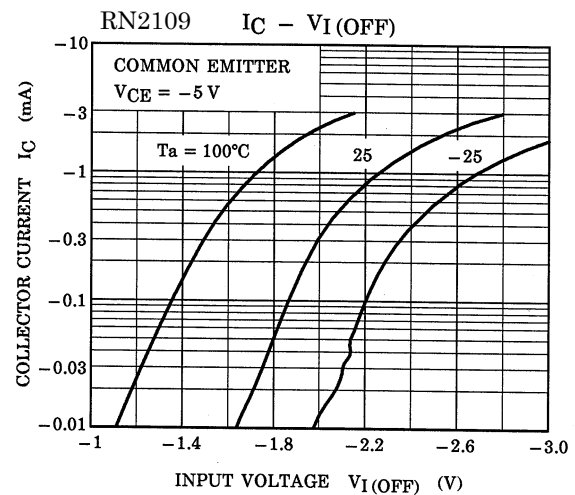
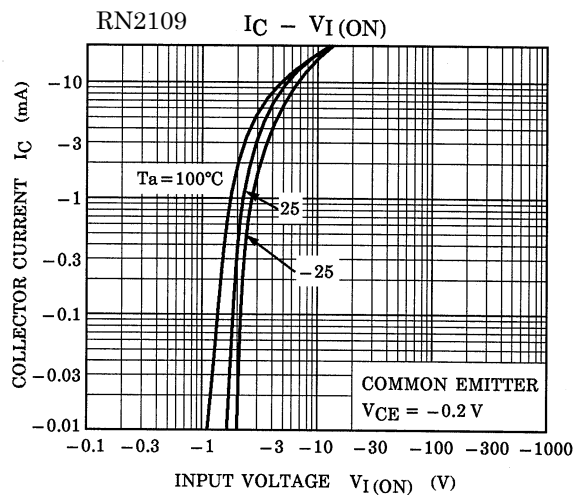
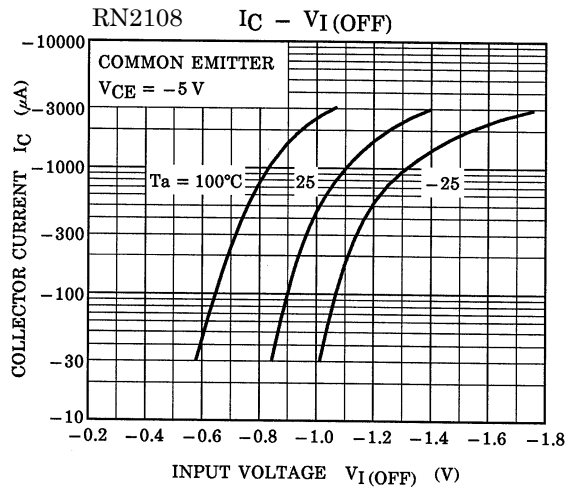
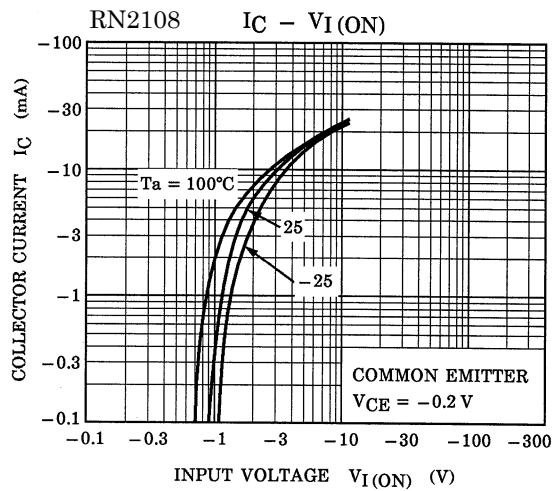
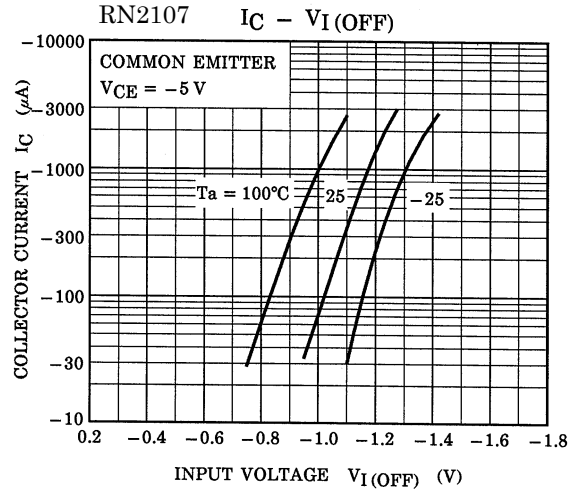
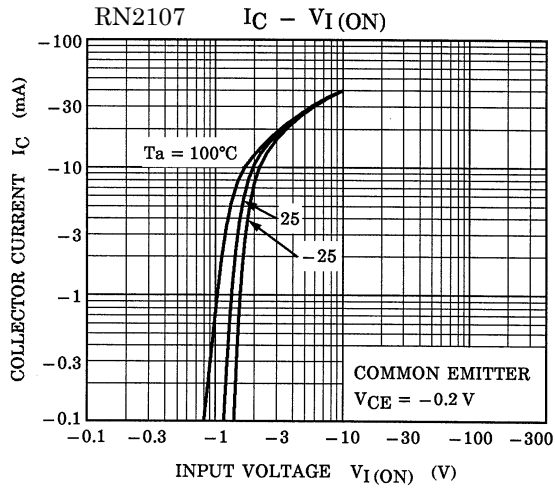
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

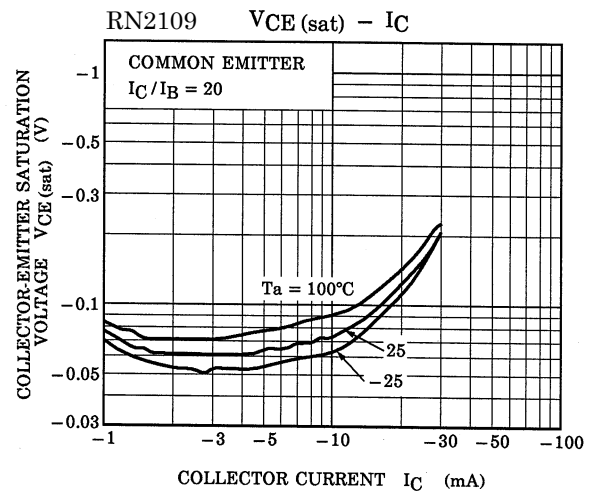
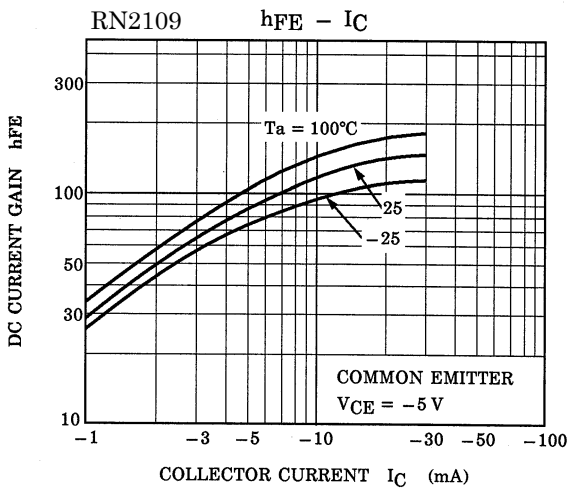
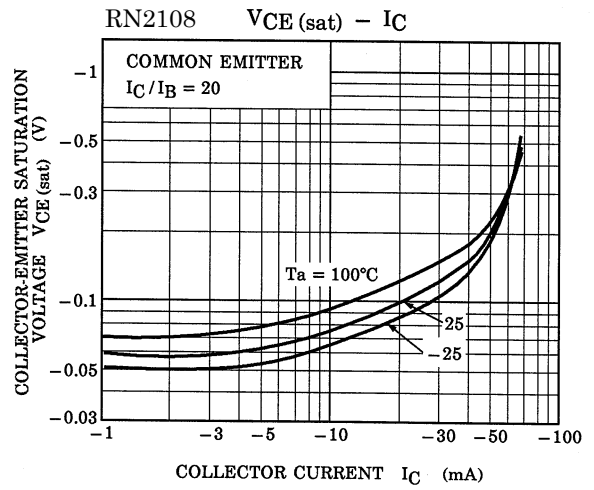
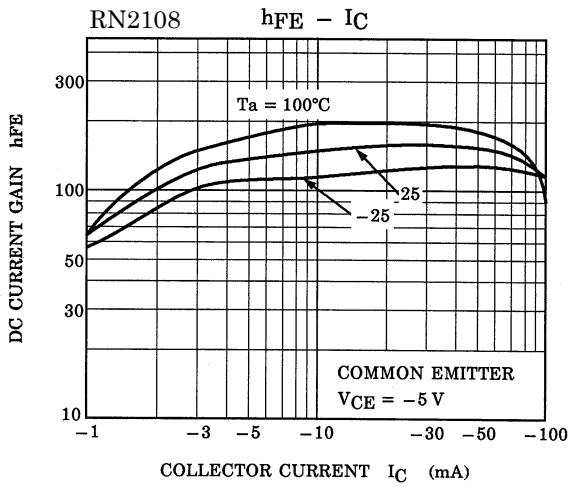
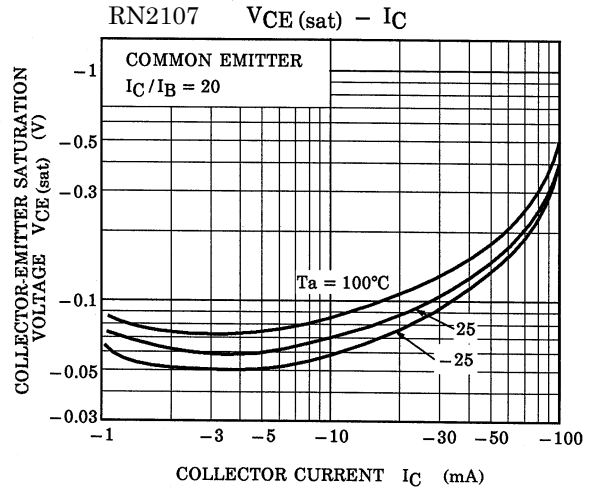
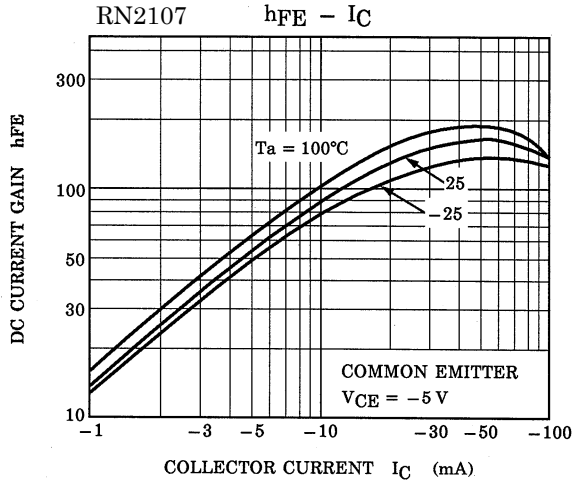
\*: Total rating

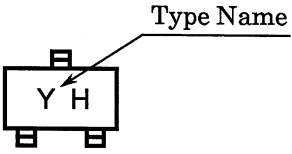
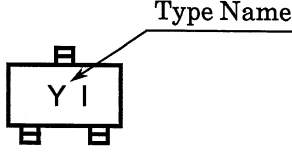
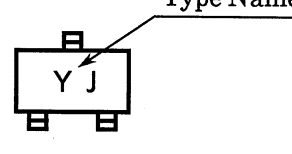
Start of commercial production  
1990-12

## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2107 to 2109	$I_{CBO}$	—	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-100	nA
		$I_{CEO}$		$V_{CE} = -50\text{ V}, I_B = 0$	—	—	-500	nA
Emitter cut-off current	RN2107	$I_{EBO}$	—	$V_{EB} = -6\text{ V}, I_C = 0$	-0.081	—	-0.15	mA
	RN2108			$V_{EB} = -7\text{ V}, I_C = 0$	-0.078	—	-0.145	
	RN2109			$V_{EB} = -15\text{ V}, I_C = 0$	-0.167	—	-0.311	
DC current gain	RN2107	$h_{FE}$	—	$V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$	80	—	—	—
	RN2108				80	—	—	
	RN2109				70	—	—	
Collector-emitter saturation voltage	RN2107 to 2109	$V_{CE(sat)}$	—	$I_C = -5\text{ mA}, I_B = -0.25\text{ mA}$	—	-0.1	-0.3	V
Input voltage (ON)	RN2107	$V_I(ON)$	—	$V_{CE} = -0.2\text{ V}, I_C = -5\text{ mA}$	-0.7	—	-1.8	V
	RN2108				-1.0	—	-2.6	
	RN2109				-2.2	—	-5.8	
Input voltage (OFF)	RN2107	$V_I(OFF)$	—	$V_{CE} = -5\text{ V}, I_C = -0.1\text{ mA}$	-0.5	—	-1.0	V
	RN2108				-0.6	—	-1.16	
	RN2109				-1.5	—	-2.6	
Transition frequency	RN2107 to 2109	$f_T$	—	$V_{CE} = -10\text{ V}, I_C = -5\text{ mA}$	—	200	—	MHz
Collector Output capacitance	RN2107 to 2109	$C_{ob}$	—	$V_{CB} = -10\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN2107	R1	—	—	7	10	13	kΩ
	RN2108				15.4	22	28.6	
	RN2109				32.9	47	61.1	
Resistor ratio	RN2107	R1/R2	—	—	0.191	0.213	0.232	—
	RN2108				0.421	0.468	0.515	
	RN2109				1.92	2.14	2.35	





Type Name	Marking
RN2107	
RN2108	
RN2109	

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