

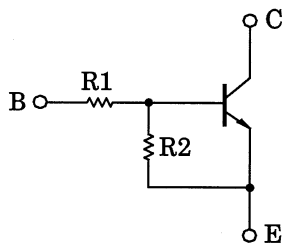
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1607, RN1608, RN1609

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

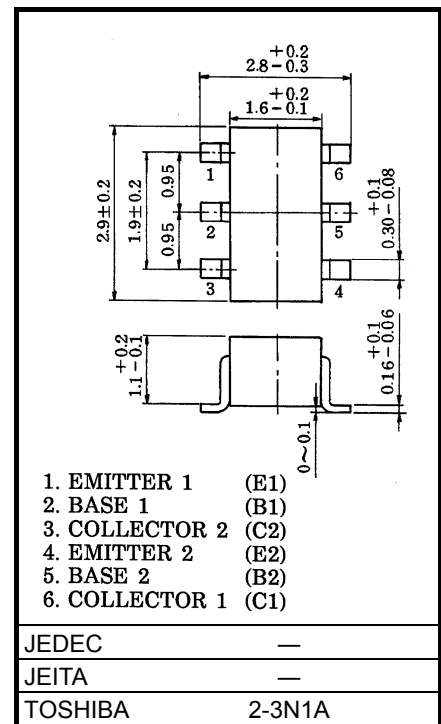
- Including two devices in SM6 (super-mini-type with six (6) leads)
- With built-in bias resistors.
- Simplified circuit design
- Reduced number of parts and manufacturing process
- Complementary to RN2607~RN2609

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1607	10	47
RN1608	22	47
RN1609	47	22

Unit: mm

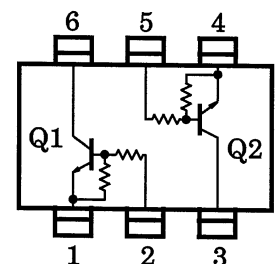


Weight: 0.015 g (typ.)

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

Characteristic	Symbol	Rating	Unit	
Collector-base voltage	RN1607~1609	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1607	V_{EBO}	6	V
	RN1608		7	
	RN1609		15	
Collector current	RN1607~1609	I_C	100	mA
Collector power dissipation		P_C	300	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-55~150	°C

Equivalent Circuit (Top View)



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.

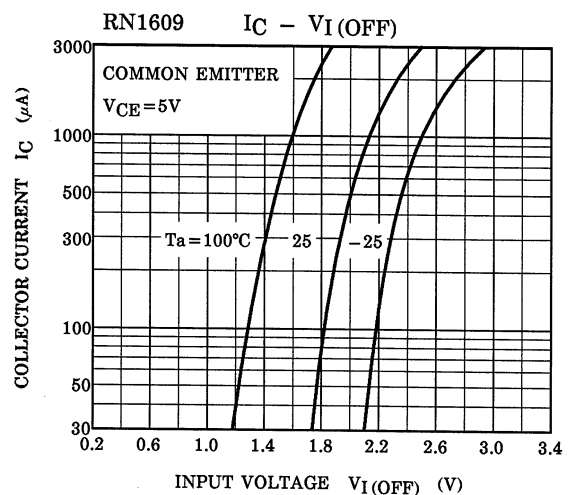
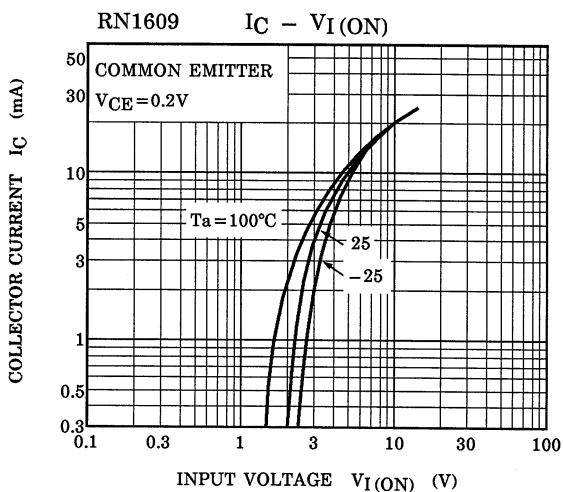
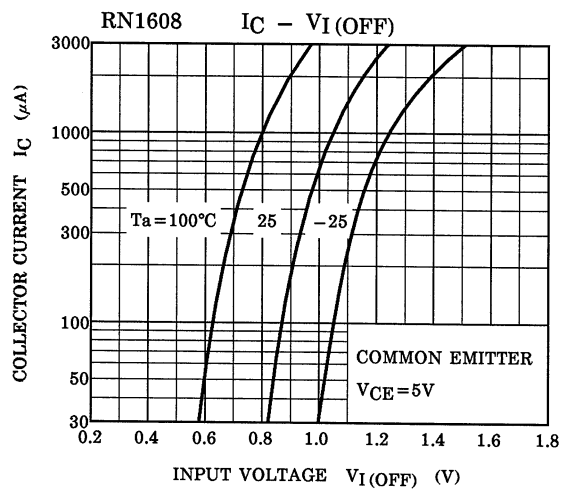
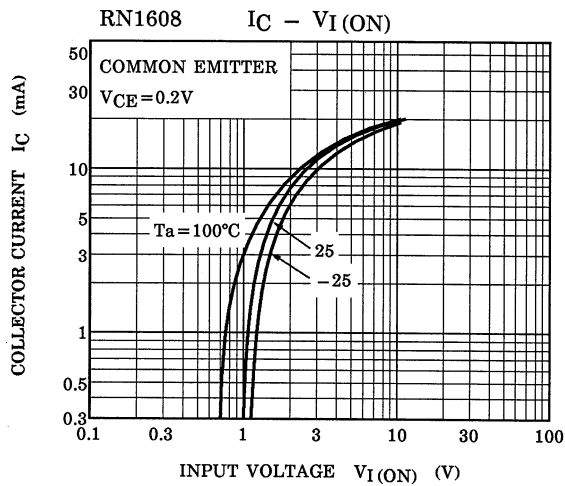
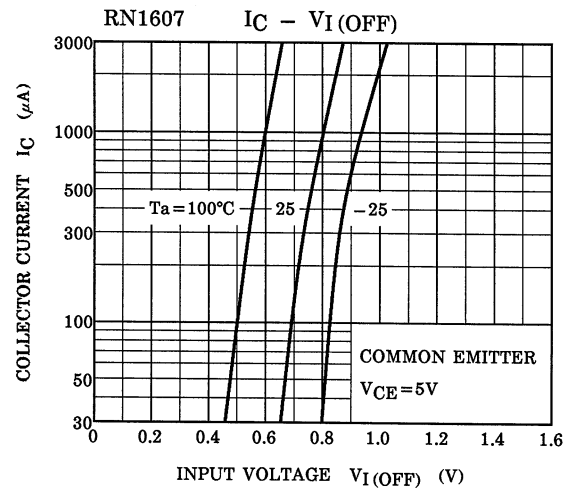
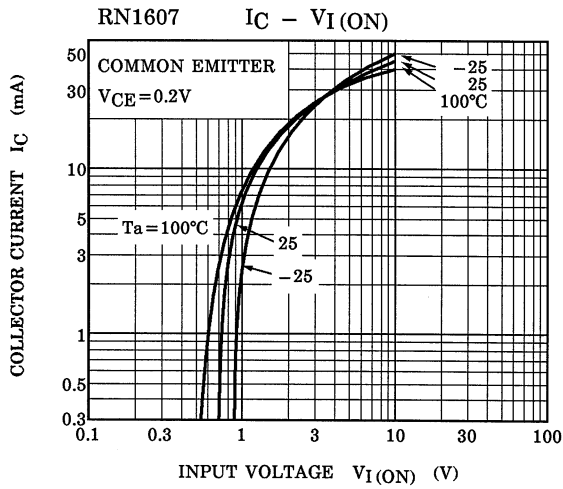
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

* Total rating

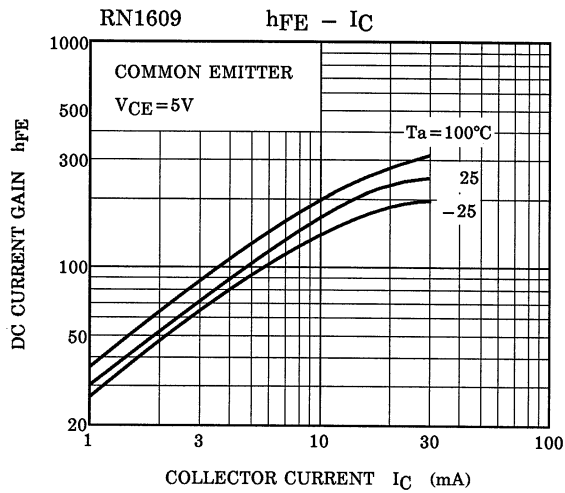
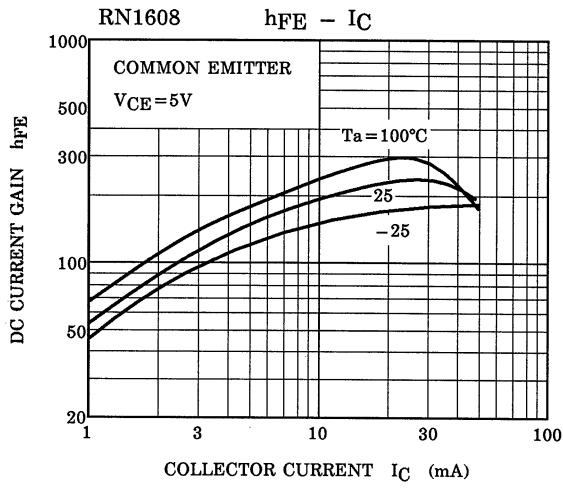
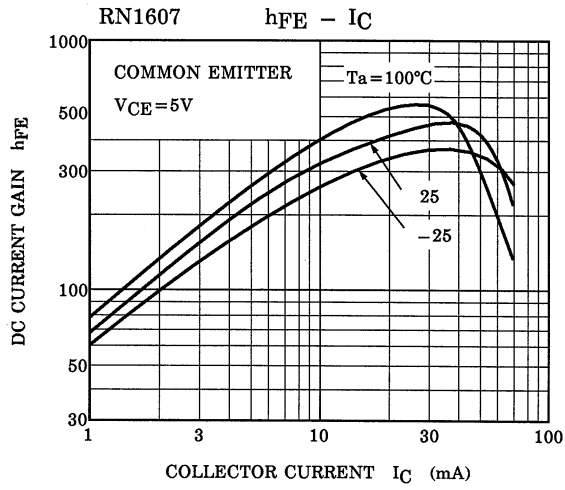
Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

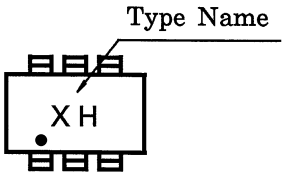
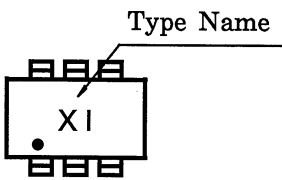
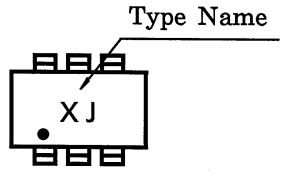
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1607~1609	I_{CBO}	—	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	—	$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	nA
Emitter cut-off current	RN1607	I_{EBO}	—	$V_{EB} = 6\text{ V}, I_C = 0$	0.081	—	0.15	mA
	RN1608		—	$V_{EB} = 7\text{ V}, I_C = 0$	0.078	—	0.145	
	RN1609		—	$V_{EB} = 15\text{ V}, I_C = 0$	0.167	—	0.311	
DC current gain	RN1607	h_{FE}	—	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	—
	RN1608		—		80	—	—	
	RN1609		—		70	—	—	
Collector-emitter saturation voltage	RN1607~1609	$V_{CE(sat)}$	—	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1607	$V_I(ON)$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.8	V
	RN1608		—		1.0	—	2.6	
	RN1609		—		2.2	—	5.8	
Input voltage (OFF)	RN1607	$V_I(OFF)$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
	RN1608		—		0.6	—	1.16	
	RN1609		—		1.5	—	2.6	
Transition frequency	RN1607~1609	f_T	—	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	RN1607~1609	C_{ob}	—	$V_{CB} = 10\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$	—	3	6	pF
Input resistor	RN1607	R1	—	—	7	10	13	kΩ
	RN1608		—		15.4	22	28.6	
	RN1609		—		32.9	47	61.1	
Resistor ratio	RN1607	R1/R2	—	—	0.191	0.213	0.232	—
	RN1608		—		0.421	0.468	0.515	
	RN1609		—		1.92	2.14	2.35	

(Q1, Q2 Common)



(Q1, Q2 Common)



Type Name	Marking
RN1607	 The diagram shows a rectangular component with a dot in the bottom-left corner. The letters "XH" are printed in the center. Above the component, the text "Type Name" is written with a line pointing to the top edge of the component. The component has four pins on the top and four on the bottom, each with a small rectangular tab.
RN1608	 The diagram shows a rectangular component with a dot in the bottom-left corner. The letters "XI" are printed in the center. Above the component, the text "Type Name" is written with a line pointing to the top edge of the component. The component has four pins on the top and four on the bottom, each with a small rectangular tab.
RN1609	 The diagram shows a rectangular component with a dot in the bottom-left corner. The letters "XJ" are printed in the center. Above the component, the text "Type Name" is written with a line pointing to the top edge of the component. The component has four pins on the top and four on the bottom, each with a small rectangular tab.

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