

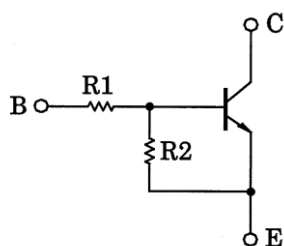
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

# RN1607, RN1608, RN1609

Switching, Inverter Circuit,  
Interface Circuit and Driver Circuit

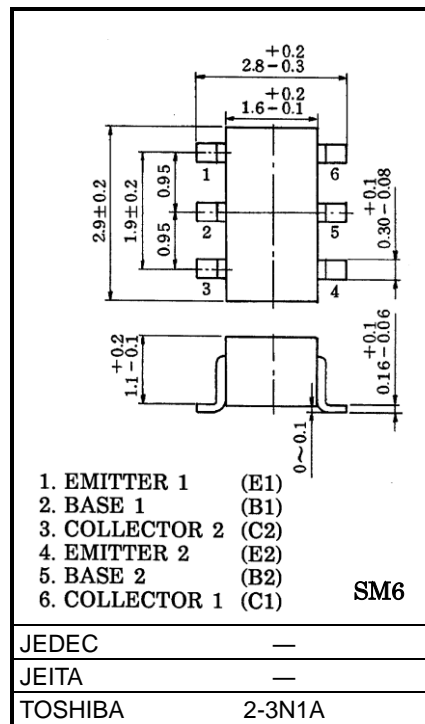
- Including two devices in SM6 (super-mini-type with six (6) leads)
- With built-in bias resistors.
- Simplified circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs.
- Complementary to RN2607 to RN2609

## Equivalent Circuit and Bias Resistor Values



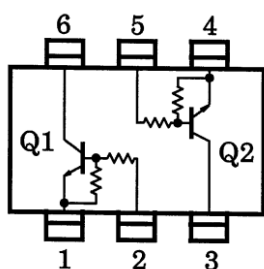
Part No..	R1 (kΩ)	R2 (kΩ)
RN1607	10	47
RN1608	22	47
RN1609	47	22

Unit: mm



Weight: 0.015 g (typ.)

## Equivalent Circuit (Top View)



Start of commercial production  
1988-11

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V <sub>CB0</sub>	50	V
Collector-emitter voltage		V <sub>CEO</sub>	50	V
Emitter-base voltage	RN1607	V <sub>EB0</sub>	6	V
	RN1608		7	
	RN1609		15	
Collector current		I <sub>C</sub>	100	mA
Collector power dissipation		P <sub>C</sub> *	300	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.

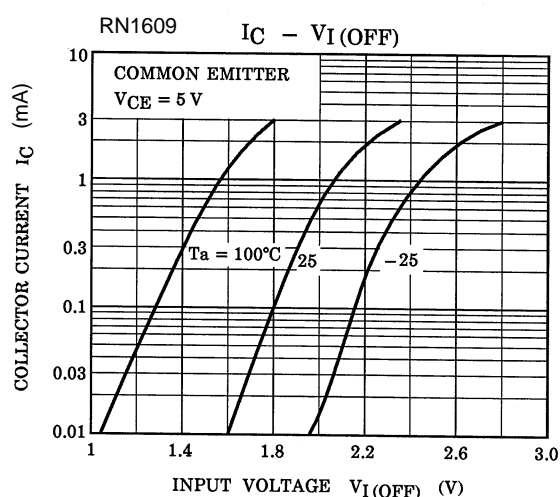
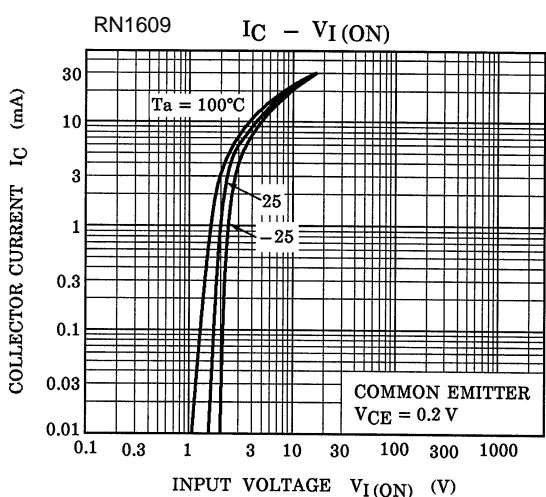
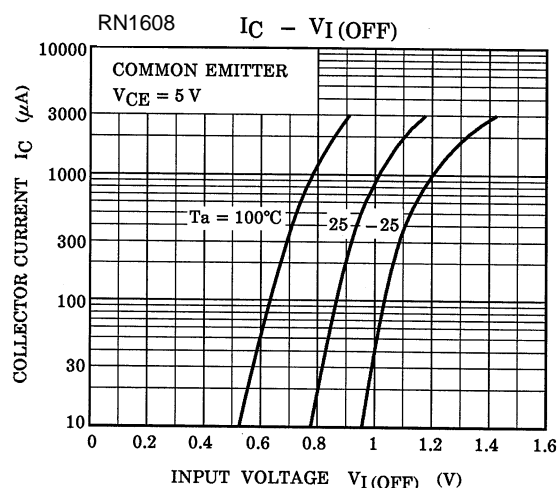
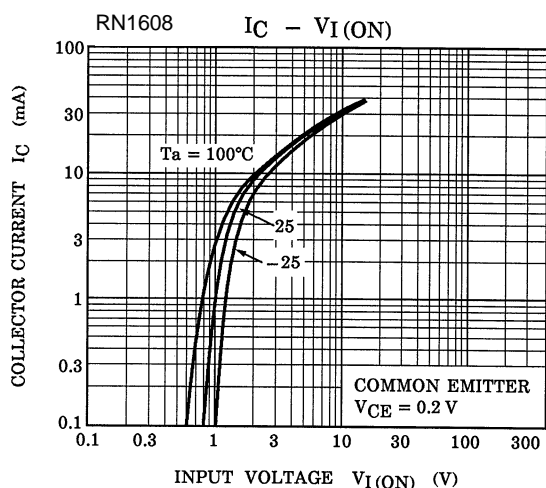
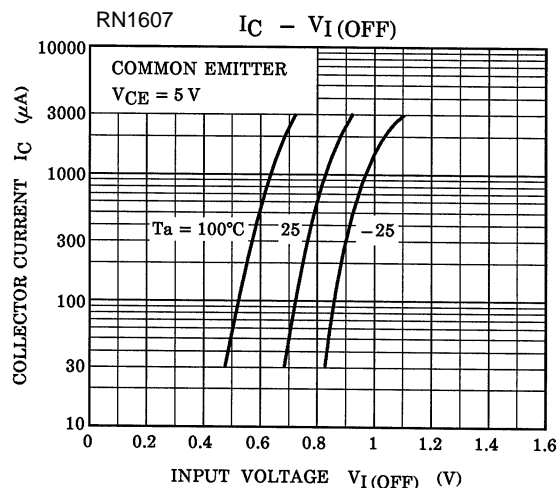
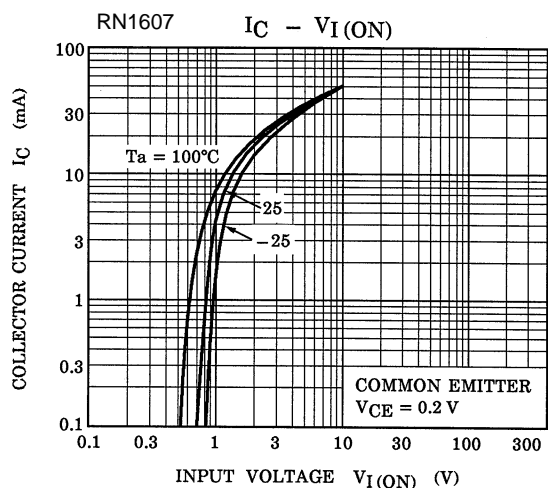
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\* Total rating

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

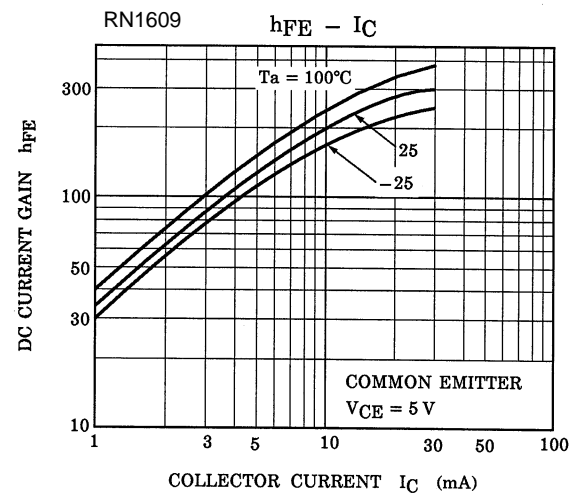
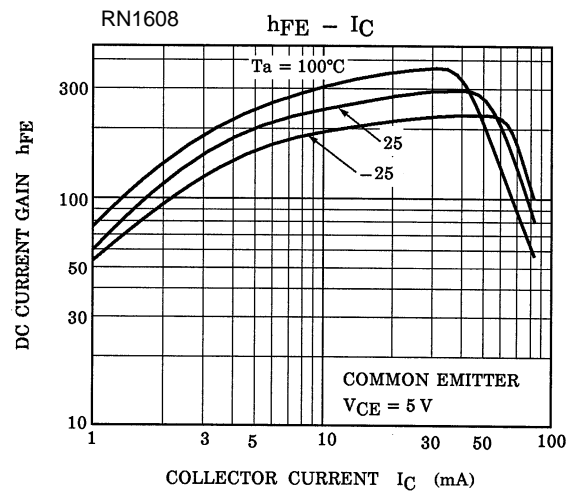
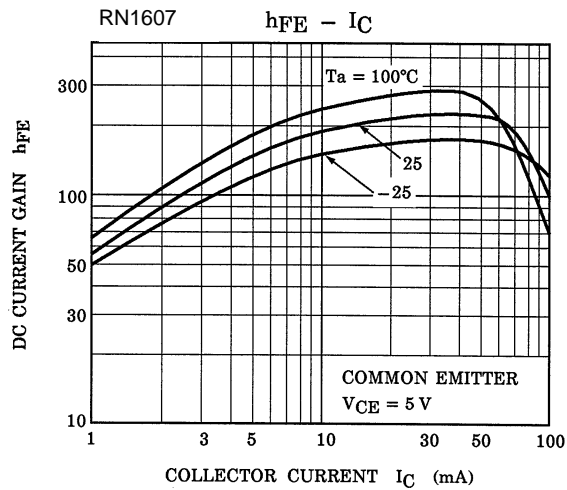
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1607 to 1609	ICBO	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 mA	—	—	100	nA
		ICEO	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0 mA	—	—	500	nA
Emitter cut-off current	RN1607	IEBO	V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0 mA	0.081	—	0.15	mA
	RN1608		V <sub>EB</sub> = 7 V, I <sub>C</sub> = 0 mA	0.078	—	0.145	
	RN1609		V <sub>EB</sub> = 15 V, I <sub>C</sub> = 0 mA	0.167	—	0.311	
DC current gain	RN1607	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	80	—	—	—
	RN1608			80	—	—	
	RN1609			70	—	—	
Collector-emitter saturation voltage	RN1607 to 1609	V <sub>CE (sat)</sub>	I <sub>C</sub> = 5 mA, I <sub>B</sub> = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1607	V <sub>I (ON)</sub>	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 5 mA	0.7	—	1.8	V
	RN1608			1.0	—	2.6	
	RN1609			2.2	—	5.8	
Input voltage (OFF)	RN1607	V <sub>I (OFF)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 mA	0.5	—	1.0	V
	RN1608			0.6	—	1.16	
	RN1609			1.5	—	2.6	
Transition frequency	RN1607 to 1609	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	—	250	—	MHz
Collector output capacitance	RN1607 to 1609	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN1607	R <sub>I</sub>	—	7	10	13	kΩ
	RN1608			15.4	22	28.6	
	RN1609			32.9	47	61.1	
Resistance ratio	RN1607	R <sub>1</sub> /R <sub>2</sub>	—	0.191	0.213	0.232	—
	RN1608			0.421	0.468	0.515	
	RN1609			1.92	2.14	2.35	

### Characteristics Curves(Q1, Q2 Common)



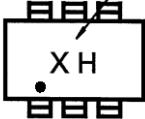

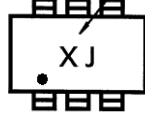
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

## Characteristics Curves(Q1, Q2 Common)



The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

## Marking

Part No.	Marking
RN1607	<p>Part No.(abbreviation code)</p> 
RN1608	<p>Part No.(abbreviation code)</p> 
RN1609	<p>Part No.(abbreviation code)</p> 

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