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

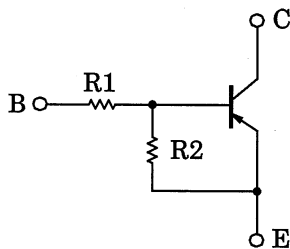
## RN2507, RN2508, RN2509

Unit: mm

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Including two devices in SMV (super mini type with 5 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1507 to RN1509

### Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2507	10	47
RN2508	22	47
RN2509	47	22

SMV

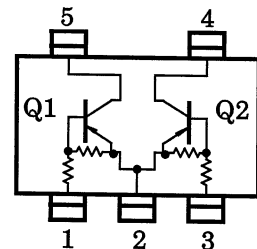
JEDEC	—
JEITA	—
TOSHIBA	2-3L1A

Weight: 14mg (typ.)

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

Characteristics	Symbol	Rating	Unit	
Collector-base voltage	RN2507 to RN2509	$V_{CB0}$	-50	V
Collector-emitter voltage		$V_{CEO}$	-50	V
Emitter-base voltage	RN2507 to RN2509	$V_{EBO}$	-6	V
			-7	
			-15	
Collector current	RN2507 to RN2509	$I_C$	-100	mA
Collector power dissipation		$P_C^*$	300	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55 to 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.

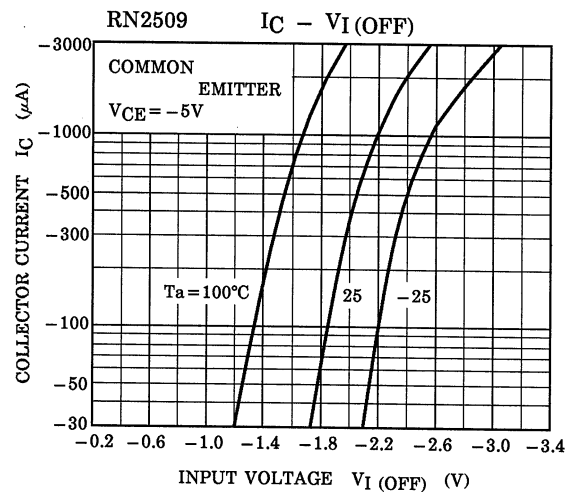
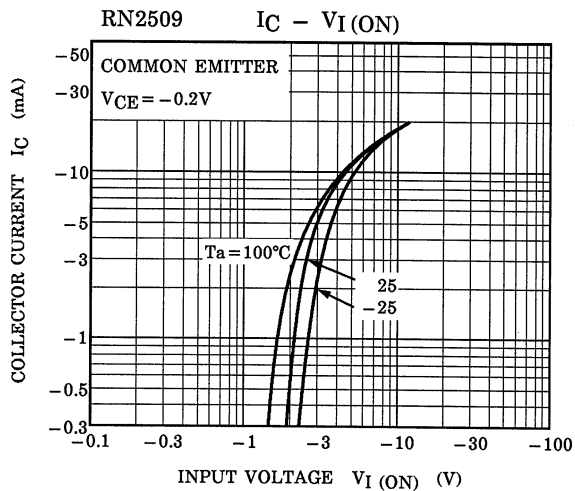
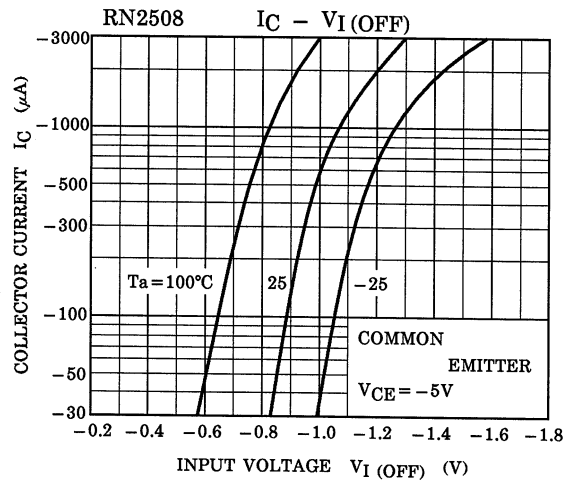
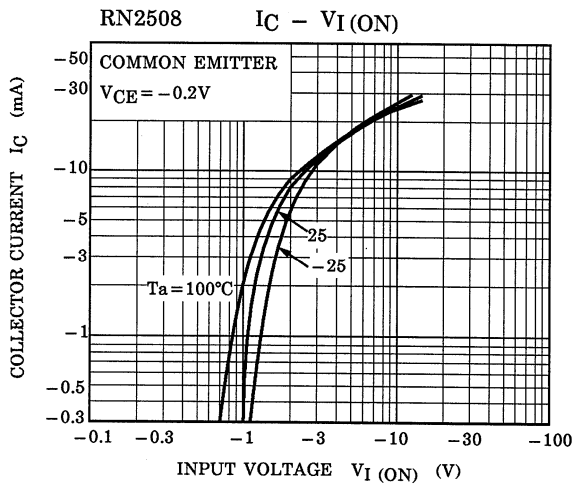
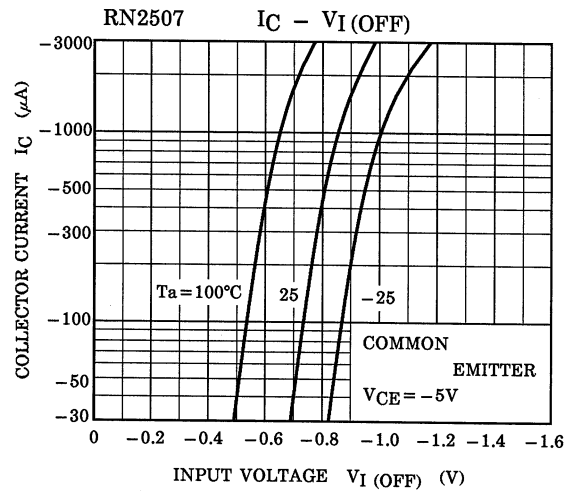
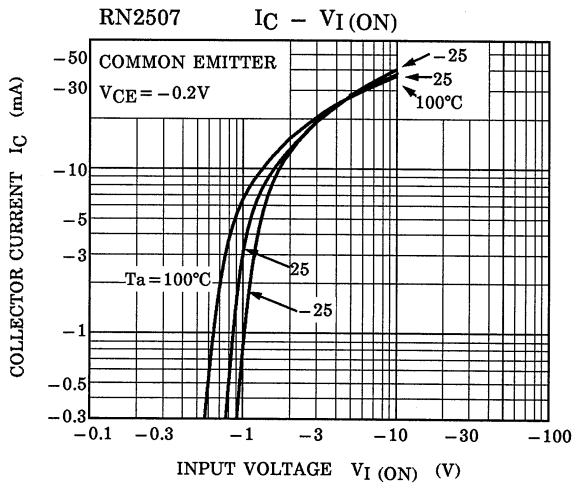
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\*Total rating

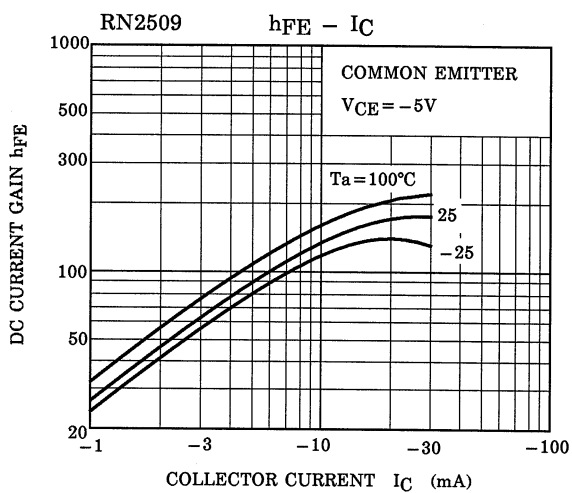
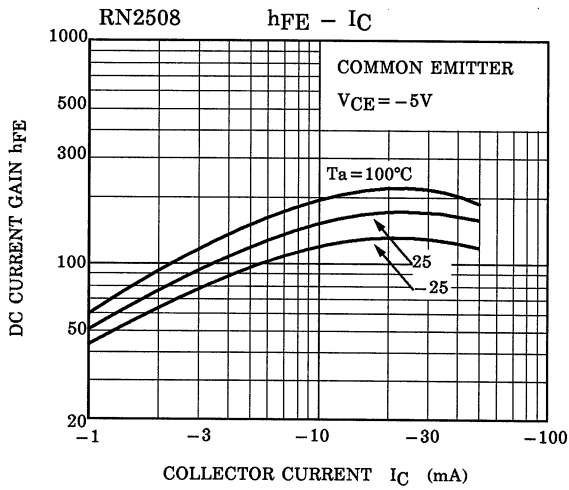
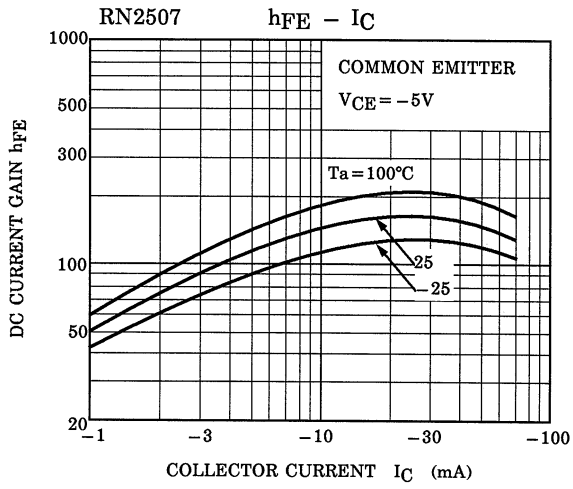
**Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)**

Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2507 to RN2509	I <sub>CBO</sub>	—	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0	—	—	-100	nA
		I <sub>CEO</sub>	—	V <sub>CE</sub> = -50V, I <sub>B</sub> = 0	—	—	-500	nA
Emitter cut-off current	RN2507	I <sub>EBO</sub>	—	V <sub>EB</sub> = -6V, I <sub>C</sub> = 0	-0.081	—	-0.15	mA
	RN2508		—	V <sub>EB</sub> = -7V, I <sub>C</sub> = 0	-0.078	—	-0.145	
	RN2509		—	V <sub>EB</sub> = -15V, I <sub>C</sub> = 0	-0.167	—	-0.311	
DC current gain	RN2507	h <sub>FE</sub>	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA	80	—	—	—
	RN2508		—		80	—	—	
	RN2509		—		70	—	—	
Collector-emitter saturation voltage	RN2507 to RN2509	V <sub>CE (sat)</sub>	—	I <sub>C</sub> = -5mA, I <sub>B</sub> = -0.25mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2507	V <sub>I (ON)</sub>	—	V <sub>CE</sub> = -0.2V, I <sub>C</sub> = -5mA	-0.7	—	-1.8	V
	RN2508		—		-1.0	—	-2.6	
	RN2509		—		-2.2	—	-5.8	
Input voltage (OFF)	RN2507	V <sub>I (OFF)</sub>	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -0.1mA	-0.5	—	-1.0	V
	RN2508		—		-0.6	—	-1.16	
	RN2509		—		-1.5	—	-2.6	
Transition frequency	RN2507 to RN2509	f <sub>T</sub>	—	V <sub>CE</sub> = -10V, I <sub>C</sub> = -5mA	—	200	—	MHz
Collector output capacitance	RN2507 to RN2509	C <sub>ob</sub>	—	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0 f = 1MHz	—	3	6	pF
Input resistor	RN2507	R1	—	—	7	10	13	kΩ
	RN2508		—		15.4	22	28.6	
	RN2509		—		32.9	47	61.1	
Resistor ratio	RN2507	R1/R2	—	—	0.191	0.213	0.232	—
	RN2508		—		0.421	0.468	0.515	
	RN2509		—		1.92	2.14	2.35	

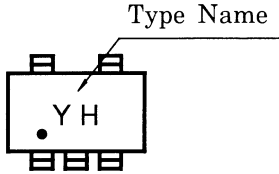
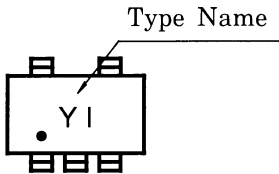
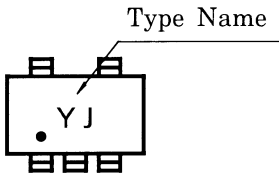
(Q1, Q2 Common)



(Q1, Q2 Common)



## Marking

Type Name	Marking
RN2507	 <p>The diagram shows a rectangular component with two pins on top and four pins on the bottom. The marking 'YH' is printed on the component, with a dot to the left of the 'Y'. A line labeled 'Type Name' points to the 'YH' marking.</p>
RN2508	 <p>The diagram shows a rectangular component with two pins on top and four pins on the bottom. The marking 'YI' is printed on the component, with a dot to the left of the 'Y'. A line labeled 'Type Name' points to the 'YI' marking.</p>
RN2509	 <p>The diagram shows a rectangular component with two pins on top and four pins on the bottom. The marking 'YJ' is printed on the component, with a dot to the left of the 'Y'. A line labeled 'Type Name' points to the 'YJ' marking.</p>

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