TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

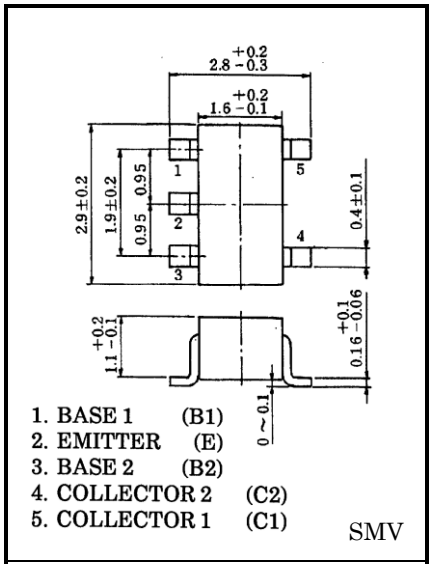
RN1507, RN1508, RN1509

Unit: mm

Switching, Inverter Circuit,

Interface Circuit and Driver Circuit

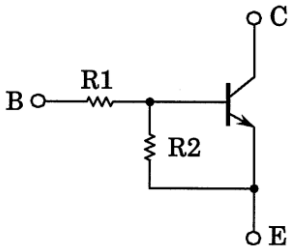
- Including two devices in SMV (super mini type with 5 leads)
- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process and miniaturize equipment.
- Various resistance values are available to suit various circuit designs
- Complementary to RN2507 to RN2509



JEDEC	—
JEITA	—
TOSHIBA	2-3L1A

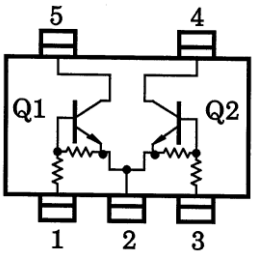
Weight: 0.014g (typ.)

Equivalent Circuit and Bias Resistor Values



Part No.	R1 (kΩ)	R2 (kΩ)
RN1507	10	47
RN1508	22	47
RN1509	47	22

Internal Circuit (Top View)



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

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1507	V_{EBO}	6	V
	RN1508		7	
	RN1509		15	
Collector current		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

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

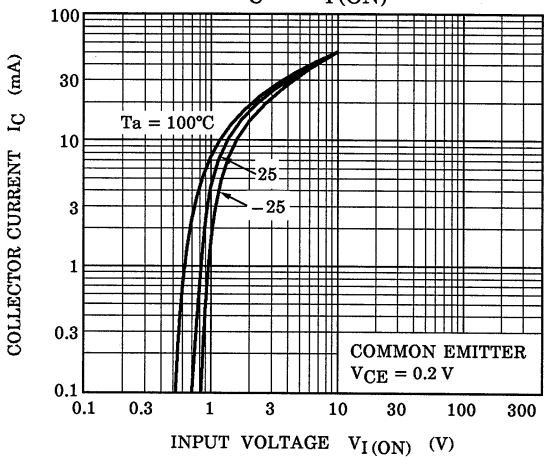
Start of commercial production
1988-10

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

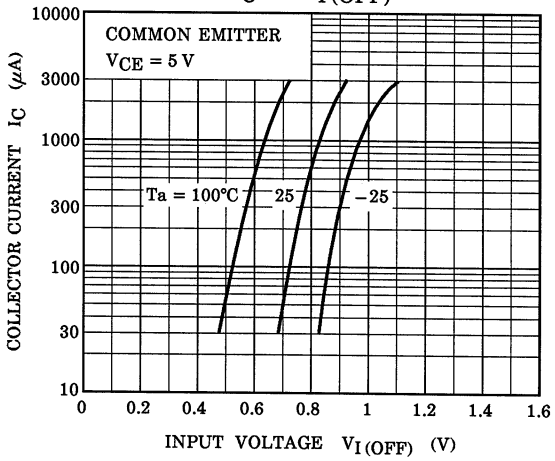
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1507 to 1509	I_{CBO}	V_{CB} = 50 V, I_E = 0 mA	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0 mA	—	—	500	nA
Emitter cut-off current	RN1507	I_{EBO}	V_{EB} = 6 V, I_C = 0 mA	0.081	—	0.15	mA
	RN1508		V_{EB} = 7 V, I_C = 0 mA	0.078	—	0.145	
	RN1509		V_{EB} = 15 V, I_C = 0 mA	0.167	—	0.311	
DC current gain	RN1507	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	80	—	—	—
	RN1508			80	—	—	
	RN1509			70	—	—	
Collector-emitter saturation voltage	RN1507 to 1509	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1507	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	1.8	V
	RN1508			1.0	—	2.6	
	RN1509			2.2	—	5.8	
Input voltage (OFF)	RN1507	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.5	—	1.0	V
	RN1508			0.6	—	1.16	
	RN1509			1.5	—	2.6	
Transition frequency	RN1507 to 1509	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector Output capacitance	RN1507 to 1509	C_{ob}	V_{CB} = 10 V, I_E = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN1507	R1	—	7	10	13	kΩ
	RN1508			15.4	22	28.6	
	RN1509			32.9	47	61.1	
Resistance ratio	RN1507	R1/R2	—	0.191	0.213	0.232	—
	RN1508			0.421	0.468	0.515	
	RN1509			1.92	2.14	2.35	

Characteristics Curves(Q1, Q2 Common)

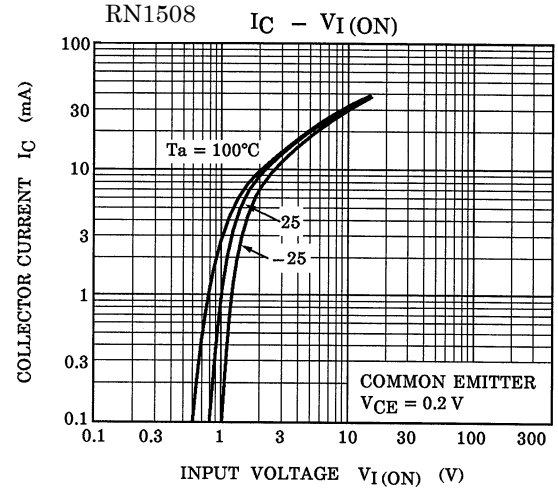
RN1507 I_C – $V_{I(ON)}$



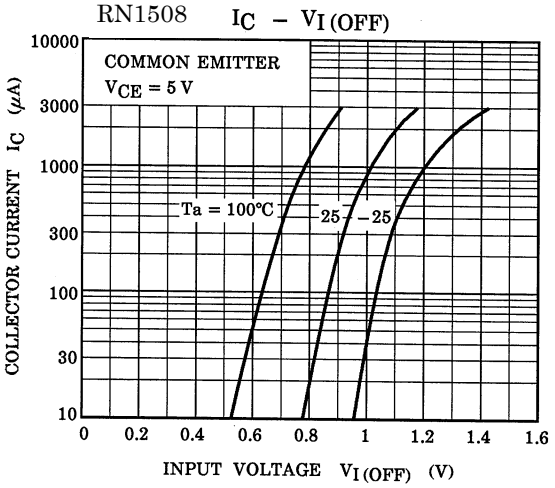
RN1507 I_C – $V_{I(OFF)}$



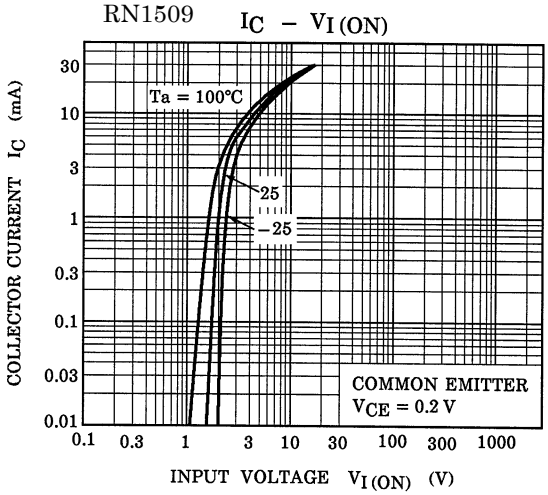
RN1508 I_C – $V_{I(ON)}$



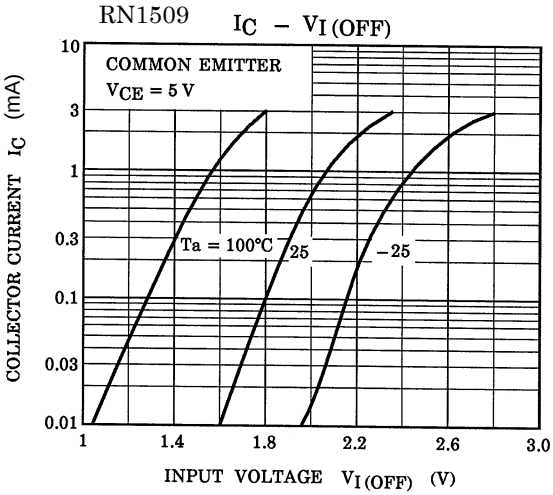
RN1508 I_C – $V_{I(OFF)}$



RN1509 I_C – $V_{I(ON)}$



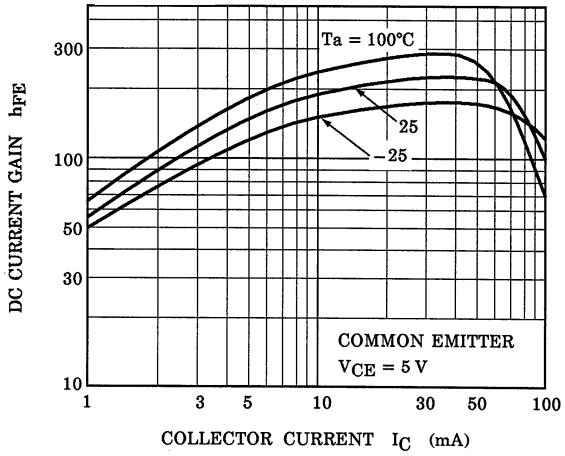
RN1509 I_C – $V_{I(OFF)}$



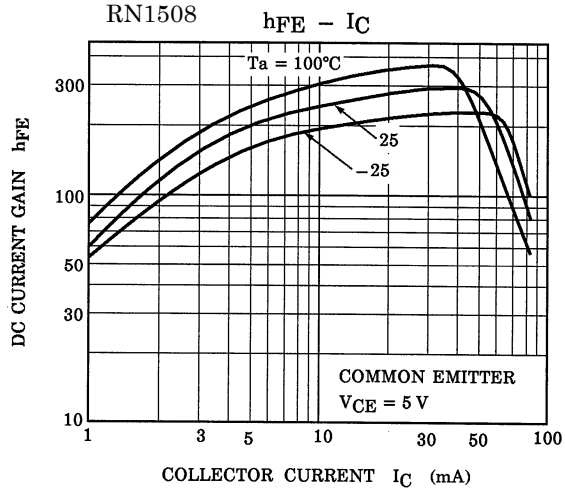
The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Characteristics Curves(Q1, Q2 Common)

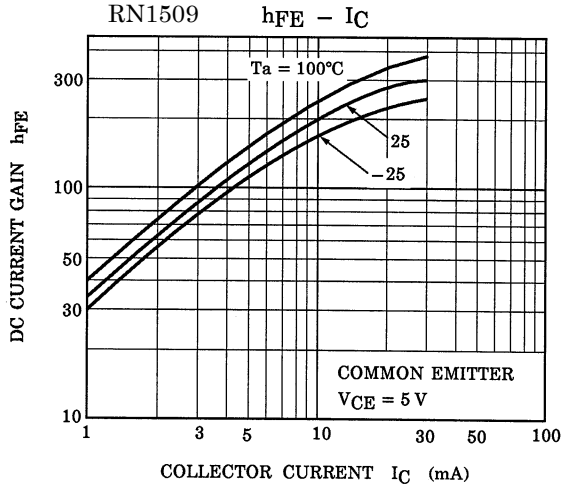
RN1507 h_{FE} – I_C



RN1508 h_{FE} – I_C



RN1509 h_{FE} – I_C



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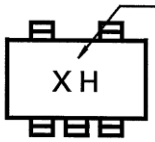
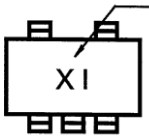
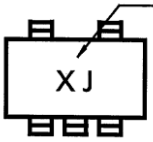
Marking

Part No	Marking
RN1507	Part No.(abbreviation code) 
RN1508	Part No.(abbreviation code) 
RN1509	Part No.(abbreviation code) 

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