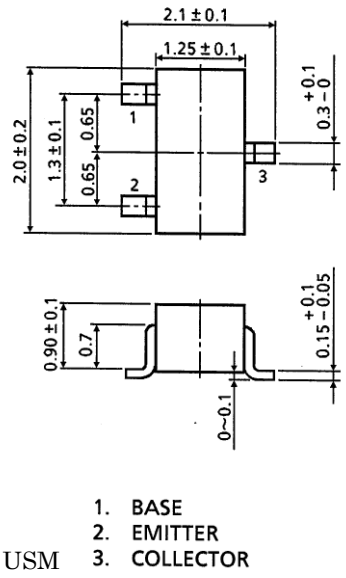
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1307, RN1308, RN1309

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2307 to RN2309

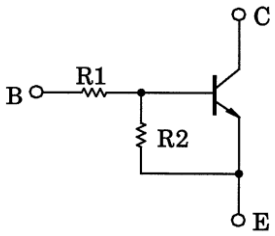
Unit: mm



JEDEC	—
JEITA	SC-70
TOSHIBA	2-2E1A

Weight: 0.006g (typ.)

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1307	10	47
RN1308	22	47
RN1309	47	22

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1307	V_{EBO}	6	V
	RN1308		7	
	RN1309		15	
Collector current		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

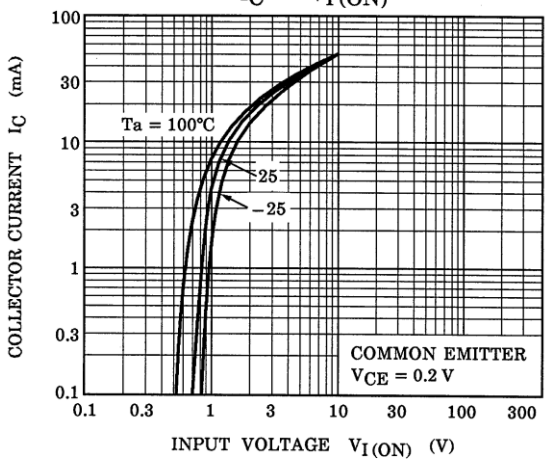
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

Start of commercial production
1988-04

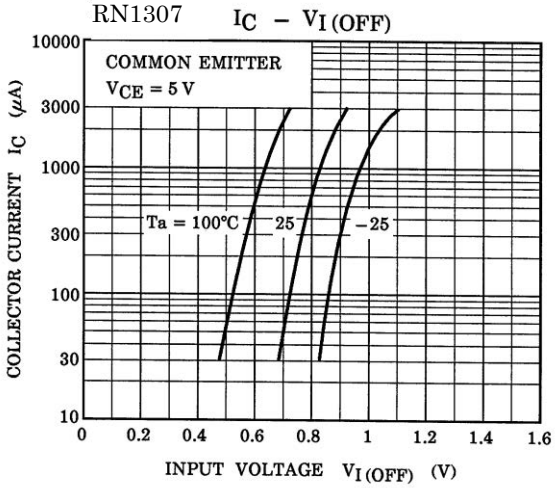
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 50 V, I_E = 0 A	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0 A	—	—	500	
Emitter cut-off current	RN1307	I_{EBO}	V_{EB} = 6 V, I_C = 0 A	0.081	—	0.15	mA
	RN1308		V_{EB} = 7 V, I_C = 0 A	0.078	—	0.145	
	RN1309		V_{EB} = 15 V, I_C = 0 A	0.167	—	0.311	
DC current gain	RN1307	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	80	—	—	—
	RN1308			80	—	—	
	RN1309			70	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1307	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	1.8	V
	RN1308			1.0	—	2.6	
	RN1309			2.2	—	5.8	
Input voltage (OFF)	RN1307	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.5	—	1.0	V
	RN1308			0.6	—	1.16	
	RN1309			1.5	—	2.6	
Translation frequency		f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0 A, f = 1 MHz	—	3	6	pF
Input resistor	RN1307	R1	—	7	10	13	kΩ
	RN1308			15.4	22	28.6	
	RN1309			32.9	47	61.1	
Resistor ratio	RN1307	R1 / R2	—	0.191	0.213	0.232	—
	RN1308			0.421	0.468	0.515	
	RN1309			1.92	2.14	2.35	

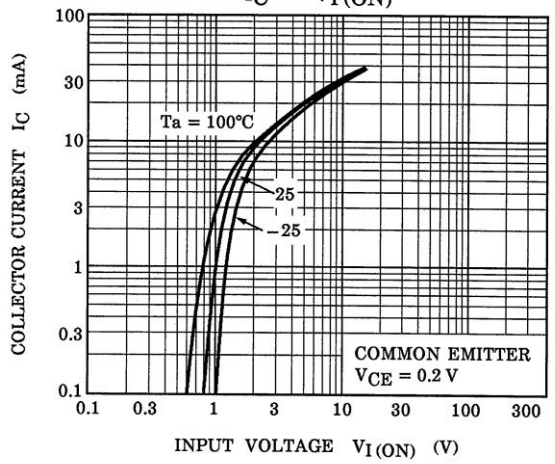
RN1307 I_C – $V_{I(ON)}$



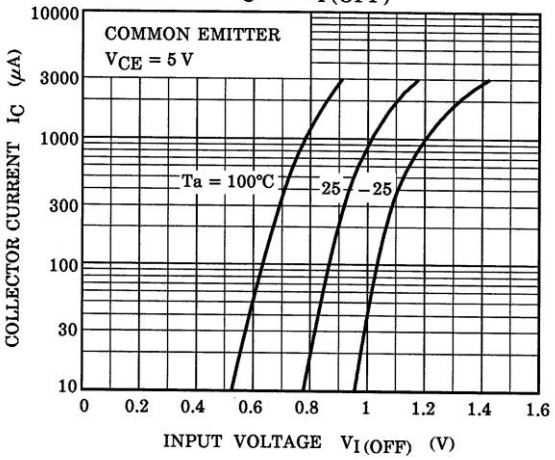
RN1307 I_C – $V_{I(OFF)}$



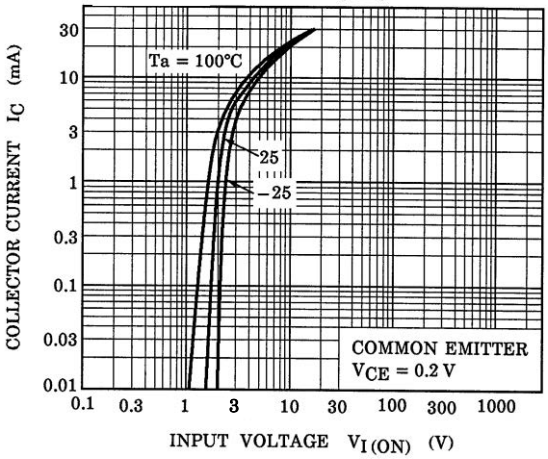
RN1308 I_C – $V_{I(ON)}$



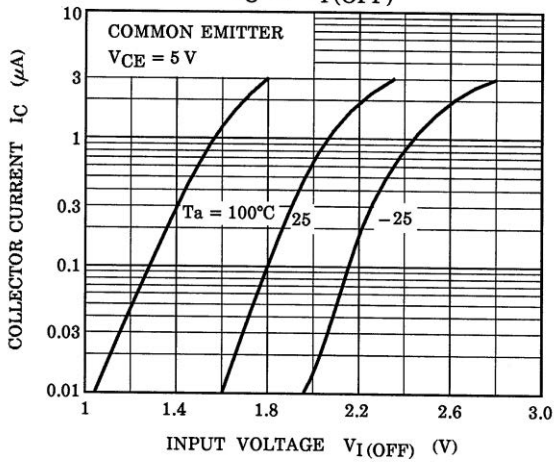
RN1308 I_C – $V_{I(OFF)}$



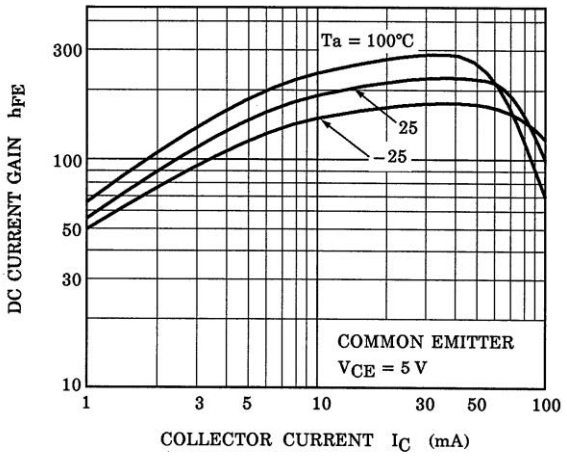
RN1309 I_C – $V_{I(ON)}$



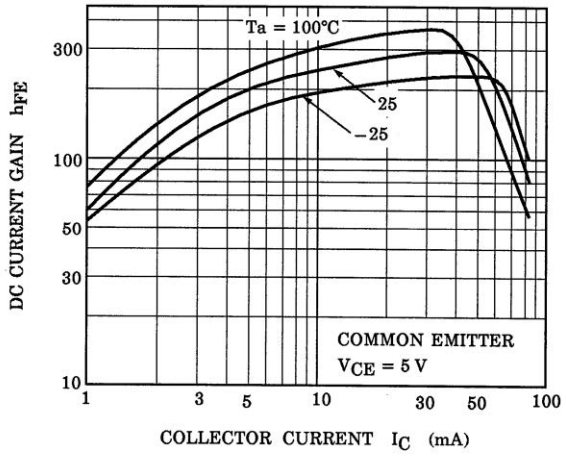
RN1309 I_C – $V_{I(OFF)}$



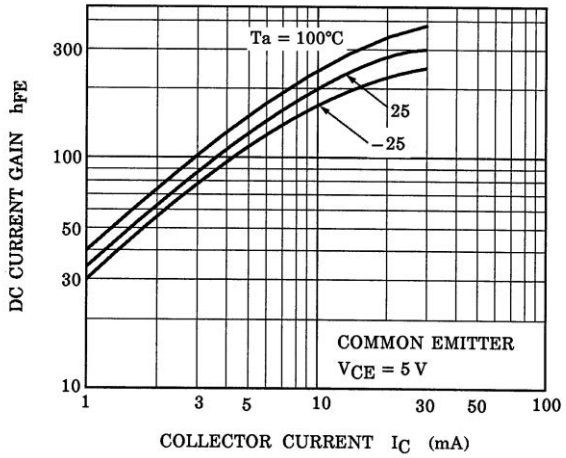
RN1307 h_{FE} – I_C

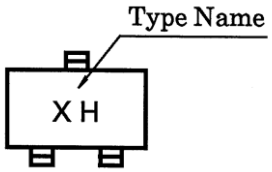
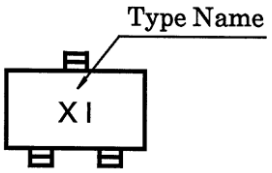
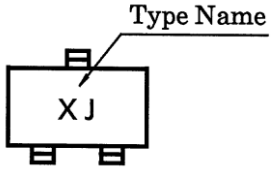


RN1308 h_{FE} – I_C



RN1309 h_{FE} – I_C



Type Name	Marking
RN1307	
RN1308	
RN1309	

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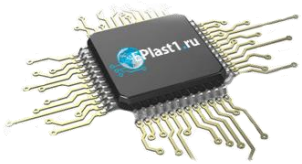

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