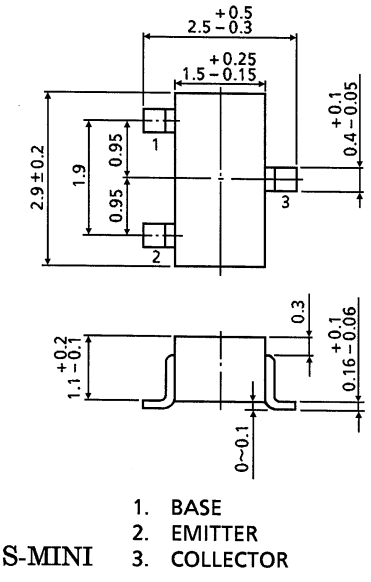
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1407, RN1408, RN1409

Switching, Inverter Circuit, Interface Circuit
And Driver Circuit Applications

- With built-in bias resistors
- Simplified circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2407~RN2409

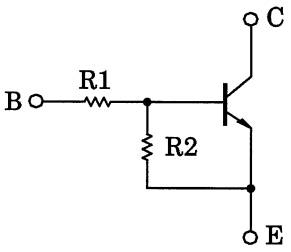
Unit: mm



JEDEC	TO-236MOD
EIAJ	SC-59
TOSHIBA	2-3F1A

Weight: 0.012g

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1407	10	47
RN1408	22	47
RN1409	47	22

Absolute Maximum Ratings (Ta = 25°C)

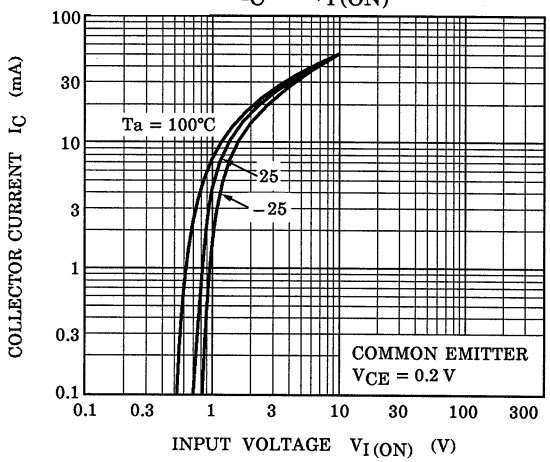
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1407~RN1409	V_{CBO}	50	V
Collector-emitter voltage	RN1407~RN1409	V_{CEO}	50	V
Emitter-base voltage	RN1407	V_{EBO}	6	V
	RN1408		7	
	RN1409		15	
Collector current	RN1407~RN1409	I_C	100	mA
Collector power dissipation	RN1407~RN1409	P_C	200	mW
Junction temperature	RN1407~RN1409	T_j	150	°C
Storage temperature range	RN1407~RN1409	T_{stg}	−55~150	°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).

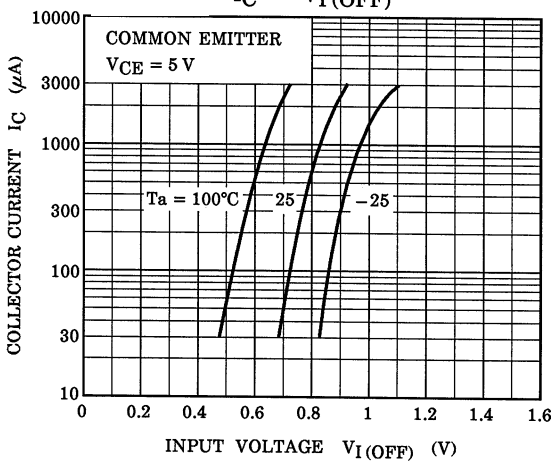
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1407~1409	I_{CBO}	—	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}		V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cut-off current	RN1407	I_{EBO}	—	V_{EB} = 6 V, I_C = 0	0.081	—	0.15	mA
	RN1408			V_{EB} = 7 V, I_C = 0	0.078	—	0.145	
	RN1409			V_{EB} = 15 V, I_C = 0	0.167	—	0.311	
DC current gain	RN1407	h_{FE}	—	V_{CE} = 5 V, I_C = 10 mA	80	—	—	—
	RN1408				80	—	—	
	RN1409				70	—	—	
Collector-emitter saturation voltage	RN1407~1409	$V_{CE\ (sat)}$	—	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1407	$V_{I\ (ON)}$	—	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	1.8	V
	RN1408				1.0	—	2.6	
	RN1409				2.2	—	5.8	
Input voltage (OFF)	RN1407	$V_{I\ (OFF)}$	—	V_{CE} = 5 V, I_C = 0.1 mA	0.5	—	1.0	V
	RN1408				0.6	—	1.16	
	RN1409				1.5		2.6	
Transition frequency	RN1407~1409	f_T	—	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector Output capacitance	RN1407~1409	C_{ob}	—	V_{CB} = 10 V, I_E = 0, f = 1 MH_z	—	3	6	pF
Input resistor	RN1407	R1	—	—	7	10	13	kΩ
	RN1408				15.4	22	28.6	
	RN1409				32.9	47	61.1	
Resistor ratio	RN1407	R1/R2	—	—	0.191	0.213	0.232	—
	RN1408				0.421	0.468	0.515	
	RN1409				1.92	2.14	2.35	

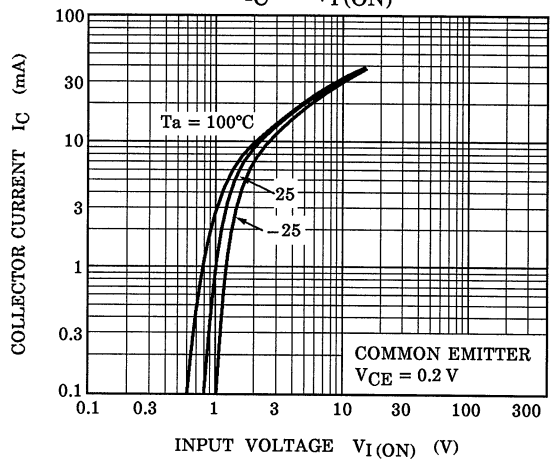
RN1407 I_C – $V_{I(ON)}$



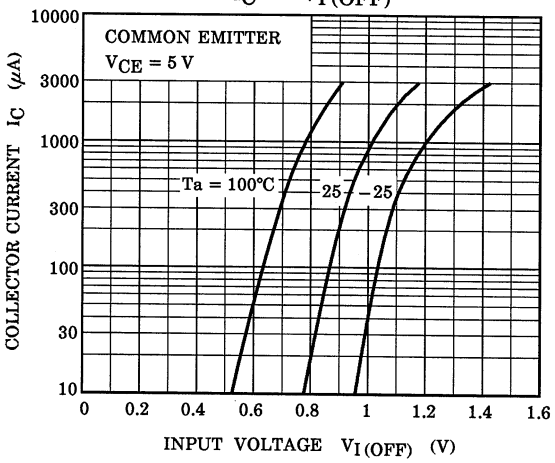
RN1407 I_C – $V_{I(OFF)}$



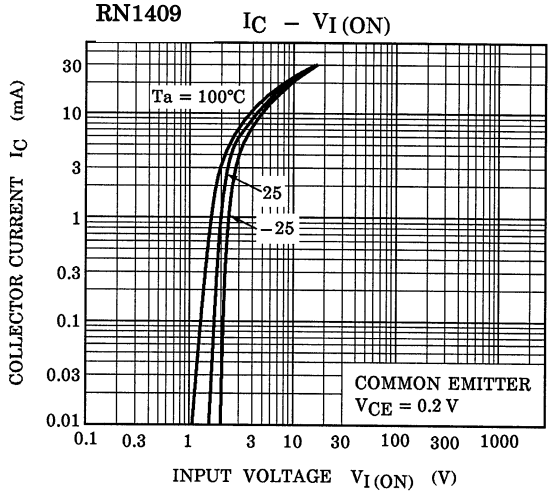
RN1408 I_C – $V_{I(ON)}$



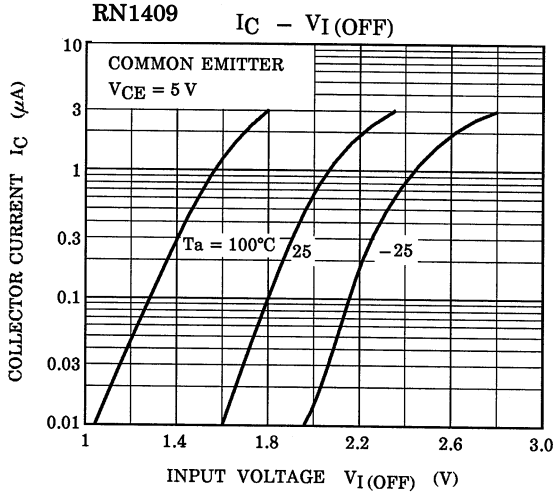
RN1408 I_C – $V_{I(OFF)}$



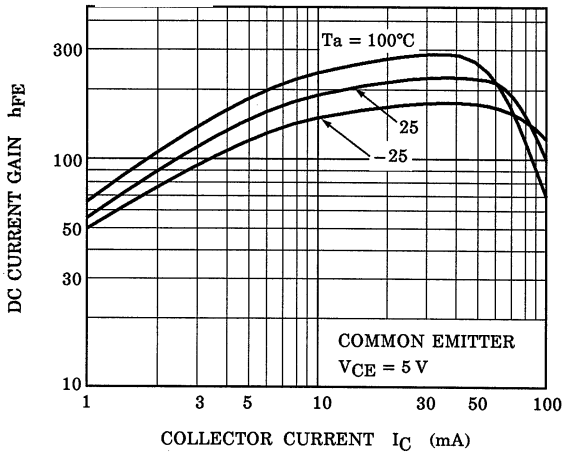
RN1409 I_C – $V_{I(ON)}$



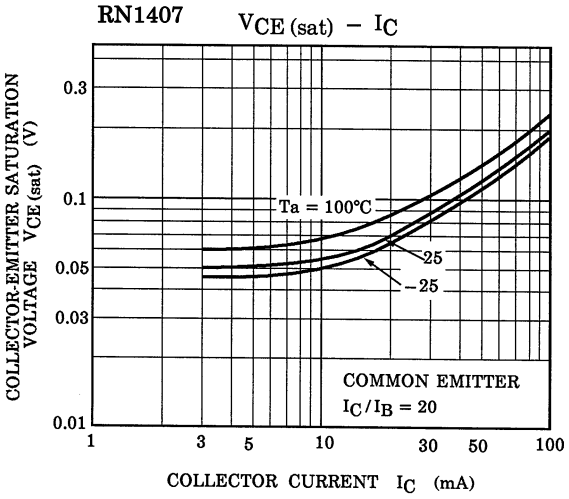
RN1409 I_C – $V_{I(OFF)}$



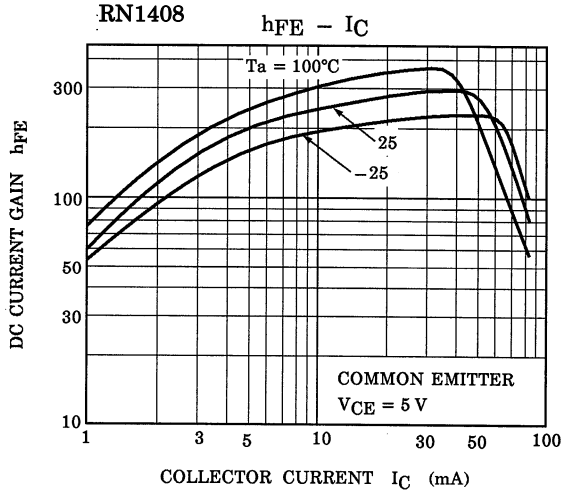
RN1407 h_{FE} – I_C



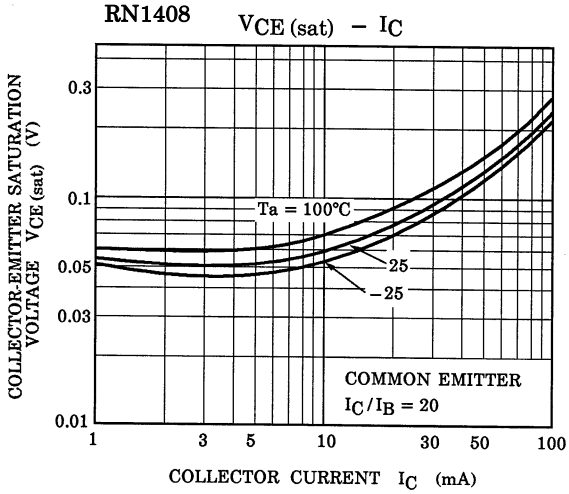
RN1407 $V_{CE\,(sat)}$ – I_C



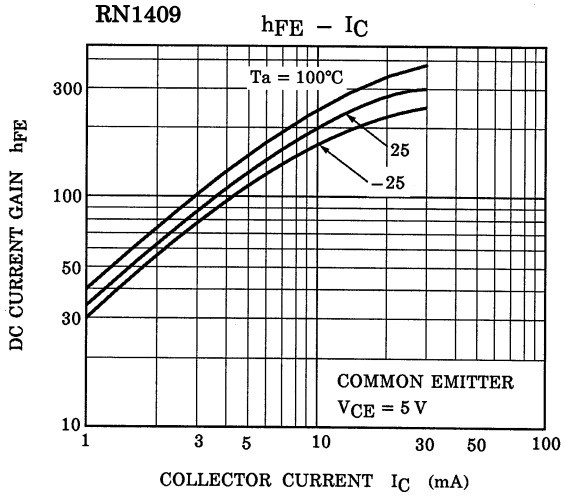
RN1408 h_{FE} – I_C



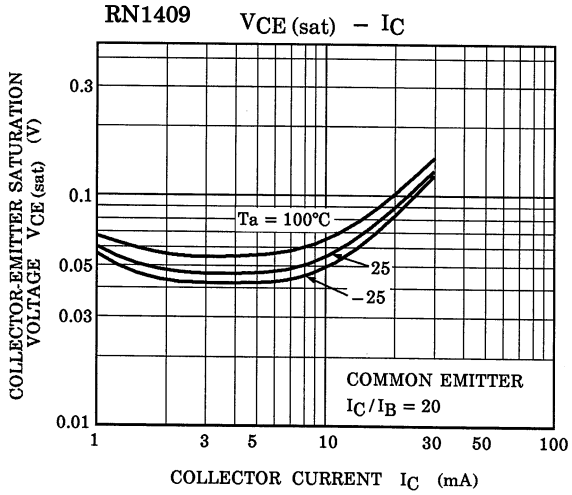
RN1408 $V_{CE\,(sat)}$ – I_C

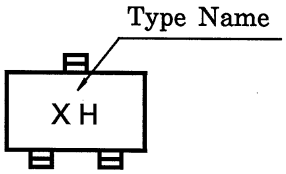
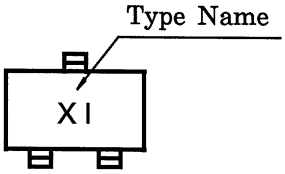
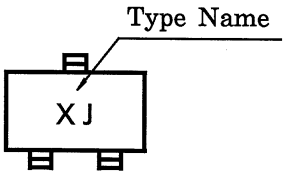


RN1409 h_{FE} – I_C



RN1409 $V_{CE\,(sat)}$ – I_C



Type No.	Marking
RN1407	
RN1408	
RN1409	

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20070701-EN GENERAL

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