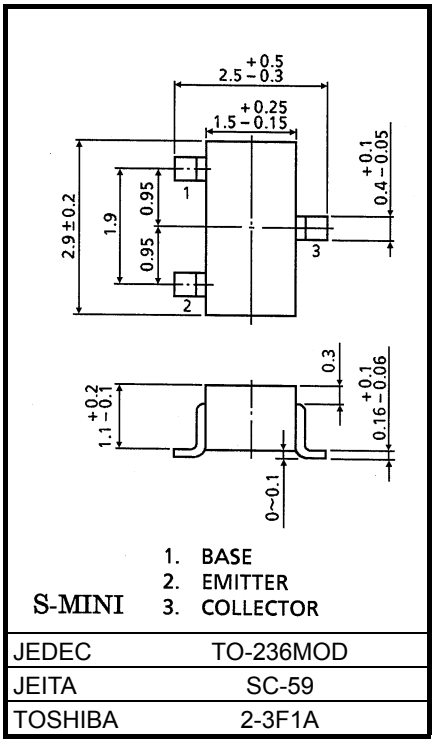
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN2407, RN2408, RN2409

Unit: mm

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

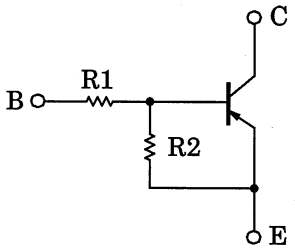
- With built-in bias resistors
- Simplified circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1407 to 1409



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

Weight: 12mg (typ.)

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2407	10	47
RN2408	22	47
RN2409	47	22

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2407 to RN2409	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2407	V_{EBO}	−6	V
	RN2408		−7	
	RN2409		−15	
Collector current	RN2407 to RN2409	I_C	−100	mA
Collector power dissipation		P_C	200	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

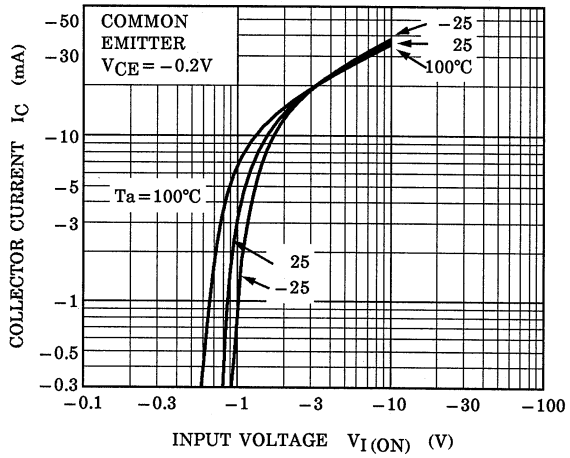
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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
1985-05

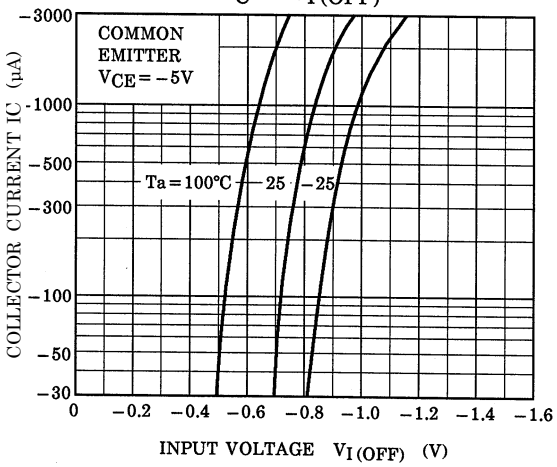
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2407 to RN2409	I_{CBO}	—	V_{CB} = −50 V, I_E = 0	—	—	−0.1	nA
		I_{CEO}	—	V_{CE} = −50 V, I_B = 0	—	—	−0.5	
Emitter cut-off current	RN2407	I_{EBO}	—	V_{EB} = −6 V, I_C = 0	−0.081	—	−0.15	mA
	RN2408		—	V_{EB} = −7 V, I_C = 0	−0.078	—	−0.145	
	RN2409		—	V_{EB} = −15 V, I_C = 0	−0.167	—	−0.311	
DC current gain	RN2407	h_{FE}	—	V_{CE} = −5 V, I_C = −10 mA	80	—	—	—
	RN2408		—		80	—	—	
	RN2409		—		70	—	—	
Collector-emitter saturation voltage	RN2407 to RN2409	$V_{CE\ (sat)}$	—	I_C = −5 mA, I_B = −0.25 mA	—	−0.1	−0.3	V
Input voltage (ON)	RN2407	$V_{I\ (ON)}$	—	V_{CE} = −0.2 V, I_C = −5 mA	−0.7	—	−1.8	V
	RN2408		—		−1.0	—	−2.6	
	RN2409		—		−2.2	—	−5.8	
Input voltage (OFF)	RN2407	$V_{I\ (OFF)}$	—	V_{CE} = −5 V, I_C = −0.1 mA	−0.5	—	−1.0	V
	RN2408		—		−0.6	—	−1.16	
	RN2409		—		−1.5	—	−2.6	
Transition frequency	RN2407 to RN2409	f_T	—	V_{CE} = −10 V, I_C = −5 mA	—	200	—	MHz
Collector output capacitance	RN2407 to RN2409	C_{ob}	—	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input resistor	RN2407	R1	—	—	7	10	13	kΩ
	RN2408		—		15.4	22	28.6	
	RN2409		—		32.9	47	61.1	
Resistor ratio	RN2407	R1/R2	—	—	0.191	0.213	0.232	—
	RN2408		—		0.421	0.468	0.515	
	RN2409		—		1.92	2.14	2.35	

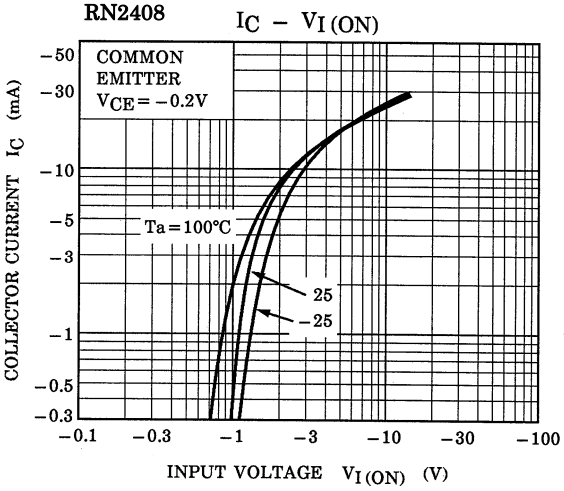
RN2407 $I_C - V_{I(ON)}$



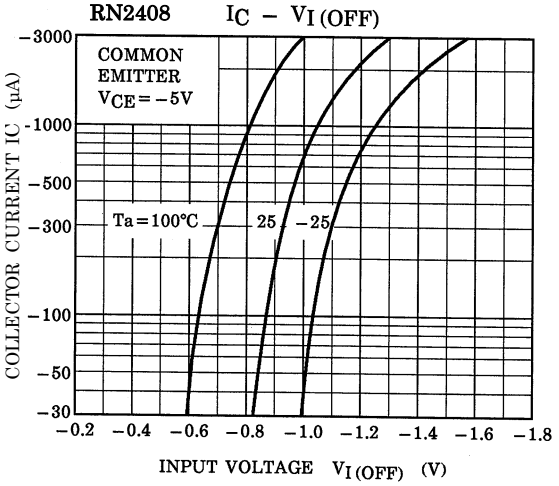
RN2407 $I_C - V_{I(OFF)}$



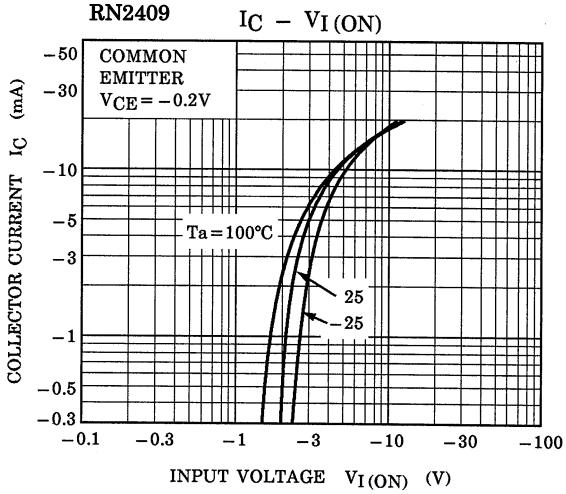
RN2408 $I_C - V_{I(ON)}$



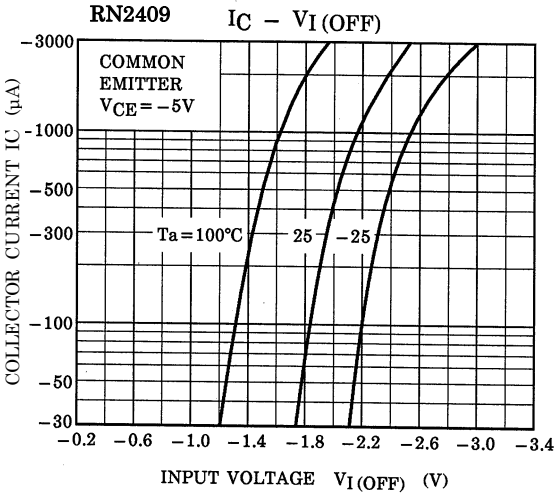
RN2408 $I_C - V_{I(OFF)}$



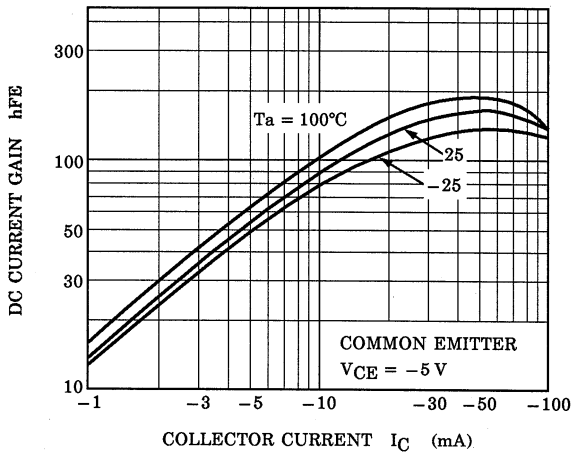
RN2409 $I_C - V_{I(ON)}$



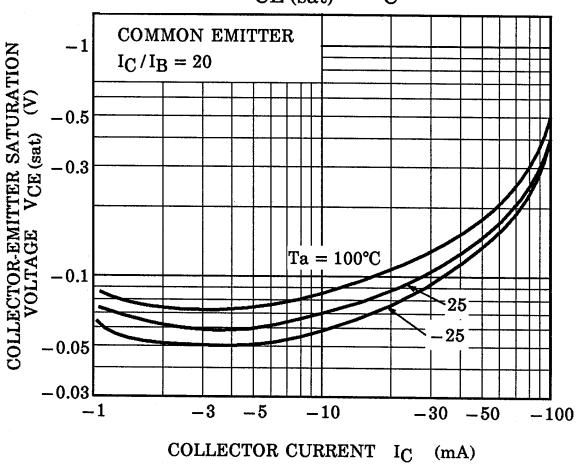
RN2409 $I_C - V_{I(OFF)}$



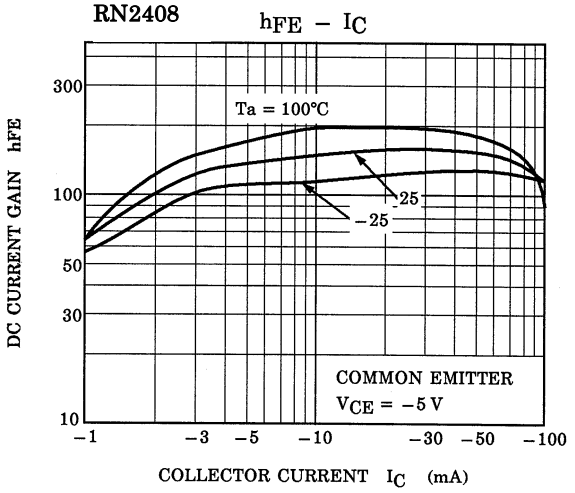
RN2407 h_{FE} – I_C



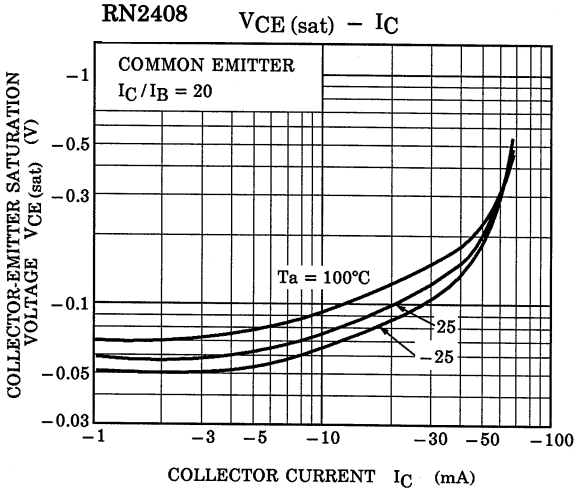
RN2407 $V_{CE\,(sat)}$ – I_C



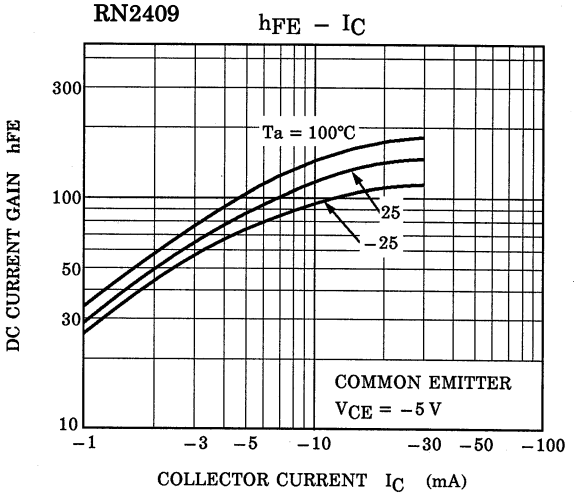
RN2408 h_{FE} – I_C



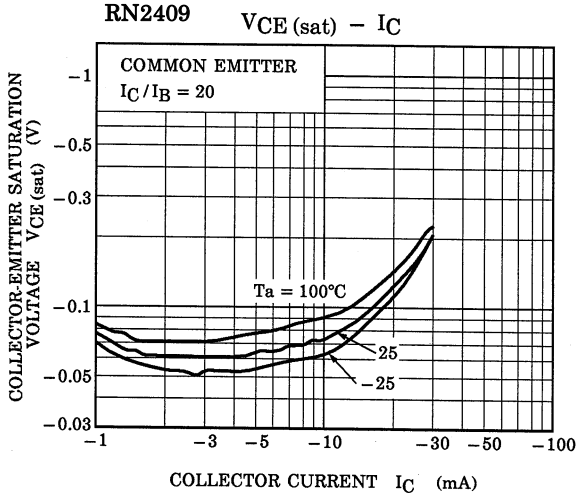
RN2408 $V_{CE\,(sat)}$ – I_C

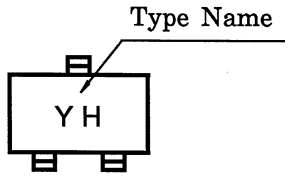
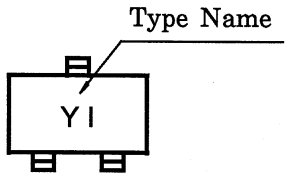
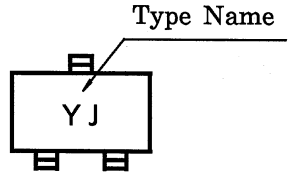


RN2409 h_{FE} – I_C



RN2409 $V_{CE\,(sat)}$ – I_C



Type Name	Marking
RN2407	
RN2408	
RN2409	

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