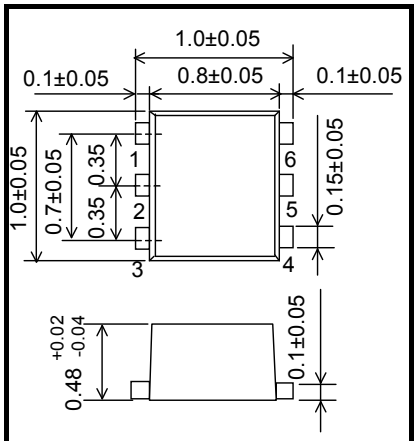
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Transistor with Built-in Bias Resistor)

RN2907AFS, RN2908AFS, RN2909AFS

Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

- Two devices are incorporated into a fine-pitch, small-mold (6-pin) package.
- Incorporating a bias resistor into a transistor reduces the parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly costs.
- Complementary to the RN1907AFS to RN1909AFS

Unit: mm



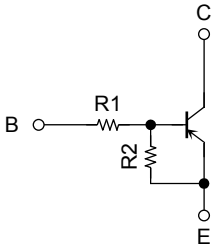
1. EMITTER1 (E1)
2. BASE1 (B1)
3. COLLECTOR2 (C2)
4. EMITTER2 (E2)
5. BASE2 (B2)
6. COLLECTOR1 (C1)

fS6

JEDEC	—
JEITA	—
TOSHIBA	2-1F1D

Weight: 1 mg (typ.)

Equivalent Circuit and Bias Resistor Values

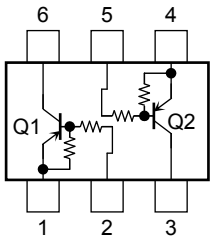


Type No.	R1 (kΩ)	R2 (kΩ)
RN2907AFS	10	47
RN2908AFS	22	47
RN2909AFS	47	22

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2907AFS to RN2909AFS	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2907AFS	V_{EBO}	−6	V
	RN2908AFS		−7	
	RN2909AFS		−15	
Collector current	RN2907AFS to RN2909AFS	I_C	−80	mA
Collector power dissipation		P_C (Note 1)	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Equivalent Circuit (top view)

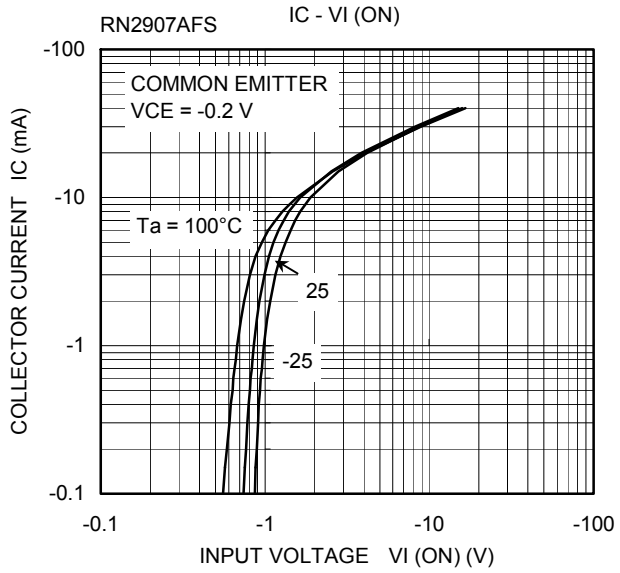


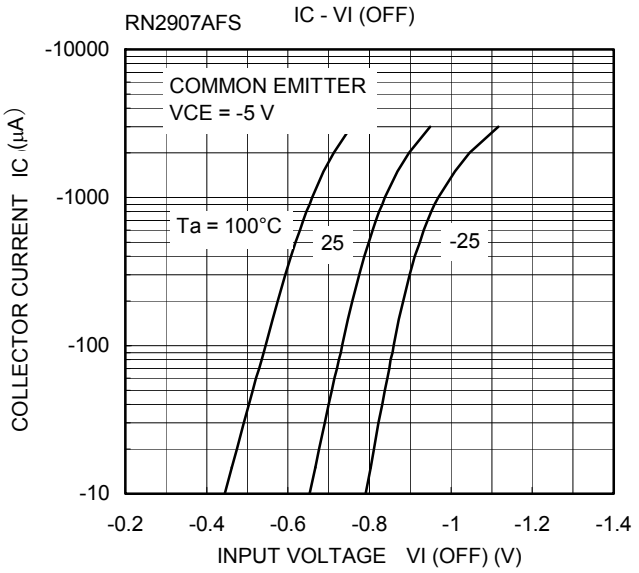
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

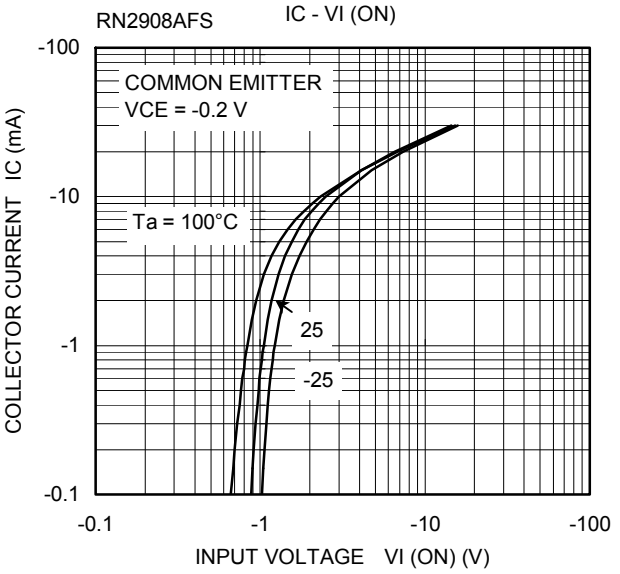
Note 1: Total rating

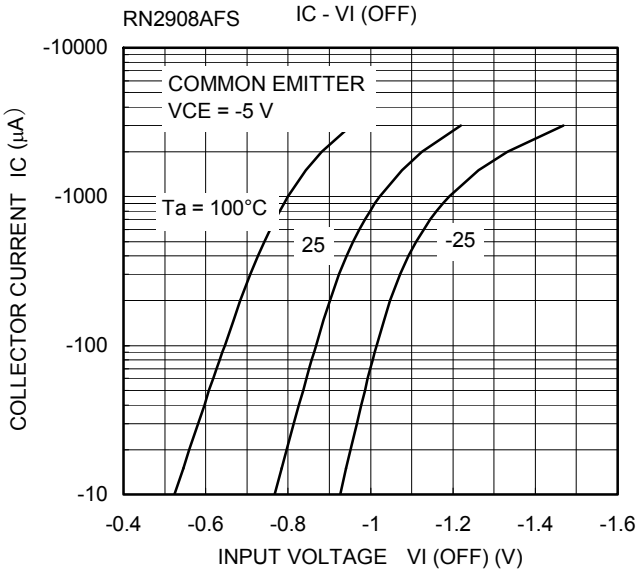
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

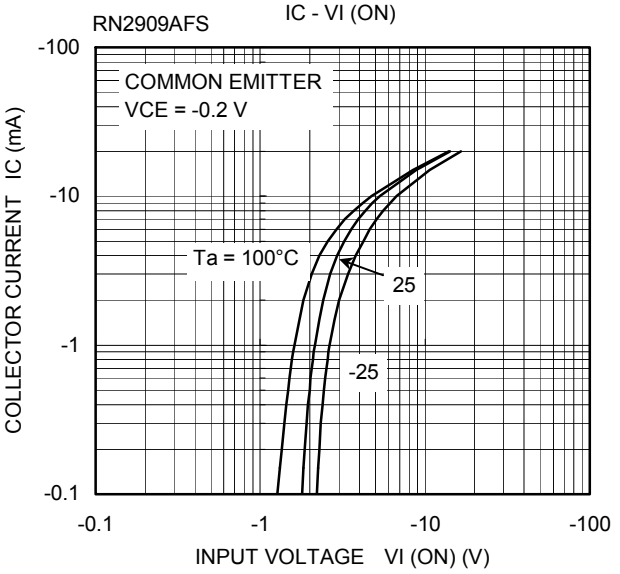
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN2907AFS to 2909AFS	I_{CBO}	V_{CB} = –50 V, I_E = 0	—	—	–100	nA
		I_{CEO}	V_{CE} = –50 V, I_B = 0	—	—	–500	
Emitter cutoff current	RN2907AFS	I_{EBO}	V_{EB} = –6 V, I_C = 0	–0.088	—	–0.131	mA
	RN2908AFS		V_{EB} = –7 V, I_C = 0	–0.085	—	–0.126	
	RN2909AFS		V_{EB} = –15 V, I_C = 0	–0.182	—	–0.271	
DC current gain	RN2907AFS	h_{FE}	V_{CE} = –5 V, I_C = –10 mA	80	—	—	—
	RN2908AFS			80	—	—	
	RN2909AFS			70	—	—	
Collector-emitter saturation voltage	RN2907AFS to 2909AFS	$V_{CE\ (sat)}$	I_C = –5 mA, I_B = –0.25 mA	—	—	–0.15	V
Input voltage (ON)	RN2907AFS	$V_{I\ (ON)}$	V_{CE} = –0.2 V, I_C = –5 mA	–0.8	—	–1.8	V
	RN2908AFS			–1.0	—	–3.0	
	RN2909AFS			–2.0	—	–6.4	
Input voltage (OFF)	RN2907AFS	$V_{I\ (OFF)}$	V_{CE} = –5 V, I_C = –0.1 mA	–0.6	—	–0.9	V
	RN2908AFS			–0.7	—	–1.2	
	RN2909AFS			–1.5	—	–2.6	
Collector output capacitance	RN2907AFS to 2909AFS	C_{ob}	V_{CB} = –10 V, I_E = 0, f = 1 MHz	—	0.9	—	pF
Input resistor	RN2907AFS	R1	—	8	10	12	kΩ
	RN2908AFS			17.6	22	26.4	
	RN2909AFS			37.6	47	56.4	
Resistor ratio	RN2907AFS	R1/R2	—	0.17	0.213	0.255	—
	RN2908AFS			0.374	0.468	0.562	
	RN2909AFS			1.71	2.14	2.56	

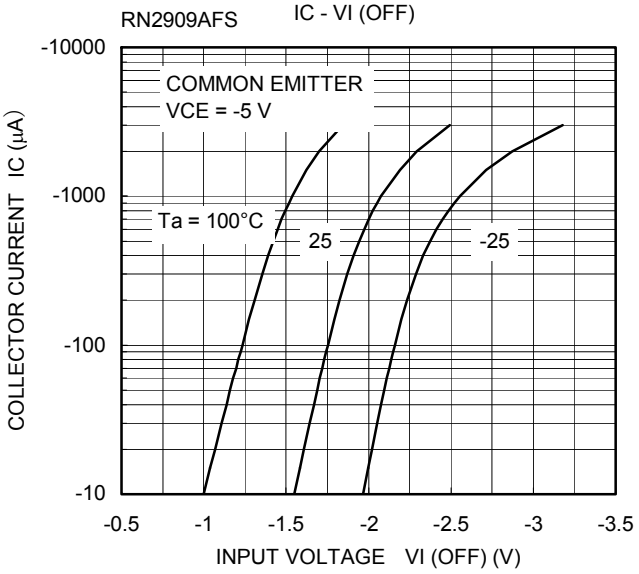




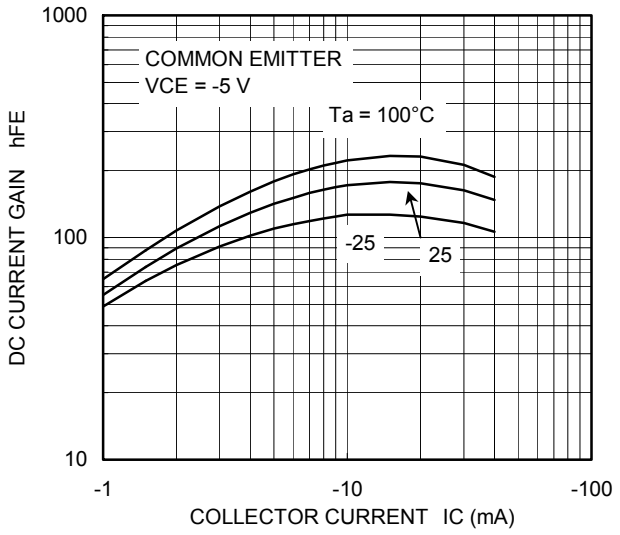




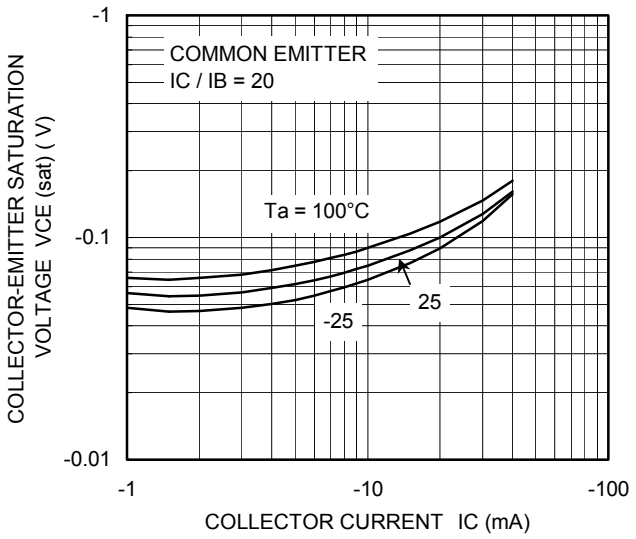




RN2907AFS hFE - IC



RN2907AFS VCE (sat) - IC



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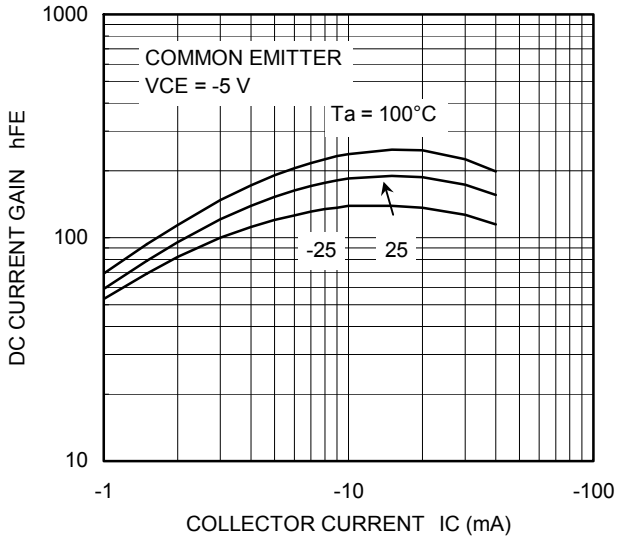

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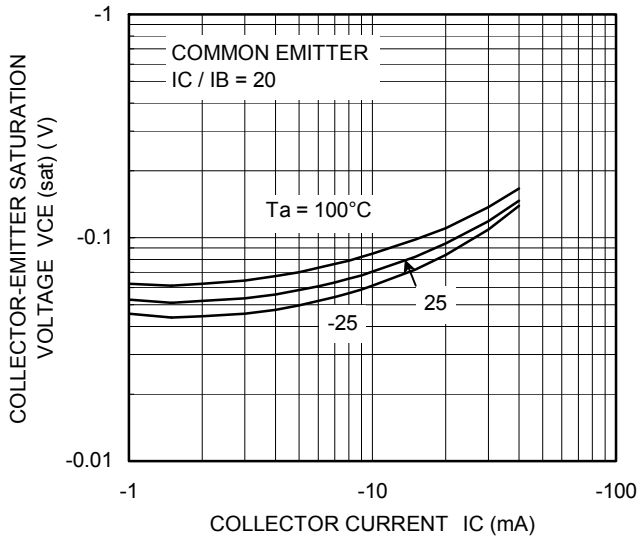
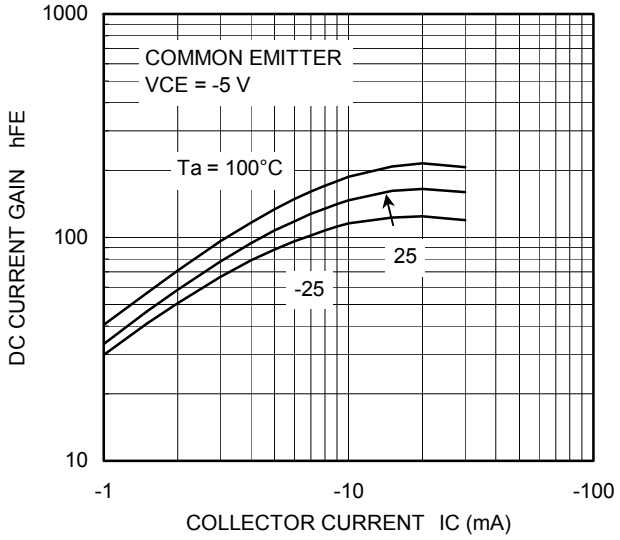
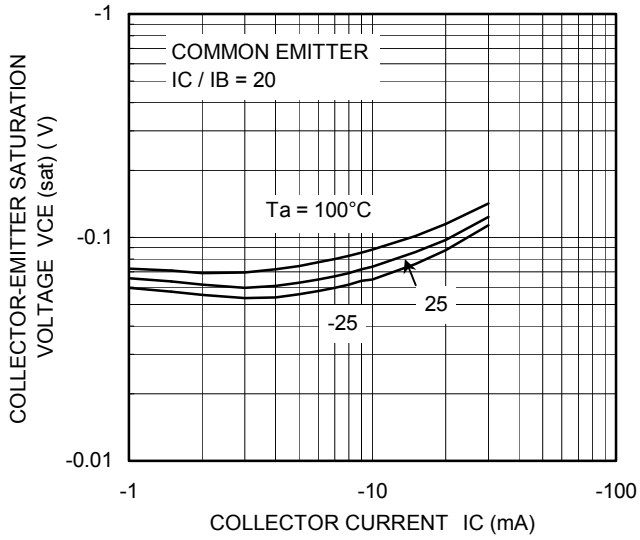


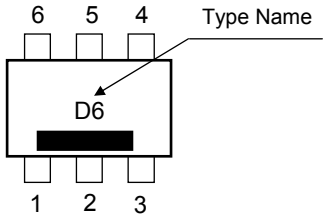
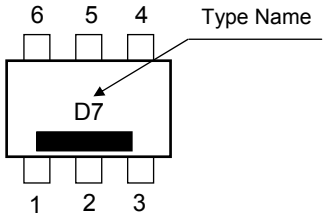
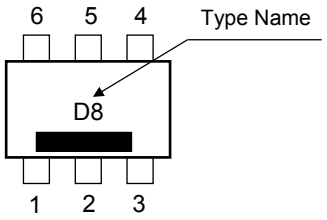
RN2909AFS hFE- IC



RN2909AFS VCE (sat) - IC



Marking

Type Name	Marking
RN2907AFS	
RN2908AFS	
RN2909AFS	

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