

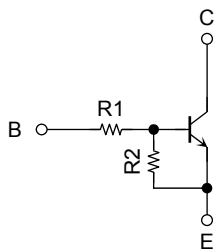
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Transistor with Built-in Bias Resistor)

RN1907AFS, RN1908AFS, RN1909AFS

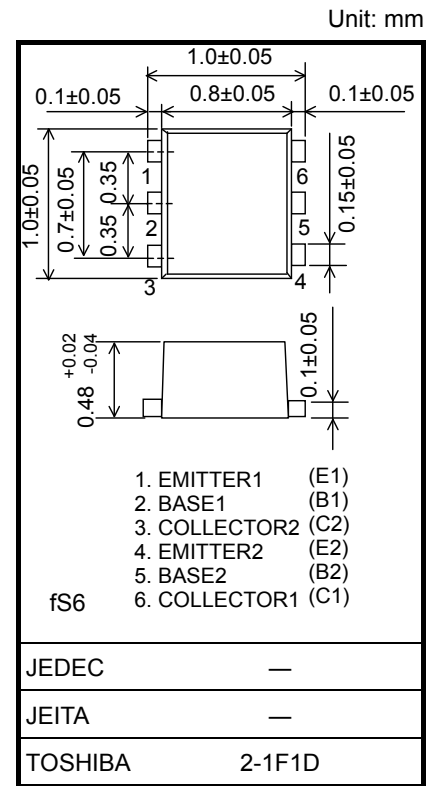
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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 the assembly cost.
- Complementary to the RN2907AFS~RN2909AFS

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1907AFS	10	47
RN1908AFS	22	47
RN1909AFS	47	22

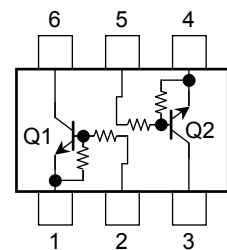


Weight: 0.001 g (typ.)

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1907AFS~RN1909AFS	V_{CB0}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1907AFS	V_{EBO}	6	V
	RN1908AFS		7	
	RN1909AFS		15	
Collector current	RN1907AFS~RN1909AFS	I_C	80	mA
Collector power dissipation		P_C (Note 1)	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-55~150	°C

Equivalent Circuit (top view)



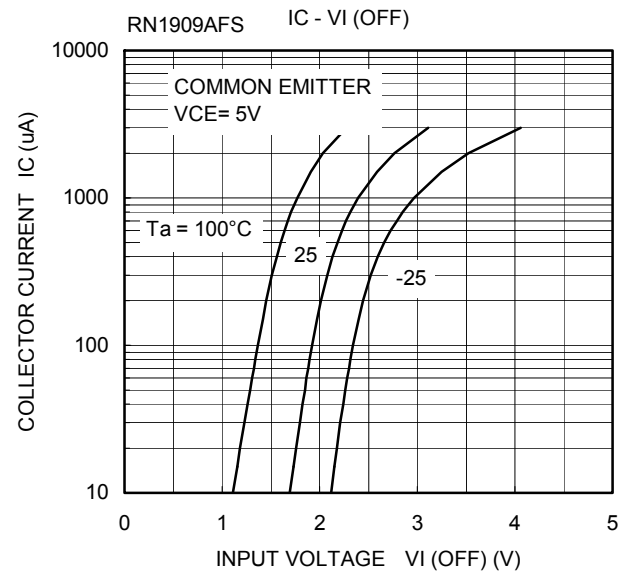
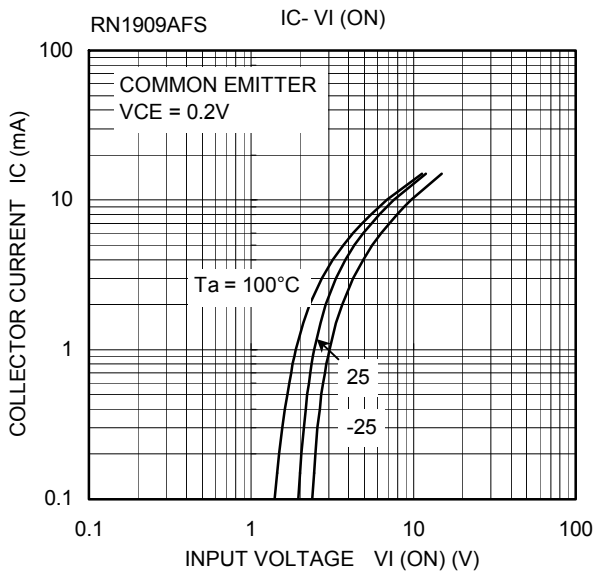
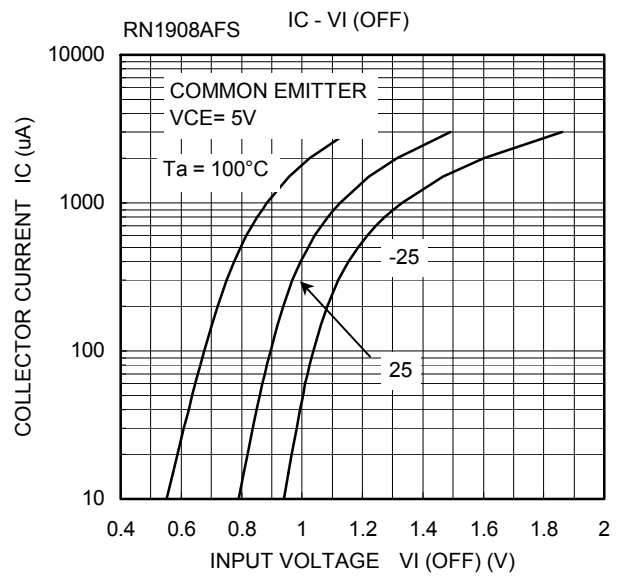
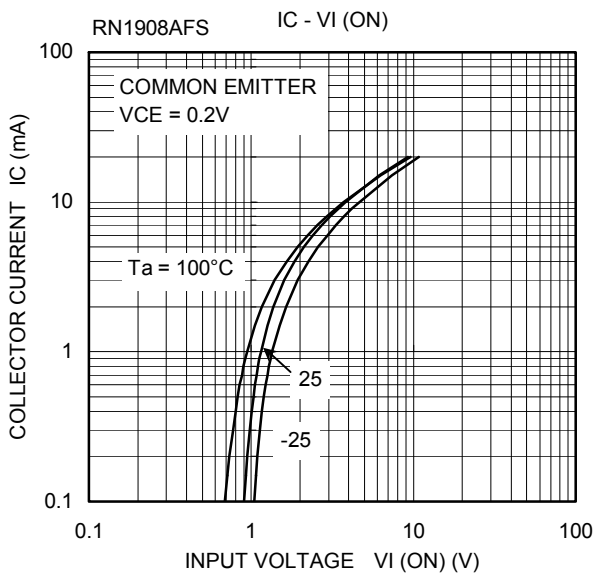
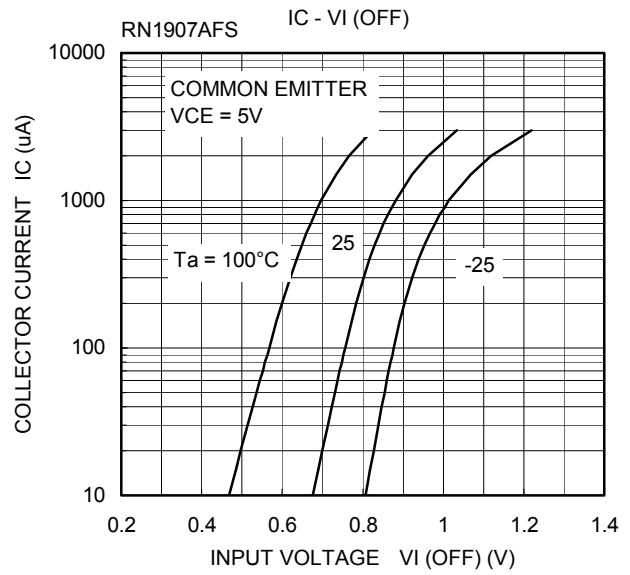
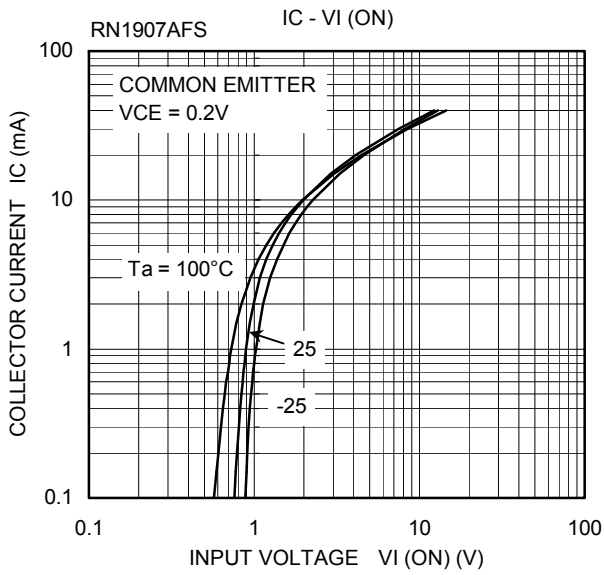
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

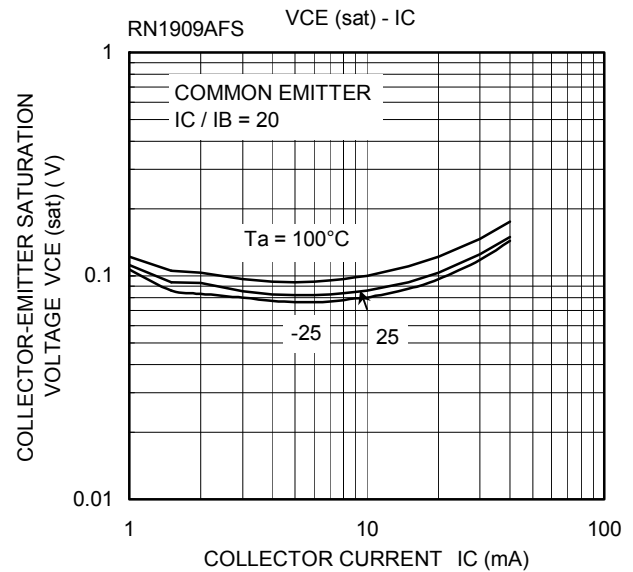
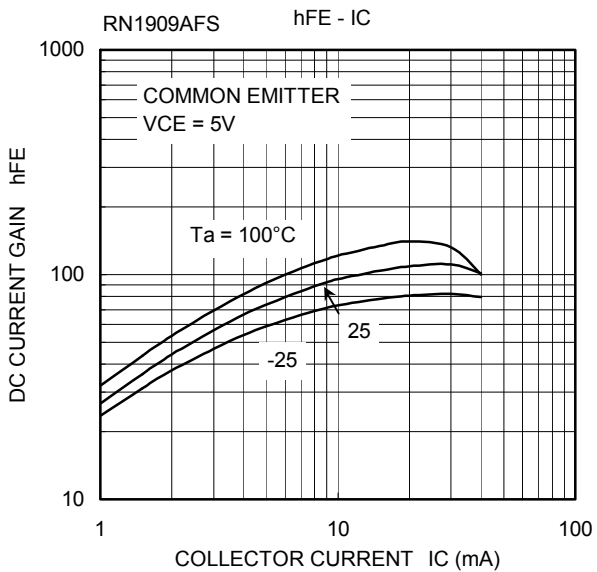
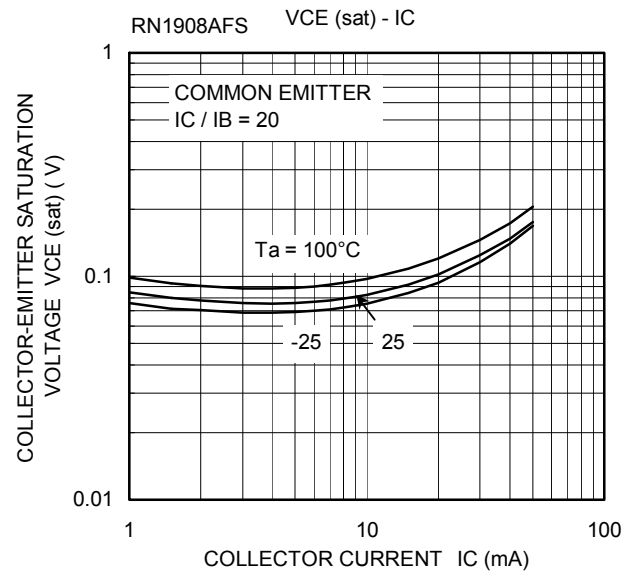
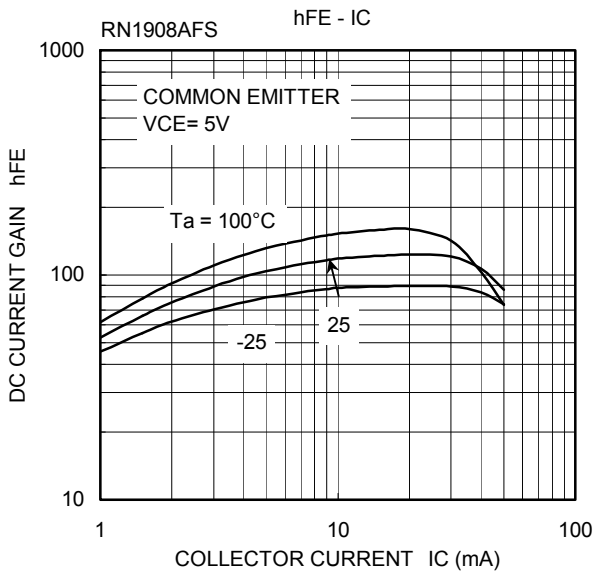
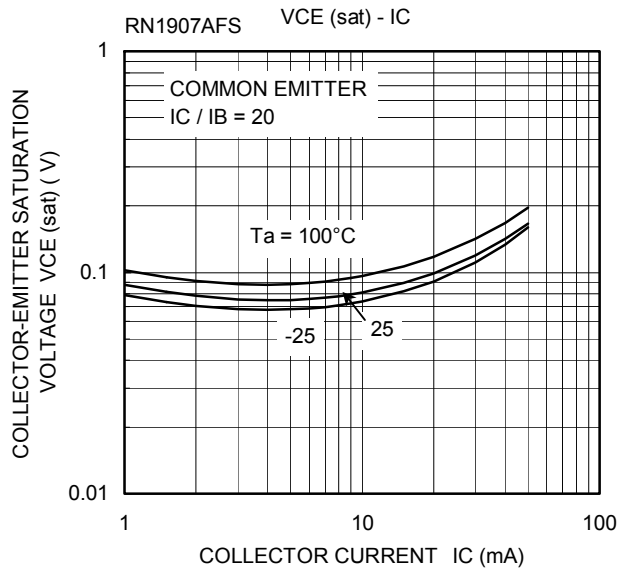
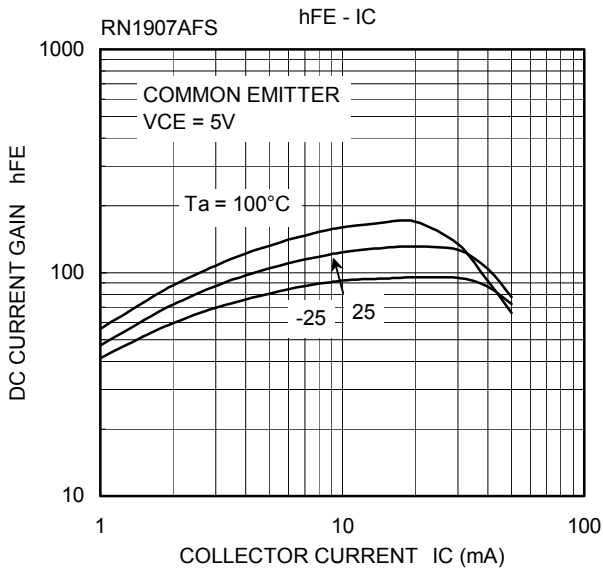
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

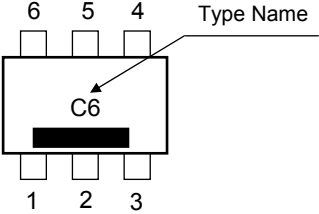
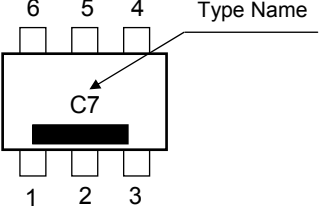
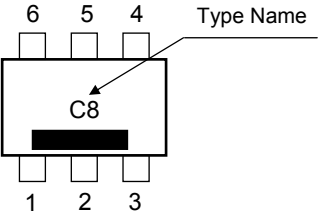
Note 1: Total rating

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1907AFS~1909AFS	I_{CBO}	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	
Emitter cutoff current	RN1907AFS	I_{EBO}	$V_{EB} = 6\text{ V}, I_C = 0$	0.088	—	0.131	mA
	RN1908AFS			0.085	—	0.126	
	RN1909AFS			0.182	—	0.271	
DC current gain	RN1907AFS	h_{FE}	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	
	RN1908AFS			80	—	—	
	RN1909AFS			70	—	—	
Collector-emitter saturation voltage	RN1907AFS~1909AFS	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1907AFS	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.8	—	1.8	V
	RN1908AFS			1.0	—	3.0	
	RN1909AFS			2.0	—	6.4	
Input voltage (OFF)	RN1907AFS	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.6	—	0.9	V
	RN1908AFS			0.7	—	1.2	
	RN1909AFS			1.5	—	2.6	
Collector output capacitance	RN1907AFS~1909AFS	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.7	—	pF
Input resistor	RN1907AFS	R1	—	8	10	12	k Ω
	RN1908AFS			17.6	22	26.4	
	RN1909AFS			37.6	47	56.4	
Resistor ratio	RN1907AFS	R1/R2	—	0.17	0.213	0.255	
	RN1908AFS			0.374	0.468	0.562	
	RN1909AFS			1.71	2.14	2.56	





Type Name	Marking
RN1907AFS	 <p>The diagram shows a rectangular component with six pins. The top three pins are labeled 6, 5, and 4 from left to right. The bottom three pins are labeled 1, 2, and 3 from left to right. An arrow points from the text 'Type Name' to the top-right corner of the component. Inside the component, the text 'C6' is printed above a solid black horizontal bar.</p>
RN1908AFS	 <p>The diagram shows a rectangular component with six pins. The top three pins are labeled 6, 5, and 4 from left to right. The bottom three pins are labeled 1, 2, and 3 from left to right. An arrow points from the text 'Type Name' to the top-right corner of the component. Inside the component, the text 'C7' is printed above a solid black horizontal bar.</p>
RN1909AFS	 <p>The diagram shows a rectangular component with six pins. The top three pins are labeled 6, 5, and 4 from left to right. The bottom three pins are labeled 1, 2, and 3 from left to right. An arrow points from the text 'Type Name' to the top-right corner of the component. Inside the component, the text 'C8' is printed above a solid black horizontal bar.</p>

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