

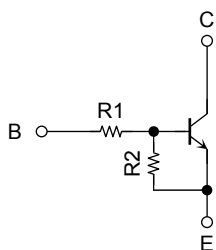
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1907FS, RN1908FS, RN1909FS

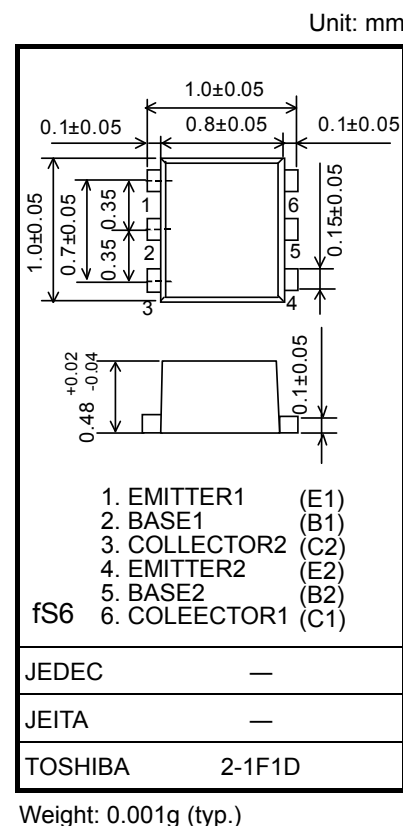
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Two devices are incorporated into a fine pitch small mold (6-pin) package.
- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enables the manufacture of ever more compact equipment and lowers assembly cost.
- Complementary to RN2907FS~RN2909FS

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (k Ω)	R2 (k Ω)
RN1907FS	10	47
RN1908FS	22	47
RN1909FS	47	22



Weight: 0.001g (typ.)

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

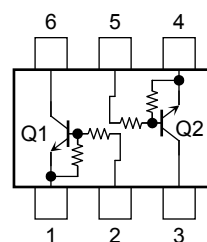
Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1907FS~RN1909FS	V_{CBO}	20	V
Collector-emitter voltage		V_{CEO}	20	V
Emitter-base voltage	RN1907FS	V_{EBO}	6	V
	RN1908FS		7	
	RN1909FS		15	
Collector current	RN1907FS~RN1909FS	I_C	50	mA
Collector power dissipation		P_C (Note 1)	50	mW
Junction temperature		T_j	150	°C
Storage temperature range		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).

Note 1: Total rating

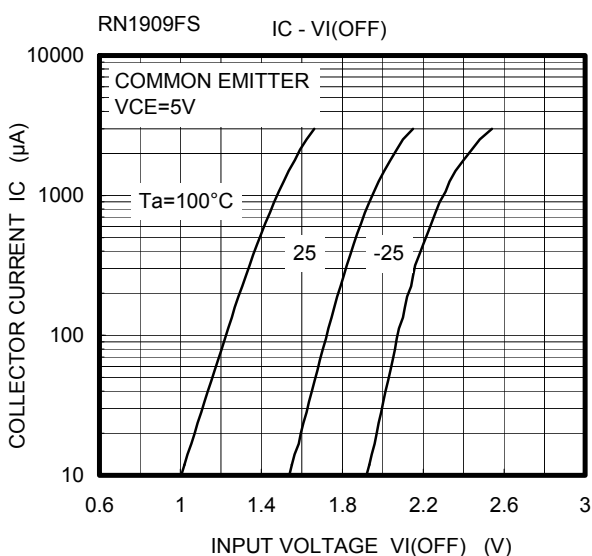
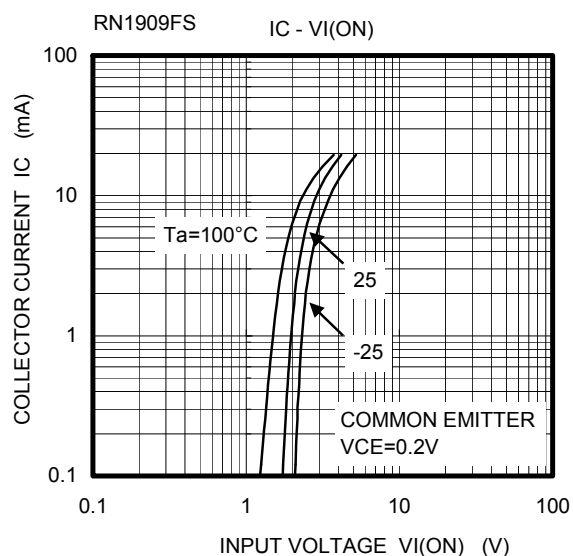
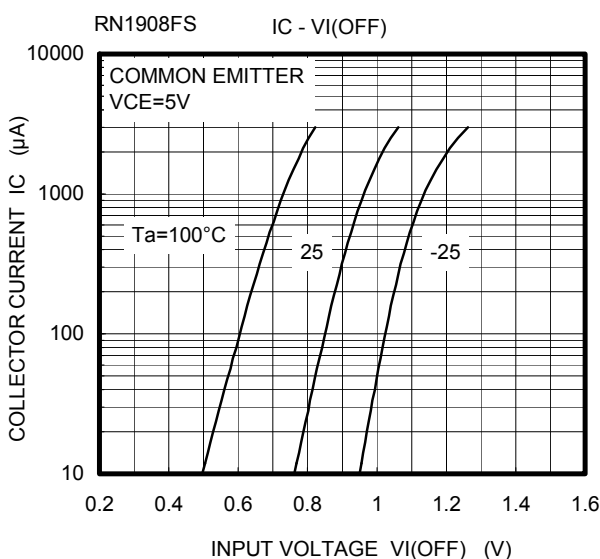
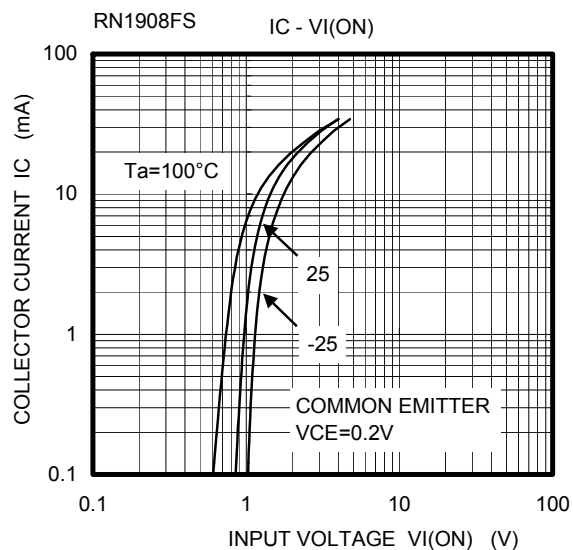
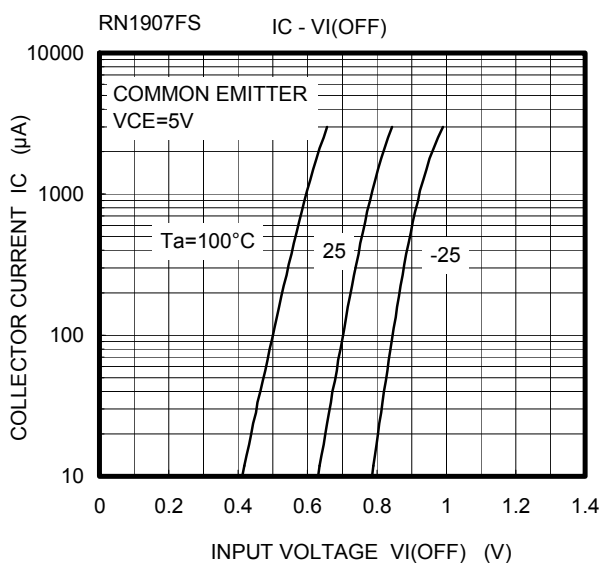
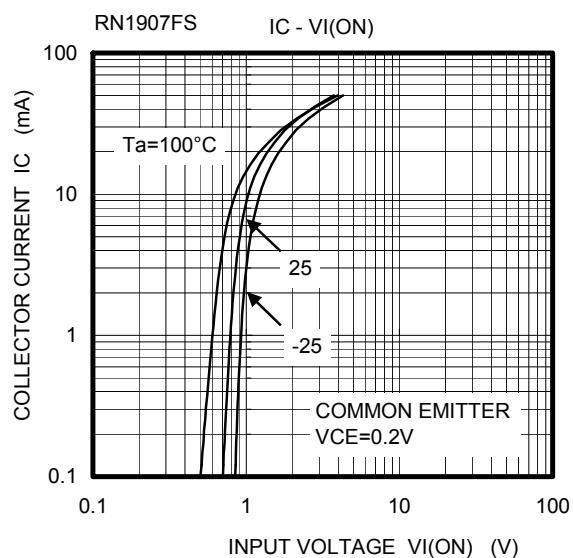
Equivalent Circuit (top view)



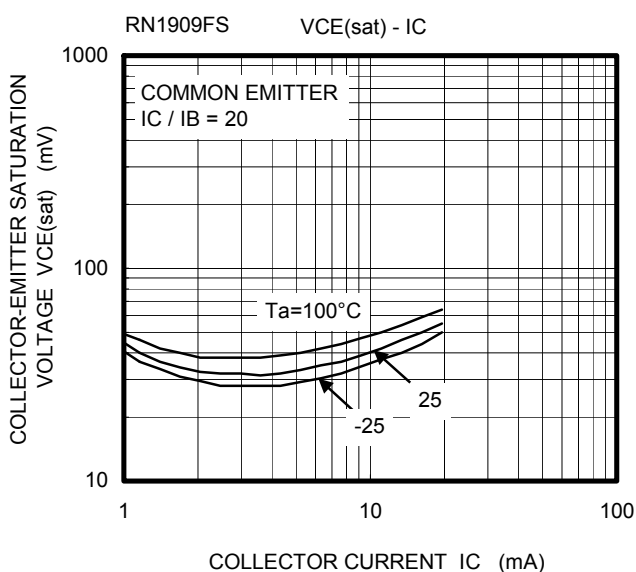
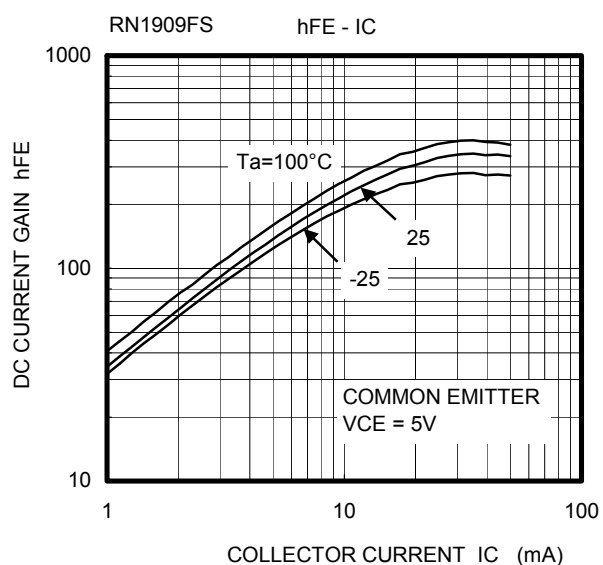
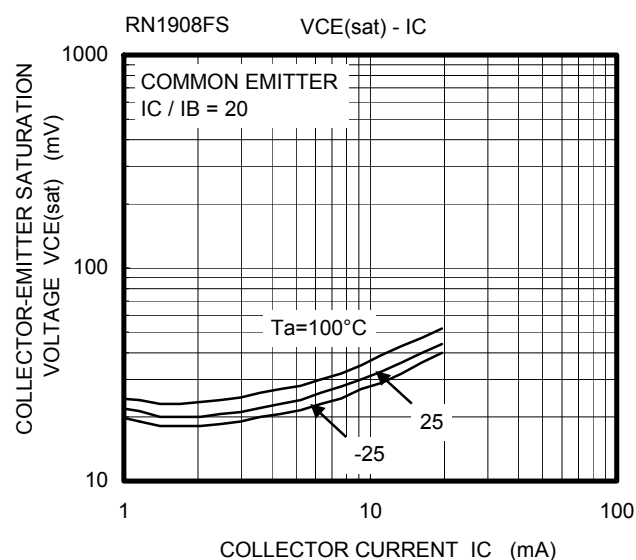
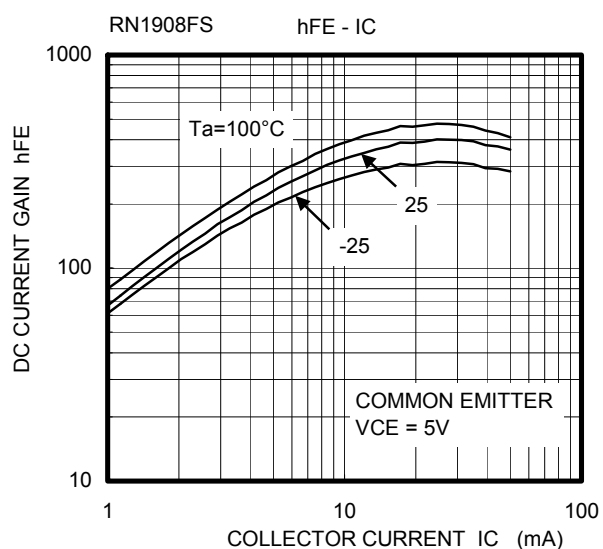
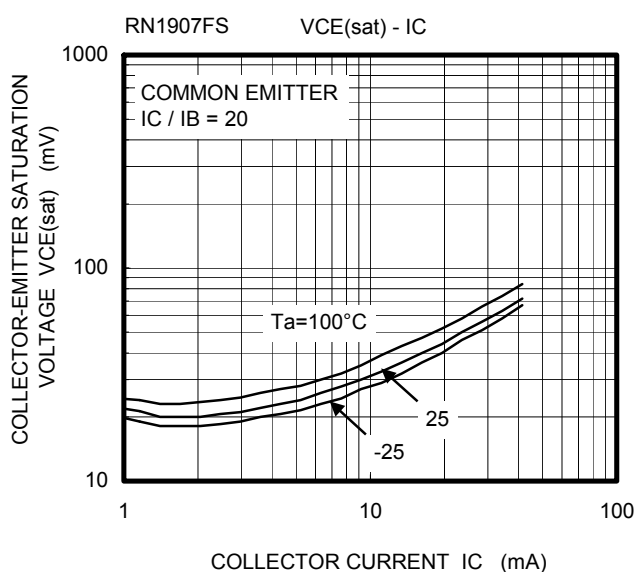
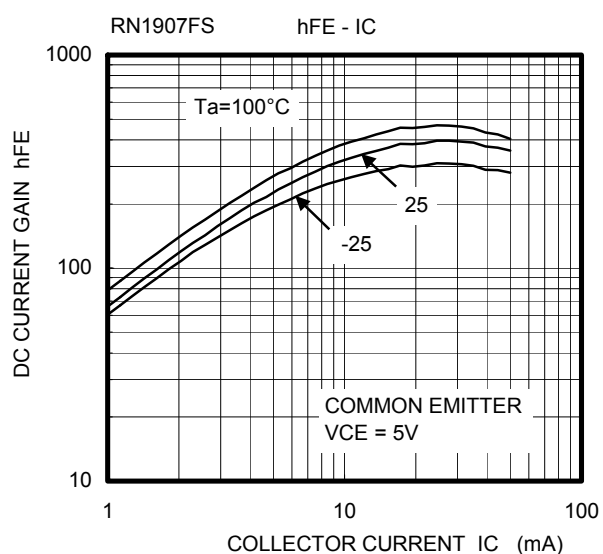
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

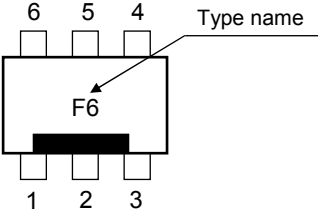
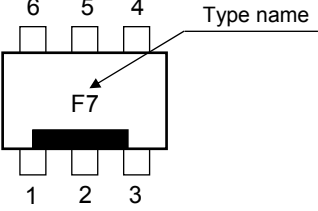
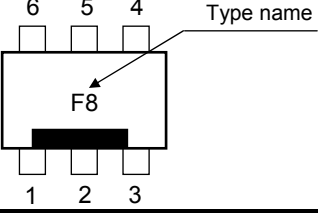
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1907FS~1909FS	I_{CBO}	$V_{CB} = 20\text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	$V_{CE} = 20\text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1907FS	I_{EBO}	$V_{EB} = 6\text{ V}, I_C = 0$	0.088	—	0.131	mA
	RN1908FS		$V_{EB} = 7\text{ V}, I_C = 0$	0.085	—	0.126	
	RN1909FS		$V_{EB} = 15\text{ V}, I_C = 0$	0.182	—	0.271	
DC current gain	RN1907FS	h_{FE}	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	120	—	—	
	RN1908FS			120	—	—	
	RN1909FS			100	—	—	
Collector-emitter saturation voltage	RN1907FS~1909FS	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1907FS	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.5	V
	RN1908FS			0.8	—	2.2	
	RN1909FS			1.6	—	5.0	
Input voltage (OFF)	RN1907FS	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
	RN1908FS			0.6	—	1.1	
	RN1909FS			1.3	—	2.6	
Collector output capacitance	RN1907FS~1909FS	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	1.2	—	pF
Input resistor	RN1907FS	R1	—	8	10	12	kΩ
	RN1908FS			17.6	22	26.4	
	RN1909FS			37.6	47	56.4	
Resistor ratio	RN1907FS	R1/R2	—	0.17	0.213	0.255	
	RN1908FS			0.374	0.468	0.562	
	RN1909FS			1.71	2.14	2.56	

(Q1, Q2 Common)



(Q1, Q2 Common)



Type Name	Marking
RN1907FS	 The diagram shows a rectangular component with six pins. Pins 1, 2, and 3 are at the bottom, and pins 4, 5, and 6 are at the top. A black rectangular marking is located between pins 1 and 2. An arrow points from the text 'F6' to this marking. Another arrow points from the text 'Type name' to the top right corner of the component.
RN1908FS	 The diagram shows a rectangular component with six pins. Pins 1, 2, and 3 are at the bottom, and pins 4, 5, and 6 are at the top. A black rectangular marking is located between pins 1 and 2. An arrow points from the text 'F7' to this marking. Another arrow points from the text 'Type name' to the top right corner of the component.
RN1909FS	 The diagram shows a rectangular component with six pins. Pins 1, 2, and 3 are at the bottom, and pins 4, 5, and 6 are at the top. A black rectangular marking is located between pins 1 and 2. An arrow points from the text 'F8' to this marking. Another arrow points from the text 'Type name' to the top right corner of the component.

Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic discharge. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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