

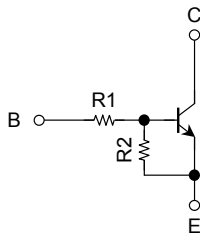
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Transistor with Built-in Bias Resistor)

## RN1907AFS, RN1908AFS, RN1909AFS

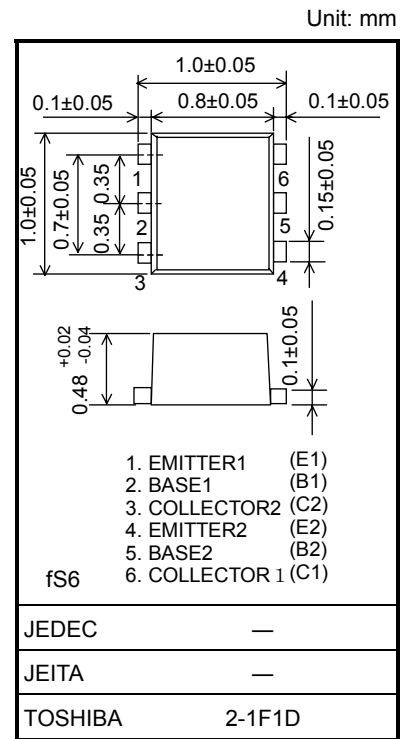
## Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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
- Lead (Pb) - free

## Equivalent Circuit and Bias Resistor Values



Type No.	R1 (k $\Omega$ )	R2 (k $\Omega$ )
RN1907AFS	10	47
RN1908AFS	22	47
RN1909AFS	47	22



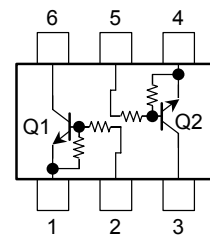
Weight: 0.001 g (typ.)

### Equivalent Circuit (top view)

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

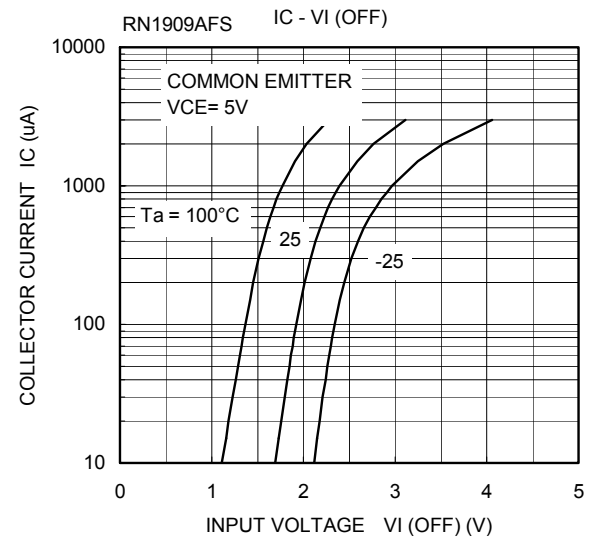
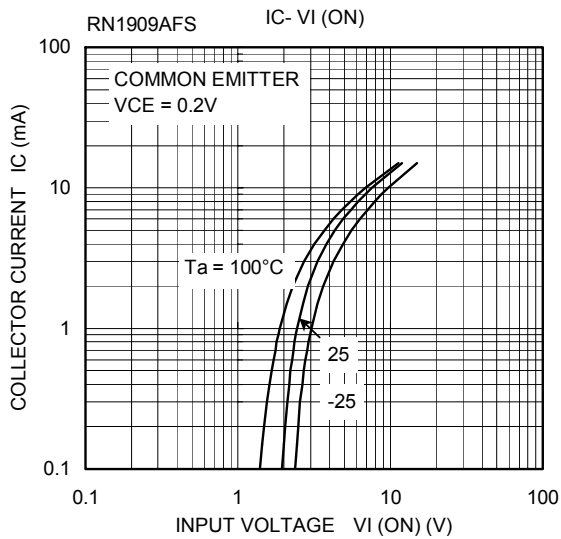
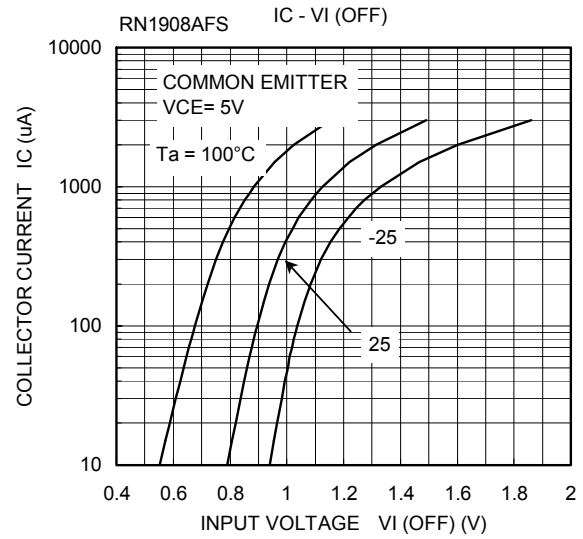
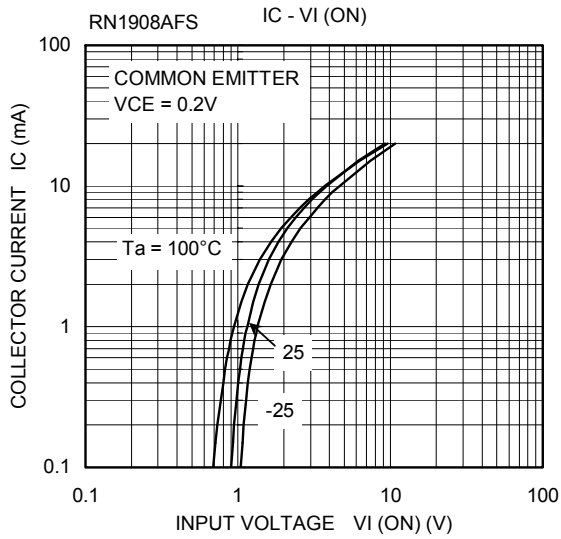
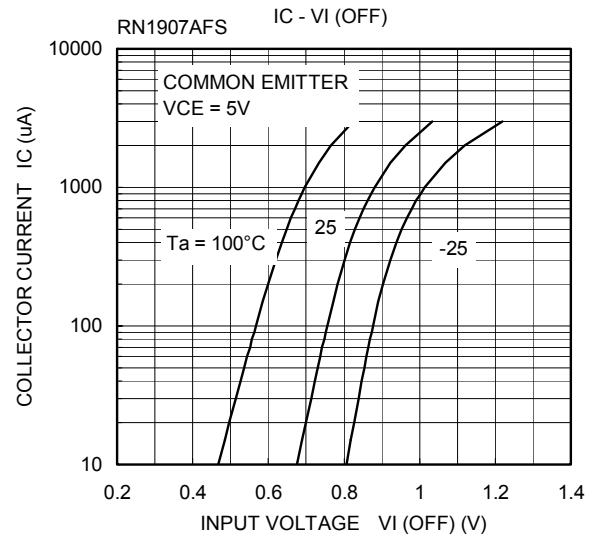
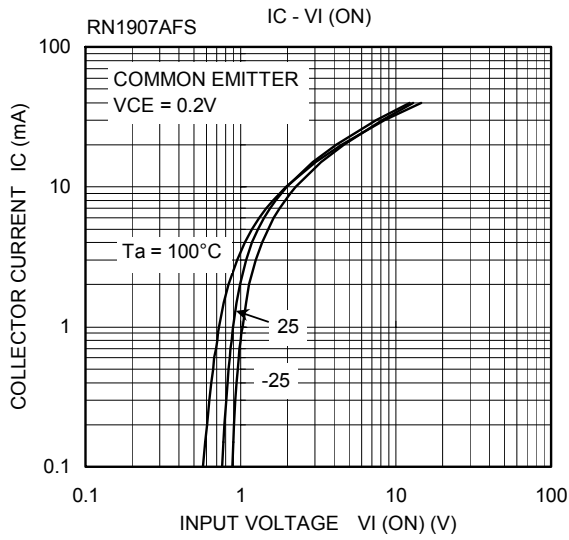
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1907AFS~RN1909AFS	$V_{CB0}$	50	V
Collector-emitter voltage		$V_{CEO}$	50	V
Emitter-base voltage	RN1907AFS	$V_{EBO}$	6	V
	RN1908AFS		7	
	RN1909AFS		15	
Collector current	RN1907AFS~RN1909AFS	$I_C$	80	mA
Collector power dissipation		$P_C$ (Note)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

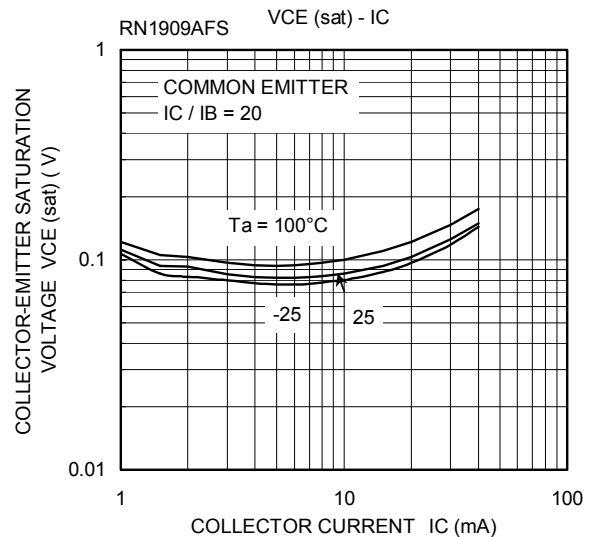
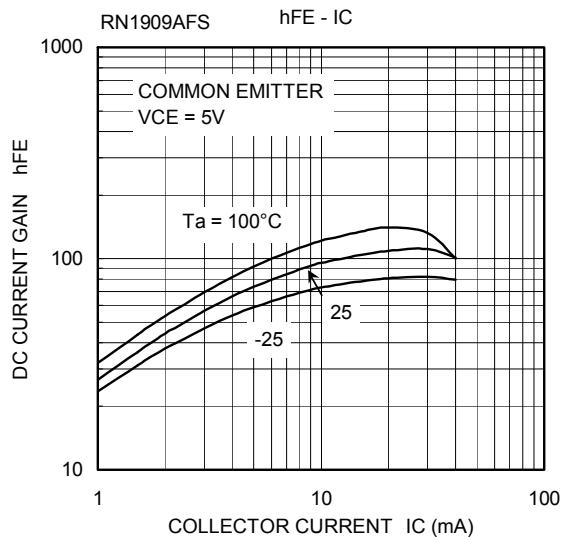
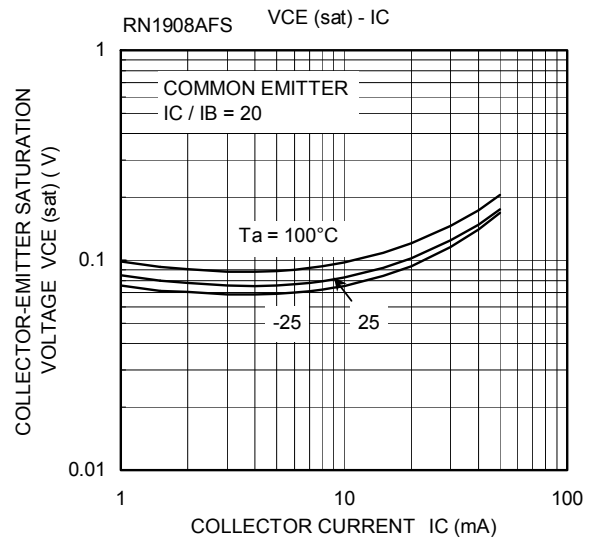
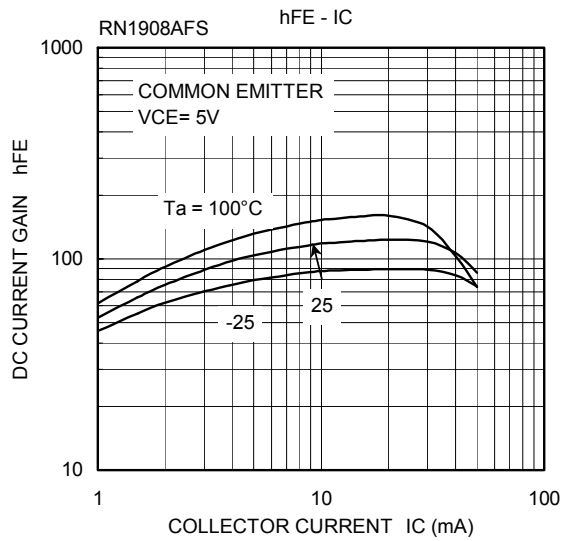
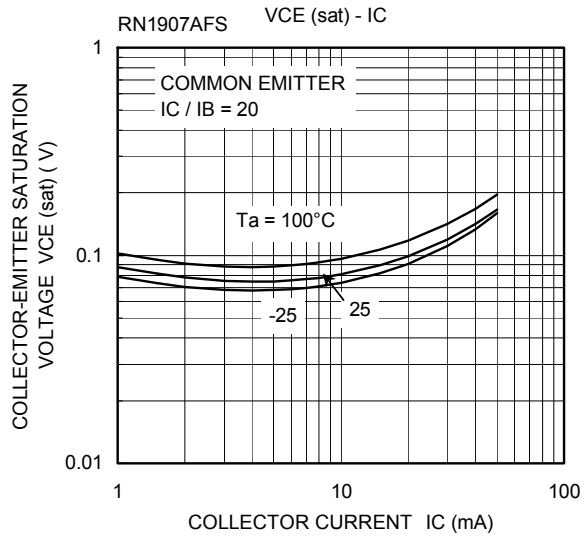
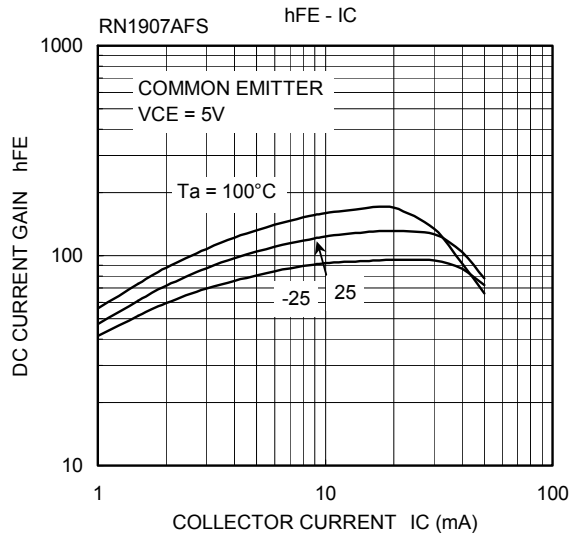
Note: Total rating

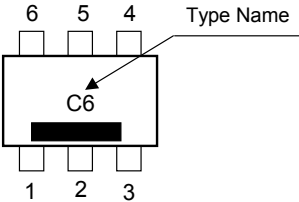
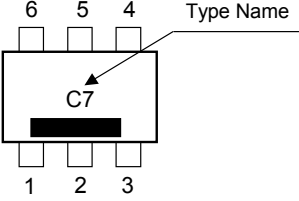
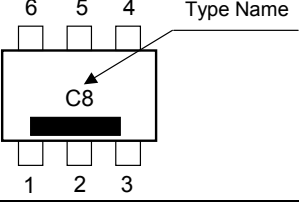


**Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)**

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		$V_{EB} = 7 \text{ V}, I_C = 0$	0.085	—	0.126	
	RN1909AFS		$V_{EB} = 15 \text{ V}, I_C = 0$	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	kΩ
	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>Diagram showing marking for RN1907AFS. The marking is C6. The Type Name is indicated by an arrow pointing to the top right corner of the marking area. The marking area is a rectangle with a black bar at the bottom. The pins are numbered 1, 2, 3 at the bottom and 6, 5, 4 at the top.</p>
RN1908AFS	 <p>Diagram showing marking for RN1908AFS. The marking is C7. The Type Name is indicated by an arrow pointing to the top right corner of the marking area. The marking area is a rectangle with a black bar at the bottom. The pins are numbered 1, 2, 3 at the bottom and 6, 5, 4 at the top.</p>
RN1909AFS	 <p>Diagram showing marking for RN1909AFS. The marking is C8. The Type Name is indicated by an arrow pointing to the top right corner of the marking area. The marking area is a rectangle with a black bar at the bottom. The pins are numbered 1, 2, 3 at the bottom and 6, 5, 4 at the top.</p>

**RESTRICTIONS ON PRODUCT USE**

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.