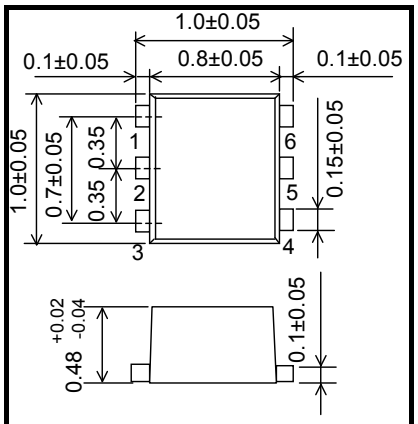
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Transistor with Built-in Bias Resistor)

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

Unit: mm



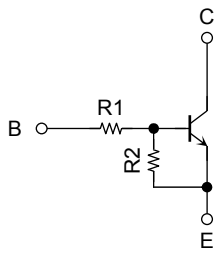
1. EMITTER1 (E1)
2. BASE1 (B1)
3. COLLECTOR2 (C2)
4. EMITTER2 (E2)
5. BASE2 (B2)
6. COLLECTOR1 (C1)

fS6

JEDEC	—
JEITA	—
TOSHIBA	2-1F1D

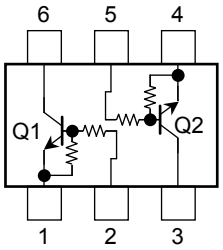
Weight: 0.001 g (typ.)

Equivalent Circuit and Bias Resistor Values



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

Equivalent Circuit (top view)



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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1907AFS~RN1909AFS	V_{CBO}	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

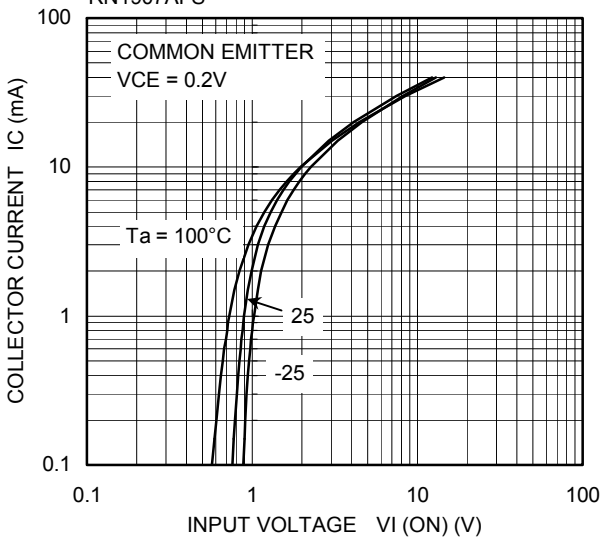
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

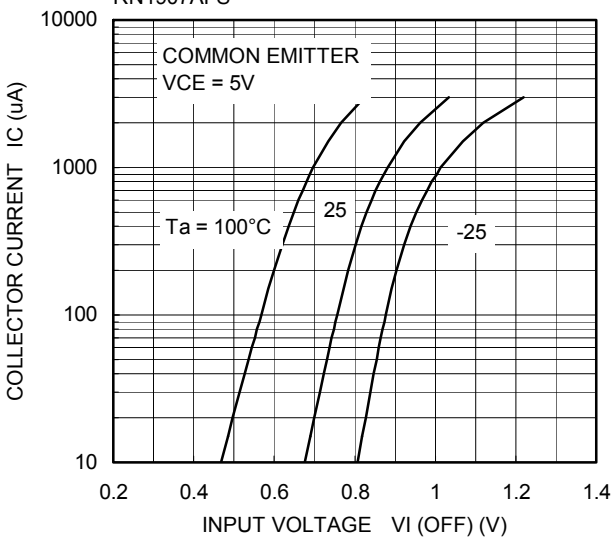
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1907AFS~1909AFS	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cutoff current	RN1907AFS	I_{EBO}	V_{EB} = 6 V, I_C = 0	0.088	—	0.131	mA
	RN1908AFS		V_{EB} = 7 V, I_C = 0	0.085	—	0.126	
	RN1909AFS		V_{EB} = 15 V, I_C = 0	0.182	—	0.271	
DC current gain	RN1907AFS	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	80	—	—	
	RN1908AFS			80	—	—	
	RN1909AFS			70	—	—	
Collector-emitter saturation voltage	RN1907AFS~1909AFS	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	—	0.15	V
Input voltage (ON)	RN1907AFS	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 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 V, I_C = 0.1 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 V, I_E = 0, f = 1 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	

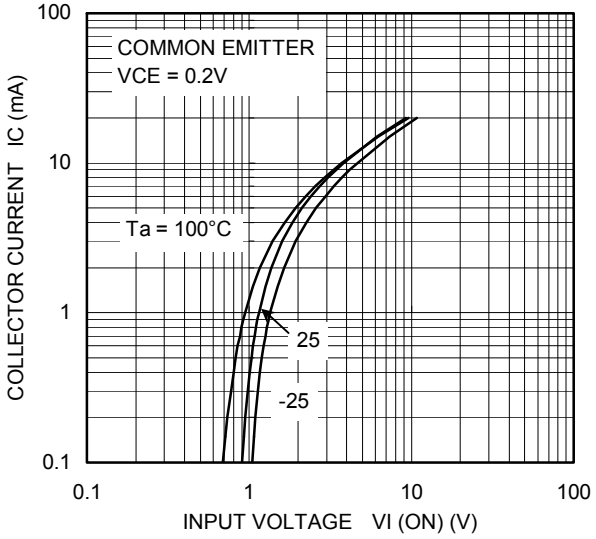
RN1907AFS IC - VI (ON)



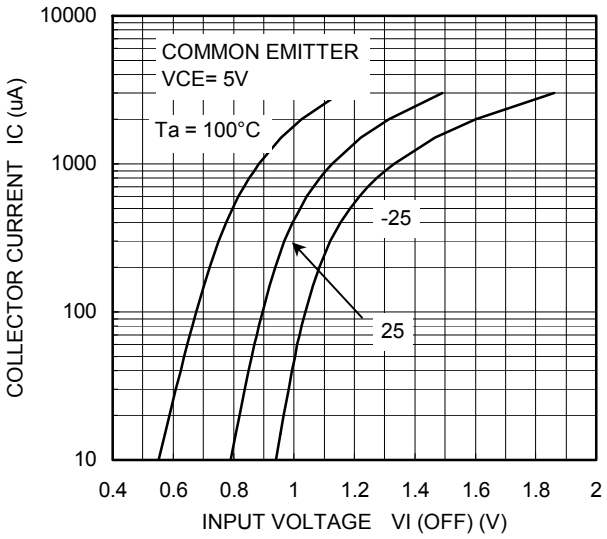
RN1907AFS IC - VI (OFF)



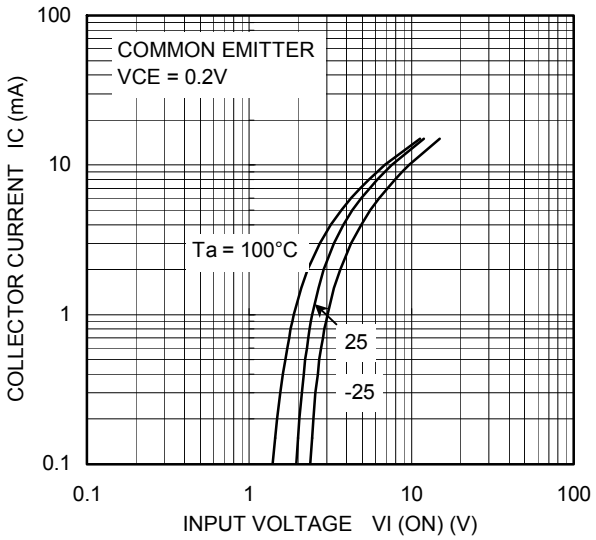
RN1908AFS IC - VI (ON)



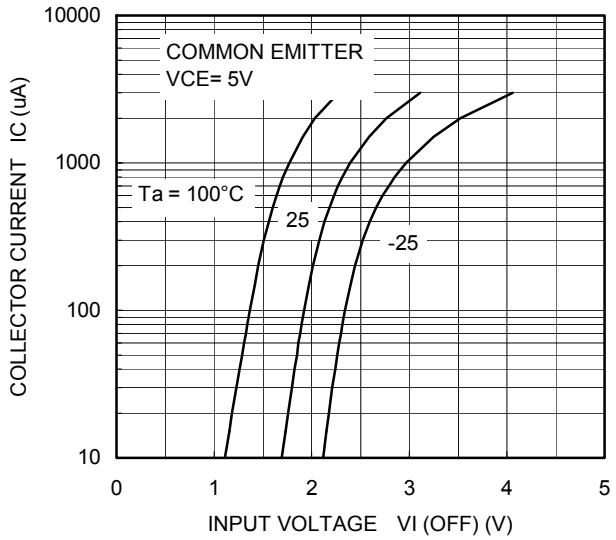
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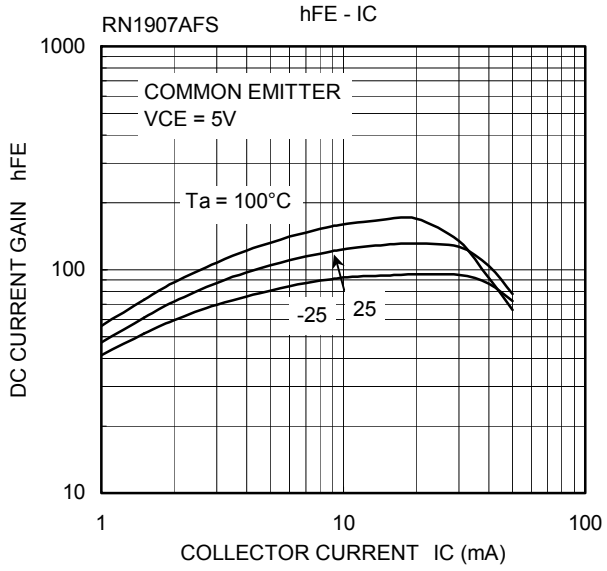


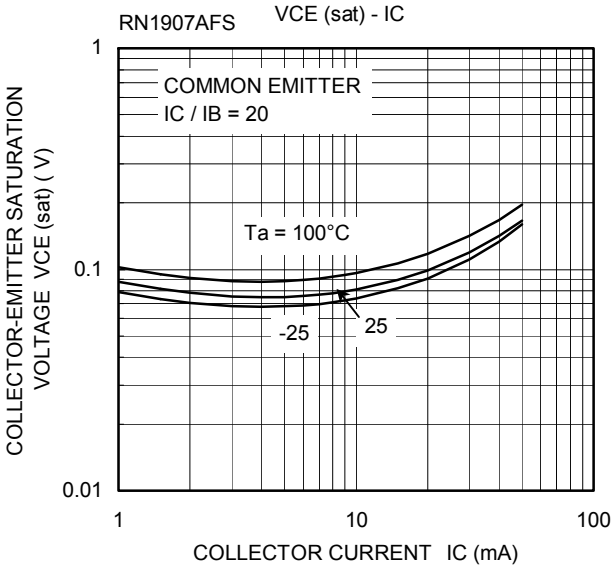
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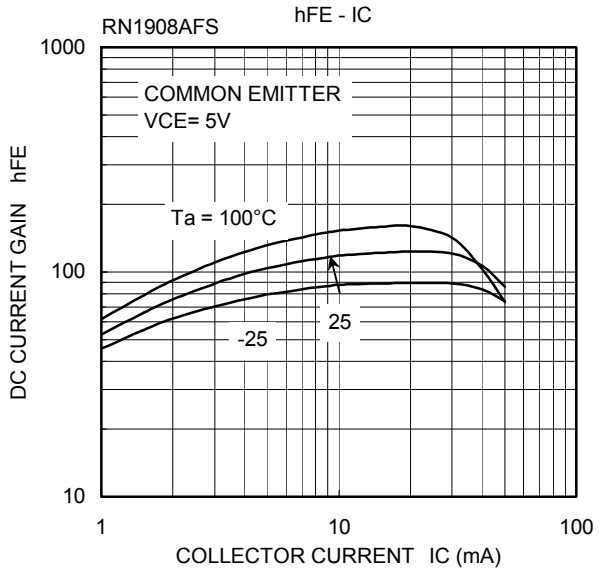


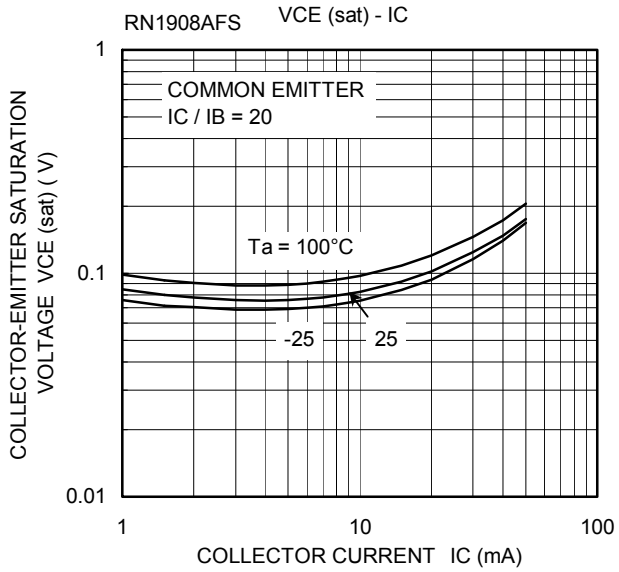
RN1909AFS IC - VI (OFF)

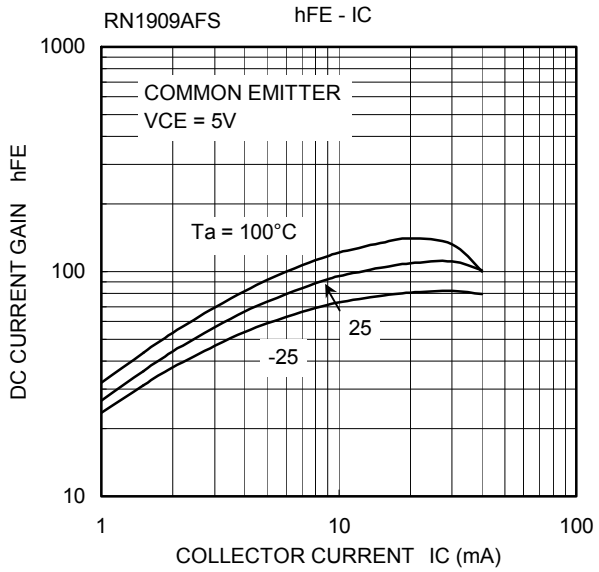


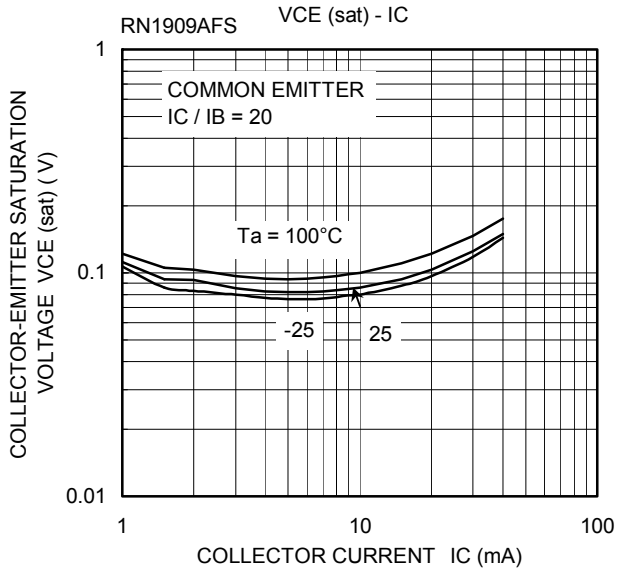

RN1907AFS
hFE - IC
COMMON EMITTER
VCE = 5V
Ta = 100°C
25
-25
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)
1000
100
10
1
10
100

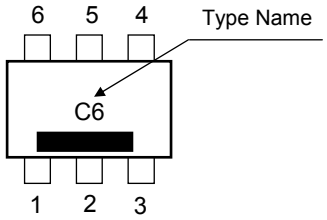
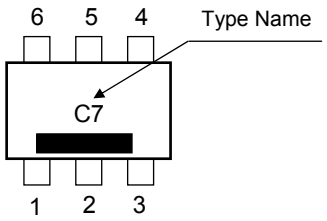
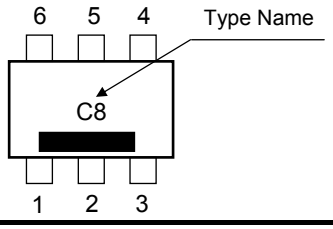

RN1907AFS
VCE (sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
1
0.1
0.01
1
10
100


RN1908AFS
hFE - IC
COMMON EMITTER
VCE= 5V
Ta = 100°C
25
-25
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)
1000
100
10
1
10
100


RN1908AFS
VCE (sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
1
0.1
0.01
1
10
100


RN1909AFS
hFE - IC
COMMON EMITTER
VCE = 5V
Ta = 100°C
25
-25
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)
1000
100
10
1
10
100


RN1909AFS
VCE (sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
1
0.1
0.01
1
10
100

Type Name	Marking
RN1907AFS	
RN1908AFS	
RN1909AFS	

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