Bipolar Transistors Silicon PNP Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

RN2907FE/08FE/09FE

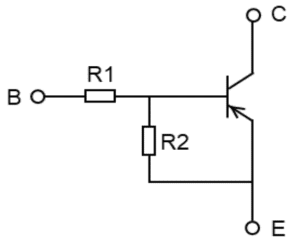
1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

2. Features

(1) AEC-Q101 qualified
(2) Small package (Dual type)
(3) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.
(4) Complementary to RN1907FE to RN1909FE

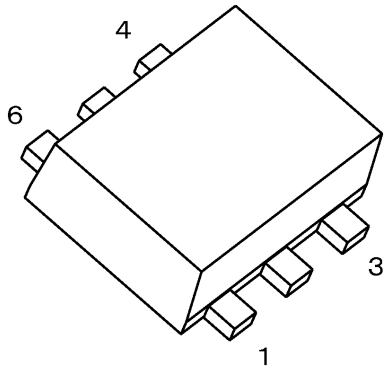
3. Equivalent Circuit



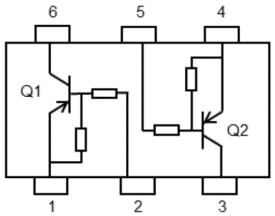
4. Bias Resistor Values

Part No.	R1 (kΩ)	R2 (kΩ)
RN2907FE	10	47
RN2908FE	22	47
RN2909FE	47	22

5. Packaging and Pin Assignment



ES6



1: Emitter1
2: Base1
3: Collector2
4: Emitter2
5: Base2
6: Collector1

Start of commercial production
2000-05

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6. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C) (Q1, Q2 Common)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2907FE to RN2909FE	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	
Emitter-base voltage	RN2907FE	V_{EBO}	-6	
	RN2908FE		-7	
	RN2909FE		-15	
Collector current	RN2907FE to RN2909FE	I_C	-100	mA
Collector power dissipation (Note 1)		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	-55 to 150	

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

7. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C) (Q1, Q2 Common)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2907FE to RN2909FE	I_{CBO}	V_{CB} = -50 V, I_E = 0 mA	—	—	-100	nA
		I_{CEO}	V_{CE} = -50 V, I_B = 0 mA	—	—	-500	
Emitter cut-off current	RN2907FE	I_{EBO}	V_{EB} = -6 V, I_C = 0 mA	-0.081	—	-0.15	mA
	RN2908FE		V_{EB} = -7 V, I_C = 0 mA	-0.078	—	-0.145	
	RN2909FE		V_{EB} = -15 V, I_C = 0 mA	-0.167	—	-0.311	
DC current gain	RN2907FE	h_{FE}	V_{CE} = -5 V, I_C = -10 mA	80	—	—	—
	RN2908FE			80	—	—	
	RN2909FE			70	—	—	
Collector-emitter saturation voltage	RN2907FE to RN2909FE	$V_{CE(sat)}$	I_C = -5 mA, I_B = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2907FE	$V_{I(ON)}$	V_{CE} = -0.2 V, I_C = -5 mA	-0.7	—	-1.8	
	RN2908FE			-1.0	—	-2.6	
	RN2909FE			-2.2	—	-5.8	
Input voltage (OFF)	RN2907FE	$V_{I(OFF)}$	V_{CE} = -5 V, I_C = -0.1 mA	-0.5	—	-1.0	
	RN2908FE			-0.6	—	-1.16	
	RN2909FE			-1.5	—	-2.6	
Transition frequency	RN2907FE to RN2909FE	f_T	V_{CE} = -10 V, I_C = -5 mA	—	200	—	MHz
Collector output capacitance	RN2907FE to RN2909FE	C_{ob}	V_{CB} = -10 V, I_E = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN2907FE	R_1	-	7	10	13	kΩ
	RN2908FE			15.4	22	28.6	
	RN2909FE			32.9	47	61.1	
Resistor ratio	RN2907FE	R1/R2	-	0.191	0.213	0.232	—
	RN2908FE			0.421	0.468	0.515	
	RN2909FE			1.92	2.14	2.35	

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8. Marking

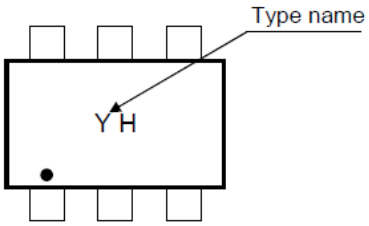


Fig. 8.1 Marking RN2907FE

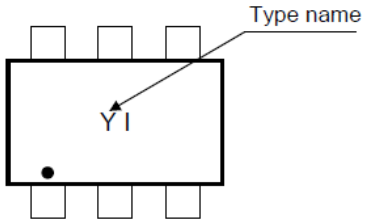


Fig. 8.2 Marking RN2908FE

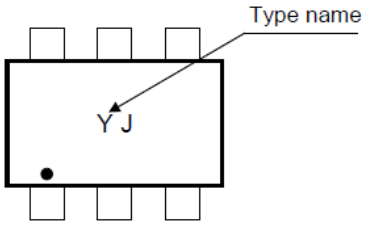


Fig. 8.3 Marking RN2909FE

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9. Characteristics Curves (Note)(Q1, Q2 Common)

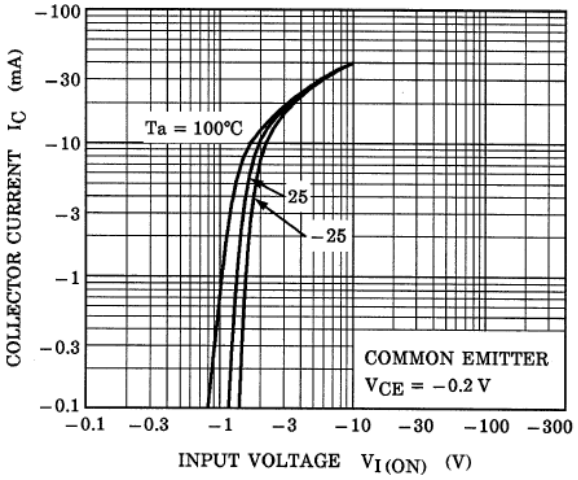


Fig. 9.1 RN2907FE I_C-$V_{I(ON)}$

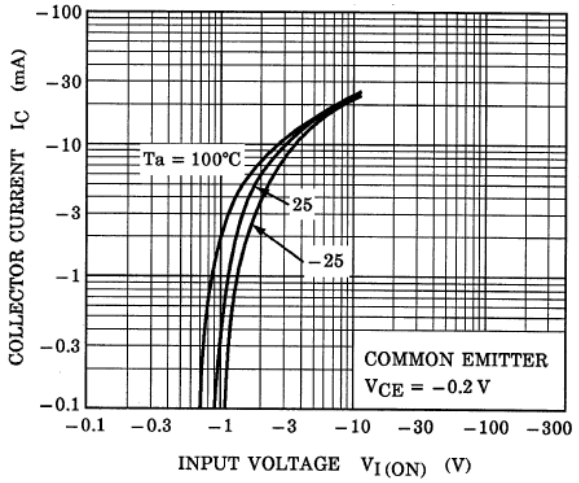


Fig. 9.2 RN2908FE I_C-$V_{I(ON)}$

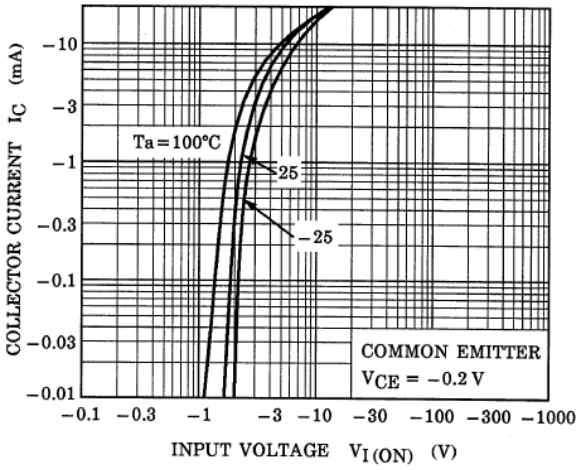


Fig. 9.3 RN2909FE I_C-$V_{I(ON)}$

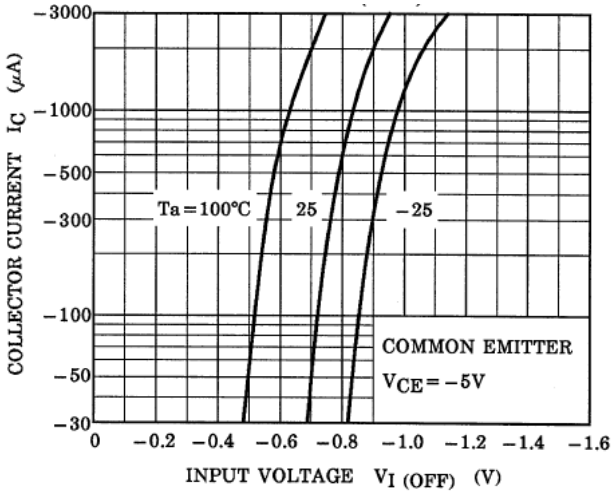


Fig. 9.4 RN2907FE I_C-$V_{I(OFF)}$

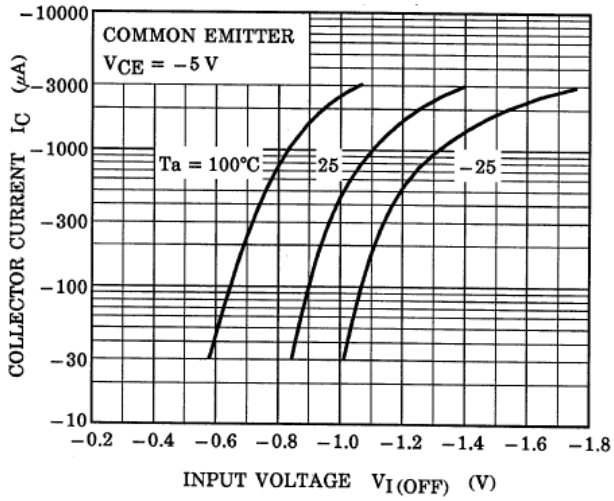


Fig. 9.5 RN2908FE I_C-$V_{I(OFF)}$

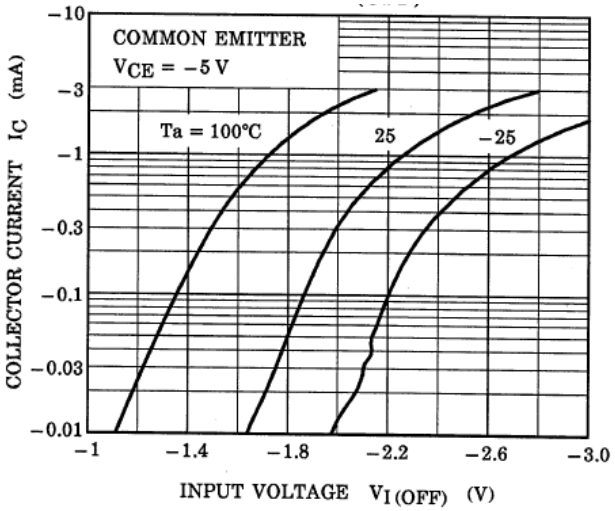


Fig. 9.6 RN2909FE I_C-$V_{I(OFF)}$

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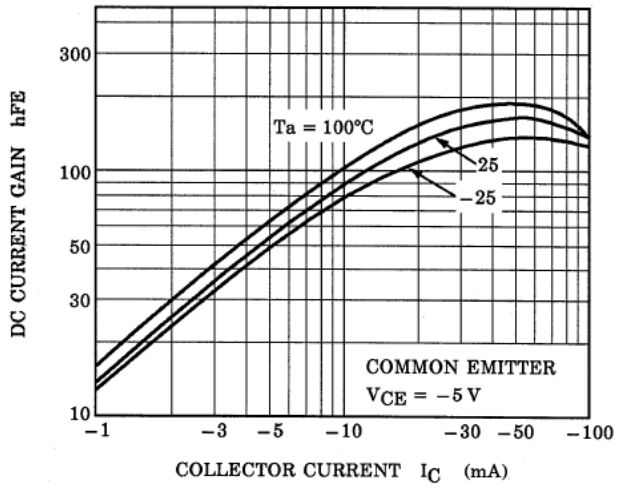


Fig. 9.7 RN2907FE h_{FE}-I_C

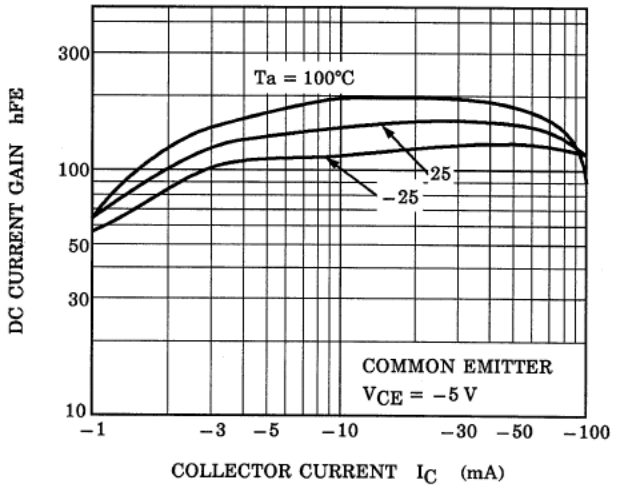


Fig. 9.8 RN2908FE h_{FE}-I_C

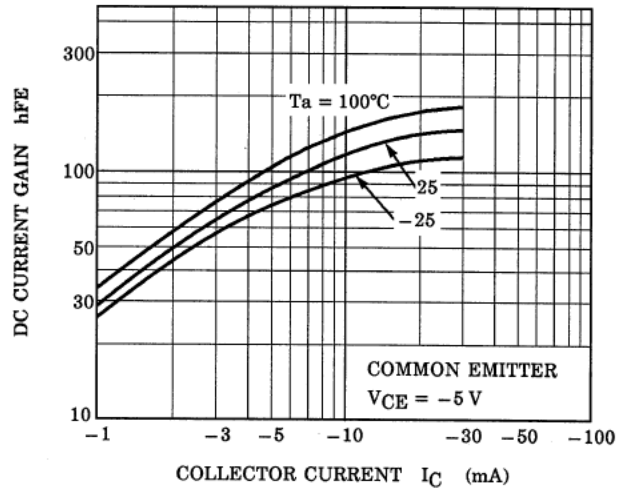


Fig. 9.9 RN2909FE h_{FE}-I_C

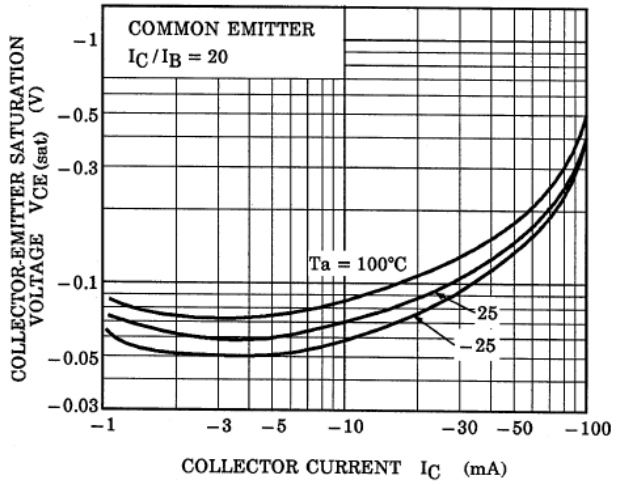


Fig. 9.10 RN2907FE $V_{CE(sat)}$-I_C

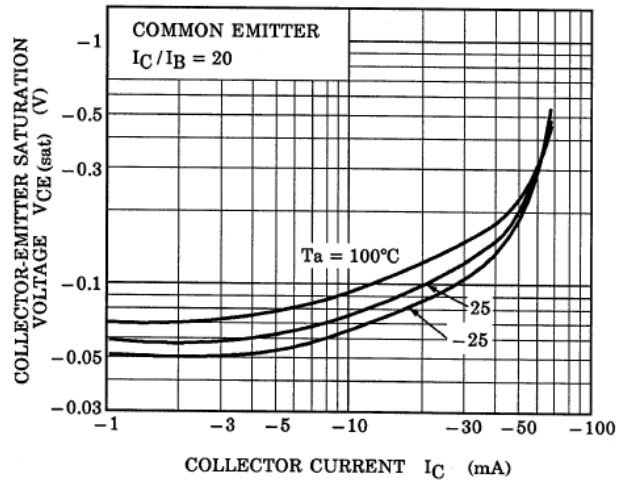


Fig. 9.11 RN2908FE $V_{CE(sat)}$-I_C

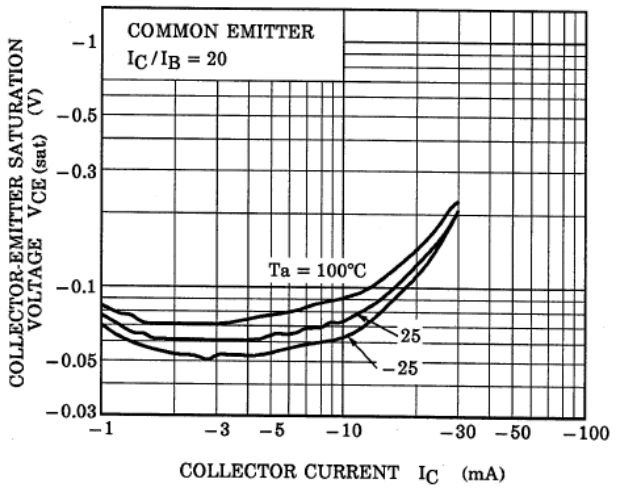


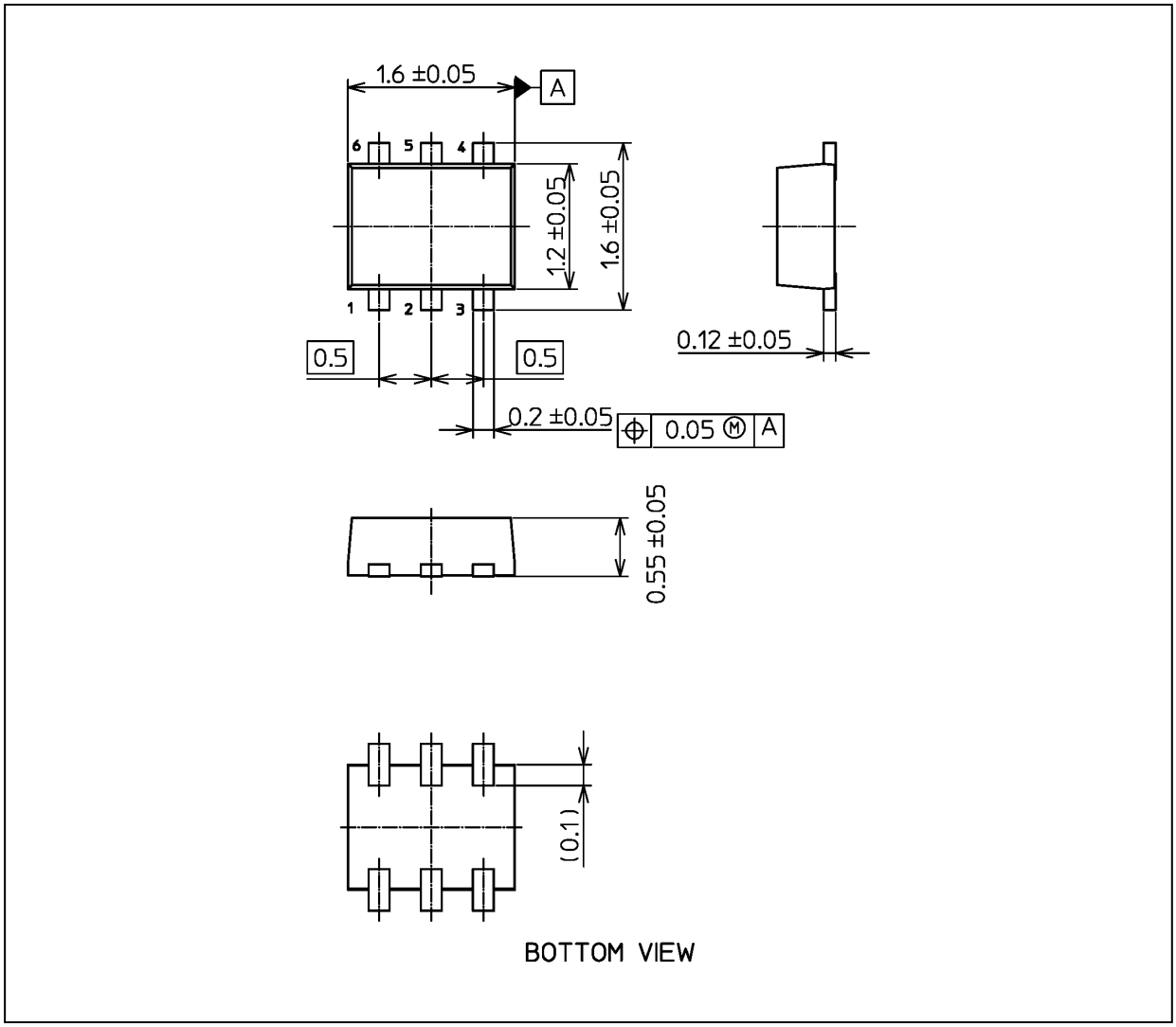
Fig. 9.12 RN2909FE $V_{CE(sat)}$-I_C

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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Package Dimensions

Unit: mm



Weight: 3.0 mg (typ.)

Package Name(s)
Nickname: ES6

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