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

RN2907/08/09

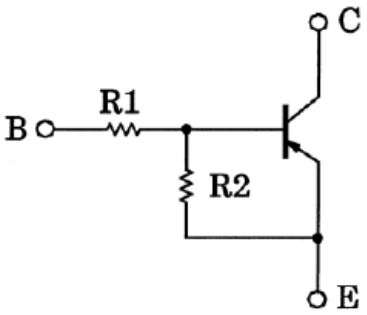
1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

2. Features

(1) AEC-Q101 qualified (Please see the orderable part number list)
(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) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.
(5) Complementary to RN1907 to RN1909

3. Equivalent Circuit

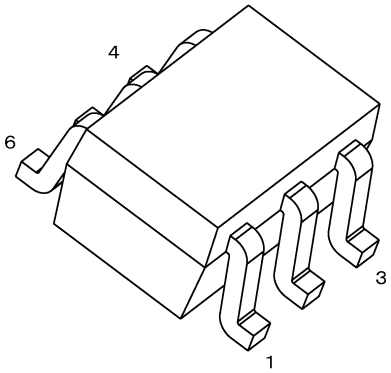


4. Bias Resistor Values

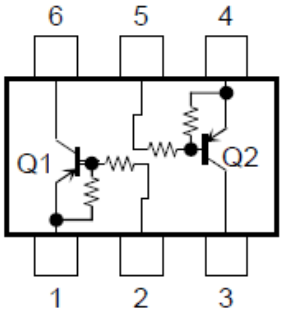
Part No.	R1 (kΩ)	R2 (kΩ)
RN2907	10	47
RN2908	22	47
RN2909	47	22

Start of commercial production
1990-12

5. Packaging and Pin Assignment



US6



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

6. Orderable part number

Orderable part number		AEC-Q101	Note
RN2907	RN2907,LF	—	General Use
	RN2907,LXGF	YES (Note 1)	Unintended Use (Note 1)
	RN2907,LXHF	YES	Automotive Use
RN2908	RN2908,LF	—	General Use
	RN2908,LXGF	YES (Note 1)	Unintended Use (Note 1)
	RN2908,LXHF	YES	Automotive Use
RN2909	RN2909,LF	—	General Use
	RN2909,LXGF	YES (Note 1)	Unintended Use (Note 1)
	RN2909,LXHF	YES	Automotive Use

Note 1: For more information, please contact our sales or use the inquiry form on our website.

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

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2907～RN2909	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	
Emitter-base voltage	RN2907	V_{EBO}	-6	V
	RN2908		-7	
	RN2909		-15	
Collector current	RN2907～RN2909	I_C	-100	mA
Collector power dissipation (Note 1)		P_C	200	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

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2907~ RN2909	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	RN2907	I_{EBO}	V_{EB} = -6 V, I_C = 0 mA	-0.081	—	-0.15	mA
	RN2908		V_{EB} = -7 V, I_C = 0 mA	-0.078	—	-0.145	
	RN2909		V_{EB} = -15 V, I_C = 0 mA	-0.167	—	-0.311	
DC current gain	RN2907	h_{FE}	V_{CE} = -5 V, I_C = -10 mA	80	—	—	—
	RN2908			80	—	—	
	RN2909			70	—	—	
Collector-emitter saturation voltage	RN2907~ RN2909	$V_{CE(sat)}$	I_C = -5 mA, I_B = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2907	$V_{I(ON)}$	V_{CE} = -0.2 V, I_C = -5 mA	-0.7	—	-1.8	V
	RN2908			-1.0	—	-2.6	
	RN2909			-2.2	—	-5.8	
Input voltage (OFF)	RN2907	$V_{I(OFF)}$	V_{CE} = -5 V, I_C = -0.1 mA	-0.5	—	-1.0	V
	RN2908			-0.6	—	-1.16	
	RN2909			-1.5	—	-2.6	
Transition frequency	RN2907~ RN2909	f_T	V_{CE} = -10 V, I_C = -5 mA	—	200	—	MHz
Collector output capacitance	RN2907~ RN2909	C_{ob}	V_{CB} = -10 V, I_E = 0 mA, f = 1 MHz	—	3	6	pF
Input resistance	RN2907	R_1	-	7	10	13	kΩ
	RN2908			15.4	22	28.6	
	RN2909			32.9	47	61.1	
Resistor ratio	RN2907	R1/R2	-	0.191	0.213	0.232	—
	RN2908			0.421	0.468	0.515	
	RN2909			1.92	2.14	2.35	

9. Marking

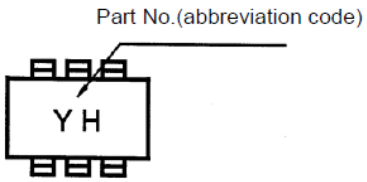


Fig. 9.1 Mraking RN2907

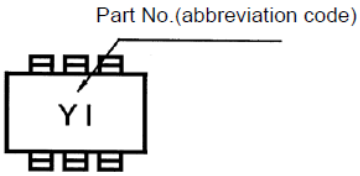


Fig. 9.2 Mraking RN2908

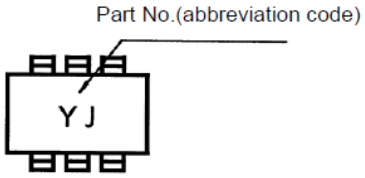


Fig. 9.3 Mraking RN2909

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

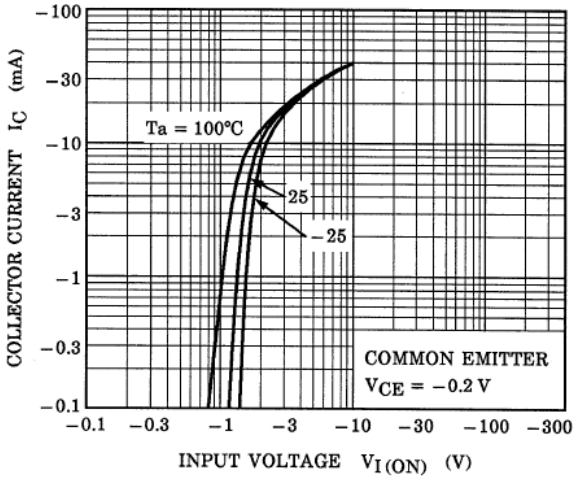


Fig. 10.1 RN2907 I_C-$V_{I(ON)}$

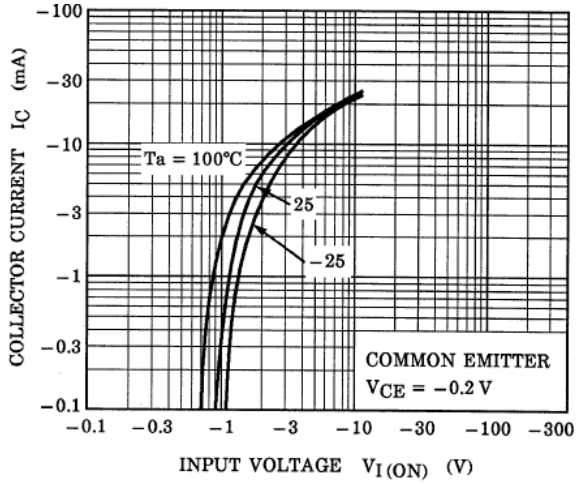


Fig. 10.2 RN2908 I_C-$V_{I(ON)}$

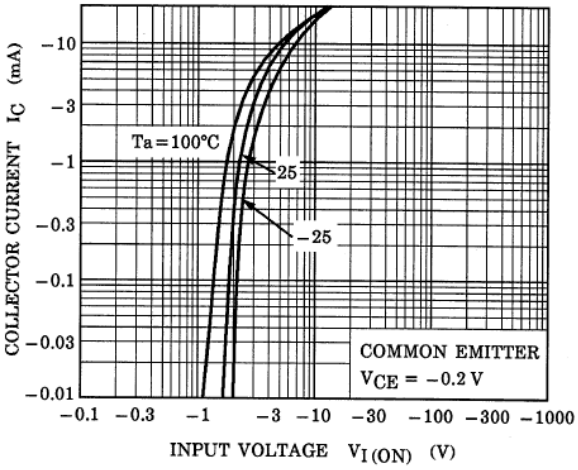


Fig. 10.3 RN2909 I_C-$V_{I(ON)}$

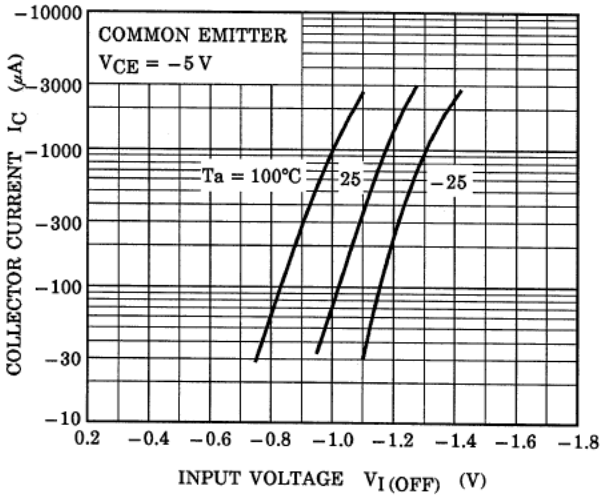


Fig. 10.4 RN2907 I_C-$V_{I(OFF)}$

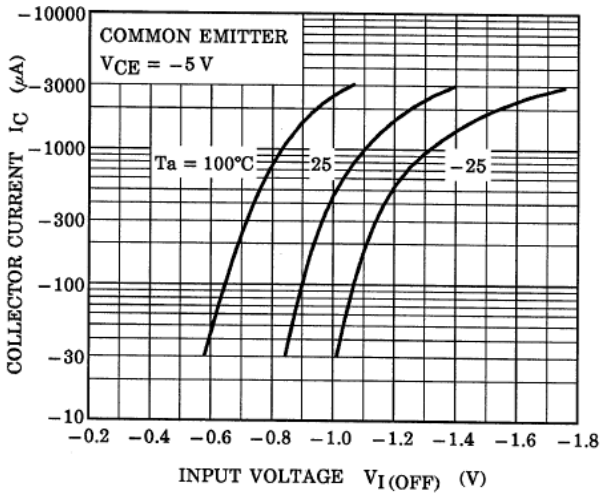


Fig. 10.5 RN2908 I_C-$V_{I(OFF)}$

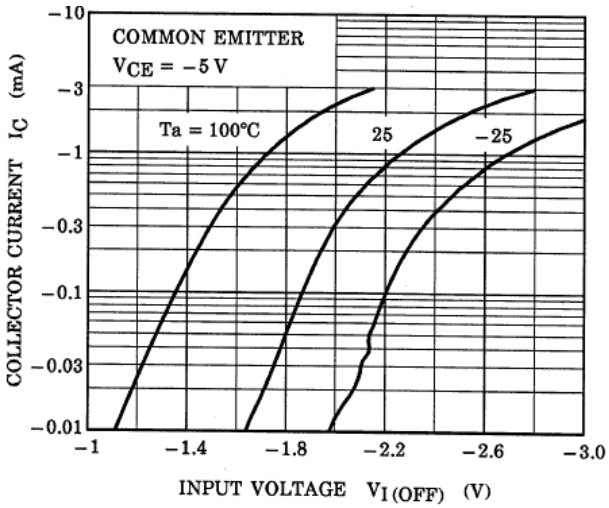


Fig. 10.6 RN2909 I_C-$V_{I(OFF)}$

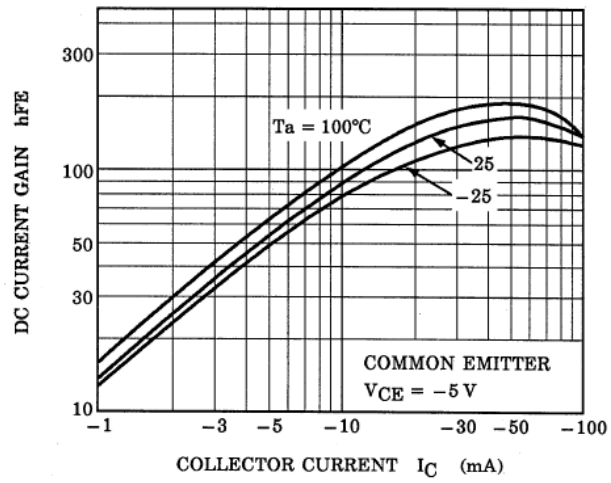


Fig. 10.7 RN2907 h_{FE}-I_C

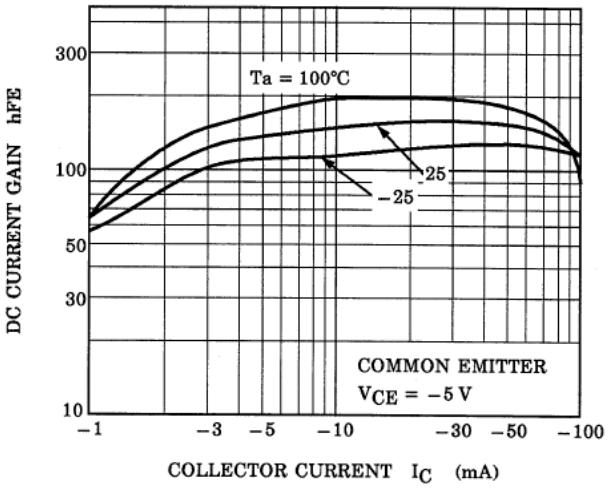


Fig. 10.8 RN2908 h_{FE}-I_C

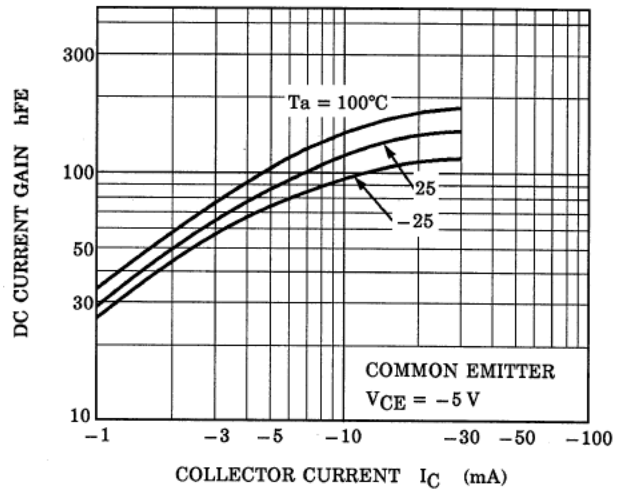


Fig. 10.9 RN2909 h_{FE}-I_C

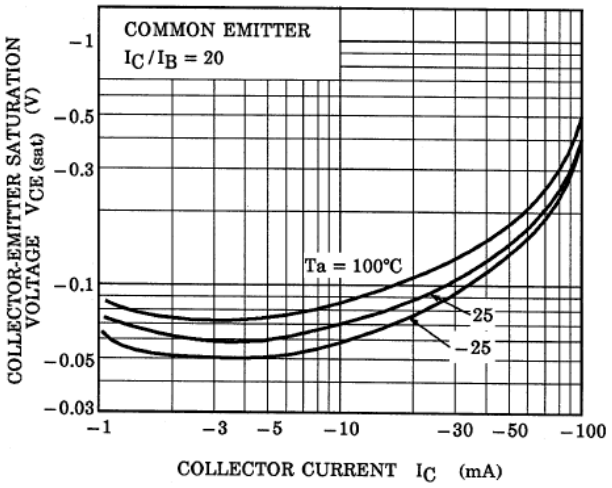


Fig. 10.10 RN2907 $V_{CE(sat)}$-I_C

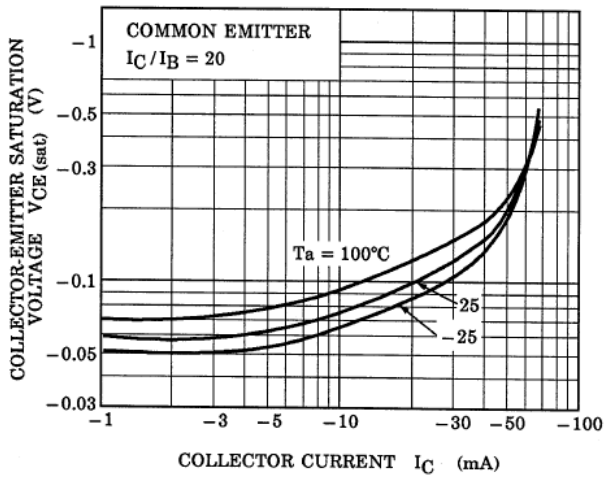


Fig. 10.11 RN2908 $V_{CE(sat)}$-I_C

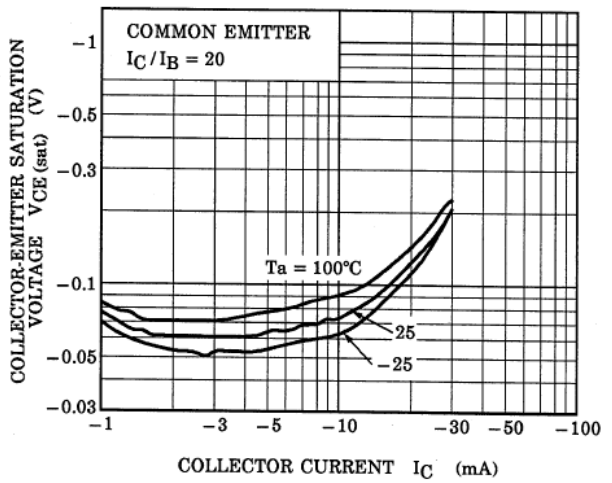
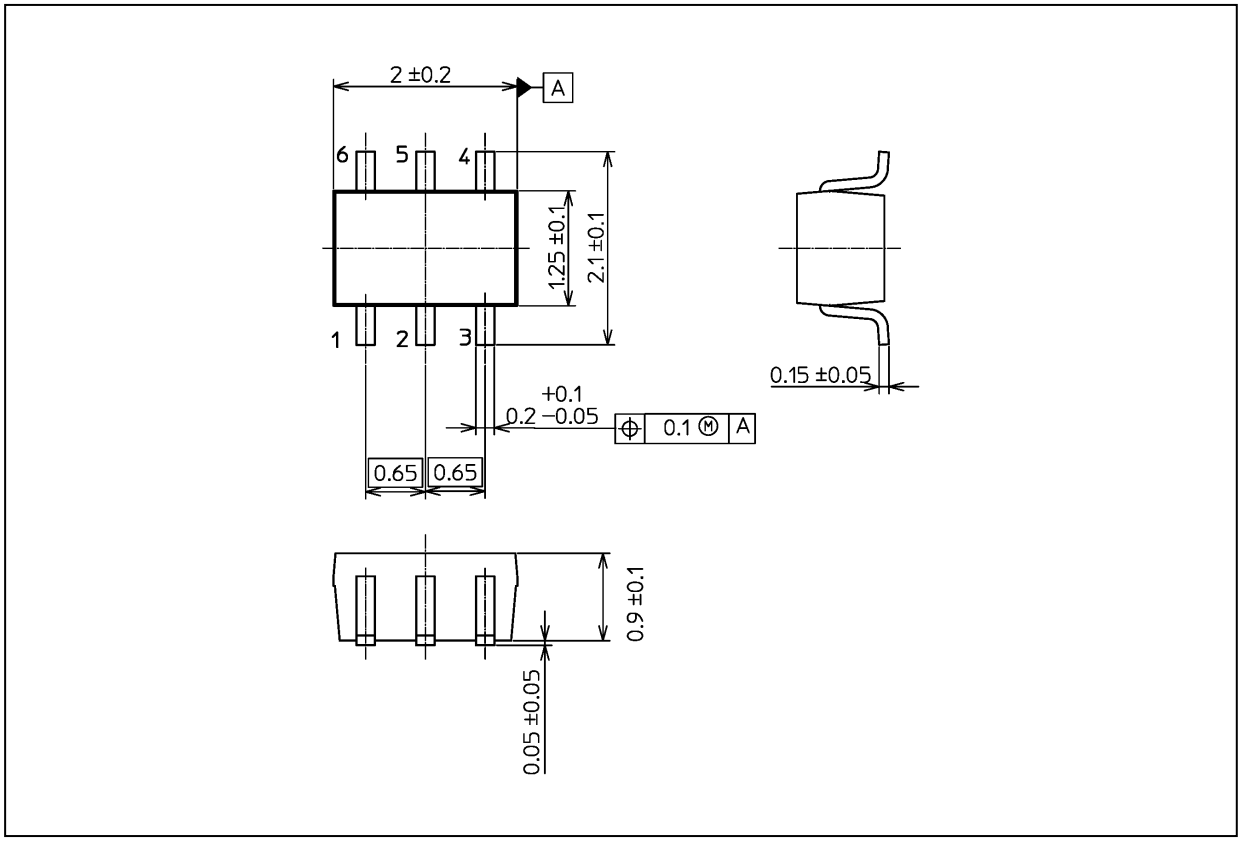


Fig. 10.12 RN2909 $V_{CE(sat)}$-I_C

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

Package Dimensions

Unit: mm



Weight: 6.8 mg (typ.)

Package Name(s)
TOSHIBA: 1-2T1S
Nickname: US6

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