

# BC559

## Low Noise Transistors PNP Silicon

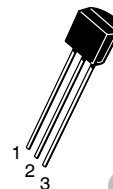


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### MAXIMUM RATINGS

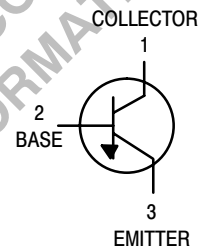
Rating	Symbol	BC559	BC560	Unit
Collector–Emitter Voltage	$V_{CEO}$	-30	-45	Vdc
Collector–Base Voltage	$V_{CBO}$	-30	-50	Vdc
Emitter–Base Voltage	$V_{EBO}$	-5.0		Vdc
Collector Current — Continuous	$I_C$	-100		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625		mW
		5.0		mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5		Watt
		12		mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150		$^\circ\text{C}$



CASE 29-04, STYLE 17  
TO-92 (TO-226AA)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$



### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = -10 \text{ mAdc}, I_B = 0$ )	BC559 BC560	$V_{(BR)CEO}$	-30 -45	— —	— —	Vdc
Collector–Base Breakdown Voltage ( $I_C = -10 \mu\text{Adc}, I_E = 0$ )	BC559 BC560	$V_{(BR)CBO}$	-30 -50	— —	— —	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -10 \mu\text{Adc}, I_C = 0$ )		$V_{(BR)EBO}$	-5.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = -30 \text{ Vdc}, I_E = 0$ ) ( $V_{CB} = -30 \text{ Vdc}, I_E = 0, T_A = +125^\circ\text{C}$ )		$I_{CBO}$	—	—	-15	nAdc
			—	—	-5.0	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = -4.0 \text{ Vdc}, I_C = 0$ )		$I_{EBO}$	—	—	-15	nAdc

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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = -10 μAdc, V <sub>CE</sub> = -5.0 Vdc)  (I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = -5.0 Vdc)	h <sub>FE</sub>	100 100 180 380 120	150 270 290 500 —	— — 460 800 800	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = -0.5 mAdc) (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = see note 1) (I <sub>C</sub> = -100 mAdc, I <sub>B</sub> = -5.0 mAdc, see note 2)	V <sub>CE(sat)</sub>	— — —	-0.075 -0.3 -0.25	-0.25 -0.6 —	Vdc
Base–Emitter Saturation Voltage (I <sub>C</sub> = -100 mAdc, I <sub>B</sub> = -5.0 mAdc)	V <sub>BE(sat)</sub>	—	-1.1	—	Vdc
Base–Emitter On Voltage (I <sub>C</sub> = -10 μAdc, V <sub>CE</sub> = -5.0 Vdc) (I <sub>C</sub> = -100 μAdc, V <sub>CE</sub> = -5.0 Vdc) (I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = -5.0 Vdc)	V <sub>BE(on)</sub>	— — -0.55	-0.52 -0.55 -0.62	— — -0.7	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current–Gain — Bandwidth Product (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -5.0 Vdc, f = 100 MHz)	f <sub>T</sub>	—	250	—	MHz
Collector–Base Capacitance (V <sub>CB</sub> = -10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>cb0</sub>	—	2.5	—	pF
Small–Signal Current Gain (I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = -5.0 V, f = 1.0 kHz)	h <sub>fe</sub>	240 450	330 600	500 900	—
Noise Figure (I <sub>C</sub> = -200 μAdc, V <sub>CE</sub> = -5.0 Vdc, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz) (I <sub>C</sub> = -200 μAdc, V <sub>CE</sub> = -5.0 Vdc, R <sub>S</sub> = 100 kΩ, f = 1.0 kHz, Δf = 200 kHz)	NF <sub>1</sub> NF <sub>2</sub>	— —	0.5 —	2.0 10	dB

**NOTES:**

1. I<sub>B</sub> is value for which I<sub>C</sub> = -11 mA at V<sub>CE</sub> = -1.0 V.
2. Pulse test = 300 μs – Duty cycle = 2%.

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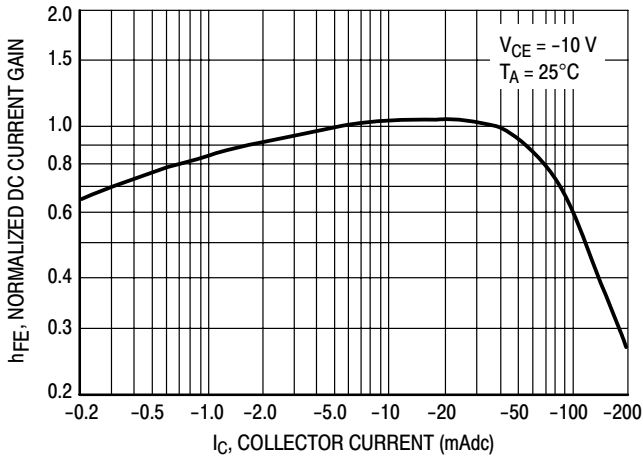


Figure 1. Normalized DC Current Gain

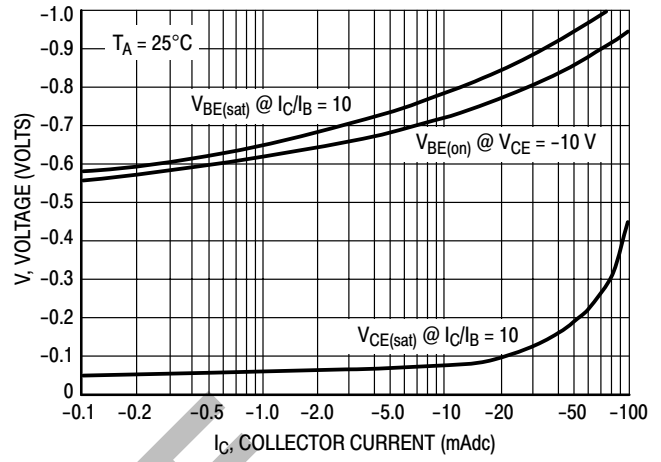


Figure 2. "Saturation" and "On" Voltages

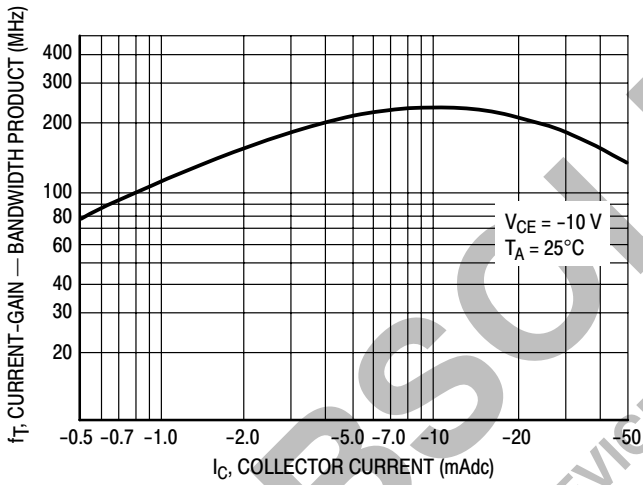


Figure 3. Current-Gain — Bandwidth Product

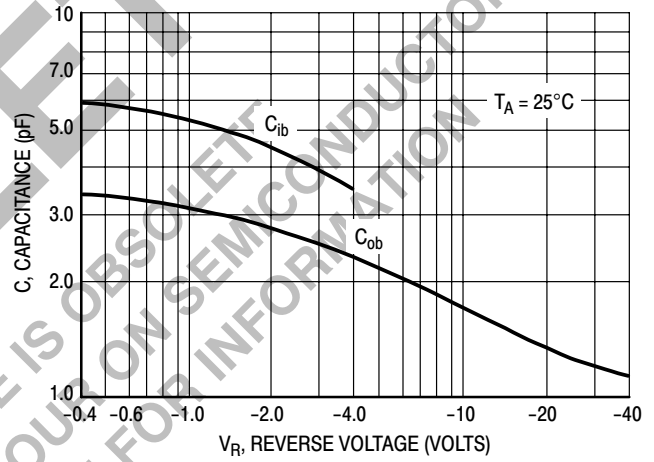


Figure 4. Capacitance

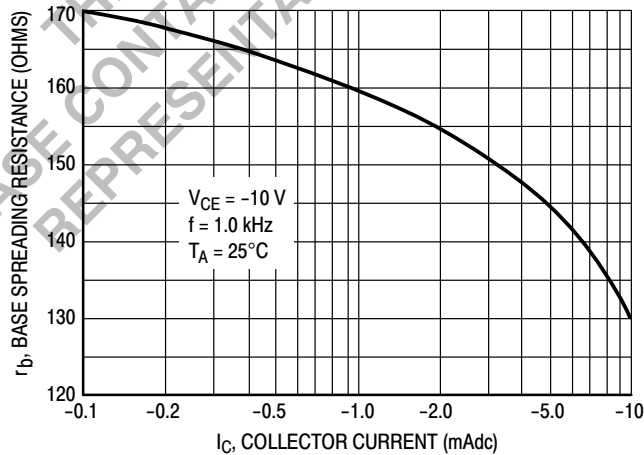
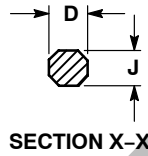
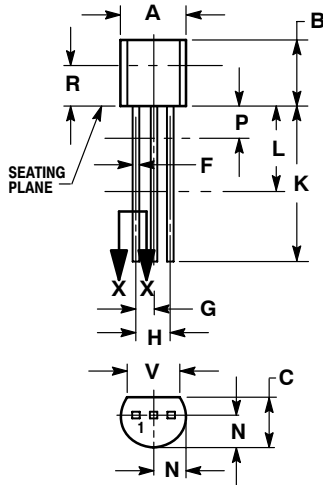


Figure 5. Base Spreading Resistance

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## PACKAGE DIMENSIONS

CASE 029-04  
(TO-226AA)  
ISSUE AD



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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