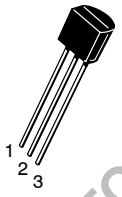
BC559

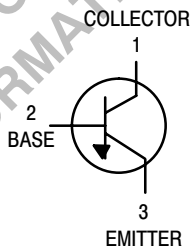
Low Noise Transistors
PNP Silicon

ON Semiconductor®

http://onsemi.com



CASE 29–04, STYLE 17
TO–92 (TO–226AA)



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°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watt mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150		°C

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = –10 mAdc, I_B = 0)	 BC559 BC560	$V_{(BR)CEO}$	 –30 –45	 — —	 — —	Vdc
Collector–Base Breakdown Voltage (I_C = –10 μAdc, I_E = 0)	 BC559 BC560	$V_{(BR)CBO}$	 –30 –50	 — —	 — —	Vdc
Emitter–Base Breakdown Voltage (I_E = –10 μAdc, I_C = 0)		$V_{(BR)EBO}$	–5.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = –30 Vdc, I_E = 0) (V_{CB} = –30 Vdc, I_E = 0, T_A = +125°C)		I_{CBO}	 — —	 — —	 –15 –5.0	 nAdc μAdc
Emitter Cutoff Current (V_{EB} = –4.0 Vdc, I_C = 0)		I_{EBO}	—	—	–15	nAdc

August, 2006 – Rev. 3
Publication Order Number:
BC559/D

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				—
(I_C = −10 μAdc, V_{CE} = −5.0 Vdc)	BC559B		100	150	—	
	BC559C/560C		100	270	—	
(I_C = −2.0 mAdc, V_{CE} = −5.0 Vdc)	BC559B		180	290	460	
	BC559C/560C		380	500	800	
	BC559		120	—	800	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = −10 mAdc, I_B = −0.5 mAdc)			—	−0.075	−0.25	
(I_C = −10 mAdc, I_B = see note 1)			—	−0.3	−0.6	
(I_C = −100 mAdc, I_B = −5.0 mAdc, see note 2)			—	−0.25	—	
Base−Emitter Saturation Voltage (I_C = −100 mAdc, I_B = −5.0 mAdc)		$V_{BE(sat)}$	—	−1.1	—	Vdc
Base−Emitter On Voltage		$V_{BE(on)}$				Vdc
(I_C = −10 μAdc, V_{CE} = −5.0 Vdc)			—	−0.52	—	
(I_C = −100 μAdc, V_{CE} = −5.0 Vdc)			—	−0.55	—	
(I_C = −2.0 mAdc, V_{CE} = −5.0 Vdc)			−0.55	−0.62	−0.7	
SMALL−SIGNAL CHARACTERISTICS						
Current−Gain — Bandwidth Product (I_C = −10 mAdc, V_{CE} = −5.0 Vdc, f = 100 MHz)		f_T	—	250	—	MHz
Collector−Base Capacitance (V_{CB} = −10 Vdc, I_E = 0, f = 1.0 MHz)		C_{cbo}	—	2.5	—	pF
Small−Signal Current Gain		h_{fe}				—
(I_C = −2.0 mAdc, V_{CE} = −5.0 V, f = 1.0 kHz)	BC559B		240	330	500	
	BC559C/BC560C		450	600	900	
Noise Figure						dB
(I_C = −200 μAdc, V_{CE} = −5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz)		NF_1	—	0.5	2.0	
(I_C = −200 μAdc, V_{CE} = −5.0 Vdc, R_S = 100 kΩ, f = 1.0 kHz, Δf = 200 kHz)		NF_2	—	—	10	

NOTES:
1. I_B is value for which I_C = −11 mA at V_{CE} = −1.0 V.
2. Pulse test = 300 μs − Duty cycle = 2%.

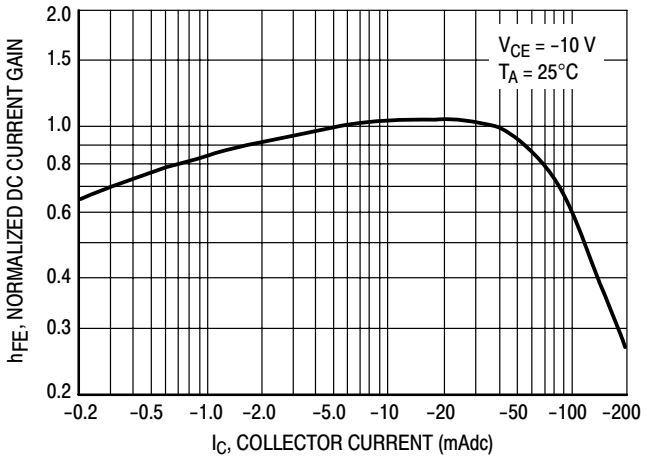


Figure 1. Normalized DC Current Gain

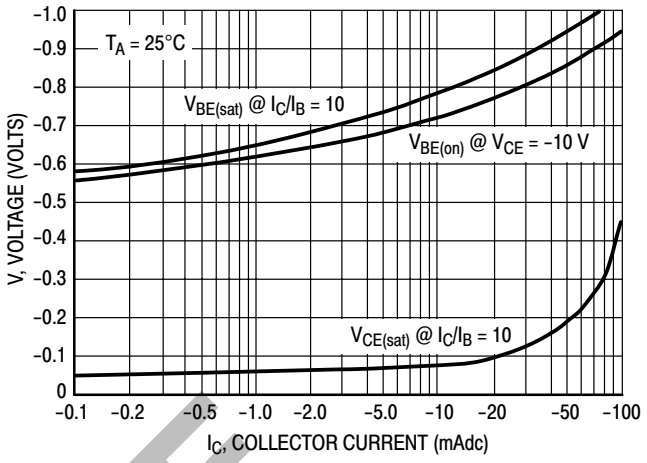


Figure 2. "Saturation" and "On" Voltages

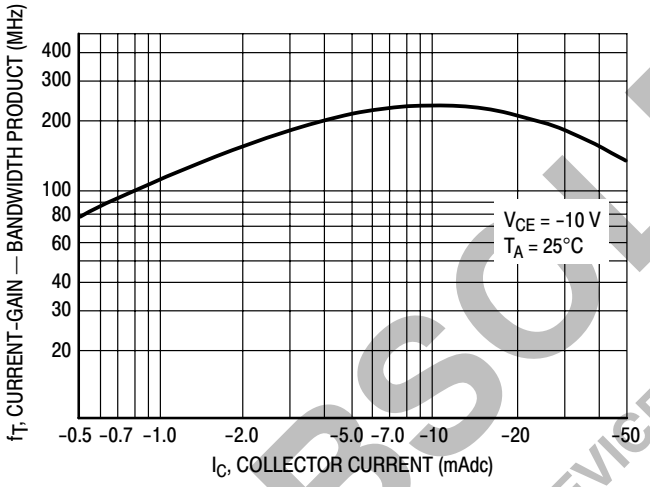


Figure 3. Current−Gain — Bandwidth Product

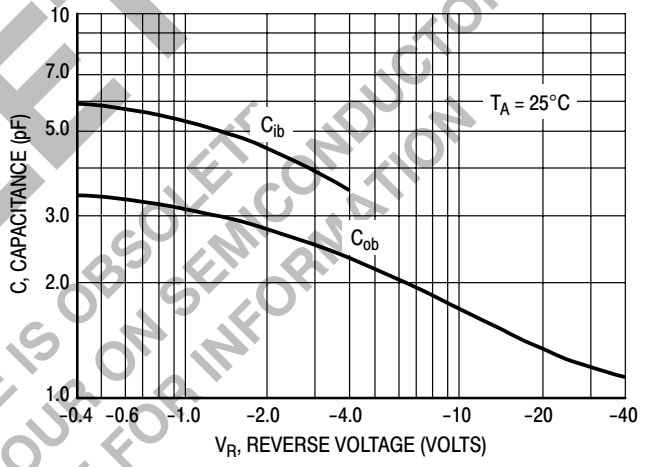


Figure 4. Capacitance

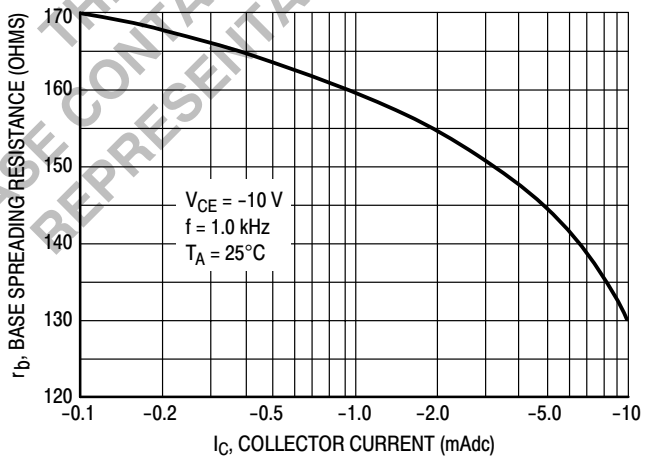
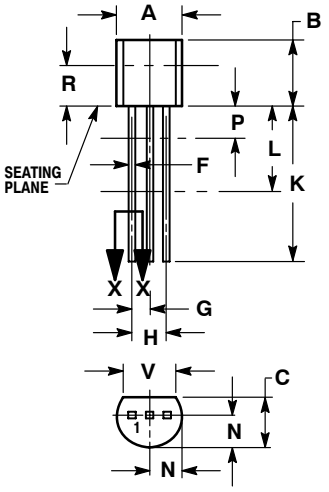
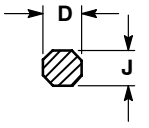


Figure 5. Base Spreading Resistance

PACKAGE DIMENSIONS

CASE 029–04
(TO–226AA)
ISSUE AD





SECTION X–X

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.

	INCHES		MILLIMETERS	
DIM	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:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

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