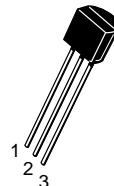
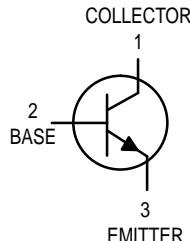


## Low Noise Transistors

### NPN Silicon

**BC549B,C**  
**BC550B,C**



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

#### MAXIMUM RATINGS

Rating	Symbol	BC549	BC550	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 5.0		mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12		Watt mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150		$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

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

#### 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 ( $I_C = 10$ mA, $I_B = 0$ ) BC549B,C BC550B,C	$V_{(BR)CEO}$	30 45	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10$ $\mu\text{A}$ , $I_E = 0$ ) BC549B,C BC550B,C	$V_{(BR)CBO}$	30 50	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10$ $\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30$ V, $I_E = 0$ ) ( $V_{CB} = 30$ V, $I_E = 0$ , $T_A = +125^\circ\text{C}$ )	$I_{CBO}$	— —	— —	15 5.0	nAdc $\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 4.0$ Vdc, $I_C = 0$ )	$I_{EBO}$	—	—	15	nAdc

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

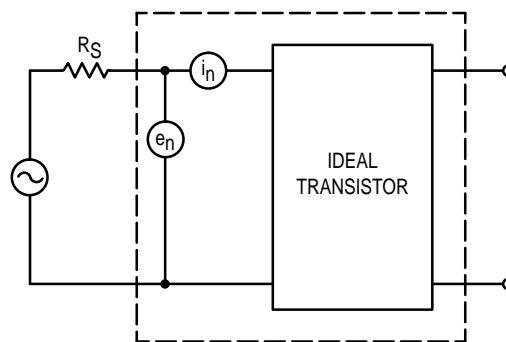
Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = 10 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	100	150	—	—
BC549B/550B		100	270	—	—
BC549C/550C		200	290	450	—
(I <sub>C</sub> = 2.0 mAdc, V <sub>CE</sub> = 5.0 Vdc)		420	500	800	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0.5 mAdc)	V <sub>CE(sat)</sub>	—	0.075	0.25	Vdc
(I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = see note 1)		—	0.3	0.6	—
(I <sub>C</sub> = 100 mAdc, I <sub>B</sub> = 5.0 mAdc, see note 2)		—	0.25	0.6	—
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 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc)	V <sub>BE(on)</sub>	—	0.52	—	Vdc
(I <sub>C</sub> = 100 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc)		—	0.55	—	—
(I <sub>C</sub> = 2.0 mAdc, V <sub>CE</sub> = 5.0 Vdc)		0.55	0.62	0.7	—

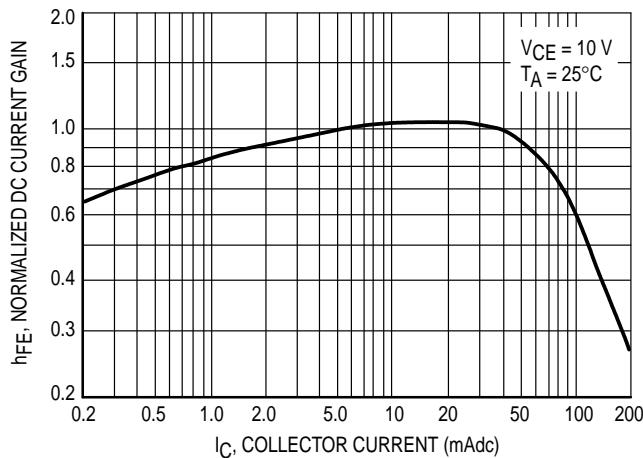
**SMALL-SIGNAL CHARACTERISTICS**

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>cbo</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 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc, R <sub>S</sub> = 2.0 k $\Omega$ , f = 1.0 kHz) (I <sub>C</sub> = 200 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc, R <sub>S</sub> = 100 k $\Omega$ , f = 1.0 kHz)	NF <sub>1</sub> NF <sub>2</sub>	— —	0.6 —	2.5 10	dB

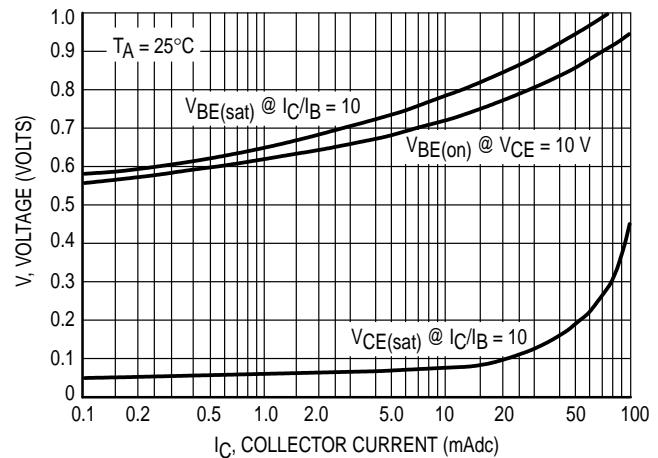
**NOTES:**

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  $\mu$ s — Duty cycle = 2%.

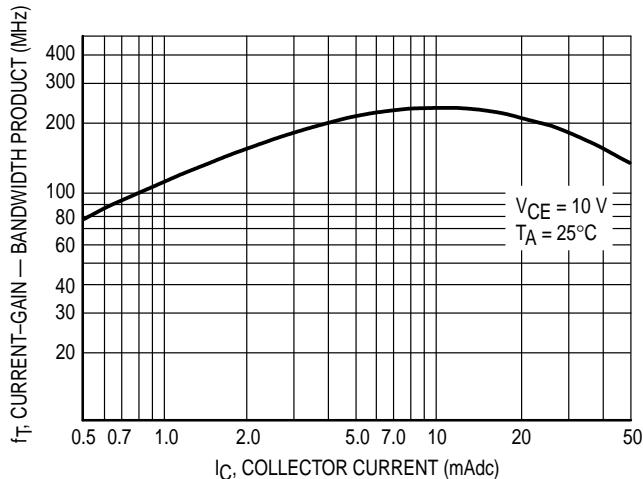

**Figure 1. Transistor Noise Model**



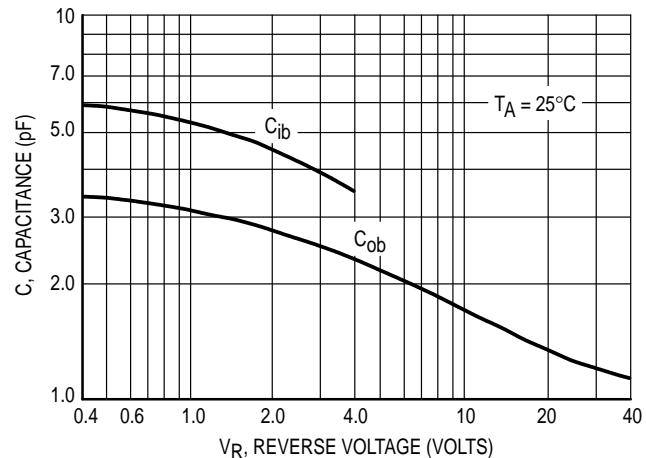
**Figure 2. Normalized DC Current Gain**



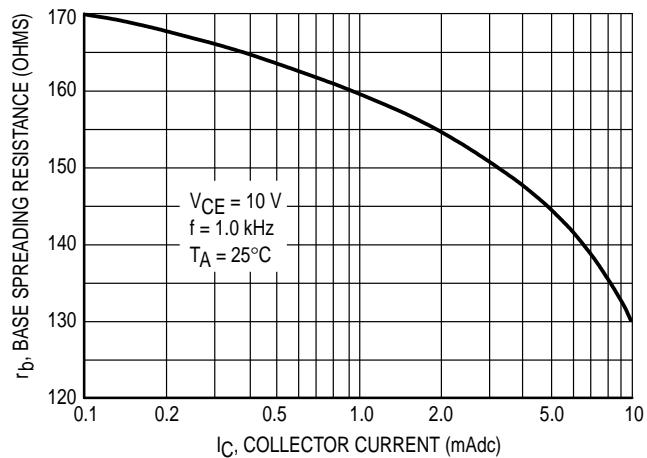
**Figure 3. "Saturation" and "On" Voltages**



**Figure 4. Current-Gain — Bandwidth Product**

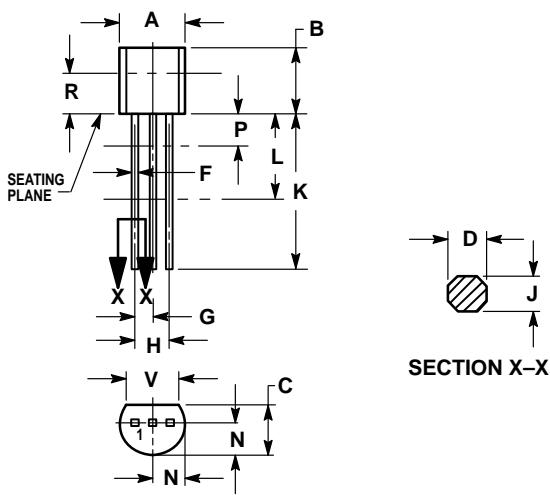


**Figure 5. Capacitance**



**Figure 6. Base Spreading Resistance**

## 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:  
PIN 1. COLLECTOR  
2. BASE  
3. Emitter

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