# **Low Noise Transistors NPN Silicon**

# BC549B,C BC550B,C

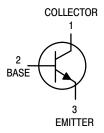
#### **MAXIMUM RATINGS**

Rating	Symbol	BC549	BC550	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	30	45	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	30	50	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	5.0		Vdc
Collector Current — Continuous	I <sub>C</sub>	100		mAdc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	625 5.0		mW mW/°C
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.5 12		Watt mW/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-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<sub>A</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0)	BC549B,C BC550B,C	V <sub>(BR)CEO</sub>	30 45			Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>E</sub> = 0)	BC549B,C BC550B,C	V <sub>(BR)</sub> CBO	30 50			Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	5.0	_	_	Vdc
Collector Cutoff Current $(V_{CB} = 30 \text{ V}, I_E = 0)$ $(V_{CB} = 30 \text{ V}, I_E = 0, T_A = +125^{\circ}\text{C})$		Ісво			15 5.0	nAdc μAdc
Emitter Cutoff Current (V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)		I <sub>EBO</sub>	_	_	15	nAdc

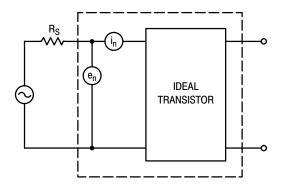
# BC549B,C BC550B,C

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

Characteristic		Symbol	Min	Тур	Max	Unit
ON CHARACTERISTICS						
DC Current Gain $(I_C = 10 \ \mu Adc, \ V_{CE} = 5.0 \ Vdc)$ $(I_C = 2.0 \ mAdc, \ V_{CE} = 5.0 \ Vdc)$	BC549B/550B BC549C/550C BC549B/550B BC549C/550C	h <sub>FE</sub>	100 100 200 420	150 270 290 500	— — 450 800	_
Collector–Emitter Saturation Voltage ( $I_C = 10 \text{ mAdc}$ , $I_B = 0.5 \text{ mAdc}$ ) ( $I_C = 10 \text{ mAdc}$ , $I_B = \text{see note 1}$ ) ( $I_C = 100 \text{ mAdc}$ , $I_B = 5.0 \text{ mAdc}$ , see note 2)		V <sub>CE(sat)</sub>	_ _ _	0.075 0.3 0.25	0.25 0.6 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 $ \begin{aligned} &(I_C=10~\mu\text{Adc},~V_{CE}=5.0~\text{Vdc})\\ &(I_C=100~\mu\text{Adc},~V_{CE}=5.0~\text{Vdc})\\ &(I_C=2.0~\text{mAdc},~V_{CE}=5.0~\text{Vdc}) \end{aligned} $		V <sub>BE(on)</sub>	  0.55	0.52 0.55 0.62	  0.7	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current–Gain — Bandwidth Product $(I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 100 \text{ MHz})$		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 ( $I_C = 2.0 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ V}$ , $f = 1.0 \text{ kHz}$ )	BC549B/BC550B BC549C/BC550C	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 $\Omega$ , t(I <sub>C</sub> = 200 $\mu$ Adc, V <sub>CE</sub> = 5.0 Vdc, R <sub>S</sub> = 100 k $\Omega$ ,	•	NF <sub>1</sub> NF <sub>2</sub>	_	0.6	2.5 10	dB

### NOTES:

- 1.  $I_B$  is value for which  $I_C$  = 11 mA at  $V_{CE}$  = 1.0 V. 2. Pulse test = 300  $\mu$ s Duty cycle = 2%.



**Figure 1. Transistor Noise Model** 

# BC549B,C BC550B,C

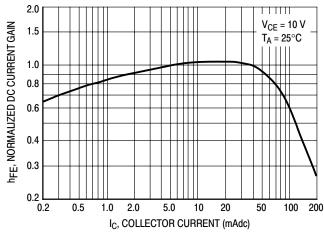


Figure 2. Normalized DC Current Gain

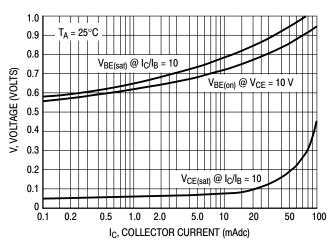


Figure 3. "Saturation" and "On" Voltages

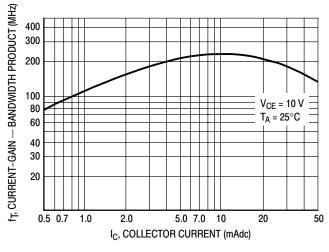


Figure 4. Current-Gain — Bandwidth Product

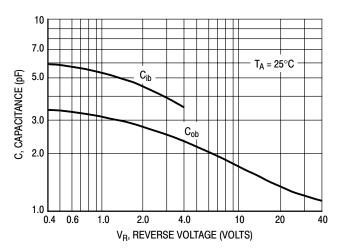


Figure 5. Capacitance

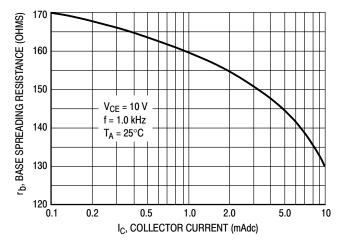
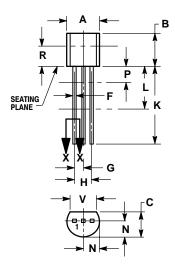


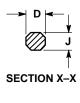
Figure 6. Base Spreading Resistance

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# PACKAGE DIMENSIONS

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





#### NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI
   MARKET 1000
- Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
- CONTOUR OF PACKAGE BEYOND DIMENSION R
   IS UNCONTROLLED.
- 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		MILLIM	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.175	0.205	4.45	5.20
В	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
Н	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	
٧	0.135		3.43	

STYLE 17:

PIN 1. COLLECTOR 2. BASE 3. EMITTER

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