

# BC549C, BC550C

## Low Noise Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	45	Vdc
Collector–Base Voltage	$V_{CBO}$	50	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current – Continuous	$I_C$	100	Vdc
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 @ $T_A = 25^\circ\text{C}$ Derate above = $25^\circ\text{C}$	$P_D$	1.5 12	W 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	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

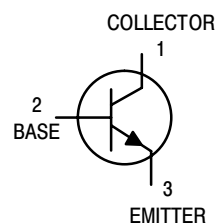
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



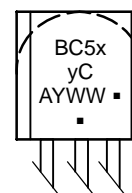
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TO-92  
CASE 29-11  
STYLE 17

#### MARKING DIAGRAM



BC5xyC = Device Code  
x = 4 or 5  
y = 9 or 0

A = Assembly Location  
Y = Year

WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping
BC549C	TO-92	5000 Units / Box
BC549CG	TO-92 (Pb-Free)	5000 Units / Box
BC550C	TO-92	5000 Units / Box
BC550CG	TO-92 (Pb-Free)	5000 Units / Box

# BC549C, BC550C

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	45	–	–	Vdc
Collector–Base Breakdown Voltage ( $I_C = 10\text{ }\mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	50	–	–	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	–	–	Vdc
Collector Cutoff Current ( $V_{CB} = 30\text{ V}$ , $I_E = 0$ ) ( $V_{CB} = 30\text{ V}$ , $I_E = 0$ , $T_A = +125^\circ\text{C}$ )	$I_{CBO}$	–	–	15 5.0	nAdc $\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 4.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	–	15	nAdc

## ON CHARACTERISTICS

DC Current Gain ( $I_C = 10\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	100 420	270 500	– 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)	$V_{CE(sat)}$	– – –	0.075 0.3 0.25	0.25 0.6 0.6	Vdc
Base–Emitter Saturation Voltage ( $I_C = 100\text{ mAdc}$ , $I_B = 5.0\text{ mAdc}$ )	$V_{BE(sat)}$	–	1.1	–	Vdc
Base–Emitter On Voltage ( $I_C = 10\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 100\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$V_{BE(on)}$	– – 0.55	0.52 0.55 0.62	– – 0.7	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	–	250	–	MHz
Collector–Base Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{cbo}$	–	2.5	–	pF
Small–Signal Current Gain ( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ kHz}$ )	$h_{fe}$	450	600	900	–
Noise Figure ( $I_C = 200\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ ) ( $I_C = 200\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $R_S = 100\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ )	$NF_1$ $NF_2$	– –	0.6 –	2.5 10	dB

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

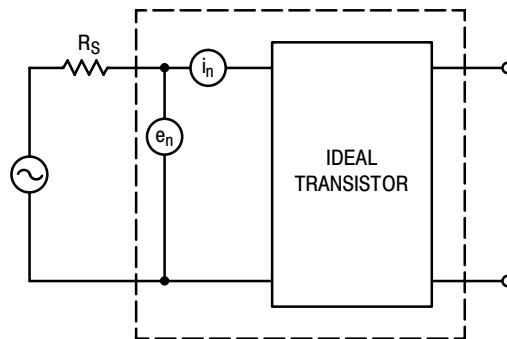


Figure 1. Transistor Noise Model

# BC549C, BC550C

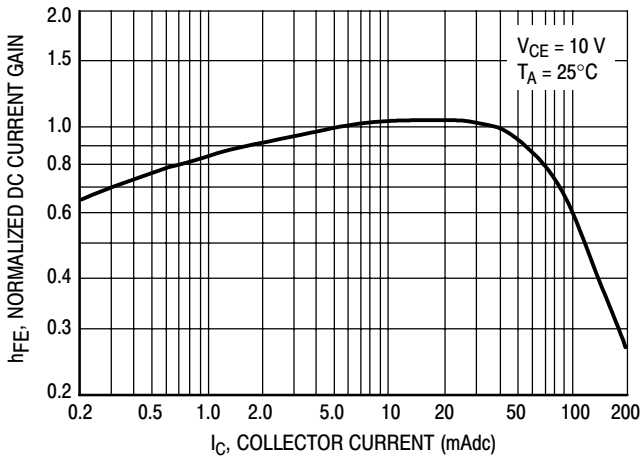


Figure 2. Normalized DC Current Gain

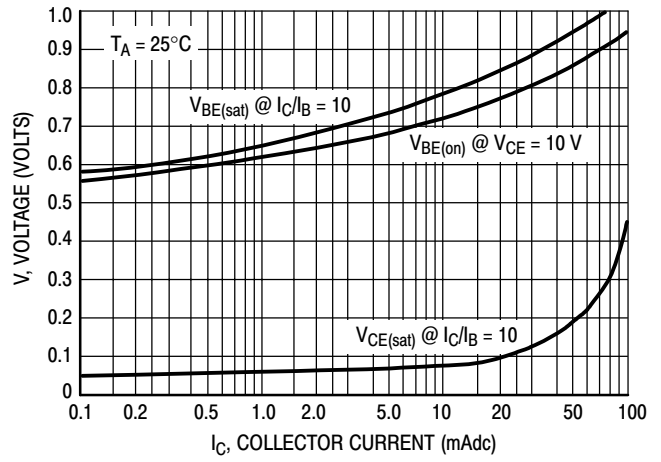


Figure 3. "Saturation" and "On" Voltages

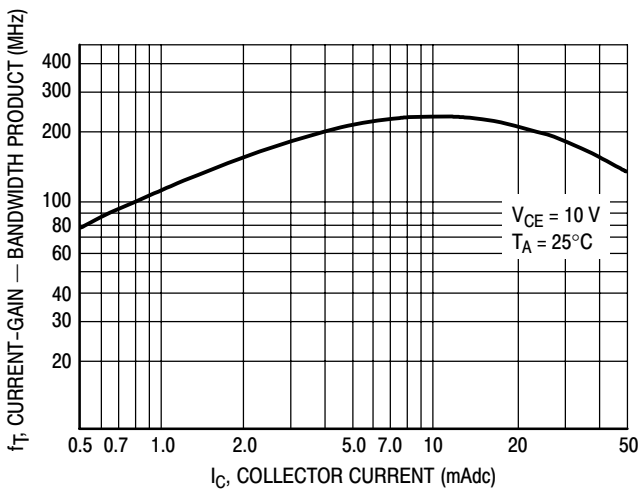


Figure 4. Current-Gain — Bandwidth Product

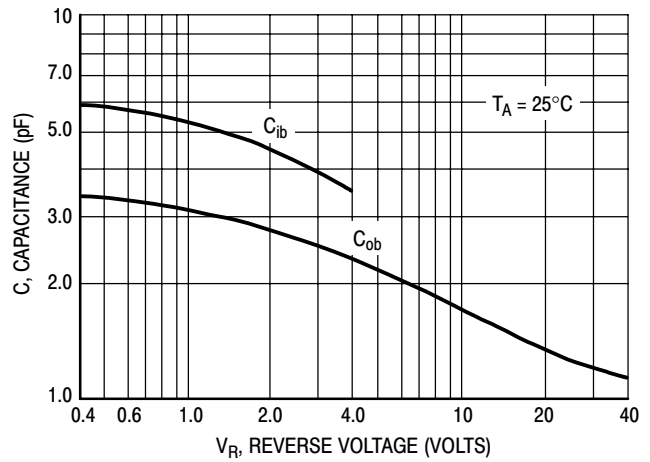


Figure 5. Capacitance

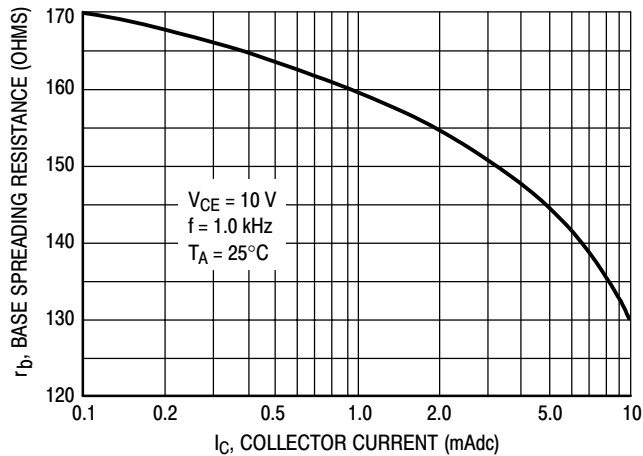
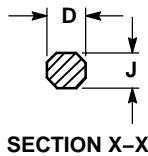
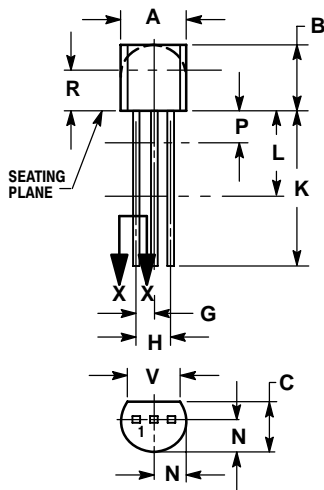


Figure 6. Base Spreading Resistance

# BC549C, BC550C

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. 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	0.021	0.407	0.533
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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