

# BC549C, BC550C

## Low Noise Transistors

### NPN Silicon

#### Features

- These are Pb-Free Devices\*

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                       |
|--|----------------|-------------|----------------------------|
| Collector – Emitter Voltage  | $V_{CEO}$      | 30<br>45    | Vdc                        |
| Collector – Base Voltage   | $V_{CBO}$      | 30<br>50    | Vdc                        |
| Emitter – Base Voltage   | $V_{EBO}$      | 5.0         | Vdc                        |
| Collector Current – Continuous   | $I_C$          | 100         | Vdc                        |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above = $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above = $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>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 | $^\circ\text{C}/\text{W}$ |

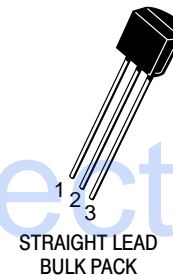
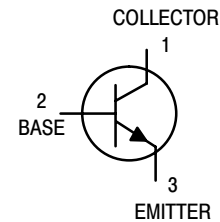
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



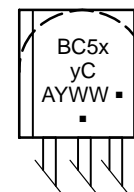
ON Semiconductor®

<http://onsemi.com>



TO-92  
CASE 29  
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          |
|---------|--------------------|-------------------|
| BC549CG | TO-92<br>(Pb-Free) | 5000 Units / Bulk |
| BC550CG | TO-92<br>(Pb-Free) | 5000 Units / Bulk |

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

## ON CHARACTERISTICS

|   |               |                |                      |                    |     |
|---|---------------|----------------|----------------------|--------------------|-----|
| DC Current Gain<br>( $I_C = 10\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )   | $h_{FE}$      | 100<br>420     | 270<br>500           | –<br>800           | –   |
| Collector–Emitter Saturation Voltage<br>( $I_C = 10\text{ mAdc}$ , $I_B = 0.5\text{ mAdc}$ )<br>( $I_C = 10\text{ mAdc}$ , $I_B = \text{see note 1}$ )<br>( $I_C = 100\text{ mAdc}$ , $I_B = 5.0\text{ mAdc}$ , see note 2) | $V_{CE(sat)}$ | –<br>–<br>–    | 0.075<br>0.3<br>0.25 | 0.25<br>0.6<br>0.6 | Vdc |
| Base–Emitter Saturation Voltage<br>( $I_C = 100\text{ mAdc}$ , $I_B = 5.0\text{ mAdc}$ )  | $V_{BE(sat)}$ | –              | 1.1                  | –                  | Vdc |
| Base–Emitter On Voltage<br>( $I_C = 10\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 100\text{ }\mu\text{Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )   | $V_{BE(on)}$  | –<br>–<br>0.55 | 0.52<br>0.55<br>0.62 | –<br>–<br>0.7      | Vdc |

## SMALL-SIGNAL CHARACTERISTICS

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

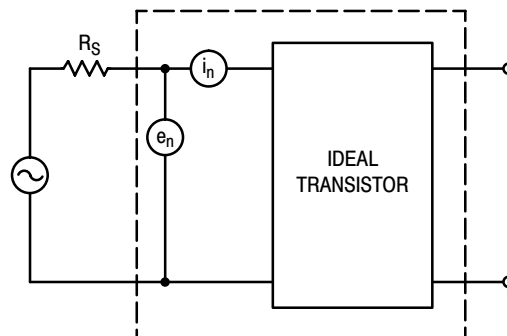


Figure 1. Transistor Noise Model

# BC549C, BC550C

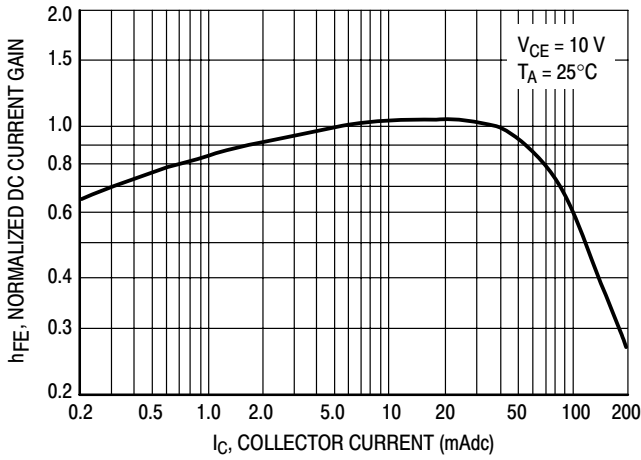


Figure 2. Normalized DC Current Gain

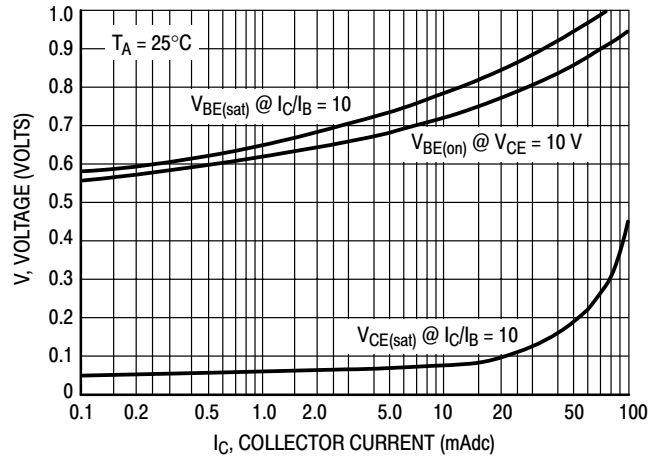


Figure 3. "Saturation" and "On" Voltages

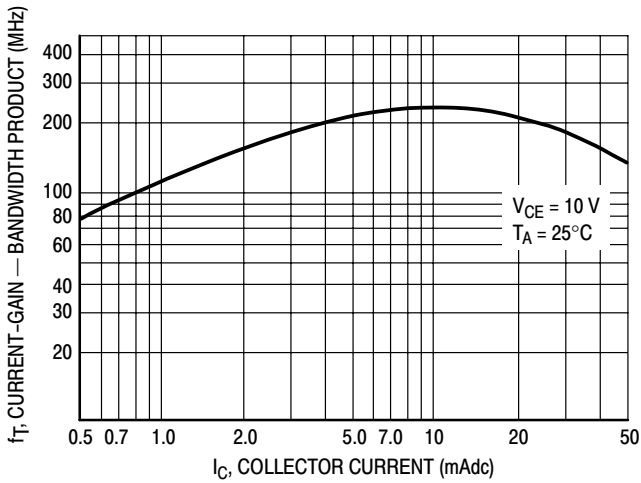


Figure 4. Current-Gain — Bandwidth Product

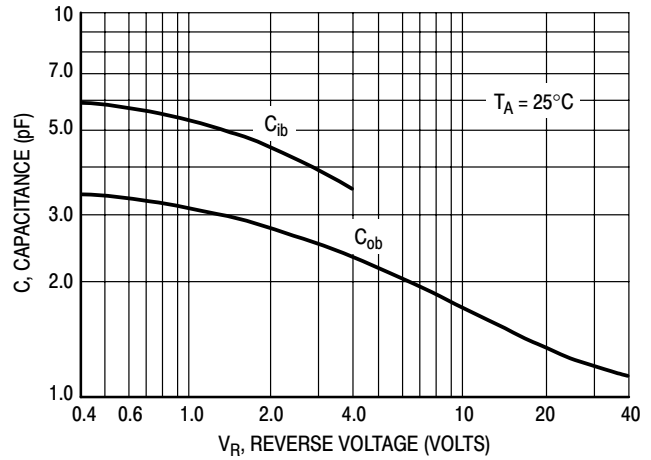


Figure 5. Capacitance

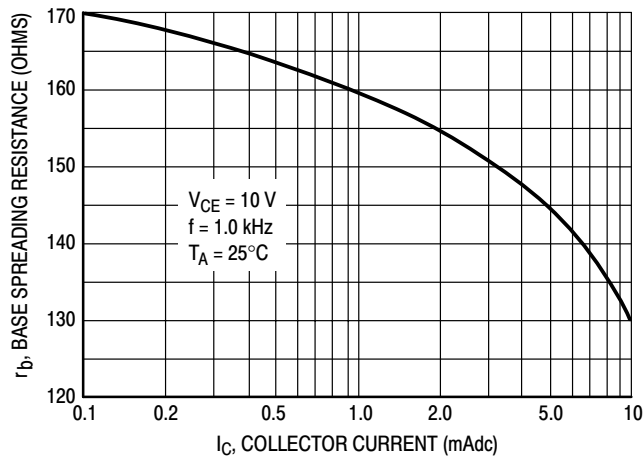
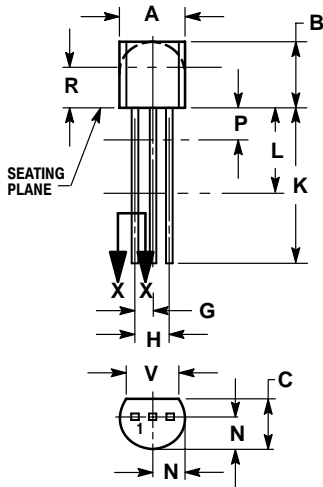


Figure 6. Base Spreading Resistance

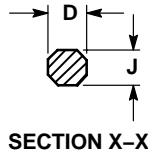
# BC549C, BC550C

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD  
BULK PACK

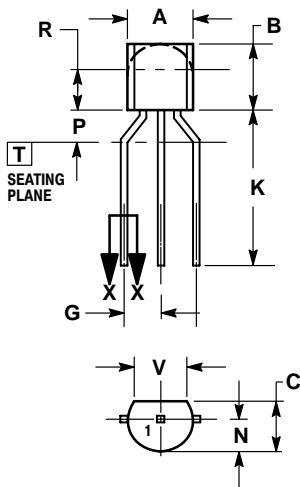


SECTION X-X

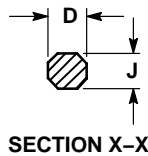
NOTES:

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



BENT LEAD  
TAPE & REEL  
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 4.45        | 5.20 |
| B   | 4.32        | 5.33 |
| C   | 3.18        | 4.19 |
| D   | 0.40        | 0.54 |
| G   | 2.40        | 2.80 |
| J   | 0.39        | 0.50 |
| K   | 12.70       | ---  |
| N   | 2.04        | 2.66 |
| P   | 1.50        | 4.00 |
| R   | 2.93        | ---  |
| V   | 3.43        | ---  |

STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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