# BC549C, BC550C

# Low Noise Transistors

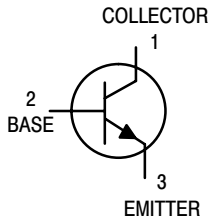
## NPN Silicon

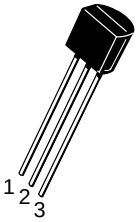
ON Semiconductor®

http://onsemi.com

### Features

- These are Pb−Free Devices*




STRAIGHT LEAD
BULK PACK

**TO−92**
**CASE 29**
**STYLE 17**

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector−Emitter Voltage<br>BC549C<br>BC550C | $V_{CEO}$ | <br>30<br>45 | Vdc |
| Collector−Base Voltage<br>BC549C<br>BC550C | $V_{CBO}$ | <br>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°C<br>Derate above = 25°C | $P_D$ | 625<br>5.0 | mW<br>mW/°C |
| Total Device Dissipation @ $T_A$ = 25°C<br>Derate above = 25°C | $P_D$ | 1.5<br>12 | W<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −55 to +150 | °C |

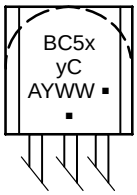
### THERMAL CHARACTERISTICS

| 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 |

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.

### 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 |

**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) | $V_{(BR)CEO}$ | 45 | – | – | Vdc |
| Collector−Base Breakdown Voltage ($I_C$ = 10 μAdc, $I_E$ = 0) | $V_{(BR)CBO}$ | 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 V, $I_E$ = 0)<br>($V_{CB}$ = 30 V, $I_E$ = 0, $T_A$ = +125°C) | $I_{CBO}$ | –<br>– | –<br>– | 15<br>5.0 | nAdc<br>μAdc |
| Emitter Cutoff Current ($V_{EB}$ = 4.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | – | – | 15 | nAdc |
| **ON CHARACTERISTICS** | | | | | |
| DC Current Gain ($I_C$ = 10 μAdc, $V_{CE}$ = 5.0 Vdc)<br>($I_C$ = 2.0 mAdc, $V_{CE}$ = 5.0 Vdc) | $h_{FE}$ | 100<br>420 | 270<br>500 | –<br>800 | – |
| Collector−Emitter Saturation Voltage ($I_C$ = 10 mAdc, $I_B$ = 0.5 mAdc)<br>($I_C$ = 10 mAdc, $I_B$ = see note 1)<br>($I_C$ = 100 mAdc, $I_B$ = 5.0 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 ($I_C$ = 100 mAdc, $I_B$ = 5.0 mAdc) | $V_{BE(sat)}$ | – | 1.1 | – | Vdc |
| Base−Emitter On Voltage ($I_C$ = 10 μAdc, $V_{CE}$ = 5.0 Vdc)<br>($I_C$ = 100 μAdc, $V_{CE}$ = 5.0 Vdc)<br>($I_C$ = 2.0 mAdc, $V_{CE}$ = 5.0 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 ($I_C$ = 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 ($I_C$ = 2.0 mAdc, $V_{CE}$ = 5.0 V, f = 1.0 kHz) | $h_{fe}$ | 450 | 600 | 900 | – |
| Noise Figure ($I_C$ = 200 μAdc, $V_{CE}$ = 5.0 Vdc, $R_S$ = 2.0 kΩ, f = 1.0 kHz)<br>($I_C$ = 200 μAdc, $V_{CE}$ = 5.0 Vdc, $R_S$ = 100 kΩ, f = 1.0 kHz) | $NF_1$<br>$NF_2$ | –<br>– | 0.6<br>– | 2.5<br>10 | dB |

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%.

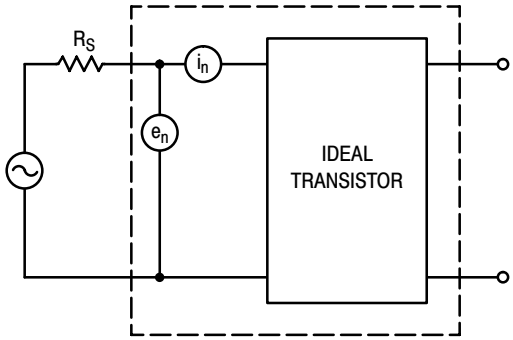



**Figure 1. Transistor Noise Model**

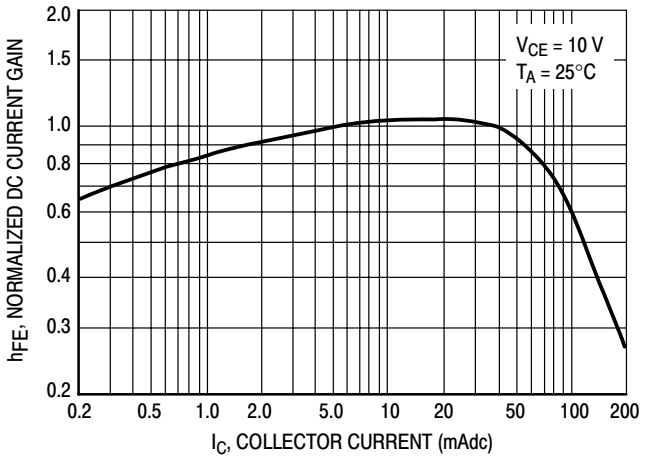



**Figure 2. Normalized DC Current Gain**

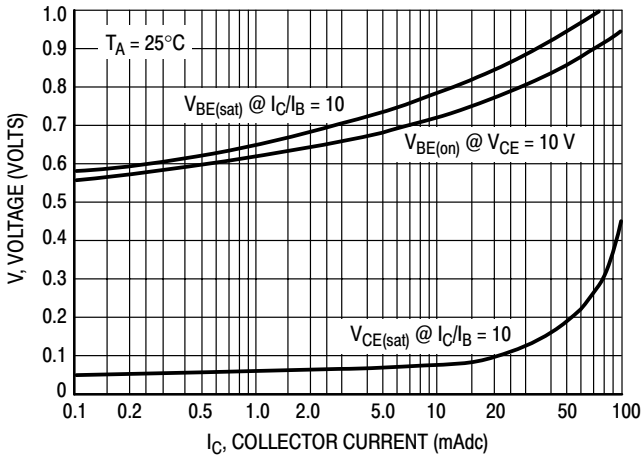



**Figure 3. “Saturation” and “On” Voltages**

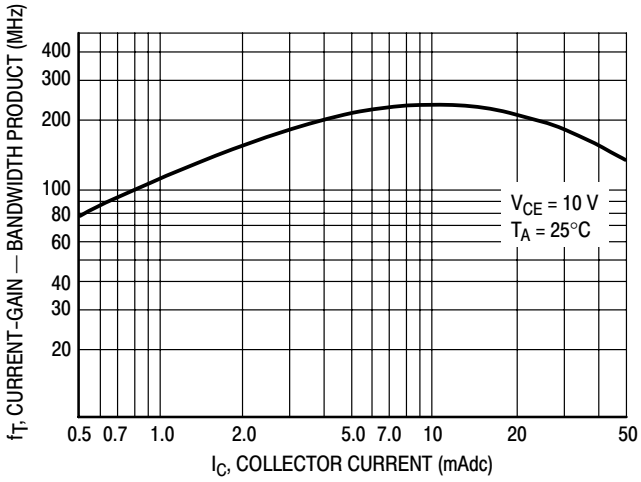



**Figure 4. Current−Gain — Bandwidth Product**

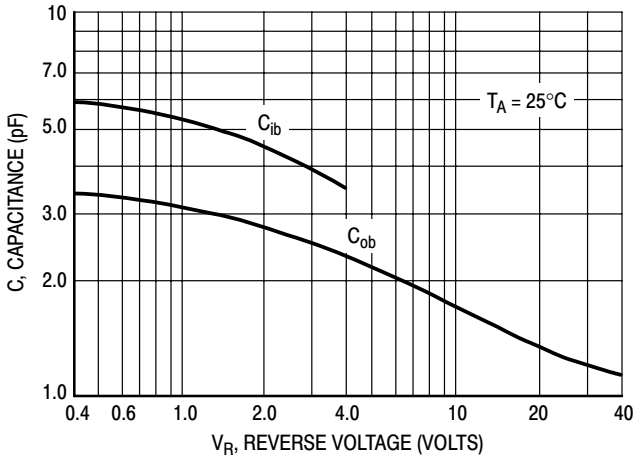



**Figure 5. Capacitance**

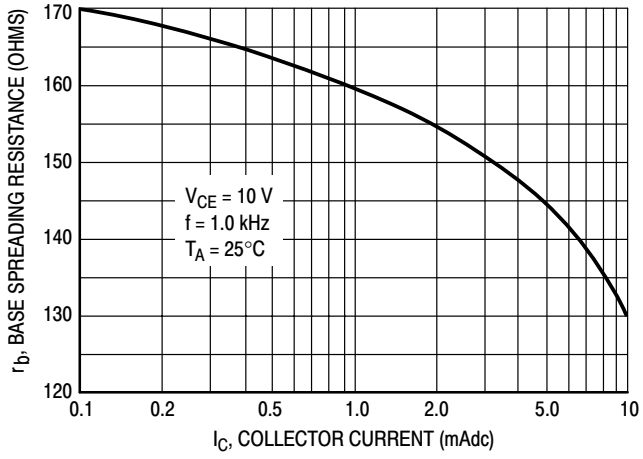
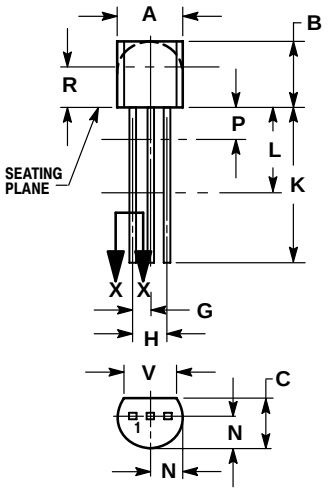


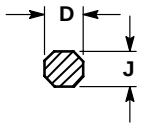

**Figure 6. Base Spreading Resistance**

## PACKAGE DIMENSIONS

**TO−92 (TO−226)**
CASE 29−11
ISSUE AM



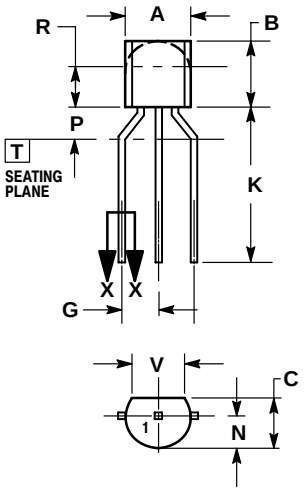

STRAIGHT LEAD
BULK PACK



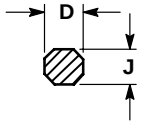

**SECTION X−X**

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.

| | 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 | 0.021 | 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.

| | MILLIMETERS | |
|---|---|---|
| DIM | 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:
PIN 1. COLLECTOR
2. BASE
3. EMITTER



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