

BC546B, BC547A, B, C, BC548B, C

Amplifier Transistors

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|-------------------------|----------------|----------------------------|
| Collector - Emitter Voltage | V_{CEO} | 65 45 30 | Vdc |
| | BC546 BC547 BC548 | | |
| Collector - Base Voltage | V_{CBO} | 80 50 30 | Vdc |
| | BC546 BC547 BC548 | | |
| Emitter - Base Voltage | V_{EBO} | 6.0 | Vdc |
| Collector Current - Continuous | I_C | 100 | mAdc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 625 5.0 | mW mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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 | $^\circ\text{C}/\text{W}$ |

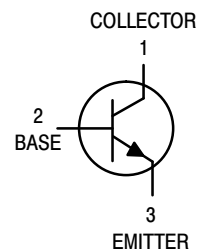
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

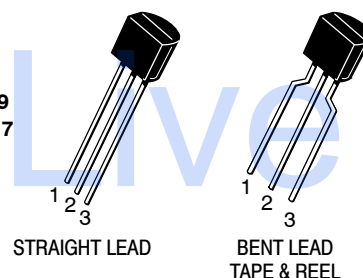


ON Semiconductor®

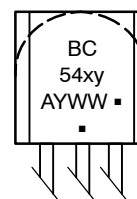
<http://onsemi.com>



TO-92
CASE 29
STYLE 17



MARKING DIAGRAM



- x = 6, 7, or 8
- y = A, B or C
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

BC546B, BC547A, B, C, BC548B, C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit | |
|---|--|----------------------|--|----------------------------------|--|--------------|
| OFF CHARACTERISTICS | | | | | | |
| Collector – Emitter Breakdown Voltage (I _C = 1.0 mA, I _B = 0) | BC546 BC547 BC548 | V _{(BR)CEO} | 65 45 30 | – – – | – – – | V |
| Collector – Base Breakdown Voltage (I _C = 100 μA) | BC546 BC547 BC548 | V _{(BR)CBO} | 80 50 30 | – – – | – – – | V |
| Emitter – Base Breakdown Voltage (I _E = 10 μA, I _C = 0) | BC546 BC547 BC548 | V _{(BR)EBO} | 6.0 6.0 6.0 | – – – | – – – | V |
| Collector Cutoff Current (V _{CE} = 70 V, V _{BE} = 0) (V _{CE} = 50 V, V _{BE} = 0) (V _{CE} = 35 V, V _{BE} = 0) (V _{CE} = 30 V, T _A = 125°C) | BC546 BC547 BC548 BC546/547/548 | I _{CES} | – – – – | 0.2 0.2 0.2 – | 15 15 15 4.0 | nA μA |
| ON CHARACTERISTICS | | | | | | |
| DC Current Gain (I _C = 10 μA, V _{CE} = 5.0 V) | BC547A BC546B/547B/548B BC548C | h _{FE} | – – – | 90 150 270 | – – – | – |
| (I _C = 2.0 mA, V _{CE} = 5.0 V) | BC546 BC547 BC548 BC547A BC546B/547B/548B BC547C/BC548C | | 110 110 110 110 200 420 | – – – 180 290 520 | 450 800 800 220 450 800 | |
| (I _C = 100 mA, V _{CE} = 5.0 V) | BC547A/548A BC546B/547B/548B BC548C | | – – – | 120 180 300 | – – – | |
| Collector – Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA) (I _C = 10 mA, I _B = See Note 1) | | V _{CE(sat)} | – – – | 0.09 0.2 0.3 | 0.25 0.6 0.6 | V |
| Base – Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) | | V _{BE(sat)} | – | 0.7 | – | V |
| Base – Emitter On Voltage (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = 10 mA, V _{CE} = 5.0 V) | | V _{BE(on)} | 0.55 – | – – | 0.7 0.77 | V |
| SMALL-SIGNAL CHARACTERISTICS | | | | | | |
| Current – Gain – Bandwidth Product (I _C = 10 mA, V _{CE} = 5.0 V, f = 100 MHz) | BC546 BC547 BC548 | f _T | 150 150 150 | 300 300 300 | – – – | MHz |
| Output Capacitance (V _{CB} = 10 V, I _C = 0, f = 1.0 MHz) | | C _{obo} | – | 1.7 | 4.5 | pF |
| Input Capacitance (V _{EB} = 0.5 V, I _C = 0, f = 1.0 MHz) | | C _{ibo} | – | 10 | – | pF |
| Small – Signal Current Gain (I _C = 2.0 mA, V _{CE} = 5.0 V, f = 1.0 kHz) | BC546 BC547/548 BC547A BC546B/547B/548B BC547C/548C | h _{fe} | 125 125 125 240 450 | – – 220 330 600 | 500 900 260 500 900 | – |
| Noise Figure (I _C = 0.2 mA, V _{CE} = 5.0 V, R _S = 2 kΩ, f = 1.0 kHz, Δf = 200 Hz) | BC546 BC547 BC548 | NF | – – – | 2.0 2.0 2.0 | 10 10 10 | dB |

1. I_B is value for which I_C = 11 mA at V_{CE} = 1.0 V.

BC547/BC548

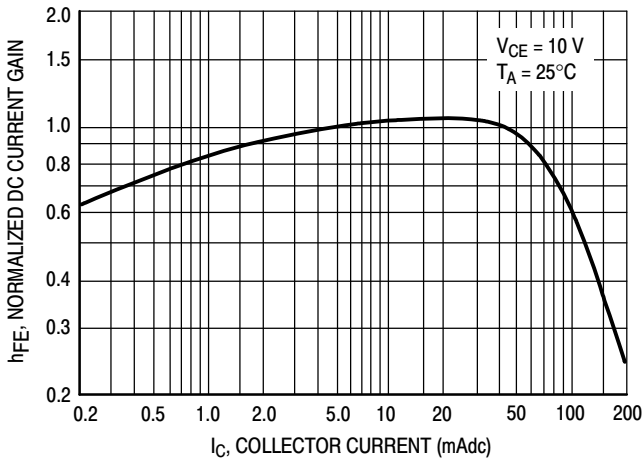


Figure 1. Normalized DC Current Gain

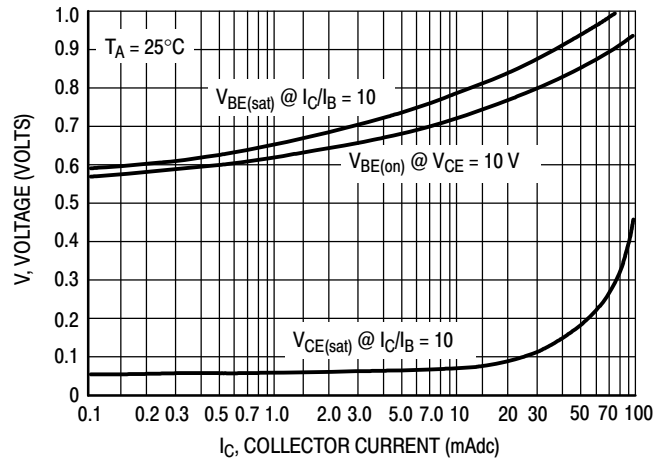


Figure 2. "Saturation" and "On" Voltages

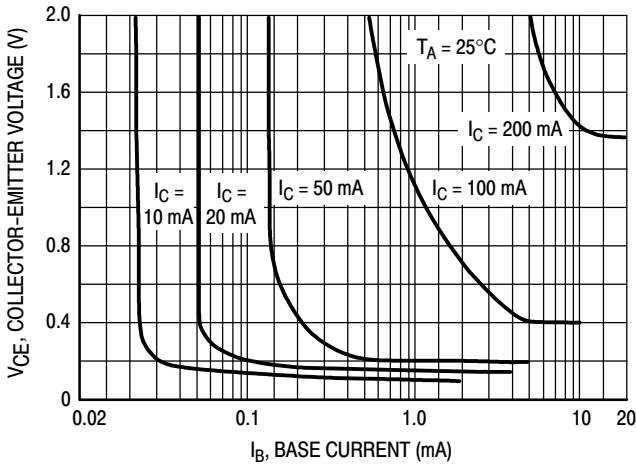


Figure 3. Collector Saturation Region

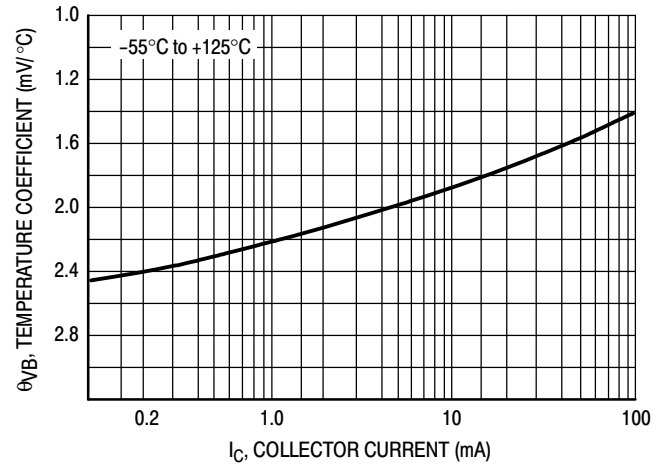


Figure 4. Base-Emitter Temperature Coefficient

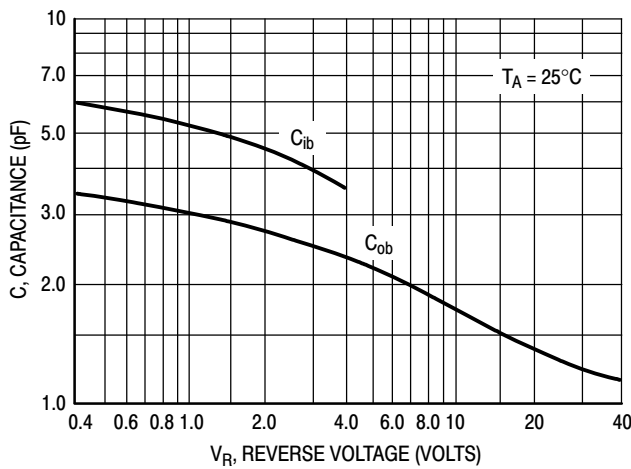


Figure 5. Capacitances

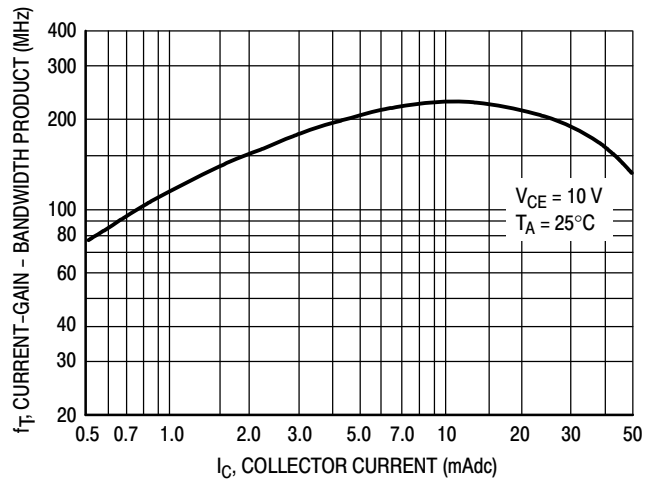


Figure 6. Current-Gain - Bandwidth Product

BC546



Figure 7. DC Current Gain



Figure 8. "On" Voltage



Figure 9. Collector Saturation Region



Figure 10. Base-Emitter Temperature Coefficient



Figure 11. Capacitance

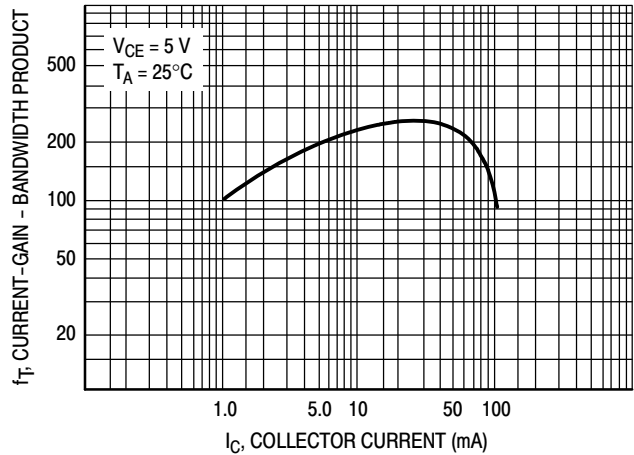


Figure 12. Current-Gain - Bandwidth Product

BC546B, BC547A, B, C, BC548B, C

ORDERING INFORMATION

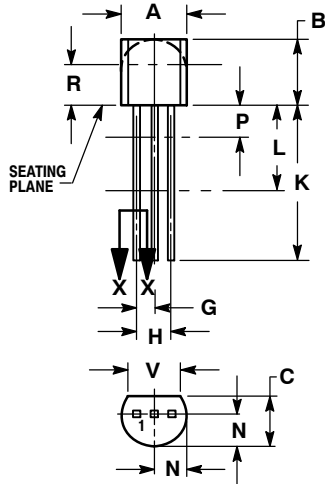
| Device | Package | Shipping† |
|------------|--------------------|--------------------|
| BC546B | TO-92 | 5000 Units / Bulk |
| BC546BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC546BRL1 | TO-92 | 2000 / Tape & Reel |
| BC546BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC546BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC547ARL | TO-92 | 2000 / Tape & Reel |
| BC547ARLG | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC547AZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC547BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC547BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC547BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC547CG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC547CZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC548BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC548BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC548BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC548CG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC548CZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

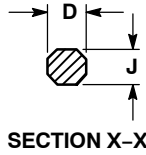
BC546B, BC547A, B, C, BC548B, C

PACKAGE DIMENSIONS

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



STRAIGHT LEAD

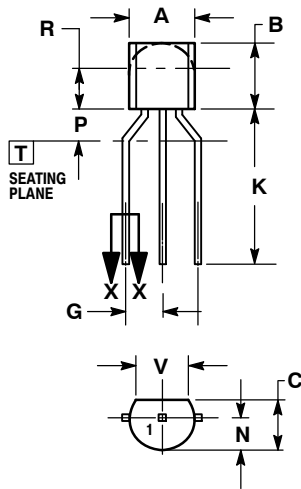


SECTION X-X

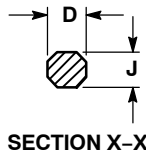
NOTES:

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



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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