

BC556B, BC557A, B, C, BC558B

Amplifier Transistors

PNP Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|-------------------|-------------------|----------------------------|
| Collector - Emitter Voltage BC556 BC557 BC558 | V_{CEO} | -65 -45 -30 | Vdc |
| Collector - Base Voltage BC556 BC557 BC558 | V_{CBO} | -80 -50 -30 | Vdc |
| Emitter - Base Voltage | V_{EBO} | -5.0 | Vdc |
| Collector Current – Continuous – Peak | I_C I_{CM} | -100 -200 | mAdc |
| Base Current – Peak | I_{BM} | -200 | 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 | $^\circ\text{C}/\text{W}$ |

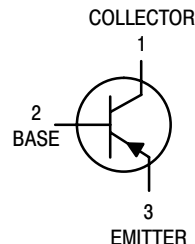
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

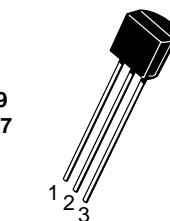


ON Semiconductor®

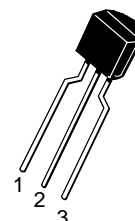
<http://onsemi.com>



TO-92
CASE 29
STYLE 17

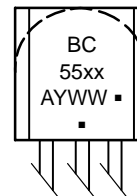


STRAIGHT LEAD
BULK PACK



BENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



xx = 6B, 7A, 7B, 7C, or 8B
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 6 of this data sheet.

BC556B, BC557A, B, C, BC558B

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

| Characteristic | Symbol | Min | Typ | Max | Unit | |
|---|--|----------------------|----------------------------|-------------------------------------|--|------------------|
| OFF CHARACTERISTICS | | | | | | |
| Collector–Emitter Breakdown Voltage (I _C = –2.0 mAdc, I _B = 0) | BC556 BC557 BC558 | V _{(BR)CEO} | –65 –45 –30 | – – – | – – – | V |
| Collector–Base Breakdown Voltage (I _C = –100 μAdc) | BC556 BC557 BC558 | V _{(BR)CBO} | –80 –50 –30 | – – – | – – – | V |
| Emitter–Base Breakdown Voltage (I _E = –100 μAdc, I _C = 0) | BC556 BC557 BC558 | V _{(BR)EBO} | –5.0 –5.0 –5.0 | – – – | – – – | V |
| Collector–Emitter Leakage Current (V _{CES} = –40 V) (V _{CES} = –20 V) (V _{CES} = –20 V, T _A = 125°C) | BC556 BC557 BC558 BC556 BC557 BC558 | I _{CES} | – – – – – – | –2.0 –2.0 –2.0 – – – | –100 –100 –100 –4.0 –4.0 –4.0 | nA μA |

ON CHARACTERISTICS

| | | | | | | |
|---|--|----------------------|--|---|--|---|
| DC Current Gain (I _C = –10 μAdc, V _{CE} = –5.0 V) (I _C = –2.0 mAdc, V _{CE} = –5.0 V) (I _C = –100 mAdc, V _{CE} = –5.0 V) | A Series Device B Series Devices C Series Devices BC557 A Series Device B Series Devices C Series Devices A Series Device B Series Devices C Series Devices | h _{FE} | – – – 120 120 180 420 – – – | 90 150 270 – 170 290 500 120 180 300 | – – – 800 220 460 800 – – – | – |
| Collector–Emitter Saturation Voltage (I _C = –10 mAdc, I _B = –0.5 mAdc) (I _C = –10 mAdc, I _B = see Note 1) (I _C = –100 mAdc, I _B = –5.0 mAdc) | | V _{CE(sat)} | – – – | –0.075 –0.3 –0.25 | –0.3 –0.6 –0.65 | V |
| Base–Emitter Saturation Voltage (I _C = –10 mAdc, I _B = –0.5 mAdc) (I _C = –100 mAdc, I _B = –5.0 mAdc) | | V _{BE(sat)} | – – | –0.7 –1.0 | – – | V |
| Base–Emitter On Voltage (I _C = –2.0 mAdc, V _{CE} = –5.0 Vdc) (I _C = –10 mAdc, V _{CE} = –5.0 Vdc) | | V _{BE(on)} | –0.55 – | –0.62 –0.7 | –0.7 –0.82 | V |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | | |
|--|--|-----------------|--------------------------|-------------------|--------------------------|-----|
| Current–Gain – Bandwidth Product (I _C = –10 mA, V _{CE} = –5.0 V, f = 100 MHz) | BC556 BC557 BC558 | f _T | – – – | 280 320 360 | – – – | MHz |
| Output Capacitance (V _{CB} = –10 V, I _C = 0, f = 1.0 MHz) | | C _{ob} | – | 3.0 | 6.0 | pF |
| Noise Figure (I _C = –0.2 mAdc, V _{CE} = –5.0 V, R _S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz) | BC556 BC557 BC558 | NF | – – – | 2.0 2.0 2.0 | 10 10 10 | dB |
| Small–Signal Current Gain (I _C = –2.0 mAdc, V _{CE} = 5.0 V, f = 1.0 kHz) | BC557 A Series Device B Series Devices C Series Devices | h _{fe} | 125 125 240 450 | – – – – | 900 260 500 900 | – |

1. I_C = –10 mAdc on the constant base current characteristics, which yields the point I_C = –11 mAdc, V_{CE} = –1.0 V.

BC556B, BC557A, B, C, BC558B

BC557/BC558



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

BC556B, BC557A, B, C, BC558B

BC556

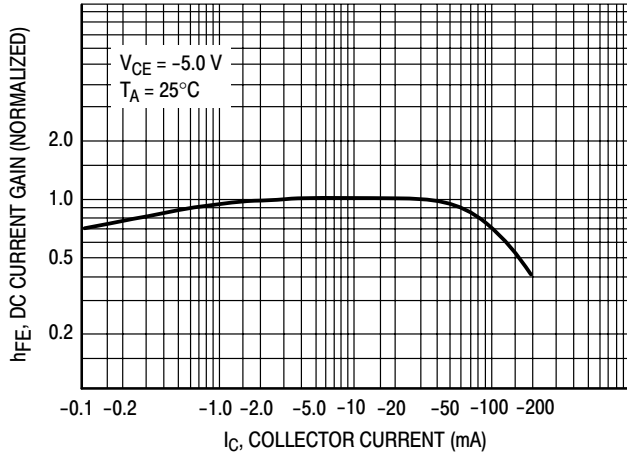


Figure 7. DC Current Gain

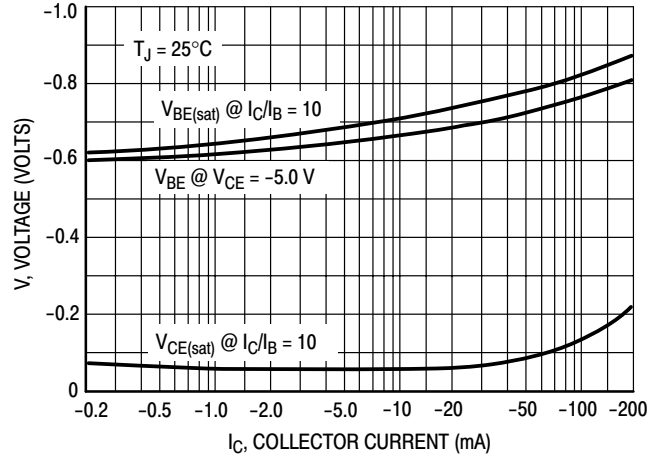


Figure 8. "On" Voltage

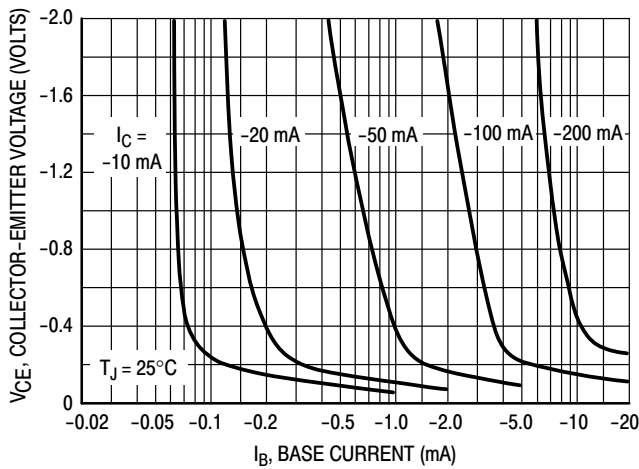


Figure 9. Collector Saturation Region

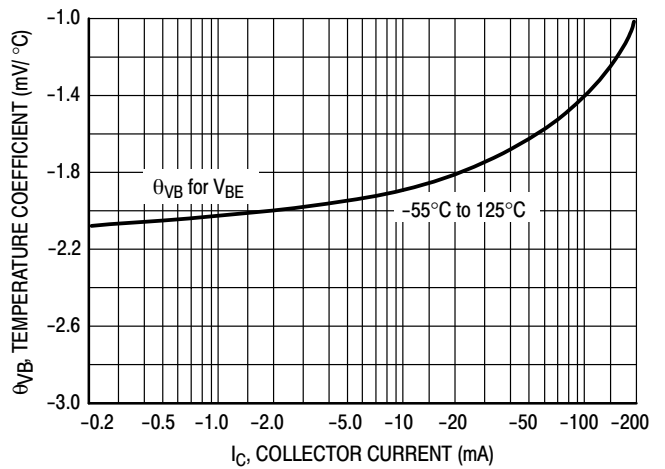


Figure 10. Base-Emitter Temperature Coefficient

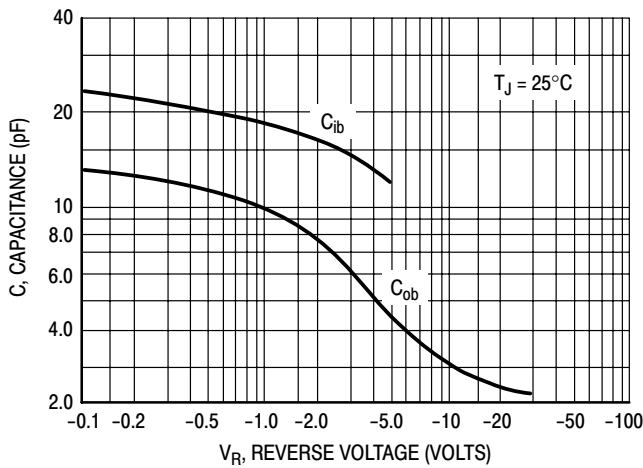


Figure 11. Capacitance

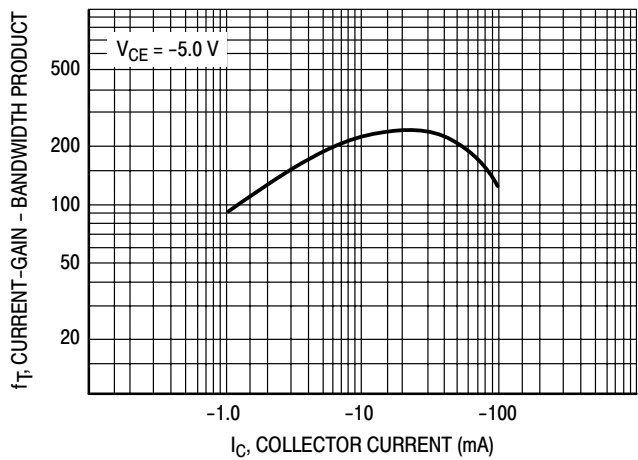


Figure 12. Current-Gain - Bandwidth Product

BC556B, BC557A, B, C, BC558B

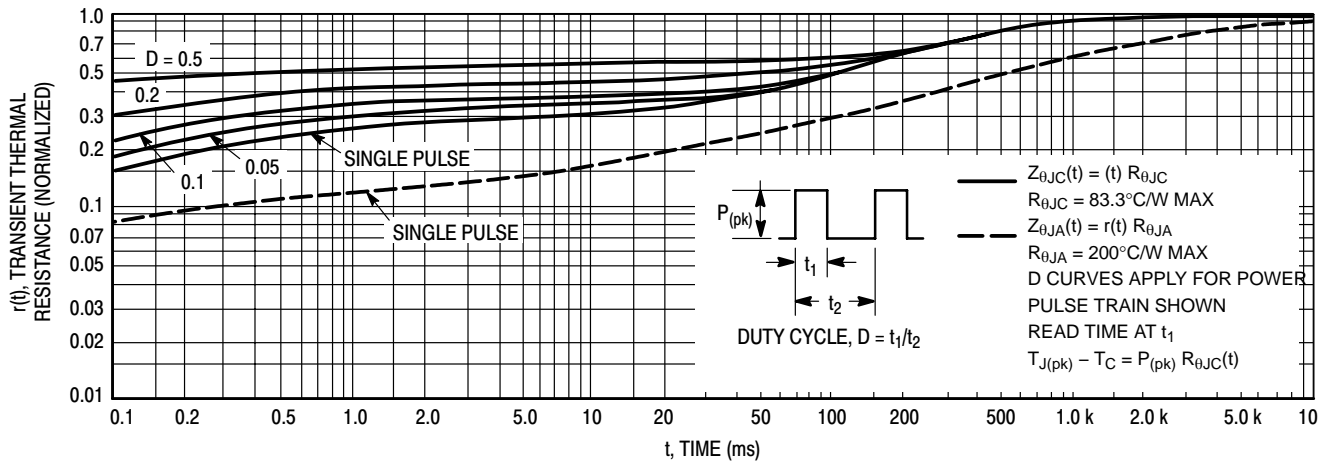


Figure 13. Thermal Response

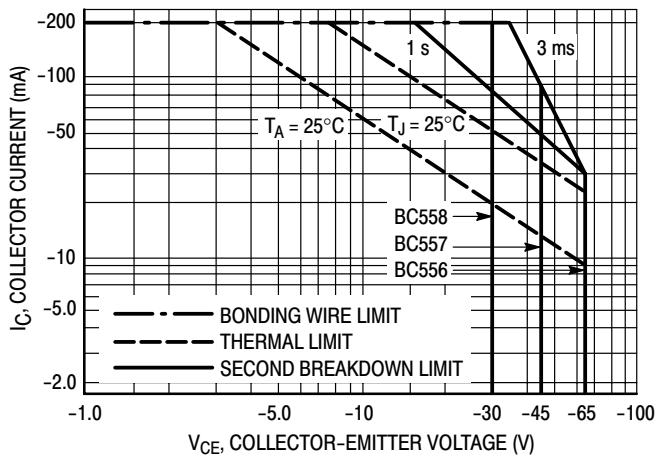


Figure 14. Active Region - Safe Operating Area

The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150^\circ\text{C}$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

BC556B, BC557A, B, C, BC558B

ORDERING INFORMATION

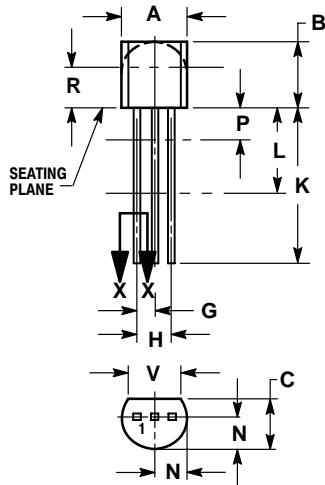
| Device | Package | Shipping† |
|------------|--------------------|--------------------|
| BC556BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC556BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557AZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC557BRL1 | TO-92 | 2000 / Tape & Reel |
| BC557BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC557BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557CG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC557CZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC558BRLG | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC558BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC558BZL1G | 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.

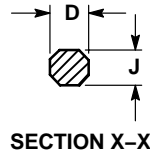
BC556B, BC557A, B, C, BC558B

PACKAGE DIMENSIONS

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



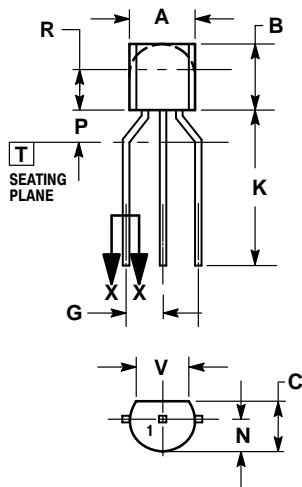
STRAIGHT LEAD
BULK PACK



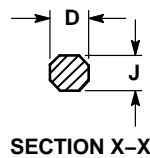
NOTES:

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



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

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative