

BC556B, BC557A, B, C, BC558B, C

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

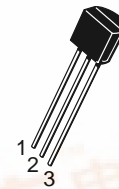
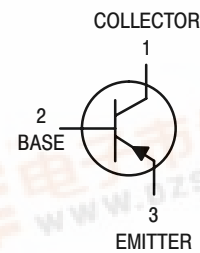
| Characteristic | Symbol | Max | Unit |
|--|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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.



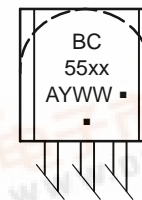
ON Semiconductor®

<http://onsemi.com>



TO-92
CASE 29
STYLE 17

MARKING DIAGRAM



BC55x = Device Code
x = 6, 7, or 8
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.



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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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 mA _{dc} , I _B = 0) | V _{(BR)CEO} | –65 –45 –30 | – – – | – – – | V |
| Collector–Base Breakdown Voltage (I _C = –100 µA _{dc}) | V _{(BR)CBO} | –80 –50 –30 | – – – | – – – | V |
| Emitter–Base Breakdown Voltage (I _E = –100 µA _{dc} , I _C = 0) | V _{(BR)EBO} | –5.0 –5.0 –5.0 | – – – | – – – | V |
| Collector–Emitter Leakage Current (V _{CE} = –40 V) (V _{CE} = –20 V) (V _{CE} = –20 V, T _A = 125°C) | 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 µA _{dc} , V _{CE} = –5.0 V) (I _C = –2.0 mA _{dc} , V _{CE} = –5.0 V) (I _C = –100 mA _{dc} , 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 mA _{dc} , I _B = –0.5 mA _{dc}) (I _C = –10 mA _{dc} , I _B = see Note 1) (I _C = –100 mA _{dc} , I _B = –5.0 mA _{dc}) | | V _{CE(sat)} | – – – | –0.075 –0.3 –0.25 | – –0.6 –0.65 | V |
| Base–Emitter Saturation Voltage (I _C = –10 mA _{dc} , I _B = –0.5 mA _{dc}) (I _C = –100 mA _{dc} , I _B = –5.0 mA _{dc}) | | V _{BE(sat)} | – – | –0.7 –1.0 | – – | V |
| Base–Emitter On Voltage (I _C = –2.0 mA _{dc} , V _{CE} = –5.0 V _{dc}) (I _C = –10 mA _{dc} , V _{CE} = –5.0 V _{dc}) | | 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 mA _{dc} , 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 mA _{dc} , 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 mA_{dc} on the constant base current characteristics, which yields the point I_C = –11 mA_{dc}, V_{CE} = –1.0 V.

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BC557/BC558

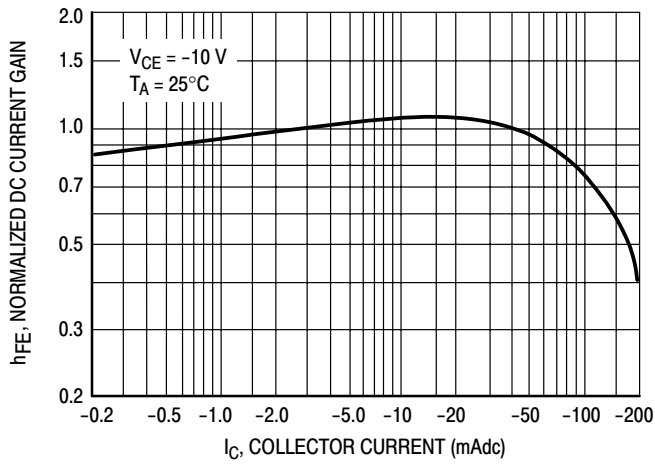


Figure 1. Normalized DC Current Gain

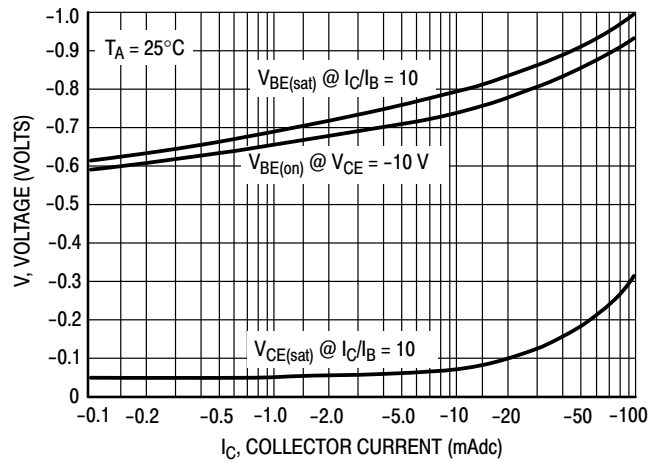


Figure 2. "Saturation" and "On" Voltages

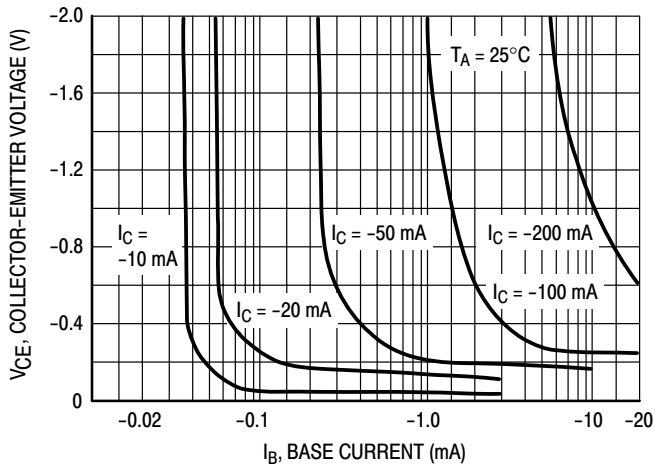


Figure 3. Collector Saturation Region

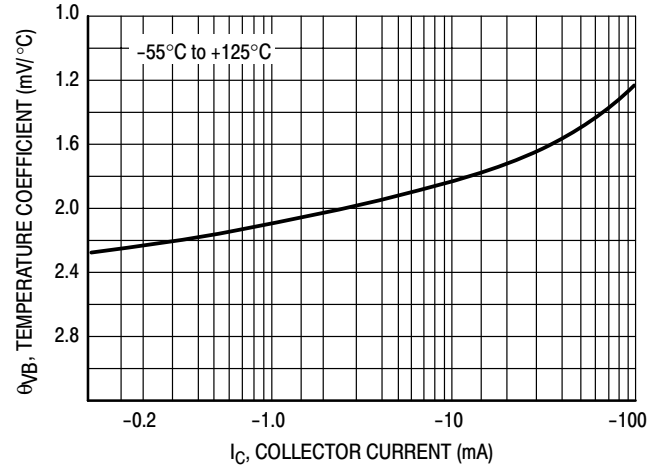


Figure 4. Base-Emitter Temperature Coefficient

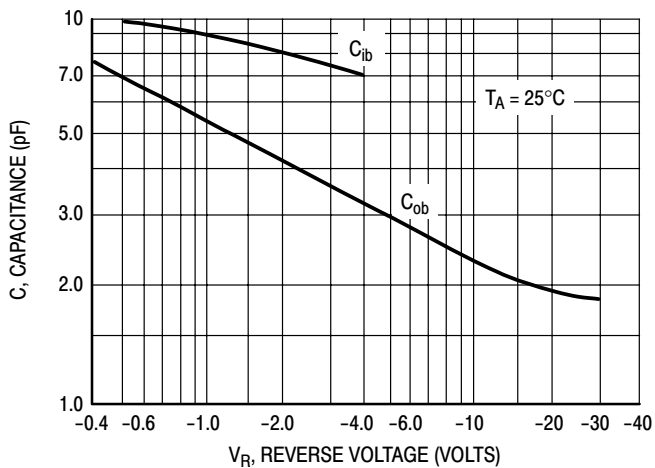


Figure 5. Capacitances

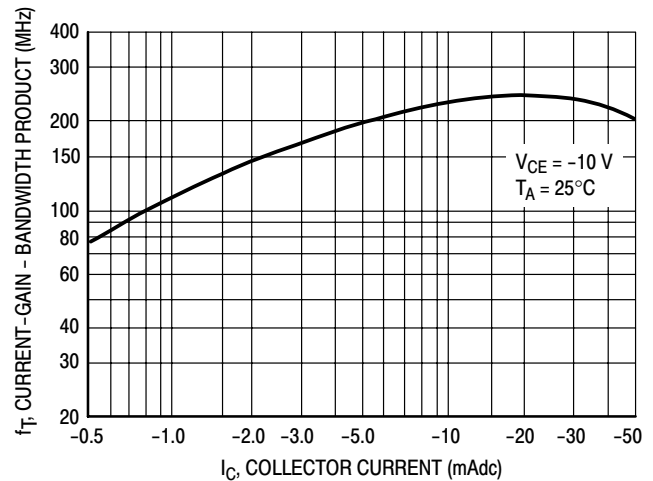


Figure 6. Current-Gain - Bandwidth Product

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BC556

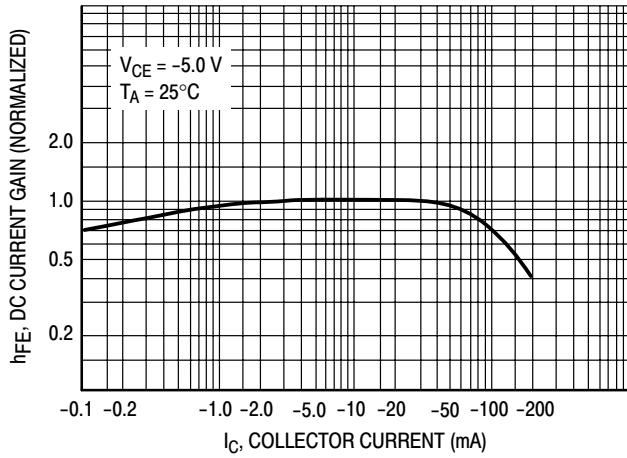


Figure 7. DC Current Gain

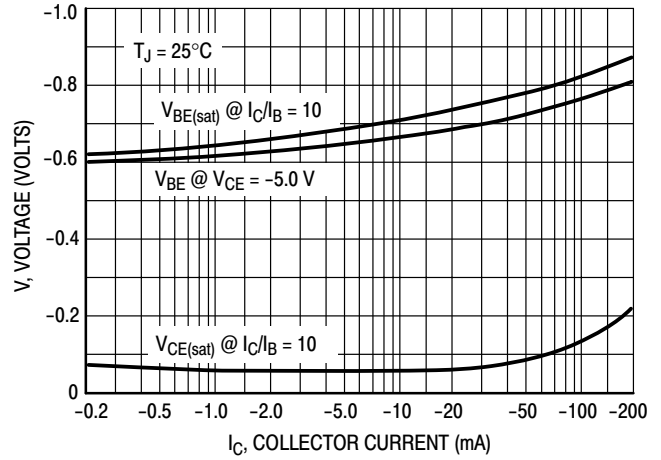


Figure 8. "On" Voltage

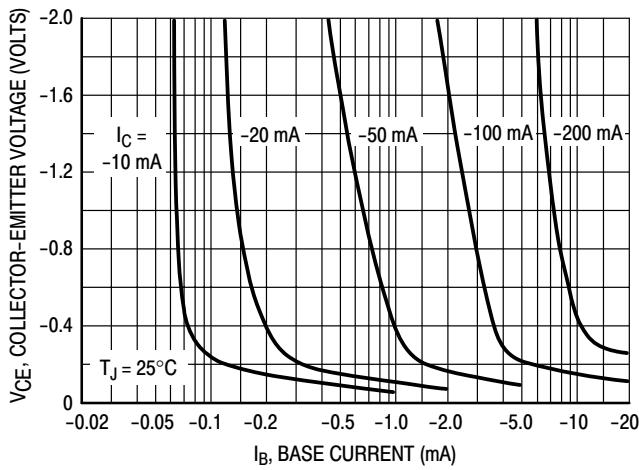


Figure 9. Collector Saturation Region

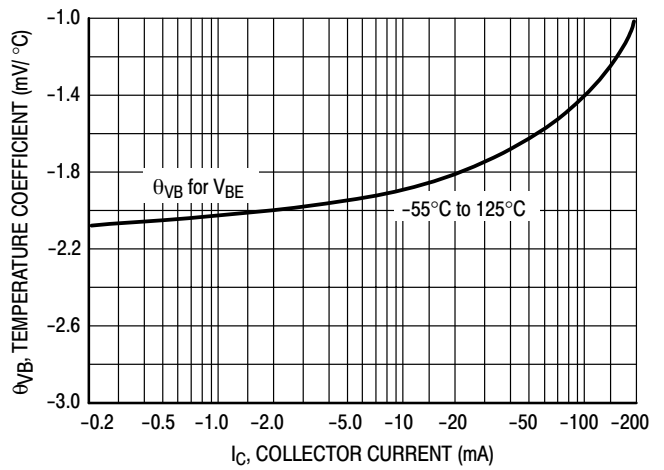


Figure 10. Base-Emitter Temperature Coefficient

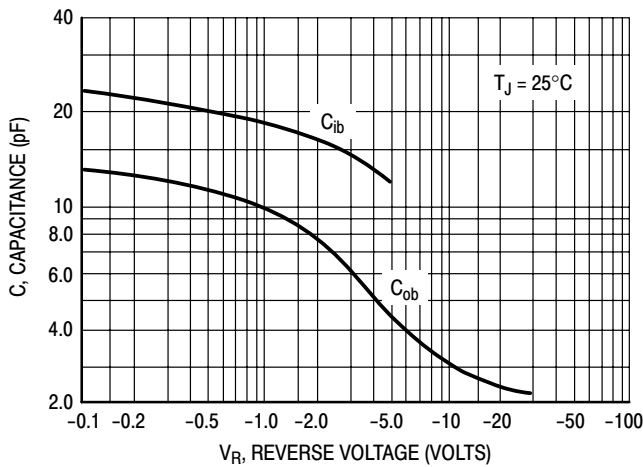


Figure 11. Capacitance

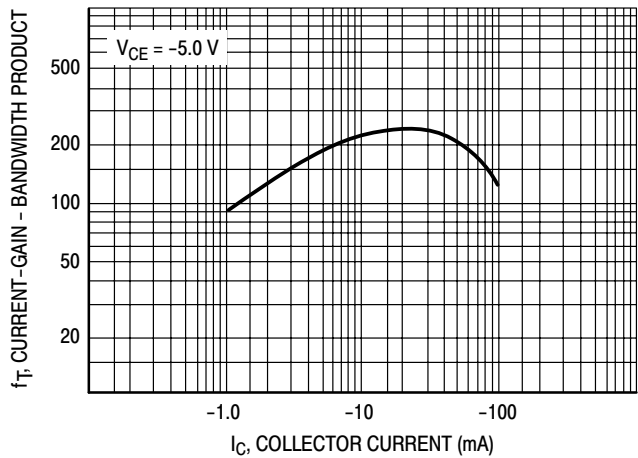


Figure 12. Current-Gain - Bandwidth Product

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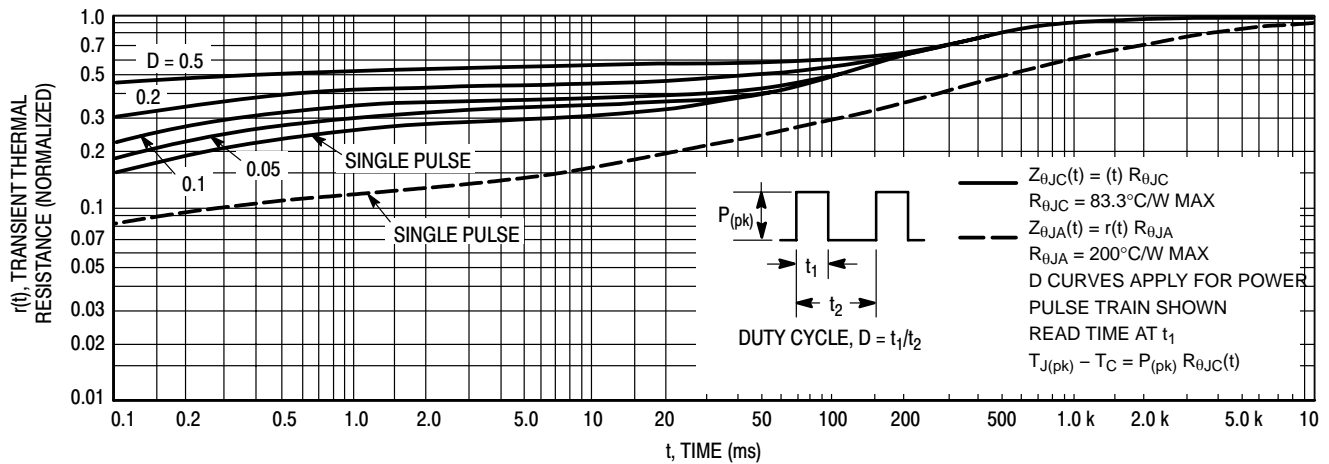


Figure 13. Thermal Response

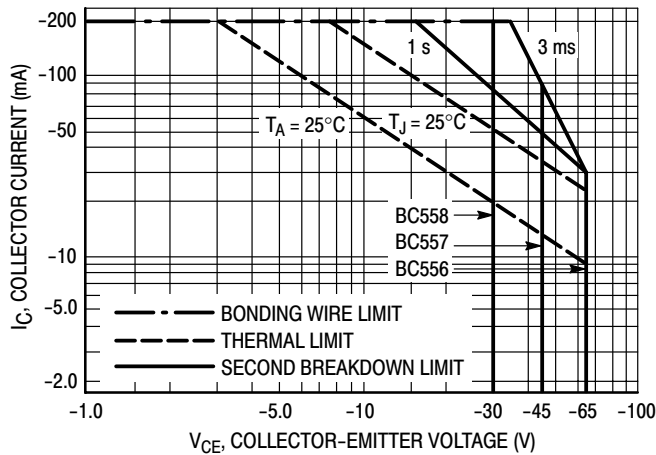


Figure 14. Active Region - Safe Operating Area

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 than can be handled to values less than the limitations imposed by second breakdown.

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DEVICE ORDERING INFORMATION

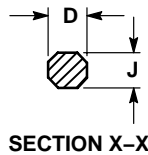
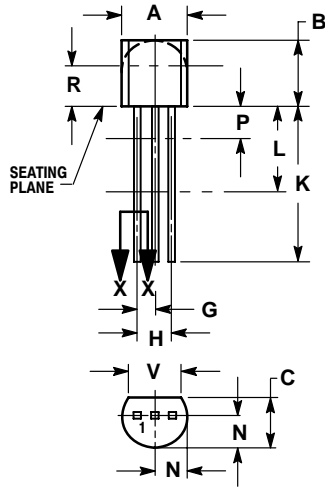
| Device | Package | Shipping† |
|------------|--------------------|--------------------|
| BC556B | TO-92 | 5000 Units / Bulk |
| BC556BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC556BZL1 | TO-92 | 2000 / Ammo Box |
| BC556BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557AZL1 | TO-92 | 2000 / Ammo Box |
| BC557AZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557B | TO-92 | 5000 Units / Bulk |
| BC557BG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC557BRL1 | TO-92 | 2000 / Tape & Reel |
| BC557BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC557BZL1 | TO-92 | 2000 / Ammo Box |
| BC557BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC557C | TO-92 | 5000 Units / Bulk |
| BC557CG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC557CZL1 | TO-92 | 2000 / Ammo Box |
| BC557CZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC558BRL | TO-92 | 2000 / Tape & Reel |
| BC558BRLG | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC558BRL1 | TO-92 | 2000 / Tape & Reel |
| BC558BRL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC558BZL1 | TO-92 | 2000 / Ammo Box |
| BC558BZL1G | TO-92 (Pb-Free) | 2000 / Ammo Box |
| BC558CZL1 | TO-92 | 2000 / Ammo Box |
| BC558CZL1G | 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.

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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 |
| E | 0.045 | 0.055 | 1.15 | 1.39 |
| F | 0.095 | 0.105 | 2.42 | 2.66 |
| G | 0.015 | 0.020 | 0.39 | 0.50 |
| H | 0.500 | --- | 12.70 | --- |
| I | 0.250 | --- | 6.35 | --- |
| J | 0.080 | 0.105 | 2.04 | 2.66 |
| K | --- | 0.100 | --- | 2.54 |
| L | 0.115 | --- | 2.93 | --- |
| M | 0.135 | --- | 3.43 | --- |

STYLE 17:

- PIN 1. COLLECTOR
2. BASE
3. EMITTER

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