

# 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 $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C}/\text{W}$

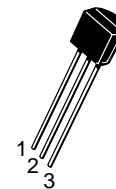
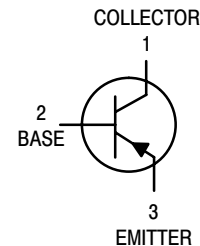
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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



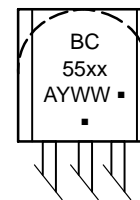
ON Semiconductor®

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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.

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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = –2.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	BC556 BC557 BC558	V <sub>(BR)CEO</sub>	–65 –45 –30	– – –	– – –	V
Collector–Base Breakdown Voltage (I <sub>C</sub> = –100 μA <sub>dc</sub> )	BC556 BC557 BC558	V <sub>(BR)CBO</sub>	–80 –50 –30	– – –	– – –	V
Emitter–Base Breakdown Voltage (I <sub>E</sub> = –100 μA <sub>dc</sub> , I <sub>C</sub> = 0)	BC556 BC557 BC558	V <sub>(BR)EBO</sub>	–5.0 –5.0 –5.0	– – –	– – –	V
Collector–Emitter Leakage Current (V <sub>CE</sub> = –40 V) (V <sub>CE</sub> = –20 V)  (V <sub>CE</sub> = –20 V, T <sub>A</sub> = 125°C)	BC556 BC557 BC558 BC556 BC557 BC558	I <sub>CES</sub>	– – – – – –	–2.0 –2.0 –2.0 – – –	–100 –100 –100 –4.0 –4.0 –4.0	nA   μA

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = –10 μA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V)	A Series Device B Series Devices C Series Devices	h <sub>FE</sub>	– – –	90 150 270	– – –	–
(I <sub>C</sub> = –2.0 mA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V)	BC557 A Series Device B Series Devices C Series Devices		120 120 180 420	– 170 290 500	800 220 460 800	
(I <sub>C</sub> = –100 mA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V)	A Series Device B Series Devices C Series Devices		– – –	120 180 300	– – –	
Collector–Emitter Saturation Voltage (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = –0.5 mA <sub>dc</sub> ) (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = see Note 1) (I <sub>C</sub> = –100 mA <sub>dc</sub> , I <sub>B</sub> = –5.0 mA <sub>dc</sub> )		V <sub>CE(sat)</sub>	– – –	–0.075 –0.3 –0.25	–0.3 –0.6 –0.65	V
Base–Emitter Saturation Voltage (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = –0.5 mA <sub>dc</sub> ) (I <sub>C</sub> = –100 mA <sub>dc</sub> , I <sub>B</sub> = –5.0 mA <sub>dc</sub> )		V <sub>BE(sat)</sub>	– –	–0.7 –1.0	– –	V
Base–Emitter On Voltage (I <sub>C</sub> = –2.0 mA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V <sub>dc</sub> ) (I <sub>C</sub> = –10 mA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V <sub>dc</sub> )		V <sub>BE(on)</sub>	–0.55 –	–0.62 –0.7	–0.7 –0.82	V

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5.0 V, f = 100 MHz)	BC556 BC557 BC558	f <sub>T</sub>	– – –	280 320 360	– – –	MHz
Output Capacitance (V <sub>CB</sub> = –10 V, I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>ob</sub>	–	3.0	6.0	pF
Noise Figure (I <sub>C</sub> = –0.2 mA <sub>dc</sub> , V <sub>CE</sub> = –5.0 V, R <sub>S</sub> = 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 <sub>C</sub> = –2.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V, f = 1.0 kHz)	BC557 A Series Device B Series Devices C Series Devices	h <sub>fe</sub>	125 125 240 450	– – – –	900 260 500 900	–

1. I<sub>C</sub> = –10 mA<sub>dc</sub> on the constant base current characteristics, which yields the point I<sub>C</sub> = –11 mA<sub>dc</sub>, V<sub>CE</sub> = –1.0 V.

# BC556B, BC557A, B, C, BC558B, C

## BC557/BC558

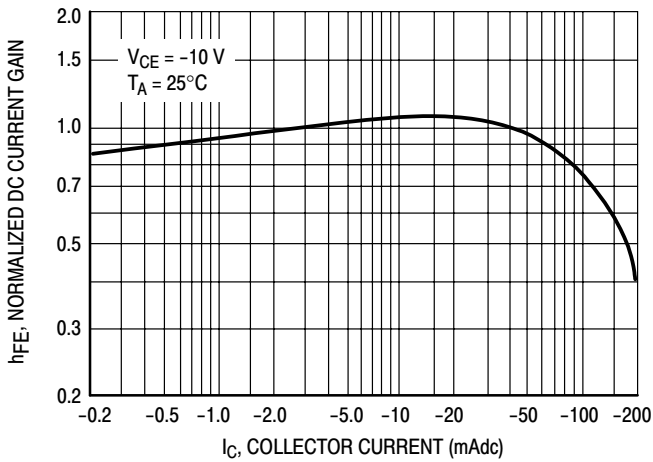


Figure 1. Normalized DC Current Gain

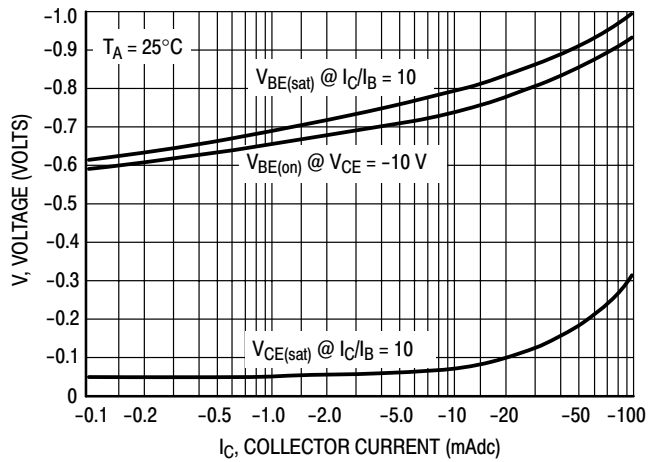


Figure 2. "Saturation" and "On" Voltages

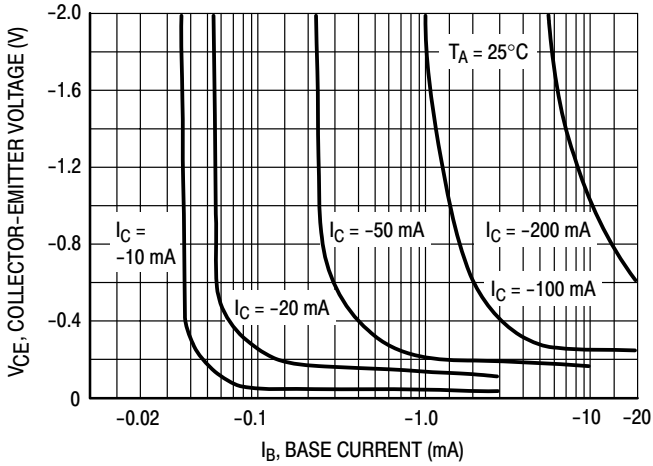


Figure 3. Collector Saturation Region

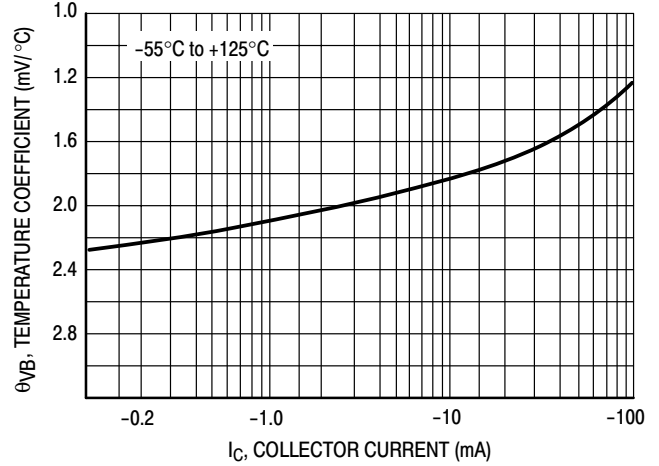


Figure 4. Base-Emitter Temperature Coefficient

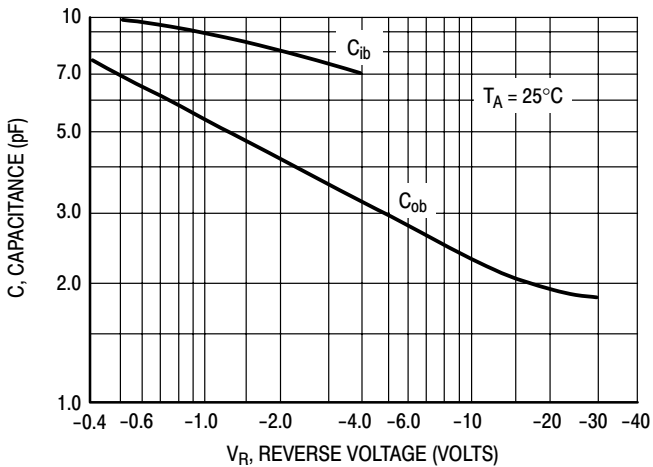


Figure 5. Capacitances

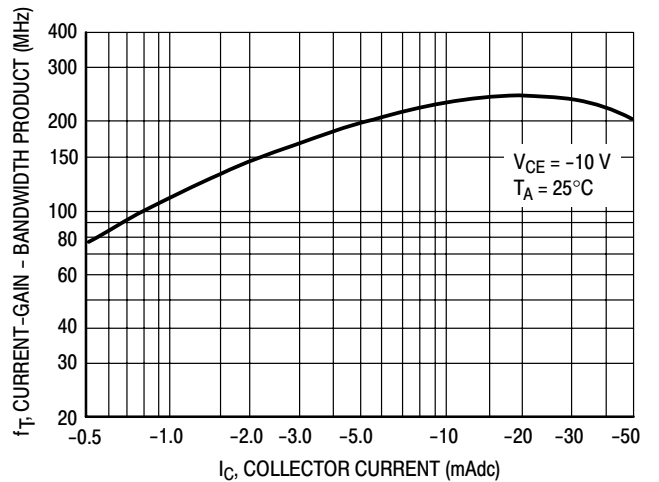


Figure 6. Current-Gain - Bandwidth Product

# BC556B, BC557A, B, C, BC558B, C

## BC556

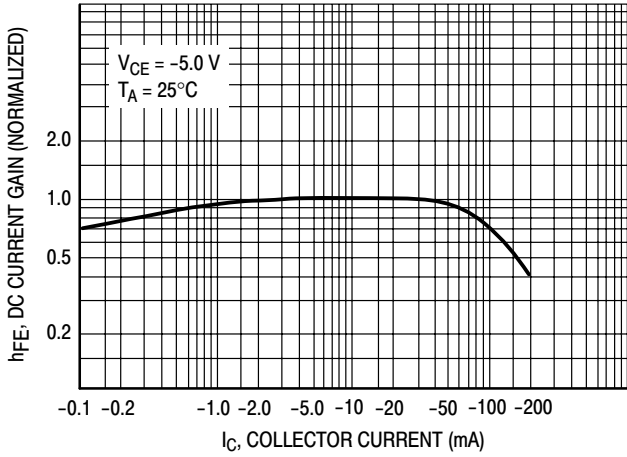


Figure 7. DC Current Gain

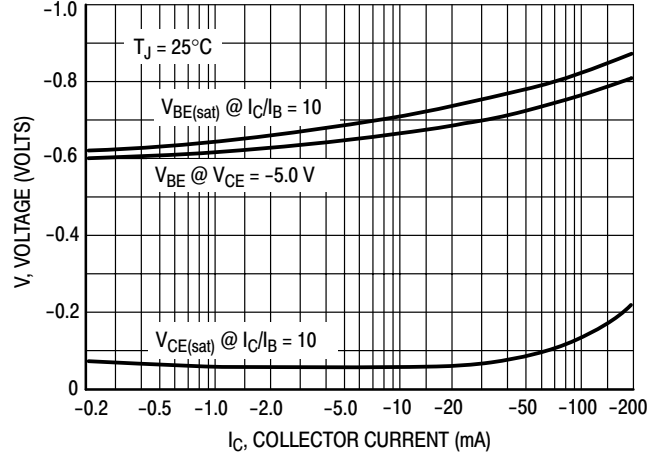


Figure 8. "On" Voltage

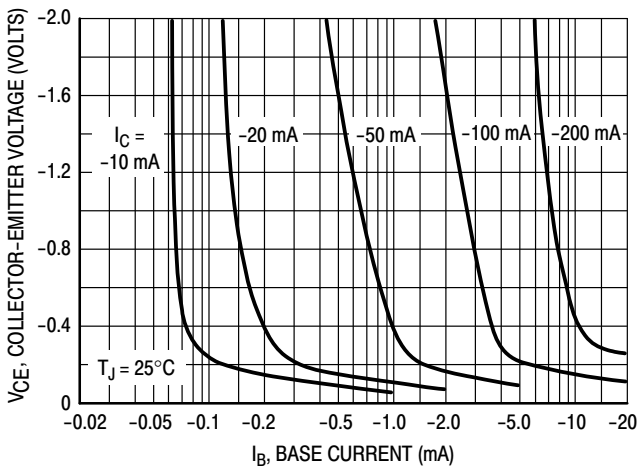


Figure 9. Collector Saturation Region

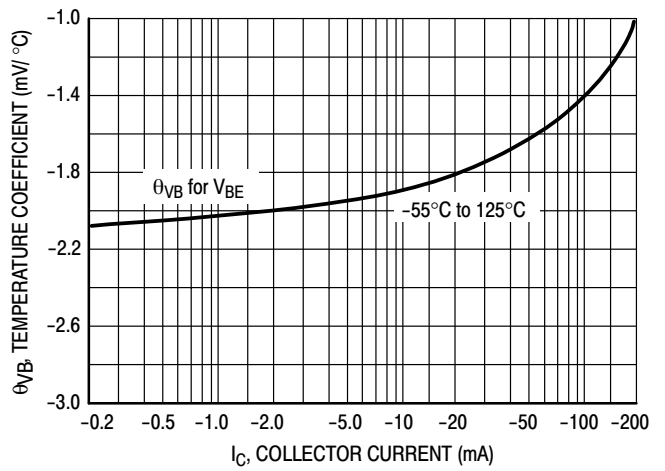


Figure 10. Base-Emitter Temperature Coefficient

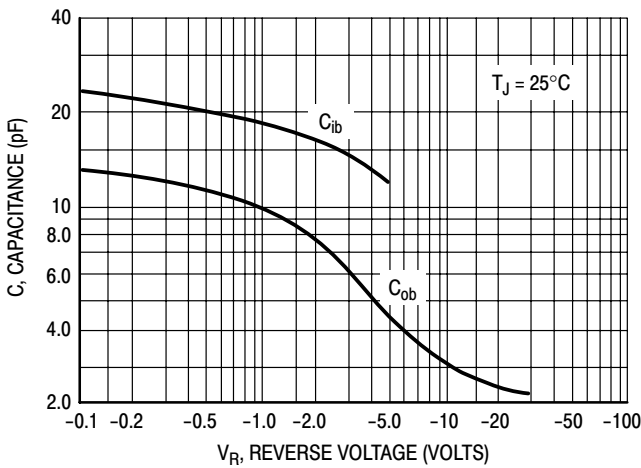


Figure 11. Capacitance

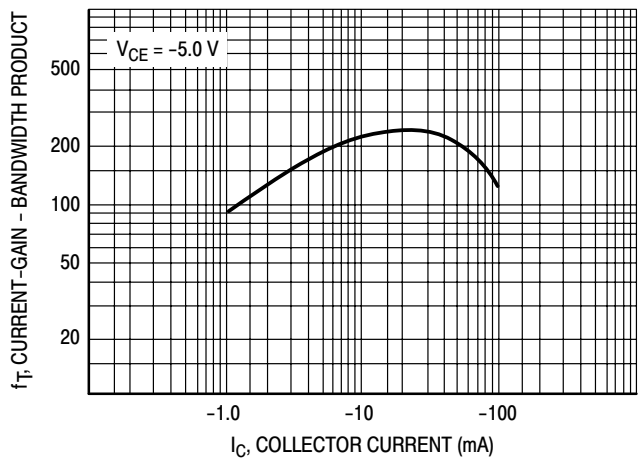


Figure 12. Current-Gain - Bandwidth Product

# BC556B, BC557A, B, C, BC558B, C

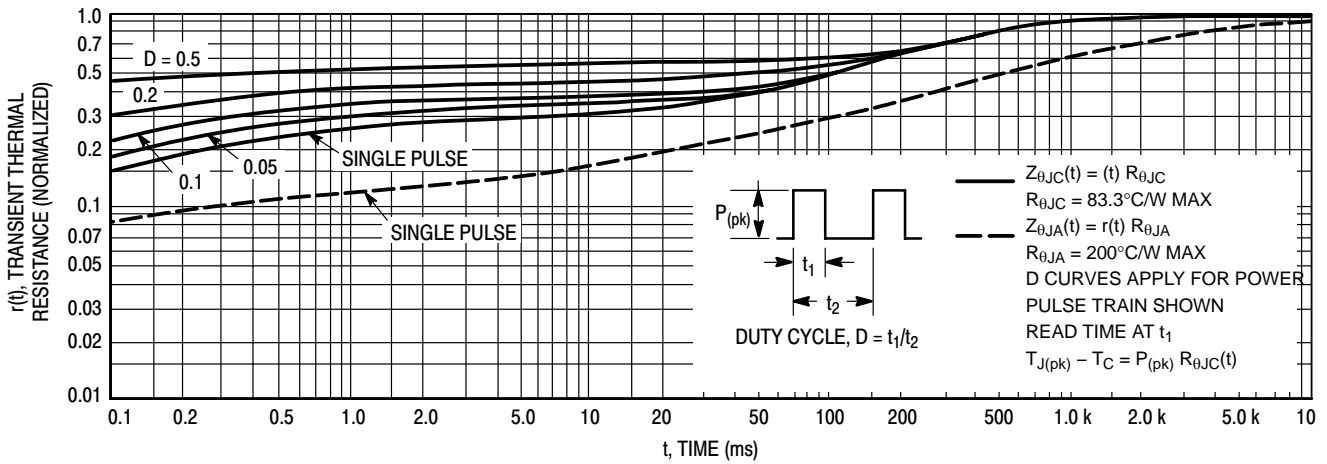


Figure 13. Thermal Response

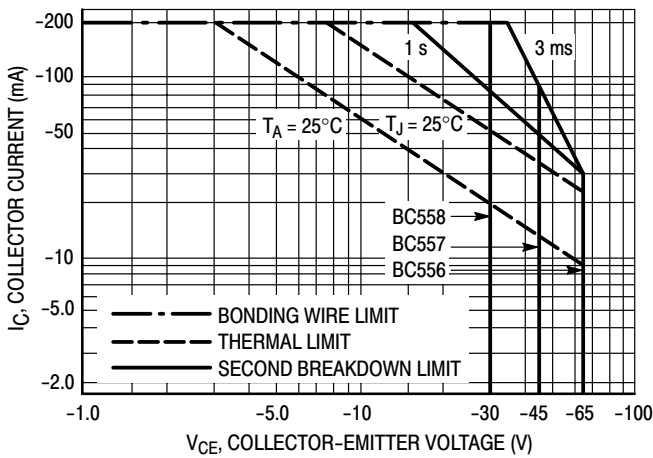


Figure 14. Active Region - Safe Operating Area

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.

## BC556B, BC557A, B, C, BC558B, C

### DEVICE ORDERING INFORMATION

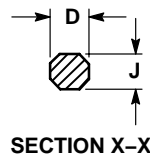
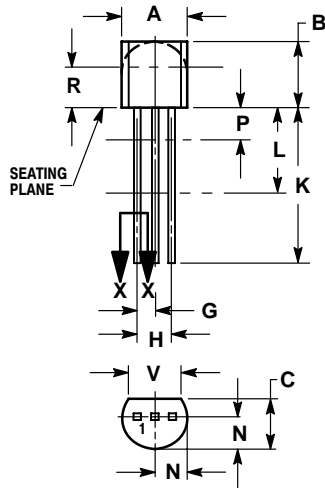
Device	Package	Shipping†
BC556B	TO-92	5000 Units / Bulk
BC556BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC556BZL1	TO-92	2000 / Ammo Box
BC556BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557AZL1	TO-92	2000 / Ammo Box
BC557AZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557B	TO-92	5000 Units / Bulk
BC557BG	TO-92 (Pb-Free)	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
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	---

### STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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