BC556B, BC557A, B, C, BC558B

Amplifier Transistors

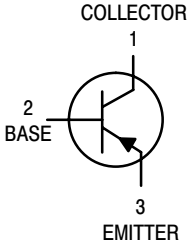
PNP Silicon

ON Semiconductor®

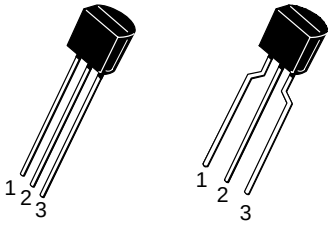
http://onsemi.com

Features

- Pb−Free Packages are Available*



TO−92
CASE 29
STYLE 17



STRAIGHT LEAD
BULK PACK

BENT LEAD
TAPE & REEL
AMMO PACK

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°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

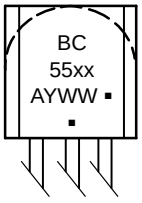
THERMAL CHARACTERISTICS

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



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.

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Breakdown Voltage		$V_{(BR)CEO}$				V
(I_C = −2.0 mAdc, I_B = 0)	BC556		−65	−	−	
	BC557		−45	−	−	
	BC558		−30	−	−	
Collector−Base Breakdown Voltage		$V_{(BR)CBO}$				V
(I_C = −100 μAdc)	BC556		−80	−	−	
	BC557		−50	−	−	
	BC558		−30	−	−	
Emitter−Base Breakdown Voltage		$V_{(BR)EBO}$				V
(I_E = −100 μAdc, I_C = 0)	BC556		−5.0	−	−	
	BC557		−5.0	−	−	
	BC558		−5.0	−	−	
Collector−Emitter Leakage Current		I_{CES}				
(V_{CES} = −40 V)	BC556		−	−2.0	−100	nA
(V_{CES} = −20 V)	BC557		−	−2.0	−100	
	BC558		−	−2.0	−100	
(V_{CES} = −20 V, T_A = 125°C)	BC556		−	−	−4.0	μA
	BC557		−	−	−4.0	
	BC558		−	−	−4.0	
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				−
(I_C = −10 μAdc, V_{CE} = −5.0 V)	A Series Device		−	90	−	
	B Series Devices		−	150	−	
	C Series Devices		−	270	−	
(I_C = −2.0 mAdc, V_{CE} = −5.0 V)	BC557		120	−	800	
	A Series Device		120	170	220	
	B Series Devices		180	290	460	
	C Series Devices		420	500	800	
(I_C = −100 mAdc, V_{CE} = −5.0 V)	A Series Device		−	120	−	
	B Series Devices		−	180	−	
	C Series Devices		−	300	−	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$				V
(I_C = −10 mAdc, I_B = −0.5 mAdc)			−	−0.075	−0.3	
(I_C = −10 mAdc, I_B = see Note 1)			−	−0.3	−0.6	
(I_C = −100 mAdc, I_B = −5.0 mAdc)			−	−0.25	−0.65	
Base−Emitter Saturation Voltage		$V_{BE(sat)}$				V
(I_C = −10 mAdc, I_B = −0.5 mAdc)			−	−0.7	−	
(I_C = −100 mAdc, I_B = −5.0 mAdc)			−	−1.0	−	
Base−Emitter On Voltage		$V_{BE(on)}$				V
(I_C = −2.0 mAdc, V_{CE} = −5.0 Vdc)			−0.55	−0.62	−0.7	
(I_C = −10 mAdc, V_{CE} = −5.0 Vdc)			−	−0.7	−0.82	
SMALL−SIGNAL CHARACTERISTICS						
Current−Gain − Bandwidth Product		f_T				MHz
(I_C = −10 mA, V_{CE} = −5.0 V, f = 100 MHz)	BC556		−	280	−	
	BC557		−	320	−	
	BC558		−	360	−	
Output Capacitance		C_{ob}	−	3.0	6.0	pF
(V_{CB} = −10 V, I_C = 0, f = 1.0 MHz)						
Noise Figure		NF				dB
(I_C = −0.2 mAdc, V_{CE} = −5.0 V,	BC556		−	2.0	10	
R_S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC557		−	2.0	10	
	BC558		−	2.0	10	
Small−Signal Current Gain		h_{fe}				−
(I_C = −2.0 mAdc, V_{CE} = 5.0 V, f = 1.0 kHz)	BC557		125	−	900	
	A Series Device		125	−	260	
	B Series Devices		240	−	500	
	C Series Devices		450	−	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.

BC557/BC558

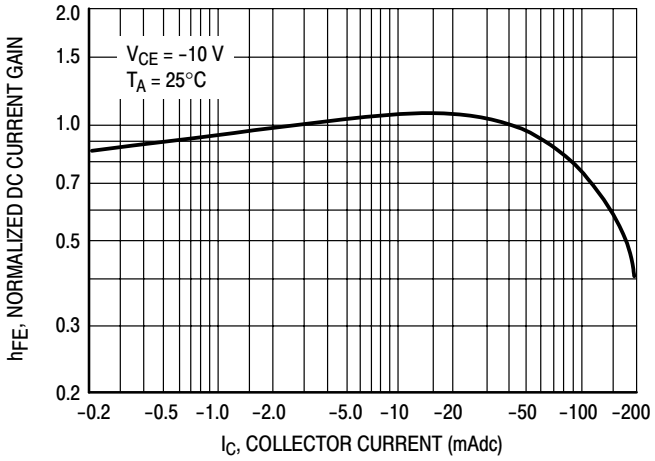


Figure 1. Normalized DC Current Gain

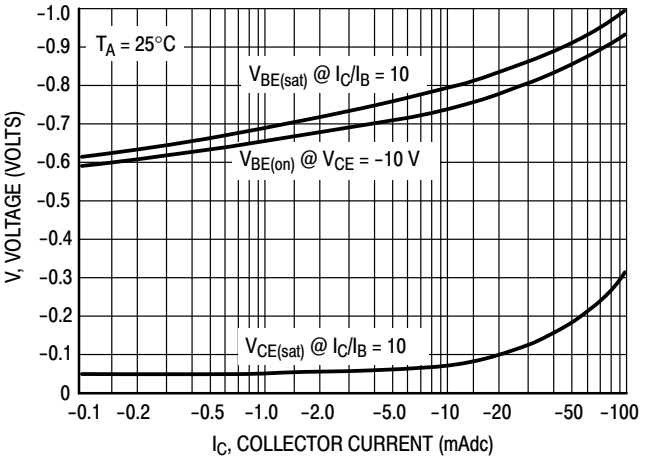


Figure 2. “Saturation” and “On” Voltages

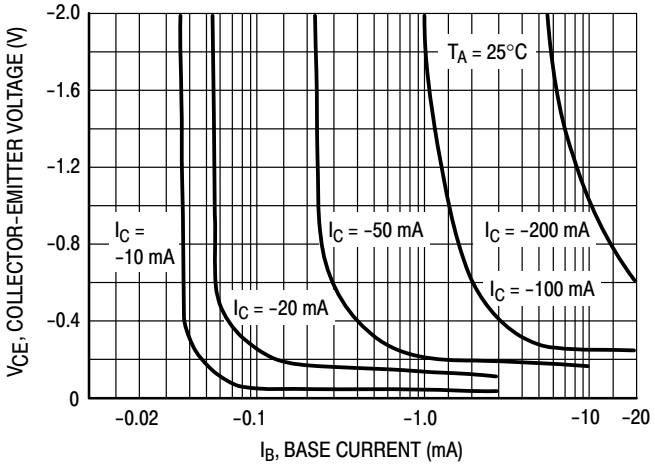


Figure 3. Collector Saturation Region

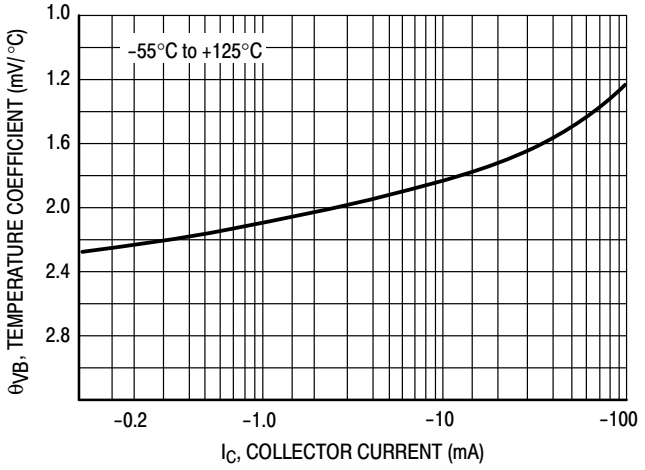


Figure 4. Base−Emitter Temperature Coefficient

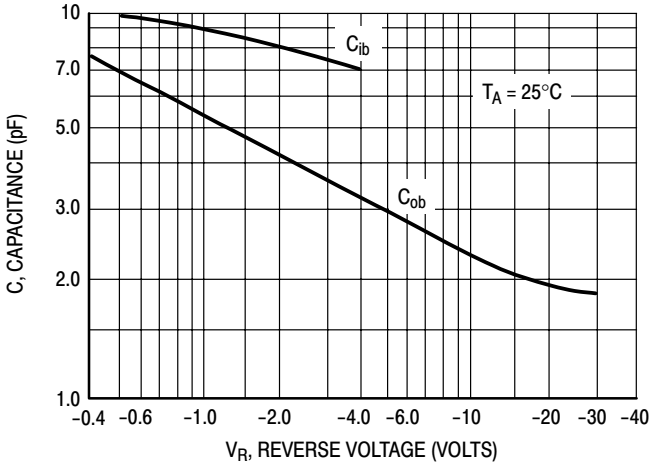


Figure 5. Capacitances

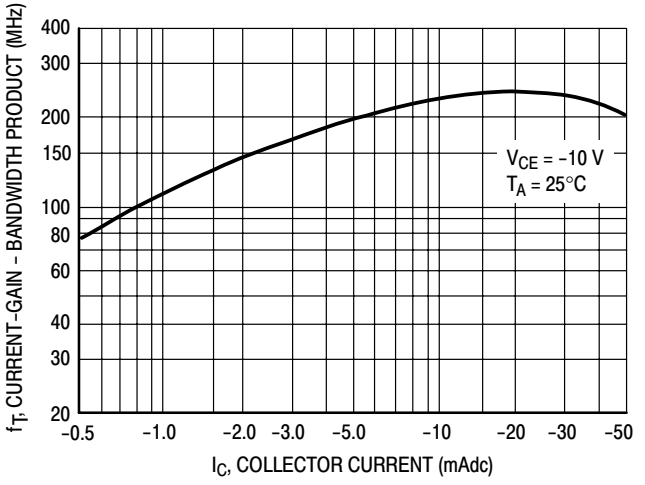


Figure 6. Current−Gain − Bandwidth Product

BC556

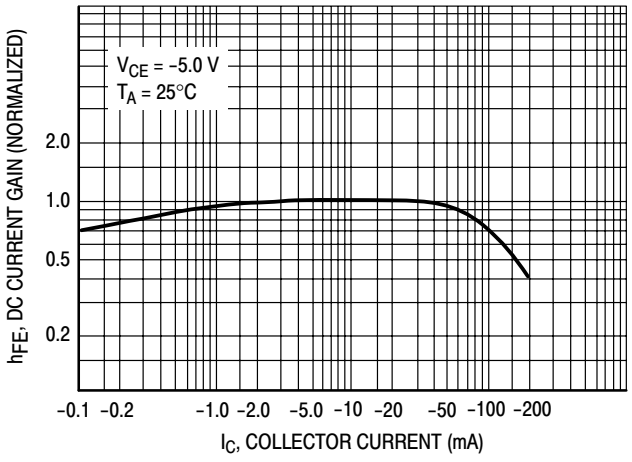


Figure 7. DC Current Gain

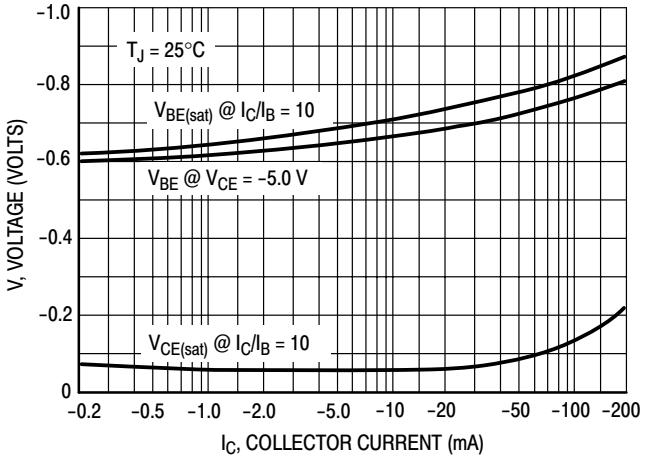


Figure 8. “On” Voltage

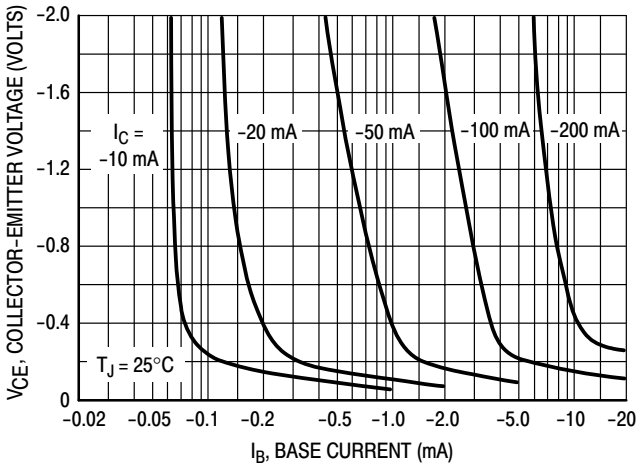


Figure 9. Collector Saturation Region

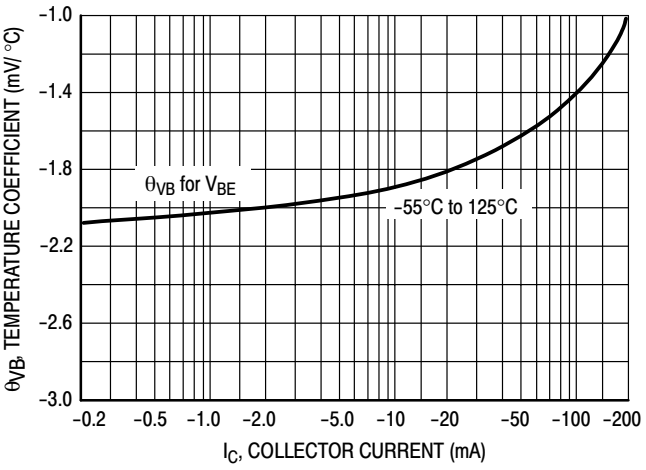


Figure 10. Base−Emitter Temperature Coefficient

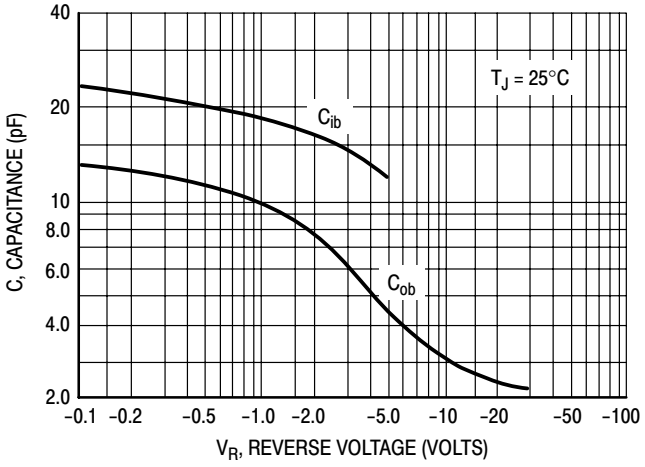


Figure 11. Capacitance

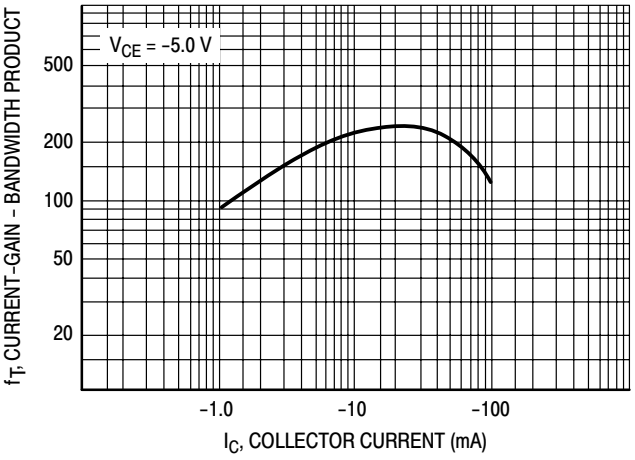


Figure 12. Current−Gain − Bandwidth Product

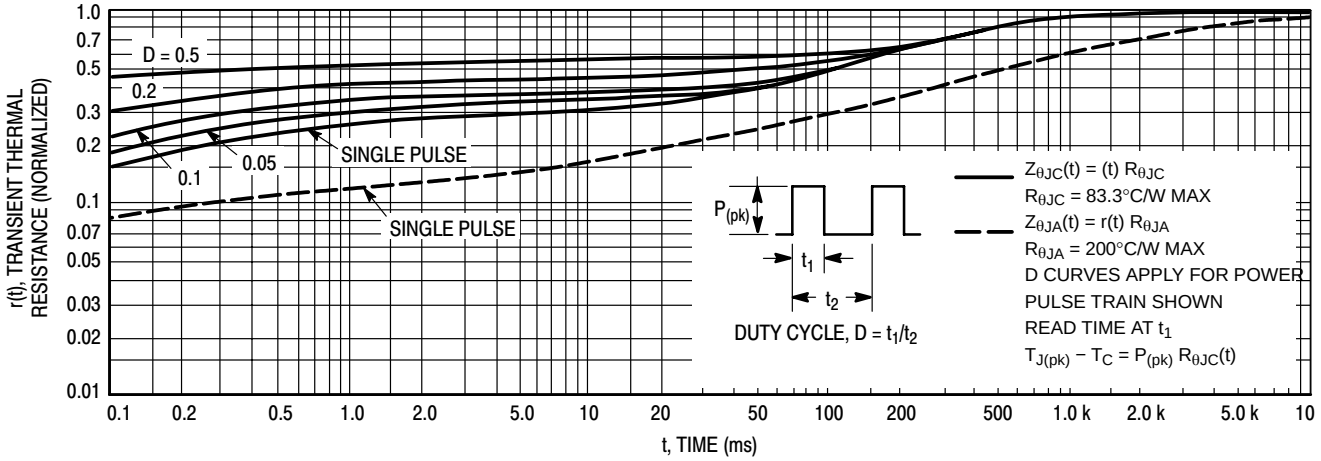


Figure 13. Thermal Response

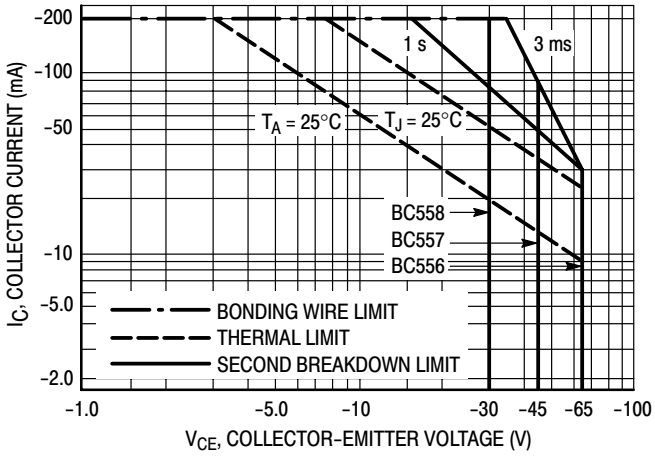


Figure 14. Active Region − Safe Operating Area

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°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°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.

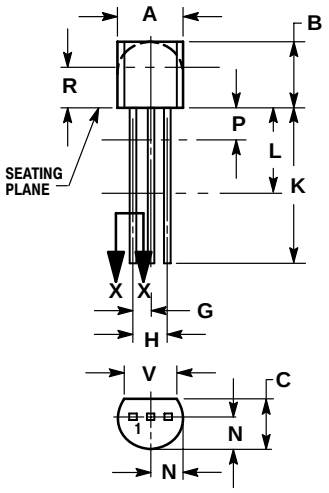
ORDERING INFORMATION

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

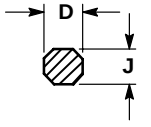
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29−11
ISSUE AM



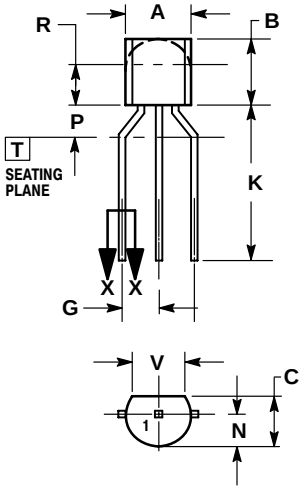
STRAIGHT LEAD
BULK PACK



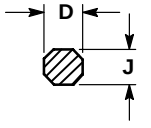
SECTION X−X

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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Mouser Electronics

Authorized Distributor

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ON Semiconductor:

BC556B BC556BZL1 BC556BZL1G BC557AZL1 BC557AZL1G BC557B BC557BRL1 BC557BZL1 BC557C BC557CZL1 BC558BRL BC558BRL1 BC558BRL1G BC558BZL1 BC558BZL1G