

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	$^\circ\text{C}/\text{W}$

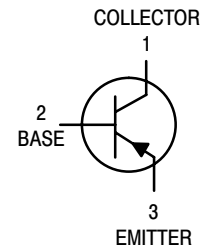
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

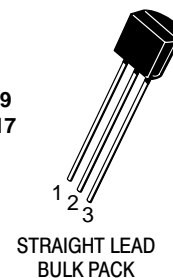


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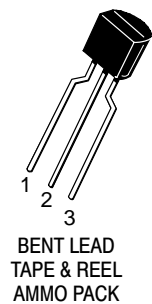
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TO-92
CASE 29
STYLE 17

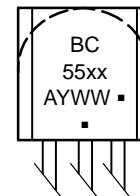


STRAIGHT LEAD
BULK PACK



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.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage ($I_C = -2.0 \text{ mAdc}$, $I_B = 0$)	BC556 BC557 BC558	$V_{(BR)CEO}$	-65 -45 -30	- - -	- - -	V
Collector–Base Breakdown Voltage ($I_C = -100 \mu\text{Adc}$)	BC556 BC557 BC558	$V_{(BR)CBO}$	-80 -50 -30	- - -	- - -	V
Emitter–Base Breakdown Voltage ($I_E = -100 \mu\text{Adc}$, $I_C = 0$)	BC556 BC557 BC558	$V_{(BR)EBO}$	-5.0 -5.0 -5.0	- - -	- - -	V
Collector–Emitter Leakage Current ($V_{CES} = -40 \text{ V}$) ($V_{CES} = -20 \text{ V}$) ($V_{CES} = -20 \text{ V}$, $T_A = 125^\circ\text{C}$)	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 ($I_C = -10 \mu\text{Adc}$, $V_{CE} = -5.0 \text{ V}$) ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$) ($I_C = -100 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$)	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 ($I_C = -10 \text{ mAdc}$, $I_B = -0.5 \text{ mAdc}$) ($I_C = -10 \text{ mAdc}$, $I_B = \text{see Note 1}$) ($I_C = -100 \text{ mAdc}$, $I_B = -5.0 \text{ mAdc}$)		$V_{CE(sat)}$	- - -	-0.075 -0.3 -0.25	-0.3 -0.6 -0.65	V
Base–Emitter Saturation Voltage ($I_C = -10 \text{ mAdc}$, $I_B = -0.5 \text{ mAdc}$) ($I_C = -100 \text{ mAdc}$, $I_B = -5.0 \text{ mAdc}$)		$V_{BE(sat)}$	- -	-0.7 -1.0	- -	V
Base–Emitter On Voltage ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ Vdc}$) ($I_C = -10 \text{ mAdc}$, $V_{CE} = -5.0 \text{ Vdc}$)		$V_{BE(on)}$	-0.55 -	-0.62 -0.7	-0.7 -0.82	V

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product ($I_C = -10 \text{ mA}$, $V_{CE} = -5.0 \text{ V}$, $f = 100 \text{ MHz}$)	BC556 BC557 BC558	f_T	- - -	280 320 360	- - -	MHz
Output Capacitance ($V_{CB} = -10 \text{ V}$, $I_C = 0$, $f = 1.0 \text{ MHz}$)		C_{ob}	-	3.0	6.0	pF
Noise Figure ($I_C = -0.2 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$, $R_S = 2.0 \text{ k}\Omega$, $f = 1.0 \text{ kHz}$, $\Delta f = 200 \text{ Hz}$)	BC556 BC557 BC558	NF	- - -	2.0 2.0 2.0	10 10 10	dB
Small–Signal Current Gain ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ V}$, $f = 1.0 \text{ kHz}$)	BC557 A Series Device B Series Devices C Series Devices	h_{fe}	125 125 240 450	- - - -	900 260 500 900	-

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

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BC557/BC558

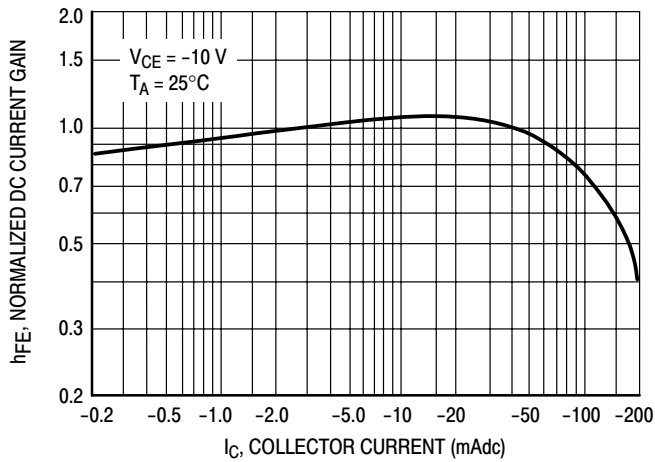


Figure 1. Normalized DC Current Gain

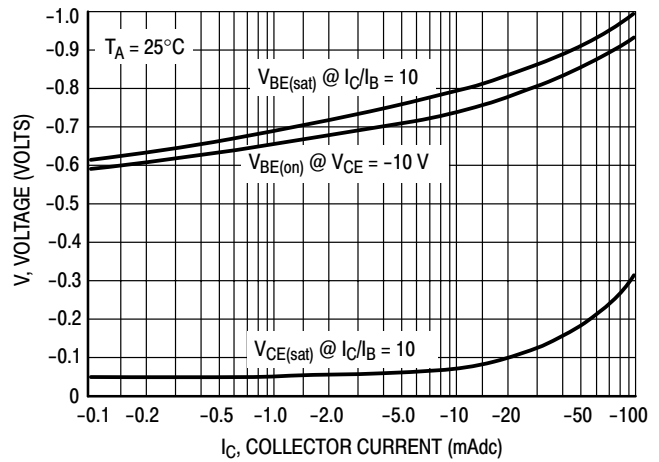


Figure 2. "Saturation" and "On" Voltages

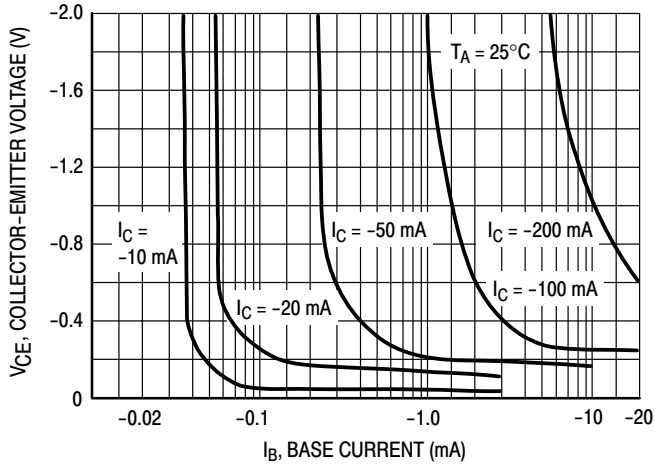


Figure 3. Collector Saturation Region

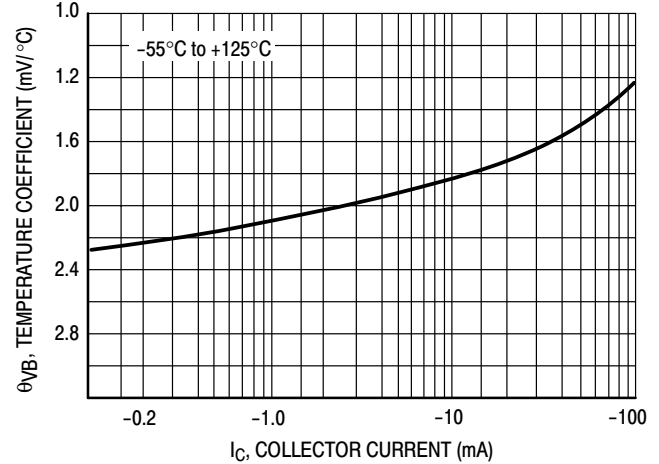


Figure 4. Base-Emitter Temperature Coefficient

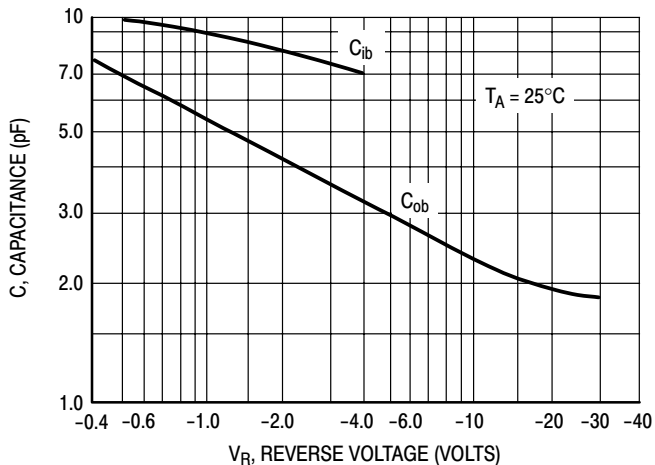


Figure 5. Capacitances

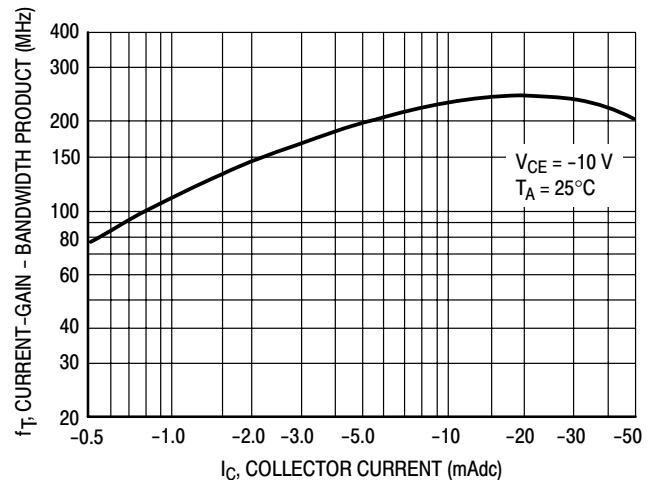


Figure 6. Current-Gain - Bandwidth Product

BC556B, BC557A, B, C, BC558B

BC556

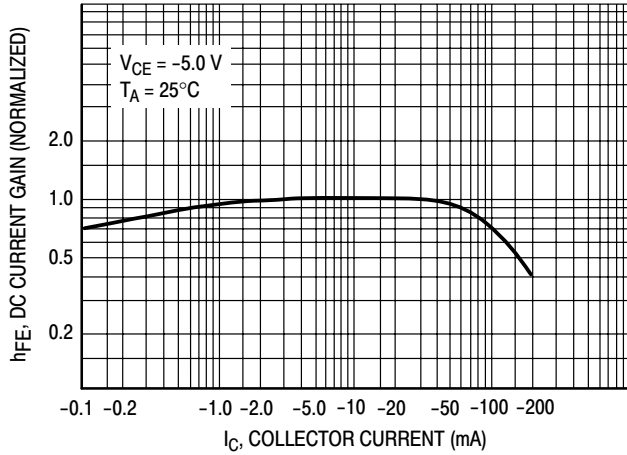


Figure 7. DC Current Gain

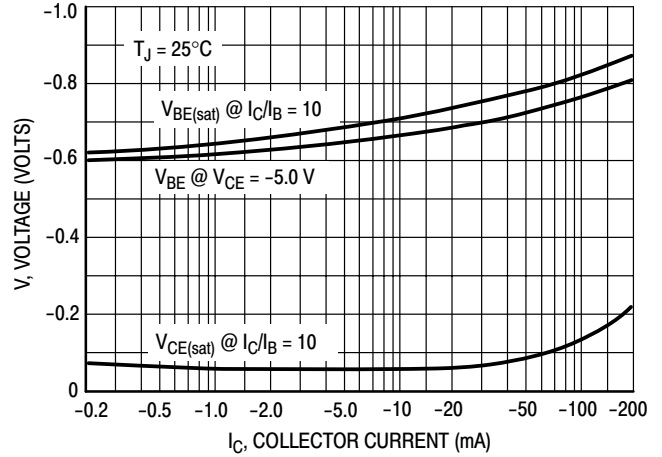


Figure 8. "On" Voltage

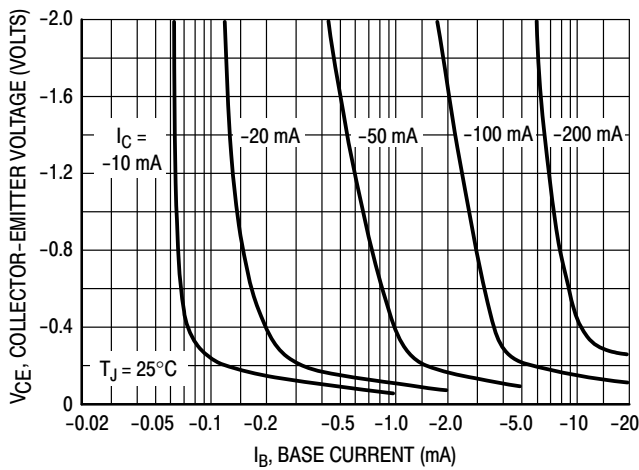


Figure 9. Collector Saturation Region

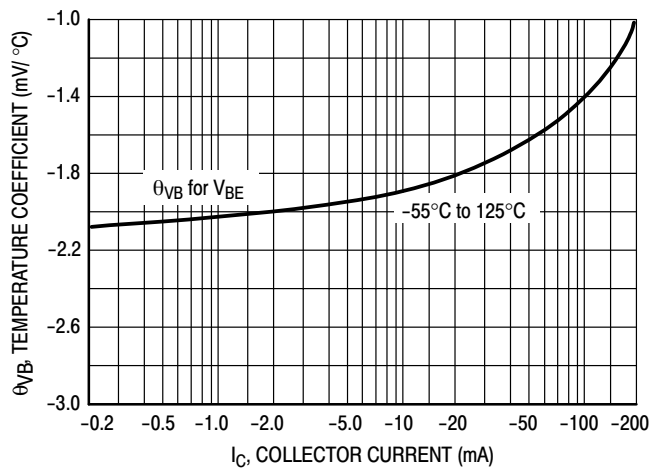


Figure 10. Base-Emitter Temperature Coefficient

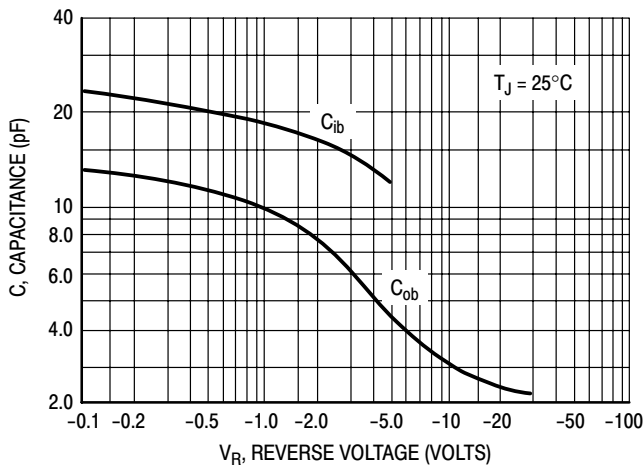


Figure 11. Capacitance

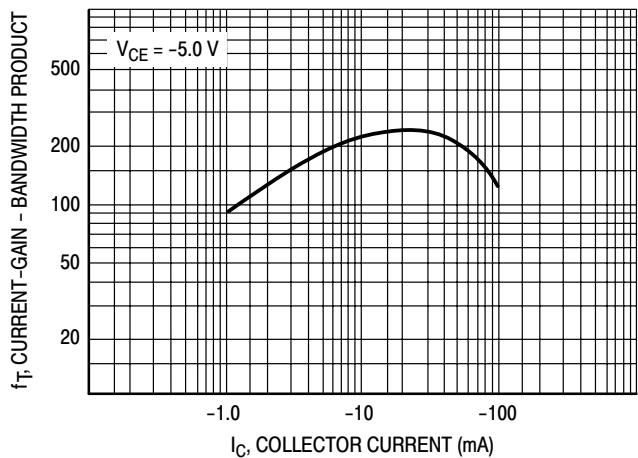


Figure 12. Current-Gain - Bandwidth Product

BC556B, BC557A, B, C, BC558B

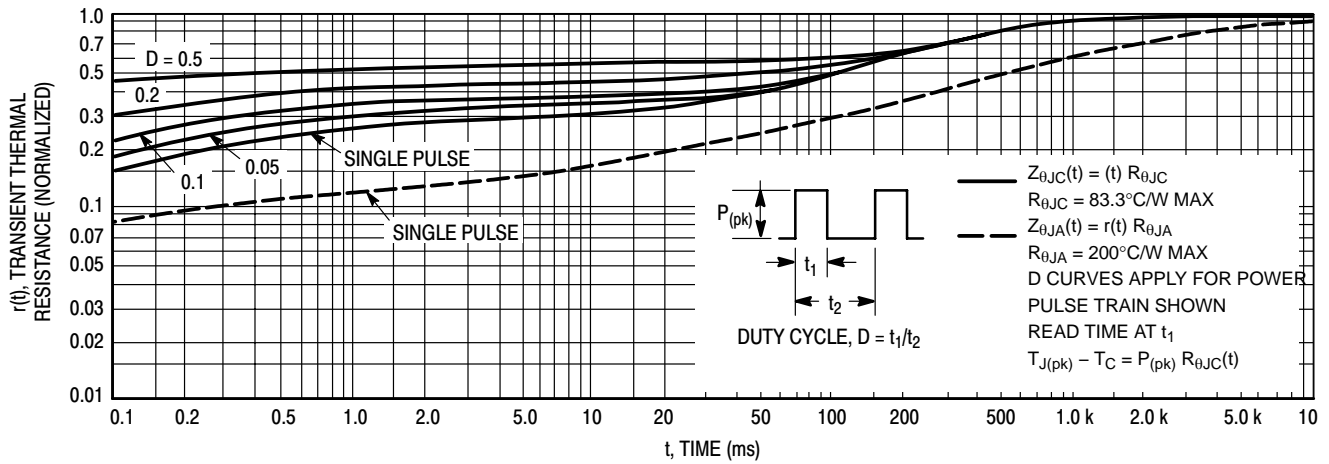


Figure 13. Thermal Response

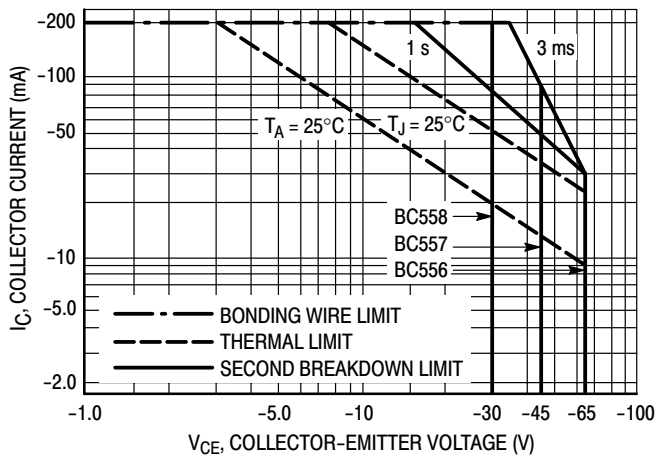


Figure 14. Active Region - Safe Operating Area

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 than 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

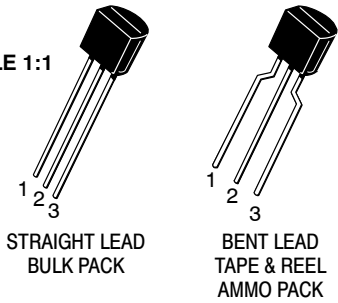
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

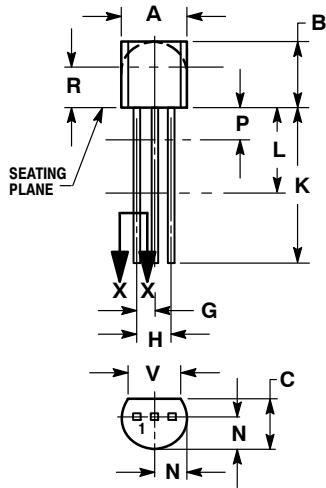


SCALE 1:1

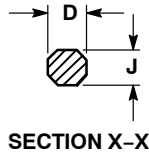


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CASE 29-11
ISSUE AM

DATE 09 MAR 2007



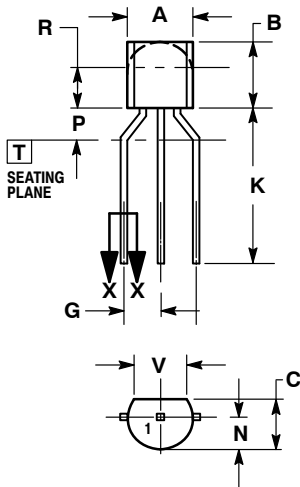
STRAIGHT LEAD
BULK PACK



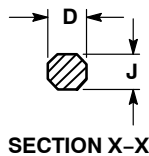
NOTES:

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	---

STYLES ON PAGE 2

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

DATE 09 MAR 2007

- | | | | | |
|--|---|---|--|--|
| <p>STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. COLLECTOR</p> | <p>STYLE 2:
 PIN 1. BASE
 2. EMITTER
 3. COLLECTOR</p> | <p>STYLE 3:
 PIN 1. ANODE
 2. ANODE
 3. CATHODE</p> | <p>STYLE 4:
 PIN 1. CATHODE
 2. CATHODE
 3. ANODE</p> | <p>STYLE 5:
 PIN 1. DRAIN
 2. SOURCE
 3. GATE</p> |
| <p>STYLE 6:
 PIN 1. GATE
 2. SOURCE & SUBSTRATE
 3. DRAIN</p> | <p>STYLE 7:
 PIN 1. SOURCE
 2. DRAIN
 3. GATE</p> | <p>STYLE 8:
 PIN 1. DRAIN
 2. GATE
 3. SOURCE & SUBSTRATE</p> | <p>STYLE 9:
 PIN 1. BASE 1
 2. EMITTER
 3. BASE 2</p> | <p>STYLE 10:
 PIN 1. CATHODE
 2. GATE
 3. ANODE</p> |
| <p>STYLE 11:
 PIN 1. ANODE
 2. CATHODE & ANODE
 3. CATHODE</p> | <p>STYLE 12:
 PIN 1. MAIN TERMINAL 1
 2. GATE
 3. MAIN TERMINAL 2</p> | <p>STYLE 13:
 PIN 1. ANODE 1
 2. GATE
 3. CATHODE 2</p> | <p>STYLE 14:
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 2. COLLECTOR
 3. BASE</p> | <p>STYLE 15:
 PIN 1. ANODE 1
 2. CATHODE
 3. ANODE 2</p> |
| <p>STYLE 16:
 PIN 1. ANODE
 2. GATE
 3. CATHODE</p> | <p>STYLE 17:
 PIN 1. COLLECTOR
 2. BASE
 3. EMITTER</p> | <p>STYLE 18:
 PIN 1. ANODE
 2. CATHODE
 3. NOT CONNECTED</p> | <p>STYLE 19:
 PIN 1. GATE
 2. ANODE
 3. CATHODE</p> | <p>STYLE 20:
 PIN 1. NOT CONNECTED
 2. CATHODE
 3. ANODE</p> |
| <p>STYLE 21:
 PIN 1. COLLECTOR
 2. EMITTER
 3. BASE</p> | <p>STYLE 22:
 PIN 1. SOURCE
 2. GATE
 3. DRAIN</p> | <p>STYLE 23:
 PIN 1. GATE
 2. SOURCE
 3. DRAIN</p> | <p>STYLE 24:
 PIN 1. EMITTER
 2. COLLECTOR/ANODE
 3. CATHODE</p> | <p>STYLE 25:
 PIN 1. MT 1
 2. GATE
 3. MT 2</p> |
| <p>STYLE 26:
 PIN 1. V_{CC}
 2. GROUND 2
 3. OUTPUT</p> | <p>STYLE 27:
 PIN 1. MT
 2. SUBSTRATE
 3. MT</p> | <p>STYLE 28:
 PIN 1. CATHODE
 2. ANODE
 3. GATE</p> | <p>STYLE 29:
 PIN 1. NOT CONNECTED
 2. ANODE
 3. CATHODE</p> | <p>STYLE 30:
 PIN 1. DRAIN
 2. GATE
 3. SOURCE</p> |
| <p>STYLE 31:
 PIN 1. GATE
 2. DRAIN
 3. SOURCE</p> | <p>STYLE 32:
 PIN 1. BASE
 2. COLLECTOR
 3. EMITTER</p> | <p>STYLE 33:
 PIN 1. RETURN
 2. INPUT
 3. OUTPUT</p> | <p>STYLE 34:
 PIN 1. INPUT
 2. GROUND
 3. LOGIC</p> | <p>STYLE 35:
 PIN 1. GATE
 2. COLLECTOR
 3. EMITTER</p> |

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