

# BC556B, BC557, A, B, C, BC558B, C

## Amplifier Transistors

PNP Silicon



ON Semiconductor™

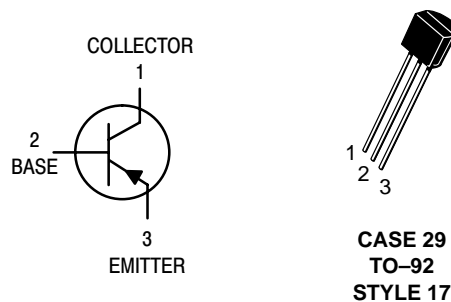
<http://onsemi.com>

### 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	Watts 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	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$



### ORDERING INFORMATION

Device	Package	Shipping
BC556B	TO-92	5000 Units/Box
BC556BRL1	TO-92	2000/Tape & Reel
BC556BZL1	TO-92	2000/Ammo Pack
BC557	TO-92	5000 Units/Box
BC557ZL1	TO-92	2000/Ammo Pack
BC557A	TO-92	5000 Units/Box
BC557AZL1	TO-92	2000/Ammo Pack
BC557B	TO-92	5000 Units/Box
BC557BRL1	TO-92	2000/Tape & Reel
BC557BZL1	TO-92	2000/Ammo Pack
BC557C	TO-92	5000 Units/Box
BC557CZL1	TO-92	2000/Ammo Pack
BC558B	TO-92	5000 Units/Box
BC558BRL	TO-92	2000/Tape & Reel
BC558BRL1	TO-92	2000/Tape & Reel
BC558BZL1	TO-92	2000/Ammo Pack
BC558C	TO-92	5000 Units/Box
BC558CRL1	TO-92	2000/Tape & Reel
BC558ZL1	TO-92	2000/Ammo Pack
BC558CZL1	TO-92	2000/Ammo Pack

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

Characteristic		Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage ( $I_C = -2.0\text{ mA}$ , $I_B = 0$ )	BC556	$V_{(BR)CEO}$	-65	-	-	V
	BC557		-45	-	-	
	BC558		-30	-	-	
Collector–Base Breakdown Voltage ( $I_C = -100\ \mu\text{A}$ )	BC556	$V_{(BR)CBO}$	-80	-	-	V
	BC557		-50	-	-	
	BC558		-30	-	-	
Emitter–Base Breakdown Voltage ( $I_E = -100\ \mu\text{A}$ , $I_C = 0$ )	BC556	$V_{(BR)EBO}$	-5.0	-	-	V
	BC557		-5.0	-	-	
	BC558		-5.0	-	-	
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	$I_{CES}$	-	-2.0	-100	nA
	BC557		-	-2.0	-100	
	BC558		-	-2.0	-100	
	BC556		-	-	-4.0	$\mu\text{A}$
	BC557		-	-	-4.0	
	BC558		-	-	-4.0	

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

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>ON CHARACTERISTICS</b>						
DC Current Gain (I <sub>C</sub> = -10 μAdc, V <sub>CE</sub> = -5.0 V)	h <sub>FE</sub>	A Series Device	-	90	-	-
		B Series Devices	-	150	-	
		C Series Devices	-	270	-	
(I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = -5.0 V)	h <sub>FE</sub>	BC557	120	-	800	-
		A Series Device	120	170	220	
		B Series Devices	180	290	460	
(I <sub>C</sub> = -100 mAdc, V <sub>CE</sub> = -5.0 V)	h <sub>FE</sub>	C Series Devices	420	500	800	-
		A Series Device	-	120	-	
		B Series Devices	-	180	-	
	C Series Devices	-	300	-	-	
Collector-Emitter Saturation Voltage (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = -0.5 mAdc) (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = see Note 1) (I <sub>C</sub> = -100 mAdc, I <sub>B</sub> = -5.0 mAdc)	V <sub>CE(sat)</sub>	-	-0.075	-0.3	V	
		-	-0.3	-0.6		
		-	-0.25	-0.65		
Base-Emitter Saturation Voltage (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = -0.5 mAdc) (I <sub>C</sub> = -100 mAdc, I <sub>B</sub> = -5.0 mAdc)	V <sub>BE(sat)</sub>	-	-0.7	-	V	
		-	-1.0	-		
Base-Emitter On Voltage (I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = -5.0 Vdc) (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -5.0 Vdc)	V <sub>BE(on)</sub>	-0.55	-0.62	-0.7	V	
		-	-0.7	-0.82		

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain – Bandwidth Product (I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -5.0 V, f = 100 MHz)	f <sub>T</sub>	-	280	-	MHz
		-	320	-	
		-	360	-	
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 mAdc, V <sub>CE</sub> = -5.0 V, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	NF	-	2.0	10	dB
		-	2.0	10	
		-	2.0	10	
Small-Signal Current Gain (I <sub>C</sub> = -2.0 mAdc, V <sub>CE</sub> = 5.0 V, f = 1.0 kHz)	h <sub>fe</sub>	125	-	900	-
		125	-	260	
		240	-	500	
		450	-	900	

Note 1: I<sub>C</sub> = -10 mAdc on the constant base current characteristics, which yields the point I<sub>C</sub> = -11 mAdc, V<sub>CE</sub> = -1.0 V.

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## BC557/BC558

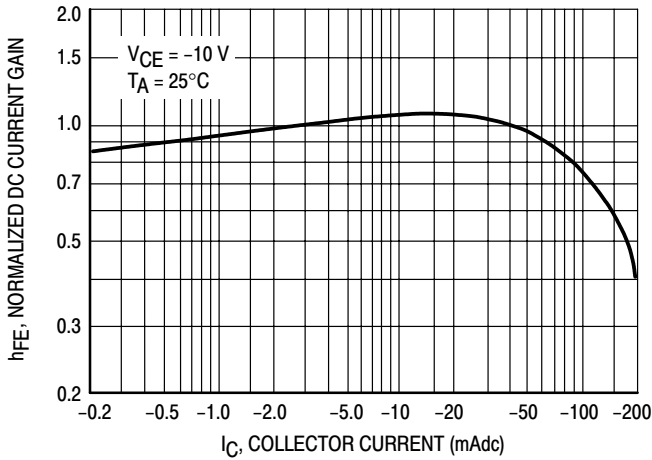


Figure 1. Normalized DC Current Gain

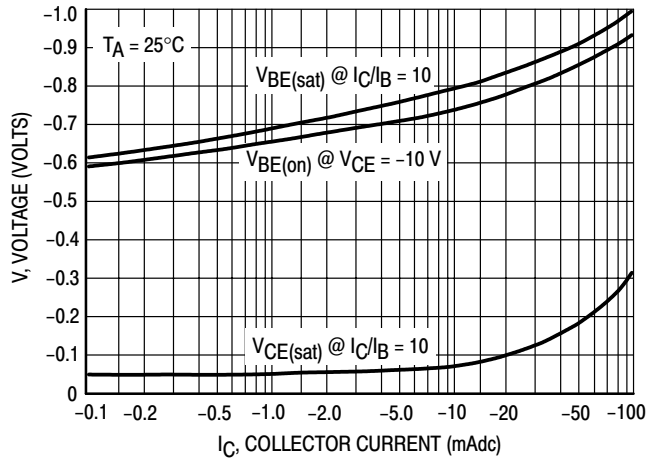


Figure 2. "Saturation" and "On" Voltages

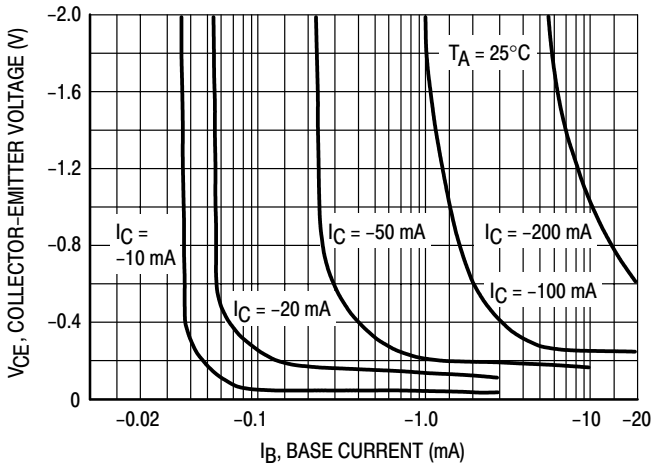


Figure 3. Collector Saturation Region

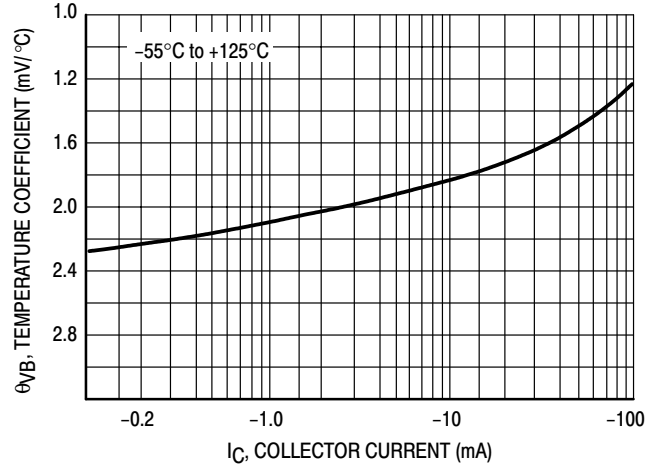


Figure 4. Base-Emitter Temperature Coefficient

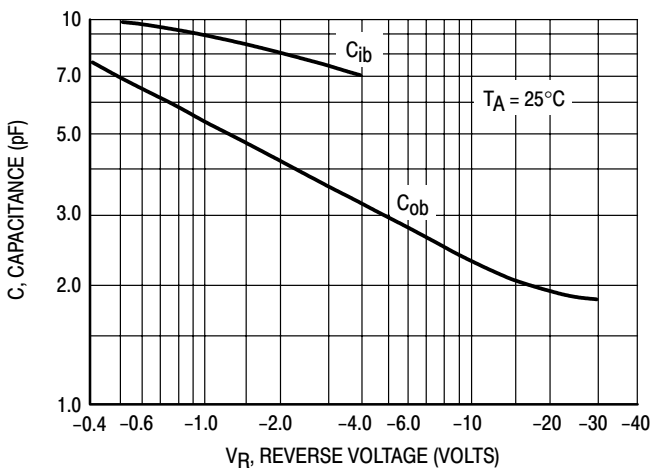


Figure 5. Capacitances

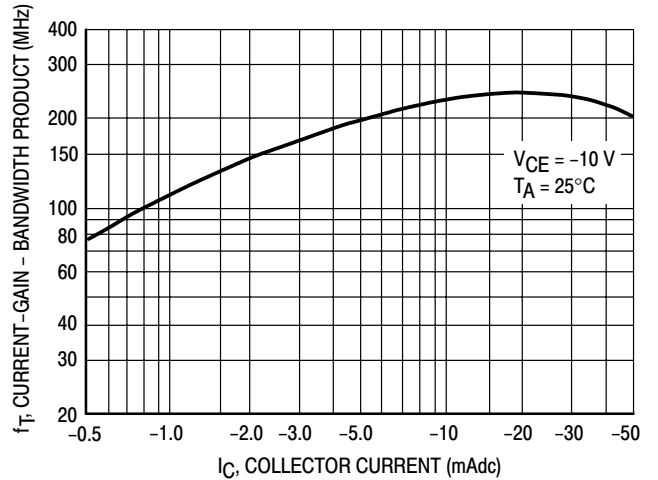


Figure 6. Current-Gain - Bandwidth Product

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## BC556

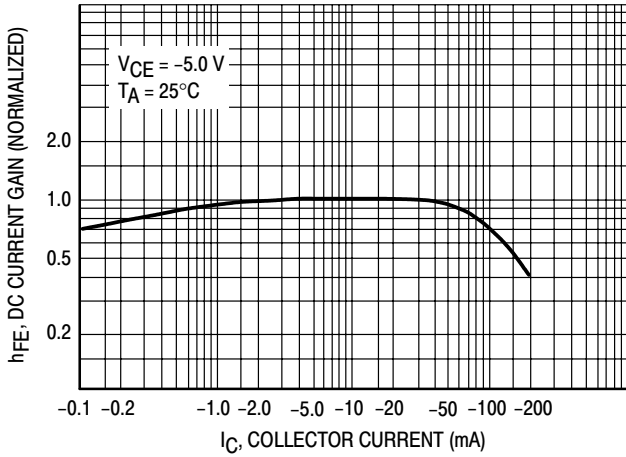


Figure 7. DC Current Gain

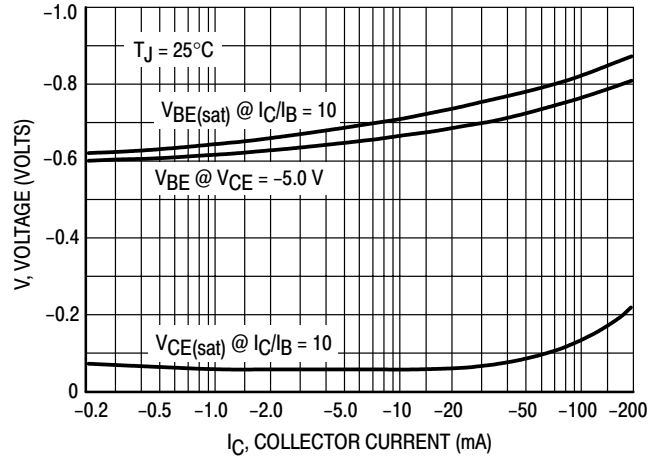


Figure 8. "On" Voltage

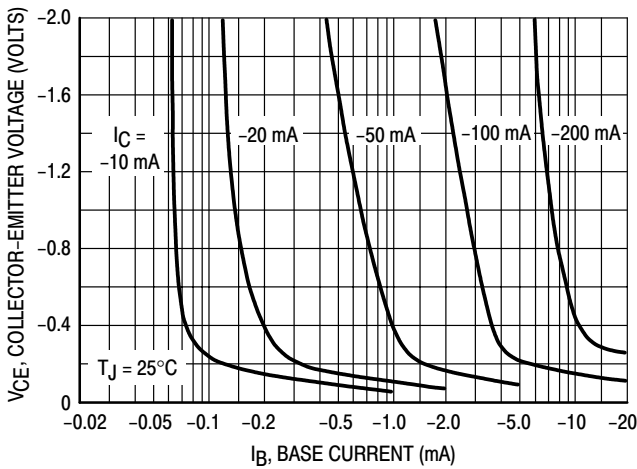


Figure 9. Collector Saturation Region

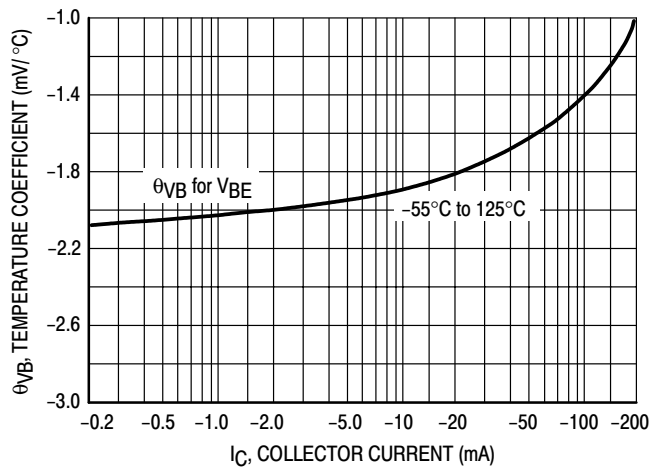


Figure 10. Base-Emitter Temperature Coefficient

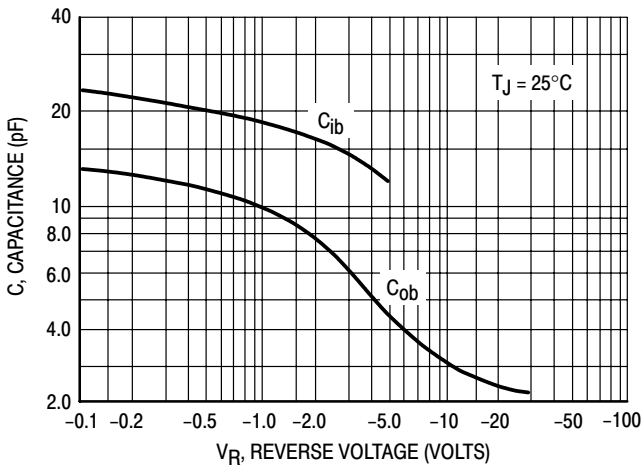


Figure 11. Capacitance

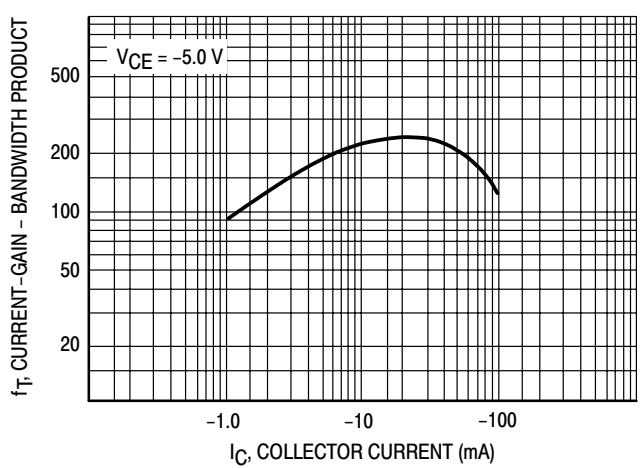


Figure 12. Current-Gain - Bandwidth Product

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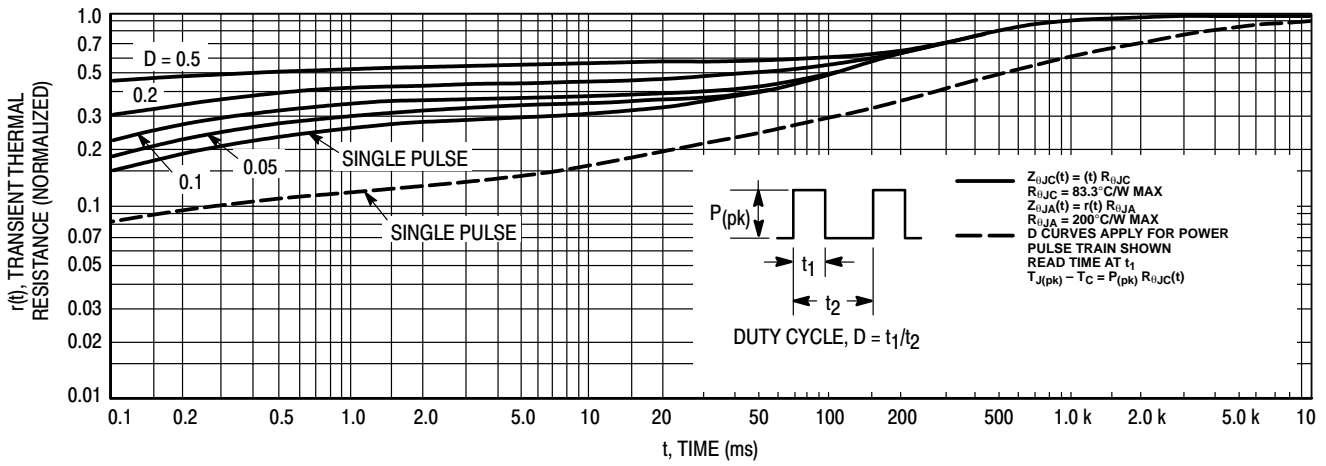


Figure 13. Thermal Response

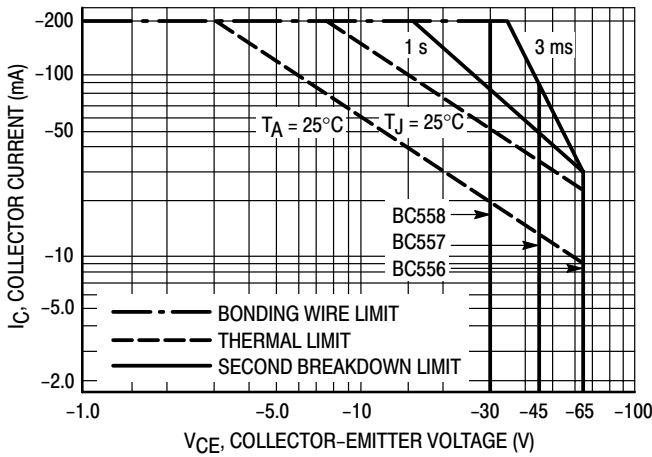


Figure 14. Active Region – Safe Operating Area

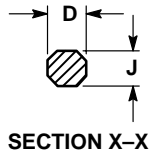
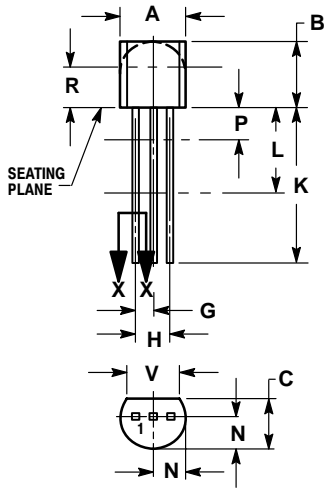
The safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

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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## 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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