

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

Amplifier Transistors

PNP Silicon



ON Semiconductor™

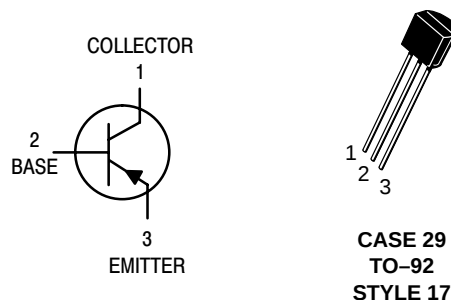
<http://onsemi.com>

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°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	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
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage ($I_C = -2.0\text{ mA}$, $I_B = 0$)	BC556 BC557 BC558	$V_{(BR)CEO}$	-65 -45 -30	– – –	– – –	V
Collector–Base Breakdown Voltage ($I_C = -100\text{ }\mu\text{A}$)	BC556 BC557 BC558	$V_{(BR)CBO}$	-80 -50 -30	– – –	– – –	V
Emitter–Base Breakdown Voltage ($I_E = -100\text{ }\mu\text{A}$, $I_C = 0$)	BC556 BC557 BC558	$V_{(BR)EBO}$	-5.0 -5.0 -5.0	– – –	– – –	V
Collector–Emitter Leakage Current ($V_{CES} = -40\text{ V}$) ($V_{CES} = -20\text{ V}$)	BC556 BC557 BC558	I_{CES}	– – –	-2.0 -2.0 -2.0	-100 -100 -100	nA
($V_{CES} = -20\text{ V}$, $T_A = 125^\circ\text{C}$)	BC556 BC557 BC558		– – –	– – –	-4.0 -4.0 -4.0	μA

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

Characteristic	Symbol	Min	Typ	Max	Unit
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ON CHARACTERISTICS

DC Current Gain ($I_C = -10 \mu\text{Adc}$, $V_{CE} = -5.0 \text{ V}$)	A Series Device B Series Devices C Series Devices	h_{FE}	— — —	90 150 270	— — —	—
($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$)	BC557 A Series Device B Series Devices C Series Devices		120 120 180 420	— 170 290 500	800 220 460 800	
($I_C = -100 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$)	A Series Device B Series Devices C Series Devices		— — —	120 180 300	— — —	
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	–

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

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BC557/BC558

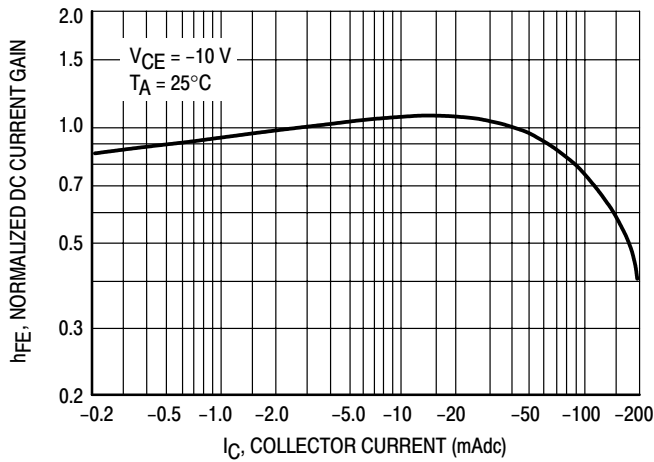


Figure 1. Normalized DC Current Gain

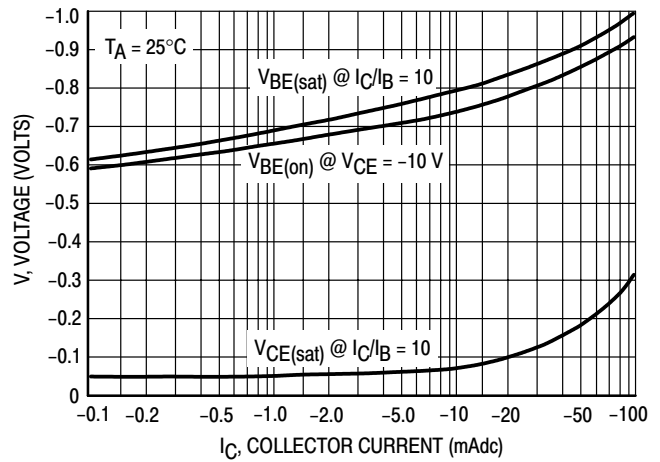


Figure 2. "Saturation" and "On" Voltages

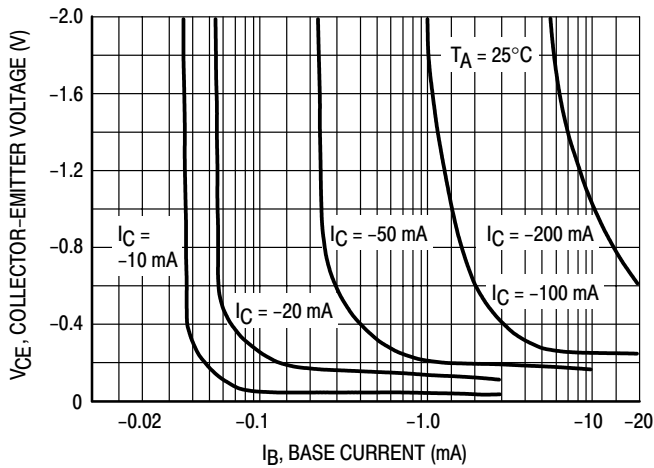


Figure 3. Collector Saturation Region

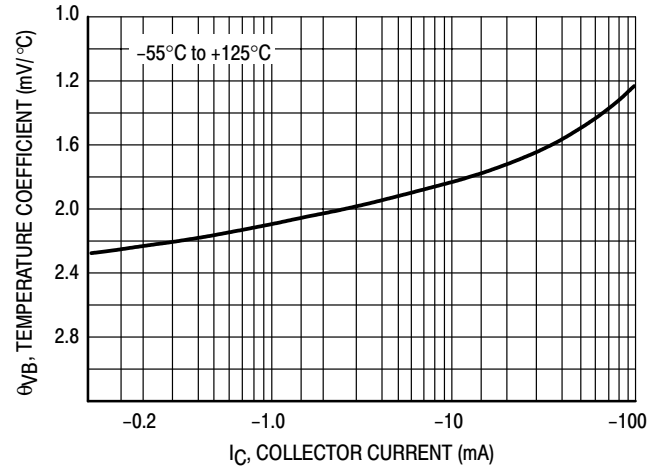


Figure 4. Base-Emitter Temperature Coefficient

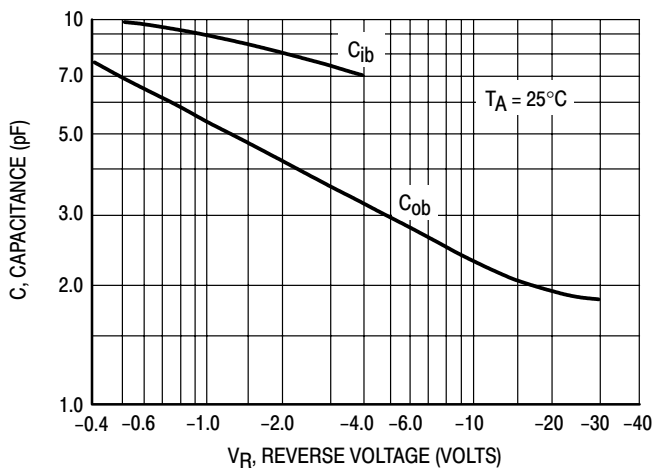


Figure 5. Capacitances

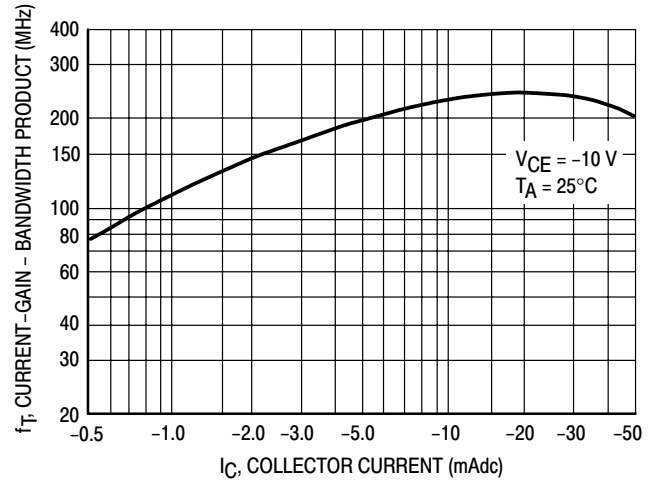


Figure 6. Current-Gain - Bandwidth Product

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BC556

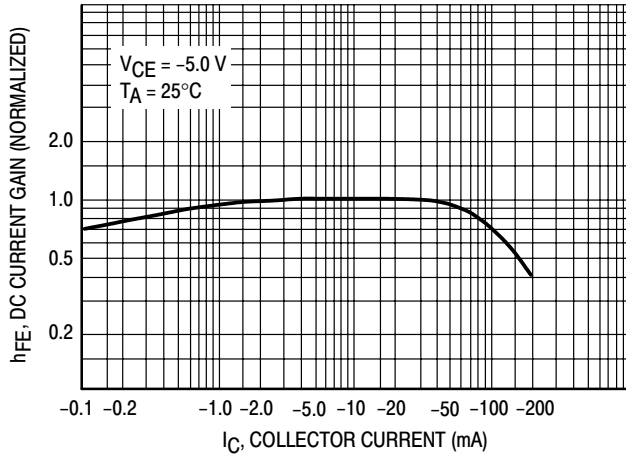


Figure 7. DC Current Gain

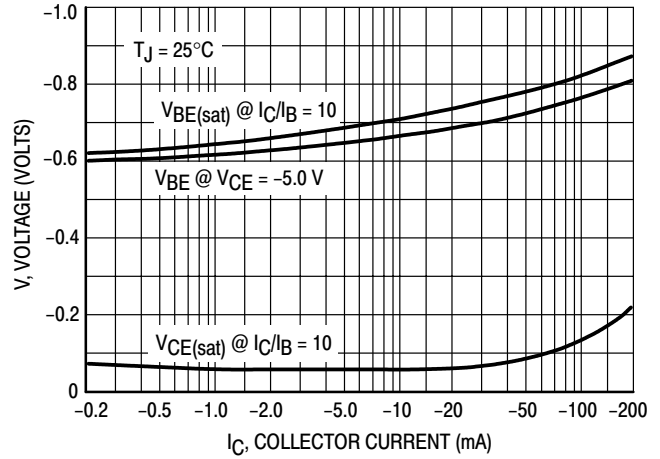


Figure 8. "On" Voltage

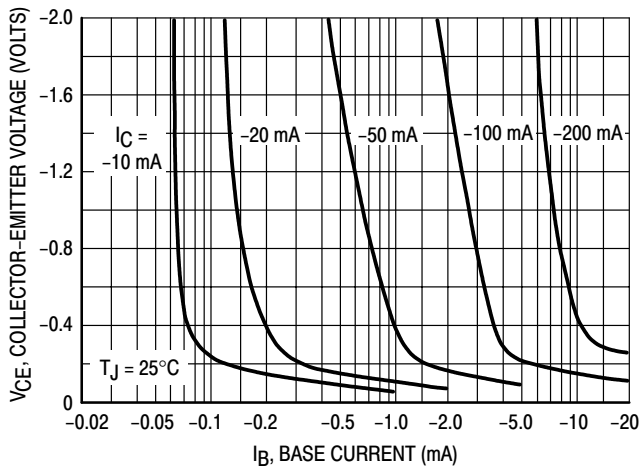


Figure 9. Collector Saturation Region

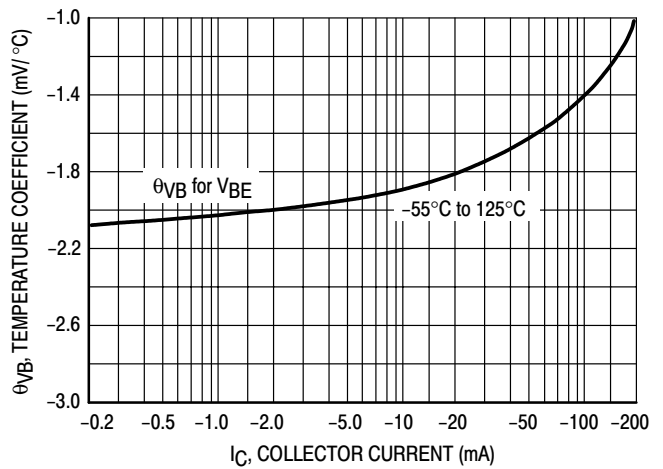


Figure 10. Base-Emitter Temperature Coefficient

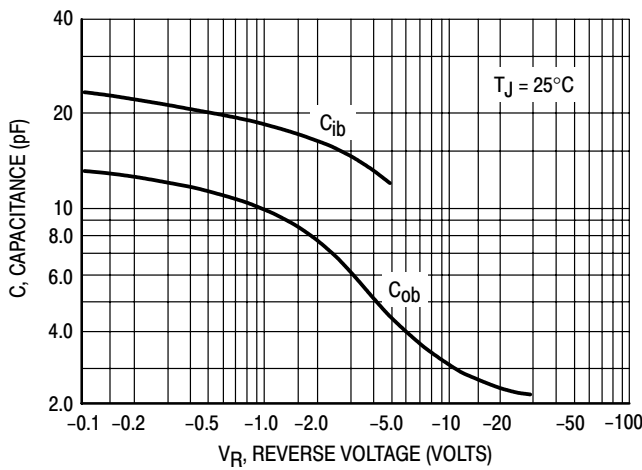


Figure 11. Capacitance

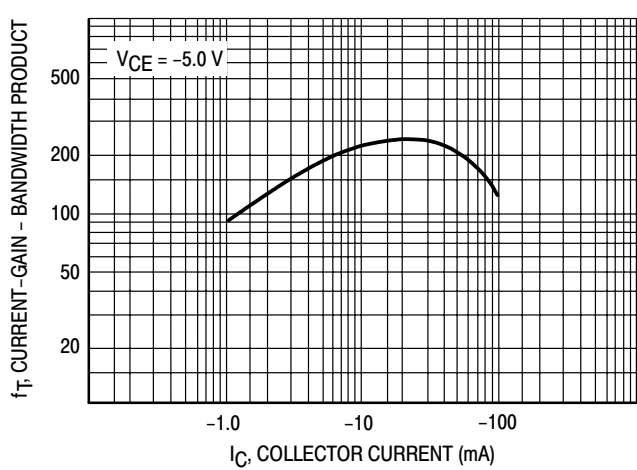


Figure 12. Current-Gain - Bandwidth Product

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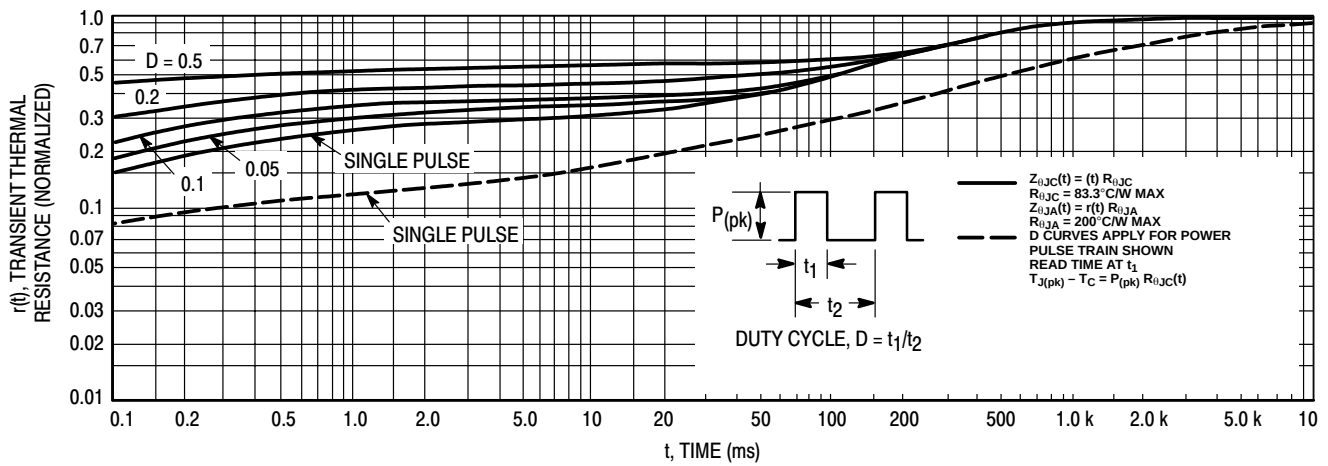


Figure 13. Thermal Response

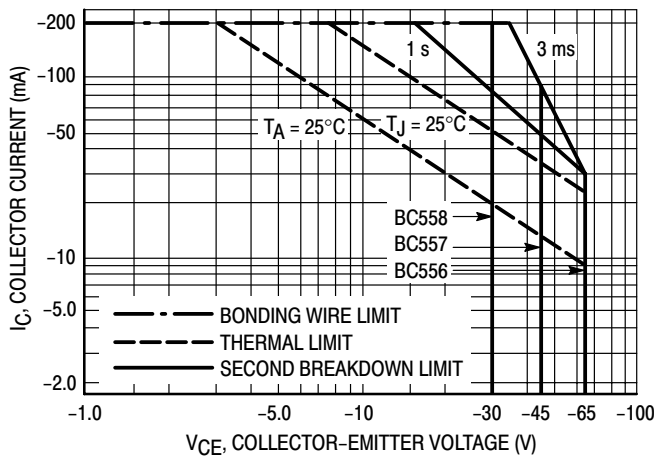


Figure 14. Active Region - Safe Operating Area

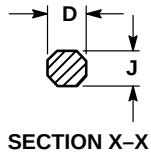
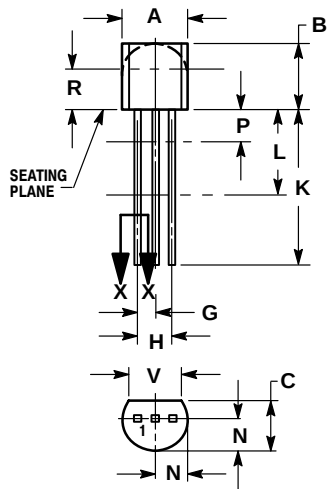
The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

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:

- PIN 1. COLLECTOR
2. BASE
3. EMITTER

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