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°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.

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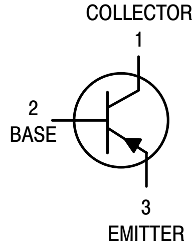
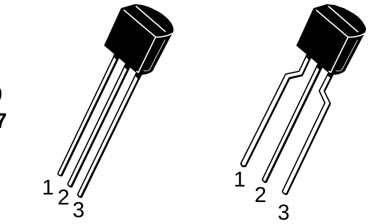


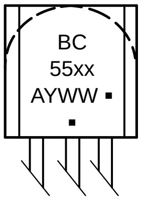
TO−92
CASE 29
STYLE 17



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

March, 2007 − Rev. 3

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 (V_{CB} = −10 V, I_C = 0, f = 1.0 MHz)		C_{ob}	–	3.0	6.0	pF
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

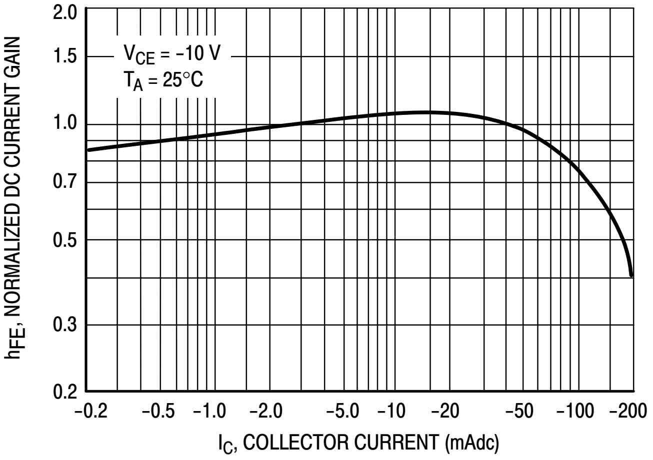


Figure 1. Normalized DC Current Gain

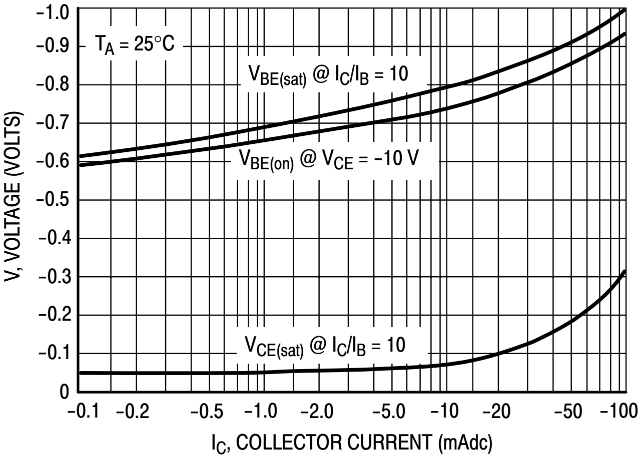


Figure 2. “Saturation” and “On” Voltages

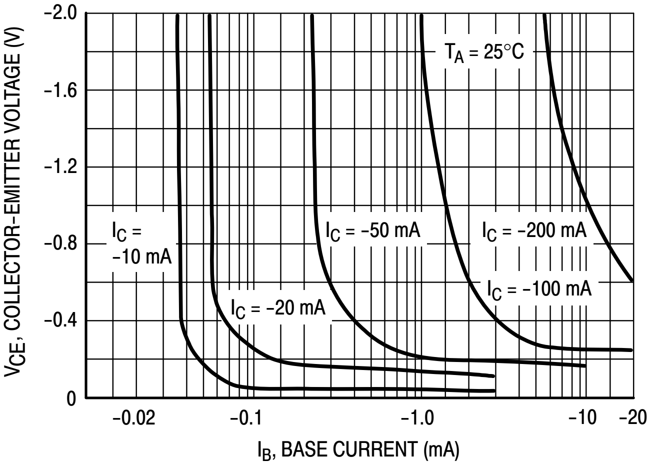


Figure 3. Collector Saturation Region

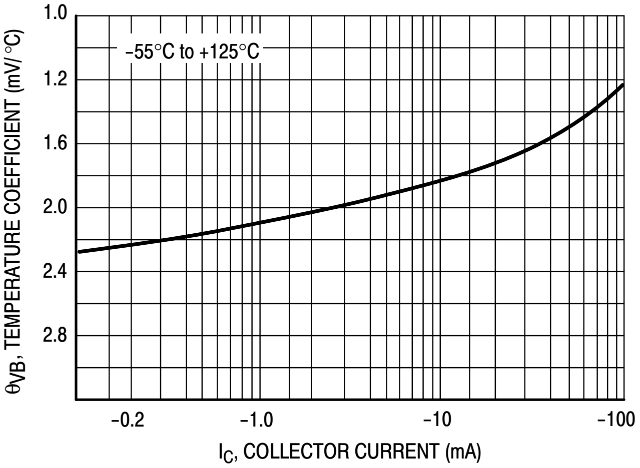


Figure 4. Base−Emitter Temperature Coefficient

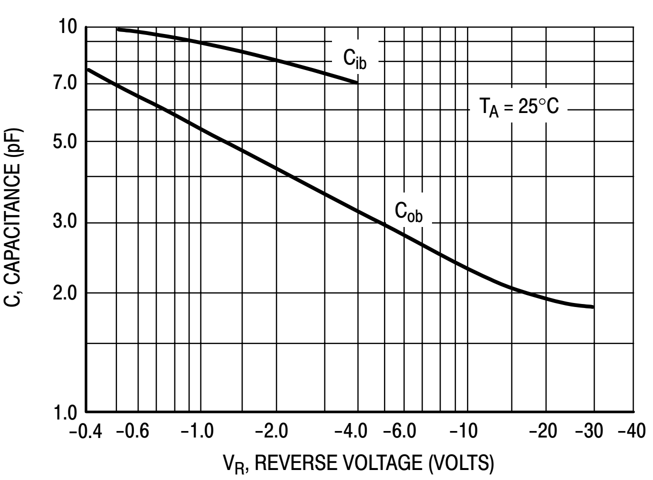


Figure 5. Capacitances

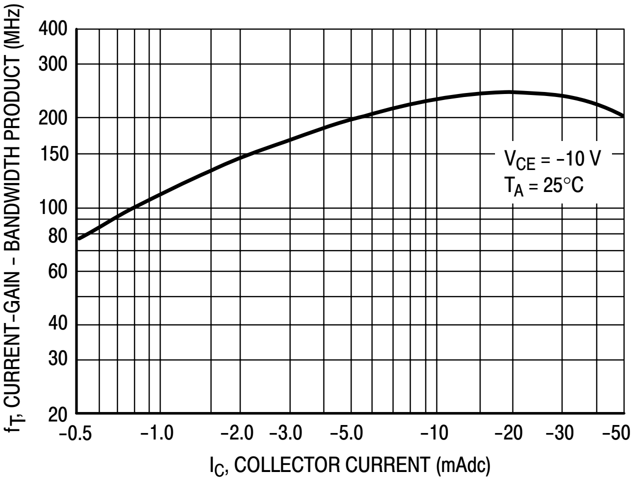


Figure 6. Current−Gain − Bandwidth Product

BC556

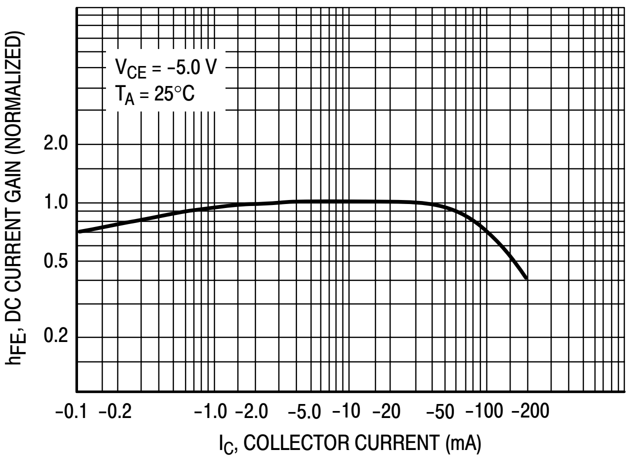


Figure 7. DC Current Gain

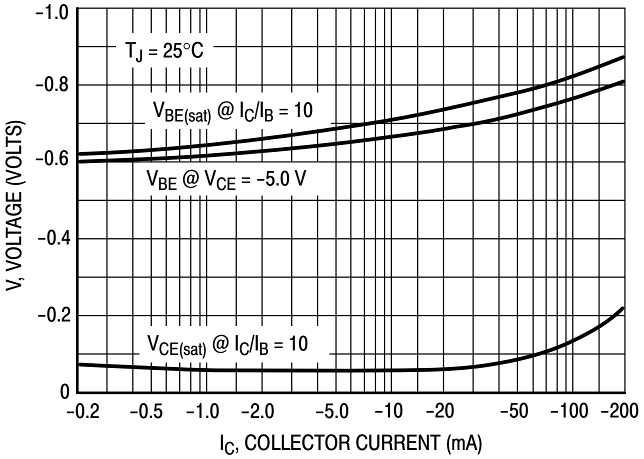


Figure 8. “On” Voltage

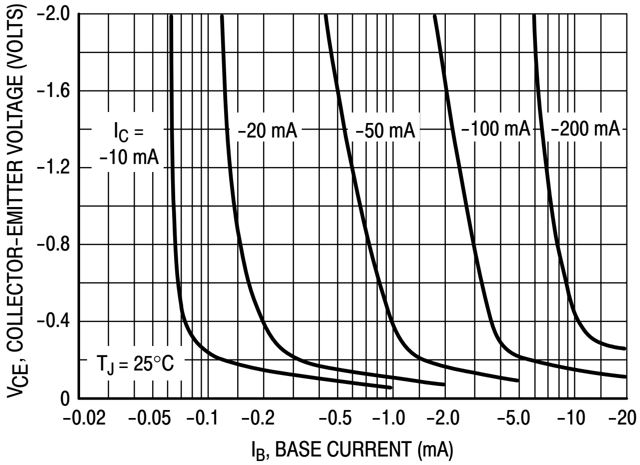


Figure 9. Collector Saturation Region

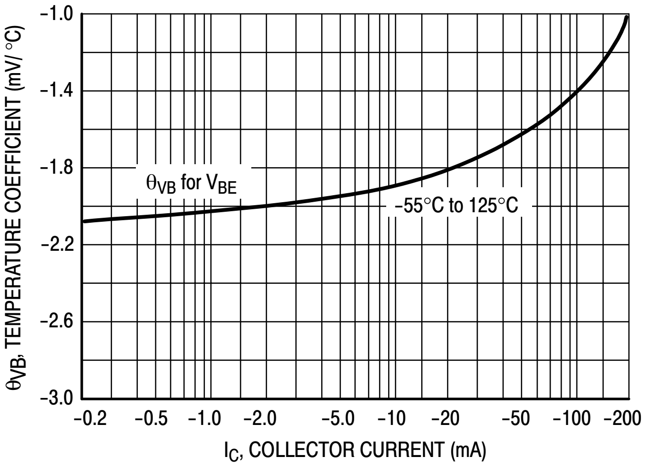


Figure 10. Base−Emitter Temperature Coefficient

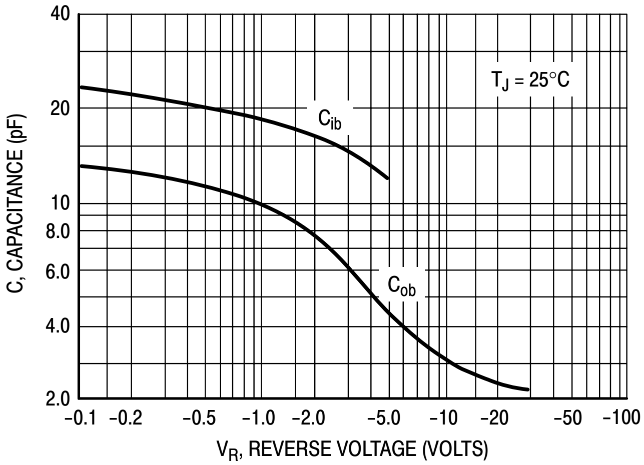


Figure 11. Capacitance

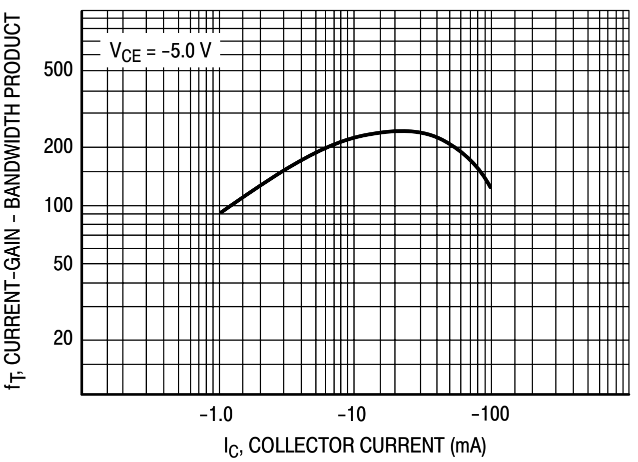


Figure 12. Current−Gain − Bandwidth Product

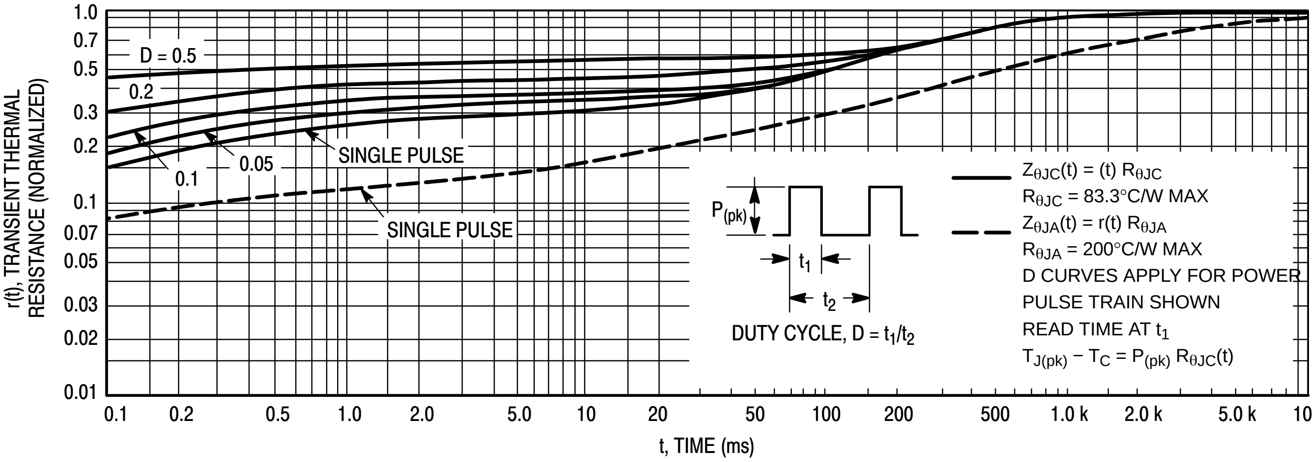


Figure 13. Thermal Response

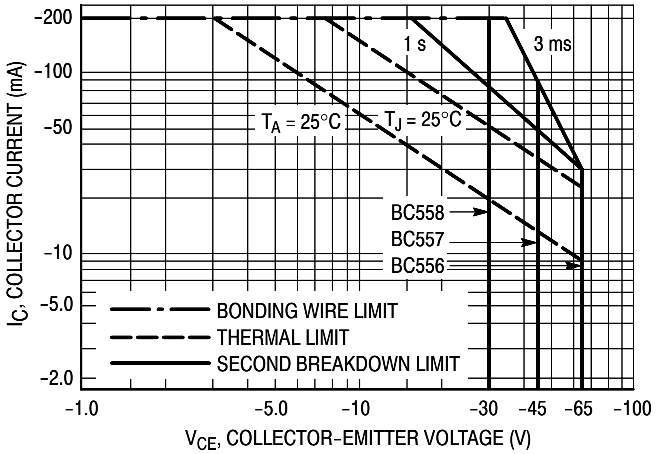


Figure 14. Active Region − Safe Operating Area

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.

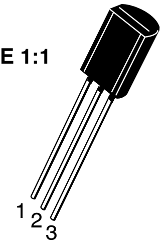
The data of Figure 14 is based upon $T_{J(pk)}$ = 150°C; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power than can be handled to values less than the limitations imposed by second breakdown.

ORDERING INFORMATION

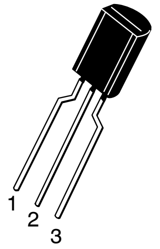
Device	Package	Shipping†
BC556BG	TO−92 (Pb−Free)	5000 Units / Bulk
BC556BZL1G	TO−92 (Pb−Free)	2000 / Ammo Box
BC557AZL1G	TO−92 (Pb−Free)	2000 / Ammo Box
BC557BG	TO−92 (Pb−Free)	5000 Units / Bulk
BC557BRL1	TO−92	2000 / Tape & Reel
BC557BRL1G	TO−92 (Pb−Free)	2000 / Tape & Reel
BC557BZL1G	TO−92 (Pb−Free)	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.

SCALE 1:1



STRAIGHT LEAD



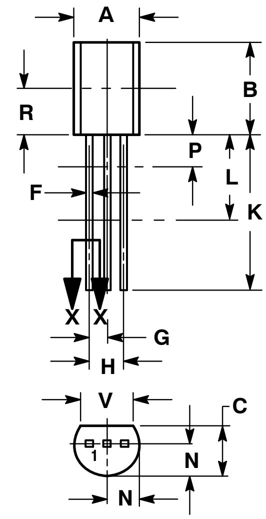
BENT LEAD

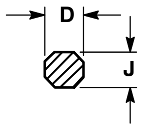
TO−92 (TO−226) 1 WATT

CASE 29−10
ISSUE A

DATE 08 MAY 2012

STRAIGHT LEAD



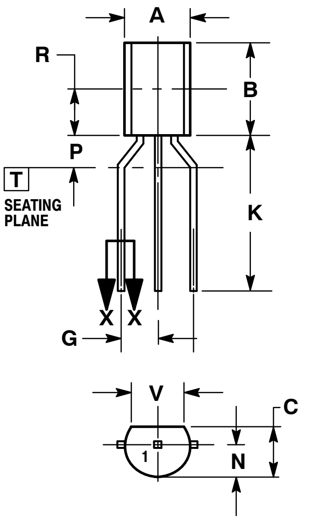


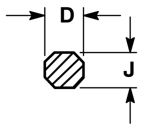
SECTION X−X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.46	0.53
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
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	0.135	---	3.43	---
V	0.135	---	3.43	---

BENT LEAD





SECTION X−X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

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B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.46	0.53
G	0.094	0.102	2.40	2.80
J	0.018	0.024	0.46	0.61
K	0.500	---	12.70	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.135	---	3.43	---
V	0.135	---	3.43	---

STYLES ON PAGE 2

DOCUMENT NUMBER:	**98AON52857E**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−92 (TO−226) 1 WATT**	**PAGE 1 OF 2**

TO−92 (TO−226) 1 WATT
CASE 29−10
ISSUE A

DATE 08 MAY 2012

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 3:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 6:
PIN 1. GATE
2. SOURCE & SUBSTRATE
3. DRAIN

STYLE 7:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 8:
PIN 1. DRAIN
2. GATE
3. SOURCE & SUBSTRATE

STYLE 9:
PIN 1. BASE 1
2. EMITTER
3. BASE 2

STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 11:
PIN 1. ANODE
2. CATHODE & ANODE
3. CATHODE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. GATE
3. MAIN TERMINAL 2

STYLE 13:
PIN 1. ANODE 1
2. GATE
3. CATHODE 2

STYLE 14:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 15:
PIN 1. ANODE 1
2. CATHODE
3. ANODE 2

STYLE 16:
PIN 1. ANODE
2. GATE
3. CATHODE

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

STYLE 18:
PIN 1. ANODE
2. CATHODE
3. NOT CONNECTED

STYLE 19:
PIN 1. GATE
2. ANODE
3. CATHODE

STYLE 20:
PIN 1. NOT CONNECTED
2. CATHODE
3. ANODE

STYLE 21:
PIN 1. COLLECTOR
2. EMITTER
3. BASE

STYLE 22:
PIN 1. SOURCE
2. GATE
3. DRAIN

STYLE 23:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 24:
PIN 1. EMITTER
2. COLLECTOR/ANODE
3. CATHODE

STYLE 25:
PIN 1. MT 1
2. GATE
3. MT 2

STYLE 26:
PIN 1. V_{CC}
2. GROUND 2
3. OUTPUT

STYLE 27:
PIN 1. MT
2. SUBSTRATE
3. MT

STYLE 28:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 29:
PIN 1. NOT CONNECTED
2. ANODE
3. CATHODE

STYLE 30:
PIN 1. DRAIN
2. GATE
3. SOURCE

STYLE 31:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 32:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

STYLE 33:
PIN 1. RETURN
2. INPUT
3. OUTPUT

STYLE 34:
PIN 1. INPUT
2. GROUND
3. LOGIC

STYLE 35:
PIN 1. GATE
2. COLLECTOR
3. EMITTER

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DESCRIPTION:	**TO−92 (TO−226) 1 WATT**	**PAGE 2 OF 2**

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