

BC548BZL1G Datasheet

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DiGi Electronics Part Number	BC548BZL1G-DG
Manufacturer	onsemi
Manufacturer Product Number	BC548BZL1G
Description	TRANS NPN 30V 0.1A TO92
Detailed Description	Bipolar (BJT) Transistor NPN 30 V 100 mA 300MHz 6 25 mW Through Hole TO-92 (TO-226)



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Purchase and inquiry

Manufacturer Product Number:

BC548BZL1G

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

30 V

Current - Collector Cutoff (Max):

15nA

Power - Max:

625 mW

Operating Temperature:

-55°C ~ 150°C (TJ)

Package / Case:

TO-226-3, TO-92-3 Long Body (Formed Leads)

Base Product Number:

BC548

Manufacturer:

onsemi

Product Status:

Obsolete

Current - Collector (Ic) (Max):

100 mA

Vce Saturation (Max) @ Ib, Ic:

600mV @ 5mA, 100mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

200 @ 2mA, 5V

Frequency - Transition:

300MHz

Mounting Type:

Through Hole

Supplier Device Package:

TO-92 (TO-226)

Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

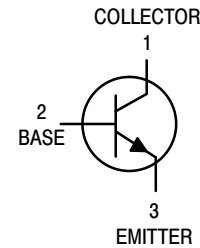
Amplifier Transistors

NPN Silicon

BC546B, BC547A, B, C, BC548B, C

Features

- Pb-Free Packages are Available*



MAXIMUM RATINGS

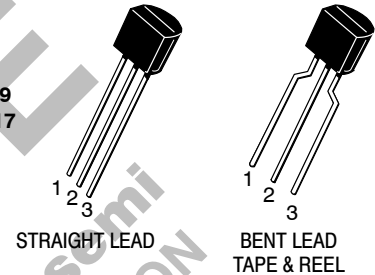
Rating	Symbol	Value	Unit
Collector - Emitter Voltage	V_{CEO}		Vdc
	BC546	65	
	BC547	45	
	BC548	30	
Collector - Base Voltage	V_{CBO}		Vdc
	BC546	80	
	BC547	50	
	BC548	30	
Emitter - Base Voltage	V_{EBO}	6.0	Vdc
Collector Current - Continuous	I_C	100	mA _{dc}
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ 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

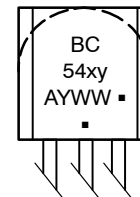
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

TO-92
CASE 29
STYLE 17



MARKING DIAGRAM



- x = 6, 7, or 8
- y = A, B or C
- 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 5 of this data sheet.

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

BC546B, BC547A, B, C, BC548B, C**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage ($I_C = 1.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	65 45 30	– – –	– – –	V
Collector – Base Breakdown Voltage ($I_C = 100\ \mu\text{A}$)	$V_{(BR)CBO}$	80 50 30	– – –	– – –	V
Emitter – Base Breakdown Voltage ($I_E = 10\ \mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	6.0 6.0 6.0	– – –	– – –	V
Collector Cutoff Current ($V_{CE} = 70\text{ V}$, $V_{BE} = 0$) ($V_{CE} = 50\text{ V}$, $V_{BE} = 0$) ($V_{CE} = 35\text{ V}$, $V_{BE} = 0$) ($V_{CE} = 30\text{ V}$, $T_A = 125^\circ\text{C}$)	I_{CES}	– – – –	0.2 0.2 0.2 –	15 15 15 4.0	nA μA
ON CHARACTERISTICS					
DC Current Gain ($I_C = 10\ \mu\text{A}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	– – –	90 150 270	– – –	–
($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$)		110 110 110 110 200 420	– – – 180 290 520	450 800 800 220 450 800	
($I_C = 100\text{ mA}$, $V_{CE} = 5.0\text{ V}$)		– – –	120 180 300	– – –	
Collector – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = \text{See Note 1}$)	$V_{CE(sat)}$	– – –	0.09 0.2 0.3	0.25 0.6 0.6	V
Base – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$)	$V_{BE(sat)}$	–	0.7	–	V
Base – Emitter On Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	$V_{BE(on)}$	0.55 –	– –	0.7 0.77	V
SMALL-SIGNAL CHARACTERISTICS					
Current – Gain – Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$, $f = 100\text{ MHz}$)	f_T	150 150 150	300 300 300	– – –	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	–	1.7	4.5	pF
Input Capacitance ($V_{EB} = 0.5\text{ V}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	–	10	–	pF
Small – Signal Current Gain ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$, $f = 1.0\text{ kHz}$)	h_{fe}	125 125 125 240 450	– – 220 330 600	500 900 260 500 900	–
Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ V}$, $R_S = 2\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $\Delta f = 200\text{ Hz}$)	NF	– – –	2.0 2.0 2.0	10 10 10	dB

1. I_B is value for which $I_C = 11\text{ mA}$ at $V_{CE} = 1.0\text{ V}$.

BC546B, BC547A, B, C, BC548B, C

BC547/BC548

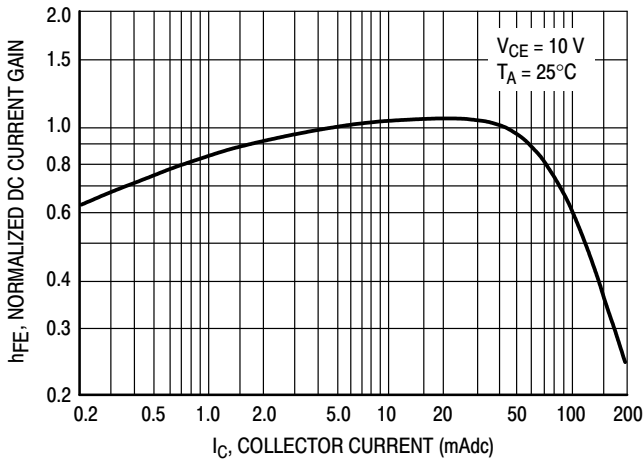


Figure 1. Normalized DC Current Gain

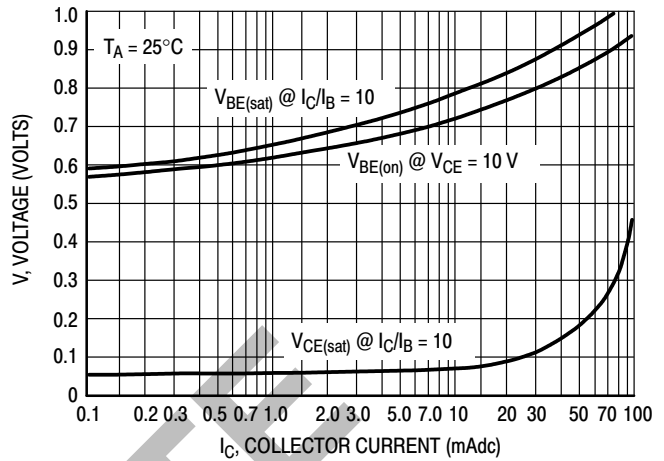


Figure 2. "Saturation" and "On" Voltages

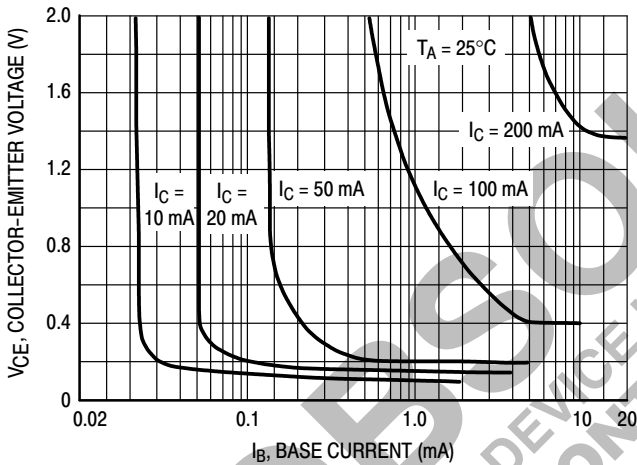


Figure 3. Collector Saturation Region

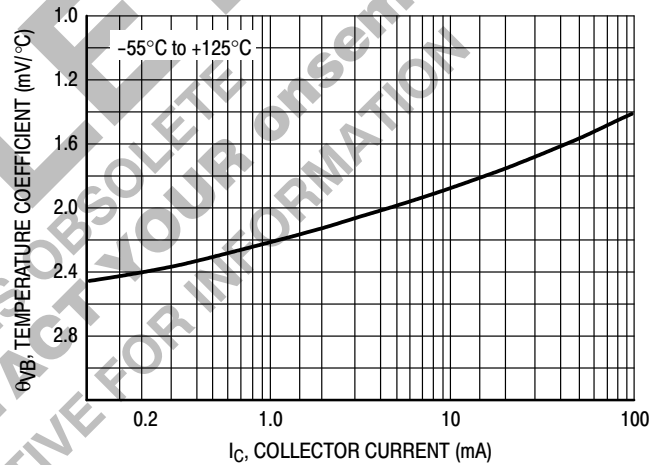


Figure 4. Base-Emitter Temperature Coefficient

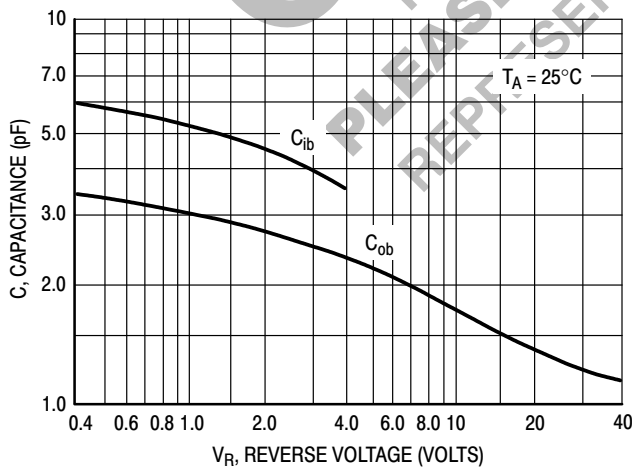


Figure 5. Capacitances

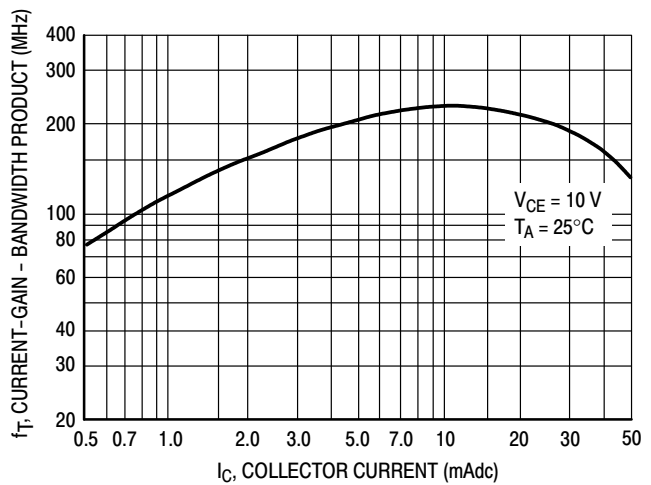


Figure 6. Current-Gain - Bandwidth Product

BC546B, BC547A, B, C, BC548B, C

BC546

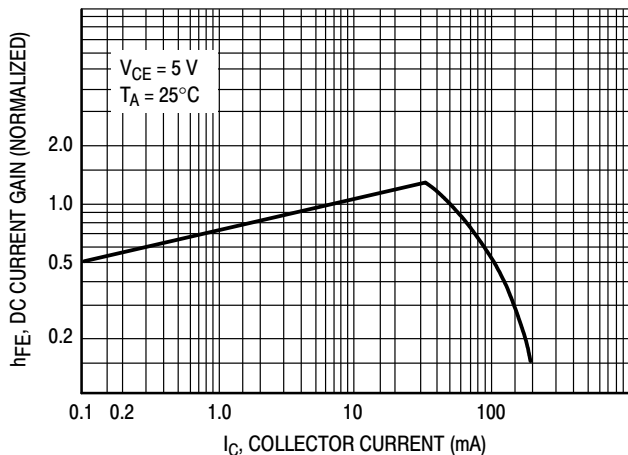


Figure 7. DC Current Gain

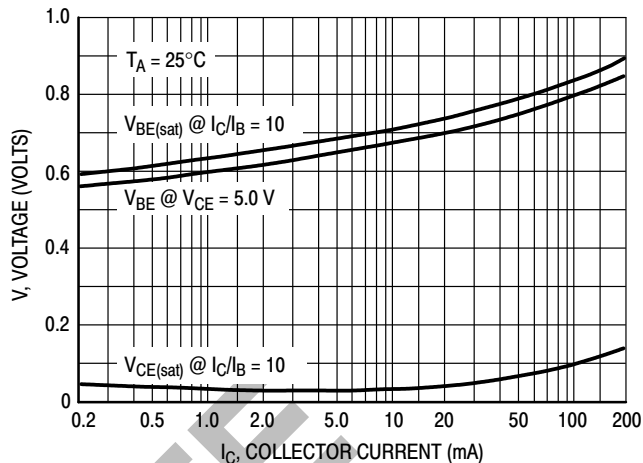


Figure 8. "On" Voltage

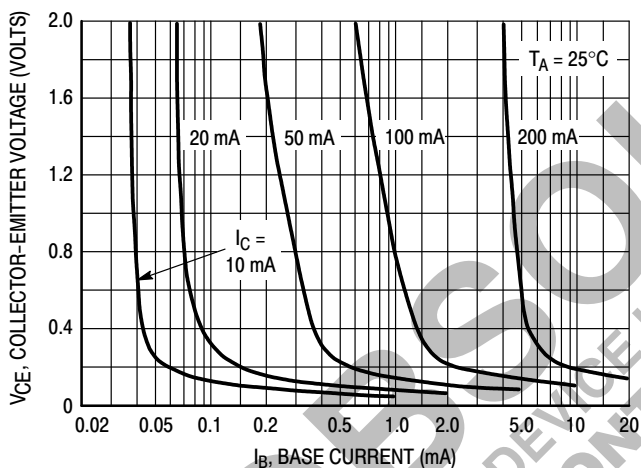


Figure 9. Collector Saturation Region

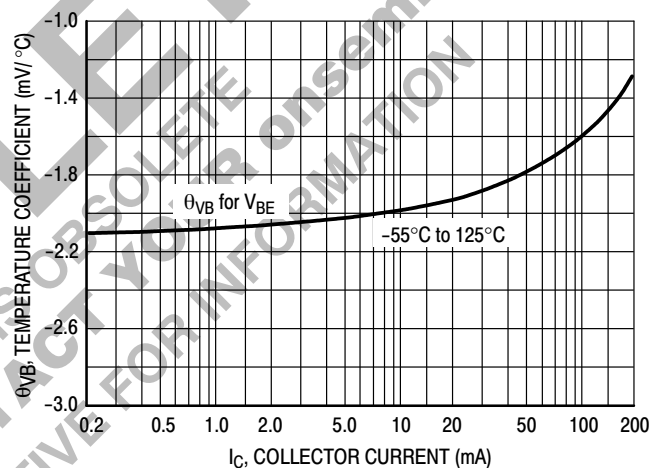


Figure 10. Base-Emitter Temperature Coefficient

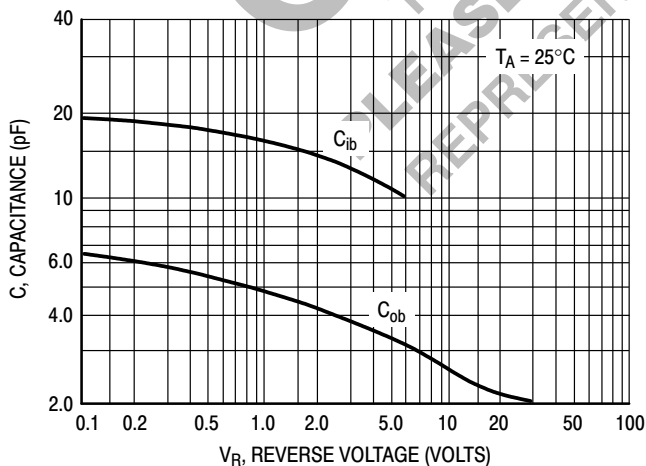


Figure 11. Capacitance

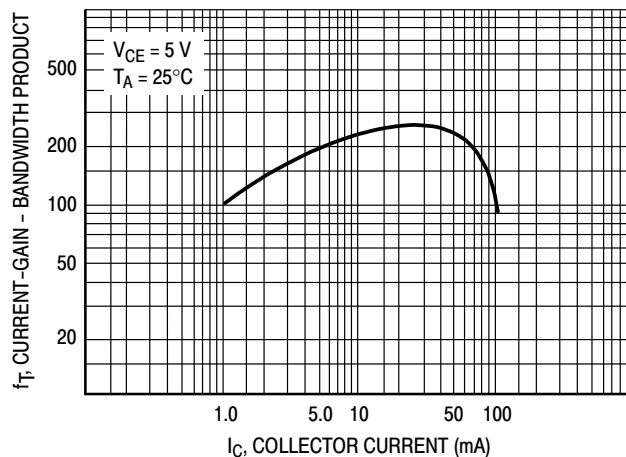


Figure 12. Current-Gain - Bandwidth Product

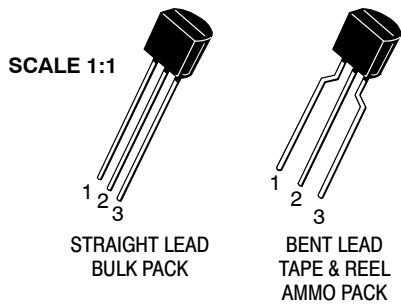
BC546B, BC547A, B, C, BC548B, C**ORDERING INFORMATION**

Device	Package	Shipping†
BC546B	TO-92	5000 Units / Bulk
BC546BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC546BRL1	TO-92	2000 / Tape & Reel
BC546BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC546BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547ARL	TO-92	2000 / Tape & Reel
BC547ARLG	TO-92 (Pb-Free)	2000 / Tape & Reel
BC547AZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC547BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC547BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC547CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC548BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC548BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC548BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC548CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC548CZL1G	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.

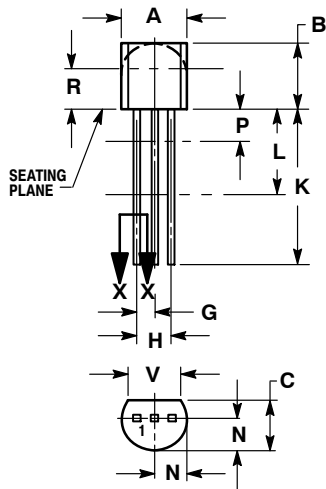


**MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS**

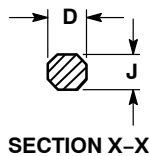


**TO-92 (TO-226)
CASE 29-11
ISSUE AM**

DATE 09 MAR 2007



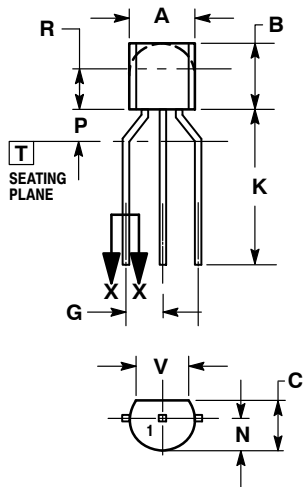
**STRAIGHT LEAD
BULK PACK**



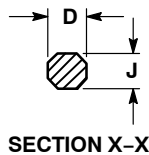
NOTES:

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:
 PIN 1. EMITTER
 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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