BZX84BxxxLT1, BZX84CxxxLT1 Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

Zener Voltage Regulators

225 mW SOT−23 Surface Mount

This series of Zener diodes is offered in the convenient, surface mount plastic SOT−23 package. These devices are designed to provide voltage regulation with minimum space requirement. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Features

- 225 mW Rating on FR−4 or FR−5 Board
- Zener Breakdown Voltage Range − 2.4 V to 75 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- Tight Tolerance Series Available (See Page 4)
- AEC−Q101 Qualified and PPAP Capable
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- Pb−Free Packages are Available

Mechanical Characteristics

CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily Solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
POLARITY: Cathode indicated by polarity band
FLAMMABILITY RATING: UL 94 V−0

MAXIMUM RATINGS

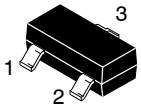
Rating	Symbol	Max	Unit
Total Power Dissipation on FR−5 Board, (Note 1) @ T_A = 25°C Derated above 25°C Thermal Resistance, Junction−to−Ambient	P_D $R_{\theta JA}$	225 1.8 556	mW mW/°C °C/W
Total Power Dissipation on Alumina Substrate, (Note 2) @ T_A = 25°C Derated above 25°C Thermal Resistance, Junction−to−Ambient	P_D $R_{\theta JA}$	300 2.4 417	mW mW/°C °C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

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.
1. FR−5 = 1.0 X 0.75 X 0.62 in.
2. Alumina = 0.4 X 0.3 X 0.024 in., 99.5% alumina.

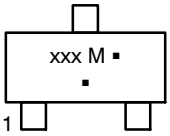
ON Semiconductor®

http://onsemi.com

MARKING DIAGRAM



SOT−23
CASE 318
STYLE 8



xxx = Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)
*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
BZX84CxxxLT1	SOT−23	3000/Tape & Reel
BZX84CxxxLT1G	SOT−23 (Pb−Free)	3000/Tape & Reel
SZBZX84xxxLT1G	SOT−23 (Pb−Free)	3000/Tape & Reel
BZX84CxxxLT3	SOT−23	10,000/Tape & Reel
BZX84CxxxLT3G	SOT−23 (Pb−Free)	10,000/Tape & Reel
SZBZXCxxxLT3G	SOT−23 (Pb−Free)	10,000/Tape & Reel
BZX84BxxxLT1	SOT−23	3000/Tape & Reel
BZX84BxxxLT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
SZBZX84BxxxLT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
BZX84BxxxLT3	SOT−23	10,000 / Tape & Reel
BZX84BxxxLT3G	SOT−23 (Pb−Free)	10,000/Tape & Reel

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

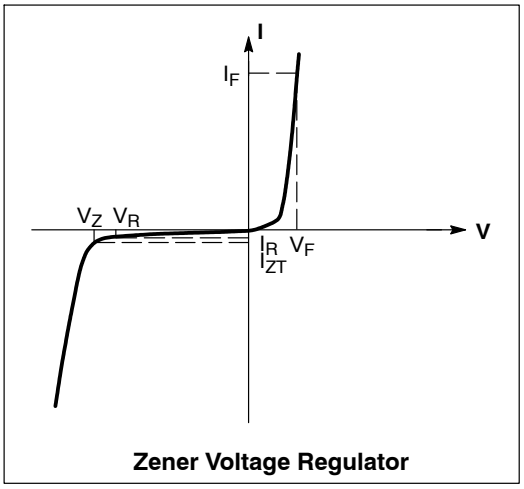
DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

ELECTRICAL CHARACTERISTICS

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) (T_A = 25°C unless otherwise noted, V_F = 0.90 V Max. @ I_F = 10 mA)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F
ΘV_Z	Maximum Temperature Coefficient of V_Z
C	Max. Capacitance @ V_R = 0 and f = 1 MHz



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS – BZX84CxxxLT1 SERIES (STANDARD TOLERANCE)

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) (T_A = 25°C unless otherwise noted, V_F = 0.90 V Max. @ I_F = 10 mA)
(Devices listed in ***bold, italic*** are ON Semiconductor Preferred devices.)

Device*	Device Marking	V_{Z1} (Volts) @ I_{ZT1} = 5 mA (Note 3)			Z_{ZT1} (Ω) @ I_{ZT1} = 5 mA	V_{Z2} (V) @ I_{ZT2} = 1 mA (Note 3)		Z_{ZT2} (Ω) @ I_{ZT2} = 1 mA	V_{Z3} (V) @ I_{ZT3} = 20 mA (Note 3)		Z_{ZT3} (Ω) @ I_{ZT3} = 20 mA	Max Reverse Leakage Current		θ_{VZ} (mV/k) @ I_{ZT1} = 5 mA		C (pF) @ V_R = 0 f = 1 MHz
		Min	Nom	Max		Min	Max		Min	Max		I_R μA @	V_R Volts	Min	Max	
SZ/BZX84C2V4LT1, G	Z11	2.2	2.4	2.6	100	1.7	2.1	600	2.6	3.2	50	50	1	–3.5	0	450
SZ/BZX84C2V7LT1, G	Z12	2.5	2.7	2.9	100	1.9	2.4	600	3	3.6	50	20	1	–3.5	0	450
SZ/BZX84C3V0LT1, G	Z13	2.8	3	3.2	95	2.1	2.7	600	3.3	3.9	50	10	1	–3.5	0	450
SZ/BZX84C3V3LT1, G	Z14	3.1	3.3	3.5	95	2.3	2.9	600	3.6	4.2	40	5	1	–3.5	0	450
SZ/BZX84C3V6LT1, G	Z15	3.4	3.6	3.8	90	2.7	3.3	600	3.9	4.5	40	5	1	–3.5	0	450
SZ/BZX84C3V9LT1, G	Z16	3.7	3.9	4.1	90	2.9	3.5	600	4.1	4.7	30	3	1	–3.5	–2.5	450
SZ/BZX84C4V3LT1, G	W9	4	4.3	4.6	90	3.3	4	600	4.4	5.1	30	3	1	–3.5	0	450
SZ/BZX84C4V7LT1/T3, G	***Z1***	***4.4***	***4.7***	***5***	***80***	***3.7***	***4.7***	***500***	***4.5***	***5.4***	***15***	***3***	***2***	***–3.5***	***0.2***	***260***
SZ/BZX84C5V1LT1/T3, G	***Z2***	***4.8***	***5.1***	***5.4***	***60***	***4.2***	***5.3***	***480***	***5***	***5.9***	***15***	***2***	***2***	***–2.7***	***1.2***	***225***
SZ/BZX84C5V6LT1/T3, G	***Z3***	***5.2***	***5.6***	***6***	***40***	***4.8***	***6***	***400***	***5.2***	***6.3***	***10***	***1***	***2***	***–2.0***	***2.5***	***200***
SZ/BZX84C6V2LT1/T3, G	***Z4***	***5.8***	***6.2***	***6.6***	***10***	***5.6***	***6.6***	***150***	***5.8***	***6.8***	***6***	***3***	***4***	***0.4***	***3.7***	***185***
SZ/BZX84C6V8LT1/T3, G	Z5	6.4	6.8	7.2	15	6.3	7.2	80	6.4	7.4	6	2	4	1.2	4.5	155
SZ/BZX84C7V5LT1, G	Z6	7	7.5	7.9	15	6.9	7.9	80	7	8	6	1	5	2.5	5.3	140
SZ/BZX84C8V2LT1, G	Z7	7.7	8.2	8.7	15	7.6	8.7	80	7.7	8.8	6	0.7	5	3.2	6.2	135
SZ/BZX84C9V1LT1/T3, G	Z8	8.5	9.1	9.6	15	8.4	9.6	100	8.5	9.7	8	0.5	6	3.8	7.0	130
SZ/BZX84C10LT1, G	Z9	9.4	10	10.6	20	9.3	10.6	150	9.4	10.7	10	0.2	7	4.5	8.0	130
SZ/BZX84C11LT1, G	Y1	10.4	11	11.6	20	10.2	11.6	150	10.4	11.8	10	0.1	8	5.4	9.0	130
SZ/BZX84C12LT1, G	***Y2***	***11.4***	***12***	***12.7***	***25***	***11.2***	***12.7***	***150***	***11.4***	***12.9***	***10***	***0.1***	***8***	***6.0***	***10.0***	***130***
SZ/BZX84C13LT1, G	Y3	12.4	13	14.1	30	12.3	14	170	12.5	14.2	15	0.1	8	7.0	11.0	120
SZ/BZX84C15LT1/T3, G	Y4	13.8	15	15.6	30	13.7	15.5	200	13.9	15.7	20	0.05	10.5	9.2	13.0	110
SZ/BZX84C16LT1, G	Y5	15.3	16	17.1	40	15.2	17	200	15.4	17.2	20	0.05	11.2	10.4	14.0	105
SZ/BZX84C18LT1/T3, G	***Y6***	***16.8***	***18***	***19.1***	***45***	***16.7***	***19***	***225***	***16.9***	***19.2***	***20***	***0.05***	***12.6***	***12.4***	***16.0***	***100***
SZ/BZX84C20LT1, G	Y7	18.8	20	21.2	55	18.7	21.1	225	18.9	21.4	20	0.05	14	14.4	18.0	85
SZ/BZX84C22LT1, G	Y8	20.8	22	23.3	55	20.7	23.2	250	20.9	23.4	25	0.05	15.4	16.4	20.0	85
SZ/BZX84C24LT1, G	Y9	22.8	24	25.6	70	22.7	25.5	250	22.9	25.7	25	0.05	16.8	18.4	22.0	80
SZ/BZX84C27LT1, G	Y10	25.1	27	28.9	80	25	28.9	300	25.2	29.3	45	0.05	18.9	21.4	25.3	70
SZ/BZX84C30LT1, G	Y11	28	30	32	80	27.8	32	300	28.1	32.4	50	0.05	21	24.4	29.4	70
SZ/BZX84C33LT1/T3, G	Y12	31	33	35	80	30.8	35	325	31.1	35.4	55	0.05	23.1	27.4	33.4	70
SZ/BZX84C36LT1, G	Y13	34	36	38	90	33.8	38	350	34.1	38.4	60	0.05	25.2	30.4	37.4	70
SZ/BZX84C39LT1, G	Y14	37	39	41	130	36.7	41	350	37.1	41.5	70	0.05	27.3	33.4	41.2	45
SZ/BZX84C43LT1, G	Y15	40	43	46	150	39.7	46	375	40.1	46.5	80	0.05	30.1	37.6	46.6	40
SZ/BZX84C47LT1, G	Y16	44	47	50	170	43.7	50	375	44.1	50.5	90	0.05	32.9	42.0	51.8	40
SZ/BZX84C51LT1, G	Y17	48	51	54	180	47.6	54	400	48.1	54.6	100	0.05	35.7	46.6	57.2	40
SZ/BZX84C56LT1, G	Y18	52	56	60	200	51.5	60	425	52.1	60.8	110	0.05	39.2	52.2	63.8	40
SZ/BZX84C62LT1, G	Y19	58	62	66	215	57.4	66	450	58.2	67	120	0.05	43.4	58.8	71.6	35
SZ/BZX84C68LT1, G	Y20	64	68	72	240	63.4	72	475	64.2	73.2	130	0.05	47.6	65.6	79.8	35
SZ/BZX84C75LT1, G	Y21	70	75	79	255	69.4	79	500	70.3	80.2	140	0.05	52.5	73.4	88.6	35

Device	Device Marking	V_{Z1} Below @ I_{ZT1} = 2 mA			Z_{ZT1} Below @ I_{ZT1} = 2 mA	V_{Z2} Below @ I_{ZT2} = 0.1 mA		Z_{ZT2} Below @ I_{ZT4} = 0.5 mA	V_{Z3} Below @ I_{ZT3} = 10 mA		Z_{ZT3} Below @ I_{ZT3} = 10 mA	Max Reverse Leakage Current		θ_{VZ} (mV/k) Below @ I_{ZT1} = 2 mA		C (pF) @ V_R = 0 f = 1 MHz
		Min	Nom	Max		Min	Max		Min	Max		I_R μA @	V_R (V)	Min	Max	

3. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C.

***** The "G" suffix indicates Pb–Free package available.

ELECTRICAL CHARACTERISTICS – BZX84BxxxL (Tight Tolerance Series)

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) (T_A = 25°C unless otherwise noted, V_F = 0.90 V Max. @ I_F = 10 mA)

Device	Device Marking	V_Z (Volts) @ I_{ZT} = 5 mA (Note 4)			Z_{ZT} (Ω) @ I_{ZT} = 5 mA (Note 4)	Max Reverse Leakage Current		θ_{VZ} (mV/k) @ I_{ZT} = 5 mA		C (pF) @ V_R =0, f = 1 MHz
						I_R @ V_R				
		Min	Nom	Max	Max	μA	Volts	Min	Max	
BZX84B4V7LT1, G	T10	4.61	4.7	4.79	80	3	2	−3.5	0.2	260
SZ/BZX84B5V1LT1, G	T11	5.00	5.1	5.20	60	2	2	−2.7	1.2	225
SZ/BZX84B5V6LT1, G	T12	5.49	5.6	5.71	40	1	2	−2	2.5	200
SZ/BZX84B6V2LT1, G	T13	6.08	6.2	6.32	10	3	4	0.4	3.7	185
SZ/BZX84B6V8LT1, G	T14	6.66	6.8	6.94	15	2	4	1.2	4.5	155
SZ/BZX84B7V5LT1, G	T15	7.35	7.5	7.65	15	1	5	2.5	5.3	140
BZX84B8V2LT1, G	T16	8.04	8.2	8.36	15	0.7	5	3.2	6.2	135
BZX84B9V1LT1, G	T17	8.92	9.1	9.28	15	0.5	6	3.8	7	130
SZ/BZX84B12LT1, G	T18	11.8	12	12.2	25	0.1	8	6	10	130
BZX84B15LT1, G	T22	14.7	15	15.3	30	0.05	10.5	9.2	13	110
SZ/BZX84B16LT1, G	T19	15.7	16	16.3	40	0.05	11.2	10.4	14	105
BZX84B18LT1, G	T20	17.6	18	18.4	45	0.05	12.6	12.4	16	100
BZX84B22LT1, G	T24	21.6	22	22.4	55	0.05	15.4	16.4	20	85
BZX84B24LT1, G	T25	23.5	24	24.5	70	0.05	16.8	18.4	22	80

4. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C.

*The “G” suffix indicates Pb−Free package available.

TYPICAL CHARACTERISTICS

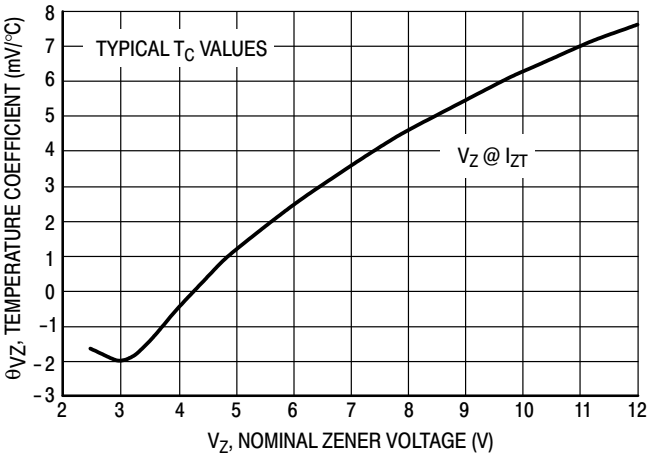


Figure 1. Temperature Coefficients (Temperature Range − 55°C to +150°C)

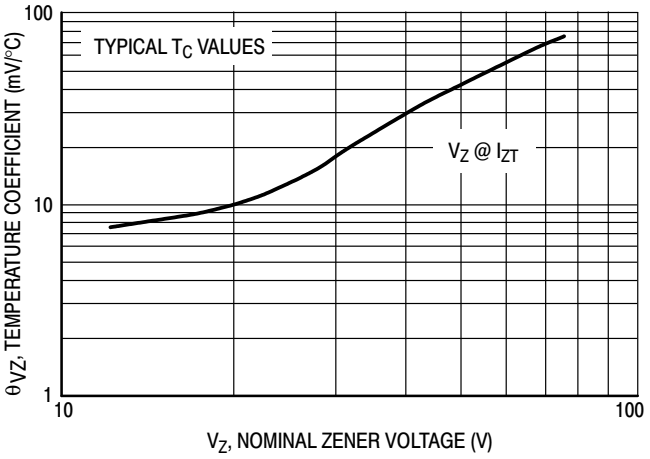


Figure 2. Temperature Coefficients (Temperature Range − 55°C to +150°C)

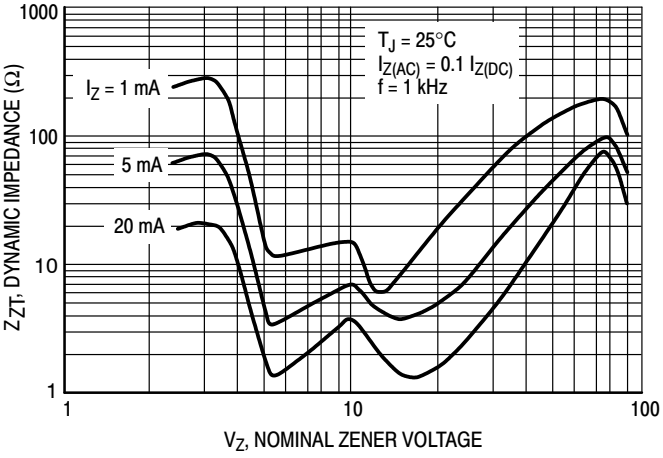


Figure 3. Effect of Zener Voltage on Zener Impedance

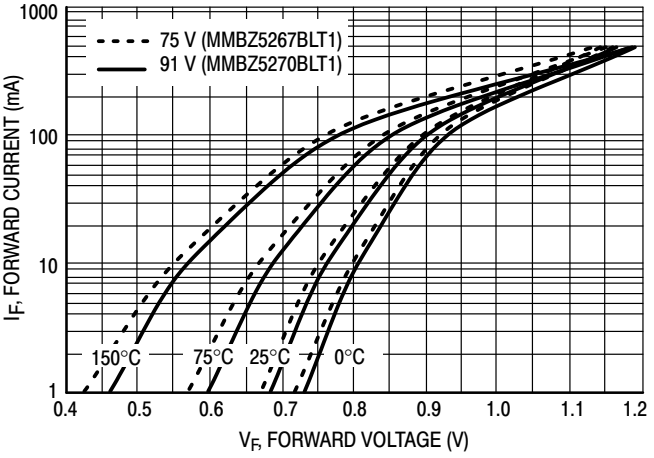


Figure 4. Typical Forward Voltage

TYPICAL CHARACTERISTICS

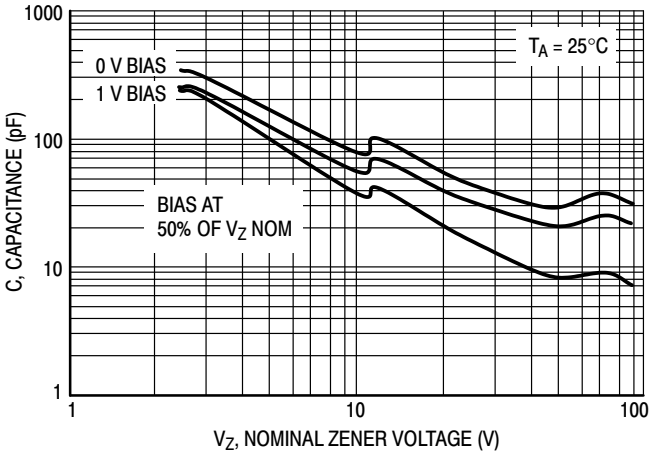


Figure 5. Typical Capacitance

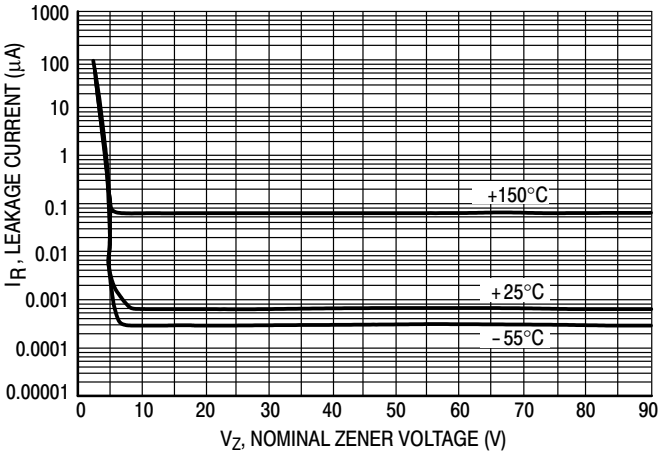


Figure 6. Typical Leakage Current

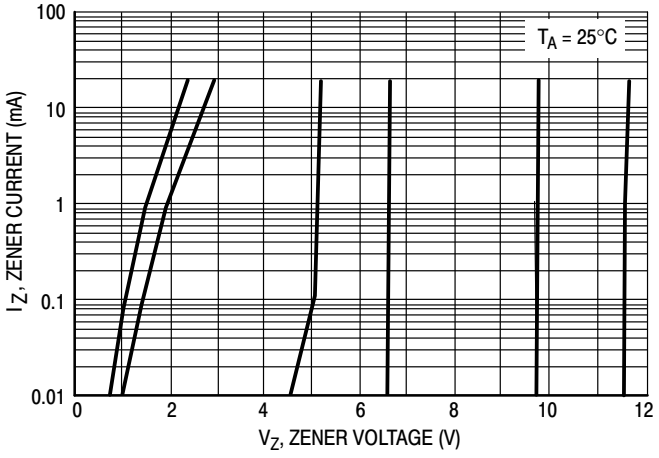


Figure 7. Zener Voltage versus Zener Current (V_Z Up to 12 V)

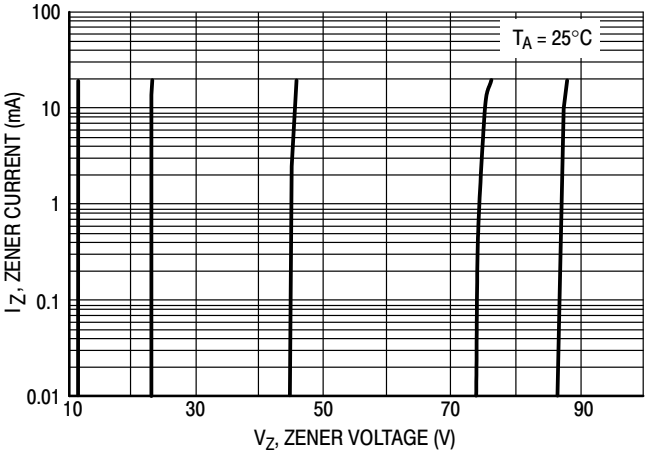
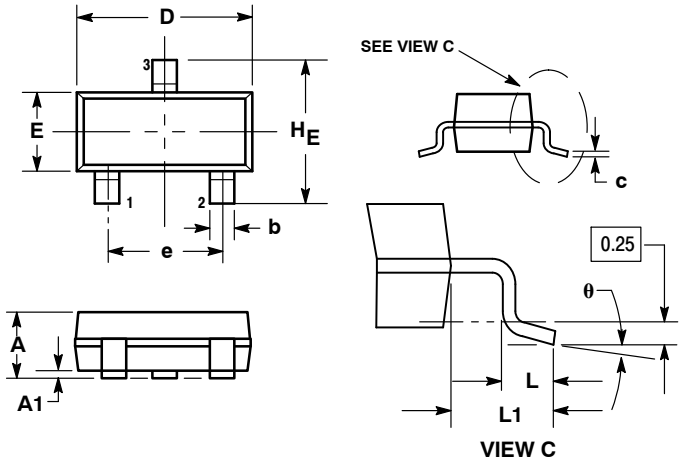


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

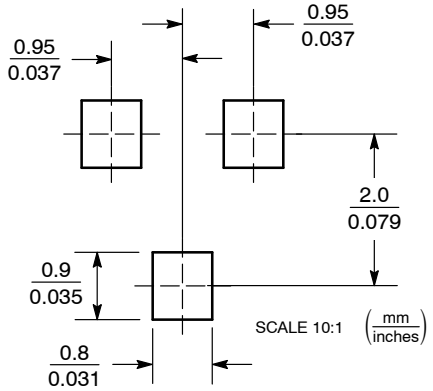


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	−−−	10°	0°	−−−	10°

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

SOLDERING FOOTPRINT*



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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative