

BZX84C2V4ET1 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.

Specification 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
- Peak Power – 225 Watt (8 X 20 μ s)

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: UL94 V-0

MAXIMUM RATINGS

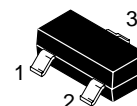
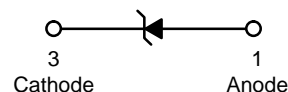
Rating	Symbol	Max	Unit
Peak Power Dissipation @ 20 μ s (Note 1) @ $T_L \leq 25^\circ\text{C}$	P_{pk}	225	Watts
Total Power Dissipation on FR-5 Board, (Note 2) @ $T_A = 25^\circ\text{C}$ Derated above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Power Dissipation on Alumina Substrate, (Note 3) @ $T_A = 25^\circ\text{C}$ Derated above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	-65 to +150	°C

1. Non-repetitive current pulse per Figure 9
2. FR-5 = 1.0 X 0.75 X 0.62 in.
3. Alumina = 0.4 X 0.3 X 0.024 in., 99.5% alumina



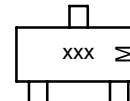
ON Semiconductor®

<http://onsemi.com>



SOT-23
CASE 318
STYLE 8

MARKING DIAGRAM



xxx = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device †	Package	Shipping
BZX84CxxxET1	SOT-23	3000/Tape & Reel
BZX84CxxxET3	SOT-23	10,000/Tape & Reel

DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

Devices listed in **bold, italic** are ON Semiconductor **Preferred** devices. Preferred devices are recommended choices for future use and best overall value.

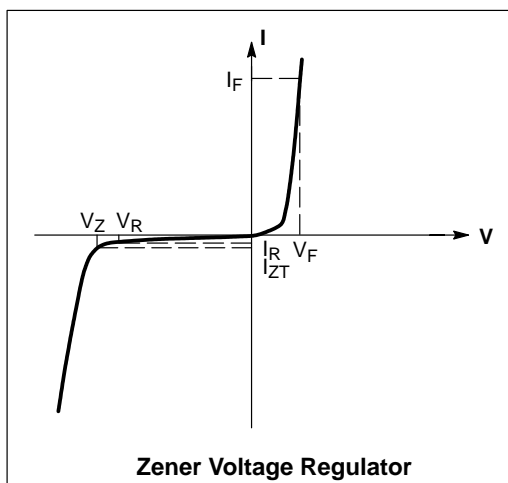
†The "T1" suffix refers to an 8 mm, 7 inch reel.
The "T3" suffix refers to an 8 mm, 13 inch reel.

BZX84C2V4ET1 Series

ELECTRICAL CHARACTERISTICS

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.95\text{ V Max. @ } I_F = 10\text{ mA}$)

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
θ_{VZ}	Maximum Temperature Coefficient of V_Z
C	Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$



ELECTRICAL CHARACTERISTICS

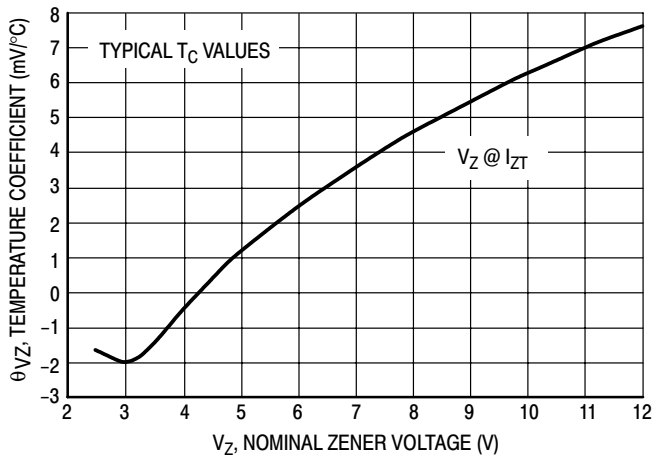
(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.90\text{ V Max. @ } I_F = 10\text{ mA}$)

Device	Device Marking	V_{Z1} (Volts) @ $I_{ZT1} = 5\text{ mA}$ (Note 4)			Z_{ZT1} (Ohms) @ $I_{ZT1} = 5\text{ mA}$	V_{Z2} (Volts) @ $I_{ZT2} = 1\text{ mA}$ (Note 4)		Z_{ZT2} (Ohms) @ $I_{ZT2} = 1\text{ mA}$	V_{Z3} (Volts) @ $I_{ZT3} = 20\text{ mA}$ (Note 4)		Z_{ZT3} (Ohms) @ $I_{ZT3} = 20\text{ mA}$	Max Reverse Leakage Current		θ_{VZ} (mV/k) @ $I_{ZT1} = 5\text{ mA}$		C (pF) @ $V_R = 0$ $f = 1\text{ MHz}$
		Min	Nom	Max		Min	Max		Min	Max		I_R μA	V_R Volts	Min	Max	
BZX84C3V3ET1	Z14	3.1	3.3	3.5	95	2.3	2.9	600	3.6	4.2	40	5	1	-3.5	0	450
<i>BZX84C4V7ET1</i>	<i>Z1</i>	<i>4.4</i>	<i>4.7</i>	<i>5</i>	<i>80</i>	<i>3.7</i>	<i>4.7</i>	<i>500</i>	<i>4.5</i>	<i>5.4</i>	<i>15</i>	<i>3</i>	<i>2</i>	<i>-3.5</i>	<i>0.2</i>	<i>260</i>
<i>BZX84C5V1ET1</i>	<i>Z2</i>	<i>4.8</i>	<i>5.1</i>	<i>5.4</i>	<i>60</i>	<i>4.2</i>	<i>5.3</i>	<i>480</i>	<i>5</i>	<i>5.9</i>	<i>15</i>	<i>2</i>	<i>2</i>	<i>-2.7</i>	<i>1.2</i>	<i>225</i>
<i>BZX84C5V6ET1</i>	<i>Z3</i>	<i>5.2</i>	<i>5.6</i>	<i>6</i>	<i>40</i>	<i>4.8</i>	<i>6</i>	<i>400</i>	<i>5.2</i>	<i>6.3</i>	<i>10</i>	<i>1</i>	<i>2</i>	<i>-2.0</i>	<i>2.5</i>	<i>200</i>
<i>BZX84C6V2ET1</i>	<i>Z4</i>	<i>5.8</i>	<i>6.2</i>	<i>6.6</i>	<i>10</i>	<i>5.6</i>	<i>6.6</i>	<i>150</i>	<i>5.8</i>	<i>6.8</i>	<i>6</i>	<i>3</i>	<i>4</i>	<i>0.4</i>	<i>3.7</i>	<i>185</i>
BZX84C6V8ET1	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
BZX84C7V5ET1	Z6	7	7.5	7.9	15	6.9	7.9	80	7	8	6	1	5	2.5	5.3	140
BZX84C10ET1	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
<i>BZX84C12ET1</i>	<i>Y2</i>	<i>11.4</i>	<i>12</i>	<i>12.7</i>	<i>25</i>	<i>11.2</i>	<i>12.7</i>	<i>150</i>	<i>11.4</i>	<i>12.9</i>	<i>10</i>	<i>0.1</i>	<i>8</i>	<i>6.0</i>	<i>10.0</i>	<i>130</i>
BZX84C15ET1	Y4	14.3	15	15.8	30	13.7	15.5	200	13.9	15.7	20	0.05	10.5	9.2	13.0	110
BZX84C16ET1	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
<i>BZX84C18ET1</i>	<i>Y6</i>	<i>16.8</i>	<i>18</i>	<i>19.1</i>	<i>45</i>	<i>16.7</i>	<i>19</i>	<i>225</i>	<i>16.9</i>	<i>19.2</i>	<i>20</i>	<i>0.05</i>	<i>12.6</i>	<i>12.4</i>	<i>16.0</i>	<i>100</i>
BZX84C24ET1	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
Device	Device Marking	V_{Z1} Below @ $I_{ZT1} = 2\text{ mA}$			Z_{ZT1} Below @ $I_{ZT1} = 2\text{ mA}$	V_{Z2} Below @ $I_{ZT2} = 0.1\text{ mA}$		Z_{ZT2} Below @ $I_{ZT4} = 0.5\text{ mA}$	V_{Z3} Below @ $I_{ZT3} = 10\text{ mA}$		Z_{ZT3} Below @ $I_{ZT3} = 10\text{ mA}$	Max Reverse Leakage Current		θ_{VZ} (mV/k) Below @ $I_{ZT1} = 2\text{ mA}$		C (pF) @ $V_R = 0$ $f = 1\text{ MHz}$
		Min	Nom	Max		Min	Max		Min	Max		I_R μA	V_R Volts	Min	Max	
BZX84C27ET1	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

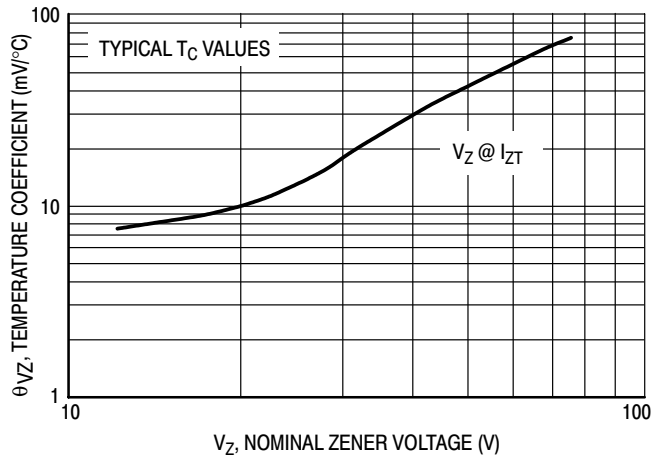
4. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C

BZX84C2V4ET1 Series

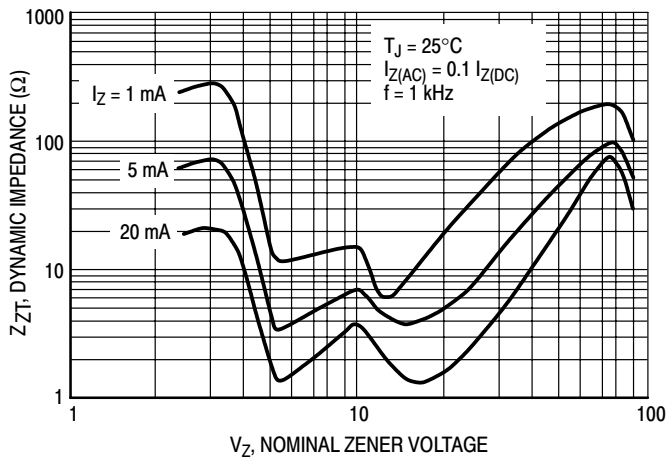
TYPICAL CHARACTERISTICS



**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**

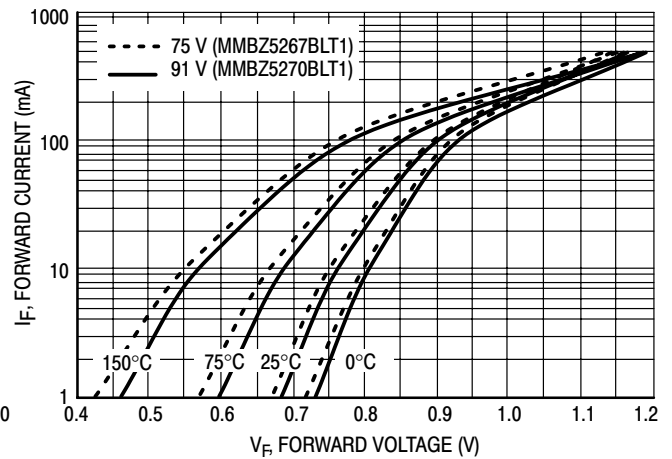


Figure 4. Typical Forward Voltage

BZX84C2V4ET1 Series

TYPICAL CHARACTERISTICS

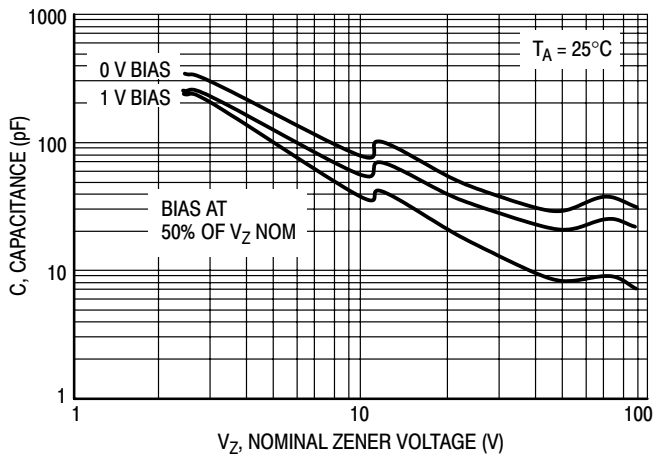


Figure 5. Typical Capacitance

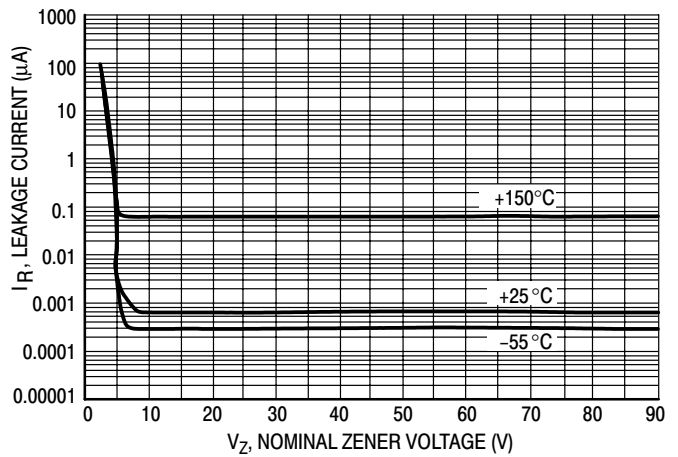


Figure 6. Typical Leakage Current

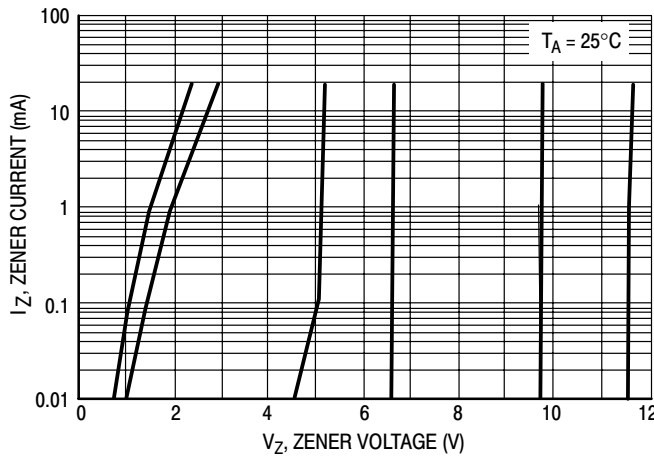


Figure 7. Zener Voltage versus Zener Current (V_Z Up to 12 V)

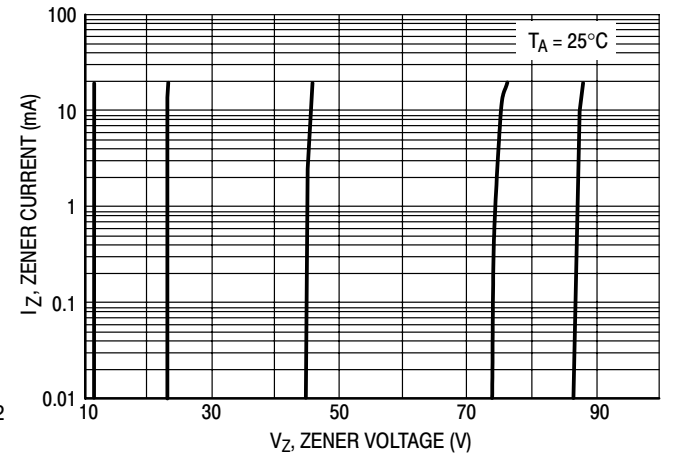


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

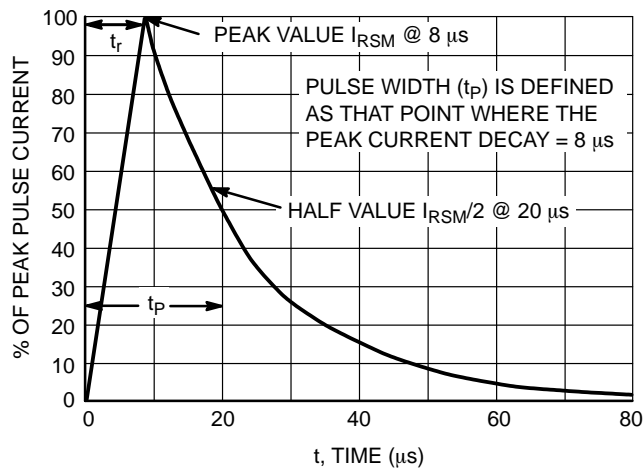
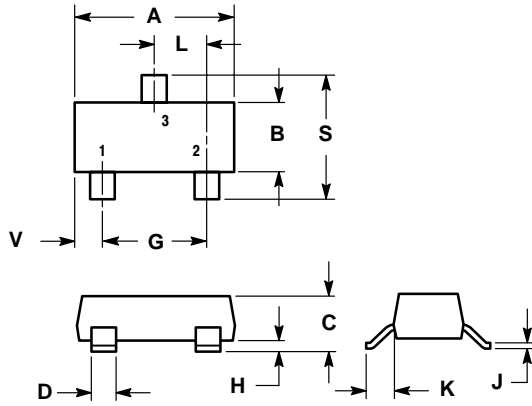


Figure 9. $8 \times 20 \mu\text{s}$ Pulse Waveform

BZX84C2V4ET1 Series

PACKAGE DIMENSIONS

SOT-23
TO-236AB
CASE 318-09
ISSUE AH



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. 318-01, -02, AND -06 OBSOLETE, NEW STANDARD 318-09.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0385	0.0498	0.99	1.26
D	0.0140	0.0200	0.36	0.50
G	0.0670	0.0826	1.70	2.10
H	0.0040	0.0098	0.10	0.25
J	0.0034	0.0070	0.085	0.177
K	0.0180	0.0236	0.45	0.60
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.0984	2.10	2.50
V	0.0177	0.0236	0.45	0.60

STYLE 8:

- PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

BZX84C2V4ET1 Series

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

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

JAPAN: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.