

# Zener Voltage Regulators

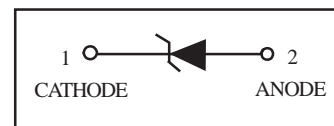
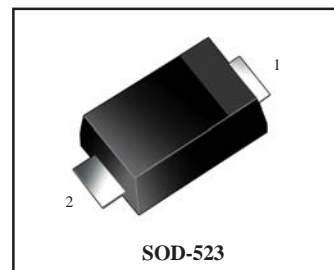
## 200mW SOD-523 Surface Mount

- We declare that the material of product compliance with RoHS requirements.

### ORDERING INFORMATION

Device	Package	Shipping
FDZ2.0E ~ FDZ75E	SOD-523	3000/Tape&Reel

This series of Zener diodes is packaged in a SOD-523 surface mount package. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.



### Specification Features:

- Standard Zener Breakdown Voltage Range – 2.0 V to 75 V
- Steady State Power Rating of 200 mW
- Small Body Outline Dimensions: 0.047" x 0.032"(1.20 mm x 0.80 mm)
- Low Body Height: 0.028" (0.7 mm)
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- AEC-Q101 qualified

### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded,thermosetting plastic  
Epoxy Meets UL 94 V-0

**LEAD FINISH:** 100% Matte Sn (Tin)

**QUALIFIED MAX REFLOW TEMPERATURE:**260°C

Device Meets MSL 1 Requirements

**MOUNTING POSITION:** Any

### MAXIMUM RATINGS

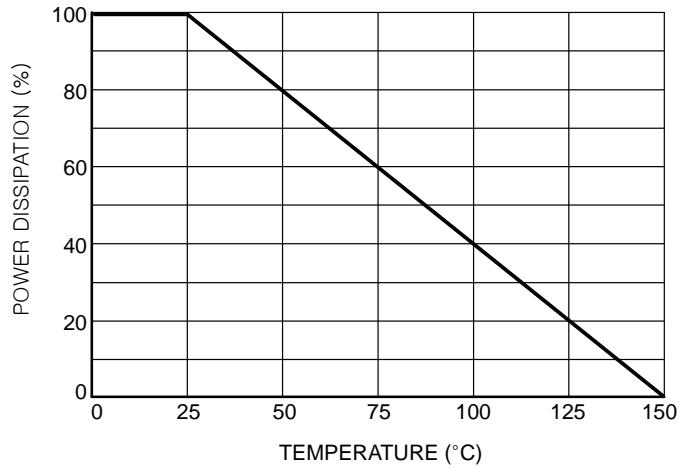
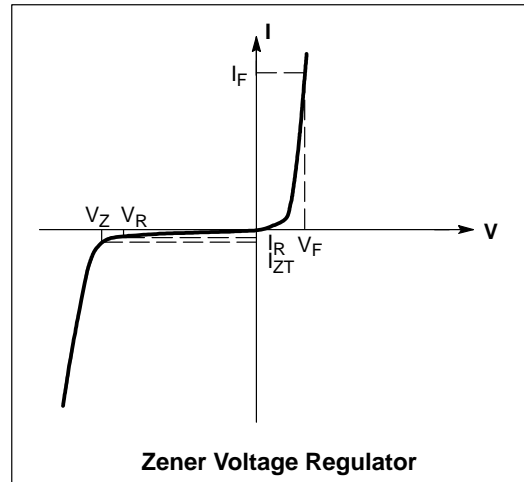
Rating	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, @ T <sub>A</sub> = 25°C	P <sub>D</sub>	200	mW
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

## ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted,  
 $V_F = 0.9\text{ V Max. @ } I_F = 10\text{ mA}$  for all types)

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



**Figure 1. Steady State Power Derating**



# FDZ2.0E ~ FDZ75E

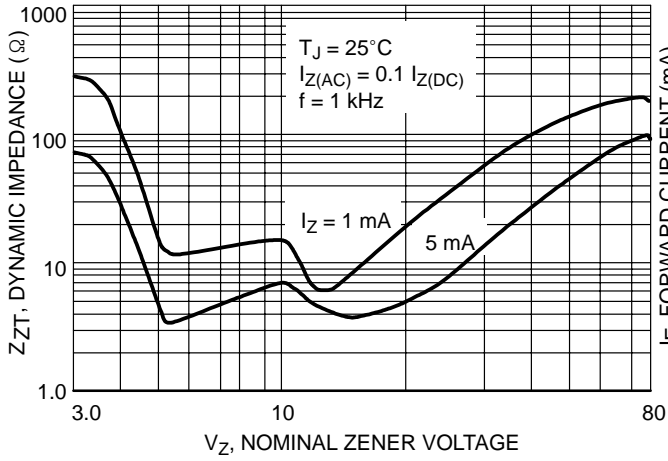
## ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.9\text{ V Max.}$  @  $I_F = 10\text{ mA}$  for all types)

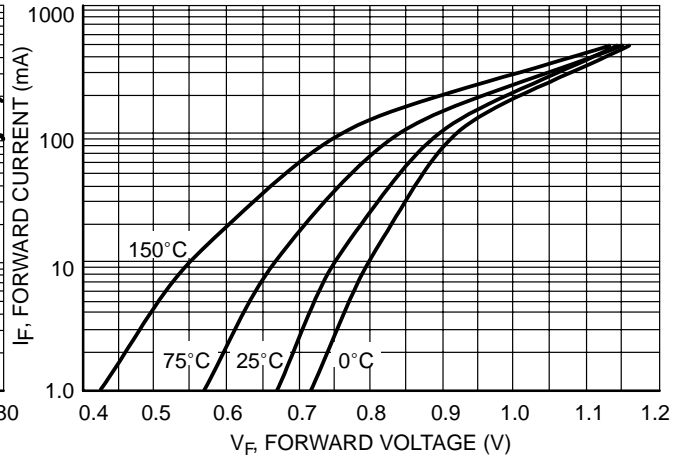
Device	Device Marking	Zener Voltage (Note 1)			Zener Impedance			Leakage Current		$\theta V_Z$ (mV/k) @ $I_{ZT}$		C @ $V_R = 0$ f = 1 MHz pF	
		$V_Z$ (Volts)			@ $I_{ZT}$	$Z_{ZT}$ @ $I_{ZT}$	$Z_{ZK}$ @ $I_{ZK}$		$I_R$ @ $V_R$		Min		Max
		Min	Nom	Max	mA	$\Omega$	$\Omega$	mA	$\mu\text{A}$	Volts			
FDZ2.0E	WY	1.91	2.0	2.09	5	100	600	1.0	150	1.0	-3.5	0	450
FDZ2.4E	00	2.2	2.4	2.6	5	100	1000	1.0	50	1.0	-3.5	0	450
FDZ2.7E	01	2.5	2.7	2.9	5	100	1000	1.0	20	1.0	-3.5	0	450
FDZ3.0E	02	2.8	3.0	3.2	5	100	1000	1.0	10	1.0	-3.5	0	450
FDZ3.3E	05	3.1	3.3	3.5	5	95	1000	1.0	5	1.0	-3.5	0	450
FDZ3.6E	06	3.4	3.6	3.8	5	90	1000	1.0	5	1.0	-3.5	0	450
FDZ3.9E	07	3.7	3.9	4.1	5	90	1000	1.0	3	1.0	-3.5	-2.5	450
FDZ4.3E	08	4.0	4.3	4.6	5	90	1000	1.0	3	1.0	-3.5	0	450
FDZ4.7E	09	4.4	4.7	5.0	5	80	800	1.0	3	2.0	-3.5	0.2	260
FDZ5.1E	0A	4.8	5.1	5.4	5	60	500	1.0	2	2.0	-2.7	1.2	225
FDZ5.6E	0C	5.2	5.6	6.0	5	40	400	1.0	1	2.0	-2.0	2.5	200
FDZ6.2E	0E	5.8	6.2	6.6	5	10	100	1.0	3	4.0	0.4	3.7	185
FDZ6.8E	0F	6.4	6.8	7.2	5	15	160	1.0	2	4.0	1.2	4.5	155
FDZ7.5E	0G	7.0	7.5	7.9	5	15	160	1.0	1	5.0	2.5	5.3	140
FDZ8.2E	0H	7.7	8.2	8.7	5	15	160	1.0	0.7	5.0	3.2	6.2	135
FDZ9.1E	0K	8.5	9.1	9.6	5	15	160	1.0	0.2	7.0	3.8	7.0	130
FDZ10E	0L	9.4	10	10.6	5	20	160	1.0	0.1	8.0	4.5	8.0	130
FDZ11E	0M	10.4	11	11.6	5	20	160	1.0	0.1	8.0	5.4	9.0	130
FDZ12E	0N	11.4	12	12.7	5	25	80	1.0	0.1	8.0	6.0	10	130
FDZ13E	0P	12.4	13.25	14.1	5	30	80	1.0	0.1	8.0	7.0	11	120
FDZ15E	0T	14.3	15	15.8	5	30	200	1.0	0.05	10.5	9.2	13	110
FDZ16E	0U	15.3	16.2	17.1	2	40	200	1.0	0.05	11.2	10.4	14	105
FDZ18E	0W	16.8	18	19.1	2	45	225	1.0	0.05	12.6	12.4	16	100
FDZ20E	0Z	18.8	20	21.2	2	55	225	1.0	0.05	14.0	14.4	18	85
FDZ22E	10	20.8	22	23.3	2	55	250	1.0	0.05	15.4	16.4	20	85
FDZ24E	11	22.8	24.2	25.6	2	70	120	1.0	0.05	16.8	18.4	22	80
FDZ27E	12	25.1	27	28.9	2	80	300	1.0	0.05	18.9	21.4	25.3	70
FDZ30E	14	28	30	32	2	80	300	1.0	0.05	21.0	24.4	29.4	70
FDZ33E	18	31	33	35	2	80	300	1.0	0.05	23.2	27.4	33.4	70
FDZ36E	19	34	36	38	2	90	500	1.0	0.05	25.2	30.4	37.4	70
FDZ39E	20	37	39	41	2	130	500	1.0	0.05	27.3	33.4	41.2	45
FDZ43E	21	40	43	46	1	150	500	1.0	0.05	30.1	37.6	46.6	40
FDZ47E	1A	44	47	50	1	170	500	1.0	0.05	32.9	42.0	51.8	40
FDZ51E	1C	48	51	54	1	180	500	1.0	0.05	35.7	46.6	57.2	40
FDZ56E	1D	52	56	60	1	200	500	1.0	0.05	39.2	52.2	63.8	40
FDZ62E	1E	58	62	66	1	215	500	1.0	0.05	43.4	58.8	71.6	35
FDZ68E	1F	64	68	72	1	240	500	1.0	0.05	47.6	65.6	79.8	35
FDZ75E	1G	70	75	79	1	255	500	1.0	0.05	52.5	73.4	88.6	35

1. Zener voltage is measured with a pulse test current  $I_Z$  at an ambient temperature of  $25^\circ\text{C}$ .

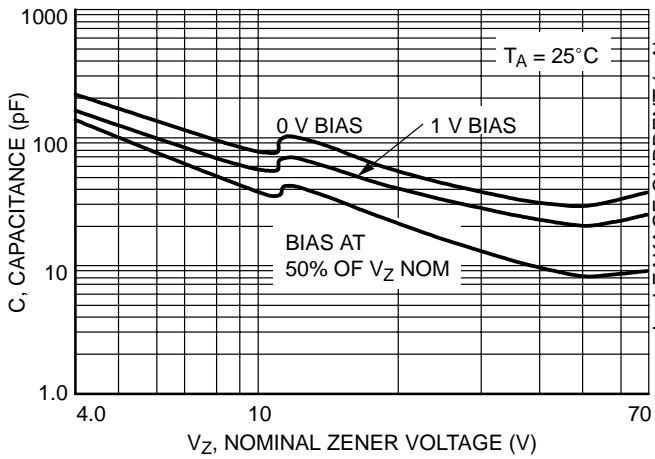
## Typical Characteristics



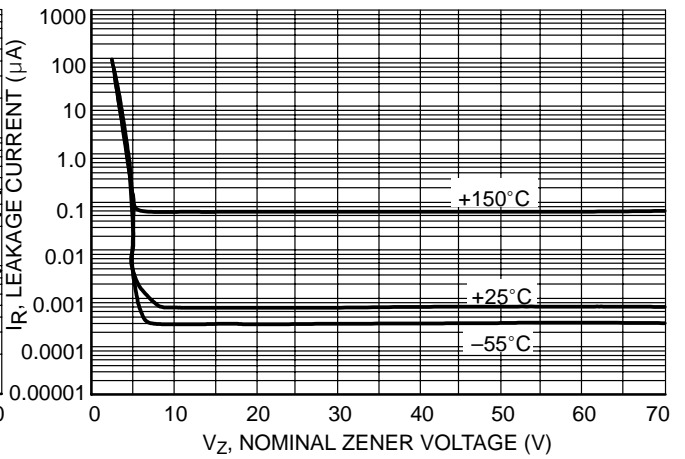
**Figure 1. Effect of Zener Voltage on Zener Impedance**



**Figure 2. Typical Forward Voltage**

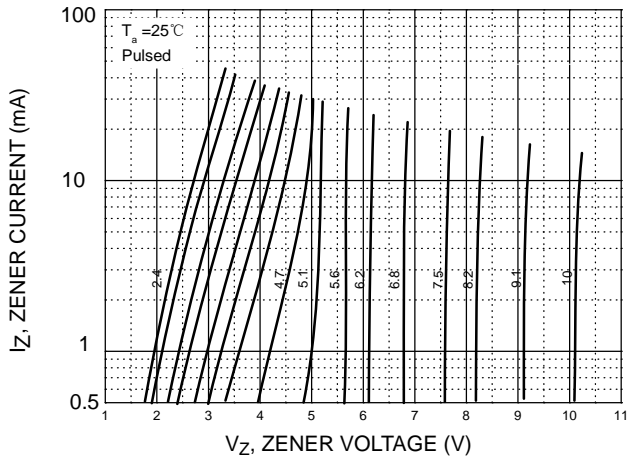


**Figure 3. Typical Capacitance**

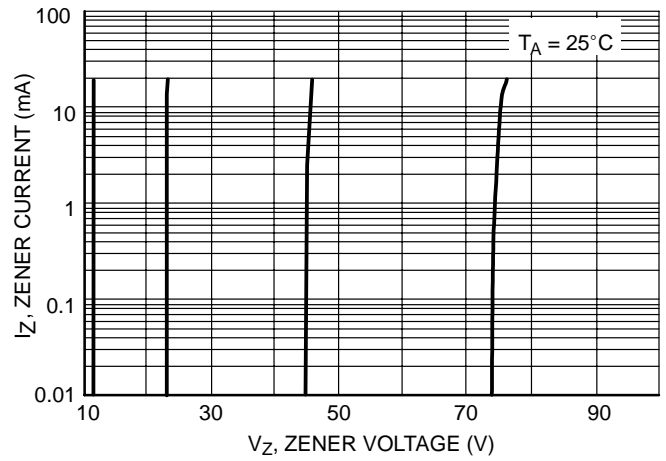


**Figure 4. Typical Leakage Current**

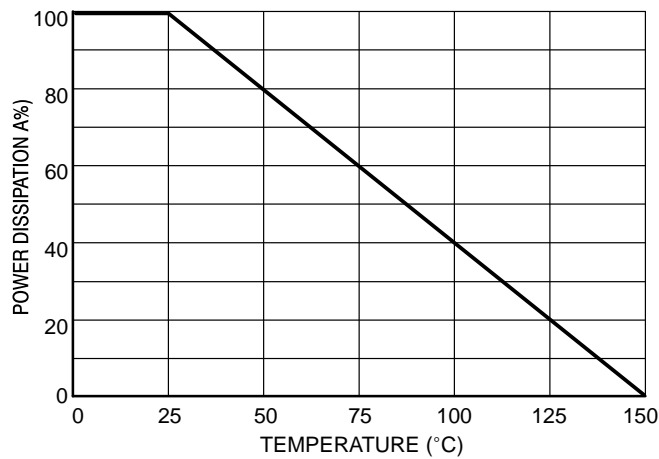
## Typical Characteristics



**Figure 5. Zener Voltage versus Zener Current (V<sub>Z</sub> Up to 12 V)**

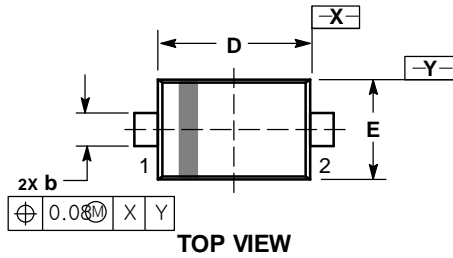


**Figure 6. Zener Voltage versus Zener Current (12 V to 75 V)**

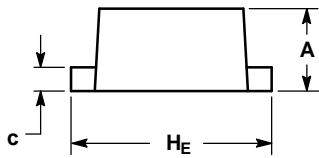


**Figure 7. Steady State Power Derating**

## SC-79/SOD-523



TOP VIEW



SIDE VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.60	0.70
b	0.25	0.30	0.35
c	0.07	0.14	0.20
D	1.10	1.20	1.30
E	0.70	0.80	0.90
H <sub>E</sub>	1.50	1.60	1.70
L	0.30 REF		
L2	0.15	0.20	0.25

### RECOMMENDED SOLDERING FOOTPRINT\*

