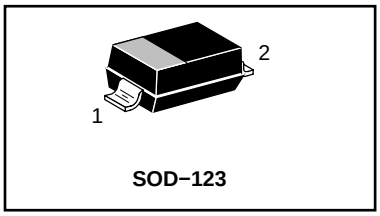
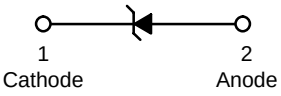
Zener Voltage Regulators

500 mW SOD−123 Surface Mount

Three complete series of Zener diodes are offered in the convenient, surface mount plastic SOD−123 package. These devices provide a convenient alternative to the leadless 34−package style.



SOD−123



Features

- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range − 2.4 V to 110 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- We declare that the material of product compliance with RoHS requirements.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic case

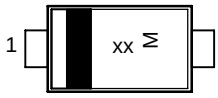
FINISH: Corrosion resistant finish, easily solderable

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds

POLARITY: Cathode indicated by polarity band

FLAMMABILITY RATING: UL 94 V−0

MARKING DIAGRAM



xx = Device Code
M = Date Code

MAXIMUM RATINGS

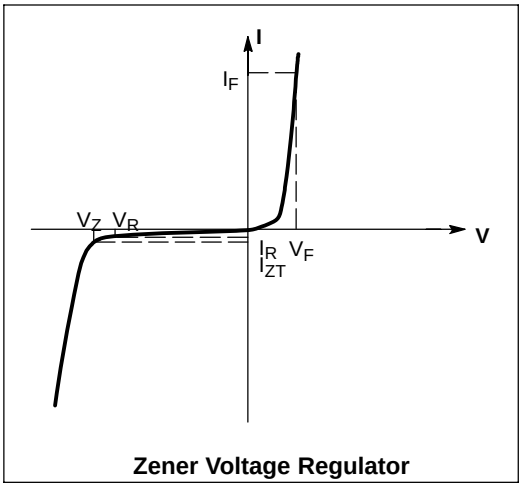
Rating	Symbol	Max	Unit
Total Power Dissipation on FR−5 Board, (Note 1) @ T_L = 75°C Derated above 75°C	P_D	500 6.7	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	340	°C/W
Thermal Resistance, Junction−to−Lead (Note 2)	$R_{\theta JL}$	150	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 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.

1. FR−5 = 3.5 X 1.5 inches, using the minimum recommended footprint.
2. Thermal Resistance measurement obtained via infrared Scan Method.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.9 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_{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



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.9 V Max. @ I_F = 10 mA)

Device	Device Marking	Zener Voltage (Notes 3 and 4)				Zener Impedance (Note 5)			Leakage Current	
		V_Z (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	Volts
MSZ5221B	***C1***	***2.28***	***2.4***	***2.52***	***20***	***30***	***1200***	***0.25***	***100***	***1***
MSZ5222B	***C2***	***2.38***	***2.5***	***2.63***	***20***	***30***	***1250***	***0.25***	***100***	***1***
MSZ5223B	C3	2.57	2.7	2.84	20	30	1300	0.25	75	1
MSZ5224B	C4	2.66	2.8	2.94	20	30	1400	0.25	75	1
MSZ5225B	***C5***	***2.85***	***3.0***	***3.15***	***20***	***29***	***1600***	***0.25***	***50***	***1***
MSZ5226B	D1	3.14	3.3	3.47	20	28	1600	0.25	25	1
MSZ5227B	D2	3.42	3.6	3.78	20	24	1700	0.25	15	1
MSZ5228B	D3	3.71	3.9	4.10	20	23	1900	0.25	10	1
MSZ5229B	***D4***	***4.09***	***4.3***	***4.52***	***20***	***22***	***2000***	***0.25***	***5***	***1***
MSZ5230B	***D5***	***4.47***	***4.7***	***4.94***	***20***	***19***	***1900***	***0.25***	***5***	***2***
MSZ5231B	***E1***	***4.85***	***5.1***	***5.36***	***20***	***17***	***1600***	***0.25***	***5***	***2***
MSZ5232B	***E2***	***5.32***	***5.6***	***5.88***	***20***	***11***	***1600***	***0.25***	***5***	***3***
MSZ5233B	E3	5.70	6.0	6.30	20	7	1600	0.25	5	3.5
MSZ5234B	***E4***	***5.89***	***6.2***	***6.51***	***20***	***7***	***1000***	***0.25***	***5***	***4***
MSZ5235B	E5	6.46	6.8	7.14	20	5	750	0.25	3	5
MSZ5236B	F1	7.13	7.5	7.88	20	6	500	0.25	3	6
MSZ5237B	F2	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MSZ5238B	F3	8.27	8.7	9.14	20	8	600	0.25	3	6.5
MSZ5239B	F4	8.65	9.1	9.56	20	10	600	0.25	3	7
MSZ5240B	***F5***	***9.50***	***10***	***10.50***	***20***	***17***	***600***	***0.25***	***3***	***8***
MSZ5241B	H1	10.45	11	11.55	20	22	600	0.25	2	8.4
MSZ5242B	***H2***	***11.40***	***12***	***12.60***	***20***	***30***	***600***	***0.25***	***1***	***9.1***
MSZ5243B	H3	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MSZ5244B	H4	13.30	14	14.70	9.0	15	600	0.25	0.1	10
MSZ5245B	***H5***	***14.25***	***15***	***15.75***	***8.5***	***16***	***600***	***0.25***	***0.1***	***11***
MSZ5246B	***J1***	***15.20***	***16***	***16.80***	***7.8***	***17***	***600***	***0.25***	***0.1***	***12***
MSZ5247B	J2	16.15	17	17.85	7.4	19	600	0.25	0.1	13
MSZ5248B	***J3***	***17.10***	***18***	***18.90***	***7.0***	***21***	***600***	***0.25***	***0.1***	***14***
MSZ5250B	J5	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MSZ5251B	K1	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MSZ5252B	***K2***	***22.80***	***24***	***25.20***	***5.2***	***33***	***600***	***0.25***	***0.1***	***18***
MSZ5253B	K3	23.75	25	26.25	5.0	35	600	0.25	0.1	19
MSZ5254B	K4	25.65	27	28.35	4.6	41	600	0.25	0.1	21
MSZ5255B	K5	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MSZ5256B	M1	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MSZ5257B	M2	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MSZ5258B	M3	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MSZ5259B	M4	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MSZ5260B	M5	40.85	43	45.15	3.0	93	900	0.25	0.1	33
MSZ5261B	***N1***	***44.65***	***47***	***49.35***	***2.7***	***105***	***1000***	***0.25***	***0.1***	***36***
MSZ5262B	N2	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
MSZ5263B	N3	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MSZ5264B	N4	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
MSZ5265B	N5	58.90	62	65.10	2.0	185	1400	0.25	0.1	47
MSZ5266B	P1	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
MSZ5267B	P2	71.25	75	78.75	1.7	270	1700	0.25	0.1	56
MSZ5268B	P3	77.90	82	86.10	1.5	330	2000	0.25	0.1	62
MSZ5269B	P4	82.65	87	91.35	1.4	370	2200	0.25	0.1	68
MSZ5270B	P5	86.45	91	95.55	1.4	400	2300	0.25	0.1	69
MSZ5272B	R2	104.5	110	115.5	1.1	750	3000	0.25	0.1	84

***** Not production

3. The type numbers shown have a standard tolerance of ±5% on the nominal Zener voltage.
4. Nominal Zener voltage is measured with the device junction in thermal equilibrium at T_L = 30°C ±1°C.
5. Z_{ZT} and Z_{ZK} are measured by dividing the AC voltage drop across the device by the ac current applied. The specified limits are for $I_{Z(AC)}$ = 0.1 $I_{Z(dc)}$ with the AC frequency = 1 KHz.

TYPICAL CHARACTERISTICS

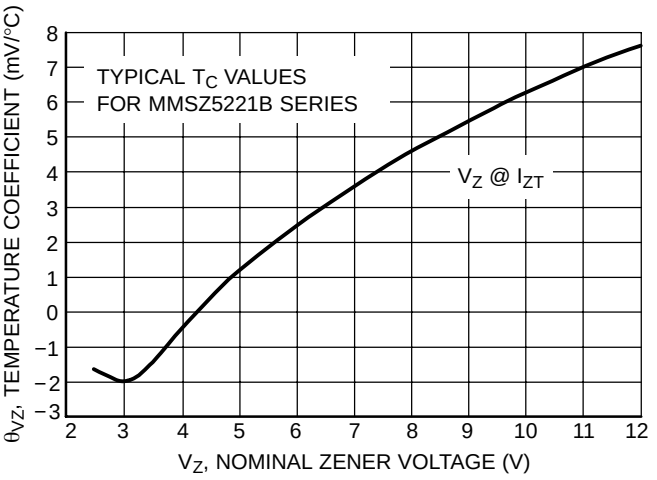


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

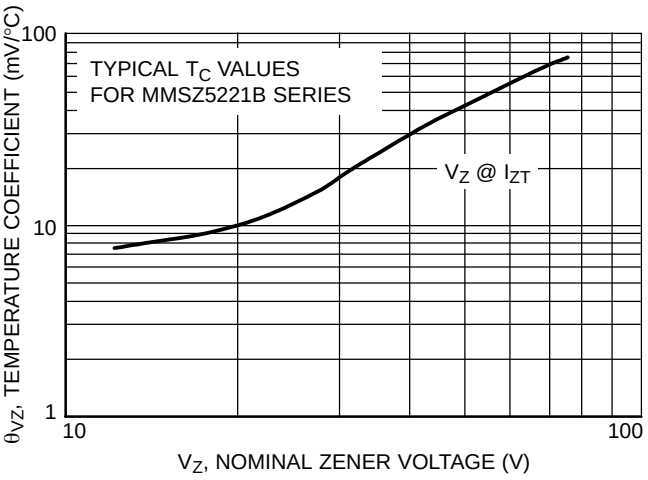


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

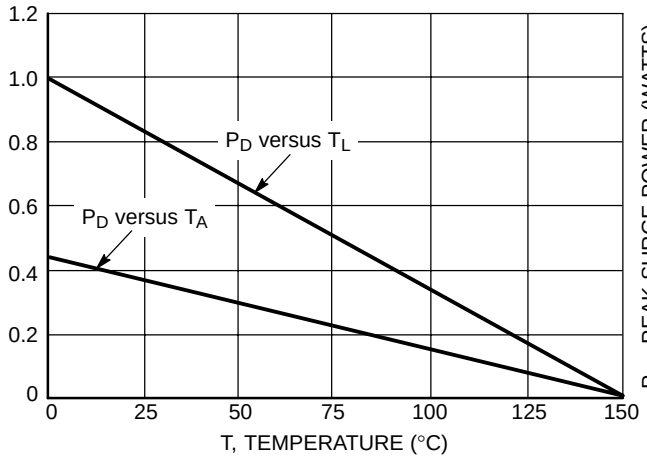


Figure 3. Steady State Power Derating

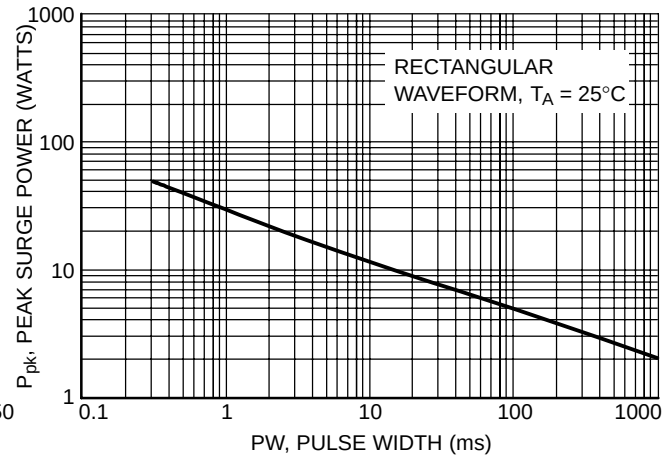


Figure 4. Maximum Nonrepetitive Surge Power

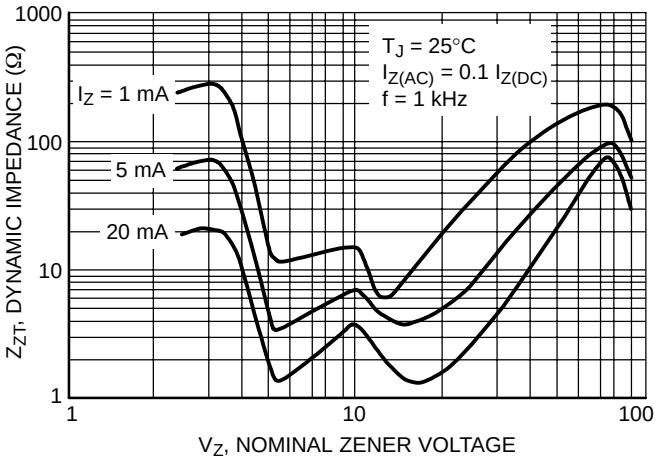


Figure 5. Effect of Zener Voltage on Zener Impedance

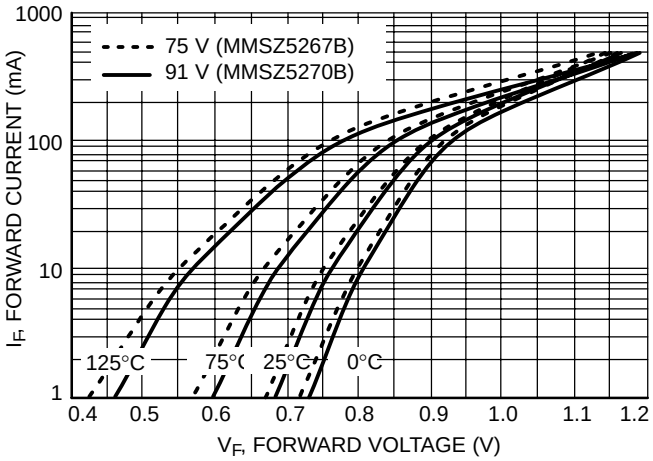


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

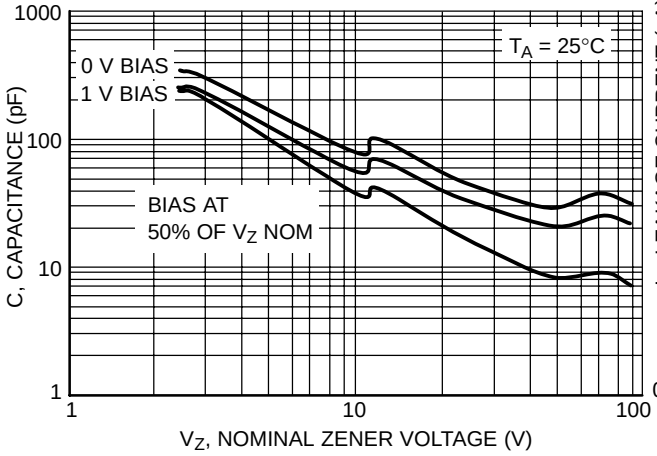


Figure 7. Typical Capacitance

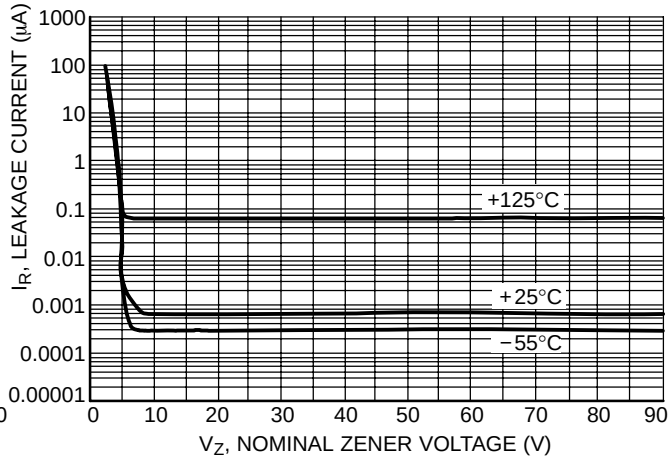


Figure 8. Typical Leakage Current

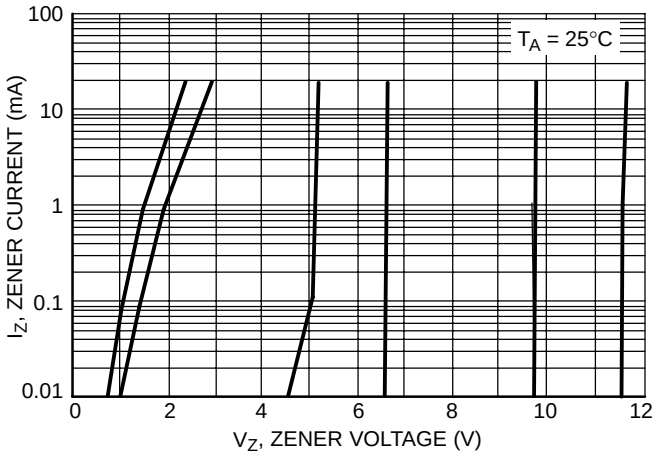


Figure 9. Zener Voltage versus Zener Current (V_Z Up to 12 V)

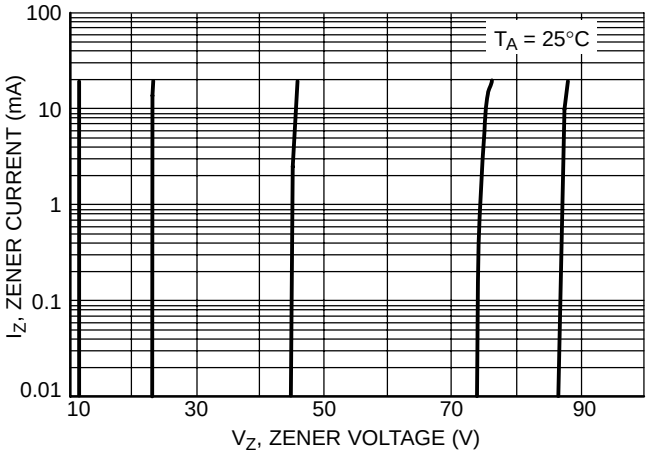
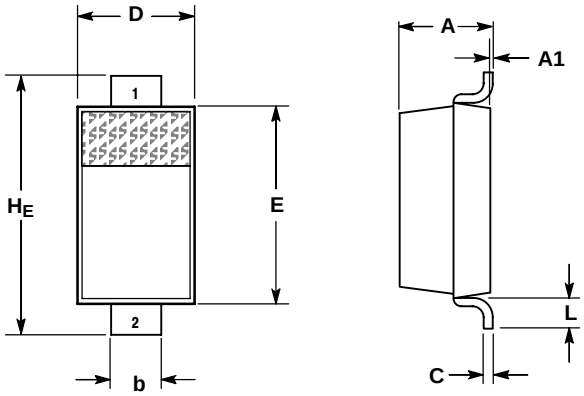


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)

SOD−123

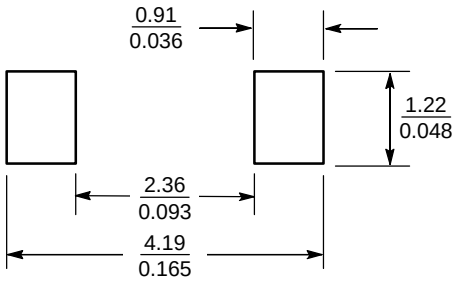


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.94	1.17	1.35	0.037	0.046	0.053
A1	0.00	0.05	0.10	0.000	0.002	0.004
b	0.51	0.61	0.71	0.020	0.024	0.028
c	---	---	0.15	---	---	0.006
D	1.40	1.60	1.80	0.055	0.063	0.071
E	2.54	2.69	2.84	0.100	0.106	0.112
H_E	3.56	3.68	3.86	0.140	0.145	0.152
L	0.25	---	---	0.010	---	---

STYLE 1:
PIN 1. CATHODE
2. ANODE

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{mm}{inches}\right)$