

MMSZ2V4T1 Series

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.

Features

- 500 mW Rating on FR-4 or FR-5 Board
- Wide Zener Reverse Voltage Range – 2.4 V to 56 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
- 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) @ $T_L = 75^\circ\text{C}$ 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.

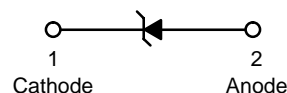
1. FR-5 = 3.5 X 1.5 inches.

2. Thermal Resistance measurement obtained via infrared Scan Method.



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**SOD-123
CASE 425
STYLE 1**

MARKING DIAGRAM



xx = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMSZxxxT1	SOD-123	3000/Tape & Reel
MMSZxxxT1G	SOD-123 (Pb-Free)	3000/Tape & Reel
MMSZxxxT3*	SOD-123	10,000/Tape & Reel
MMSZxxxT3G*	SOD-123 (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 Specifications Brochure, BRD8011/D.

Individual devices are listed on page 3 of this data sheet.

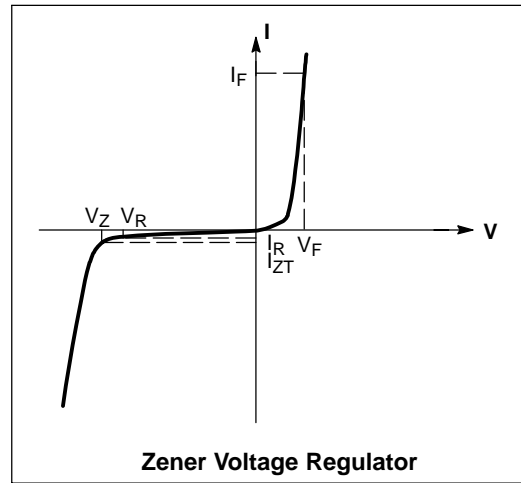
DEVICE MARKING INFORMATION

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

MMSZ2V4T1 Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ 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



MMSZ2V4T1 Series

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

Device [†]	Device Marking	V_{Z1} (Volts) (Notes 3 and 4)			Z_{ZT1} (Note 5)	V_{Z2} (Volts) (Notes 3 and 4)		Z_{ZT2} (Note 5)	Leakage Current	
		@ $I_{ZT1} = 5\text{ mA}$				@ $I_{ZT2} = 1\text{ mA}$			$I_R @ V_R$	
		Min	Nom	Max	Ω	Min	Max	Ω	μA	Volts
MMSZ2V4T1, G	T1	2.28	2.4	2.52	100	1.7	2.1	600	50	1
MMSZ2V7T1, G	T2	2.57	2.7	2.84	100	1.9	2.4	600	20	1
MMSZ3V0T1, G*	T3	2.85	3.0	3.15	95	2.1	2.7	600	10	1
MMSZ3V3T1, G	T4	3.14	3.3	3.47	95	2.3	2.9	600	5	1
MMSZ3V6T1, G	T5	3.42	3.6	3.78	90	2.7	3.3	600	5	1
MMSZ3V9T1, G	U1	3.71	3.9	4.10	90	2.9	3.5	600	3	1
MMSZ4V3T1, G	U2	4.09	4.3	4.52	90	3.3	4.0	600	3	1
MMSZ4V7T1, G	U3	4.47	4.7	4.94	80	3.7	4.7	500	3	2
MMSZ5V1T1, G	U4	4.85	5.1	5.36	60	4.2	5.3	480	2	2
MMSZ5V6T1, G*	U5	5.32	5.6	5.88	40	4.8	6.0	400	1	2
MMSZ6V2T1, G*	V1	5.89	6.2	6.51	10	5.6	6.6	150	3	4
MMSZ6V8T1, G	V2	6.46	6.8	7.14	15	6.3	7.2	80	2	4
MMSZ7V5T1, G	V3	7.13	7.5	7.88	15	6.9	7.9	80	1	5
MMSZ8V2T1, G	V4	7.79	8.2	8.61	15	7.6	8.7	80	0.7	5
MMSZ9V1T1, G	V5	8.65	9.1	9.56	15	8.4	9.6	100	0.5	6
MMSZ10T1, G	A1	9.50	10	10.50	20	9.3	10.6	150	0.2	7
MMSZ11T1, G	A2	10.45	11	11.55	20	10.2	11.6	150	0.1	8
MMSZ12T1, G	A3	11.40	12	12.60	25	11.2	12.7	150	0.1	8
MMSZ13T1, G	A4	12.35	13	13.65	30	12.3	14.0	170	0.1	8
MMSZ15T1, G	A5	14.25	15	15.75	30	13.7	15.5	200	0.05	10.5
MMSZ16T1, G	X1	15.20	16	16.80	40	15.2	17.0	200	0.05	11.2
MMSZ18T1, G	X2	17.10	18	18.90	45	16.7	19.0	225	0.05	12.6
MMSZ20T1, G	X3	19.00	20	21.00	55	18.7	21.1	225	0.05	14
MMSZ22T1, G	X4	20.90	22	23.10	55	20.7	23.2	250	0.05	15.4
MMSZ24T1, G	X5	22.80	24	25.20	70	22.7	25.5	250	0.05	16.8
MMSZ27T1, G	Y1	25.65	27	28.35	80	25	28.9	300	0.05	18.9
MMSZ30T1, G	Y2	28.50	30	31.50	80	27.8	32	300	0.05	21
MMSZ33T1, G	Y3	31.35	33	34.65	80	30.8	35	325	0.05	23.1
MMSZ36T1, G	Y4	34.20	36	37.80	90	33.8	38	350	0.05	25.2
MMSZ39T1, G*	Y5	37.05	39	40.95	130	36.7	41	350	0.05	27.3
MMSZ43T1, G	Z1	40.85	43	45.15	150	39.7	46	375	0.05	30.1
MMSZ51T1, G	Z3	48.45	51	53.55	180	47.6	54	400	0.05	35.7
MMSZ56T1, G	Z4	53.20	56	58.80	200	51.5	60	425	0.05	39.2

3. The type numbers shown have a standard tolerance of $\pm 5\%$ on the nominal Zener Voltage.

4. Tolerance and Voltage Designation: Zener Voltage (V_Z) is measured with the Zener Current applied for $PW = 1\text{ ms}$.

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.

[†]The "G" suffix indicates Pb-Free package available.

*Not Available in the 10,000/Tape & Reel.

MMSZ2V4T1 Series

TYPICAL CHARACTERISTICS

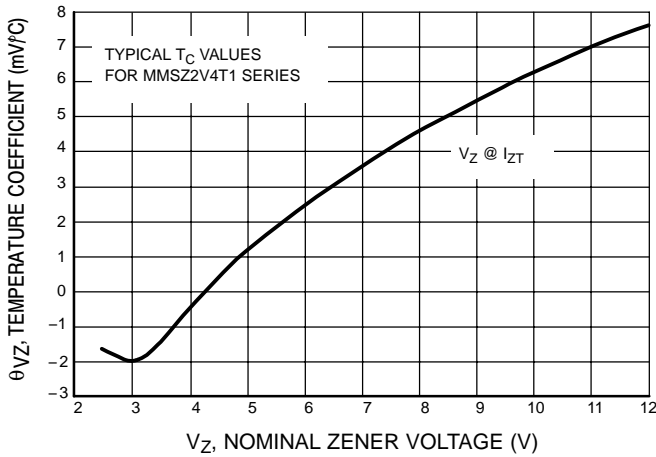


Figure 1. Temperature Coefficients (Temperature Range -55°C to +150°C)

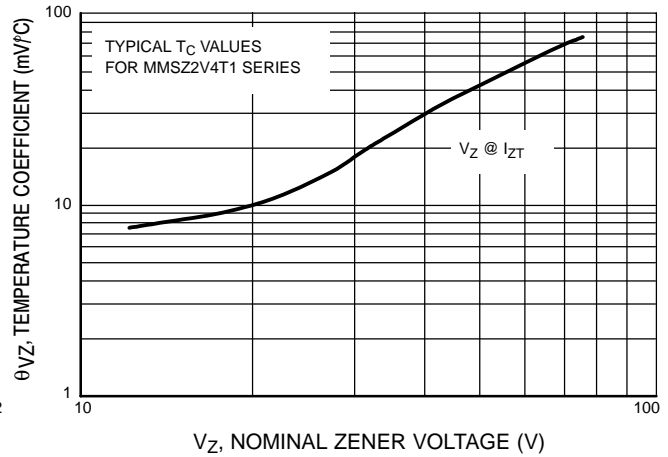


Figure 2. Temperature Coefficients (Temperature Range -55°C to +150°C)

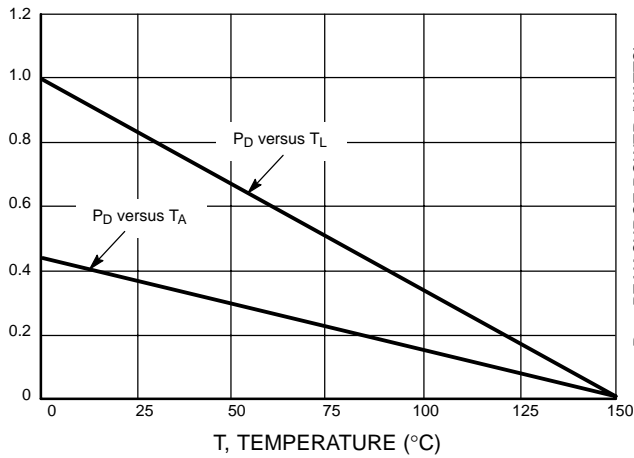


Figure 3. Steady State Power Derating

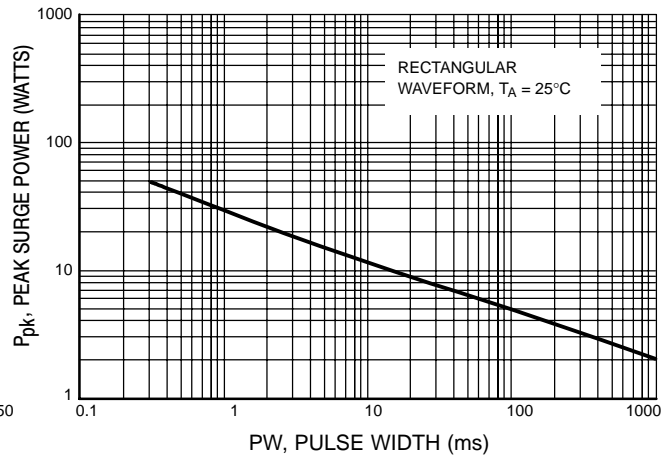


Figure 4. Maximum Nonrepetitive Surge Power

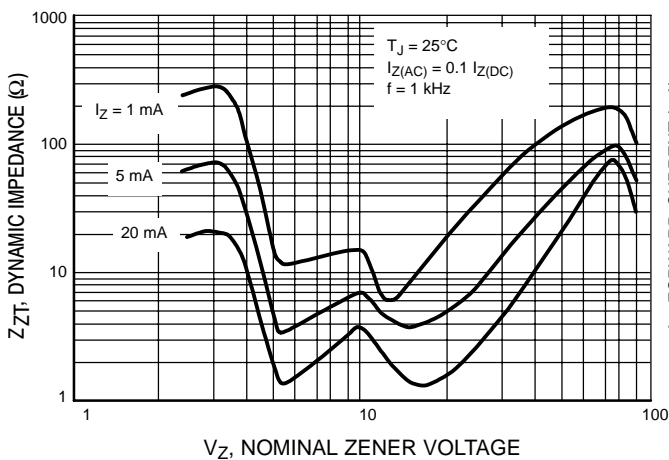


Figure 5. Effect of Zener Voltage on Zener Impedance

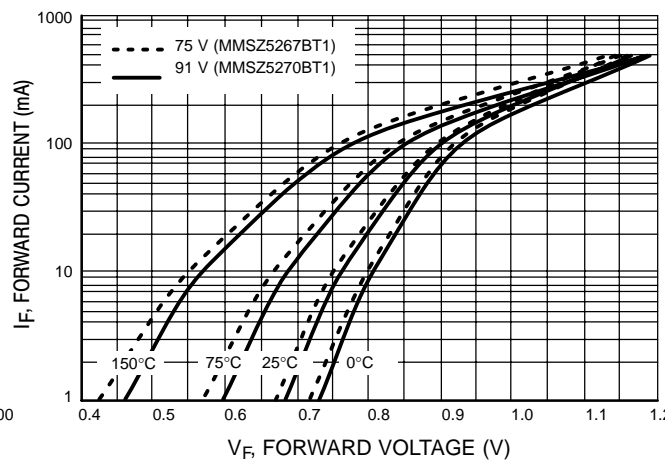


Figure 6. Typical Forward Voltage

MMSZ2V4T1 Series

TYPICAL CHARACTERISTICS

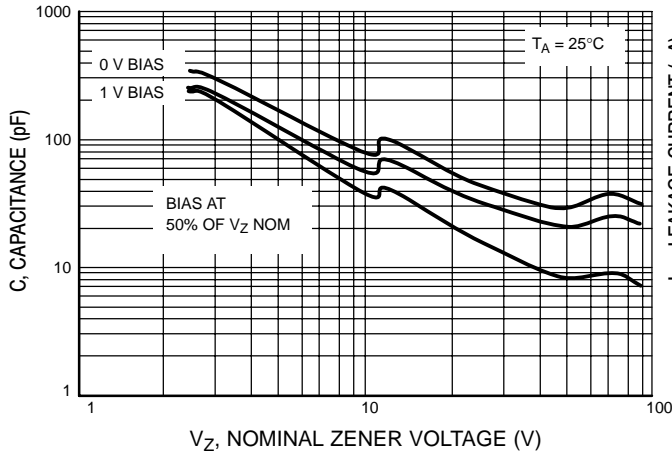


Figure 7. Typical Capacitance

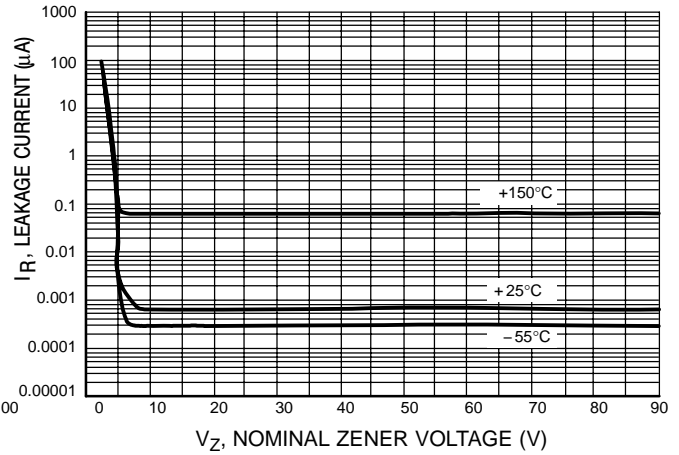


Figure 8. Typical Leakage Current

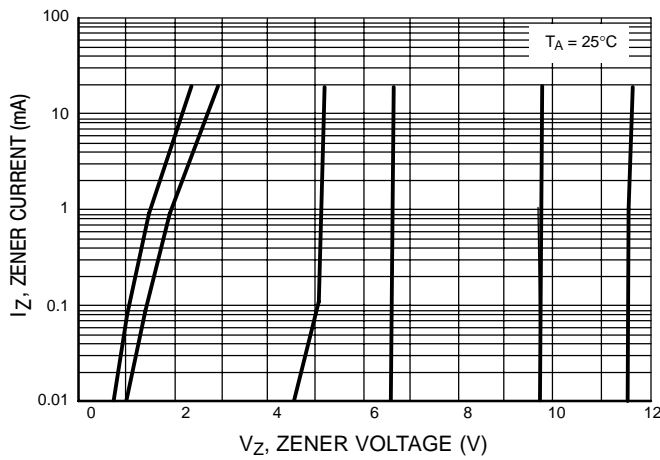


Figure 9. Zener Voltage versus Zener Current
(V_Z Up to 12 V)

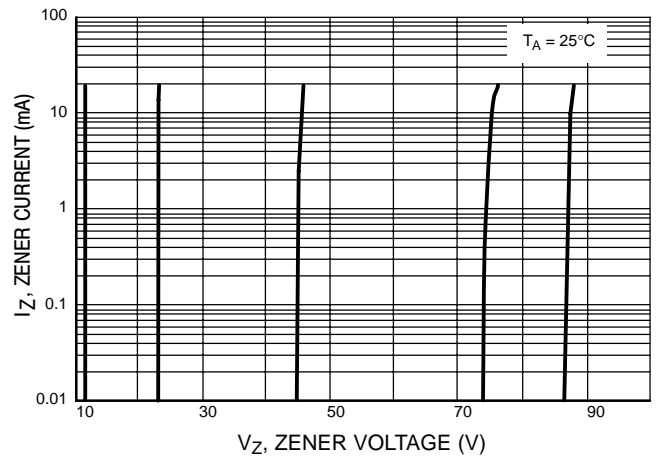
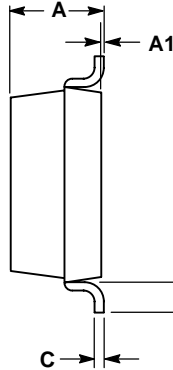
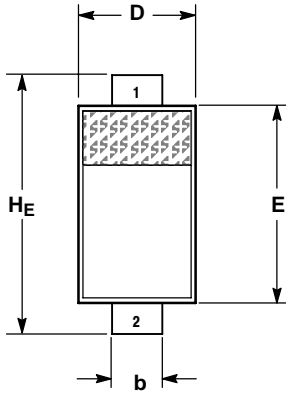


Figure 10. Zener Voltage versus Zener Current
(12 V to 91 V)

MMSZ2V4T1 Series

PACKAGE DIMENSIONS

SOD-123
CASE 425-04
ISSUE E



NOTES:

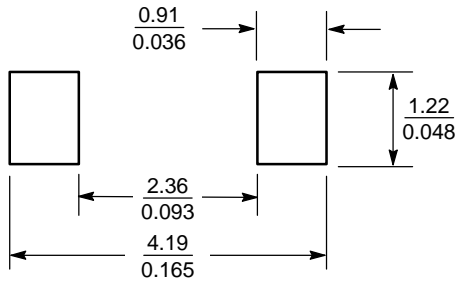
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	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
HE	3.56	3.68	3.86	0.140	0.145	0.152
L	0.25	---	---	0.010	---	---

STYLE 1:

- PIN 1. CATHODE
- ANODE

SOLDERING FOOTPRINT*



SCALE 10:1 (mm/inches)

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

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