Zener Voltage Regulators

500 mW SOD−123 Surface Mount

LMSZ4678ET1G Series

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.

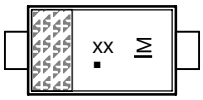
SOD−123

Features

- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range − 1.8 V to 43 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 W (8 x 20 μs)
- We declare that the material of product compliance with RoHS requirements.

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
▪ = Pb−Free Package

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Peak Power Dissipation @ 20 μs (Note 1) @ $T_L \le 25°C$	P_{pk}	225	W
Total Power Dissipation on FR−5 Board, (Note 2) @ T_L = 75°C Derated above 75°C	P_D	500 6.7	mW mW/°C
Thermal Resistance, (Note 3) Junction−to−Ambient	$R_{\theta JA}$	340	°C/W
Thermal Resistance, (Note 3) Junction−to−Lead	$R_{\theta JL}$	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.

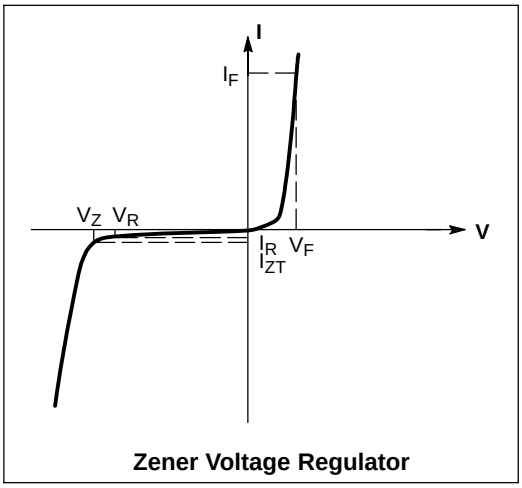
1. Nonrepetitive current pulse per Figure 11.
2. FR−5 = 3.5 x 1.5 inches, using the minimum recommended footprint.
3. Thermal Resistance measurement obtained via infrared Scan Method.

ORDERING INFORMATION

Device	Package	Shipping
LMSZ4xxxET1G	SOD−123	3000/Tape & Reel
LMSZ4xxxET3G	SOD−123	10000/Tape & Reel

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.95 V Max. @ I_F = 10 mA)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
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 (Note 1) V_Z (V) Min	Nom	Max	@ I_{ZT} µA	Leakage Current I_R @ V_R µA	V
LMSZ4684ET1G	CG3	3.13	3.3	3.47	50	7.5	1.5
LMSZ4688ET1G	CG7	4.47	4.7	4.94	50	10	3
LMSZ4689ET1G	CG8	4.85	5.1	5.36	50	10	3
LMSZ4690ET1G	CG9	5.32	5.6	5.88	50	10	4
LMSZ4691ET1G	CH1	5.89	6.2	6.51	50	10	5
LMSZ4692ET1G	CH2	6.46	6.8	7.14	50	10	5.1
LMSZ4693ET1G	CH3	7.13	7.5	7.88	50	10	5.7
LMSZ4697ET1G	CH7	9.50	10	10.50	50	1	7.6
LMSZ4699ET1G	CH9	11.40	12	12.60	50	0.05	9.1
LMSZ4701ET1G	CJ2	13.3	14	14.7	50	0.05	10.6
LMSZ4702ET1G	CJ3	14.25	15	15.75	50	0.05	11.4
LMSZ4703ET1G	CJ4	15.20	16	16.80	50	0.05	12.1
LMSZ4705ET1G	CJ6	17.10	18	18.90	50	0.05	13.6
LMSZ4709ET1G	CK1	22.80	24	25.20	50	0.01	18.2
LMSZ4711ET1G	CK3	25.65	27	28.35	50	0.01	20.4
LMSZ4717ET1G	CK9	40.85	43	45.15	50	0.01	32.6

1. Nominal Zener voltage is measured with the device junction in thermal equilibrium at T_L = 30°C ±1°C.

TYPICAL CHARACTERISTICS

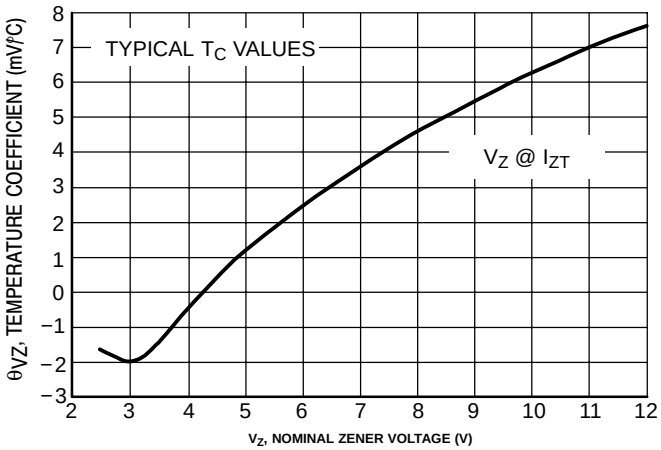


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

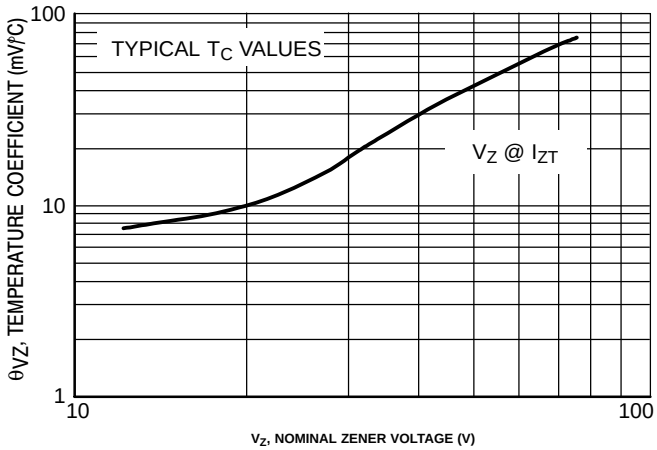


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

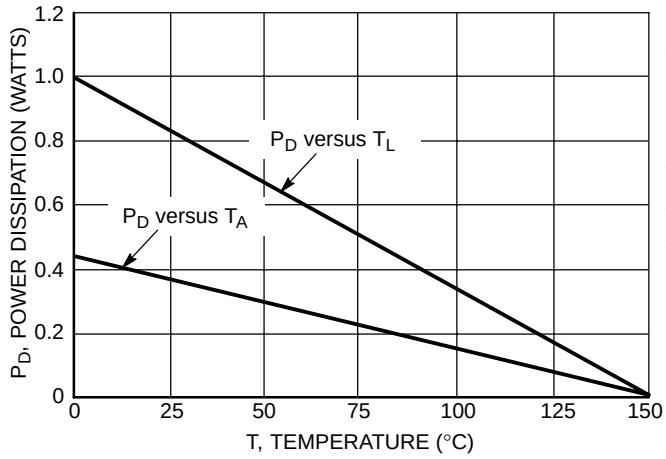


Figure 3. Steady State Power Derating

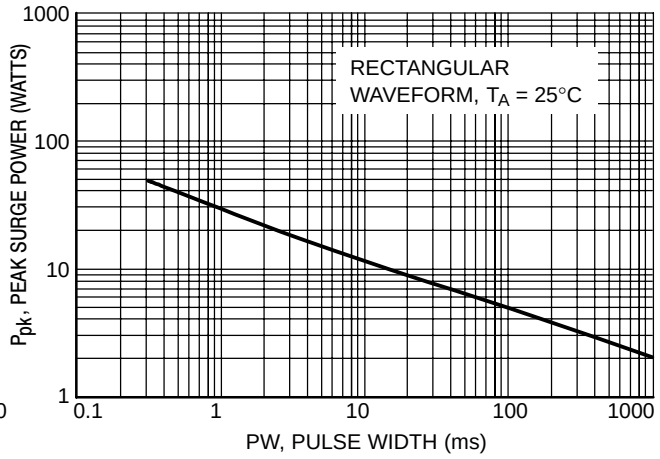


Figure 4. Maximum Nonrepetitive Surge Power

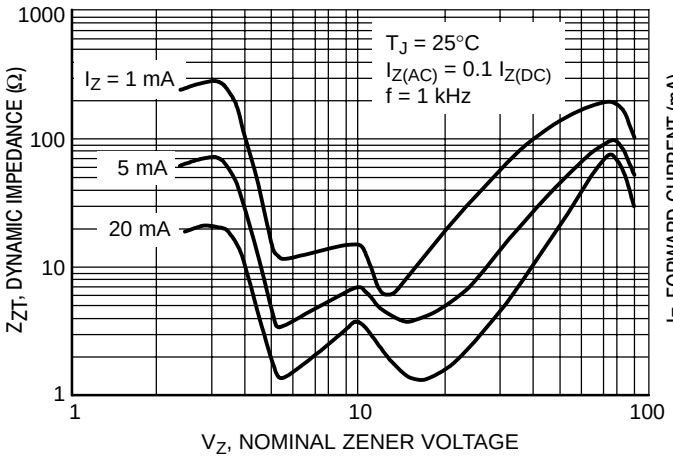


Figure 5. Effect of Zener Voltage on Zener Impedance

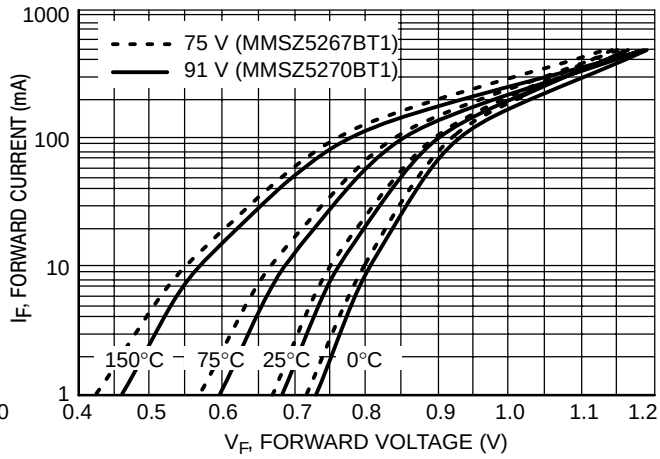


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

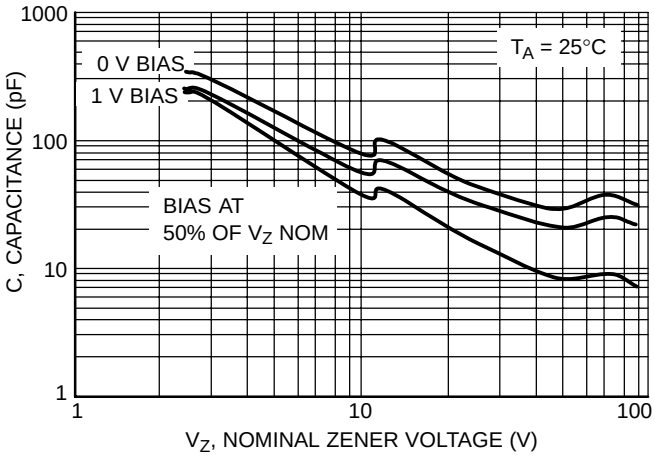


Figure 7. Typical Capacitance

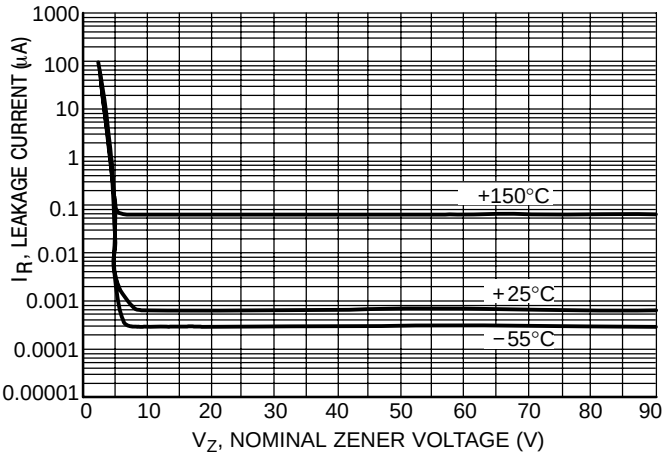


Figure 8. Typical Leakage Current

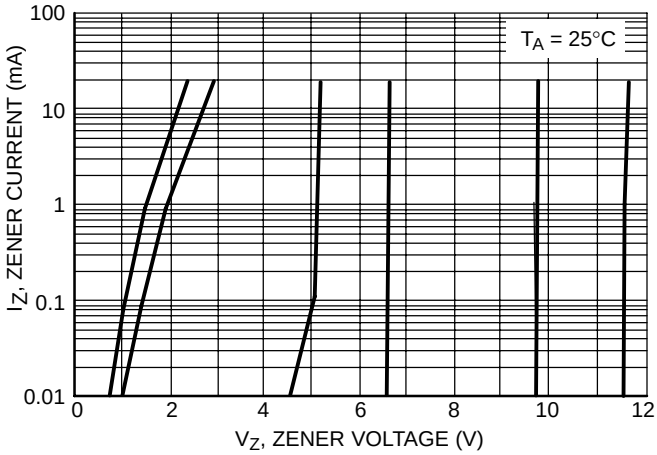


Figure 9. Zener Voltage versus Zener Current (V_Z Up to 12 V)

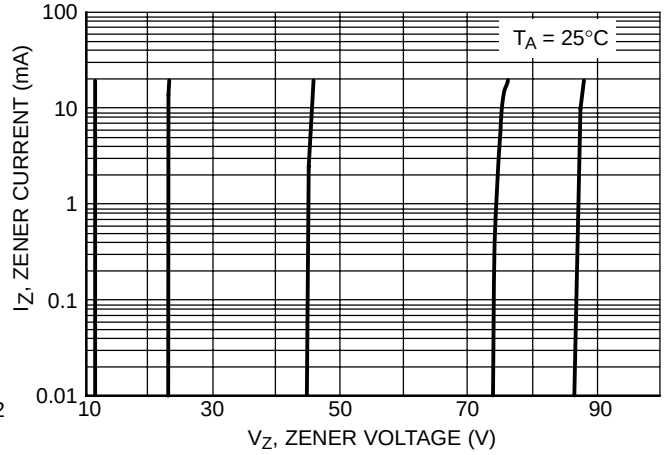


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)

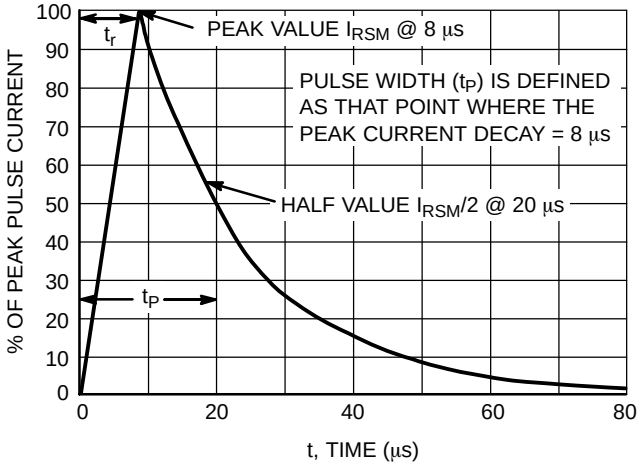
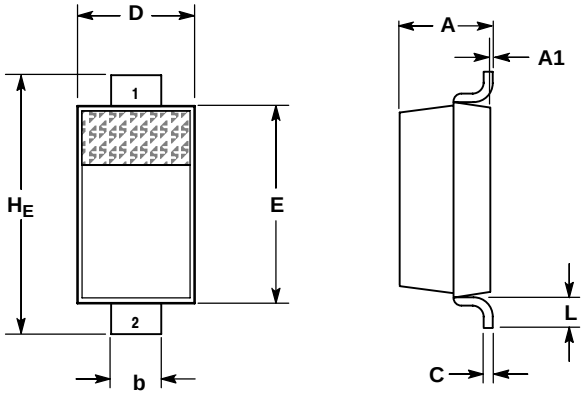


Figure 11. 8 × 20 μs Pulse Waveform

PACKAGE DIMENSIONS

SOD−123
CASE 425−04
ISSUE E

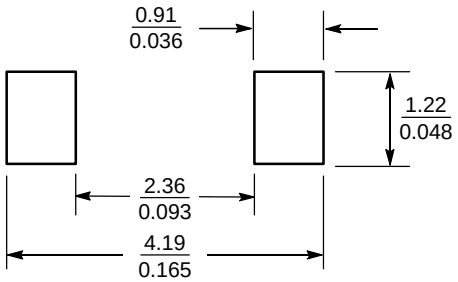


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	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 $\left(\frac{mm}{inches}\right)$