Diodes, Dual 40 Watt Peak Power, High Temperature

SC−70 Dual Common Anode Zeners

MMBZHxxVAWT1G Series, SZMMBZHxxVAWT1G Series

These dual monolithic silicon Zener diodes are designed for applications requiring transient overvoltage ESD protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. Their dual junction common anode design protects two separate lines using only one package. These devices are high temperature rated and ideal for use in high reliability applications where board space is at a premium.

Features

- SC−70 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Standard Zener Breakdown Voltage Range: 12 − 33 V
- Peak Power − 40 W @ 1.0 ms (Unidirectional), per Figure 5 Waveform
- ESD Rating:
  - − Class 3B (> 16 kV) per the Human Body Model
  - − Class C (> 400 V) per the Machine Model
- Low Leakage < 5.0 μA
- Flammability Rating UL 94 V−0
- 175°C $T_{J(MAX)}$ − Rated for High Temperature, Mission Critical Applications
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These are Pb−Free Devices*

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
Package designed for optimal automated board assembly
Small package size for high density applications
Available in 8 mm Tape and Reel

Use the Device Number to order the 7 inch/3,000 unit reel.

ON Semiconductor®

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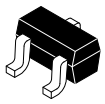
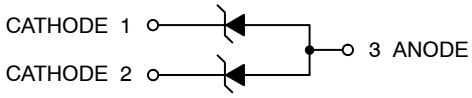
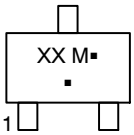


SC−70
CASE 419
STYLE 4



MARKING DIAGRAM



XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMBZHxxVAWT1G	SC−70 (Pb−Free)	3,000 / Tape & Reel
SZMMBZHxxVAWT1G	SC−70 (Pb−Free)	3,000 / 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.

DEVICE MARKING INFORMATION

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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 1.0 ms (Note 1) @ $T_L \le 25°C$	P_{pk}	40	W
Total Power Dissipation on FR−5 Board (Note 2) @ $T_A = 25°C$ Derate above 25°C	P_D	225 1.5	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	605	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	− 55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

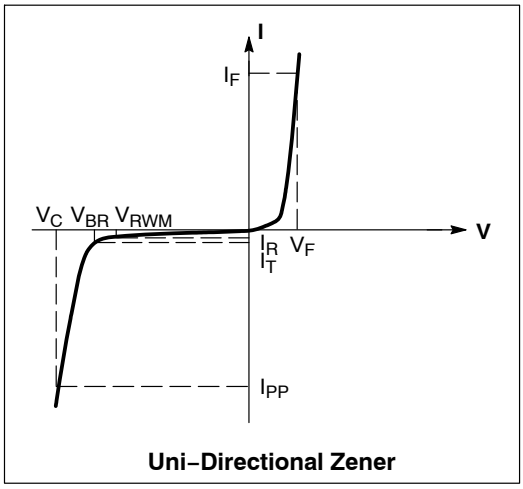
1. Non−repetitive current pulse per Figure 5 and derate above $T_A = 25°C$ per Figure 6.
2. FR−5 = 1.0 x 0.75 x 0.62 in.

ELECTRICAL CHARACTERISTICS

($T_A = 25°C$ unless otherwise noted)

UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or 2 and 3)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
ΘV_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}



Uni−Directional Zener

ELECTRICAL CHARACTERISTICS ($T_A = 25°C$ unless otherwise noted)

UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or Pins 2 and 3)

($V_F = 0.9$ V Max @ $I_F = 10$ mA)

Device*	Device Marking	V_{RWM}	I_R @ V_{RWM}	Breakdown Voltage V_{BR} (Note 3) (V)			@ I_T	V_C @ I_{PP} (Note 4)		ΘV_{BR}
				Min	Nom	Max		V_C	I_{PP}	
		Volts	nA				mA	V	A	mV/°C
MMBZH12VAWT1G	CK	8.5	200	11.40	12	12.60	1.0	17	2.35	7.5
MMBZH15VAWT1G	AJ	12	50	14.25	15	15.75	1.0	21	1.9	12.3
MMBZH20VAWT1G**	–	17	50	19.00	20	21.00	1.0	28	1.4	17.2
MMBZH27VAWT1G**	–	22	50	25.65	27	28.35	1.0	40	1.0	24.3
MMBZH33VAWT1G**	–	26	50	31.35	33	34.65	1.0	46	0.87	30.4

3. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C.
4. Surge current waveform per Figure 5 and derate per Figure 6.

*Includes SZ prefix devices where applicable.

**AEC−Q release available upon request.

TYPICAL CHARACTERISTICS

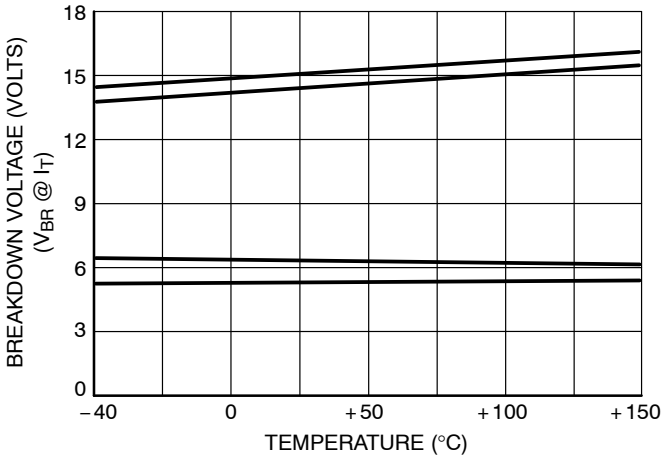


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

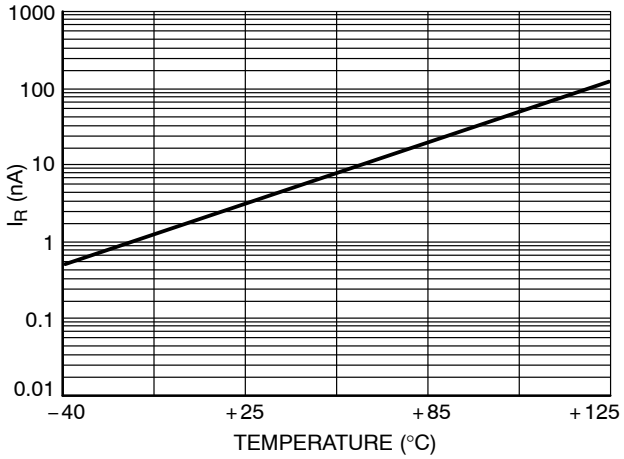


Figure 2. Typical Leakage Current versus Temperature

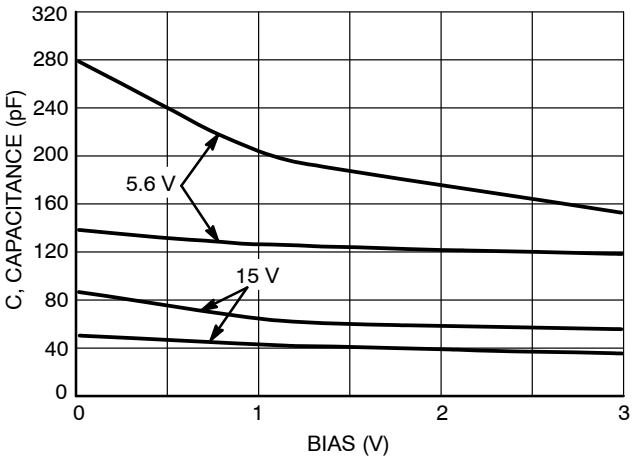


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

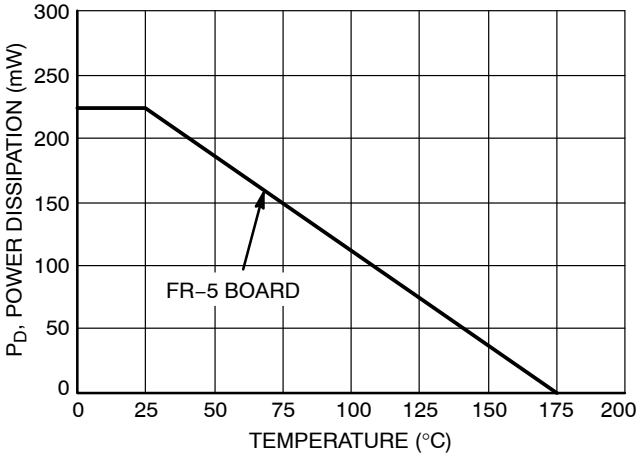


Figure 4. Steady State Power Derating Curve

TYPICAL CHARACTERISTICS

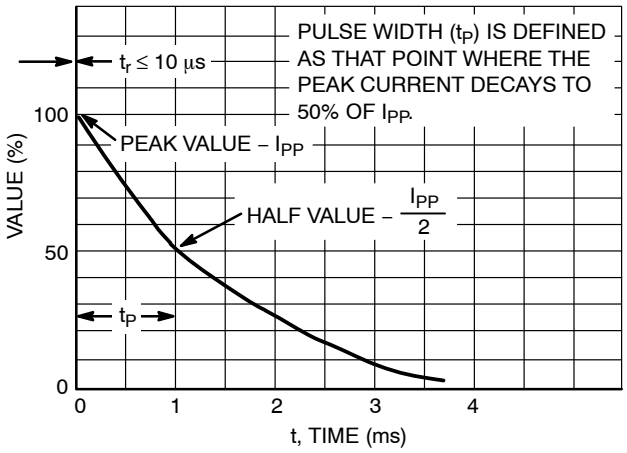


Figure 5. Pulse Waveform

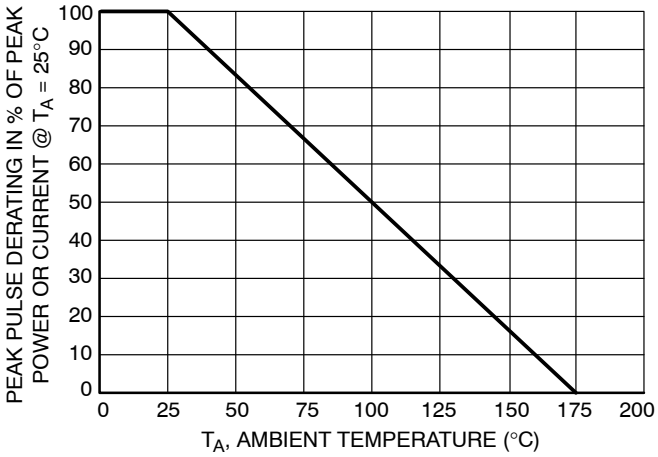


Figure 6. Pulse Derating Curve

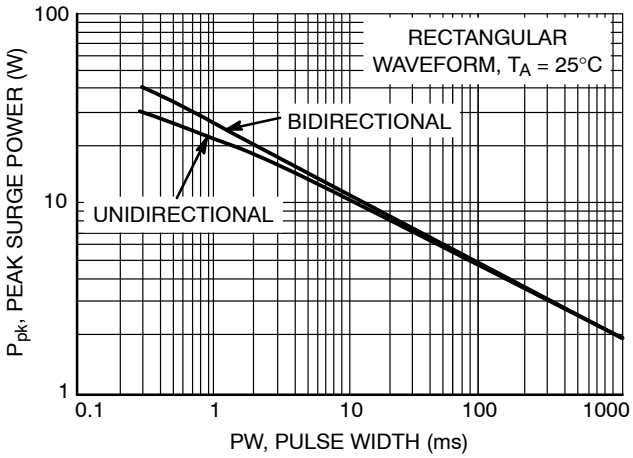


Figure 7. Maximum Non−repetitive Surge Power, P_{pk} versus PW

Power is defined as V_{RSM} x I_Z(pk) where V_{RSM} is the clamping voltage at I_Z(pk).

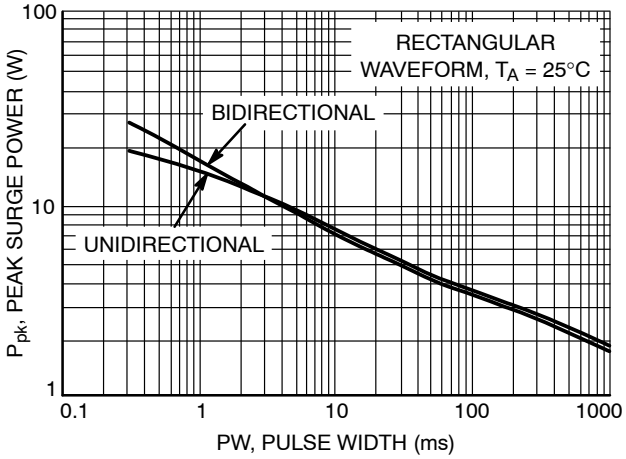


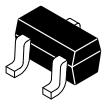
Figure 8. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

Power is defined as V_Z(NOM) x I_Z(pk) where V_Z(NOM) is the nominal Zener voltage measured at the low test current used for voltage classification.

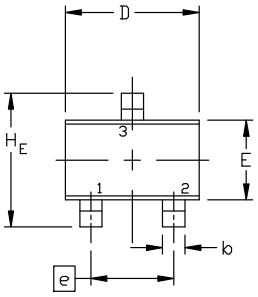
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

SC−70 (SOT−323)
CASE 419
ISSUE R

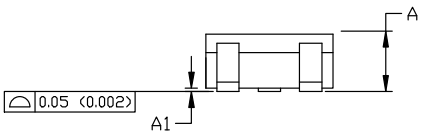
DATE 11 OCT 2022



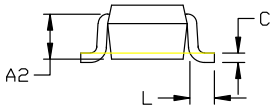
SCALE 4:1



TOP VIEW



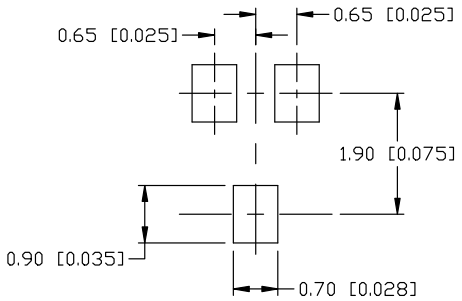
SIDE VIEW



END VIEW

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

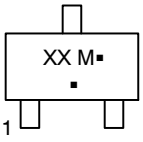
	MILLIMETERS			INCHES		
DIM	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70 REF			0.028 BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.00	2.20	0.071	0.080	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.56	0.008	0.015	0.022
H_E	2.00	2.10	2.40	0.079	0.083	0.095



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

SOLDERING FOOTPRINT

GENERIC MARKING DIAGRAM



XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
CANCELLED

STYLE 2:
PIN 1. ANODE
2. N.C.
3. CATHODE

STYLE 3:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 6:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 7:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 8:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. ANODE−CATHODE

STYLE 11:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

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