

# Zener Diodes, 40 Watt Peak Power

## SOT-23 Dual Common Cathode Zeners

### MMBZxxVxL, SZMMBZxxVxL Series

These dual monolithic silicon zener diodes are designed for applications requiring 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 cathode design protects two separate lines using only one package. These devices are ideal for situations where board space is at a premium.

#### Specification Features:

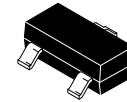
- SOT-23 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Standard Zener Breakdown Voltage Range – 15 V, 27 V, 39 V
- Peak Power – 40 W @ 1.0 ms (Bidirectional), per Figure 5 Waveform
- ESD Rating of Class 3B (exceeding 16 kV) per the Human Body Model
- ESD Rating of IEC61000-4-2 Level 4, ±30 kV Contact Discharge
- Low Leakage < 100 nA
- Flammability Rating: UL 94 V-O
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Devices

#### Mechanical Characteristics:

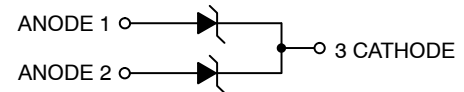
**CASE:** Void-free, transfer-molded, thermosetting plastic case

**FINISH:** Corrosion resistant finish, easily solderable

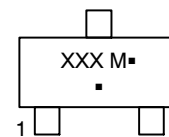
**MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:**  
260 °C for 10 Seconds



SOT-23  
CASE 318  
STYLE 9



#### MARKING DIAGRAM



XXX = 15D, 27C or 39C

M = Date Code

■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMBZ15VCLT1G, SZMMBZ15VCLT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBZ15VCLT3G, SZMMBZ15VCLT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
MMBZxxVCLT1G, SZMMBZxxVCLT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBZxxVCLT3G, SZMMBZxxVCLT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel

<sup>†</sup> For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 3.

# MMBZxxVxL, SZMMBZxxVxL Series

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 1.0 ms (Note 1) @ $T_L \leq 25^\circ\text{C}$	$P_{pk}$	40	Watts
Total Power Dissipation on FR-5 Board (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Power Dissipation on Alumina Substrate (Note 3) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to +150	$^\circ\text{C}$
Lead Solder Temperature – Maximum (10 Second Duration)	$T_L$	260	$^\circ\text{C}$

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.

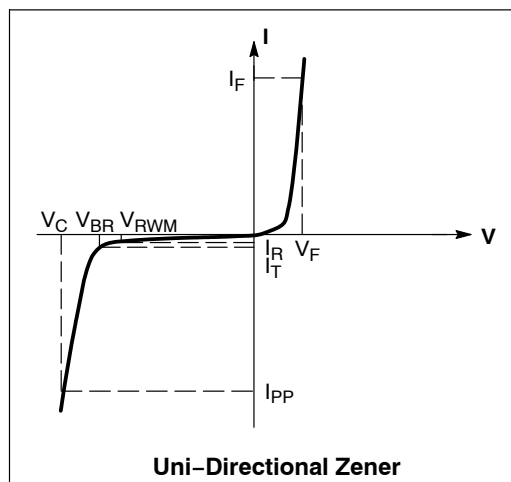
1. Nonrepetitive current pulse per Figure 5 and derate above  $T_A = 25^\circ\text{C}$  per Figure 6.
2. FR-5 =  $1.0 \times 0.75 \times 0.62$  in.
3. Alumina =  $0.4 \times 0.3 \times 0.024$  in., 99.5% alumina

## ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  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
$V_{BR}$	Maximum Temperature Coefficient of $V_{BR}$
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$



## MMBZxxVxL, SZMMBZxxVxL Series

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

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

( $V_F = 0.9\text{ V Max @ }I_F = 10\text{ mA}$ )

Device*	Device Marking	$V_{RWM}$	$I_R @ V_{RWM}$	Breakdown Voltage				$V_C @ I_{PP}$ (Note 6)		$V_{BR}$
				$V_{BR}$ (Note 5) (V)			@ $I_T$	$V_C$	$I_{PP}$	
		Volts	nA	Min	Nom	Max	mA	V	A	mV/ $^{\circ}\text{C}$
MMBZ15VCLT1G/T3G	15D	12.8	100	14.3	15	15.8	1.0	21.2	1.9	12

( $V_F = 1.1\text{ V Max @ }I_F = 200\text{ mA}$ )

Device*	Device Marking	$V_{RWM}$	$I_R @ V_{RWM}$	Breakdown Voltage				$V_C @ I_{PP}$ (Note 6)		$V_{BR}$
				$V_{BR}$ (Note 5) (V)			@ $I_T$	$V_C$	$I_{PP}$	
		Volts	nA	Min	Nom	Max	mA	V	A	mV/ $^{\circ}\text{C}$
MMBZ27VCLT1G/T3G	27C	22	50	25.65	27	28.35	1.0	38	1.0	26

**DISCONTINUED** (Note 4)

MMBZ39VCLT1G/T3G	39C	31.2	50	37.05	39	40.95	1.0	55	0.76	35.3
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Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

\* Include SZ-prefix devices where applicable.

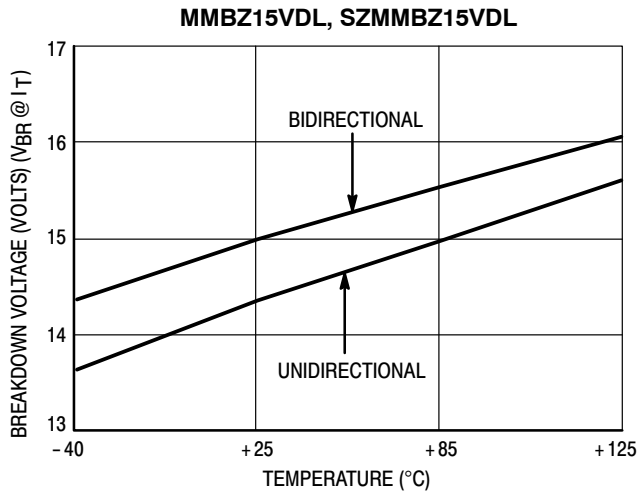
4. **DISCONTINUED:** These devices are not available. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

5.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of  $25\text{ }^{\circ}\text{C}$ .

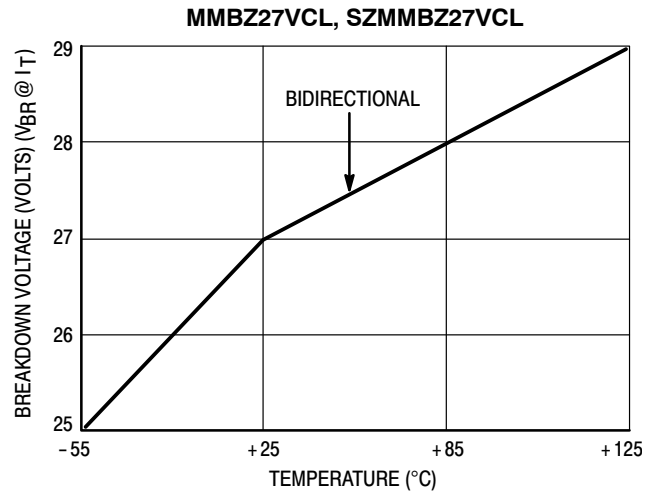
6. Surge current waveform per Figure 5 and derate per Figure 6

# MMBZxxVxL, SZMMBZxxVxL Series

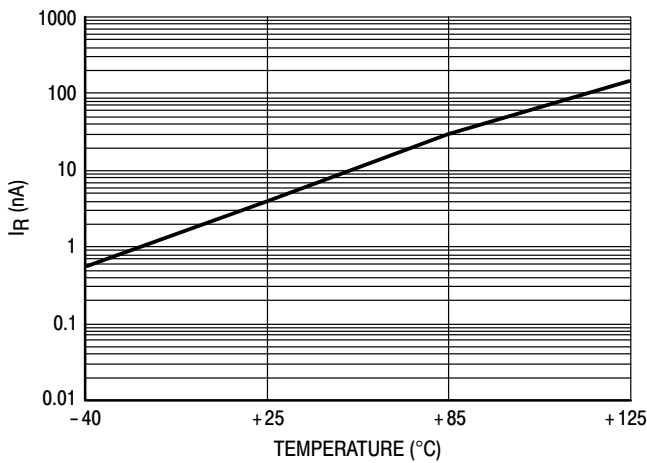
## TYPICAL CHARACTERISTICS



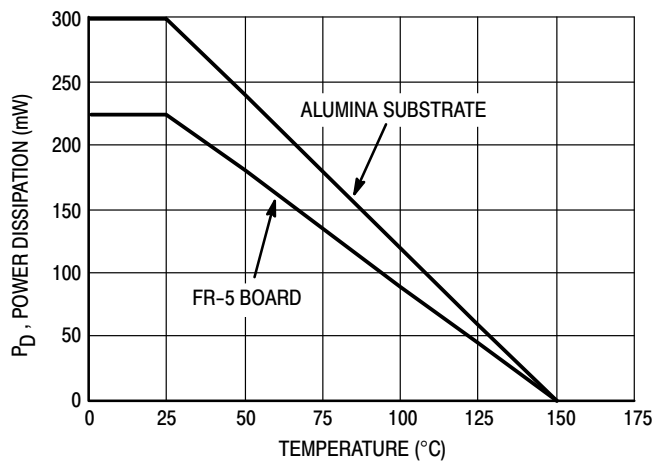
**Figure 1. Typical Breakdown Voltage versus Temperature**



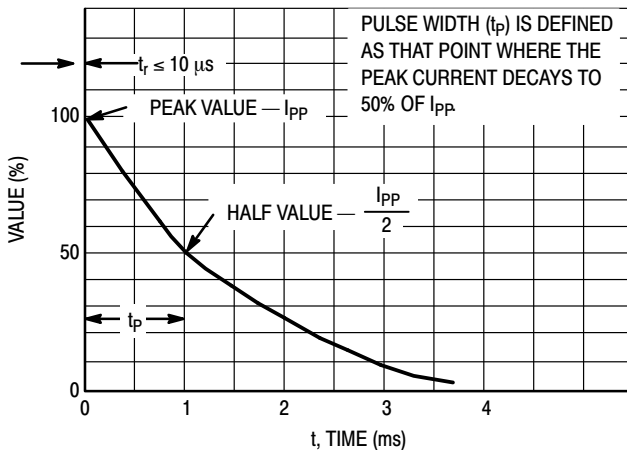
**Figure 2. Typical Breakdown Voltage versus Temperature**



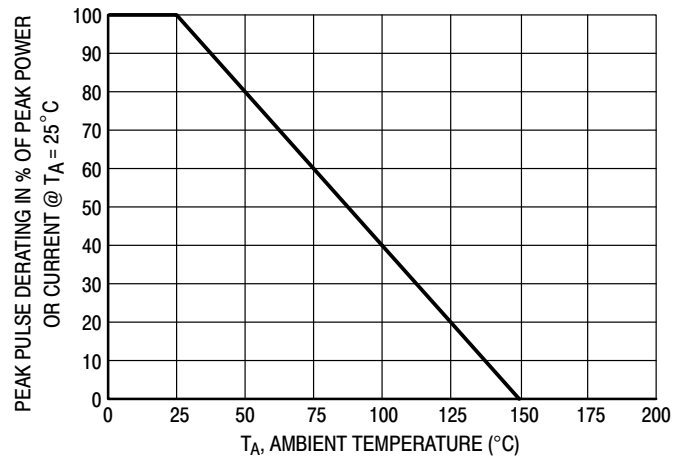
**Figure 3. Typical Leakage Current versus Temperature**



**Figure 4. Steady State Power Derating Curve**



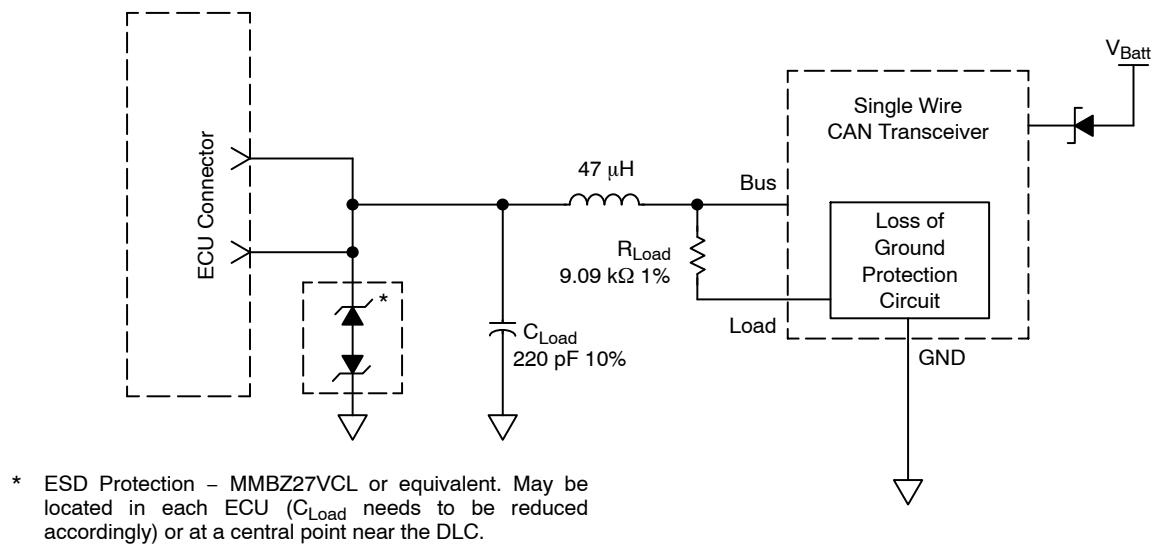
**Figure 5. Pulse Waveform**



**Figure 6. Pulse Derating Curve**

## MMBZxxVxL, SZMMBZxxVxL Series

### TYPICAL APPLICATIONS



**Figure 7. Single Wire CAN Network**

Figure is the recommended solution for transient EMI/ESD protection. This circuit is shown in the Society of Automotive Engineers February, 2000 J2411 “Single Wire CAN Network for Vehicle Applications” specification (Figure 6). Note: the dual common anode zener configuration shown above is electrically equivalent to a dual common cathode zener configuration.

## MMBZxxVxL, SZMMBZxxVxL Series

### REVISION HISTORY

Revision	Description of Changes	Date
18	Rebranded the Data Sheet to <b>onsemi</b> format. MMBZ39VCLT3G, MMBZ39VCLT1G OPNs Marked as Discontinued.	10/15/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P  
CASE 318  
ISSUE AU

DATE 14 AUG 2024

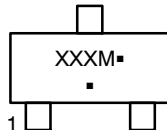


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC  
MARKING DIAGRAM\*



XXX = 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.



RECOMMENDED  
MOUNTING FOOTPRINT

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

STYLES ON PAGE 2

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**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE	STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE	STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE	STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE	STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE	STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE	STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE
STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE	STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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