MMBZ15VDLT1, MMBZ27VCLT1

Preferred Devices

40 Watt Peak Power Zener Transient Voltage Suppressors

SOT−23 Dual Common Cathode Zeners for ESD Protection

These dual monolithic silicon zener diodes are designed for applications requiring transient overvoltage 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.

The MMBZ27VCLT1 can be used to protect a single wire communication network form EMI and ESD transient surge voltages. The MMBZ27VCLT1 is recommended by the Society of Automotive Engineers (SAE), February 2000, J2411 "Single Wire Can Network for Vehicle Applications" specification as a solution for transient voltage problems.

Specification Features:

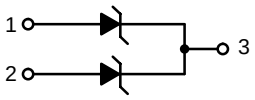
- SOT−23 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Working Peak Reverse Voltage Range − 12.8 V, 22 V
- Standard Zener Breakdown Voltage Range − 15 V, 27 V
- Peak Power − 40 W @ 1.0 ms (Bidirectional), per Figure 5 Waveform
- ESD Rating of Class N (exceeding 16 kV) per the Human Body Model
- Low Leakage < 100 nA
- Flammability Rating: UL 94 V−O
- Pb−Free Packages are Available

Mechanical Characteristics:

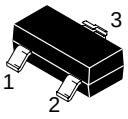
CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:
260°C for 10 Seconds

ON Semiconductor®

http://onsemi.com

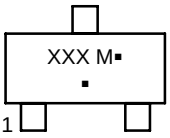


PIN 1. ANODE
2. ANODE
3. CATHODE



SOT−23
CASE 318
STYLE 9

MARKING DIAGRAM



xxx = 15D or 27C
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMBZ15VDLT1	SOT−23	3000/Tape & Reel
MMBZ15VDLT1G	SOT−23 (Pb−Free)	3000/Tape & Reel
MMBZ15VDLT3	SOT−23	10,000/Tape & Reel
MMBZ15VDLT3G	SOT−23 (Pb−Free)	10,000/Tape & Reel
MMBZ27VCLT1	SOT−23	3000/Tape & Reel
MMBZ27VCLT1G	SOT−23 (Pb−Free)	3000/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.

Preferred devices are recommended choices for future use and best overall value.

MAXIMUM RATINGS

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

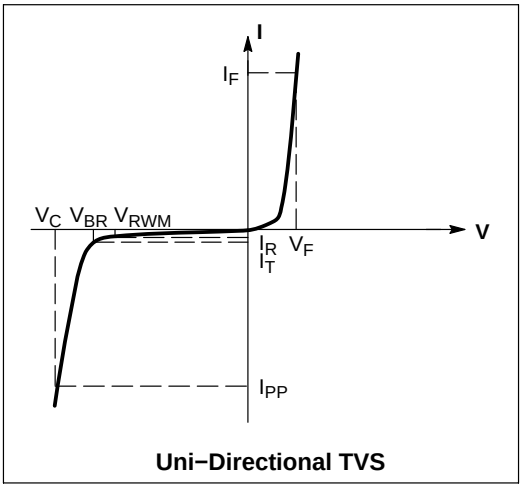
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Nonrepetitive current pulse per Figure 5 and derate above $T_A = 25°C$ per Figure 6.
2. FR−5 = 1.0 x 0.75 x 0.62 in.
3. Alumina = 0.4 x 0.3 x 0.024 in., 99.5% alumina

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
V_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F



Uni−Directional TVS

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_C @ I_{PP} (Note 5)		
				V_{BR} (Note 4) (V)			@ I_T	V_C	I_{PP}	V_{BR}
		Volts	nA	Min	Nom	Max	mA	V	A	mV/°C
MMBZ15VDLT1, G*	15D	12.8	100	14.3	15	15.8	1.0	21.2	1.9	12

($V_F = 1.1$ V Max @ $I_F = 200$ mA)

Device	Device Marking	V_{RWM}	I_R @ V_{RWM}	Breakdown Voltage				V_C @ I_{PP} (Note 5)		
				V_{BR} (Note 4) (V)			@ I_T	V_C	I_{PP}	V_{BR}
		Volts	nA	Min	Nom	Max	mA	V	A	mV/°C
MMBZ27VCLT1, G*	27C	22	50	25.65	27	28.35	1.0	38	1.0	26

*The “G” suffix indicates Pb−Free package available.

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

TYPICAL CHARACTERISTICS

MMBZ15VDLT1

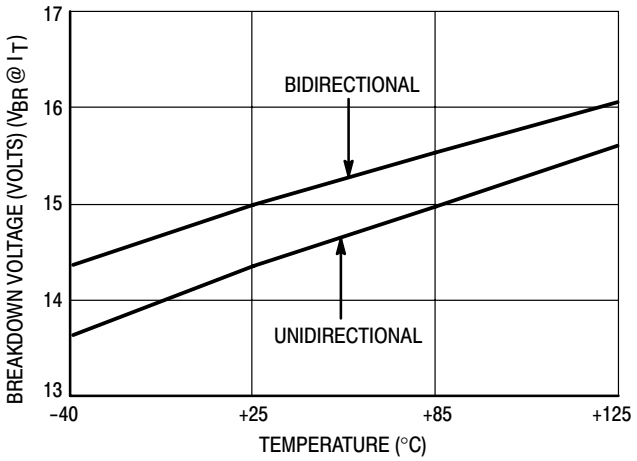


Figure 1. Typical Breakdown Voltage versus Temperature

MMBZ27VCLT1

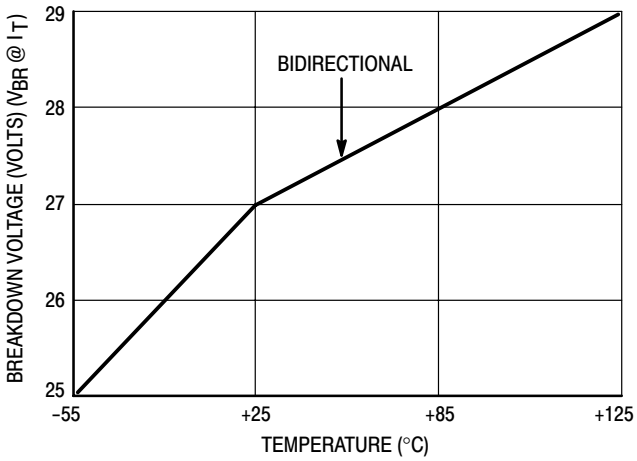


Figure 2. Typical Breakdown Voltage versus Temperature

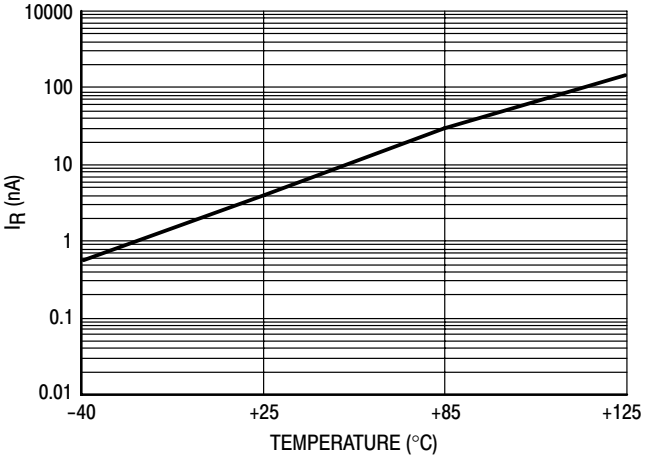


Figure 3. Typical Leakage Current versus Temperature

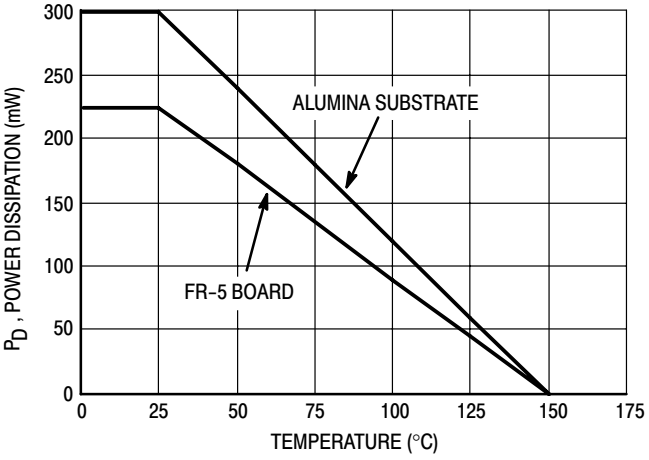


Figure 4. Steady State Power Derating Curve

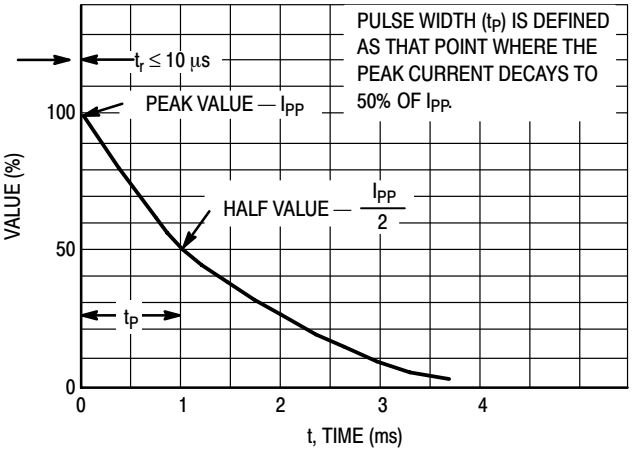


Figure 5. Pulse Waveform

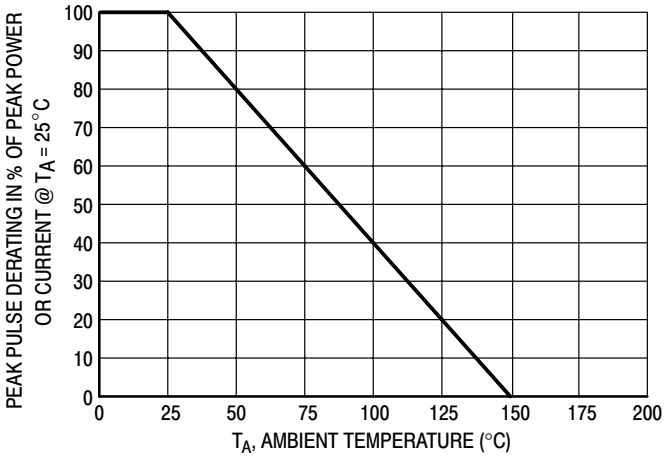
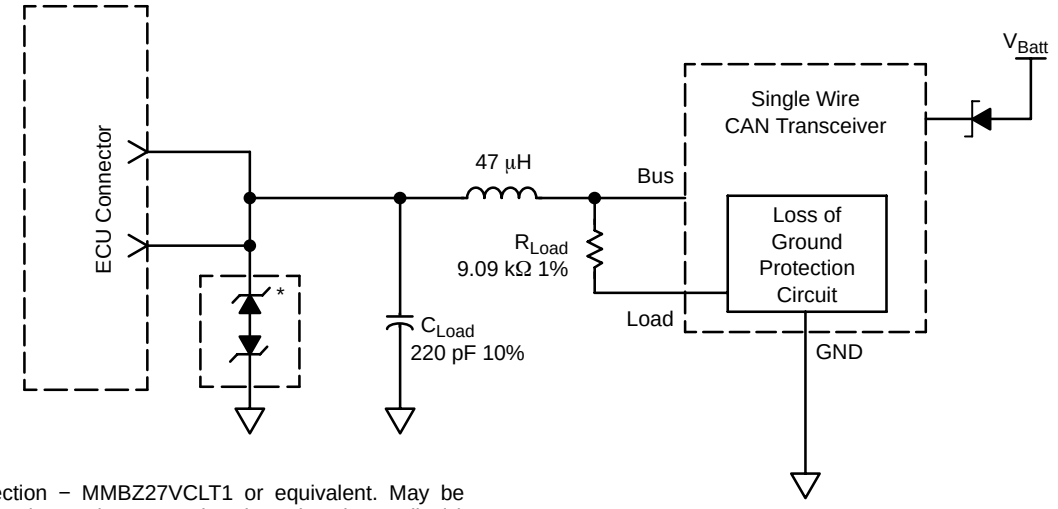


Figure 6. Pulse Derating Curve

TYPICAL APPLICATIONS



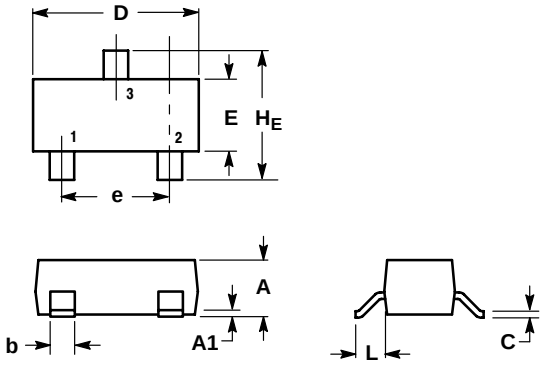
*ESD Protection − MMBZ27VCLT1 or equivalent. May be located in each ECU (C_{Load} needs to be reduced accordingly) or at a central point near the DLC.

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, page 11).

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AL

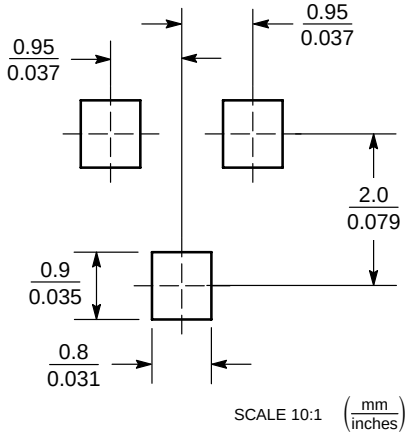


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

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

SOLDERING FOOTPRINT*



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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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MMBZ15VDLT1/D