

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 from 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

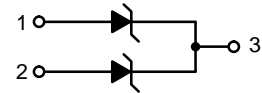
FINISH: Corrosion resistant finish, easily solderable

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



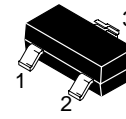
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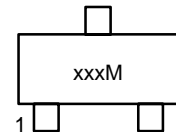


PIN 1. ANODE
2. ANODE
3. CATHODE

MARKING DIAGRAM



SOT-23
CASE 318
STYLE 9



xxx = 15D or 27C
M = Date Code

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
MMBZ27VCLT3	SOT-23	10,000/Tape & Reel
MMBZ27VCLT3G	SOT-23 (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.

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

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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°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°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	$^\circ\text{C}$

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.

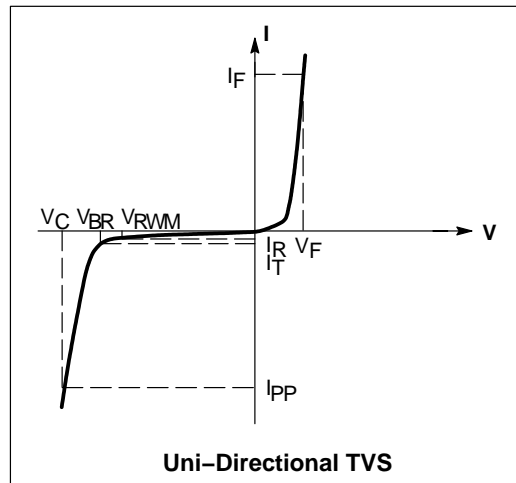
- Nonrepetitive current pulse per Figure 5 and derate above $T_A = 25^\circ\text{C}$ per Figure 6.
- FR-5 = 1.0 x 0.75 x 0.62 in.
- Alumina = 0.4 x 0.3 x 0.024 in., 99.5% alumina

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



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ 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} Volts	$I_R @ V_{RWM}$ nA	Breakdown Voltage				$V_C @ I_{PP}$ (Note 5)		V_{BR} mV/ $^\circ\text{C}$
				V_{BR} (Note 4) (V)			@ I_T mA	V_C V	I_{PP} A	
				Min	Nom	Max				
MMBZ15VDLT1	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} Volts	$I_R @ V_{RWM}$ nA	Breakdown Voltage				$V_C @ I_{PP}$ (Note 5)		V_{BR} mV/ $^\circ\text{C}$
				V_{BR} (Note 4) (V)			@ I_T mA	V_C V	I_{PP} A	
				Min	Nom	Max				
MMBZ27VCLT1	27C	22	50	25.65	27	28.35	1.0	38	1.0	26

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

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TYPICAL CHARACTERISTICS

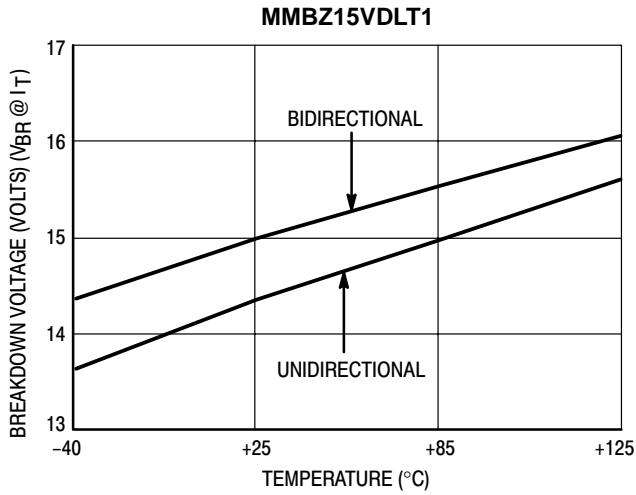


Figure 1. Typical Breakdown Voltage versus Temperature

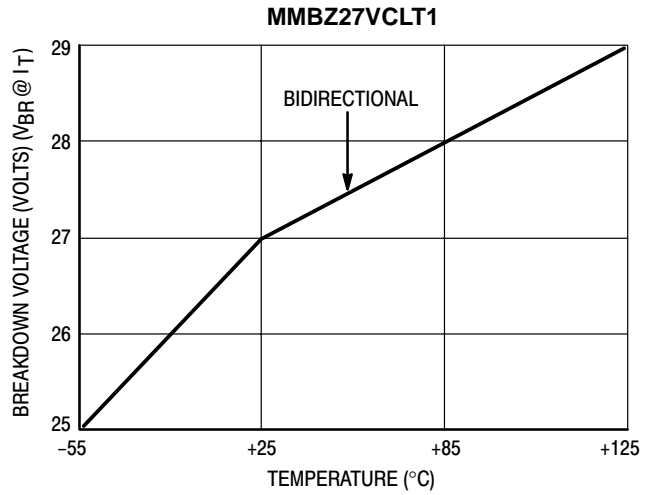


Figure 2. Typical Breakdown Voltage versus Temperature

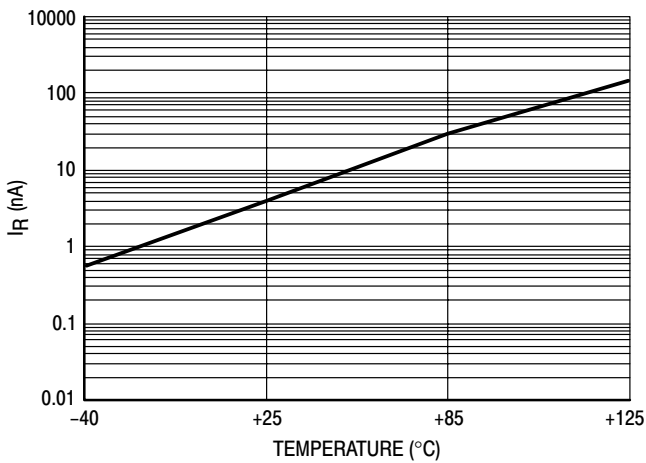


Figure 3. Typical Leakage Current versus Temperature

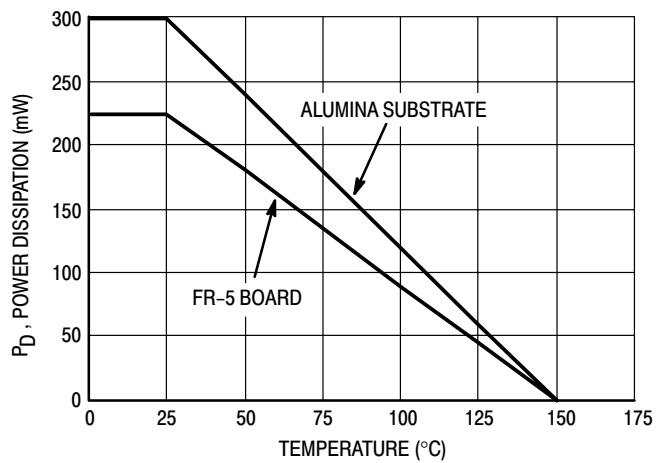


Figure 4. Steady State Power Derating Curve

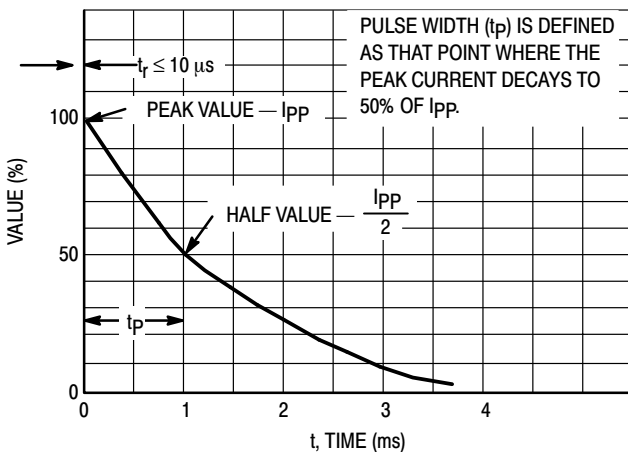


Figure 5. Pulse Waveform

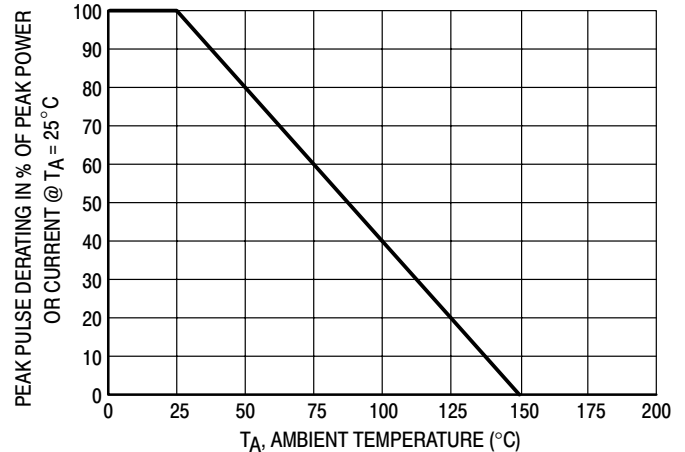
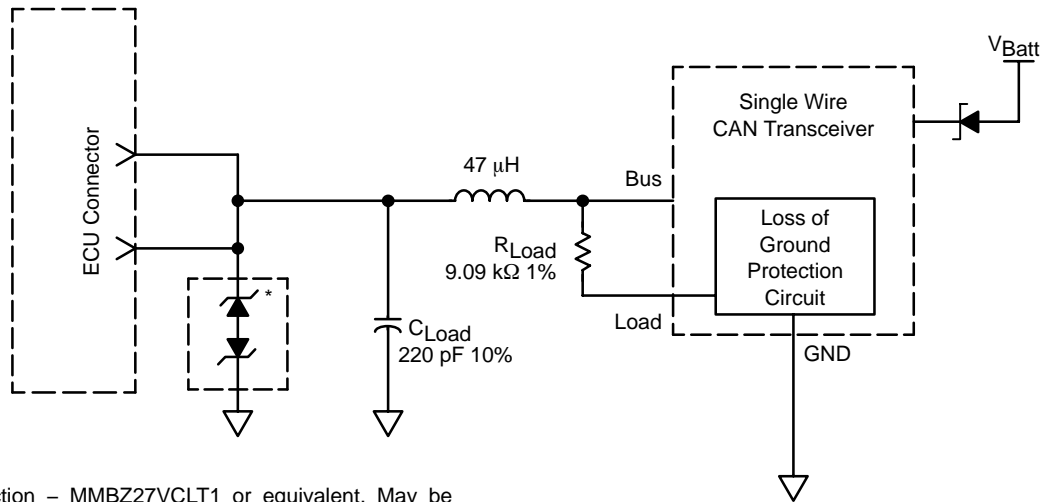


Figure 6. Pulse Derating Curve

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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).