

DESCRIPTION

The 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 anode design protects two separate lines using only one package. These devices ideal for situations where board space is at a premium.

FEATURES

- ◇ SOT-23 package allows either two separate unidirectional configurations or a single bidirectional configuration.
- ◇ Working peak reverse voltage 2V to 26V
- ◇ Standard Zener breakdown voltage 5.1V to 33V
- ◇ Peak power 24 or 40 Watts @ 1.0ms (unidirectional) per Figure 6 Waveform
- ◇ ESD Rating:
 - Class 3B (>16kV) per the Human Body Model
 - Class C (>400V) per Machine Model
- ◇ ESD Rating of IEC61000-4-2 level 4
- ◇ Low leakage < 5.0μA

MACHANICAL DATA

- ◇ SOT-23 package
- ◇ Flammability Rating: UL 94V-0
- ◇ Packaging: Tape and Reel
- ◇ High temperature soldering guaranteed: 260°C/10s
- ◇ Reel size: 7 inch

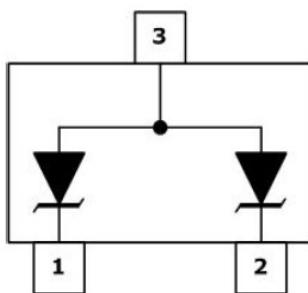
ORDERING INFORMATION

- ◇ Device: MMBZxxxAL Series
- ◇ Package: SOT-23
- ◇ Material: RoHS Compliant
- ◇ Packing: Tape & Reel
- ◇ Quantity per reel: 3,000pcs

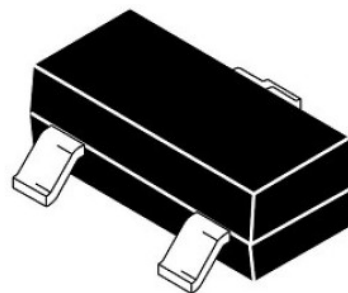
APPLICATIONS

- ◇ Computers
- ◇ Printers
- ◇ Business Machines
- ◇ Communication systems
- ◇ Medical equipment

PIN CONFIGURATION



PACKAGE OUTLINE





MMBZxxxAL Series

Common Anode Zeners for ESD Protection

ABSOLUTE MAXIMUM RATING

| Symbol | Parameter | Value | Units |
|-----------|-------------------------------|----------|-------|
| P_{PK} | Peak Power Dissipation @1.0ms | | |
| | MMBZ5V1AL thru MMBZ9V1AL | 24 | W |
| | MMBZ12VAL thru MMBZ33VAL | 40 | |
| P_D | Total Power Dissipation | 200 | Mw |
| T_{OPT} | Operating Temperature | -55/+150 | °C |
| T_{STG} | Storage Temperature | -55/+150 | °C |

24 WATTS

ELECTRICAL CHARACTERISTICS ($T_{amb}=25^{\circ}C$) UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or Pins 2 to 3)

| Part Number | Device Marking | V_{RWM} | I_R | V_{BR} | | | Z_{ZT} | Z_{ZK} | | V_C | | |
|-------------|----------------|-----------|----------------|----------|-----|------|--------------|-------------------|------|---------------|-----|---------------|
| | | (V) | (μA) | (V) | | | (Ω) | (Ω) | (ma) | (V) | (A) | |
| | | | @ V_{RWM} | Min | Nom | Max | @ I_T | Max @ I_{ZT} | Max | @ I_{ZK} | Max | @ I_{PP} |
| MMBZ5V1AL | 5A1+code | 2.0 | 5.0 | 4.8 | 5.1 | 5.4 | 5.0 | 60 | 500 | 1.0 | 13 | 2 |
| MMBZ5V6AL | 5A6+code | 3.0 | 5.0 | 5.32 | 5.6 | 5.88 | 20 | 11 | 1600 | 0.25 | 8.0 | 3.0 |
| MMBZ6V2AL | 6A2+code | 3.0 | 0.5 | 5.89 | 6.2 | 6.51 | 1.0 | -- | -- | -- | 8.7 | 2.76 |
| MMBZ6V8AL | 6A8+code | 4.5 | 0.5 | 6.46 | 6.8 | 7.14 | 1.0 | -- | -- | -- | 9.6 | 2.5 |
| MMBZ9V1AL | 9A1+code | 6.0 | 0.3 | 8.65 | 9.1 | 9.56 | 1.0 | -- | -- | -- | 14 | 1.7 |

$V_F=0.9V$ Max @ $I_F=10Ma$

40 WATTS

ELECTRICAL CHARACTERISTICS ($T_{amb}=25^{\circ}C$) UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or Pins 2 to 3)

| Part Number | Device Marking | V_{RWM} | I_R | V_{BR} | | | | V_C (note1) | |
|-------------|----------------|-----------|----------------|----------|-----|-------|------------|---------------|---------------|
| | | (V) | (nA) | (V) | | | (mA) | (V) | (A) |
| | | | @ V_{RWM} | Min | Nom | Max | @ I_T | Max | @ I_{PP} |
| MMBZ12VAL | 12A+code | 8.5 | 200 | 11.40 | 12 | 12.60 | 1 | 17 | 2.35 |
| MMBZ15VAL | 15A+code | 12.0 | 50 | 14.25 | 15 | 15.75 | 1 | 21 | 1.90 |
| MMBZ18VAL | 18A+code | 14.5 | 50 | 17.10 | 18 | 18.90 | 1 | 25 | 1.60 |
| MMBZ20VAL | 20A+code | 16.0 | 50 | 19 | 20 | 21 | 1 | 38 | 1.0 |
| MMBZ27VAL | 27A+code | 22.0 | 50 | 25.65 | 27 | 28.35 | 1 | 40 | 1.0 |
| MMBZ33VAL | 33A+code | 26.0 | 50 | 31.35 | 33 | 34.65 | 1 | 46 | 0.87 |

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

Note 1: Surge Current waveform per Figure 5

ELECTRICAL CHARACTERISTICS CURVE

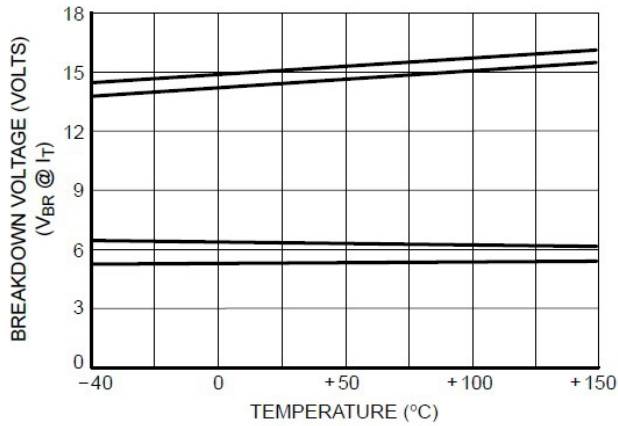


Figure 1. Typical Breakdown Voltage versus Temperature

(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

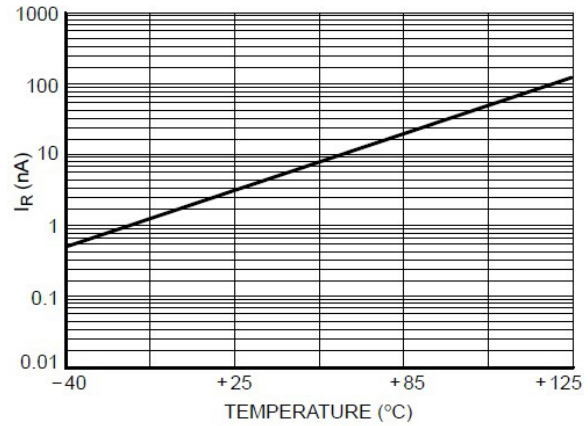


Figure 2. Typical Leakage Current versus Temperature

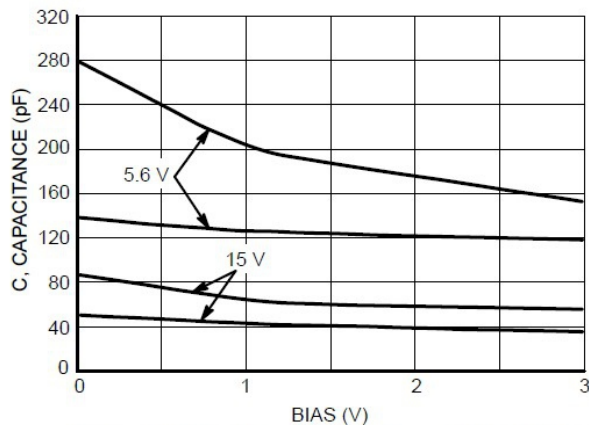


Figure 3. Typical Capacitance versus Bias Voltage

(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

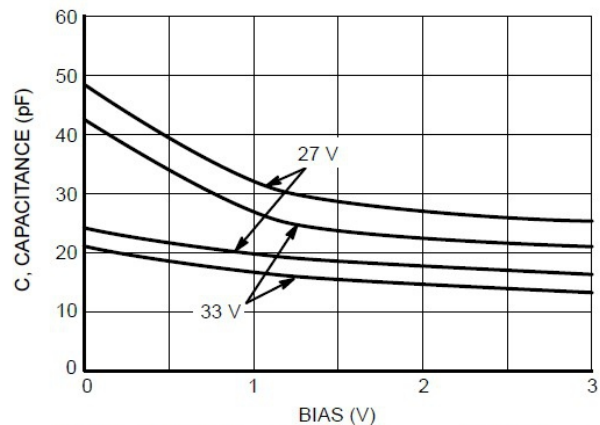


Figure 4. Typical Capacitance versus Bias Voltage

(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

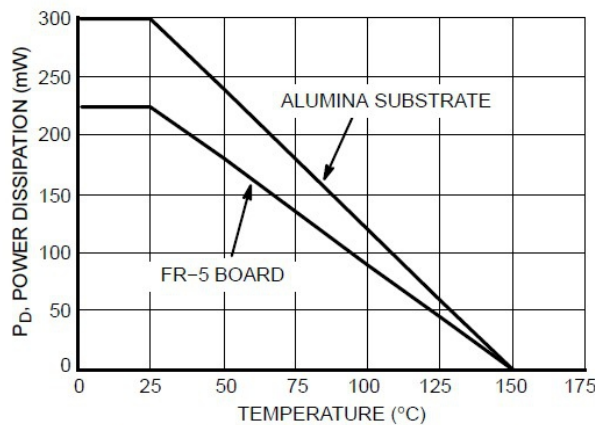


Figure 5. Steady State Power Derating Curve

ELECTRICAL CHARACTERISTICS CURVE

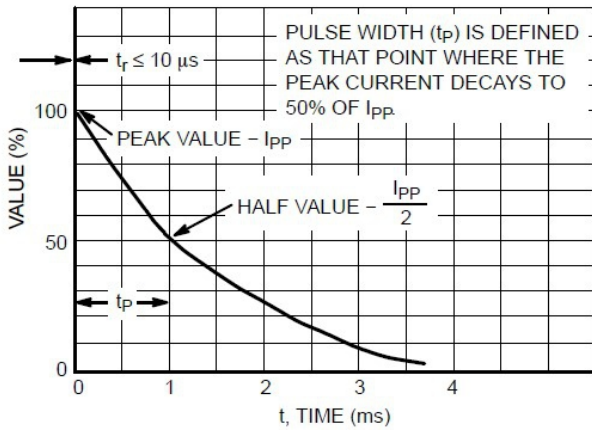


Figure 6. Pulse Waveform

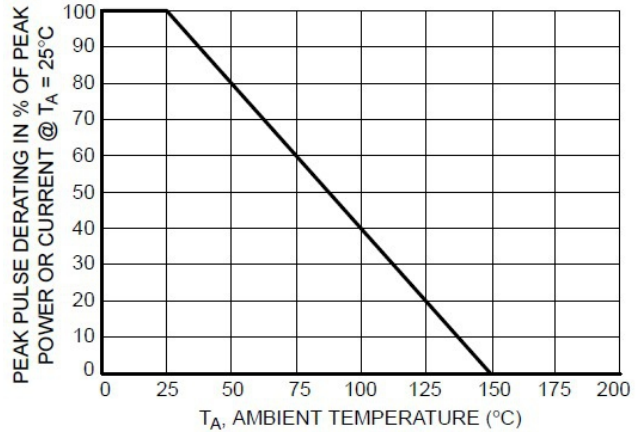


Figure 7. Pulse Derating Curve

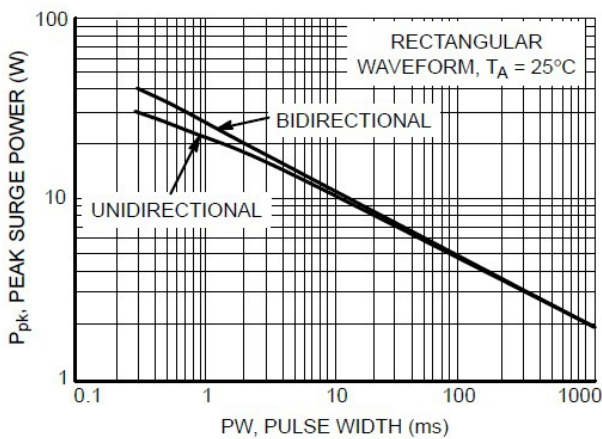


Figure 8. Maximum Non-repetitive Surge Power, P_{pk} versus PW

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

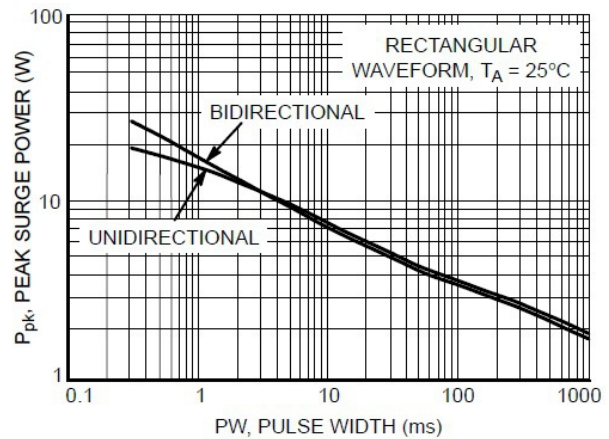
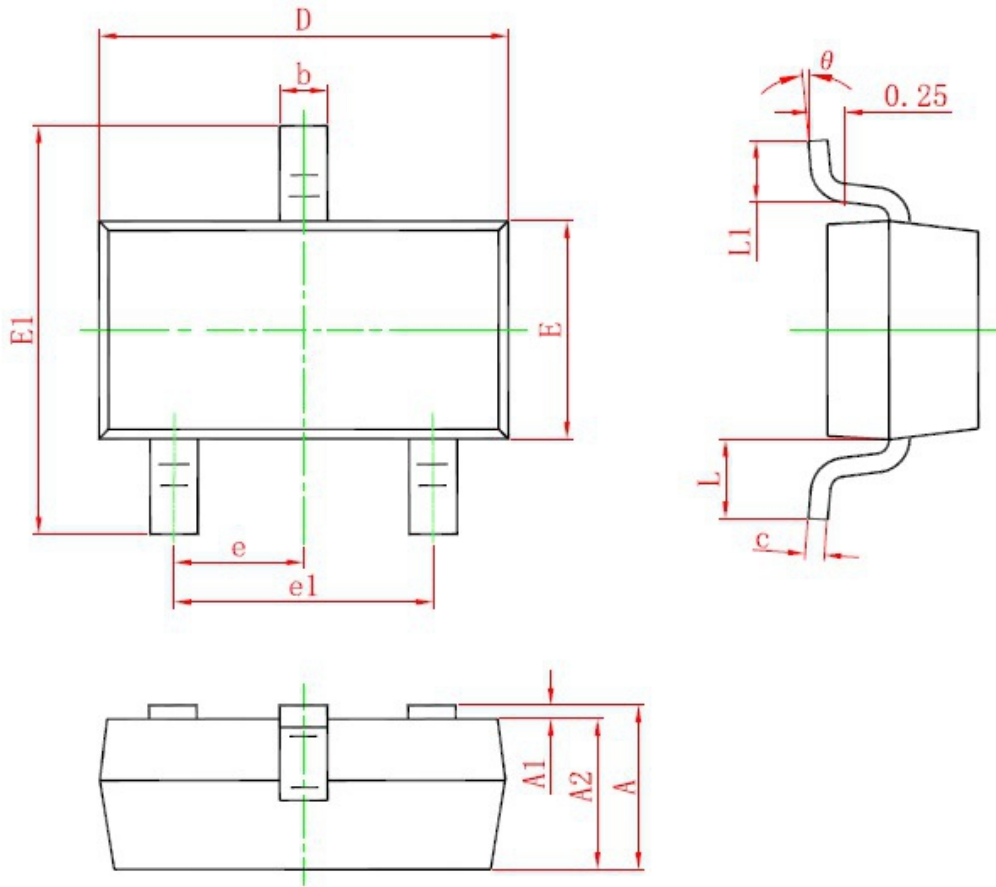


Figure 9. Maximum Non-repetitive Surge Power, $P_{pk(NOM)}$ versus PW

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

SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |