SOT-23 Plastic-Encapsulate Anode Zeners for ESD Protection Diodes

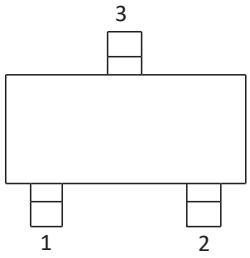
DESCRIPTION

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

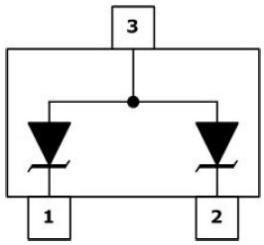
- SOT-23 package allows either two separate unidirectional configurations or a single bidirectional configuration.
- Working peak reverse voltage 3V to 22V
- Standard Zener breakdown voltage 5.6V to 27V
- Peak power 24 or Watts @ 1.0ms (unidirectional) per Figure 6 Waveform
- ESD Rating:
  Class 3B (>16kV) per the Human Body Model
  Class C (>400V) per Machine Model
- ESD Rating:
  ESD Rating of IEC61000-4-2 level 4, ±30kV contact Discharge
- Low leakage < 5.0uA
- Meets MSL 1 Requirements

Schematic & Pin Configuration



SOT23 (Top View)

Circuit Diagram



Pin	Description
1	cathode (diode 1)
2	cathode (diode 2)
3	common anode

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Dissipation @1.0ms MMBZ5V6AL thru MMBZ9V1AL MMBZ12VAL thru MMBZ27VAL	P_{PK}	 24 40	W
Total Power Dissipation	P_D	200	mW
Operating Temperature	T_{OPT}	−55 to +150	°C
Storage Temperature	T_{STG}	−55 to +150	°C
Lead Solder Temperature – Maximum (10 Second Duration)	T_L	260(10 sec.)	°C

Electrical Characteristics (TA=25°C unless otherwise specified)

24WATTS UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or Pins 2 to 3)

Part Number	Device Marking	V_{RWM} (V)	I_R (μA) @ V_{RWM}	V_{BR} (V) Min	V_{BR} (V) Nom	V_{BR} (V) Max	V_{BR} (mA) @ I_T	Z_{ZT} (¡) Max @I_{ZT}	Z_{ZK} (¡) Max	Z_{ZK} (mA) @ I_{ZK}	V_C (V) Max	V_C (A) @ I_{PP}
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

40WATTS UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or Pins 2 to 3)

Part Number	Device Marking	V_{RWM} (V)	I_R (nA) @ V_{RWM}	V_{BR} (V) Min	V_{BR} (V) Nom	V_{BR} (V) Max	V_{BR} (mA) @ I_T	V_C (note1) (V) Max	V_C (note1) (A) @ 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
MMBZ27VAL	27A+code	22.0	50	25.65	27	28.35	1	40	1.0

V_F=0.9V Max @ I_F=10mA

Note: 1. Surge Current waveform per Figure 5
2.The above data are for reference only.

ELECTRICAL CHARACTERISTICS CURVE

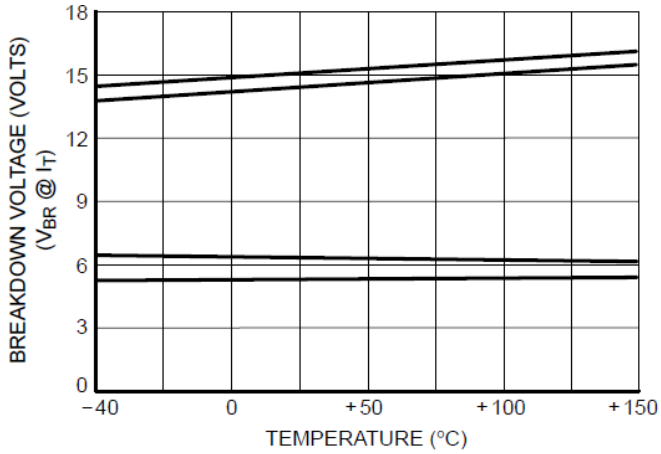


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

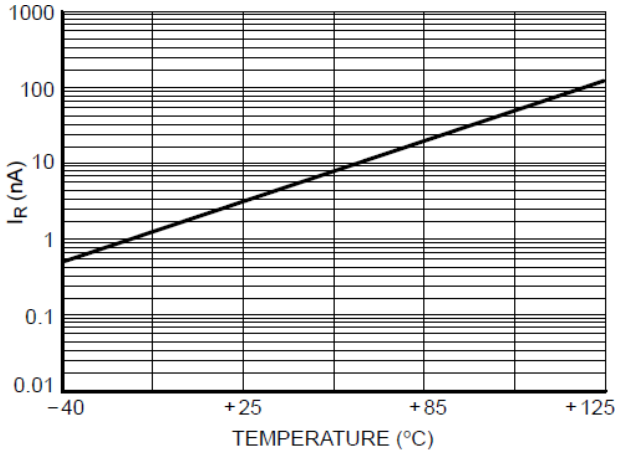


Figure 2. Typical Leakage Current versus Temperature

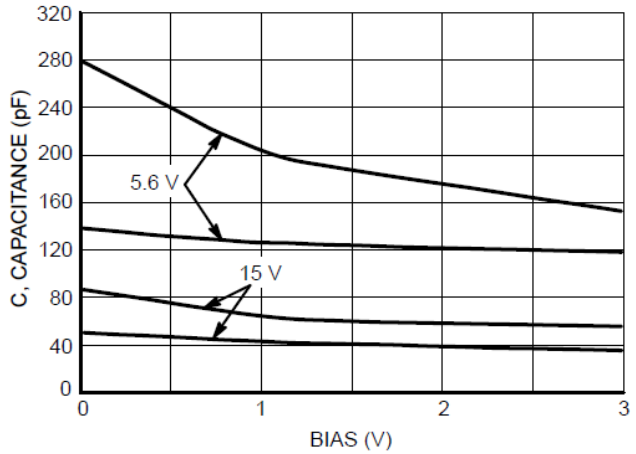


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

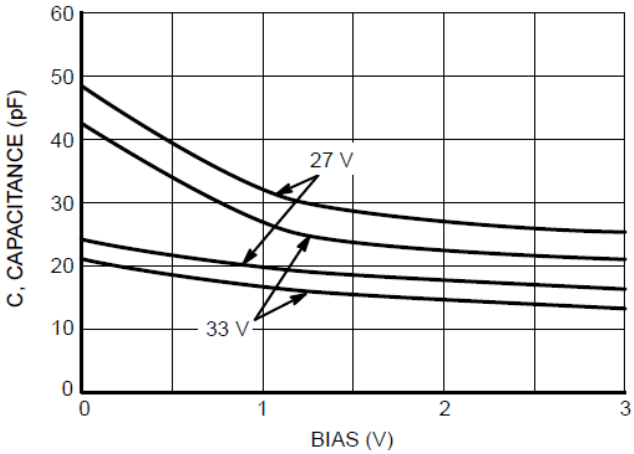


Figure 4. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

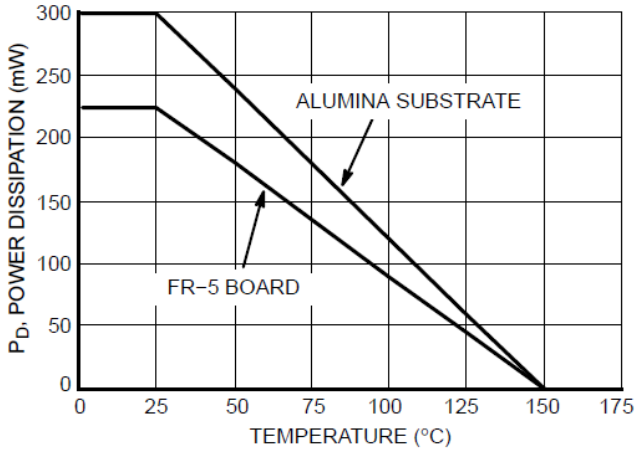


Figure 5. Steady State Power Derating Curve

The curve above is for reference only.

ELECTRICAL CHARACTERISTICS CURVE

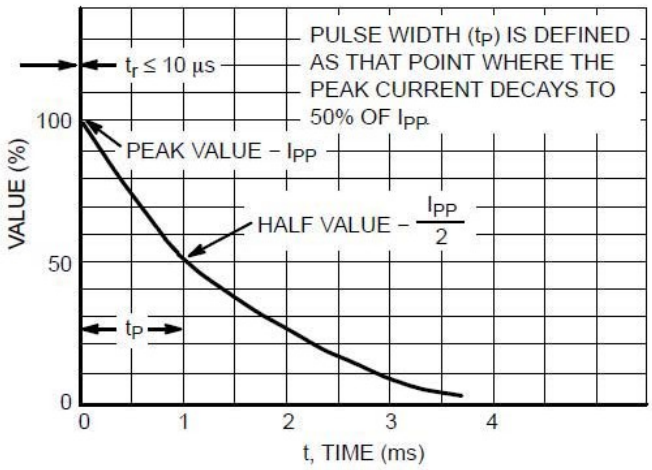


Figure 6. Pulse Waveform

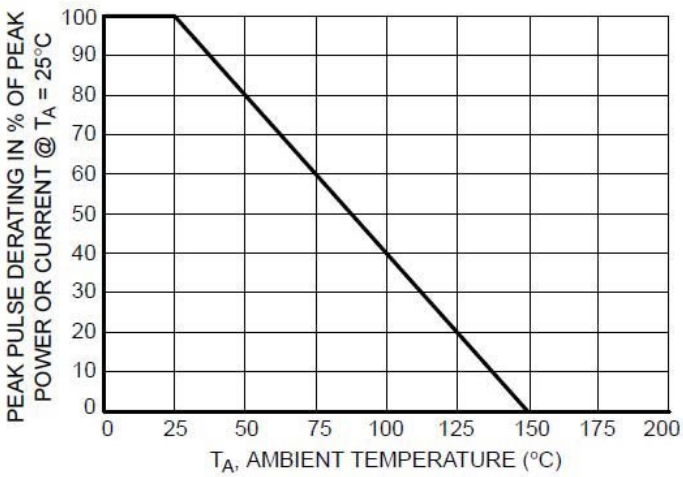


Figure 7. Pulse Derating Curve

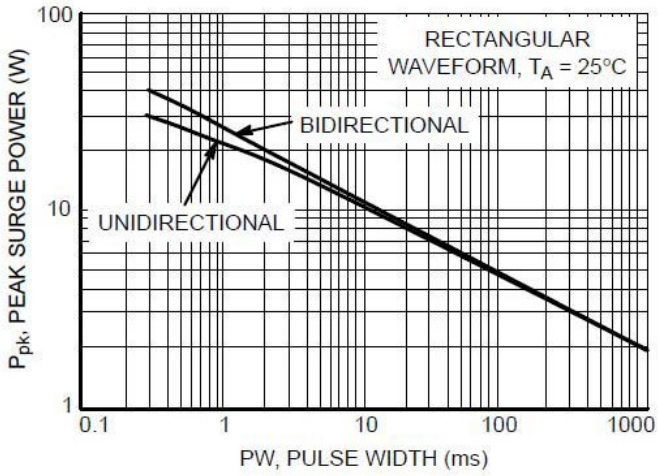


Figure 8. Maximum Non−repetitive Surge Power, P_{pk} versus PW

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

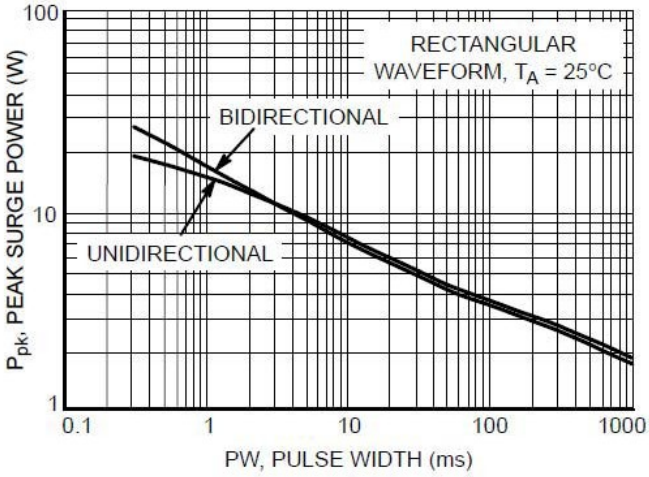


Figure 9. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

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

The curve above is for reference only.