SOT-23 Dual Common Anode 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, printer, 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 are ideal for situations where board space is at a premium.

Features

- Pb-free Package are Available
- SOT-23 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Working Peak Reverse Voltage Range 3V to 26V
- Standard Zener Breakdown Voltage Range 5.6V to 33V
- Peak Power 24 or 40 Watts @ 1.0ms(Unidirectional), per Figure 5 Waveform
- ESD Rating of Class N (exceeding 16KV) per the Human Body Model
- Maximum Clamping Voltage @ Peak Pulse Current
- AEC-Q101 qualified

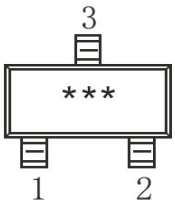
Ordering Information

- Device: MMBZ27VALQ-7-F-CN
- Package: SOT-23
- Material: Halogen free
- Packing: Tape & Reel
- Quantity per reel: 3,000pcs

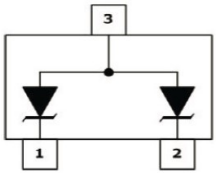
Mechanical Data

- SOT-23 Package
- Flammability Rating: UL 94V-0
- High temperature soldering guaranteed:260℃/10s

Marking code



Pin Configuration



ABSOLUTE MACIMUM RATING

Parameters	Symbol	Value	Unit
Total Power Dissipation on FR-5 Board (Note 2) @ TA=25℃ Derate above 25℃ Thermal Resistance Junction-to-Ambient	P_D $R_{\theta JA}$	225 1.8 556	mW mW/℃ ℃/W
Total Power Dissipation on Alumina Substrate (Note 3) @ TA=25℃ Derate above 25℃ Thermal Resistance Junction-to-Ambient	P_D $R_{\theta JA}$	300 2.4 417	mW mW/℃ ℃/W
Peak Power Dissipation @ 1.0ms (Note 1) TL≤25℃	P_{PK}	40	W
Junction and Storage temperature range	T_J, T_{STG}	-55-+150	℃

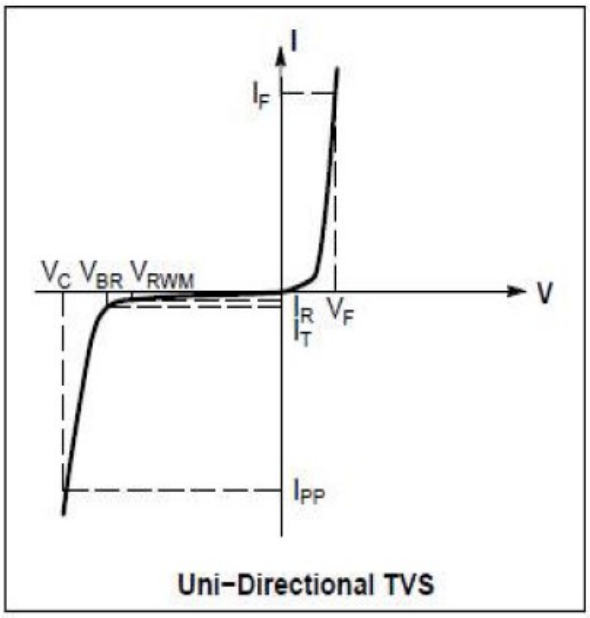
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

1, Non-repetitive current pulse per Figure 5 and derate above TA=25℃ per Figure 6;
2, FR-5 = 1.0 x 0.75 x 0.62 in;
3, Alumina = 0.4 x 0.3 x0.024 in, 99.5% alumina
* Other voltages may be available upon request.

ELECTRICAL CHARACTERISTICS T_A= 25℃ 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
ΘV_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}



Uni-Directional TVS

24 WATTS

Device	Device Marking	V_{RWM}	I_R @ V_{RWM}	Breakdown Voltage V_{BR} (Note 4) (V)			@ I_T	Max Zener Impedance (Note 5) Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		V_C @ I_{PP} (Note 6) V_C	I_{PP}	ΘV_{BR}
		Volts	μA	Min	Nom	Max	mA	Ω	Ω	mA	V	A	mV/°C
MMBZ5V6AL	5A6	3.0	5.0	5.32	5.6	5.88	20	11	1600	0.25	8.0	3.0	1.26
MMBZ6V2AL	6A2	3.0	0.5	5.89	6.2	6.51	1.0	–	–	–	8.7	2.76	2.80
MMBZ6V8AL	6A8	4.5	0.5	6.46	6.8	7.14	1.0	–	–	–	9.6	2.5	3.4
MMBZ9V1AL	9A1	6.0	0.3	8.65	9.1	9.56	1.0	–	–	–	14	1.7	7.5
MMBZ10VAL	10A	6.5	0.3	9.50	10	10.5	1.0	–	–	–	14.2	1.7	7.5

40 WATTS

Device	Device Marking	V_{RWM}	I_R @ V_{RWM}	Breakdown Voltage V_{BR} (Note 4) (V)			@ I_T	V_C @ I_{PP} (Note 6) V_C	I_{PP}	ΘV_{BR}
		Volts	nA	Min	Nom	Max	mA	V	A	mV/°C
MMBZ12VAL	12A	8.5	200	11.40	12	12.60	1.0	17	2.35	7.5
MMBZ15VAL	15A	12	50	14.25	15	15.75	1.0	21	1.9	12.3
MMBZ18VAL	18A	14.5	50	17.10	18	18.90	1.0	25	1.6	15.3
MMBZ20VAL	20A	17	50	19.00	20	21.00	1.0	28	1.4	17.2
MMBZ27VAL	27A	22	50	25.65	27	28.35	1.0	41	1.0	24.3
MMBZ33VAL	33A	26	50	31.35	33	34.65	1.0	46	0.87	30.4

4, VBR measured at pulse test current IT at an ambient temperature of 25℃
5, ZZT and ZZK are measured by dividing the AC voltage drop across the device by the AC current applied. The specified limits are for IZ(AC)=0.1 IZ(DC), with the AC frequency = 1.0kHz.
6, Surge current waveform per Figure 5 and derate Figure 6

ELECTRICAL CHARACTERISTICS CURVE

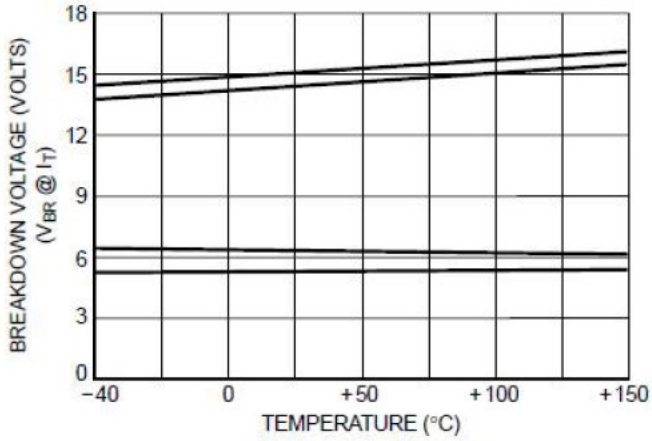


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

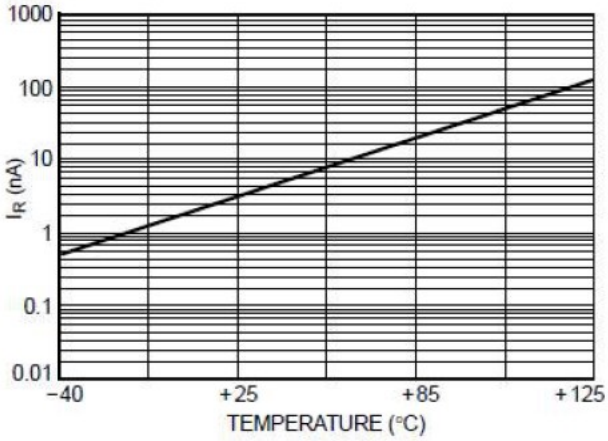


Figure 2. Typical Leakage Current versus Temperature

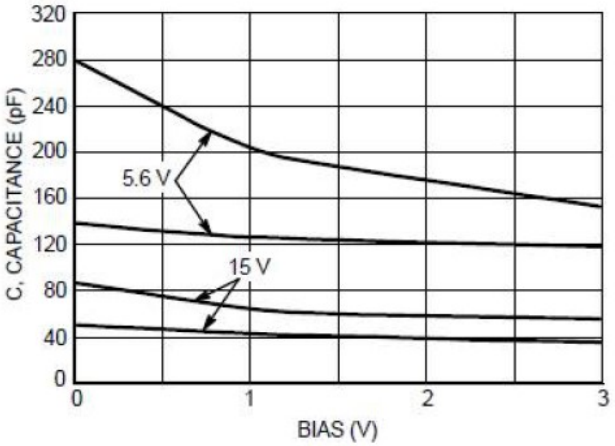


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

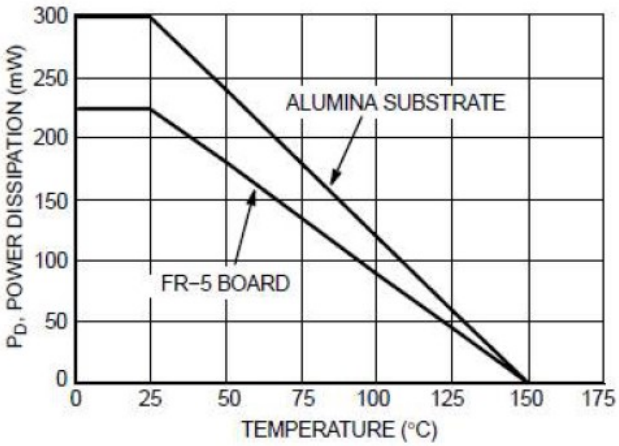


Figure 4. Steady State Power Derating Curve

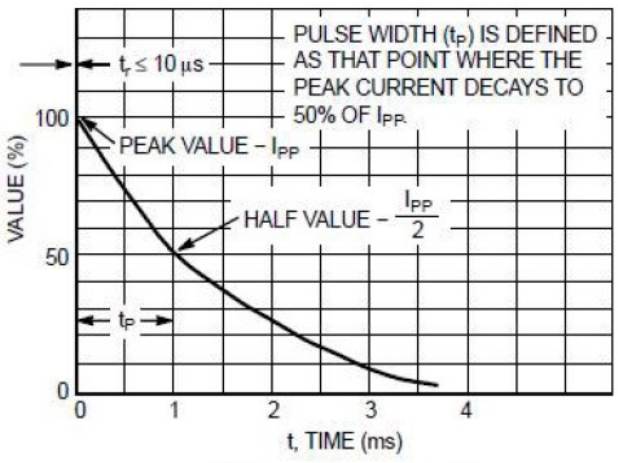


Figure 5. Pulse Waveform

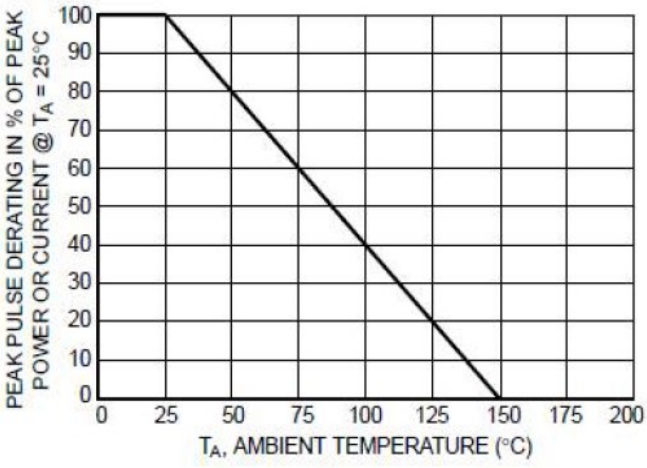


Figure 6. Pulse Derating Curve

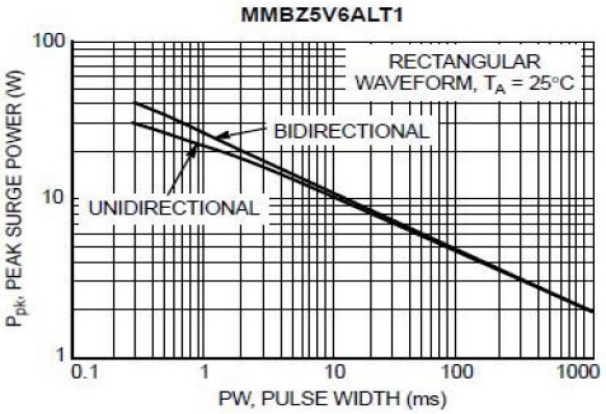


Figure 7. Maximum Non−repetitive Surge Power, P_{pk} versus PW

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

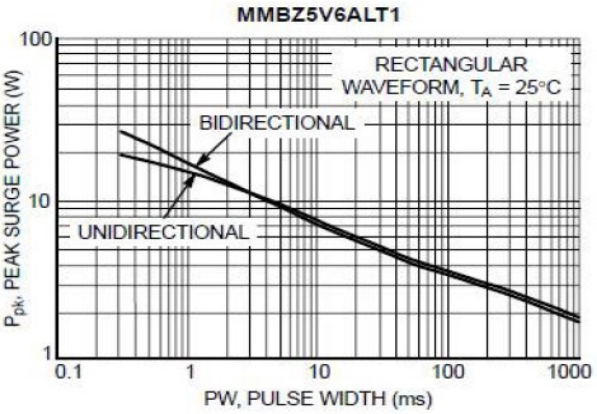
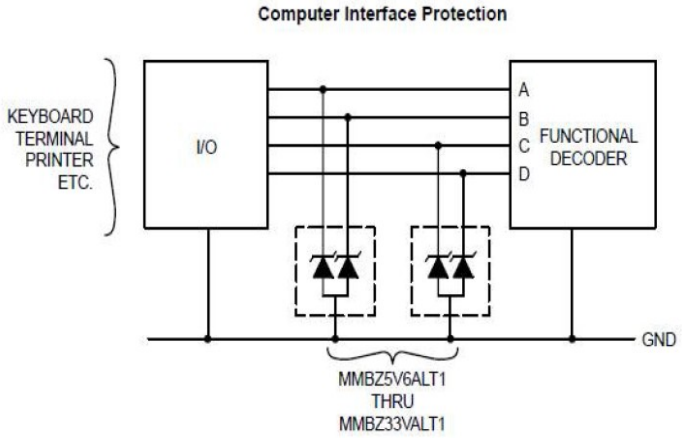


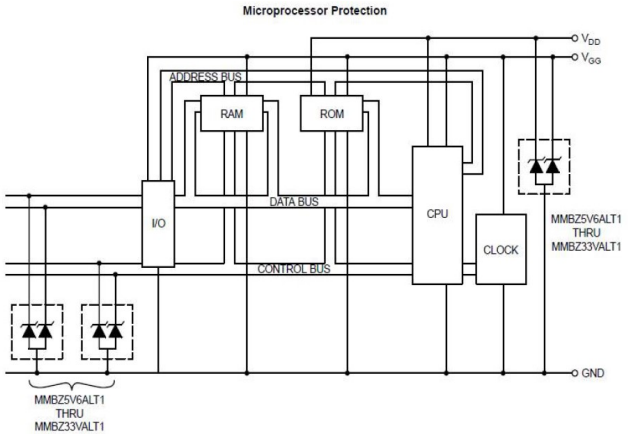
Figure 8. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

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.

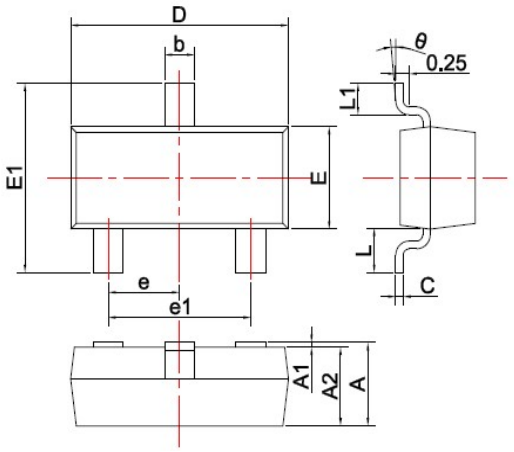
TYPICAL COMMON ANODE APPLICATIONS

A quad junction common anode design in a SOT−23 package protects four separate lines using only one package. This adds flexibility and creativity to PCB design especially when board space is at a premium. Two simplified examples of TVS applications are illustrated below.





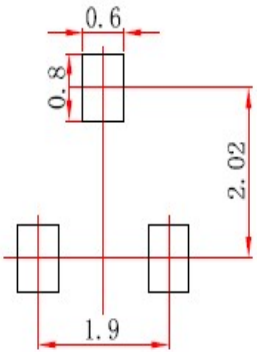
SOT-23 PACKAGE OUTLINE Plastic surface mounted package



SYMBOL	DIMENSIONS	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Unit: mm

焊盘设计参考Precautions: PCB Design(Recommended land dimensions for SOT-23 diode. Electrode patterns for PCBs)



Note:
1.Controlling dimension:In millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

NOTICE

The information presented in this document is for reference only. Involving product optimization and productivity improvement, ChipNobo reserves the right to adjust product indicators and upgrade some technical parameters. ChipNobo is entitled to be exempted from liability for any delay or non-delivery of the information disclosure process that occurs.
本文件中提供的信息仅供参考。涉及产品优化和生产效率改善，ChipNobo 有权调整产品指标和部分技术参数的升级，所出现信息披露过程存在延后或者不能送达的情形，ChipNobo 有获免责权。

The product listed herein is designed to be used with residential and commercial equipment, and do not support sensitive items and specialized equipment in areas where sanctions do exist. ChipNobo Co., Ltd or anyone on its behalf, assumes no responsibility or liability for any damages resulting from improper use.
此处列出的产品旨在民用和商业设备上使用，不支持确有制裁地区的敏感项目和特殊设备，ChipNobo 有限公司或其代表，对因不当使用而造成的任何损害不承担任何责任。

For additional information, please visit our website http://www.chipnobo.com, or consult your nearest Chipnobo sales office for further assistance.
欲了解更多信息，请访问我们的网站 http://www.chipnobo.com，或咨询离您最近的 Chipnobo 销售办事处以获得进一步帮助。