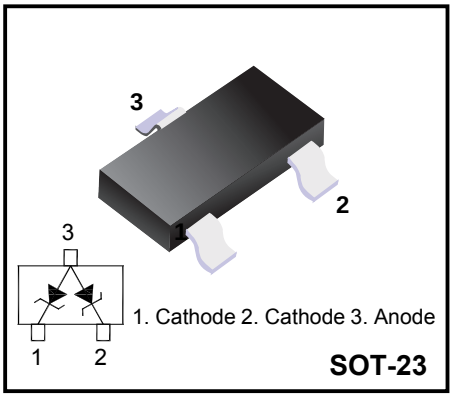
24 and 40 Watt Peak Power Zener Transient Voltage Suppressors



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

Mechanical Data

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

ABSOLUTE MACIMUM RATING

Parameter	Symbol	Rating	Unit
Total Power Dissipation on FR-5 Board (Note 2) @ TA=25℃	P_D	225	mW
Derate above 25℃		1.8	mW/℃
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	556	℃/W
Total Power Dissipation on Alumina Substrate (Note 3) @ TA=25℃	P_D	300	mW
Derate above 25℃		2.4	mW/℃
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	417	℃/W
Peak Power Dissipation @ 1.0ms (Note 1) TL≤25℃			
MMBZ5V6A to MMBZ10VA	PPK	24	W
MMBZ12VA to MMBZ33VA		40	
Junction and Storage temperature range	T_J, T_{STG}	-55-+150	℃

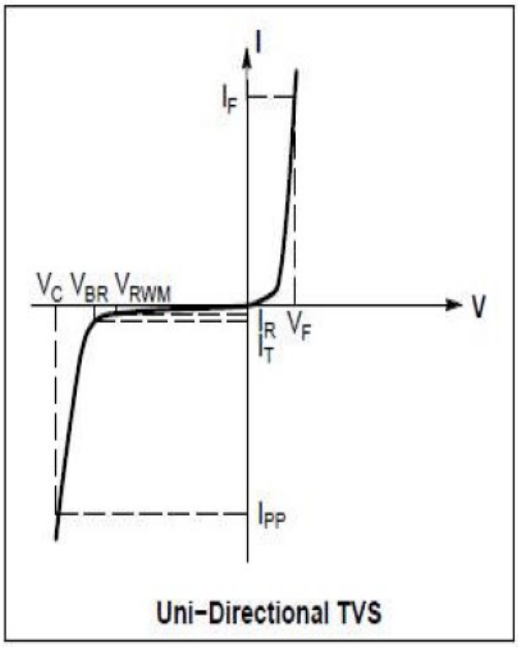
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur 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 TA =25 UNLESS OTHERWISE NOTED

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

Symbol	Parameter
I_{PP}	Mlaximum Reverse Peak Pulse Curent
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Reverse Standoff Voltage
I_R	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_{KK}	Maximum Zener Impedance @ I_{ZK}



24 WATTS

Device	Device Marking	V_{RWM}	I_R@ V_{RWM}	Breakdown Voltage					Max Zener Impedance (Note 5)		Vc @ Ipp (Note 6)		θV_{BR}
				V_{BR}(Note4)(V)			@I_T	$Z_{ZT@IZT}$	Z_{ZK} @ I_{ZK}		Vc	I_{pp}	
		Volts	nA	Min	Nom	Max	mA	Ω	Ω	mA	V	A	mV/℃
MMBZ5V6A	5A6	3	5	5.32	5.6	5.88	20	11	1600	0.25	8	3	1.26
MMBZ6V2A	6A2	3	0.5	5.89	6.2	6.51	1	-	-	-	8.7	2.76	2.8
MMBZ6V8A	6A8	4.5	0.5	6.46	6.8	7.14	1	-	-	-	9.6	2.5	3.4
MMBZ9V1A	9A1	6	0.3	8.65	9.1	9.56	1	-	-	-	14	1.7	7.5
MMBZ10VA	10A	6.5	0.3	9.5	10	10.5	1	-	-	-	14.2	1.7	7.5

40 WATTS

Device	Device Marking	V_{RWM}	I_R@ V_{RWM}	Breakdown Voltage				Vc @ Ipp (Note 6)		θV_{BR}
				V_{BR}(Note4)(V)			@I_T	Vc	Ipp	
		Volts	nA	Min	Nom	Max	mA	V	A	mV/℃
MMBZ12VA	12A	8.5	200	11.4	12	12.6	1	17	2.35	7.5
MMBZ15VA	15A	12	50	14.25	15	15.75	1	21	1.9	12.3
MMBZ18VA	18A	14.5	50	17.1	18	18.9	1	25	1.6	15.3
MMBZ20VA	20A	17	50	19	20	21	1	28	1.4	17.2
MMBZ27VA	27A	22	50	25.65	27	28.35	1	41	1	24.3
MMBZ33VA	33A	26	50	31.35	33	34.65	1	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

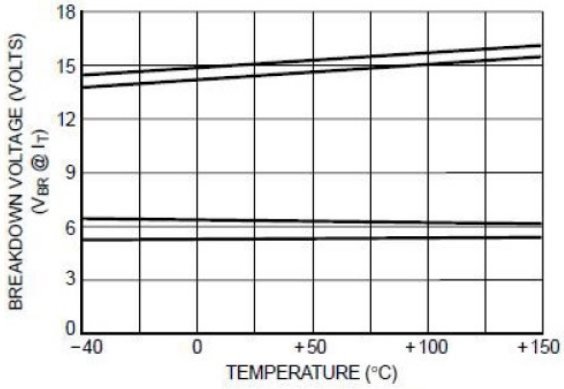


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

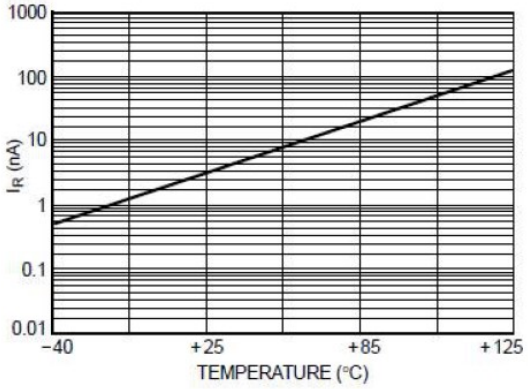


Figure 2. Typical Leakage Current versus Temperature

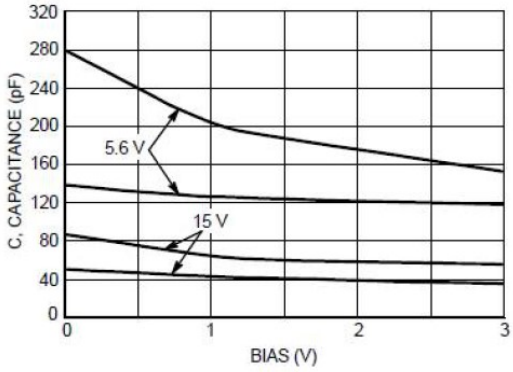


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

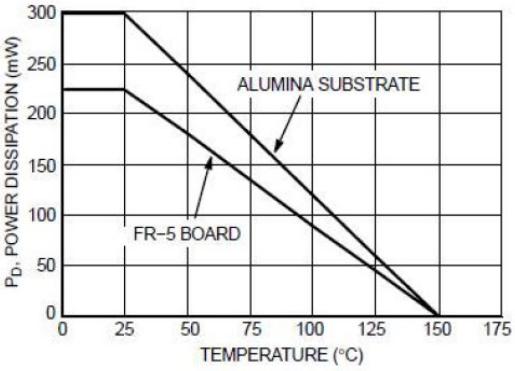


Figure 4. Steady State Power Derating Curve

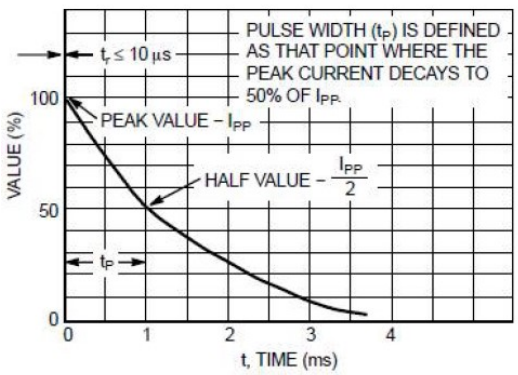


Figure 5. Pulse Waveform

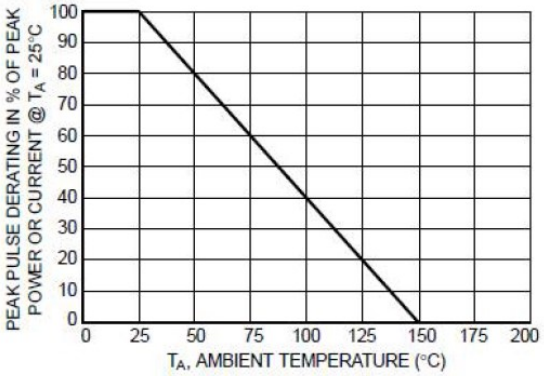


Figure 6. Pulse Derating Curve

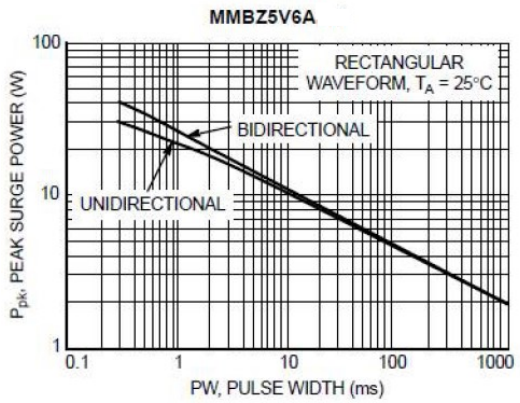


Figure 7. Maximum Non−repetitive Surge Power, P_{pk} versus PW

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

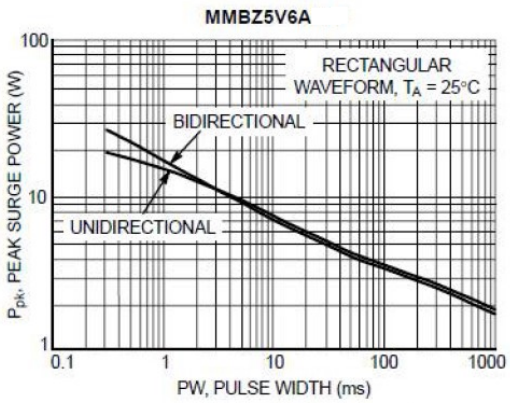
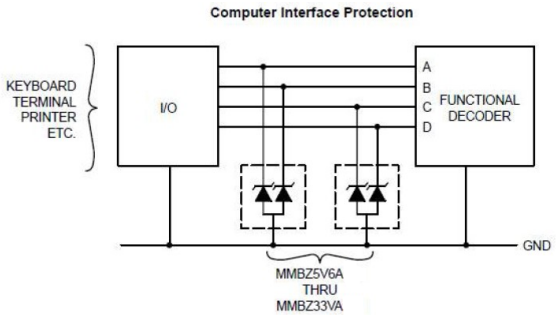


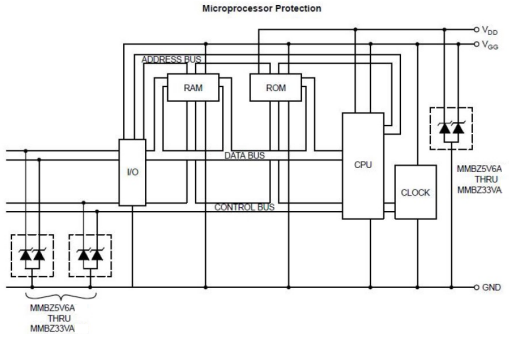
Figure 8. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

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.



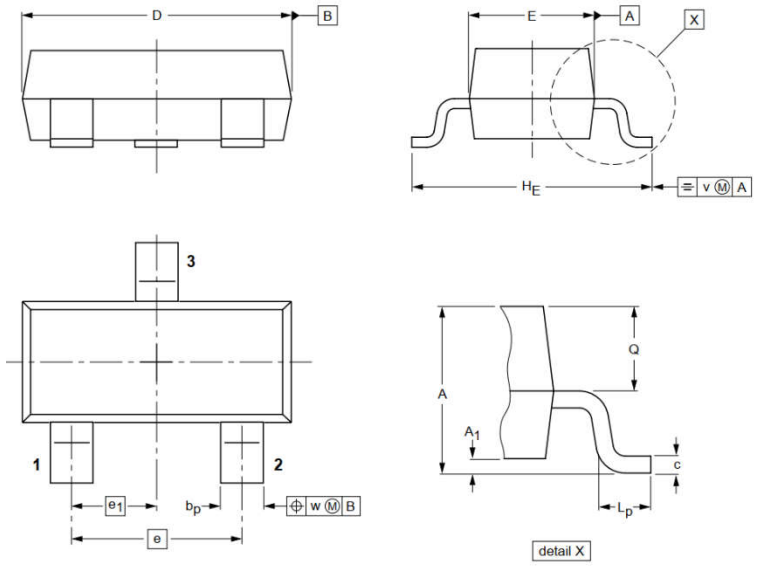


Ordering information

Package	Packing Description	Base Quantity	Packing Quantity
SOT-23	Tape/Reel,7"reel	3000pcs/Reel	24000PCS/Box 120000PCS/Carton

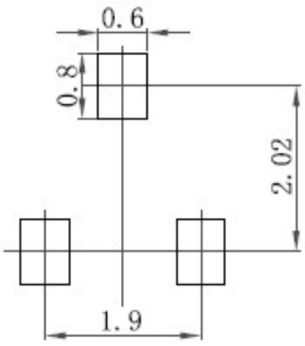
Package Dimensions

SOT-23



Dim.	Millimeter (mm)		mil	
	Min.	Max.	Min.	Max.
A	0.9	1.15	35	45
A1	0.1		3.9	
bp	0.38	0.48	15	19
C	0.09	0.15	3.54	5.9
D	2.8	3.0	110	118
E	1.2	1.4	47	55
E	1.9		75	
E1	0.95		37	
HE	2.1	2.55	83	100
Lp	0.15	0.45	5.9	18
Q	0.45	0.55	18	22
v	0.2		7.9	
W	0.1		4	

The recommended mounting pad size



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