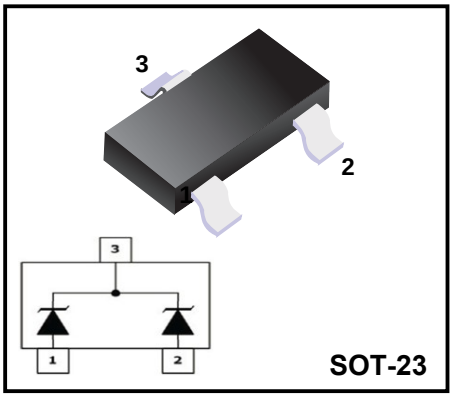
24 and 40 Watt Peak Power Zener Transient Voltage Suppressors



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℃			
MMBZ5V6C to MMBZ10VC	PPK	24	W
MMBZ12VC to MMBZ33VC		40	
Junction and Storage temperature range	T_J, T_{STG}	-55-+150	℃

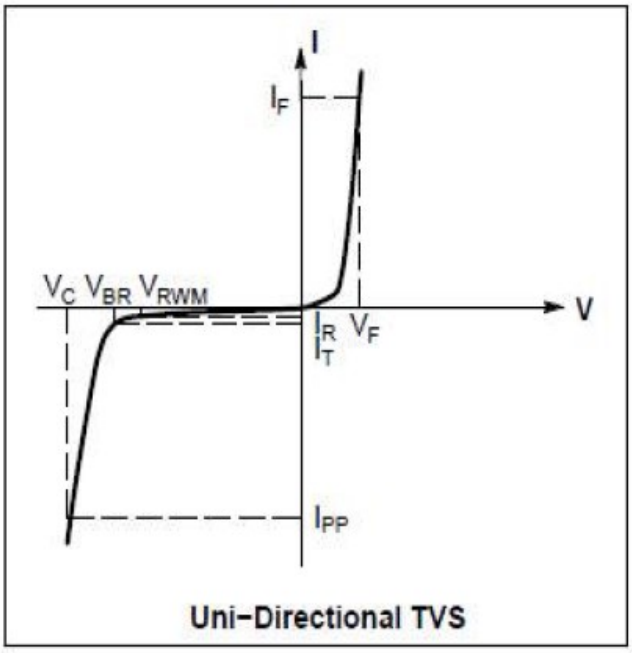
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur 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}@I_{ZT}	Z_{ZK} @ I_{ZK}		Vc	I_{pp}	
		Volts	nA	Min	Nom	Max	mA	Ω	Ω	mA	V	A	mV/℃
MMBZ5V6C	5C6	3	5	5.32	5.6	5.88	20	11	1600	0.25	8	3	1.26
MMBZ6V2C	6C2	3	0.5	5.89	6.2	6.51	1	-	-	-	8.7	2.76	2.8
MMBZ6V8C	6C8	4.5	0.5	6.46	6.8	7.14	1	-	-	-	9.6	2.5	3.4
MMBZ9V1C	9C1	6	0.3	8.65	9.1	9.56	1	-	-	-	14	1.7	7.5
MMBZ10VC	10C	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/℃
MMBZ12VC	12C	8.5	200	11.4	12	12.6	1	17	2.35	7.5
MMBZ15VC	15C	12	50	14.25	15	15.75	1	21	1.9	12.3
MMBZ18VC	18C	14.5	50	17.1	18	18.9	1	25	1.6	15.3
MMBZ20VC	20C	17	50	19	20	21	1	28	1.4	17.2
MMBZ27VC	27C	22	50	25.65	27	28.35	1	40	1	24.3
MMBZ33VC	33C	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

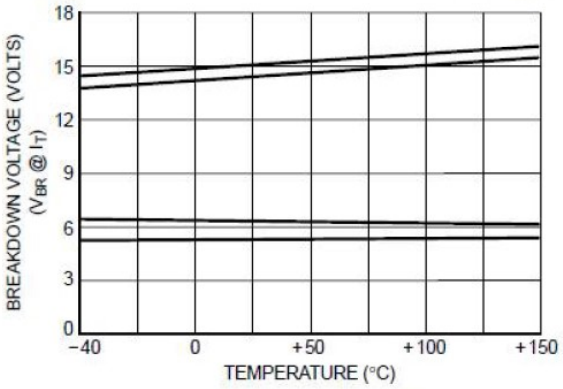


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

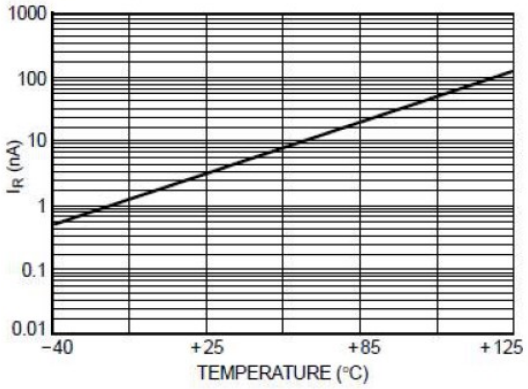


Figure 2. Typical Leakage Current versus Temperature

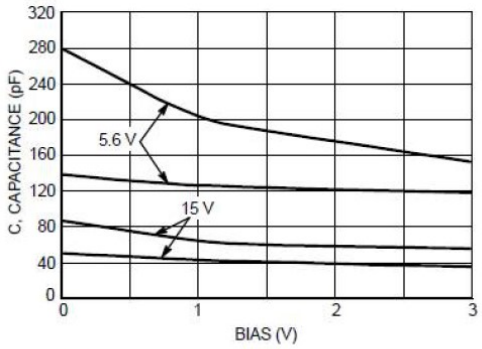


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

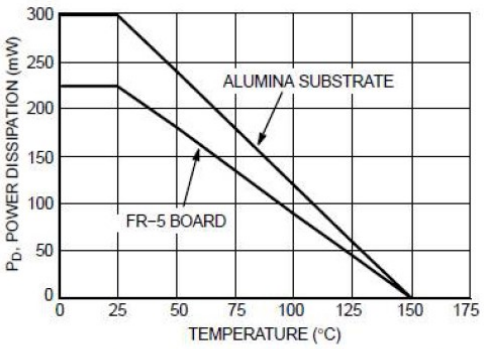


Figure 4. Steady State Power Derating Curve

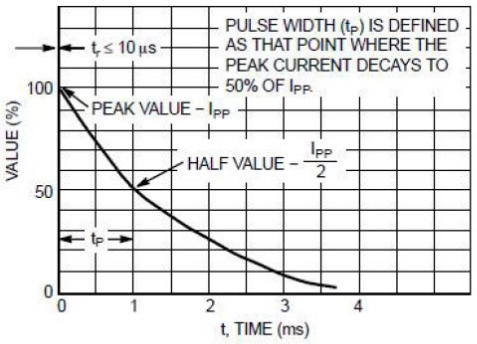


Figure 5. Pulse Waveform

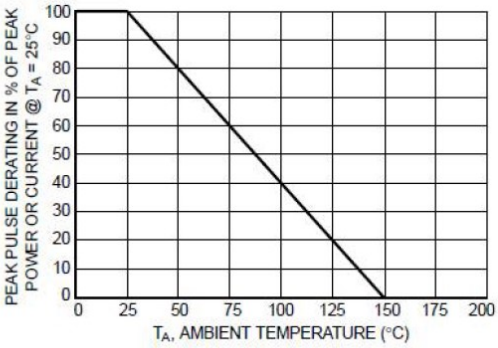


Figure 6. Pulse Derating Curve

MMBZ5V6C

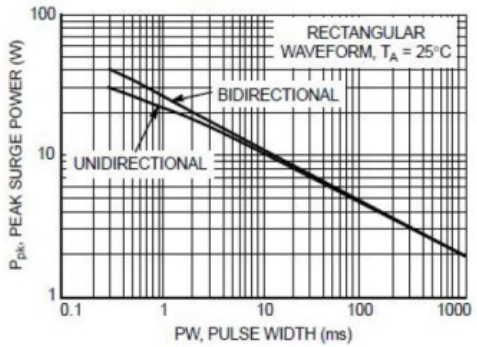


Figure 7. Maximum Non−repetitive Surge Power, P_{pk} versus PW

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

MMBZ5V6C

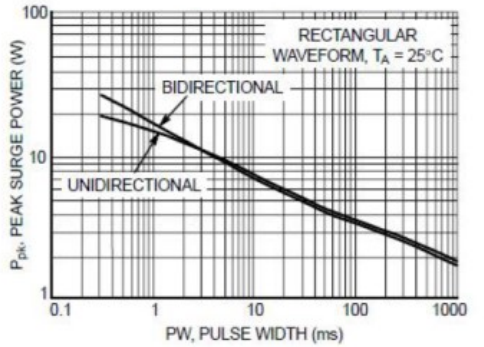


Figure 8. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

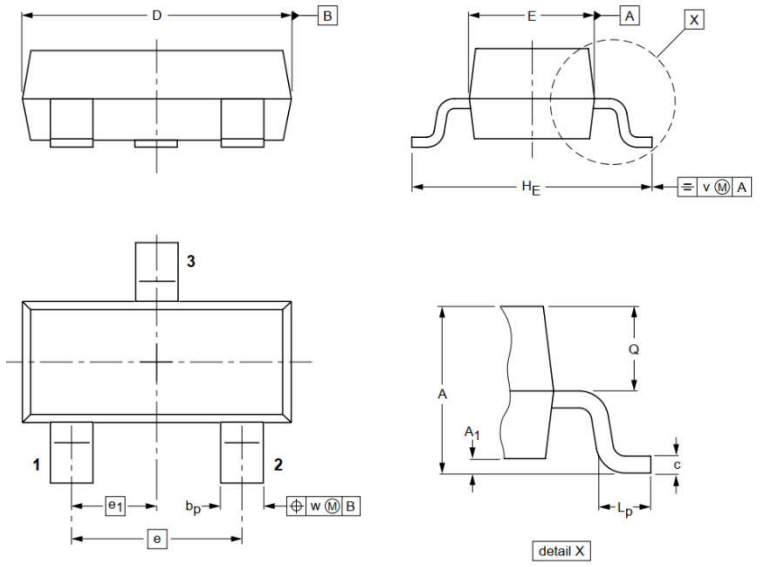
Power is defined as V_Z(NOM) x I_Z(pk) where V_Z(NOM) is the nominal Zener voltage measured at the low test current used for voltage classification.

Ordering information

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

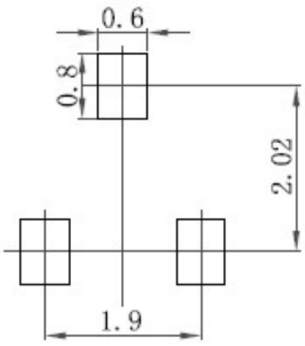
Package Dimensions

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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