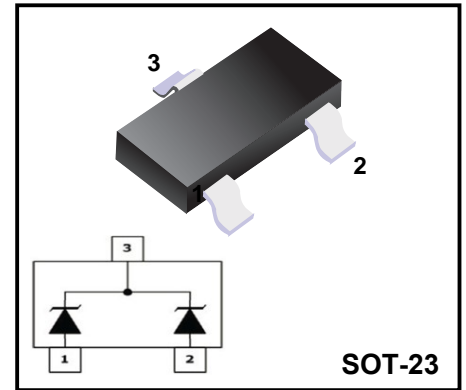


**24 and 40 Watt Peak Power Zener Transient Voltage Suppressors**



**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°C/10s

**ABSOLUTE MACIMUM RATING**

Parameter	Symbol	Rating	Unit
Total Power Dissipation on FR-5 Board (Note 2) @ TA=25°C	<b>P<sub>D</sub></b>	225	<b>mW</b>
Derate above 25°C		1.8	<b>mW/°C</b>
Thermal Resistance Junction-to-Ambient	<b>R<sub>θJA</sub></b>	556	<b>°C/W</b>
Total Power Dissipation on Alumina Substrate (Note 3) @ TA=25°C	<b>P<sub>D</sub></b>	300	<b>mW</b>
Derate above 25°C		2.4	<b>mW/°C</b>
Thermal Resistance Junction-to-Ambient	<b>R<sub>θJA</sub></b>	417	<b>°C/W</b>
Peak Power Dissipation @ 1.0ms (Note 1) TL≤25°C	<b>PPK</b>	24	<b>W</b>
MMBZ5V6C to MMBZ10VC		40	
MMBZ12VC to MMBZ33VC			
Junction and Storage temperature range	<b>T<sub>J</sub>, T<sub>STG</sub></b>	-55-+150	<b>°C</b>

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°C per Figure 6;

2. FR-5 = 1.0 x 0.75 x 0.62 in;

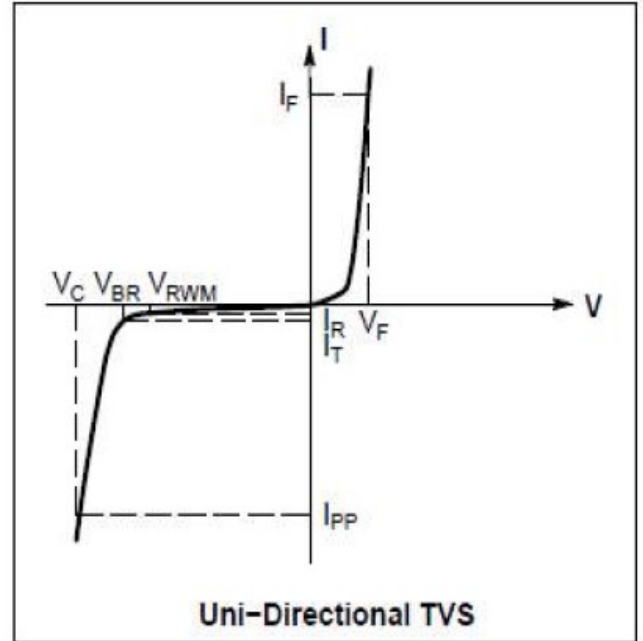
3. Alumina = 0.4 x 0.3 x 0.024 in, 99.5% alumina

\* 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
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	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
$\theta V_{BR}$	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	$V_{RWM}$ Volts	$I_R @ V_{RWM}$ nA	Breakdown Voltage					Max Zener Impedance (Note 5)		$V_C @ I_{PP}$ (Note 6)		$\theta V_{BR}$ mV/°C
				$V_{BR}(\text{Note4})(V)$			$@I_T$	$Z_{ZT}@I_{ZT}$	$Z_{ZK} @ I_{ZK}$		$V_C$	$I_{PP}$	
				Min	Nom	Max	mA	$\Omega$	$\Omega$	mA	V	A	
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
MM8Z10VC	10C	6.5	0.3	9.5	10	10.5	1	-	-	-	14.2	1.7	7.5

### 40 WATTS

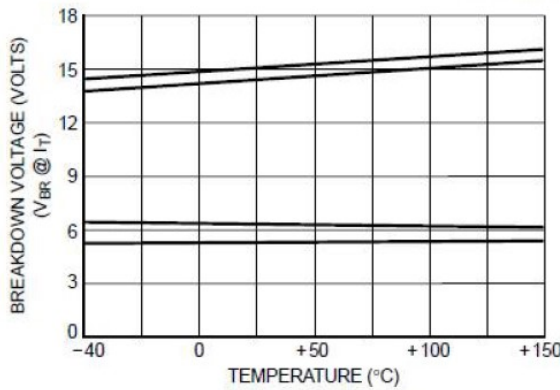
Device	Device Marking	$V_{RWM}$ Volts	$I_R @ V_{RWM}$ nA	Breakdown Voltage				$V_C @ I_{PP}$ (Note 6)		$\theta V_{BR}$ mV/°C
				$V_{BR}(\text{Note4})(V)$			$@I_T$	$V_C$	$I_{PP}$	
				Min	Nom	Max	mA	V	A	
MMBZ12VC	12C	8.5	200	11.4	12	12.6	1	17	2.35	7.5
MMBZ15VC	15C	12	50	14.25	15	15.75	1	21	1.9	12.3
MMBZ18VC	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.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of 25°C

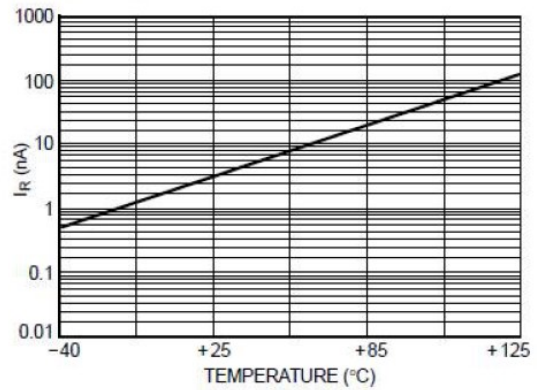
5.  $Z_{ZT}$  and  $Z_{ZK}$  are measured by dividing the AC voltage drop across the device by the AC current applied. The specified limits are for  $I_Z(\text{AC})=0.1 I_Z(\text{DC})$ , with the AC frequency = 1.0kHz.

6. Surge current waveform per Figure 5 and derate Figure 6

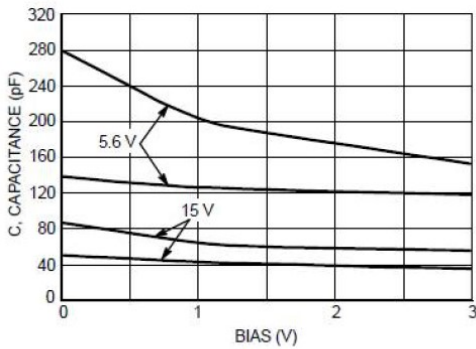
**ELECTRICAL CHARACTERISTICS CURVE**



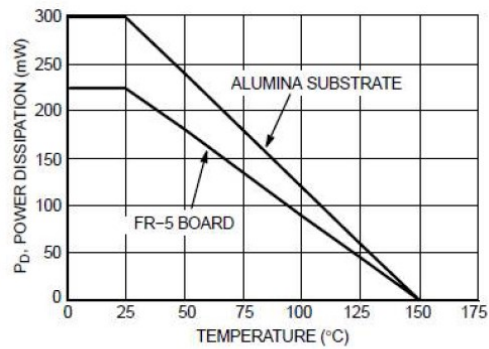
**Figure 1. Typical Breakdown Voltage versus Temperature**  
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)



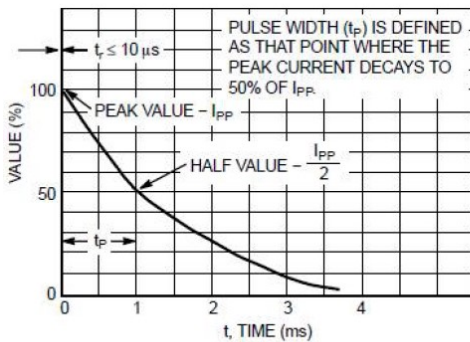
**Figure 2. Typical Leakage Current versus Temperature**



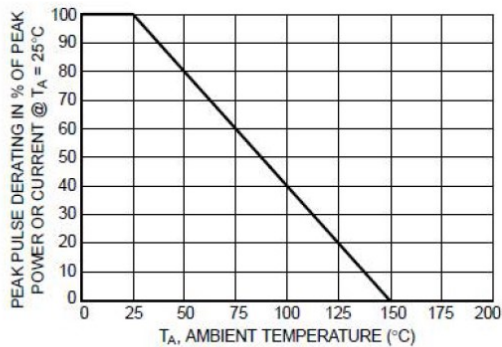
**Figure 3. Typical Capacitance versus Bias Voltage**  
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)



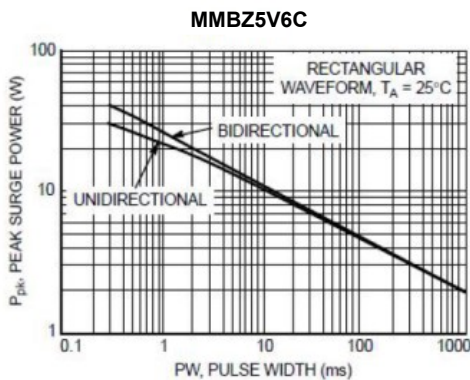
**Figure 4. Steady State Power Derating Curve**



**Figure 5. Pulse Waveform**

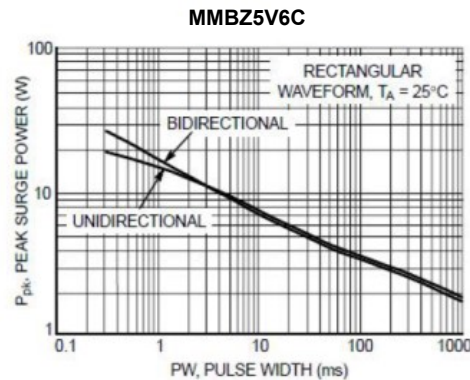


**Figure 6. Pulse Derating Curve**



**Figure 7. Maximum Non-repetitive Surge Power, Ppk versus PW**

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



**Figure 8. Maximum Non-repetitive Surge Power, Ppk(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.

**Ordering information**

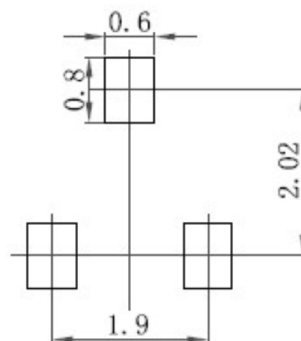
Package	Packing Description	Base Quantity	Packing Quantity
SOT-23	Tape/Reel,7"reel	3000pcs/Reel	24000PCS/Box 120000PCS/Carton

**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**



## Disclaimer

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