MMBZ33VA

SOT-23 Dual Common Anode Zeners TVS
SOT-23 双路共阳极齐纳瞬态电压抑制器

1. Description 描述

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, printers, business machines, communication systems, medical equipment and other applications.

这些双单晶硅齐纳二极管专为需要瞬态过压保护功能的应用而设计。它们适用于电压和静电放电敏感型设备，例如计算机、打印机、办公设备、通信系统、医疗设备以及其他应用领域。

2. Features 特性

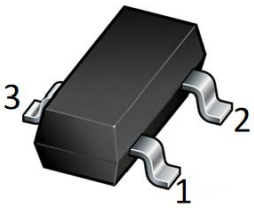
Feature 特性	Description 描述
Peak Pulse Power Dissipation 峰值脉冲耗散功率	$P_{pk} = 40W$ (1ms pulse)
Clamping Voltage 截止电压	$V_C < 46V$ @$I_{PP} = 0.87A$
Ultra low leakage current 超低漏电流	$I_R < 50nA$
Applications 应用	Excellent clamping capability 优异的钳位能力
Environmental Compliance 环保合规	Totally Lead-Free & Fully RoHS Compliant. 完全无铅和符合 RoHS 标准[1] Halogen and Antimony Free, "Green" Device. 无卤素和无锑，“绿色”器件[2]
Automotive Compliance 汽车合规	AEC-Q101 qualified. 通过了 AEC-Q101 认证。

[1] No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
无铅，完全符合欧盟标准 2002/95/EC (RoHS)，2011/65/EU （RoHS 2）和 2015/863/EU （RoHS 3）。

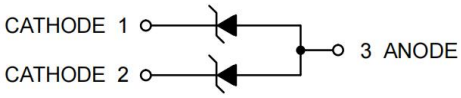
[2] Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
无卤素和无锑的“绿色”产品指溴含量<900ppm，氯含量<900ppm（溴+氯总含量<1500ppm）和锑化合物含量<1000ppm。

3. Mechanical Data 封装数据

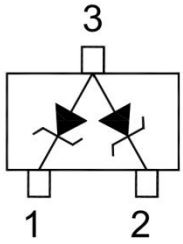
Feature 特性	Description 描述
Package 封装	SOT-23
Moisture Sensitivity Level 湿敏感度等级	J-STD-020 MSL1
Material 材料	Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0. 模塑塑料封装，“绿色”成型复合材料；UL 可燃性等级 94V-0。
Dimensions 尺寸	$1.9mm$ pitch; $2.9mm \times 1.3mm \times 1.0mm$ body 相邻引脚中心距为 $1.9mm$，封装本体（不含引脚）尺寸为 $2.9mm \times 1.3mm \times 1.0mm$
Terminals Compliance 引脚合规	3 terminals, Tin Plated Leads, Solderable per MILSTD-202, Method 208 e3 3 个镀锡引脚，可焊性符合 MIL-STD-202 标准中 208 方法 e3 条款的要求
Weight 重量	0.008 grams (Approximate) 约 0.008 克
Polarity 极性	Allows either two separate unidirectional configurations or a single bidirectional configuration, see diagrams below. 可配置为两路独立的单向保护，也可配置为单路双向保护，极性见下图



SOT-23 Top View



Device Symbol



Top View Pin-Out

4. Ordering Information 订购信息

Part Number	Compliance	Package	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
MMBZ33VA	Automotive	SOT-23	7	8	3000

5. Marking Information 丝印信息

Part Number	Marking Code
MMBZ33VA	33A

6. Absolute Maximum Ratings(T_a =+ 25℃) 绝对最大额定值

Characteristic 特性	Symbol 符号	Value 值	Unit 单位
Peak Pulse Power Dissipation (1ms pulse) 峰值脉冲耗散功率 (1ms脉冲)	P_{pk}	40	W
Reverse Stand-off Work Voltage 反向工作电压	V_{RWM}	26	V

7. Thermal Characteristics(T_a =+ 25℃) 热特性

Characteristic 特性	Symbol 符号	Value 值	Unit 单位
Power Dissipation on FR-5 Board 耗散功率[3] Derate above 25℃[3]	P_D –	225 1.8	mW mW/℃
Thermal Resistance From Junction To Ambient 结到环境的热阻[3]	$R_{\theta JA}$	556	℃/W
Power Dissipation on alumina substrate 耗散功率[4] Derate above 25℃[4]	P_D –	300 2.4	mW mW/℃
Thermal Resistance From Junction To Ambient 结到环境的热阻[4]	$R_{\theta JA}$	417	℃/W
Operating Junction Temperature 运行结温	T_J	-55 ~ +150	℃
Storage Temperature 储藏温度	T_{stg}	-55 ~ +150	℃
Lead Solder Temperature − Maximum (10 Second Duration) 引脚焊接最高温度（持续 10s）	T_L	260	℃

[3] FR-5=1.0x0.75x0.62 in.

FR-5 基板：1.0×0.75×0.62 英寸。

[4] Alumina=0.4x0.3x0.024m, 99.5% alumina

氧化铝基板：0.4×0.3×0.024 米，氧化铝纯度 99.5%。

8. ESD Ratings(T_a =+ 25℃) ESD 评级

Characteristic 特性	Symbol 符号	Standard 标准	Value 值	Unit 单位
Contact Discharge 接触放电	V_{ESD}	IEC 61000-4-2	±30	KV
Electrostatic Discharge-Human Body Model（ESD HBM） 人体放电模型	-	3B	>16000	V
Electrostatic Discharge-Machine Model（ESD MM） 带电器件模型	-	C	>400	V

9. Electrical Characteristics(T_a =+ 25℃) 电特性

Characteristic 特性	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Conditions 条件
Breakdown Voltage 击穿电压	V_{BR}	31.35	33	34.65	V	$I_T = 1mA$
Reverse Leakage Current 反向漏电流	I_R	-	-	50	nA	$V_R = V_{RWM}$
Forward Voltage 正向电压[5]	V_F	-	-	0.9	V	$I_F = 10mA$
Clamping Voltage 钳位电压	V_{CL}	-	-	46	V	$I_{PP} = 0.87A$
Maximum Temperature Coefficient of V_{BR} 击穿电压最大温度系数	θV_{BR}	-	-	30.4	$mV/℃$	-

[5] 2% Tolerance.最大正向电压存在 2%偏差。

10. Typical Electrical Characteristics Curve 典型电特性曲线

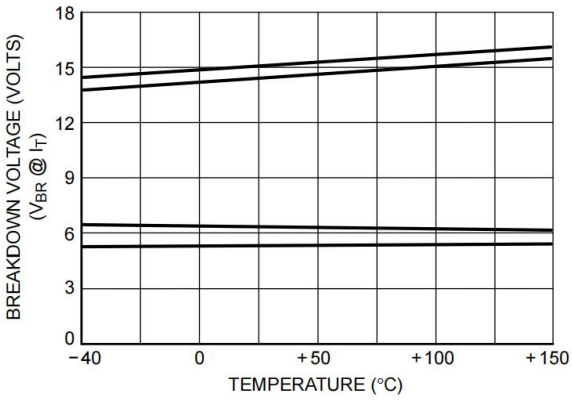


Figure 1. Typical Breakdown Voltage versus Temperature
(Upper curve for each voltage is bidirectional mode, lower curve is unidirectional mode)

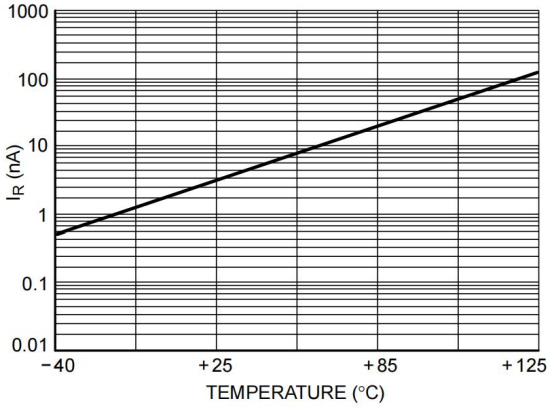


Figure 2. Typical Leakage Current versus Temperature

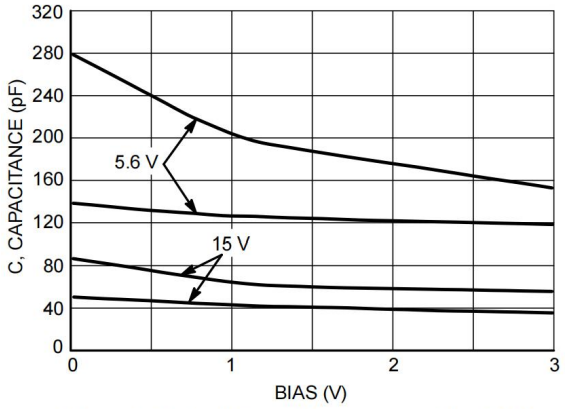


Figure 3. Typical Capacitance versus Bias Voltage
(Upper curve for each voltage is unidirectional mode, lower curve is bidirectional mode)

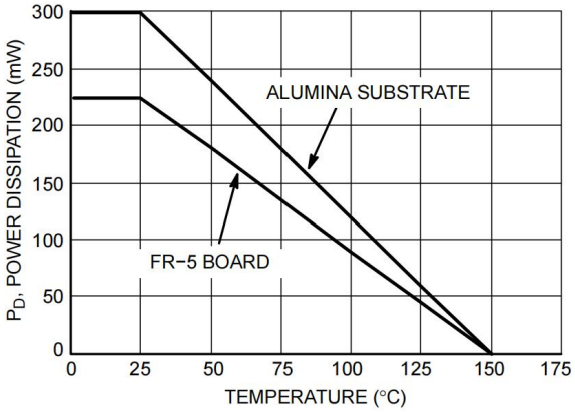


Figure 4. Steady State Power Derating Curve

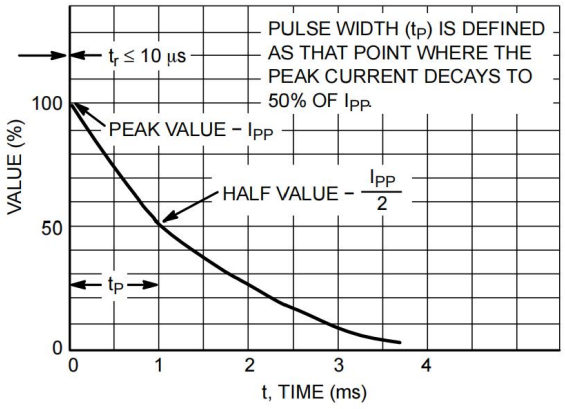


Figure 5. Pulse Waveform

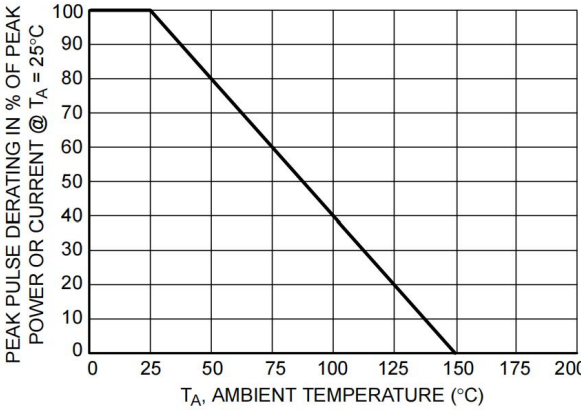


Figure 6. Pulse Derating Curve

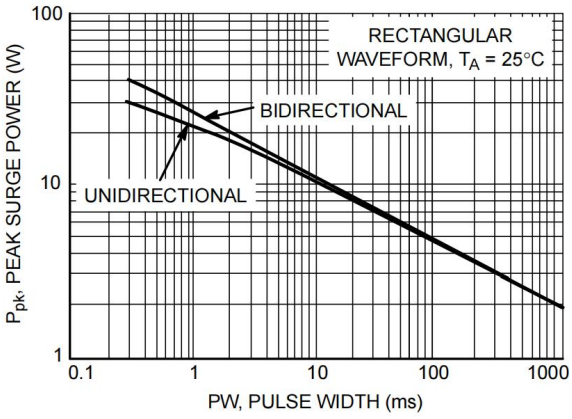


Figure 7. Maximum Non−repetitive Surge Power, P_{pk} versus PW

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

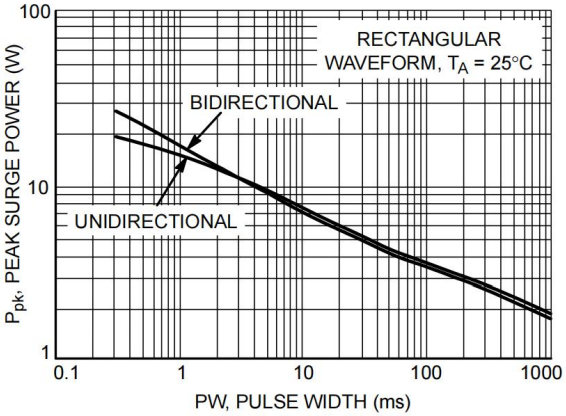
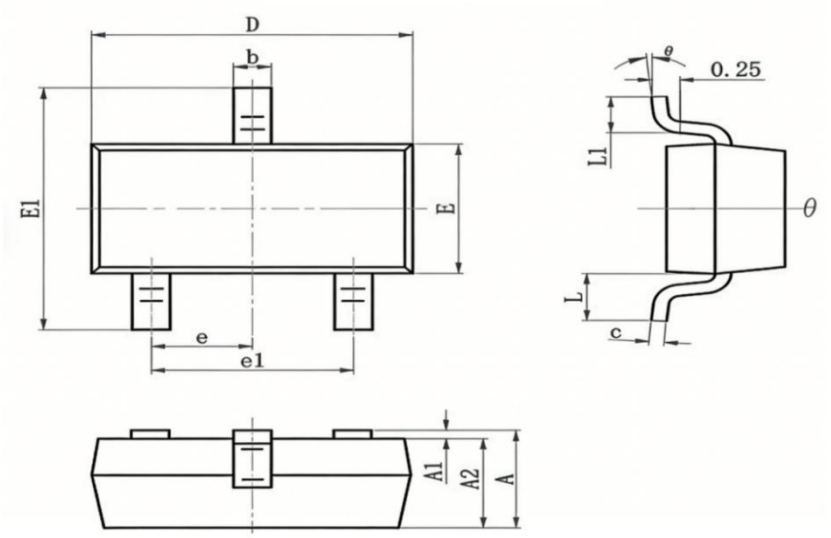


Figure 8. Maximum Non−repetitive Surge Power, P_{pk}(NOM) versus PW

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.

11. Package Outline Dimensions 封装外形尺寸

SOT-23



Symbol 符号	Millimeters 毫米	
	Min.最小值	Max.最大值
A	0.900	1.150
A1	0	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	0.900	1.000
e1	1.800	2.000
L	0.500	0.600
L1	0.300	0.500
θ	0°	8°

12. Suggested Pad Layout 推荐焊盘布局

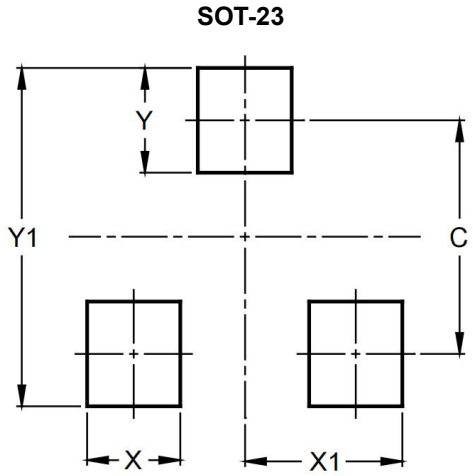


Fig. Soldering footprint for SOT-23

图 SOT-23 的引脚焊接

Dimensions 尺寸	Millimeters 毫米
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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