



MMBZ5V6AL - MMBZ33VAL

24W AND 40W PEAK POWER DUAL SURFACE MOUNT TVS

Features

Dual TVS in Common Anode Configuration

24W/40W Peak Power Dissipation Rating @ 1.0ms

(Unidirectional)

225 mW Power Dissipation

Ideally Suited for Automatic Insertion

Low Leakage

Lead Free/RoHS Compliant (Note 5)

Mechanical Data

Case: SOT-23

Case Material: Molded Plastic. UL Flammability

Classification 94V-0

Moisture Sensitivity: Level 1 per J-STD-020C

Terminals: Solderable per MIL-STD-202, Method 208

Polarity: See Diagram

Lead Free Plating (Matte Tin Finish annealed over

Alloy 42 leadframe).

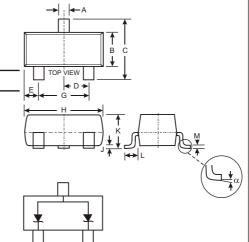
Marking: Marking Code & Date Code, See Page 2

Marking Code: See Table Below and Page 2

Ordering Information: See Page 2

ESD Rating Exceeding 16kV per the Human Body Model (Note 4)

Weight: 0.008 grams (approximate)



	SOT-23									
Dim	Min	Max								
Α	0.37	0.51								
В	1.20	1.40								
С	2.30	2.50								
D	0.89	1.03								
E	0.45	0.60 2.05								
G	1.78									
Н	2.80	3.00								
J	0.013	0.10								
K	0.903	1.10								
L	0.45	0.61								
M	0.085	0.180								
	0	8								
All Din	All Dimensions in mm									

Maximum Ratings @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P _d	225	mW
Peak Power Dissipation (Note 2) MMBZ5V6AL - MMBZ10VAL	P _{pk}	24	W
Peak Power Dissipation (Note 2) MMBZ15VAL - MMBZ33VAL	P _{pk}	40	W
Thermal Resistance, Junction to Ambient Air (Note 1)	R JA	556	°C/W
Operating and Storage Temperature Range	T_j, T_{STG}	-65 to +150	°C

Electrical Characteristics @T_A = 25°C unless otherwise specified

24 Watt (V_F = 0.9V max @ I_F = 10mA)

		.,	I _R @		Breakdow	n Voltage		V _C @ I _{PP} (Note 2)		Typical Temperature Coefficient	
Type Marking Number Code	V _{RWM}	V _{RWM}	V	_{3R} (Note 3) ((V)	@ I _T	Vc	l _{PP}			
	Volts		Min	Nom	Max	mA	٧	Α	Tc (mV/ C)		
MMBZ5V6AL	K9A	3	5.0	5.32	5.6	5.88	20	8.0	3.0	1.8	

24 Watt (V_F = 1.1V max @ I_F = 200mA)

		.,	I _R @		Breakdow	n Voltage		V _C @	I _{PP} (Note 2)	Typical Temperature Coefficient	
Type Number	Marking Code	V _{RWM}	V _{RWM}	V	BR (Note 3)	(V)	@ I _T	Vc	l _{PP}		
		Volts	Α	Min	Nom	Max	mA	V	Α	Tc (%/ C)	
MMBZ6V2AL	K9B	3.0	0.5	5.89	6.2	6.51	1.0	8.7	2.76	+0.04	
MMBZ6V8AL	K9C	4.5	0.5	6.46	6.8	7.14	1.0	9.6	2.5	+0.045	
MMBZ9V1AL	K9D	6.0	0.3	8.65	9.1	9.56	1.0	14	1.7	+0.065	
MMBZ10VAL	K9E	6.5	0.3	9.50	10	10.5	1.0	14.2	1.7	+0.065	

1. Device mounted on FR-5 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes Inc. suggested pad layout AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf. 200mW per element must not be exceeded.

- 2. Non-repetitive current pulse per Figure 2 and derate above $T_A = 25\,$ C per Figure 1.
- 3. Short duration pulse test used to minimize self-heating effect.
- 4. MMBZ5V6AL and MMBZ15VAL exceed 16kV ESD rating, all other voltages exceed 8kV ESD rating.
- 5. No purposefully added lead.



40 Watt ($V_F = 1.1V \text{ max } @ I_F = 200\text{mA}$)

		.,	I _R @		Breakdov	vn Voltage		V _C @	I _{PP} (Note 2)	Typical Temperature Coefficient	
Type Number	Marking Code	V _{RWM}	V _{RWM}	V	_{BR} (Note 3)	(V)	@ I _T	Vc	lpp		
		Volts	nA	Min	Nom	Max	mA	V	Α	Tc (%/ C)	
MMBZ15VAL	K9K	12	50	14.25	15	15.75	1.0	21	1.9	+0.080	
MMBZ18VAL	K9L	14.5	50	17.10	18	18.90	1.0	25	1.6	+0.090	
MMBZ20VAL	K9N	17	50	19.00	20	21.00	1.0	28	1.4	+0.090	
MMBZ27VAL	K9Q	22	50	25.65	27	28.35	1.0	40	1.0	+0.090	
MMBZ33VAL	K9T	26	50	31.35	33	34.65	1.0	46	0.87	+0.090	

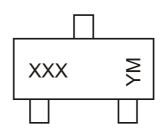
Ordering Information (Note 6)

Device	Packaging	Shipping
(Type number)-7*-F	SOT-23	3000/Tape & Reel

^{*} Example: 5.6V type = MMBZ5V6AL-7-F.

Notes: 6. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information

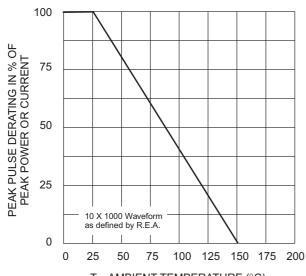


XXX = Product Type Marking Code YM = Date Code Marking Y = Year ex: N = 2002 M = Month ex: 9 = September

Date Code Key

Code M N P R S	Т	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D





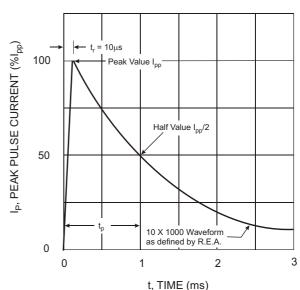


Fig. 2 Pulse Waveform

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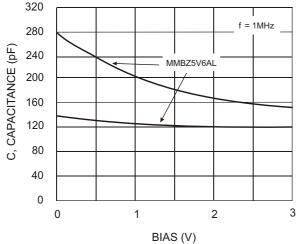
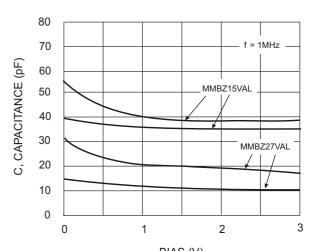


Fig. 3 Typical Capacitance vs. Bias Voltage (Lower curve is Bidirectional mode, Upper curve is Unidirectional mode)



BIAS (V)
Fig. 4 Typical Capacitance vs. Bias Voltage (Lower curve is Bidirectional mode, Upper curve is Unidirectional mode)

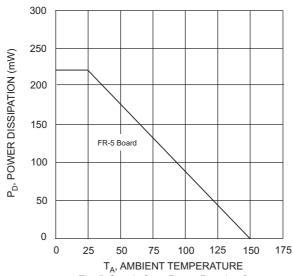
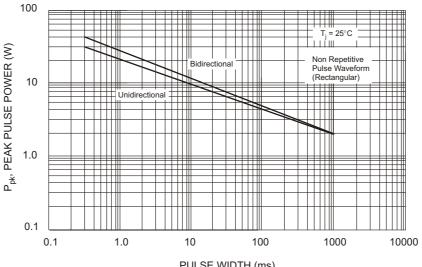


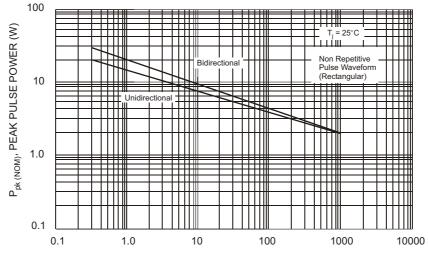
Fig. 5 Steady State Power Derating Curve



PULSE WIDTH (ms)
Fig. 6 Pulse Rating Curve,
P_{pk}(W) vs. Pulse Width (ms)

Power is defined as $P_{pk} = V_C \times I_{pp}$





 $\begin{array}{c} \text{PULSE WIDTH (ms)} \\ \text{Fig. 7 Pulse Rating Curve,} \\ \text{P}_{\text{pk (NOM)}} (\text{W}) \text{ vs. Pulse Width (ms)} \end{array}$

Power is defined as $P_{pk(NOM)} = V_{Z(NOM)} \times I_{pp}$ where $V_{Z(NOM)}$ is the nominal Zener voltage measured at the low test current used for voltage classification

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