



MMBZ5V6AL - MMBZ33VAL

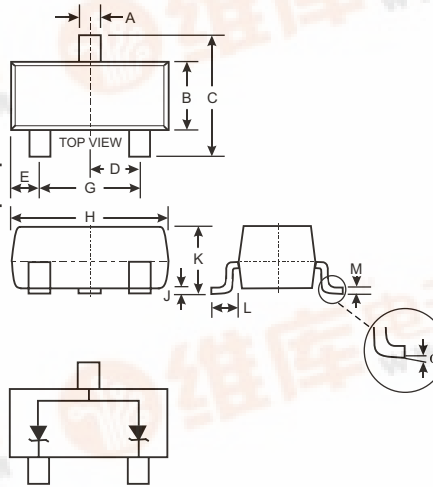
24W AND 40W PEAK POWER DUAL SURFACE MOUNT TVS

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

Mechanical Data

- Case: SOT-23, Molded Plastic
- Case material - UL Flammability Rating Classification 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Polarity: See Diagram
- Marking: Marking Code & Date Code, See Page 2
- Marking Code: See Table Below and Page 2
- Weight: 0.008 grams (Approx.)
- Ordering Information: See Page 2



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
α	0°	8°
All Dimensions in mm		

Maximum Ratings @ $T_A = 25^\circ\text{C}$ 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)	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_j, T_{STG}	-65 to +150	$^\circ\text{C}$

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

24 Watt ($V_F = 0.9\text{V max @ } I_F = 10\text{mA}$)

Type Number	Marking Code	V _{RWM}	I _R @ V _{RWM}	Breakdown Voltage			V _C @ I _{PP} (Note 2)		Typical Temperature Coefficient	
				V _{BR} (Note 3) (V)			@ I _T	V _C		I _{PP}
		Volts	μA	Min	Nom	Max	mA	V		A
MMBZ5V6AL	K9A	3	5.0	5.32	5.6	5.88	20	8.0	3.0	1.8

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

Type Number	Marking Code	V _{RWM}	I _R @ V _{RWM}	Breakdown Voltage				V _C @ I _{PP} (Note 2)		Typical Temperature Coefficient
				V _{BR} (Note 3) (V)			@ I _T	V _C	I _{PP}	
		Volts	μA	Min	Nom	Max	mA	V	A	
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

Note:

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 $T_A = 25^\circ\text{C}$ per Figure 1.

3. Short duration pulse test used to minimize self-heating effect.



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

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Type Number	Marking Code	V_{RWM} Volts	I_R @ V_{RWM} nA	Breakdown Voltage				V_C @ I_{PP} (Note 2)		Typical Temperature Coefficient T_c (%/°C)
				V_{BR} (Note 3) (V)			@ I_T mA	V_C V	I_{PP} A	
MMBZ15VAL	K9K/KDJ	12	50	Min	Nom	Max				
MMBZ18VAL	K9L	14.5	50	14.25	15	15.75	1.0	21	1.9	+0.080
MMBZ20VAL	K9N	17	50	17.10	18	18.90	1.0	25	1.6	+0.090
MMBZ27VAL	K9Q	22	50	19.00	20	21.00	1.0	28	1.4	+0.090
MMBZ33VAL	K9T	26	50	25.65	27	28.35	1.0	40	1.0	+0.090
				31.35	33	34.65	1.0	46	0.87	+0.090

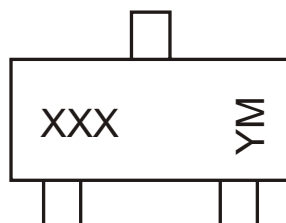
Ordering Information (Note 4)

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

* Example: 5.6V type = MMBZ5V6AL-7.

Notes: 4. 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

Year	2001	2002	2003	2004	2005	2006	2007	2008
Code	M	N	P	R	S	T	U	V

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

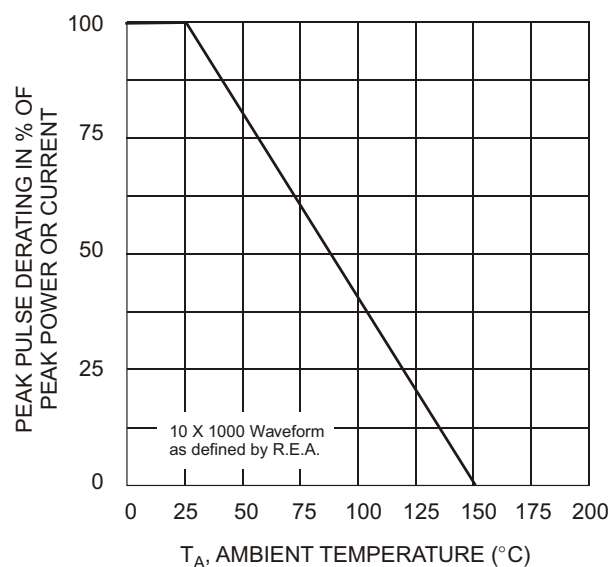


Fig. 1 Pulse Derating Curve

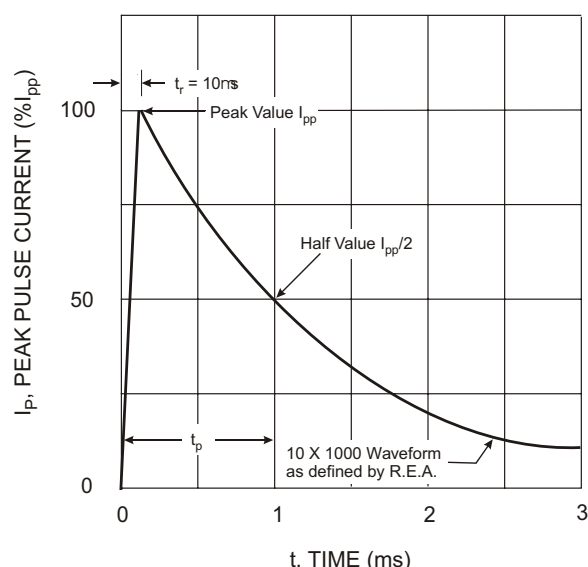


Fig. 2 Pulse Waveform

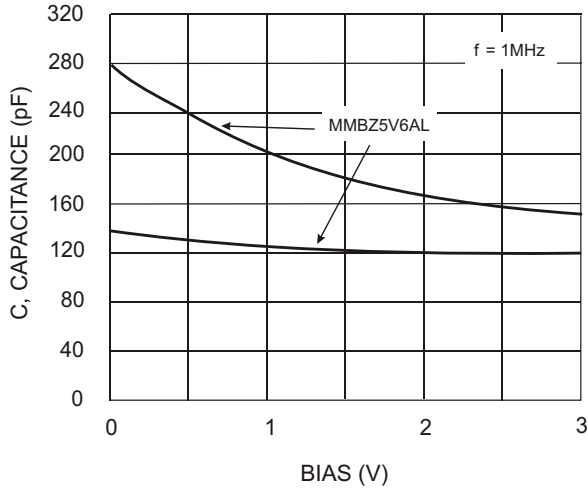


Fig. 3 Typical Capacitance vs. Bias Voltage
(Lower curve is Bidirectional mode,
Upper curve is Unidirectional mode)

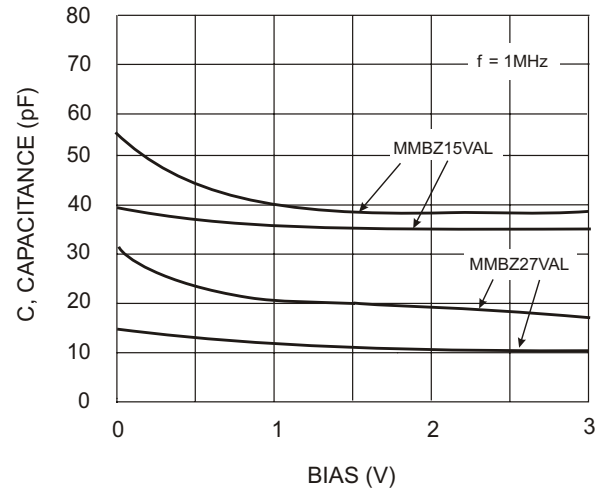


Fig. 4 Typical Capacitance vs. Bias Voltage
(Lower curve is Bidirectional mode,
Upper curve is Unidirectional mode)

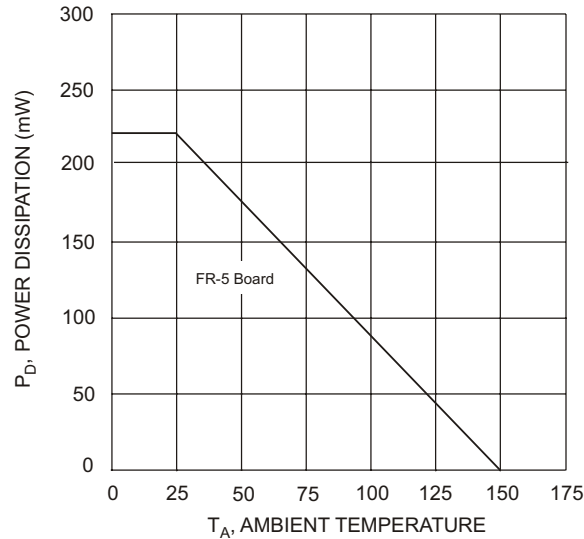


Fig. 5 Steady State Power Derating Curve

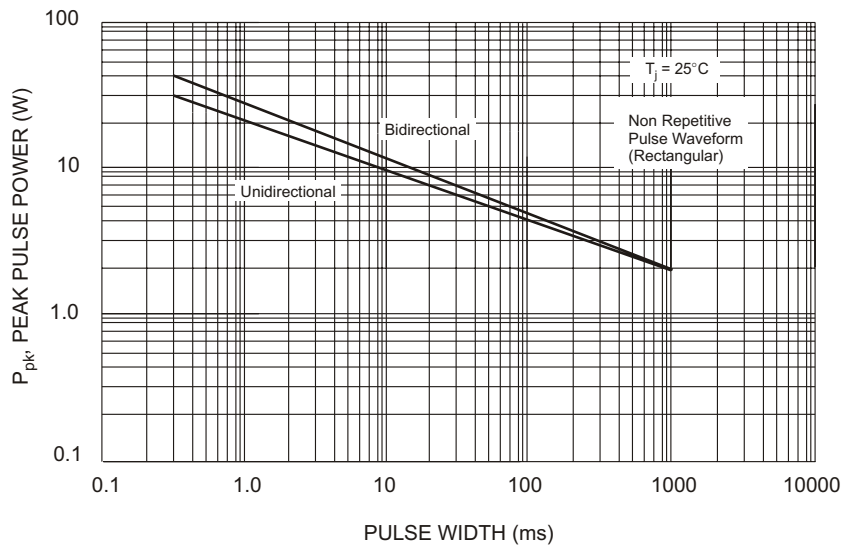


Fig. 6 Pulse Rating Curve,
P_{pk} (W) vs. Pulse Width (ms)

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

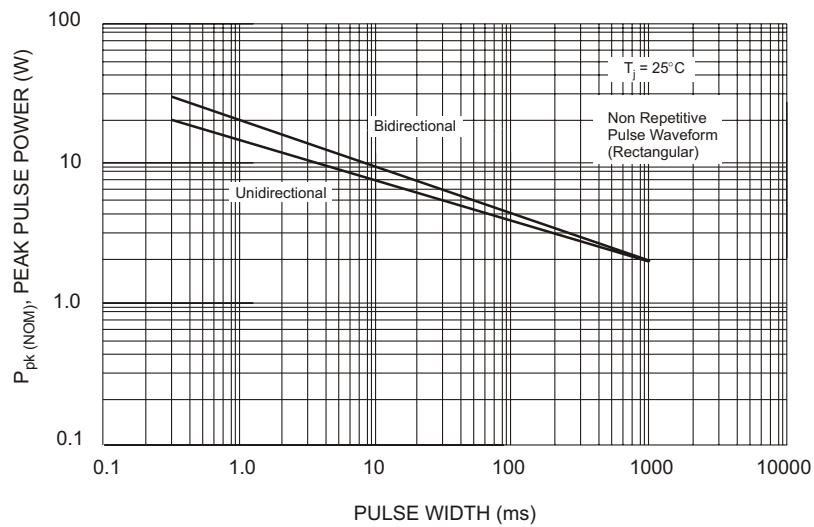


Fig. 7 Pulse Rating Curve,
 $P_{pk(NOM)}$ (W) vs. Pulse Width (ms)

Power is defined as $P_{pk(NOM)} = V_{BR(NOM)} \times I_{pp}$
where $V_{BR(NOM)}$ is the nominal breakdown voltage