MMBZ5V6AL - MMBZ33VAL

24W AND 40W PEAK POWER DUAL SURFACE MOUNT TVS

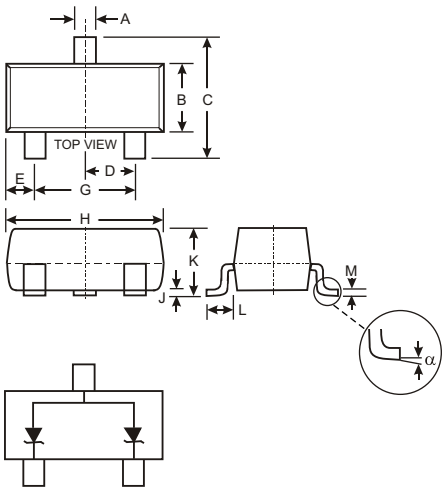
NEW PRODUCT

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**
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
	0	8
All Dimensions in mm		

Maximum Ratings @T_A = 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)

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	A	Min	Nom	Max	mA	V	A	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)

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	A	Min	Nom	Max	mA	V	A	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

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 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.

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

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	nA	Min	Nom	Max	mA	V	A	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

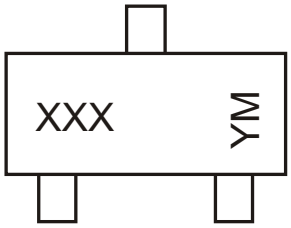
Ordering Information (Note 6)

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

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Code	M	N	P	R	S	T	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	O	N	D

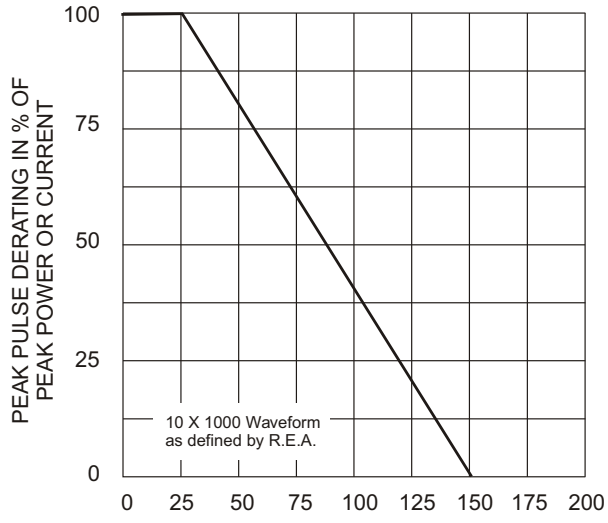


Fig. 1 Pulse Derating Curve

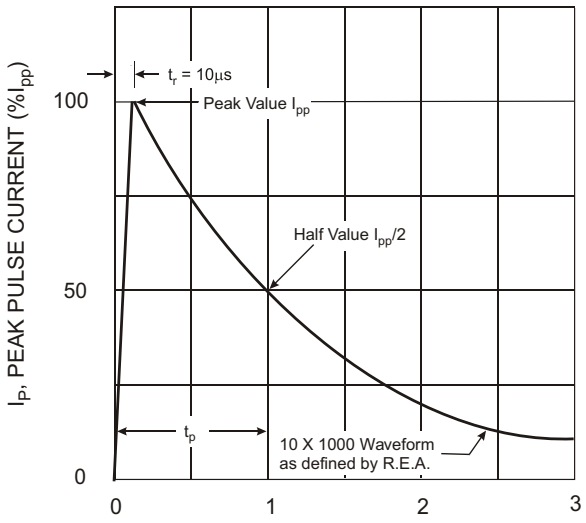


Fig. 2 Pulse Waveform

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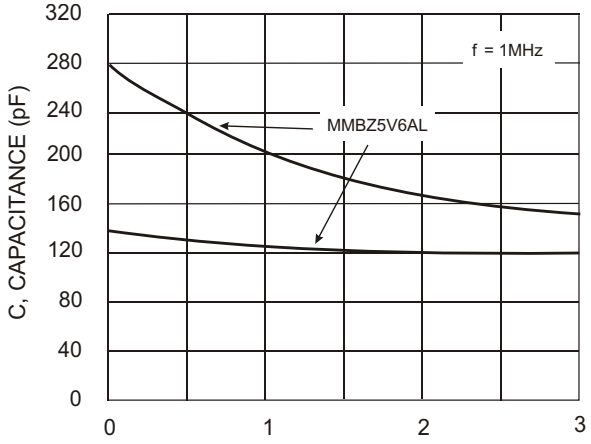

Fig. 3 Typical Capacitance vs. Bias Voltage
(Lower curve is Bidirectional mode,
Upper curve is Unidirectional mode)

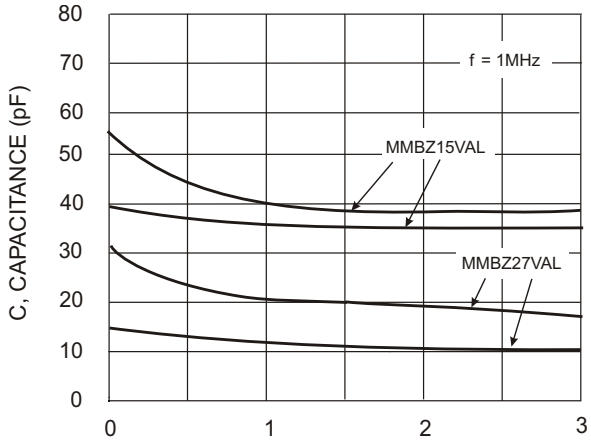

Fig. 4 Typical Capacitance vs. Bias Voltage
(Lower curve is Bidirectional mode,
Upper curve is Unidirectional mode)

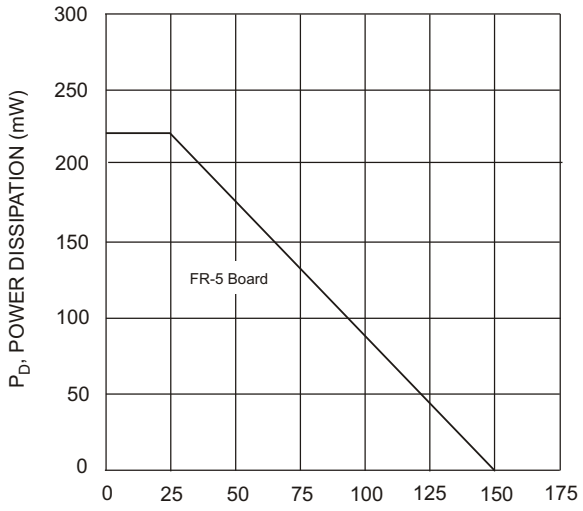

Fig. 5 Steady State Power Derating Curve

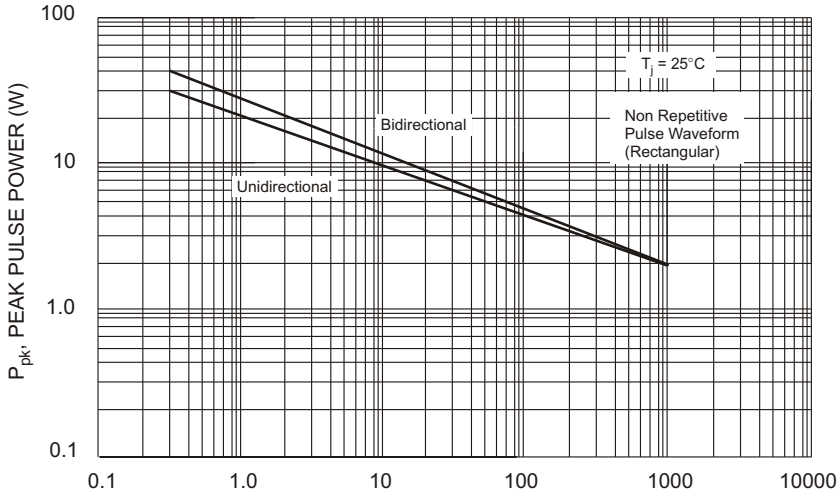

Fig. 6 Pulse Rating Curve,
P_{pk} (W) vs. Pulse Width (ms)

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

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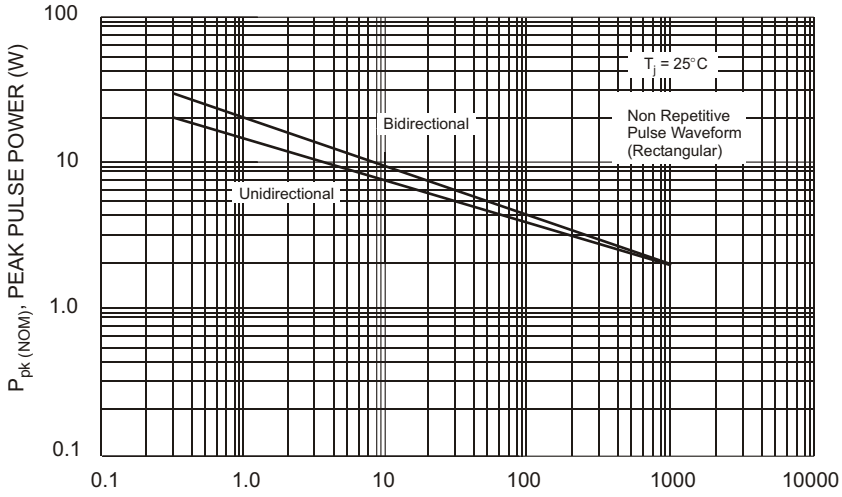

Fig. 7 Pulse Rating Curve,
$P_{pk\ (NOM)}$ (W) vs. Pulse Width (ms)

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