EVVOSEMI®

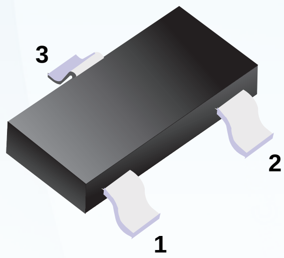
THINK CHANGE DO

ESD | TVS | MOS | LDO | Diode | Sensor | DC-DC

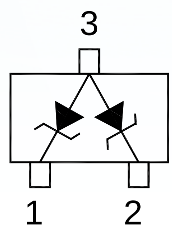
Product Specification

Domestic Part Number	MMBZ Series
Overseas Part Number	MMBZ Series
Equivalent Part Number	MMBZ Series

Dual Common Anode Zener TVS



Simplified outline(SOT-23)



Features

- Allows Either Two Separate Unidirectional Configuations or a Single Bidirectional Configuations.
- Low Leakage Current.
- 24-40 Watts Peak Power Protection.
- Excellent Clamping Capability.
- ESD Rating of Class N(exceeding 16KV)per the Human Body Model.
- Transient Voltage Suppressors Encapsulated in a SOT-23 Package.

Mechanical Data

- Case: Molded Epoxy
- Marking: Marking Code
- Maximum Case Temperature for Soldering Purpose: 260°C for 10 sec.
- Weight: 0.008grams(approx.)

Absolute Maximum Ratings Ta = 25℃

Characteristics	Symbol	Value	
Peak Power Dissipation @ 1.0 ms @ $T_L \leq 25$℃ (1) MMBZ5V6A thru MMBZ10VA MMBZ12VA thru MMBZ33VA	P_{PK}	 24 40	W
Total Power Dissipation on FR-5 Board (2)@ T_A=25℃ Derate above 25℃ Thermal Resistance Junction-to-Ambient	P_D $R_{\theta JA}$	225 1.8 556	mW mW/℃ ℃/W
Total Power Dissipation on Alumina Substrate (3)@ T_A =25℃ Derate above 25℃ Thermal Resistance Junction-to-Ambient	P_D $R_{\theta JA}$	300 2.4 417	mW mW/℃ ℃/W
Junction and Storage Temperature Range	T_J ,T_{STG}	-55 to +150	℃
Lead Solder Temperature-Maximum(10 Second Duration)	T_L	260	℃

NOTE: 1. Non-Repetitive Current Pulse, per FIG 5 and Derated above T_A=25℃ per FIG 6.
2. FR-5=1.0×0.75×0.62 in.
3. Alumina=0.4×0.3×0.024m, 99.5% alumina

ELECTRICALCHARACTERISTICS (T_A = 25℃ unless otherwise noted)
UNIDIRECTIONAL(Circuit tied to Pins 1 and 3 or Pins 2 and 3)

(V_F = 0.9 V Max @ I_F = 10 mA)

24 WATTS

				Breakdown Voltage				**Max Zener Impedance** (5)			V_C @ I_{PP} (6)		
	Device	V_{RWM}	I_R @ V_{RWM}	V_{BR} (4) (V)			@ I_T	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		V_C	I_{PP}	θV_{BR}
Device	**Marking**	**Volts**	**uA**	**Min**	**Nom**	**Max**	**mA**	**Ω**	**Ω**	**mA**	**V**	**A**	**mV/℃**
MMBZ5V6A	5A6	3.0	5.0	5.32	5.6	5.88	20	11	1600	0.25	8.0	3.0	1.26
MMBZ6V2A	6A2	3.0	0.5	5.89	6.2	6.51	1.0	-	-	-	8.7	2.76	2.80
MMBZ6V8A	6A8	4.5	0.5	6.46	6.8	7.14	1.0	-	-	-	9.6	2.5	3.4
MMBZ9V1A	9A1	6.0	0.3	8.65	9.1	9.56	1.0	-	-	-	14	1.7	7.5
MMBZ10VA	10A	6.5	0.3	9.50	10	10.5	1.0	-	-	-	14.2	1.7	7.5

(V_F = 0.9 V Max @ I_F = 10 mA)

40 WATTS

				Breakdown Voltage				V_C @ I_{PP} (6)		
	Device	V_{RWM}	I_R @ V_{RWM}	V_{BR} (4) (V)			@ I_T	V_C	I_{PP}	θV_{BR}
Device	**Marking**	**Volts**	**nA**	**Min**	**Nom**	**Max**	**mA**	**V**	**A**	**mV/℃**
MMBZ12VA	12A	8.5	200	11.40	12	12.60	1.0	17	2.35	7.5
MMBZ15VA	15A	12	50	14.25	15	15.75	1.0	21	1.9	12.3
MMBZ18VA	18A	14.5	50	17.10	18	18.90	1.0	25	1.6	15.3
MMBZ20VA	20A	17	50	19.00	20	21.00	1.0	28	1.4	17.2
MMBZ27VA	27A	22	50	25.65	27	28.35	1.0	40	1.0	24.3
MMBZ33VA	33A	26	50	31.35	33	34.65	1.0	46	0.87	30.4

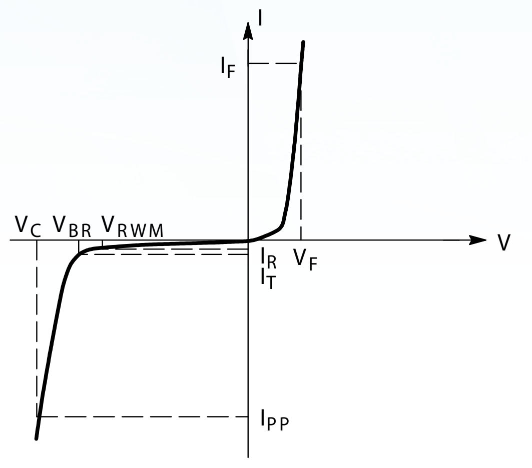
4. V_{BR} measured at pulse test current I_T at an ambient temperature of 25℃.
5. Z_{ZT} and Z_{ZK} are measured by dividing the AC voltage drop across the device by the AC current applied. The specified limits are for $I_{Z(AC)}$ = 0.1 $I_{Z(DC)}$, with the AC frequency = 1.0 kHz.
6. Surge current waveform per Fig 5 and derate per Fig 6

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}	Working Peak Reverse Votlage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
θV_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
V_{BR}	Maximum Temperature Coef ficient 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_{ZK}	Maximum Zener Impedance @ I_{ZK}



Uni-Directional TVS

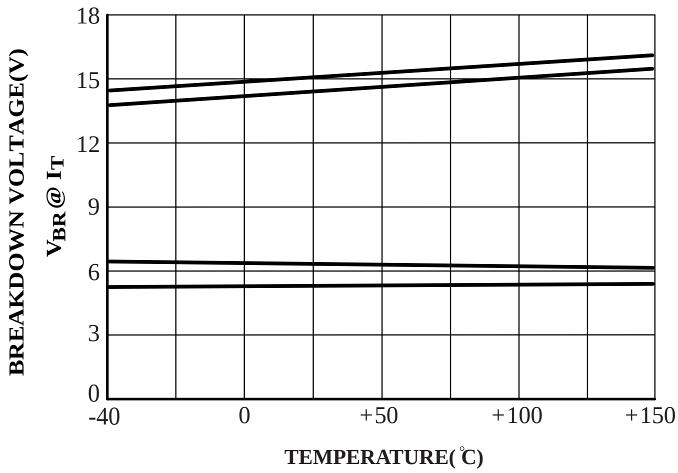


FIG.1 Typical Breakdown Voltage Versus Temperature

(Upper curve for each voltage is bidirectional mode,) lower curve is undirectional mode)

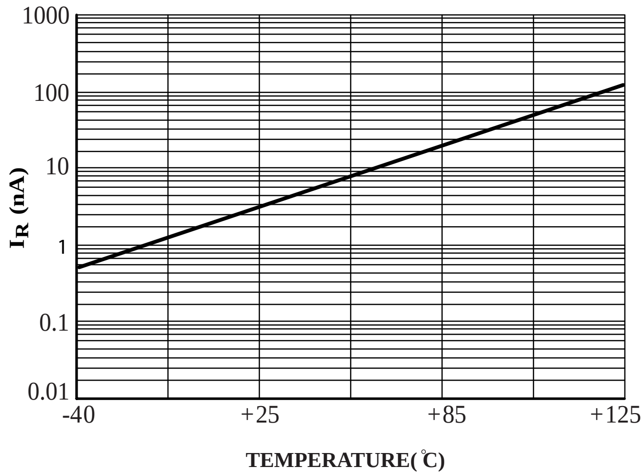


FIG.2 Typical Leakage Current Versus Temperature

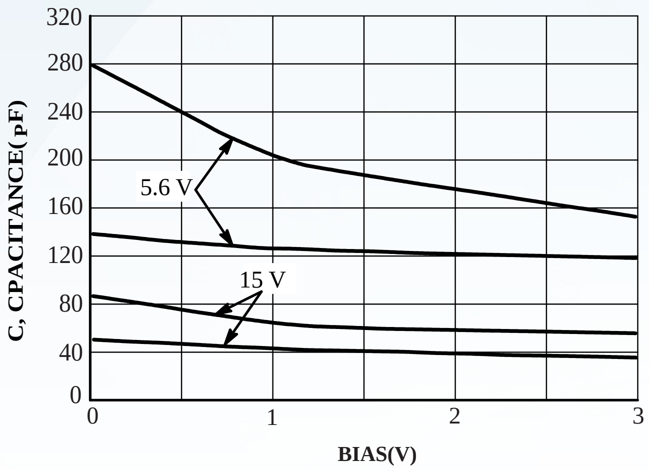


FIG.3 Typical Capacitance Versus Bias Voltage

(Upper curve for each voltage is bidirectional mode,)
lower curve is undirectional mode)

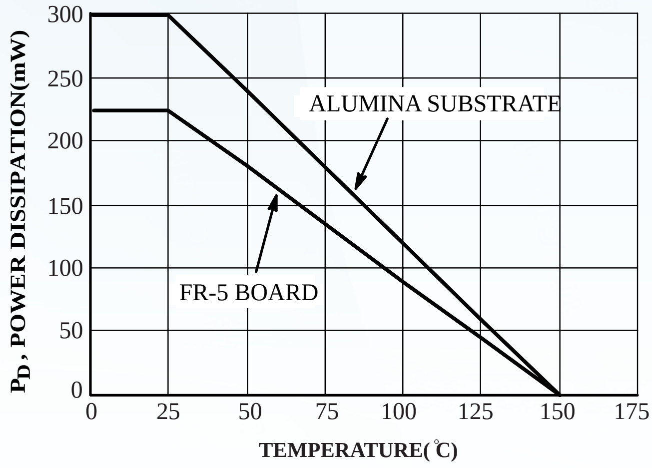


FIG.4 Steady State Power Derating Curve

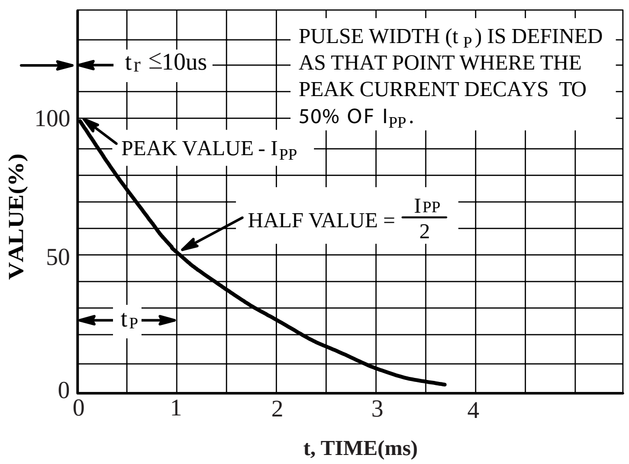


FIG.5 Pulse Waveform

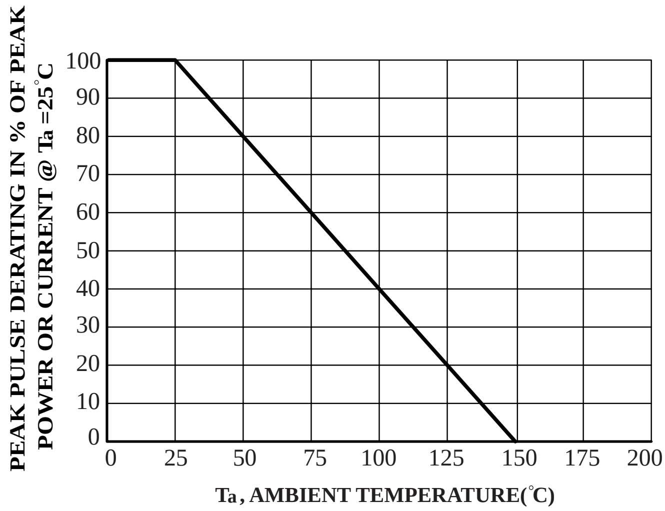


FIG.6 Pulse Derating Curve

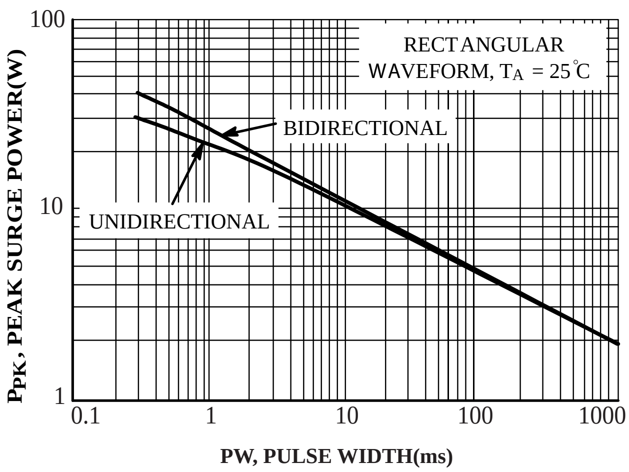


FIG.7 Maximum Non-repetitive Surge Power, P_{PK} Versus PW

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

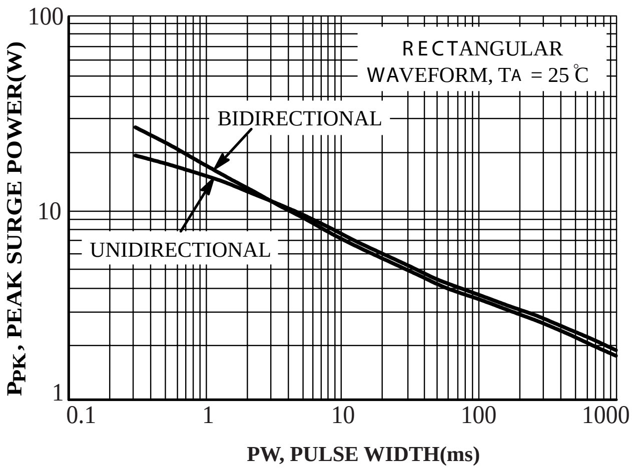
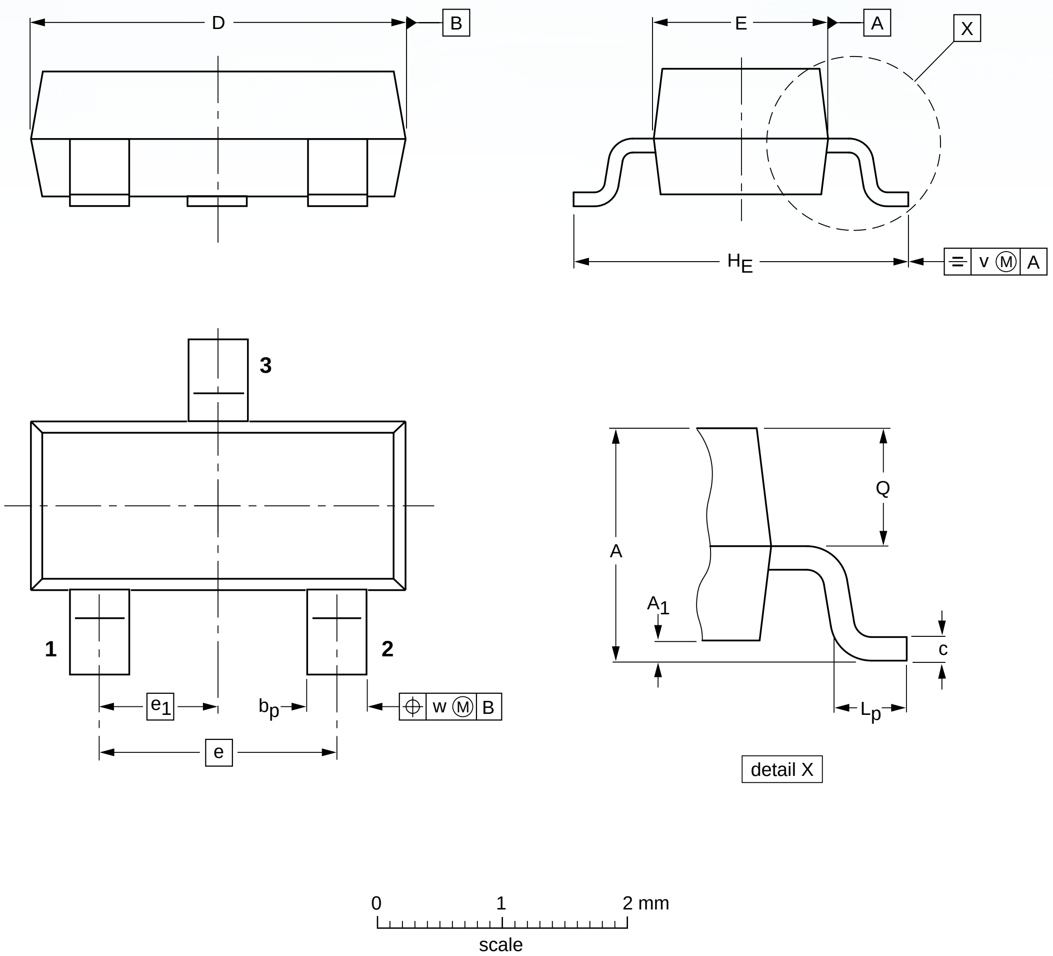


FIG.8 Maximum Non-repetitive Surge Power, P_{PK} (NOM)Versus PW

Power is defined as V_Z (NOM)xI_Z(pk)where V_Z (NOM) is the nominal Zener voltage measured at the low test current used for voltage classification

■ **SOT-23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

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