

MM5Z2V4 THRU MM5Z75V

List

List..... 1

Package outline..... 2

Features..... 2

Mechanical data..... 2

Maximum ratings 2

Electrical characteristics..... 3

Rating and characteristic curves..... 4~5

Pinning information..... 6

Suggested solder pad layout..... 6

Month code..... 6

Packing information..... 7

Reel packing..... 8

Suggested thermal profiles for soldering processes..... 8

High reliability test capabilities..... 9

MM5Z2V4 THRU MM5Z75V

150mW Surface Mount Zener Diodes-2.4V-75V

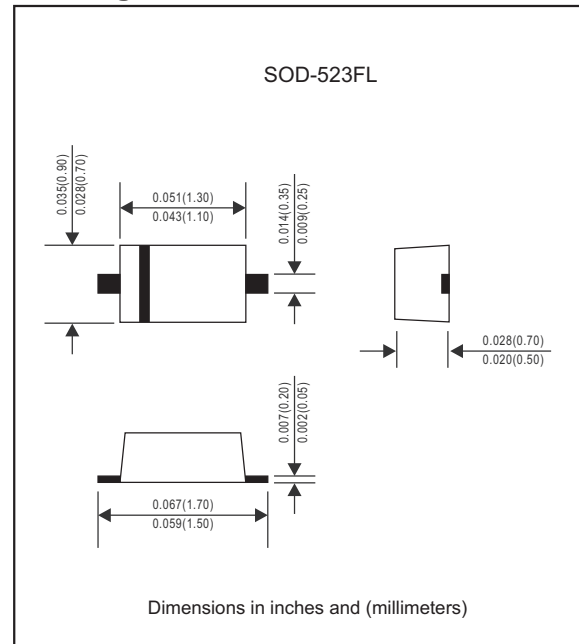
Features

- Silicon epitaxial planar chip structure.
- Wide zener reverse voltage range 2.4V to 75V.
- Tiny package size for high density applications.
- Ideally suited for automated assembly processes.
- ESD Rating of Class 3(>16kV)per Human Body Model
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free parts, ex. MM5Z2V4-H.

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-523FL
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.002 gram

Package outline



Maximum ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 10 \text{ mA}$	V_F			0.9	V
Total Device Dissipation	on FR-5 Board @ $T_A = 25^\circ\text{C}$	P_D			150	mW
Thermal Resistance	Junction to ambient	$R_{\theta JA}$		625		$^\circ\text{C}/\text{W}$
	Junction to case	$R_{\theta JC}$		350		$^\circ\text{C}/\text{W}$
Operating junction temperature range		T_J	-65		+150	$^\circ\text{C}$
Storage temperature range		T_{STG}	-65		+150	$^\circ\text{C}$

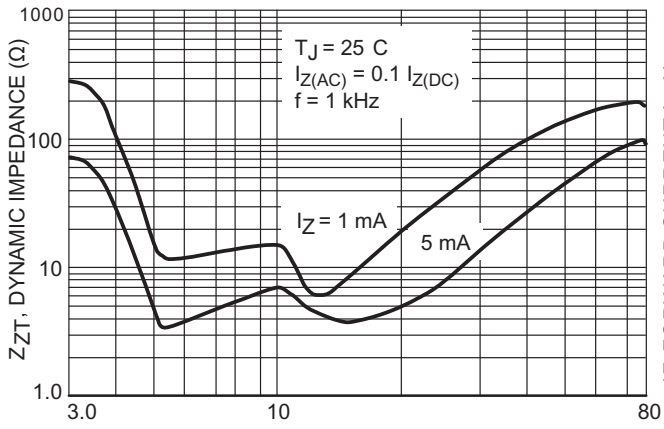
MM5Z2V4 THRU MM5Z75V

Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

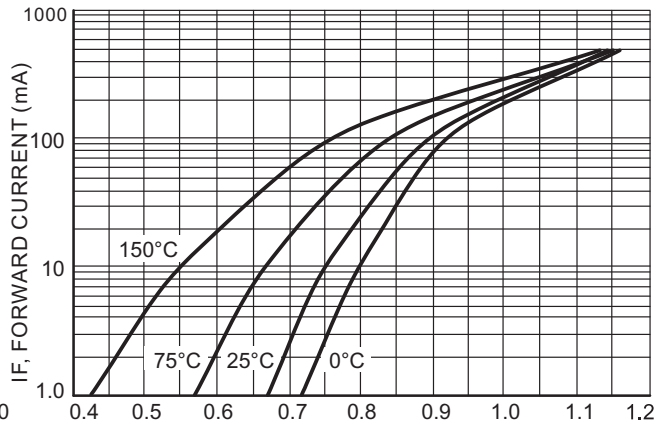
Part No.	Marking code (Note 1)	Zener voltage			Test current I_{ZT}	Zener impedance			Leakage current		θ_{Vz} (mV/k) @ I_{ZT}		C_j @ $V_R=0V$ $f=1\text{MHz}$ pF
		$V_Z @ I_{ZT}$				$Z_{ZT} @ I_{ZT}$ (Ω)Max	$Z_{ZK} @ I_{ZK}$ (Ω)Max	I_{ZK} mA	I_R (μA)Max	V_R Volts	Min.	Max.	
		Min.(V)	Nom.(V)	Max.(V)	mA								(Ω)Max
MM5Z2V4	00	2.2	2.4	2.6	5	100	1000	1.0	50	1.0	-3.5	0	450
MM5Z2V7	01	2.5	2.7	2.9	5	100	1000	1.0	20	1.0	-3.5	0	450
MM5Z3V0	02	2.8	3.0	3.2	5	100	1000	1.0	10	1.0	-3.5	0	450
MM5Z3V3	05	3.1	3.3	3.5	5	95	1000	1.0	5	1.0	-3.5	0	450
MM5Z3V6	06	3.4	3.6	3.8	5	90	1000	1.0	5	1.0	-3.5	0	450
MM5Z3V9	07	3.7	3.9	4.1	5	90	1000	1.0	3	1.0	-3.5	-2.5	450
MM5Z4V3	08	4.0	4.3	4.6	5	90	1000	1.0	3	1.0	-3.5	0	450
MM5Z4V7	09	4.4	4.7	5.0	5	80	800	1.0	3	2.0	-3.5	0.2	260
MM5Z5V1	0A	4.8	5.1	5.4	5	60	500	1.0	2	2.0	-2.7	1.2	225
MM5Z5V6	0C	5.2	5.6	6.0	5	40	200	1.0	1	2.0	-2.0	2.5	200
MM5Z6V2	0E	5.8	6.2	6.6	5	10	100	1.0	3	4.0	0.4	3.7	185
MM5Z6V8	0F	6.4	6.8	7.2	5	15	160	1.0	2	4.0	1.2	4.5	155
MM5Z7V5	0G	7.0	7.5	7.9	5	15	160	1.0	1	5.0	2.5	5.3	140
MM5Z8V2	0H	7.7	8.2	8.7	5	15	160	1.0	0.7	5.0	3.2	6.2	135
MM5Z9V1	0K	8.5	9.1	9.6	5	15	160	1.0	0.2	7.0	3.8	7.0	130
MM5Z10V	0L	9.4	10	10.6	5	20	160	1.0	0.1	8.0	4.5	8.0	130
MM5Z11V	0M	10.4	11	11.6	5	20	160	1.0	0.1	8.0	5.4	9.0	130
MM5Z12V	0N	11.4	12	12.7	5	25	80	1.0	0.1	8.0	6.0	10	130
MM5Z13V	0P	12.4	13	14.1	5	30	80	1.0	0.1	8.0	7.0	11	120
MM5Z15V	0T	14.3	15	15.8	5	30	80	1.0	0.05	10.5	9.2	13	110
MM5Z16V	0U	15.3	16	17.1	5	40	80	1.0	0.05	11.2	10.4	14	105
MM5Z18V	0W	16.8	18	19.1	5	45	80	1.0	0.05	12.6	12.4	16	100
MM5Z20V	0Z	18.8	20	21.2	5	55	100	1.0	0.05	14.0	14.4	18	85
MM5Z22V	10	20.8	22	23.3	5	55	100	1.0	0.05	15.4	16.4	20	85
MM5Z24V	11	22.8	24	25.6	5	70	120	1.0	0.05	16.8	18.4	22	80
MM5Z27V	12	25.1	27	28.9	5	80	300	1.0	0.05	18.9	21.4	25.3	70
MM5Z30V	14	28.0	30	32.0	5	80	300	1.0	0.05	21.0	24.4	29.4	70
MM5Z33V	18	31.0	33	35.0	5	80	300	1.0	0.05	23.2	27.4	33.4	70
MM5Z36V	19	34.0	36	38.0	5	90	500	1.0	0.05	25.2	30.4	37.4	70
MM5Z39V	20	37.0	39	41.0	5	130	500	1.0	0.05	27.3	33.4	41.2	45
MM5Z43V	21	40.0	43	46.0	5	150	500	1.0	0.05	30.1	37.6	46.6	40
MM5Z47V	1A	44.0	47	50.0	5	170	500	1.0	0.05	32.9	42.0	51.8	40
MM5Z51V	1C	48.0	51	54.0	5	180	500	1.0	0.05	35.7	46.6	57.2	40
MM5Z56V	1D	52.0	56	60.0	5	200	500	1.0	0.05	39.2	52.2	63.8	40
MM5Z62V	1E	58.0	62	66.0	5	215	500	1.0	0.05	43.4	58.8	71.6	35
MM5Z68V	1F	64.0	68	72.0	5	240	500	1.0	0.05	47.6	65.6	79.8	35
MM5Z75V	1G	70.0	75	79.0	5	255	500	1.0	0.05	52.5	73.4	88.6	35

Note 1: Marking code add Month code see page 5

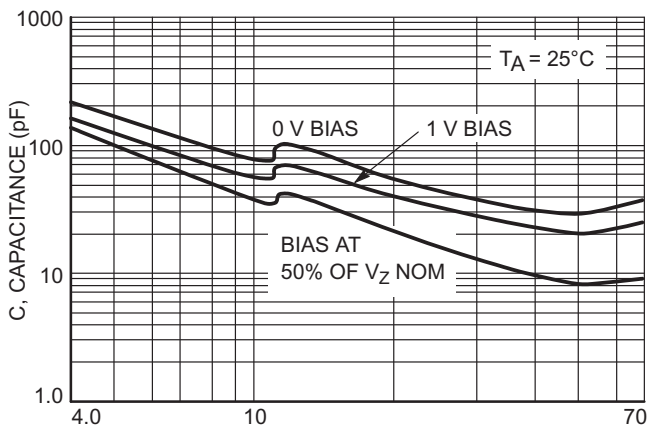
Rating and characteristic curves (MM5Z2V4 thru MM5Z75V)



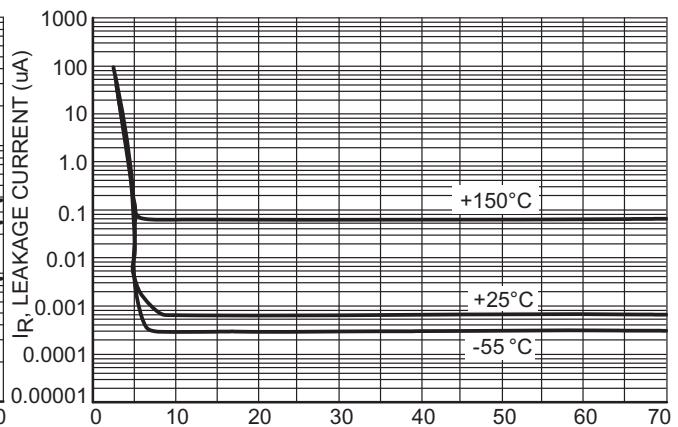
V_Z, NOMINAL ZENER VOLTAGE
Figure 1. Effect of Zener Voltage on Zener Impedance



V_F, FORWARD VOLTAGE (V)
Figure 2. Typical Forward Voltage



V_Z, NOMINAL ZENER VOLTAGE (V)
Figure 3. Typical Capacitance



V_Z, NOMINAL ZENER VOLTAGE (V)
Figure 4. Typical Leakage Current

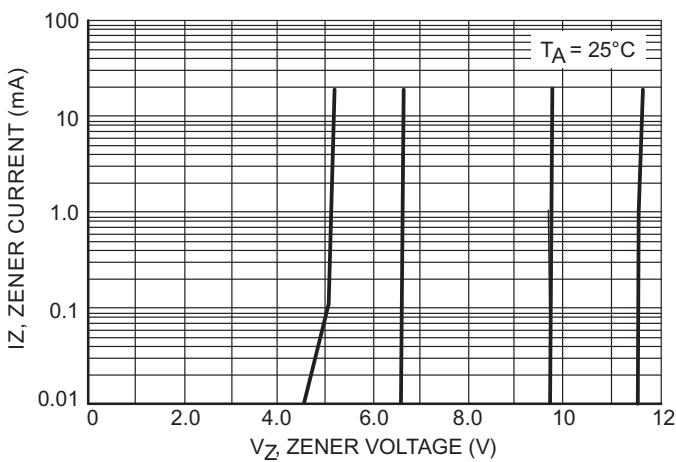


Figure 5. Zener Voltage versus Zener Current
(V_Z Up to 12 V)

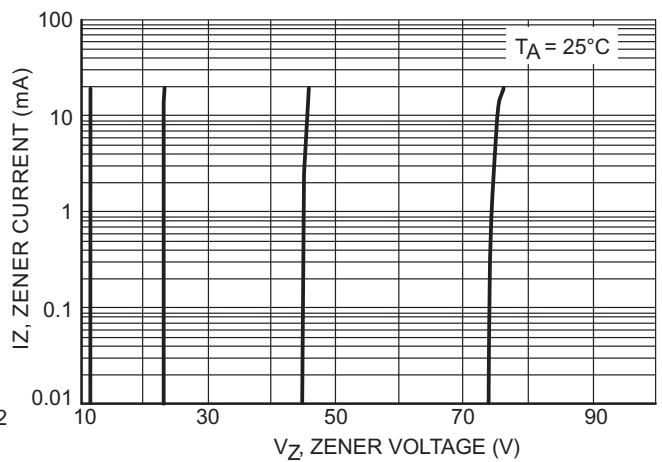


Figure 6. Zener Voltage versus Zener Current
(12 V to 75 V)

Rating and characteristic curves (MM5Z2V4 thru MM5Z75V)

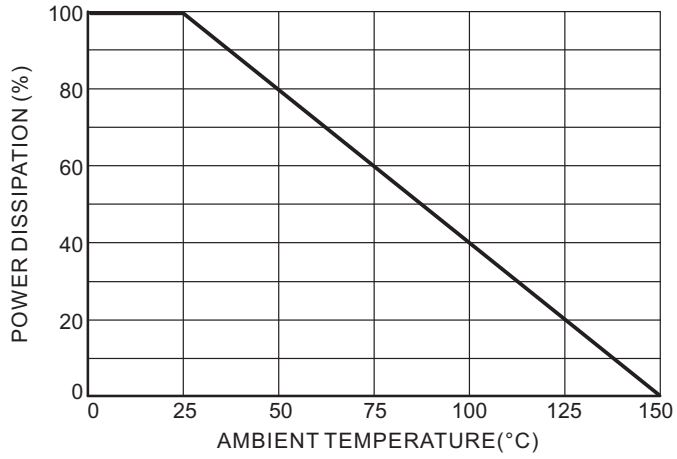


Figure 7. Steady State Power Derating

MM5Z2V4 THRU MM5Z75V

Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Month code

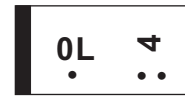
Type number	Marking
MM5Z Series	DEV Σ

DEV = Marking code (see page 3), Σ=Month code

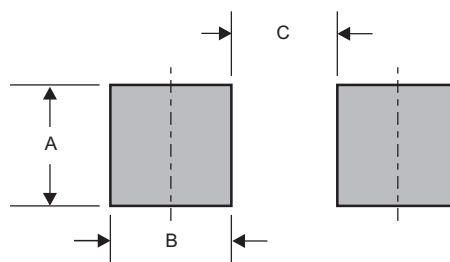
Year \ Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Odd	1	2	3	4	5	6	7	8	9	T	V	C
Even	E	F	H	J	K	L	N	P	U	X	Y	Z



Example: MM5Z10V



Suggested solder pad layout

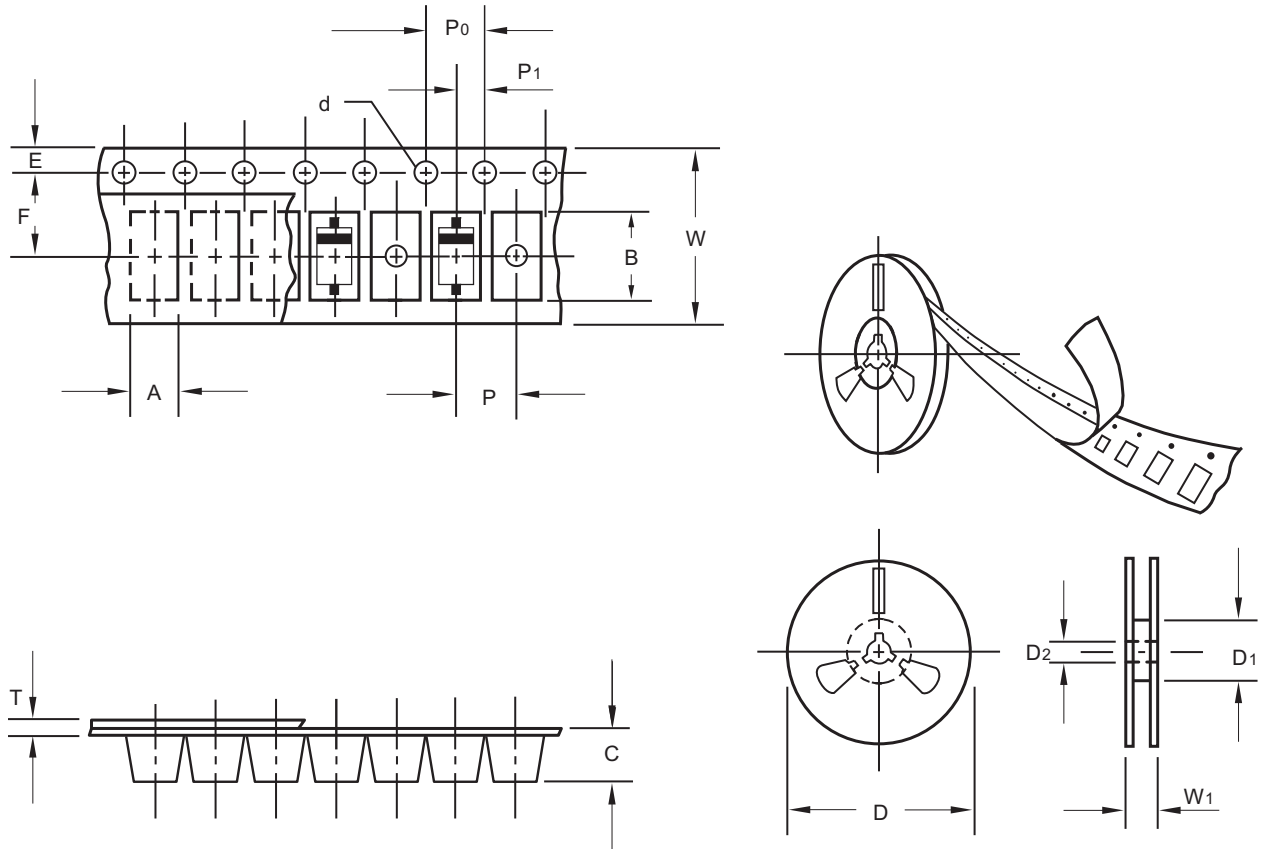


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-523FL	0.032 (0.80)	0.024 (0.60)	0.044 (1.10)

MM5Z2V4 THRU MM5Z75V

Packing information



unit:mm

Item	Symbol	Tolerance	SOD-523FL
Carrier width	A	0.1	0.90
Carrier length	B	0.1	1.94
Carrier depth	C	0.1	0.76
Sprocket hole	d	0.1	1.50
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	50.00
Feed hole diameter	D2	0.2	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	9.50

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

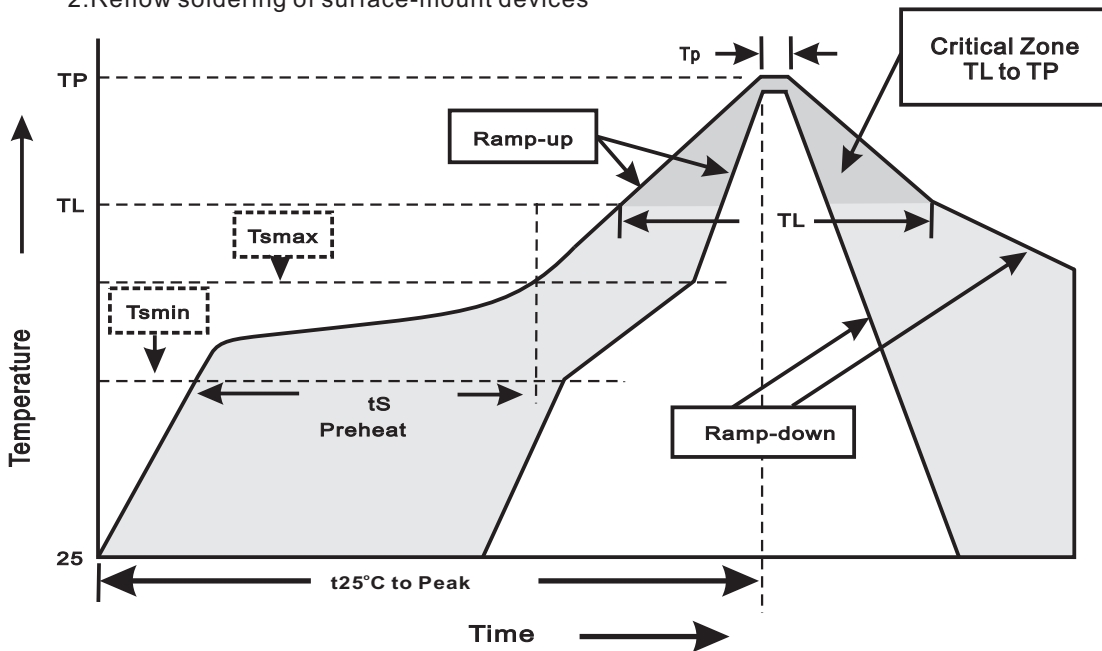
MM5Z2V4 THRU MM5Z75V

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA. (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOD-523FL	7"	3,000	2.0	30,000	183*123*183	178	382*257*387	240,000	9.5

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

MM5Z2V4 THRU MM5Z75V**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_z = V_z \text{ Nom} * 80\%$ at $T_j = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIE}}$ at $T_A = 121^\circ\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031