

MM5Z2V4 THRU MM5Z75V

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MM5Z2V4 THRU MM5Z75V

300mW Surface Mount
Zener Diodes 2.4V-75V

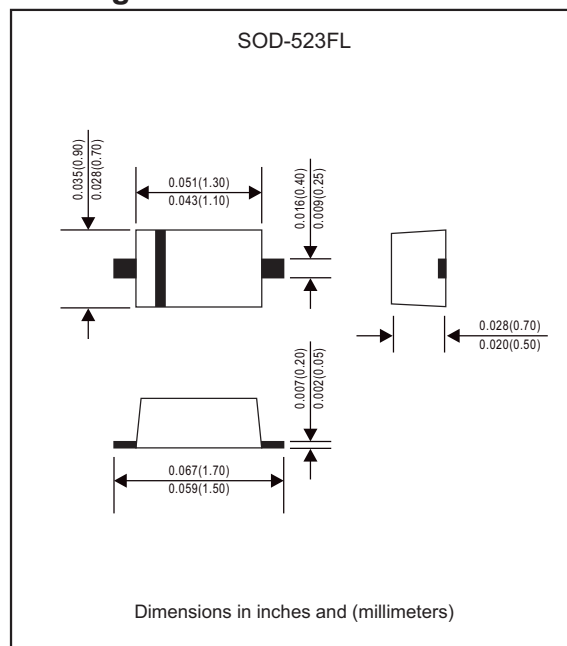
Features

- 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	Note. 1	P_D			300	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	$^{\circ}\text{C}$

Note:

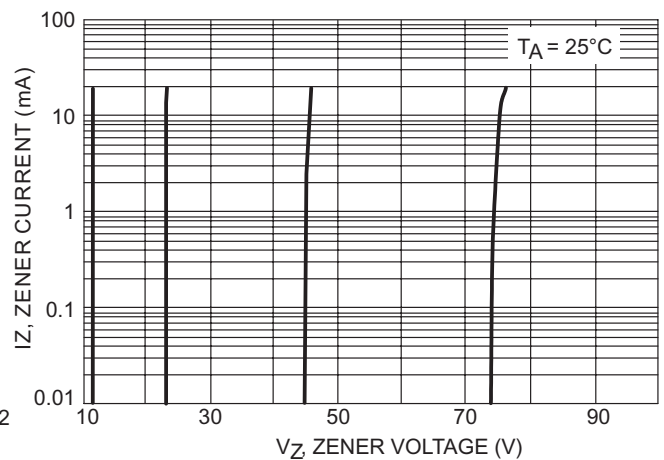
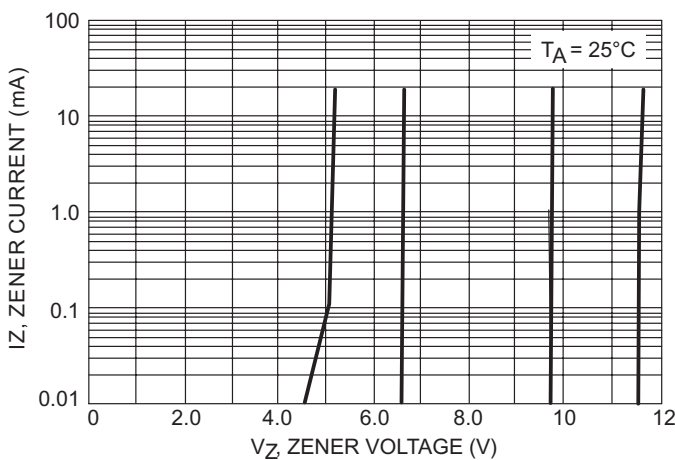
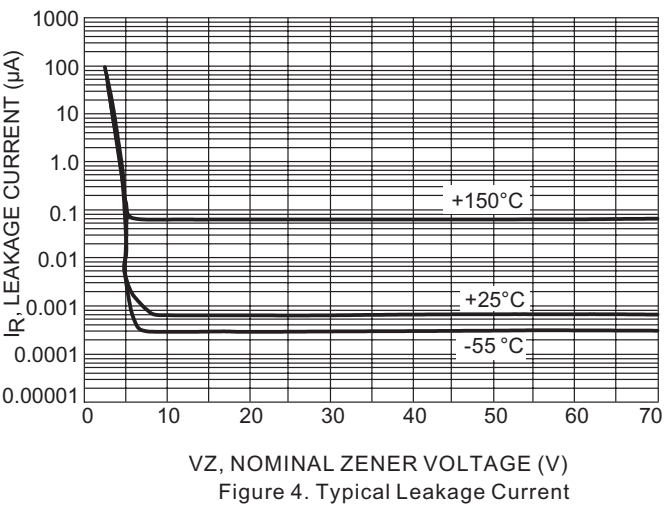
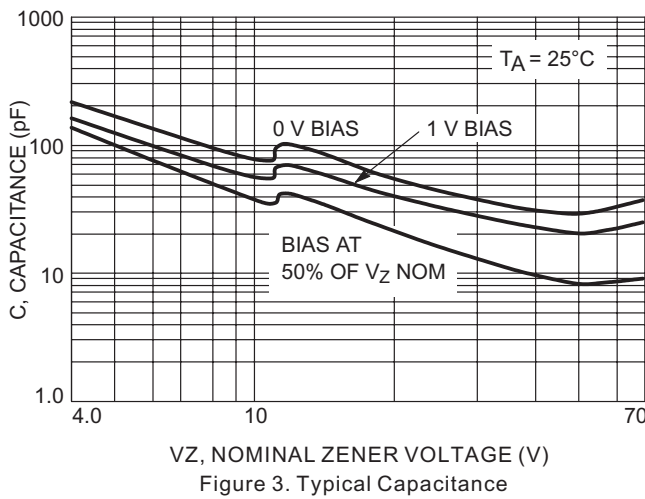
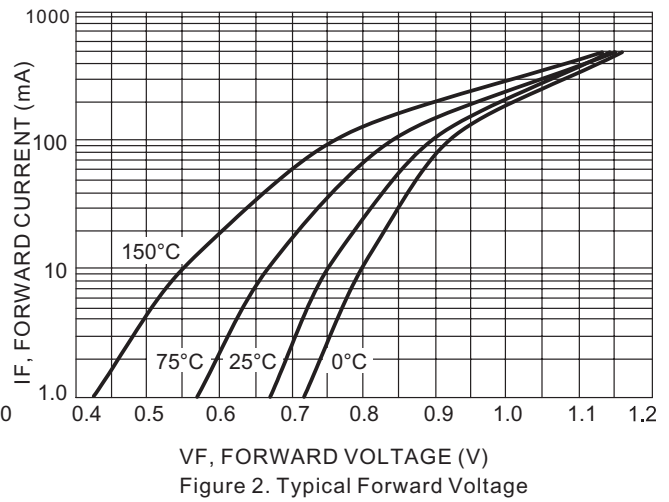
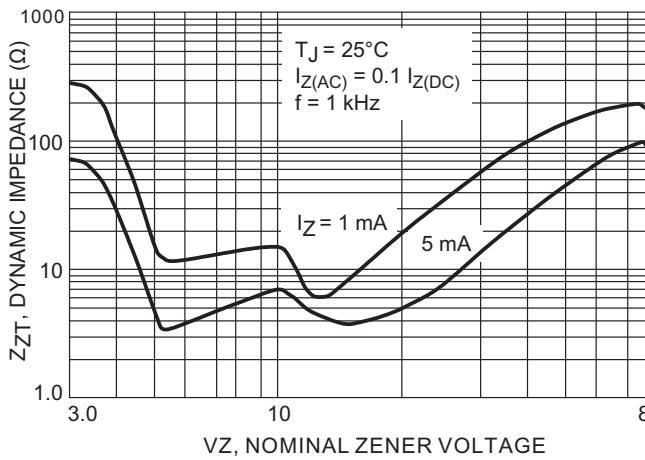
1. Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35mm^2 Cu area at cathode tab.

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

Part No.	Marking code	Zener voltage			Test current	Zener impedance			Leakage current		θV_z (mV/k) @ I_{ZT}		C_j @ $V_R=0V$ $f=1MHz$ (pF)Max
		$V_z @ I_{ZT}$				I_{ZT}	$Z_{ZT} @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	I_{ZK}	I_R			
		Min.(V)	Nom.(V)	Max.(V)	mA	Max.(Ω)	Max.(Ω)	mA	Max.(μA)	Volts	Min.	Max.	
MM5Z2V4	00,Z7	2.2	2.4	2.6	5	100	1000	1.0	50	1.0	-3.5	0	450
MM5Z2V7	01,A8	2.5	2.7	2.9	5	100	1000	1.0	20	1.0	-3.5	0	450
MM5Z3V0	02,B8	2.8	3.0	3.2	5	100	1000	1.0	10	1.0	-3.5	0	450
MM5Z3V3	05,C8	3.1	3.3	3.5	5	95	1000	1.0	5	1.0	-3.5	0	450
MM5Z3V6	06,D8	3.4	3.6	3.8	5	90	1000	1.0	5	1.0	-3.5	0	450
MM5Z3V9	07,E8	3.7	3.9	4.1	5	90	1000	1.0	3	1.0	-3.5	-2.5	450
MM5Z4V3	08,F8	4.0	4.3	4.6	5	90	1000	1.0	3	1.0	-3.5	0	450
MM5Z4V7	09,G8	4.4	4.7	5.0	5	80	800	1.0	3	2.0	-3.5	0.2	260
MM5Z5V1	0A,H8	4.8	5.1	5.4	5	60	500	1.0	2	2.0	-2.7	1.2	225
MM5Z5V6	0C,I8	5.2	5.6	6.0	5	40	400	1.0	1	2.0	-2.0	2.5	200
MM5Z6V2	0E,J8	5.8	6.2	6.6	5	10	100	1.0	3	4.0	0.4	3.7	185
MM5Z6V8	0F,K8	6.4	6.8	7.2	5	15	160	1.0	2	4.0	1.2	4.5	155
MM5Z7V5	0G,L8	7.0	7.5	7.9	5	15	160	1.0	1	5.0	2.5	5.3	140
MM5Z8V2	0H,M8	7.7	8.2	8.7	5	15	160	1.0	0.7	5.0	3.2	6.2	135
MM5Z9V1	0K,N8	8.5	9.1	9.6	5	15	160	1.0	0.2	7.0	3.8	7.0	130
MM5Z10V	0L,O8	9.4	10	10.6	5	20	160	1.0	0.1	8.0	4.5	8.0	130
MM5Z11V	0M,P8	10.4	11	11.6	5	20	160	1.0	0.1	8.0	5.4	9.0	130
MM5Z12V	0N,Q8	11.4	12	12.7	5	25	80	1.0	0.1	8.0	6.0	10	130
MM5Z13V	0P,R8	12.4	13	14.1	5	30	80	1.0	0.1	8.0	7.0	11	120
MM5Z15V	0T,S8	14.3	15	15.8	5	30	200	1.0	0.05	10.5	9.2	13	110
MM5Z16V	0U,T8	15.3	16	17.1	2	40	200	1.0	0.05	11.2	10.4	14	105
MM5Z18V	0W,U8	16.8	18	19.1	2	45	225	1.0	0.05	12.6	12.4	16	100
MM5Z20V	0Z,V8	18.8	20	21.2	2	55	225	1.0	0.05	14.0	14.4	18	85
MM5Z22V	10,W8	20.8	22	23.3	2	55	250	1.0	0.05	15.4	16.4	20	85
MM5Z24V	11,X8	22.8	24	25.6	2	70	120	1.0	0.05	16.8	18.4	22	80
MM5Z27V	12,Y8	25.1	27	28.9	2	80	300	1.0	0.05	18.9	21.4	25.3	70
MM5Z30V	14,Z8	28.0	30	32.0	2	80	300	1.0	0.05	21.0	24.4	29.4	70
MM5Z33V	18,A9	31.0	33	35.0	2	80	300	1.0	0.05	23.2	27.4	33.4	70
MM5Z36V	19,B9	34.0	36	38.0	2	90	500	1.0	0.05	25.2	30.4	37.4	70
MM5Z39V	20,C9	37.0	39	41.0	2	130	500	1.0	0.05	27.3	33.4	41.2	45
MM5Z43V	21,D9	40.0	43	46.0	2	150	500	1.0	0.05	30.1	37.6	46.6	40
MM5Z47V	1A,E9	44.0	47	50.0	2	170	500	1.0	0.05	32.9	42.0	51.8	40
MM5Z51V	1C,F9	48.0	51	54.0	2	180	500	1.0	0.05	35.7	46.6	57.2	40
MM5Z56V	1D,G9	52.0	56	60.0	2	200	500	1.0	0.05	39.2	52.2	63.8	40
MM5Z62V	1E,H9	58.0	62	66.0	2	215	500	1.0	0.05	43.4	58.8	71.6	35
MM5Z68V	1F,I9	64.0	68	72.0	2	240	500	1.0	0.05	47.6	65.6	79.8	35
MM5Z75V	1G,J9	70.0	75	79.0	2	255	500	1.0	0.05	52.5	73.4	88.6	35

Rating and characteristic curves (MM5Z2V4 thru MM5Z75V)



Rating and characteristic curves (MM5Z2V4 thru MM5Z75V)

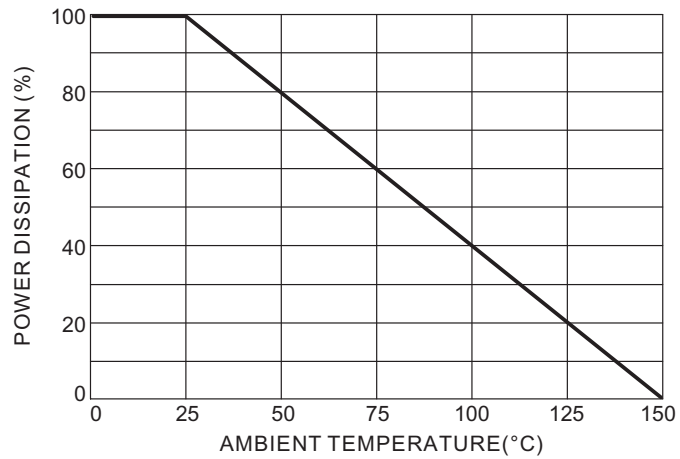


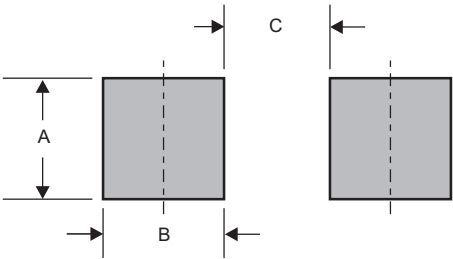
Figure 7. Steady State Power Derating

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Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

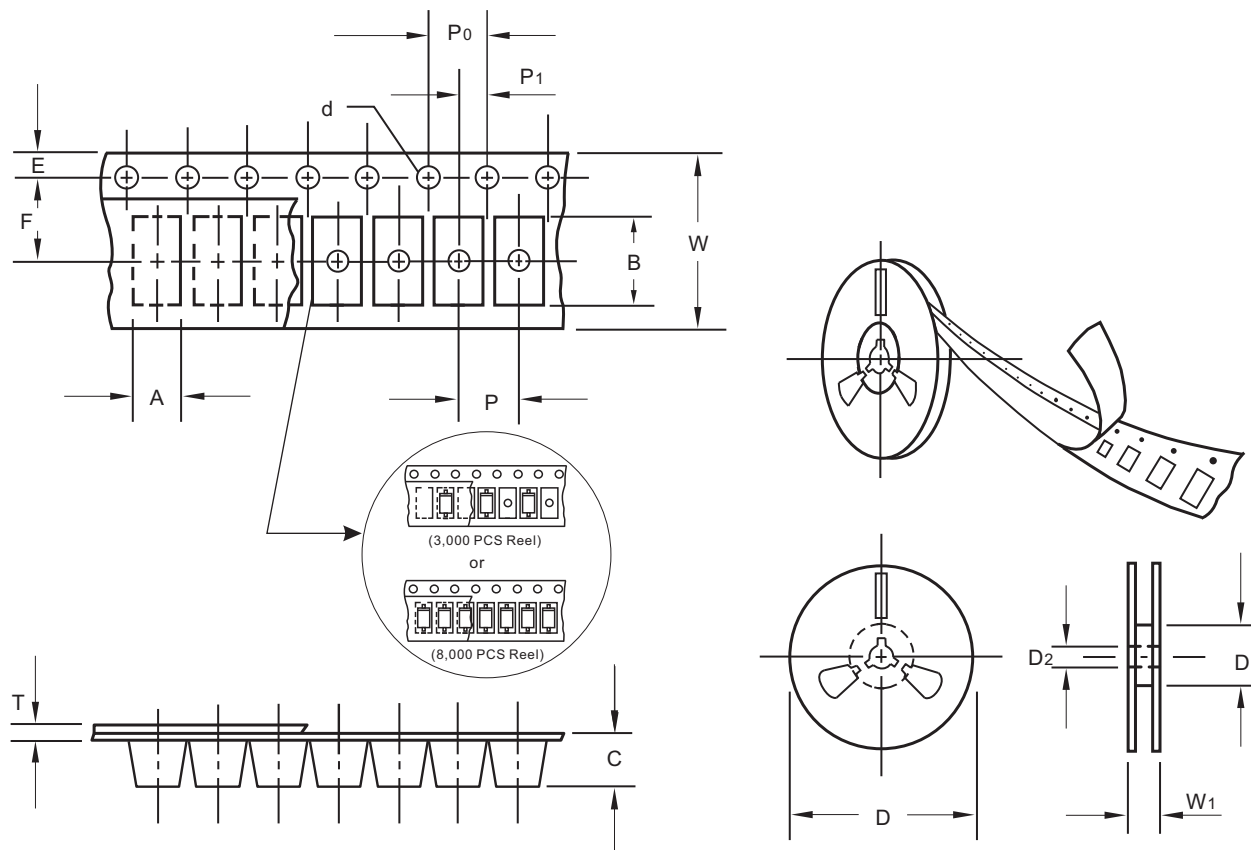


Dimensions in inches and (millimeters)

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

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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	D ₁	min	50.00
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	9.50

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

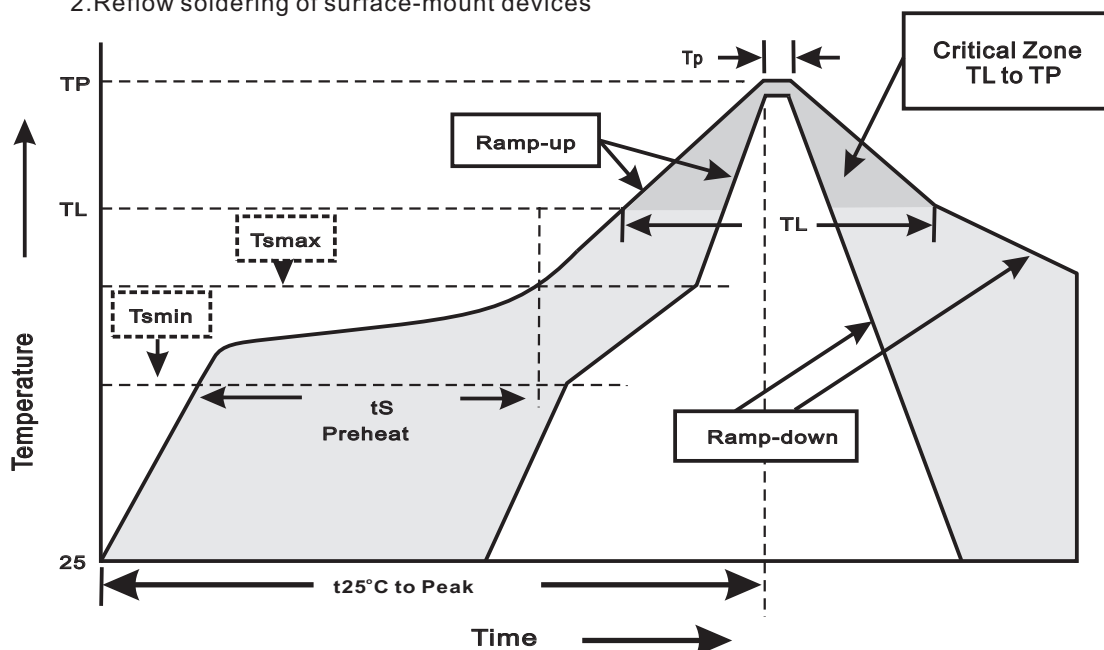
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Reel packing

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	4.0	30,000	183*123*183	178	382*257*387	240,000	8
		8,000	2.0	80,000				640,000	10

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(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ 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	$15P_{\text{SIG}}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ 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