

Formosa MS

MMSZ4678S-Q1 Thru MMSZ4717S-Q1

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300mW Zener Diodes : 1.8V ~ 43V

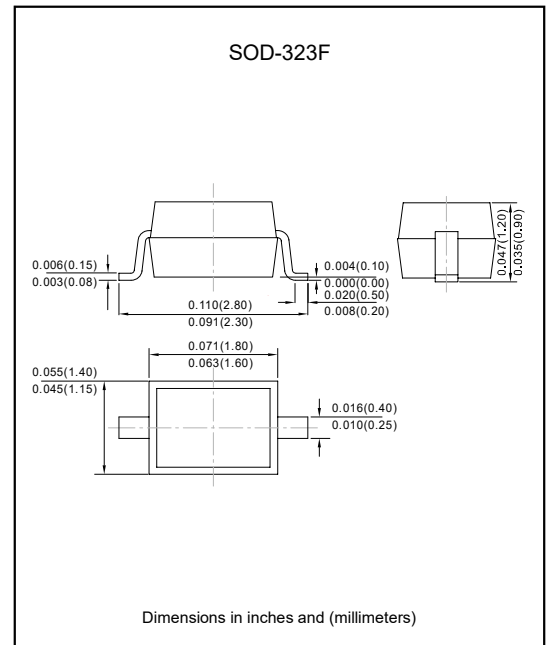
Features

- Zener voltage 1.8V-43V.
- Low zener impedance.
- High stability and high reliability.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates halogen-free parts, ex. MMSZ4678S-Q1-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOD-323F.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.

Package Outline



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

Parameter	Symbol	Value	Unit
Forward voltage @ $I_F=10\text{mA}$ (Note2)	V_F	0.9	V
Power dissipation (Note1)	P_D	300	mW
Operating temperature range	T_J	+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-65 to +150	$^{\circ}\text{C}$

Note 1. Device mounted on ceramic PCB: With pad areas 35mm^2 .
 2. Short duration test pulse used to minimize self-heating effect.
 3. $f=1\text{KHz}$.

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

Device	Device marking	Zener voltage (Note 1)				Leakage current	
		V_Z (Volts)			$@I_Z$	$I_R (@V_R)$	
		Min.	Nom.	Max.	μA	μA	Volts
MMSZ4678S-Q1	CC	1.71	1.8	1.89	50	7.5	1
MMSZ4679S-Q1	CD	1.90	2.0	2.10	50	5	1
MMSZ4680S-Q1	CE	2.09	2.2	2.31	50	4	1
MMSZ4681S-Q1	CF	2.28	2.4	2.52	50	2	1
MMSZ4682S-Q1	CH	2.565	2.7	2.835	50	1	1
MMSZ4683S-Q1	CJ	2.85	3.0	3.15	50	0.8	1
MMSZ4684S-Q1	CK	3.13	3.3	3.47	50	7.5	1.5
MMSZ4685S-Q1	CM	3.42	3.6	3.78	50	7.5	2
MMSZ4686S-Q1	CN	3.70	3.9	4.10	50	5	2
MMSZ4687S-Q1	CP	4.09	4.3	4.52	50	4	2
MMSZ4688S-Q1	CT	4.47	4.7	4.94	50	10	3
MMSZ4689S-Q1	CU	4.85	5.1	5.36	50	10	3
MMSZ4690S-Q1	CV	5.32	5.6	5.88	50	10	4
MMSZ4691S-Q1	CA	5.89	6.2	6.51	50	10	5
MMSZ4692S-Q1	CX	6.46	6.8	7.14	50	10	5.1
MMSZ4693S-Q1	CY	7.13	7.5	7.88	50	10	5.7
MMSZ4694S-Q1	CZ	7.79	8.2	8.61	50	1	6.2
MMSZ4695S-Q1	DC	8.27	8.7	9.14	50	1	6.6
MMSZ4696S-Q1	DD	8.65	9.1	9.56	50	1	6.9
MMSZ4697S-Q1	DE	9.50	10	10.50	50	1	7.6
MMSZ4698S-Q1	DF	10.45	11	11.55	50	0.05	8.4
MMSZ4699S-Q1	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700S-Q1	DJ	12.35	13	13.65	50	0.05	9.8
MMSZ4701S-Q1	DK	13.30	14	14.70	50	0.05	10.6
MMSZ4702S-Q1	DM	14.25	15	15.75	50	0.05	11.4
MMSZ4703S-Q1	DN	15.20	16	16.80	50	0.05	12.1
MMSZ4704S-Q1	DP	16.15	17	17.85	50	0.05	12.9
MMSZ4705S-Q1	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706S-Q1	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707S-Q1	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708S-Q1	DA	20.90	22	23.10	50	0.01	16.7
MMSZ4709S-Q1	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710S-Q1	DY	23.75	25	26.25	50	0.01	19.0
MMSZ4711S-Q1	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712S-Q1	EC	26.60	28	29.40	50	0.01	21.2
MMSZ4713S-Q1	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714S-Q1	EE	31.35	33	34.65	50	0.01	25.0
MMSZ4715S-Q1	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716S-Q1	EH	37.05	39	40.95	50	0.01	29.6
MMSZ4717S-Q1	EJ	40.85	43	45.15	50	0.01	32.6

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Rating and characteristic curves

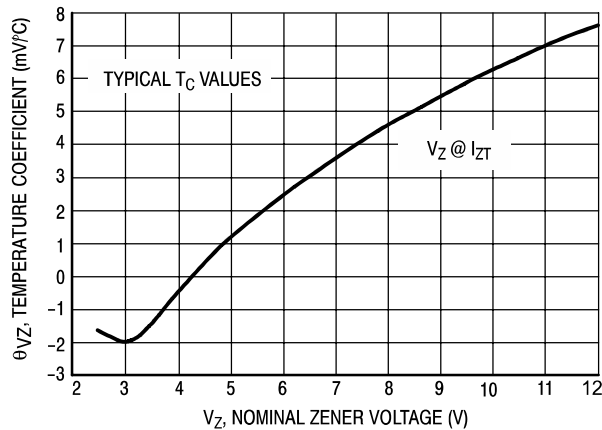


Figure 1. Temperature Coefficients
(Temperature Range -55 °C to +150°C)

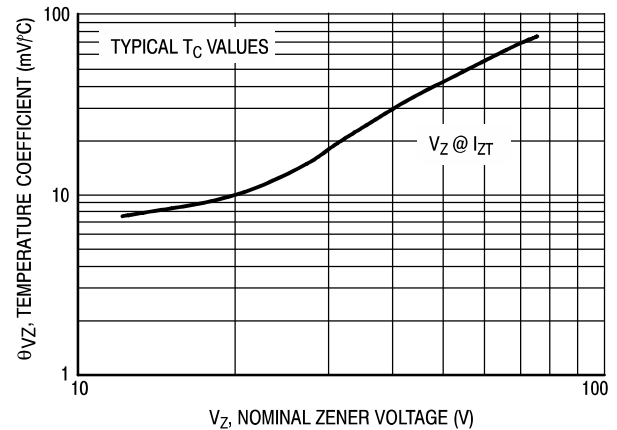


Figure 2. Temperature Coefficients
(Temperature Range -55 °C to +150°C)

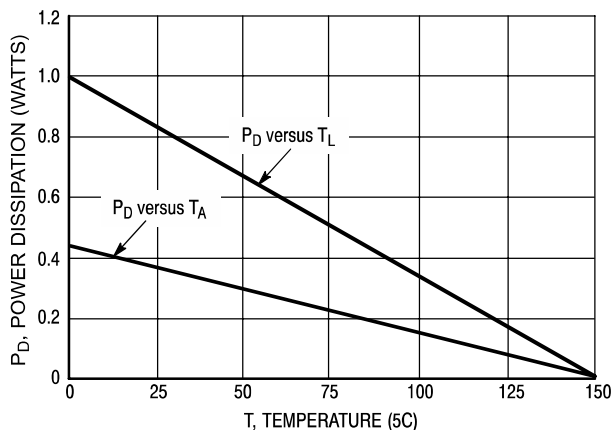


Figure 3. Steady State Power Derating

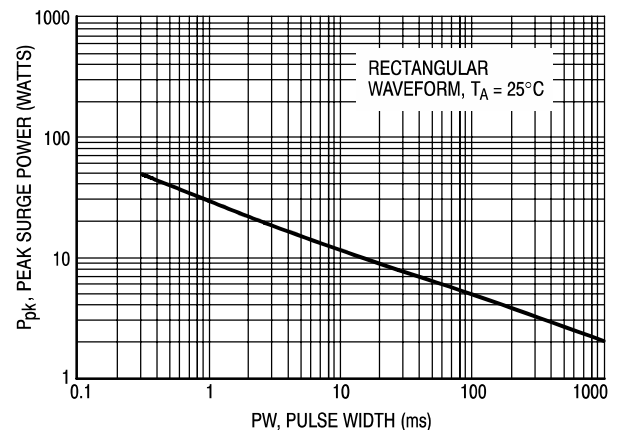


Figure 4. Maximum Nonrepetitive Surge Power

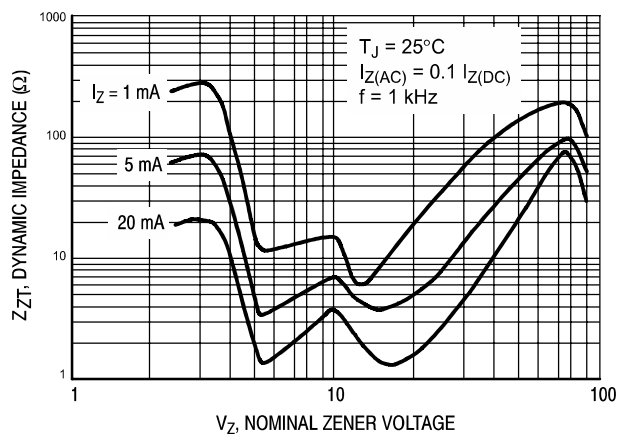


Figure 5. Effect of Zener Voltage on
Zener Impedance

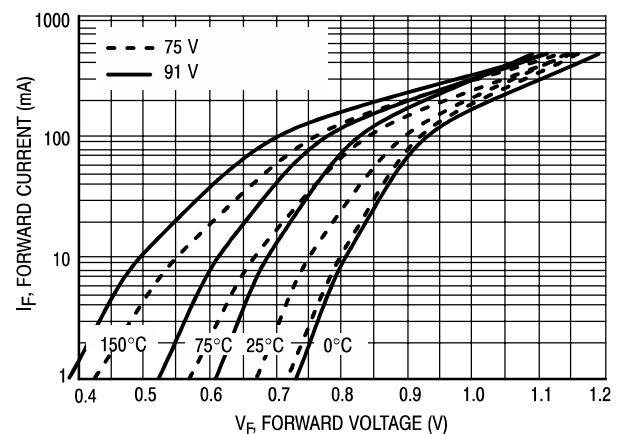


Figure 6. Typical Forward Voltage

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Rating and characteristic curves

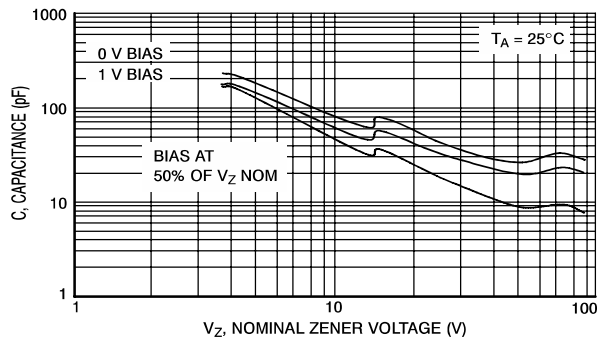


Figure 7. Typical Capacitance

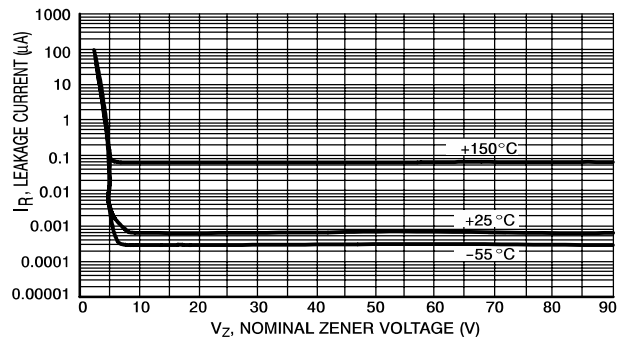


Figure 8. Typical Leakage Current

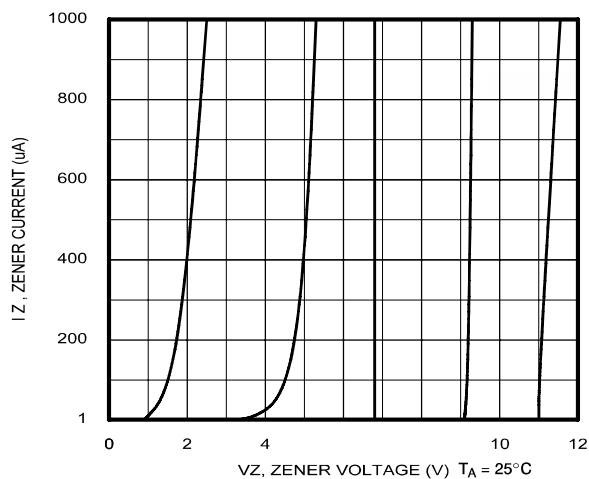


Figure 9. Zener Voltage versus Zener Current (VZ Up to 12 V)

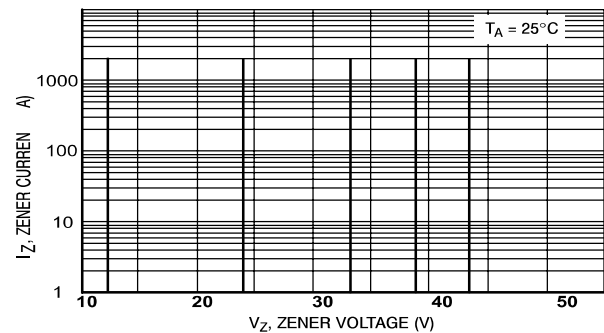
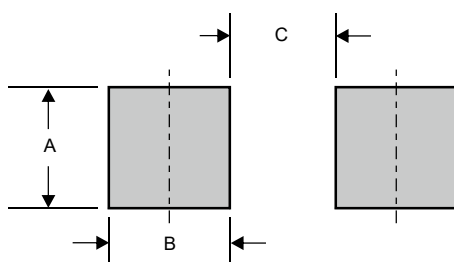


Figure 10. Zener Voltage versus Zener Current (12 V to 43 V)

Pinning information

Pin	Simplified outline	Symbol
Pin1 Cathode Pin2 Anode		

Suggested solder pad layout



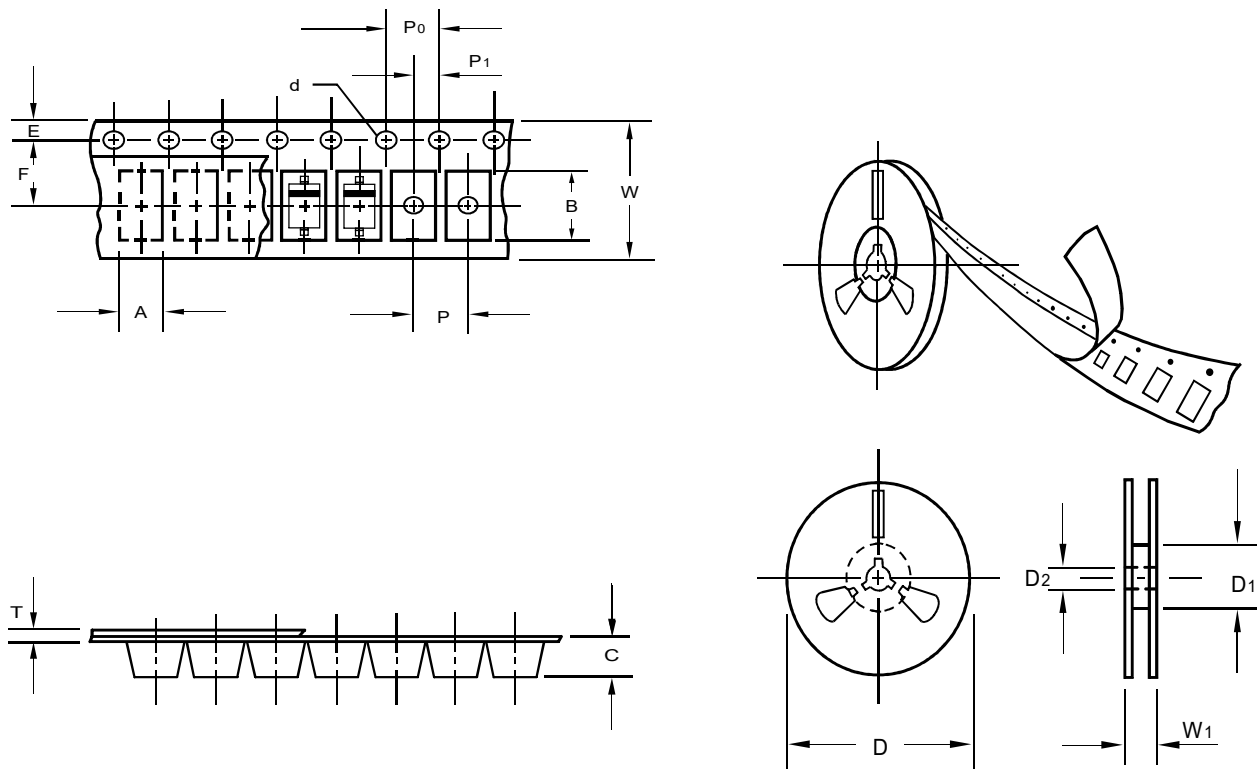
Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.033 (0.83)	0.025 (0.63)	0.063 (1.60)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323F
Carrier width	A	0.1	1.46
Carrier length	B	0.1	2.90
Carrier depth	C	0.1	1.25
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	55.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
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.

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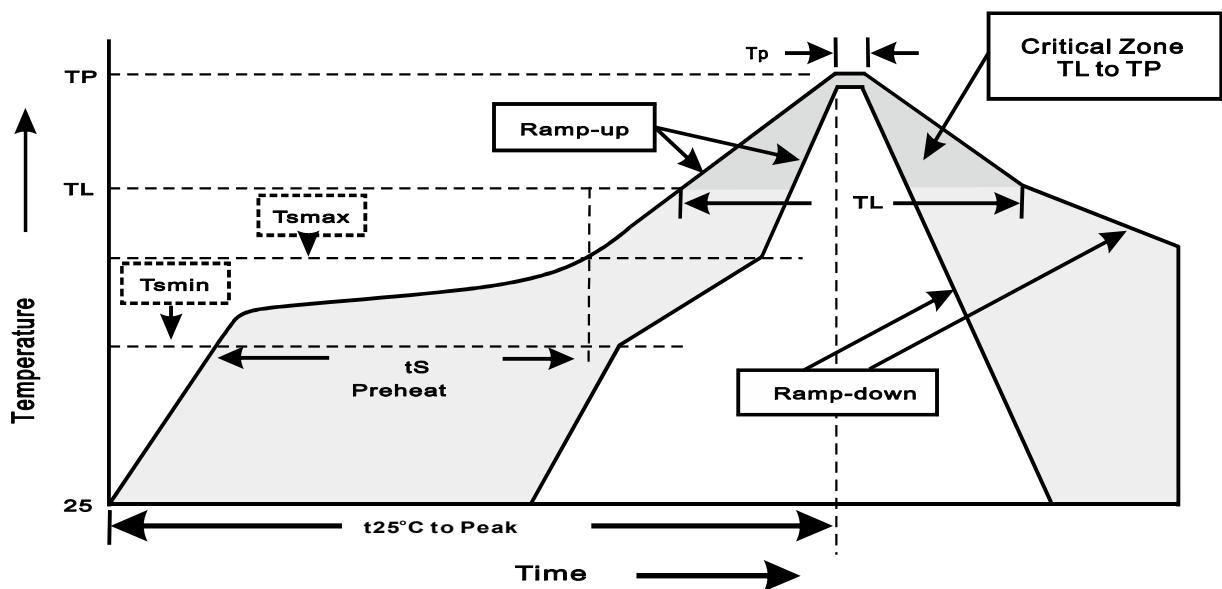
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Reel packing

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-323F	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	8.0

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 _{smín}) -Temperature Max(T _{smáx}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smáx} 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. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	Vz=Vz Nom*80% (Tj=Tj max.)Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
6. Solderability	245±5°C for 5sec	J-STD-002
7. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101