

MM5Z2V4B-Q1 THRU MM5Z75VB-Q1**List**

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MM5Z2V4B-Q1 THRU MM5Z75VB-Q1

200mW Surface Mount
Zener Diodes 2.4V-75V

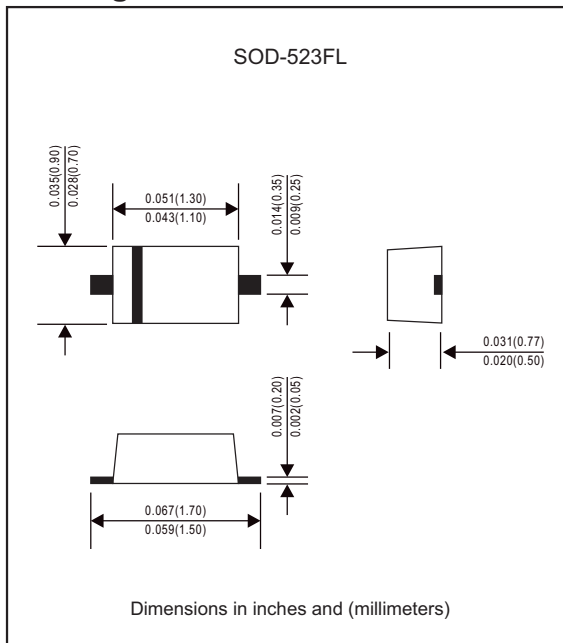
Features

- Wide zener voltage range selection, 2.4V to 75V.
- V_z tolerance selection of $\pm 2\%$.
- Flat lead SOD-523FL small outline plastic package.
- Extremely small SOD-523FL package.
- Surface device type mounting.
- Lead-free parts meet RoHS requirements.
- Qualified to AEC-Q101 standards for high reliability.
- Suffix "-H" indicates Halogen free parts, ex. MM5Z2V4B-Q1-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
Power dissipation		P_D			200	mW
Operating junction temperature range		T_J	-65		+150	$^\circ\text{C}$
Storage temperature range		T_{STG}	-65		+150	$^\circ\text{C}$

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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	
		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(uA)	Volts
MM5Z2V4B-Q1	05,XY,2V1	2.35	2.4	2.45	5	100	564	1.0	45	1.0
MM5Z2V7B-Q1	15,XZ,2V2	2.65	2.7	2.75	5	100	564	1.0	18	1.0
MM5Z3V0B-Q1	25,FR,2V3	2.94	3.0	3.06	5	100	564	1.0	9	1.0
MM5Z3V3B-Q1	35,FX,2V4	3.23	3.3	3.37	5	95	564	1.0	4.5	1.0
MM5Z3V6B-Q1	45,FY,2V5	3.53	3.6	3.67	5	90	564	1.0	4.5	1.0
MM5Z3V9B-Q1	+5,FZ,2V6	3.82	3.9	3.98	5	90	564	1.0	2.7	1.0
MM5Z4V3B-Q1	65,HA,2V7	4.21	4.3	4.39	5	90	564	1.0	2.7	1.0
MM5Z4V7B-Q1	75,HB,2Z1	4.61	4.7	4.79	5	80	470	1.0	2.7	2.0
MM5Z5V1B-Q1	85,HC,2Z2	5.00	5.1	5.20	5	60	451	1.0	1.8	2.0
MM5Z5V6B-Q1	95,HD,2Z3	5.49	5.6	5.71	5	40	376	1.0	0.9	2.0
MM5Z6V2B-Q1	A5,HE,2Z4	6.08	6.2	6.32	5	10	141	1.0	2.7	4.0
MM5Z6V8B-Q1	B5,HF,2Z5	6.66	6.8	6.94	5	15	75	1.0	1.8	4.0
MM5Z7V5B-Q1	C5,HH,2Z6	7.35	7.5	7.65	5	15	75	1.0	0.9	5.0
MM5Z8V2B-Q1	D5,HJ,2Z7	8.04	8.2	8.36	5	15	75	1.0	0.63	5.0
MM5Z9V1B-Q1	E5,HK,2Z8	8.92	9.1	9.28	5	15	94	1.0	0.45	6.0
MM5Z10VB-Q1	F5HM,2Z9	9.80	10	10.20	5	20	141	1.0	0.18	7.0
MM5Z11VB-Q1	G5,HN,2Y1	10.78	11	11.22	5	20	141	1.0	0.09	8.0
MM5Z12VB-Q1	H5,HP,2Y2	11.76	12	12.24	5	25	141	1.0	0.09	8.0
MM5Z13VB-Q1	J5,HR,2Y3	12.74	13	13.26	5	30	160	1.0	0.09	8.0
MM5Z15VB-Q1	K5,HX,2Y4	14.70	15	15.30	5	30	188	1.0	0.045	10.5
MM5Z16VB-Q1	L5,HY,2Y5	15.68	16	16.32	5	40	188	1.0	0.045	11.2
MM5Z18VB-Q1	M5,HZ,2Y6	17.64	18	18.36	5	45	212	1.0	0.045	12.6
MM5Z20VB-Q1	N5,JA,2Y7	19.60	20	20.40	5	55	212	1.0	0.045	14.0
MM5Z22VB-Q1	P5,JB,2Y8	21.56	22	22.44	5	55	235	1.0	0.045	15.4
MM5Z24VB-Q1	R5,JC,2Y9	23.52	24	24.48	5	70	235	1.0	0.045	16.8
MM5Z27VB-Q1	S5,JD,2X1	26.46	27	27.54	2	80	282	0.5	0.045	18.9
MM5Z30VB-Q1	T5,JE,2X2	29.40	30	30.60	2	80	282	0.5	0.045	21.0
MM5Z33VB-Q1	U5,JF,2X3	32.34	33	33.66	2	80	306	0.5	0.045	23.0
MM5Z36VB-Q1	V5,JH,2X4	35.28	36	36.72	2	90	329	0.5	0.045	25.2
MM5Z39VB-Q1	X5,JJ,2X5	38.22	39	39.78	2	130	329	0.5	0.045	27.3
MM5Z43VB-Q1	Y5,JK,2X6	42.14	43	43.86	2	150	353	0.5	0.045	30.1
MM5Z47VB-Q1	Z5,JM,2X7	46.06	47	47.94	2	170	353	0.5	0.045	33.0
MM5Z51VB-Q1	-5,YA,2X8	49.98	51	52.02	2	180	376	0.5	0.045	35.7
MM5Z56VB-Q1	=5,YB,2X9	54.88	56	57.12	2	200	400	0.5	0.045	39.2
MM5Z62VB-Q1	Ξ5,YC,2U1	60.76	62	63.24	2	215	423	0.5	0.045	43.4
MM5Z68VB-Q1	>5,YD,2U2	66.64	68	69.36	2	240	447	0.5	0.045	47.6
MM5Z75VB-Q1	<5,YE,2U3	73.50	75	76.50	2	255	470	0.5	0.045	52.5

Notes:

1. The Zener Voltage (V_Z) is tested under pulse condition of 10ms.
2. The zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current (I_{ZT} or I_{ZK}) is superimposed to I_{ZT} or I_{ZK} .

Rating and characteristic curves (MM5Z2V4B-Q1 THRU MM5Z75VB-Q1)

FIG. 1-POWER DISSIPATION VS. AMBIENT TEMP.

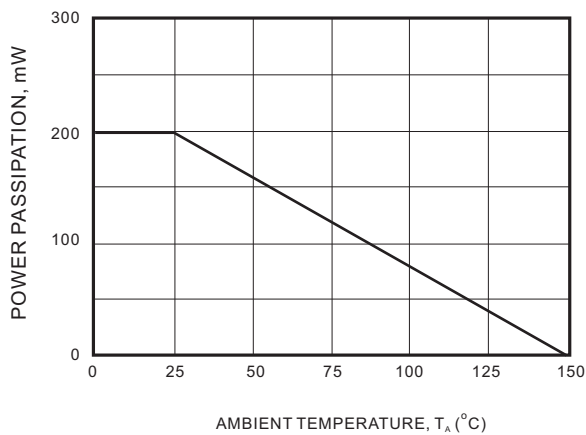


FIG. 2-EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

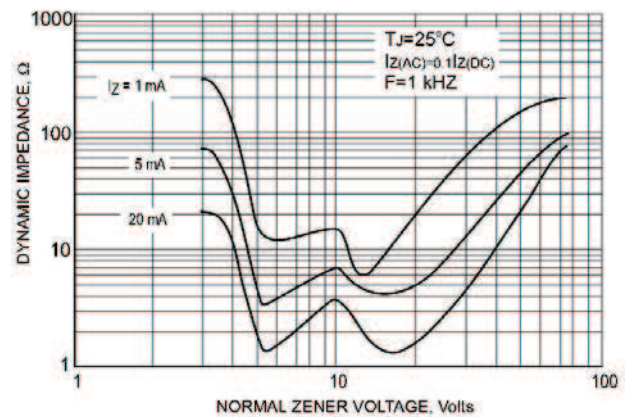


FIG. 3-TYPICAL FORWARD VOLTAGE

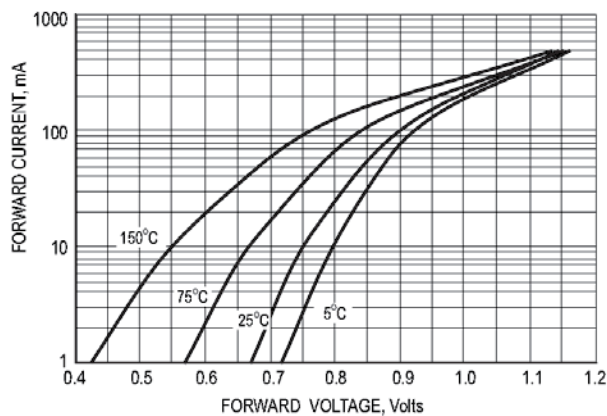


FIG. 4-TYPICAL CAPACITANCE

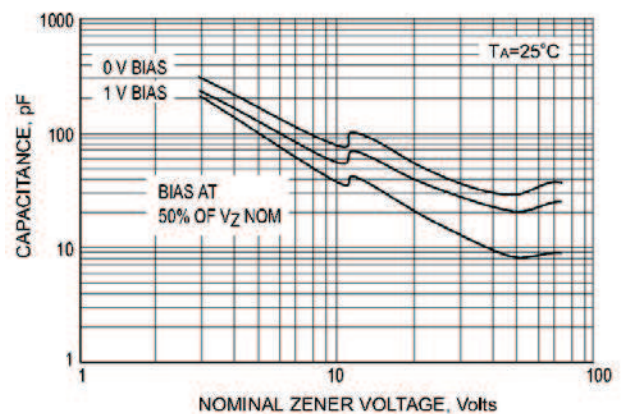


FIG. 5-ZENER BREAKDOWN CHARACTERISTICS

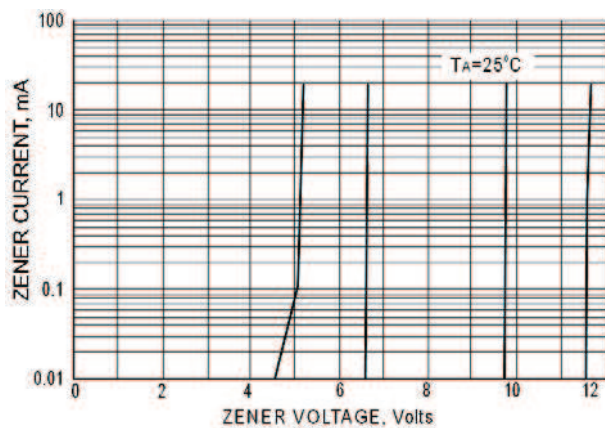
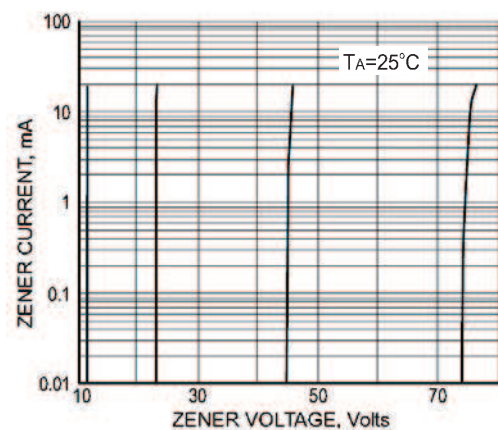
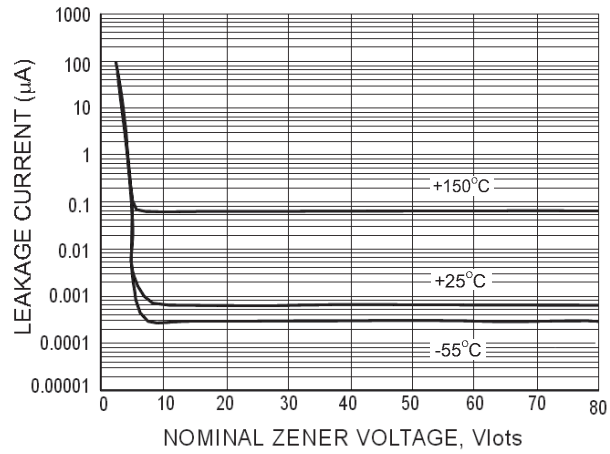


FIG. 6-ZENER BREAKDOWN CHARACTERISTICS



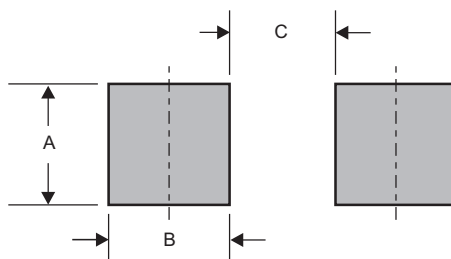
Rating and characteristic curves (MM5Z2V4B-Q1 THRU MM5Z75VB-Q1)

FIG. 7-TYPICAL LEAKGE CURRENT



MM5Z2V4B-Q1 THRU MM5Z75VB-Q1**Pinning information**

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

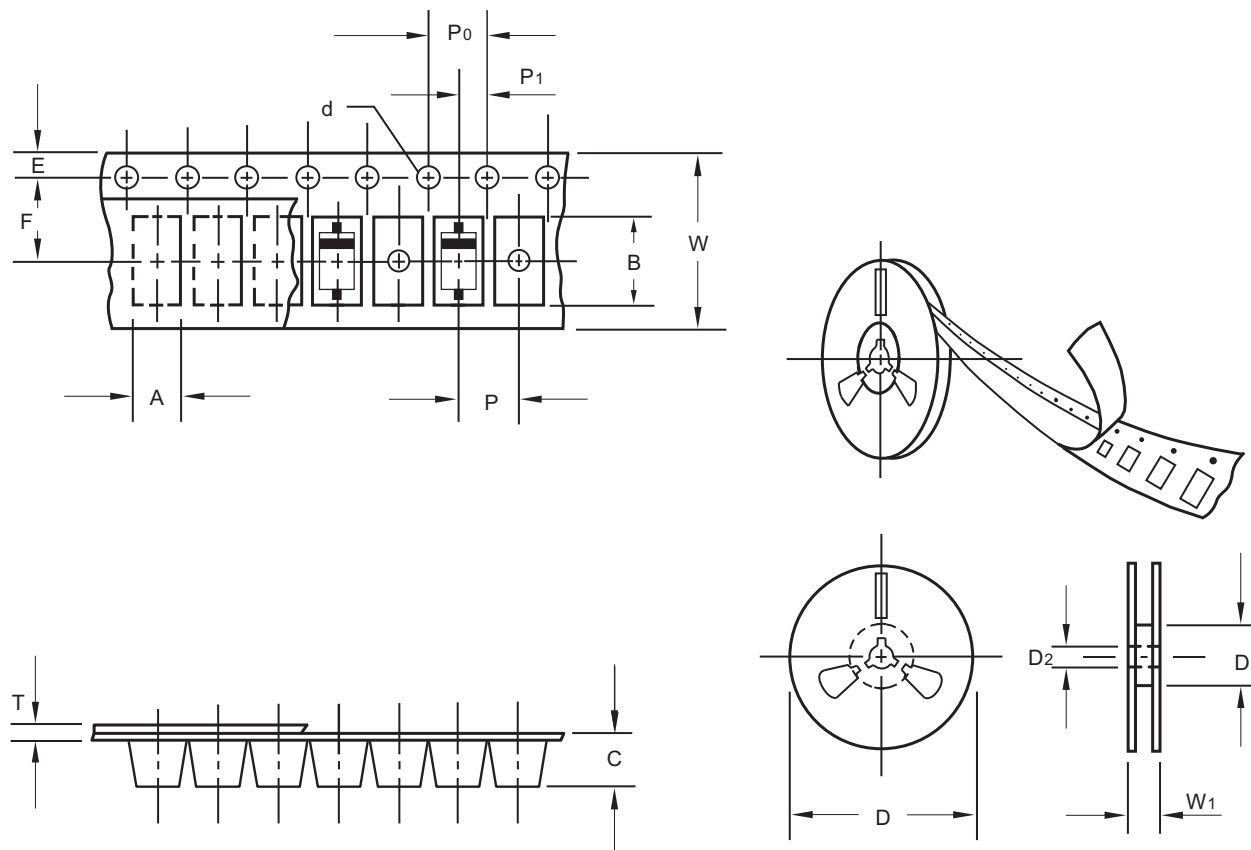
Suggested solder pad layout

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.

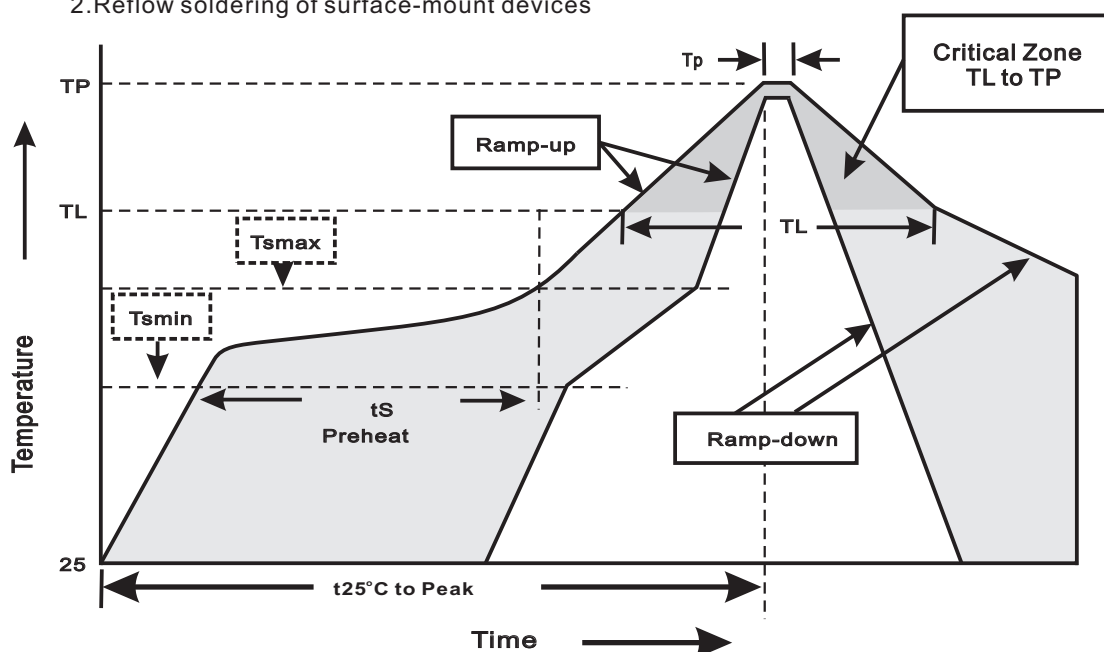
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Reel packing

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	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(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smin}) -Temperature Max(T _{smax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smax} 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

MM5Z2V4B-Q1 THRU MM5Z75VB-Q1**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=150°C)Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=125°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