MMSZ5221BS THRU MMSZ5267BS

List

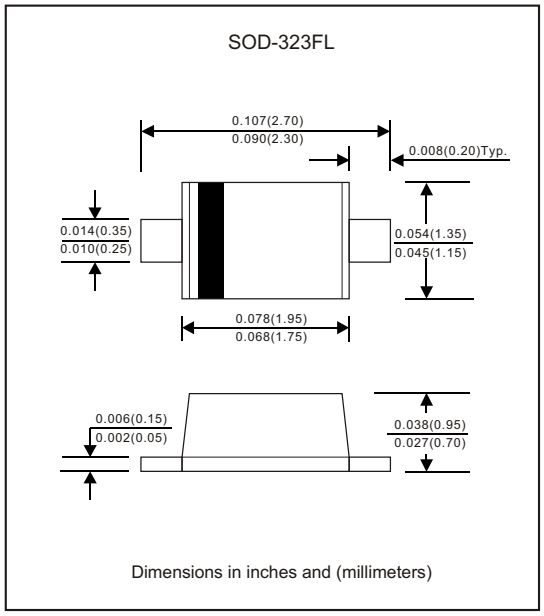
MMSZ5221BS THRU MMSZ5267BS

200mW Surface Mount Zener Diodes - 2.4V-75V

Features

- Up to 200mW power dissipation.
- Silicon epitaxial planar chip structure.
- Wide zener reverse voltage range 2.4V to 75V.
- Very tiny package size for high density applications.
- Ideally suited for automated assembly processes.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228

Package outline



Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-323FL
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.004 gram

Maximum ratings (at T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward voltage	I_F = 100 mADC	V_F			1.00	V
Power Dissipation		P_D			200	mW
Forward surge current	8.3ms single half sine-wave superimposed on rate load (JEDEC methode)	I_{FSM}			4000	mA
Storage temperature		T_{STG}	-65		+175	°C
Operating temperature		T_J	-55		+150	°C

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Electrical characteristics (at T_A=25°C unless otherwise noted)

Part No.	Marking code	Zener voltage			Test current	Zener impedance			Leakage current	
		V_Z @ I_{ZT}(Volts)			I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R	V_R
		Min	Nom	Max	mA	OHMs	OHMs	mA	uA	Volts
MMSZ5221BS	C1	2.28	2.4	2.52	20.0	30	1200	0.25	100	1.0
MMSZ5222BS	C2	2.38	2.5	2.63	20.0	30	1250	0.25	100	1.0
MMSZ5223BS	C3	2.57	2.7	2.84	20.0	30	1300	0.25	75	1.0
MMSZ5225BS	C5	3.85	3.0	3.15	20.0	30	1600	0.25	50	1.0
MMSZ5226BS	D1	3.14	3.3	3.47	20.0	28	1600	0.25	25	1.0
MMSZ5227BS	D2	3.42	3.6	3.78	20.0	24	1700	0.25	15	1.0
MMSZ5228BS	D3	3.71	3.9	4.10	20.0	23	1900	0.25	10	1.0
MMSZ5229BS	D4	4.09	4.3	4.52	20.0	22	2000	0.25	5.0	1.0
MMSZ5230BS	D5	4.47	4.7	4.94	20.0	19	1900	0.25	5.0	2.0
MMSZ5231BS	E1	4.85	5.1	5.36	20.0	17	1600	0.25	5.0	2.0
MMSZ5232BS	E2	5.32	5.6	5.88	20.0	11	1600	0.25	5.0	3.0
MMSZ5234BS	E4	5.89	6.2	6.51	20.0	7	1000	0.25	5.0	4.0
MMSZ5235BS	E5	6.46	6.8	7.14	20.0	5	750	0.25	3.0	5.0
MMSZ5236BS	F1	7.13	7.5	7.88	20.0	6	500	0.25	3.0	6.0
MMSZ5237BS	F2	7.79	8.2	8.61	20.0	8	500	0.25	3.0	6.0
MMSZ5239BS	F4	8.65	9.1	9.56	20.0	10	600	0.25	3.0	6.5
MMSZ5240BS	F5	9.50	10	10.50	20.0	17	600	0.25	3.0	8.0
MMSZ5241BS	H1	10.45	11	11.55	20.0	22	600	0.25	3.0	8.4
MMSZ5242BS	H2	11.40	12	12.60	20.0	30	600	0.25	2.0	9.1
MMSZ5243BS	H3	12.35	13	13.65	9.5	13	600	0.25	1.0	9.9
MMSZ5245BS	H5	14.25	15	15.75	8.5	16	600	0.25	0.5	11
MMSZ5246BS	J1	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMSZ5248BS	J3	17.10	18	18.90	7.0	21	600	0.25	0.1	14
MMSZ5250BS	J5	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MMSZ5251BS	K1	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMSZ5252BS	K2	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMSZ5254BS	K4	25.65	27	28.35	5.0	41	600	0.25	0.1	21
MMSZ5255BS	K5	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMSZ5256BS	M1	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMSZ5257BS	M2	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMSZ5258BS	M3	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMSZ5259BS	M4	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMSZ5260BS	M5	40.85	43	45.15	3.0	93	900	0.25	0.1	33
MMSZ5261BS	N1	44.65	47	49.35	2.7	105	1000	0.25	0.1	36
MMSZ5262BS	N2	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
MMSZ5263BS	N3	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MMSZ5264BS	N4	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
MMSZ5265BS	N5	58.90	62	65.10	2.0	185	1500	0.25	0.1	47
MMSZ5266BS	P1	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
MMSZ5267BS	P2	71.45	75	78.45	1.7	270	1400	0.25	0.1	56

Note : 5% tolerance of Zener voltage

Rating and characteristic curves (MMSZ5221BS THRU MMSZ5267BS)

FIG.1-TOTAL POWER DISSIPATION VS. AMBIENT TEMPERATURE

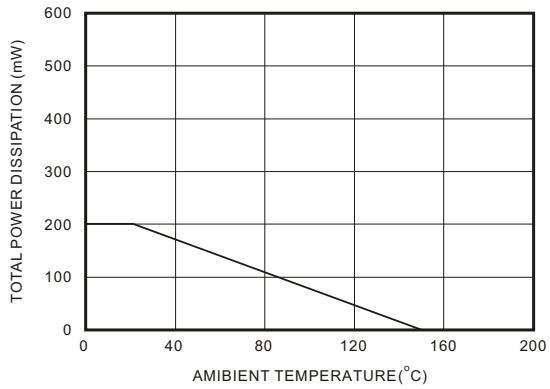

FIG. 2-TYPICAL CHANGE OF WORKING VOLTAGE UNDER OPERATING CONDITIONS AT TA=25°C

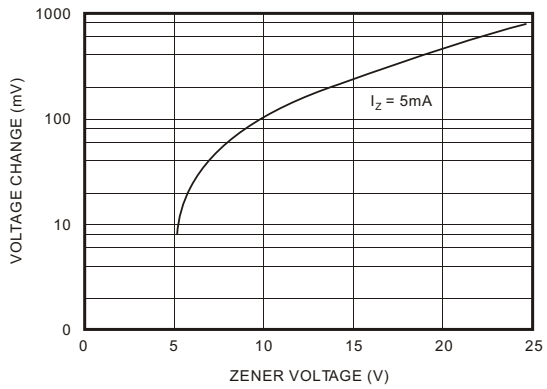

FIG. 3-TYPICAL CHANGE OF WORKING VOLTAGE VS. JUNCTION TEMPERATURE

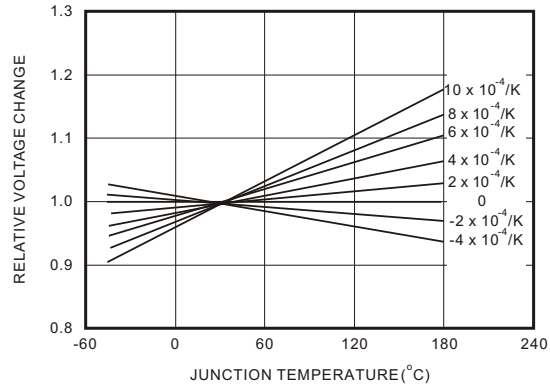

FIG. 4-TEMPERATURE COEFFICIENT OF VZ VS. Z-VOLTAGE

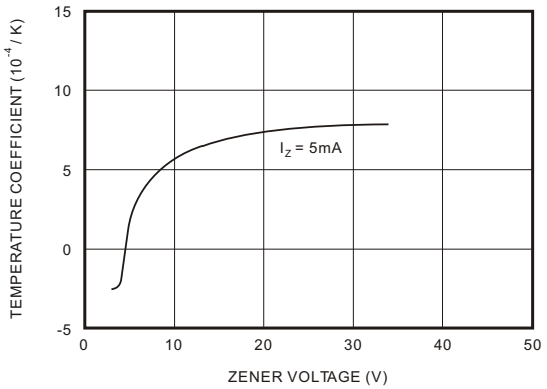

FIG. 5-DIODE CAPACITANCE VS. Z-VOLTAGE

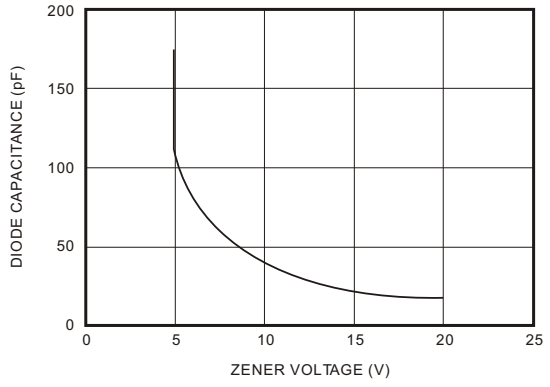

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FIG. 6-FORWARD CURRENT VS. FORWARD VOLTAGE

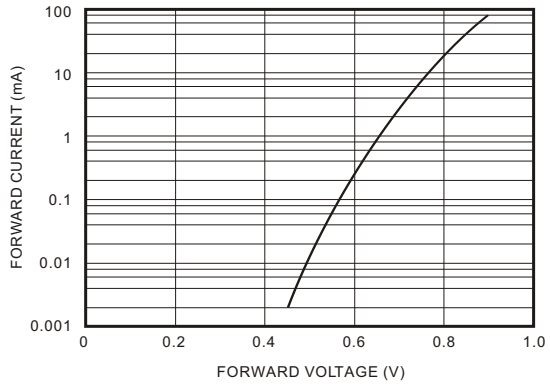


FIG. 7-Z-CURRENT VS. Z-VOLTAGE

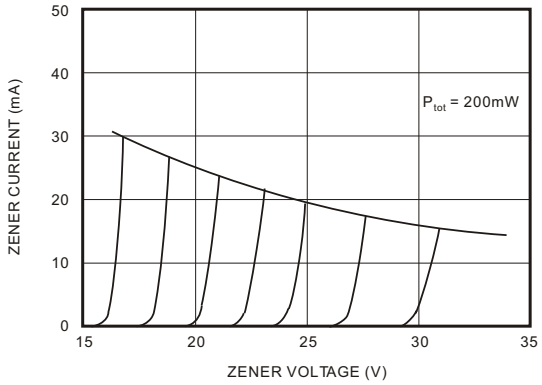


FIG. 8-Z-CURRENT VS. Z-VOLTAGE

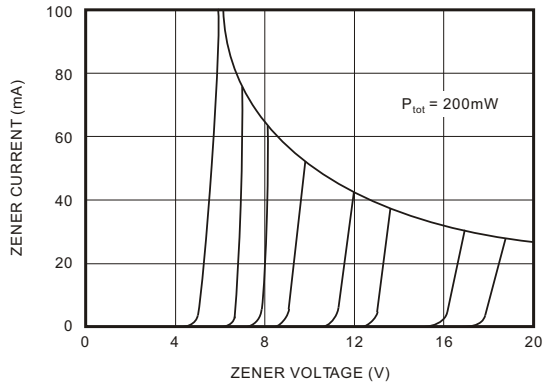


FIG. 9-DIFFERENTIAL Z-RESISTANCE VS. Z-VOLTAGE

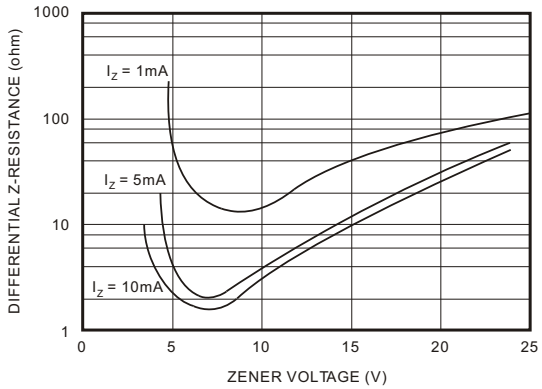
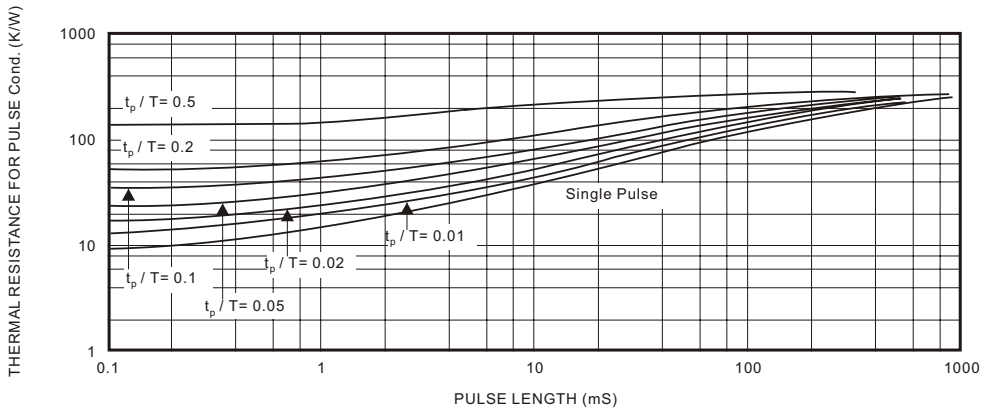


FIG. 10-THERMAL RESPONSE



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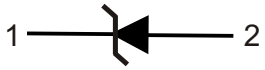
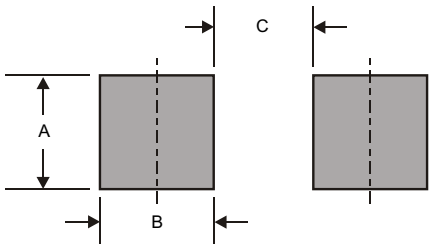
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

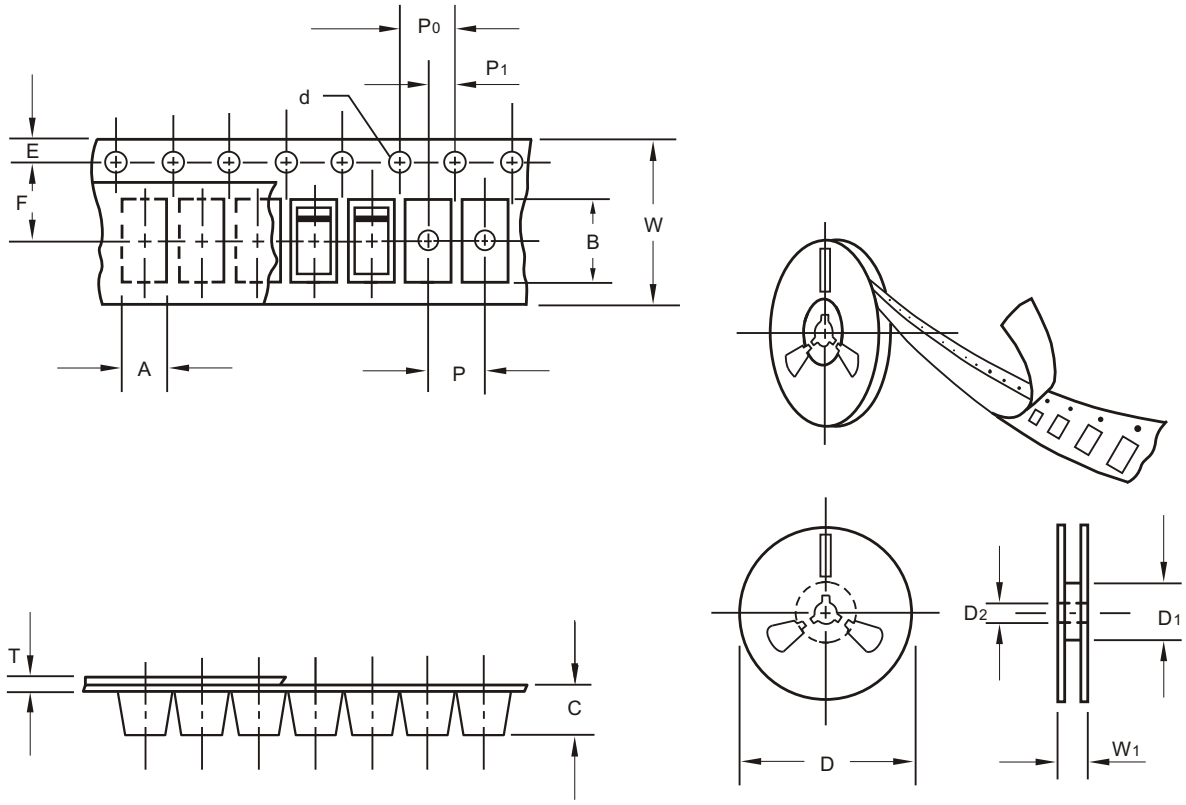


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323FL	0.059 (1.50)	0.039 (1.00)	0.051 (1.30)

MMSZ5221BS THRU MMSZ5267BS

Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323FL
Carrier width	A	0.1	1.47
Carrier length	B	0.1	2.95
Carrier depth	C	0.1	1.15
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	62.00
Feed hole diameter	D_2	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	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	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

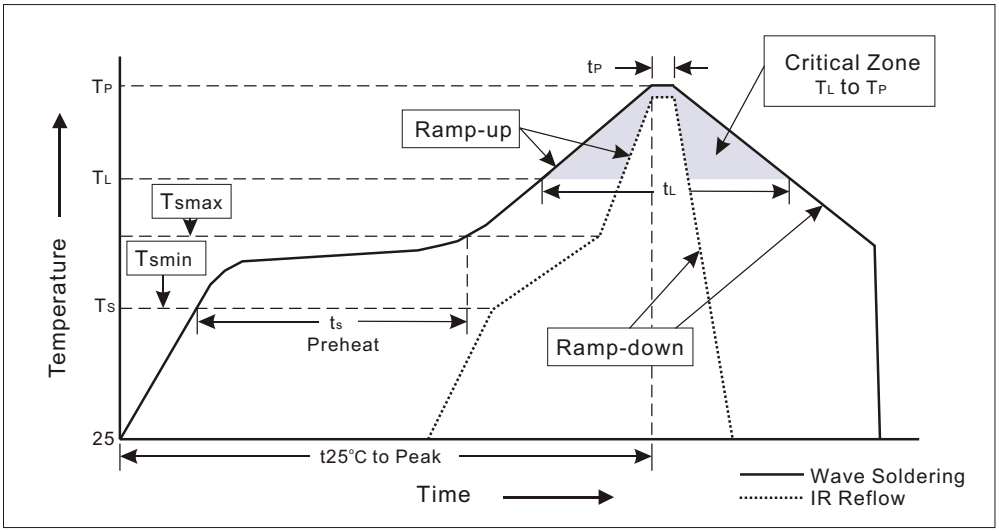
MMSZ5221BS THRU MMSZ5267BS

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-323FL	7"	5000	4.0	50,000	183*124*185	178	390*270*400	400,000	15.2

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=10°C~35°C Humidity=65%±15%
2.Reflow soldering of surface-mount devices



3.Flow (wave)soldering (solder dipping)

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 100°C 150°C 60~120sec
Tsmax to T_L -Ramp-upRate	 <3°C/sec
Time maintained above: -Temperature(T_L) -Time(t_L)	 183°C 60~150sec
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±5°C for 10±2sec. immerse body into solder 1/16"±1/32"	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_R=V_Z rate at T_A=150°C for 168 hrs.	MIL-STD-750D METHOD-1026
4. Forward Operation Life	Rated zener current at T=25°C for 500hrs.	MIL-STD-750D METHOD-1027
5. Intermittent Operation Life	T_A = 25°C, I_F = 100mA On state: power on for 5 min. off state: power off for 5 min. on and off for 500 cycles.	MIL-STD-750D METHOD-1036
6. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	
7. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Thermal Shock	0°C for 5 min. rise to 100°C for 5 min. total 10 cycles.	MIL-STD-750D METHOD-1056
9. Forward Surge	8.3ms single half sine-wave superimposed on rated load, one surge.	MIL-STD-750D METHOD-4066-2
10. Humidity	at T_A=65°C, RH=98% for 1000hrs.	MIL-STD-750D METHOD-1038
11. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031
12. Solvent Resistance	Dip into Freon at 25°C for 1 min.	MIL-STD-202F METHOD-215