ZMM5221B THRU ZMM5267B

List

ZMM5221B THRU ZMM5267B

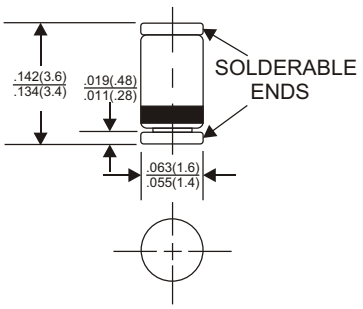
500mW Surface Mount Zener Diodes - 2.4V-75V

Features

- Silicon epitaxial planar chip structure.
- Wide zener reverse voltage range 2.4V to 67V.
- Small package size for high density applications.
- Glass hermetically sealed package.
- Ideally suited for automated assembly processes.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228

Package outline

SOD-80



Dimensions in inches and (millimeters)

Mechanical data

- Case : Glass Mini-Melf / SOD-80
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.03 gram

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

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward voltage	I_F = 200 mADC	V_F			1.10	V
Power Dissipation		P_D			500	mW
Storage temperature		T_{STG}	-55		+150	°C
Operating temperature		T_J	-65		+175	°C

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

Part No.	Marking code	Zener voltage	Test current	Zener impedance			Leakage current		Surge current
		V_Z @ I_{ZT}	I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R	V_R	I_{Surge}
		Volts	mA	OHMs	OHMs	mA	uA	Volts	mA
ZMM5221B		2.4	20.0	30	1200	0.25	100	1.0	
ZMM5222B		2.5	20.0	30	1250	0.25	100	1.0	
ZMM5223B		2.7	20.0	30	1300	0.25	75	1.0	
ZMM5224B		2.8	20.0	30	1400	0.25	75	1.0	
ZMM5225B		3.0	20.0	30	1600	0.25	50	1.0	
ZMM5226B		3.3	20.0	28	1600	0.25	25	1.0	
ZMM5227B		3.6	20.0	24	1700	0.25	15	1.0	
ZMM5228B		3.9	20.0	23	1900	0.25	10	1.0	
ZMM5229B		4.3	20.0	22	2000	0.25	5.0	1.0	
ZMM5230B		4.7	20.0	19	1900	0.25	5.0	2.0	
ZMM5231B		5.1	20.0	17	1600	0.25	5.0	2.0	
ZMM5232B		5.6	20.0	11	1600	0.25	5.0	3.0	
ZMM5234B		6.2	20.0	7	1000	0.25	5.0	4.0	
ZMM5235B		6.8	20.0	5	750	0.25	3.0	5.0	
ZMM5236B		7.5	20.0	6	500	0.25	3.0	6.0	
ZMM5237B		8.2	20.0	8	500	0.25	3.0	6.5	
ZMM5238B		8.7	20.0	8	600	0.25	3.0	6.5	
ZMM5239B		9.1	20.0	10	600	0.25	3.0	7.0	
ZMM5240B		10	20.0	17	600	0.25	3.0	8.0	
ZMM5241B		11	20.0	22	600	0.25	2.0	8.4	
ZMM5242B		12	20.0	30	600	0.25	1.0	9.1	
ZMM5243B		13	9.5	13	600	0.25	0.5	9.9	
ZMM5244B		14	9.0	15	600	0.25	0.1	9.0	
ZMM5245B		15	8.5	16	600	0.25	0.1	11	
ZMM5246B		16	7.8	17	600	0.25	0.1	12	
ZMM5247B		17	7.4	19	600	0.25	0.1	13	
ZMM5248B		18	7.0	21	600	0.25	0.1	14	
ZMM5249B		19	6.6	23	600	0.25	0.1	14	
ZMM5250B		20	6.2	25	600	0.25	0.1	15	
ZMM5251B		22	5.6	29	600	0.25	0.1	17	
ZMM5252B		24	5.2	33	600	0.25	0.1	18	
ZMM5253B		25	5.0	35	600	0.25	0.1	19	
ZMM5254B		27	4.6	41	600	0.25	0.1	21	
ZMM5255B		28	4.5	44	600	0.25	0.1	21	
ZMM5256B		30	4.2	49	600	0.25	0.1	23	
ZMM5257B		33	3.8	58	700	0.25	0.1	25	
ZMM5258B		36	3.4	70	700	0.25	0.1	27	
ZMM5259B		39	3.2	80	800	0.25	0.1	30	
ZMM5260B		43	3.0	93	900	0.25	0.1	33	
ZMM5261B		47	2.7	105	1000	0.25	0.1	36	
ZMM5262B		51	2.5	125	1100	0.25	0.1	39	
ZMM5263B		56	2.2	150	1300	0.25	0.1	43	
ZMM5264B		60	2.1	170	1400	0.25	0.1	46	
ZMM5265B		62	2.0	185	1400	0.25	0.1	47	
ZMM5266B		68	1.8	230	1600	0.25	0.1	52	
ZMM5267B		75	1.7	270	1700	0.25	0.1	56	

Note : 5% tolerance of Zener voltage

Rating and characteristic curves (ZMM5221B THRU ZMM5267B)

FIG.1-TOTAL POWER DISSIPATION VS. AMBIENT TEMPERATURE

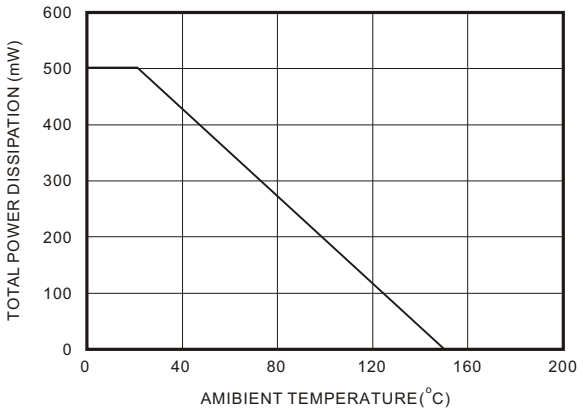


FIG. 2-TYPICAL CHANGE OF WORKING VOLTAGE UNDER OPERATING CONDITIONS AT T_A =25°C

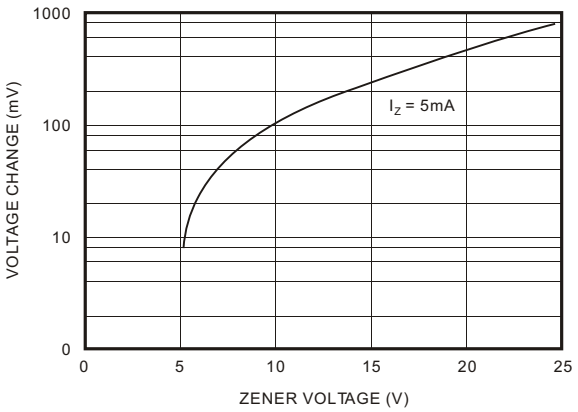


FIG. 3-TYPICAL CHANGE OF WORKING VOLTAGE VS. JUNCTION TEMPERATURE

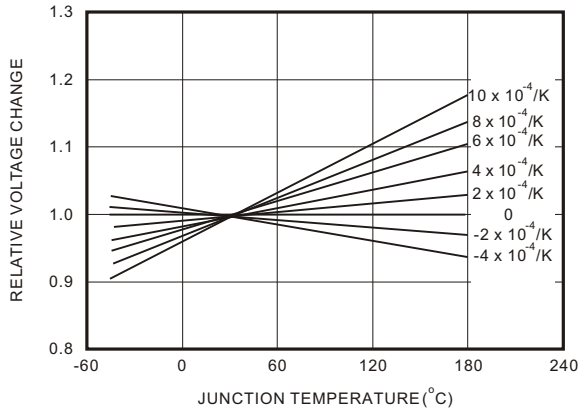


FIG. 4-TEMPERATURE COEFFICIENT OF VZ VS. Z-VOLTAGE

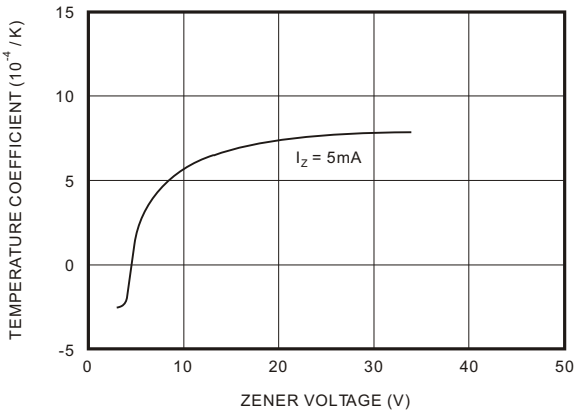
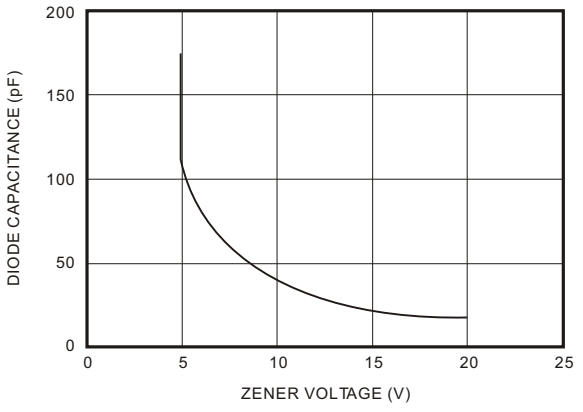


FIG. 5-DIODE CAPACITANCE VS. Z-VOLTAGE



Rating and characteristic curves (ZMM5221B THRU ZMM5267B)

FIG. 6-FORWARD CURRENT VS. FORWARD VOLTAGE

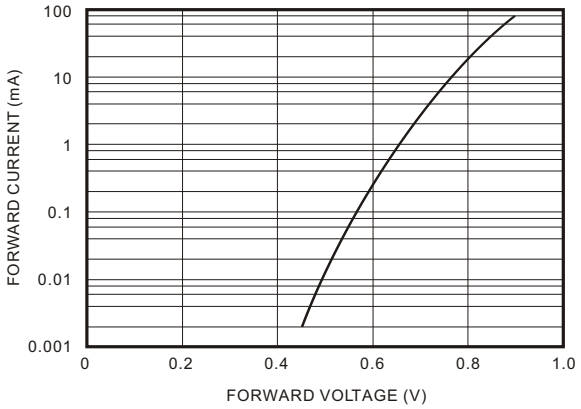


FIG. 7-Z-CURRENT VS. Z-VOLTAGE

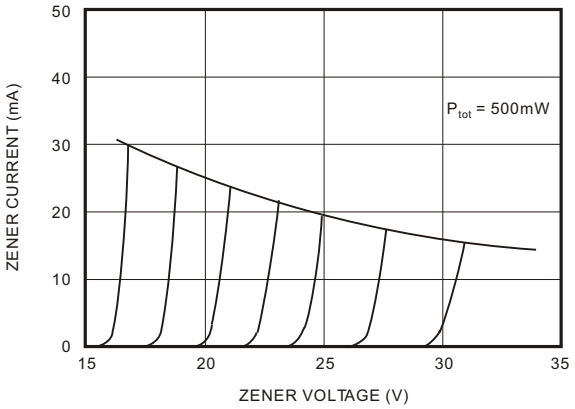


FIG. 8-Z-CURRENT VS. Z-VOLTAGE

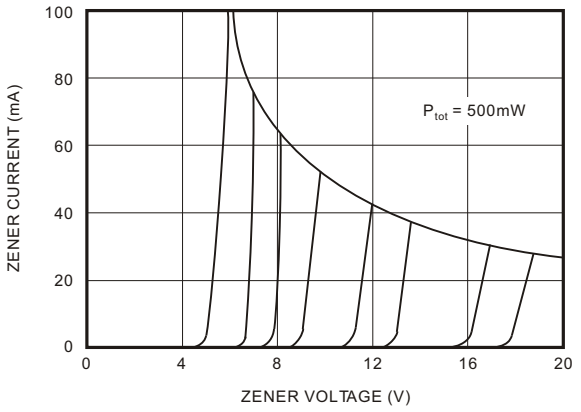


FIG. 9-DIFFERENTIAL Z-RESISTANCE VS. Z-VOLTAGE

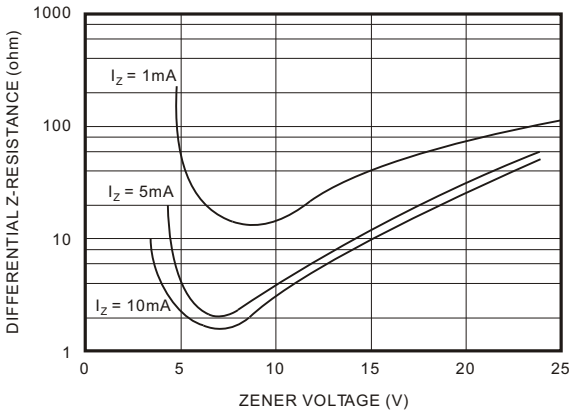
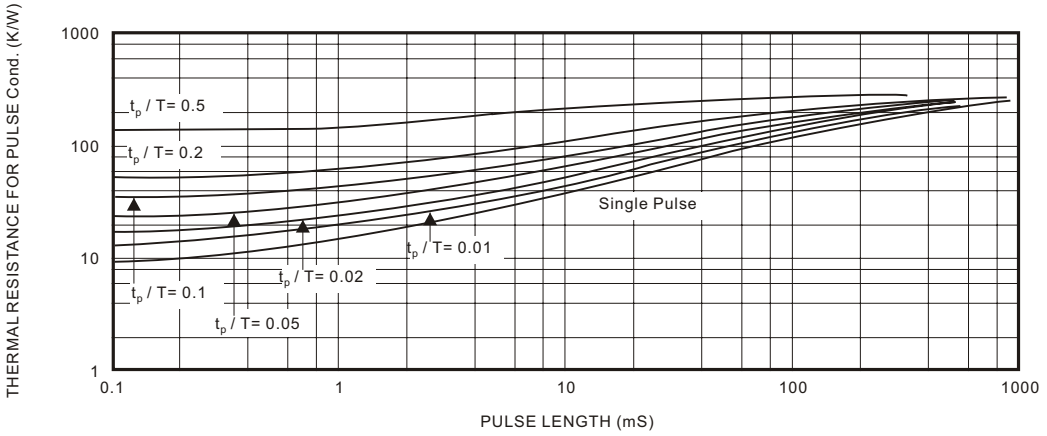


FIG. 10-THERMAL RESPONSE



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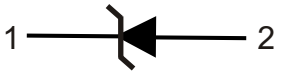
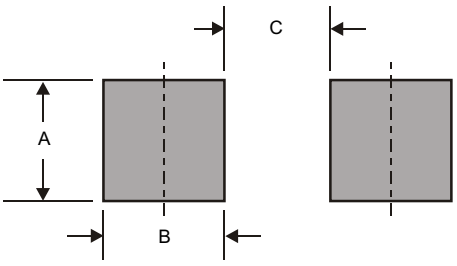
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-80	0.071 (1.80)	0.035 (0.90)	0.102 (2.60)

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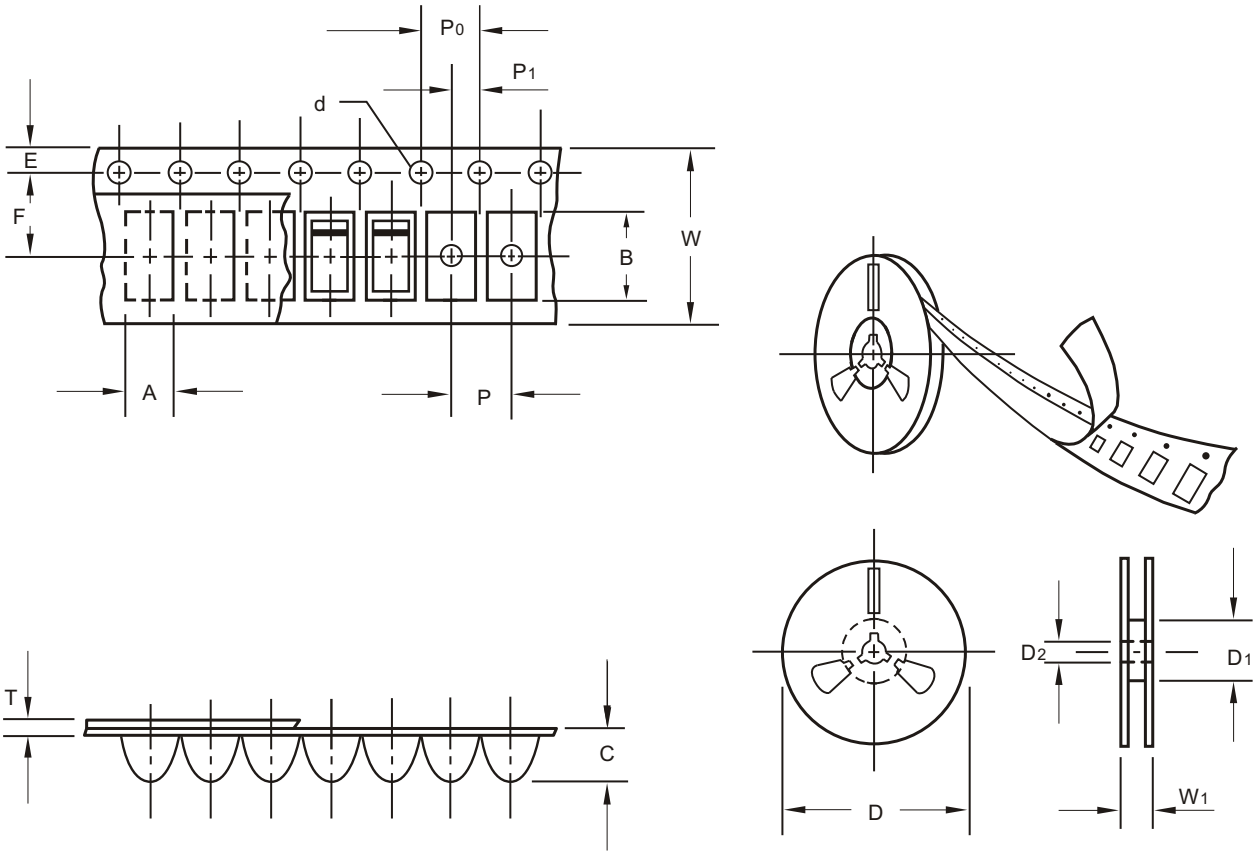
Packing information



unit:mm

Item	Symbol	Tolerance	SOD-80
Carrier width	A	0.1	2.00
Carrier length	B	0.1	3.70
Carrier depth	C	0.1	1.80
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D_1	min	50.00
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	5.50
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	12.00
Reel width	W_1	1.0	18.00

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

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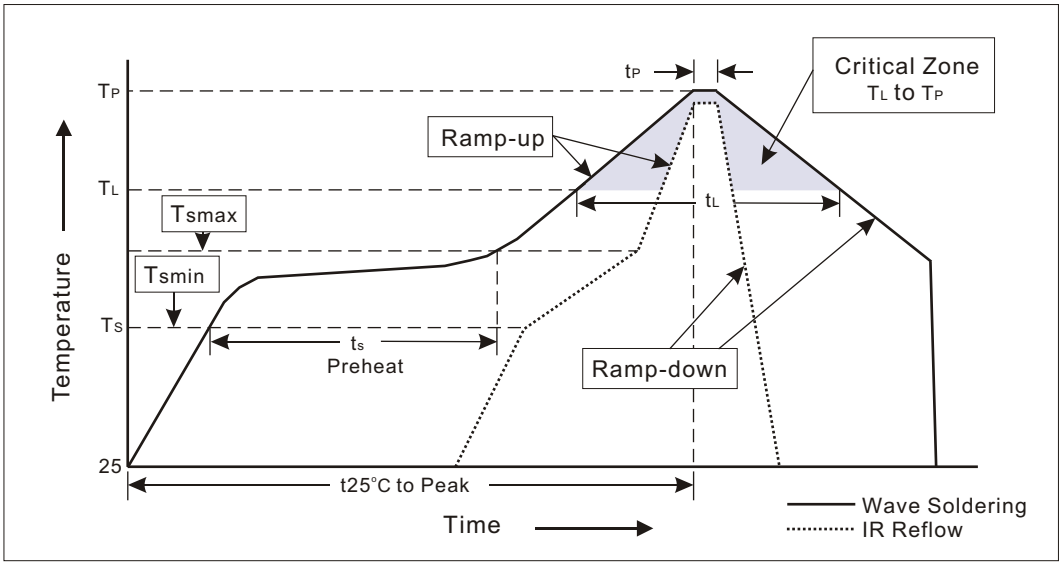
Reel packing

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-80	7"	2500	4.0	25,000	185*120*180	178	400*250*200	100,000	7.0

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 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 = 200mA 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