3KP SERIES

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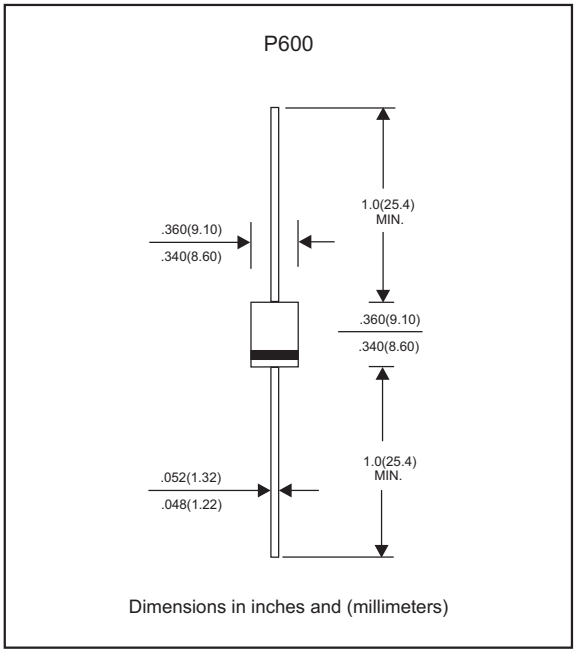
3KP SERIES

3000W Axial Leaded Transient Voltage Suppressors - 5.0V-220V

Features

- Axial lead type devices for through hole design.
- 3kW peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to V_{BR}, typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.3KP5.0A-H.

Package outline



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, P600
- Lead : Axial leads, solderable per MIL-STD-202, Method 208 guaranteed
- Polarity: Color band denotes cathode end
- Mounting Position : Any
- Weight : Approximated 2.10 gram

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

PARAMETER	CONDITIONS	Symbol	3KP SERIES	UNIT
Peak power dissipation	with a 10/1000us waveform, Note 1 & Fig. 1	P_{PPM}	3000	W
Peak pulse current	with a 10/1000us waveform	I_{PPM}	See table 1	A
Steady state power dissipation	at T_L=75°C lead length 0.375" (9.5 mm)	$P_{M(AV)}$	6.5	W
Peak forward surge current	8.3mS single half sine-wave (JEDEC Method), note 2	I_{FSM}	300	A
Maximum instantaneours forward voltage	at 100A for uni-directional types only, note 3	V_F	3.5 / 5.0	V
Operating junction temperature range		T_J	-55to+150	°C
Storage temperature range		T_{STG}	-55to+150	°C

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above T_A=25°C per Fig. 2
2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
3. V_F<3.5V. for devices of V_{BR}<= 220V, and V_F<5.0V. for devices of V_{BR}>=201V

Electrical characteristics (at T_A=25°C unless otherwise noted) Table 1

Part No.	Reverse Stand-off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}		Maximum Reverse Leakage Current
	V_{RWM}	$V_{BR\ Min}$	$V_{BR\ Max}$	I_T	V_c	I_{PP}	I_R@V_{RWM}
	Volts	Volts	Volts	mA	Volts	A	μA
3KP5.0(C)A	5.0	6.40	7.00	50	9.2	326	5000
3KP6.0(C)A	6.0	6.67	7.37	50	10.3	291.3	5000
3KP6.5(C)A	6.5	7.22	7.98	50	11.2	267.9	2000
3KP7.0(C)A	7.0	7.78	8.60	50	12.0	250	1000
3KP7.5(C)A	7.5	8.33	9.21	5.0	12.9	232.6	250
3KP8.0(C)A	8.0	8.89	9.83	5.0	13.6	220.6	150
3KP8.5(C)A	8.5	9.44	10.4	5.0	14.4	208.3	50
3KP9.0(C)A	9.0	10.0	11.1	5.0	15.4	194.8	20
3KP10(C)A	10.0	11.1	12.3	5.0	17.0	176.4	10
3KP11(C)A	11.0	12.2	13.5	5.0	18.2	164.8	10
3KP12(C)A	12.0	13.3	14.7	5.0	19.9	150.6	10
3KP13(C)A	13.0	14.4	15.9	5.0	21.5	139.4	10
3KP14(C)A	14.0	15.6	17.2	5.0	23.2	129.4	10
3KP15(C)A	15.0	16.7	18.5	5.0	24.4	123	10
3KP16(C)A	16.0	17.8	19.7	5.0	26.0	115.4	10
3KP17(C)A	17.0	18.9	20.9	5.0	27.6	108.7	10
3KP18(C)A	18.0	20.0	22.1	5.0	29.2	102.8	10
3KP20(C)A	20.0	22.2	24.5	5.0	32.4	92.6	10
3KP22(C)A	22.0	24.4	26.9	5.0	35.5	84.4	10
3KP24(C)A	24.0	26.7	29.5	5.0	38.9	77.2	10
3KP26(C)A	26.0	28.9	31.9	5.0	42.1	71.2	10
3KP28(C)A	28.0	31.1	34.4	5.0	45.4	66.0	10
3KP30(C)A	30.0	33.3	36.8	5.0	48.4	62.0	10
3KP33(C)A	33.0	36.7	40.6	5.0	53.3	56.2	10
3KP36(C)A	36.0	40.0	44.2	5.0	58.1	51.6	10
3KP40(C)A	40.0	44.4	49.1	5.0	64.5	46.4	10
3KP43(C)A	43.0	47.8	52.8	5.0	69.4	43.2	10
3KP45(C)A	45.0	50.0	55.3	5.0	72.7	41.3	10
3KP48(C)A	48.0	53.3	58.9	5.0	77.4	38.8	10
3KP51(C)A	51.0	56.7	62.7	5.0	82.4	36.4	10
3KP54(C)A	54.0	60.0	66.3	5.0	87.1	34.4	10
3KP58(C)A	58.0	64.4	71.2	5.0	93.6	32.1	10
3KP60(C)A	60.0	66.7	73.7	5.0	96.8	31.0	10
3KP64(C)A	64.0	71.1	78.6	5.0	103.0	29.1	10
3KP70(C)A	70.0	77.8	86.0	5.0	113.0	26.5	10
3KP75(C)A	75.0	83.3	92.1	5.0	121.0	24.8	10
3KP78(C)A	78.0	86.7	95.8	5.0	126.0	23.8	10
3KP85(C)A	85.0	94.4	104.0	5.0	137.0	21.9	10
3KP90(C)A	90.0	100.0	111.0	5.0	146	20.5	10
3KP100(C)A	100.0	111.0	123.0	5.0	162	18.5	10
3KP110(C)A	110.0	122.0	135.0	5.0	177	16.9	10
3KP120(C)A	120.0	133.0	147.0	5.0	193	15.5	10

Note 1. V_{BR} measured after I_T applied for 300us, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. All terms and symbols are consistent with ANS/IEEE C62.35

3KP SERIES

Electrical characteristics (at T_A=25°C unless otherwise noted) Table 1

Part No.	Reverse Stand-off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}		Maximum Reverse Leakage Current
	V_{RWM}	$V_{BR\ Min}$	$V_{BR\ Max}$	I_T	V_C@I_{PP}		I_R@V_{RWM}
	Volts	Volts	Volts	mA	Volts	I_{PP}(A)	I_R(uA)
3KP130(C)A	130	144	159	5.0	209	14.4	10
3KP150(C)A	150	167	185	5.0	243	12.3	10
3KP160(C)A	160	178	197	5.0	259	11.6	10
3KP170(C)A	170	189	209	5.0	275	10.9	10
3KP180(C)A	180	201	222	5.0	292	10.4	10
3KP190(C)A	190	211	233	5.0	308	9.7	10
3KP200(C)A	200	224	247	5.0	324	9.1	10
3KP210(C)A	210	237	263	5.0	340	8.6	10
3KP220(C)A	220	246	272	5.0	356	8.1	10

Note 1. V_{BR} measured after I_T applied for 300us, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 5 and derated per Fig. 1
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. All terms and symbols are consistent with ANS/IEEE C62.35

Fig. A - Transients of several thousand volts can be clamped to a safe level by the TVS

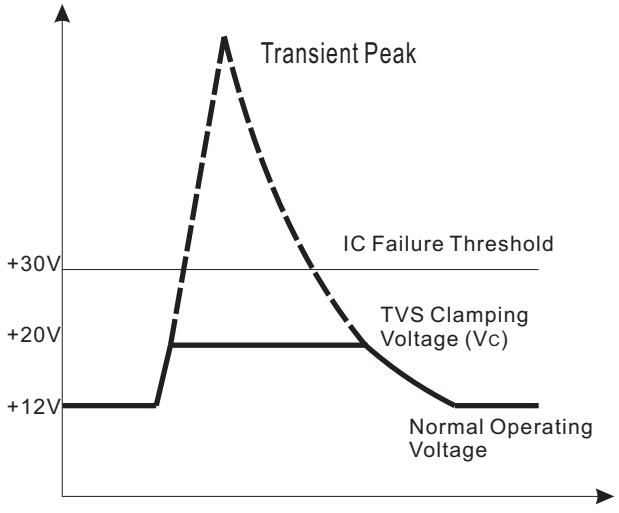
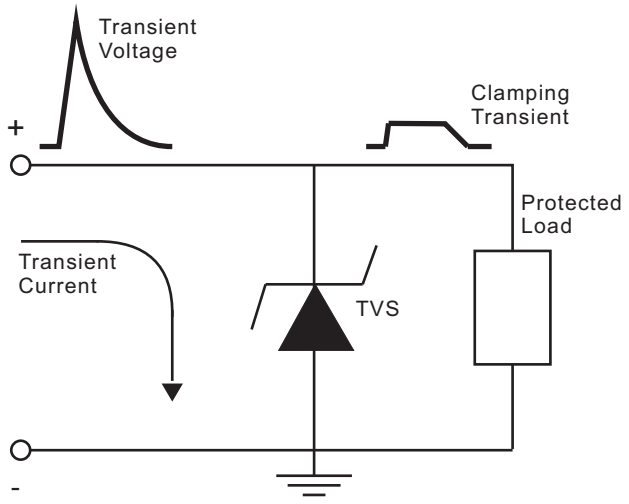


Fig. B - Transient current is divered to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level



Rating and characteristic curves (3KP SERIES)

Fig.1 - Pulse Derating Curve

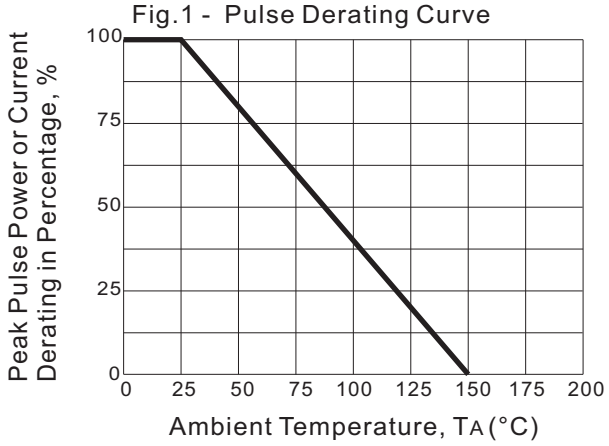


Fig.2 - Maximum Non-Repetitive Forward Surge Current

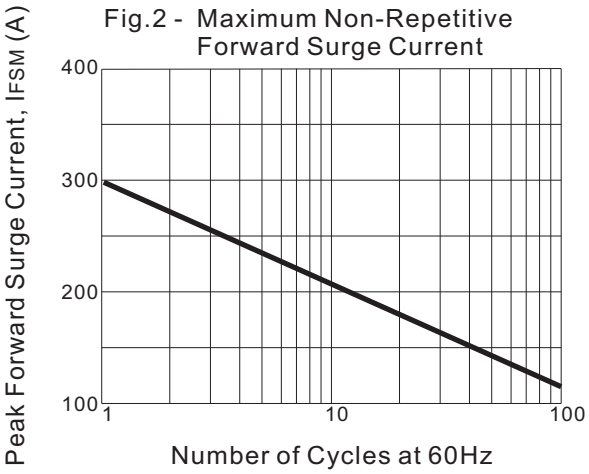


Fig.3 - Steady State Power Derating Curve

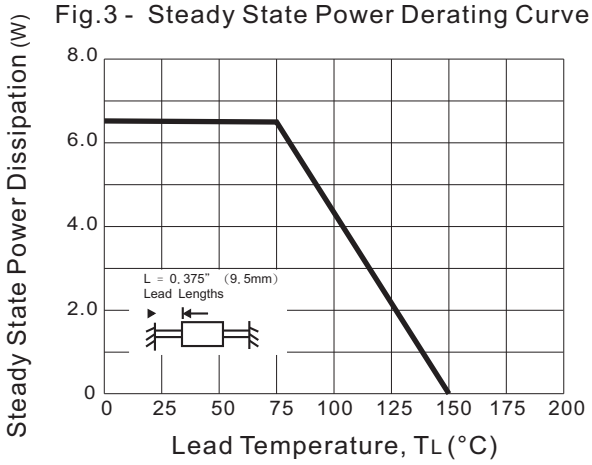


Fig.4 - Pealk Pulse Power Rating Curve

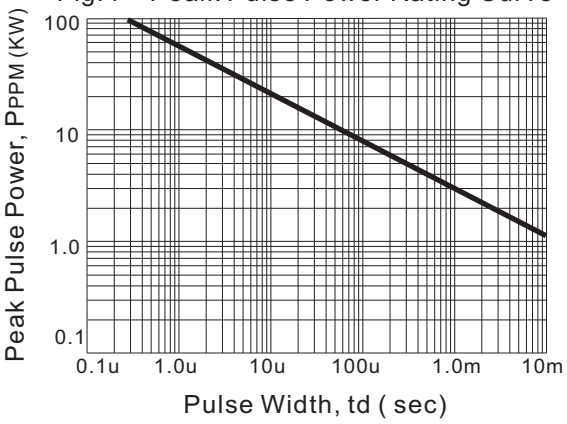


Fig.5 - Pulse Waveform

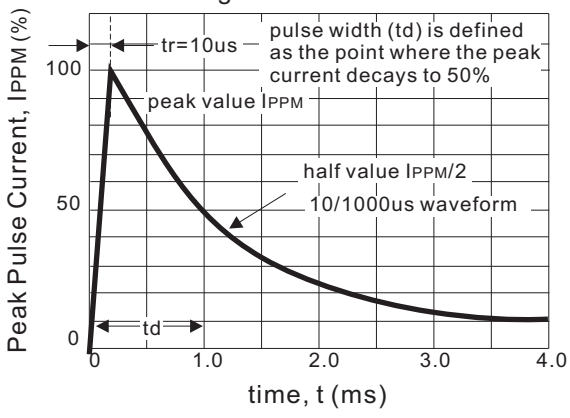
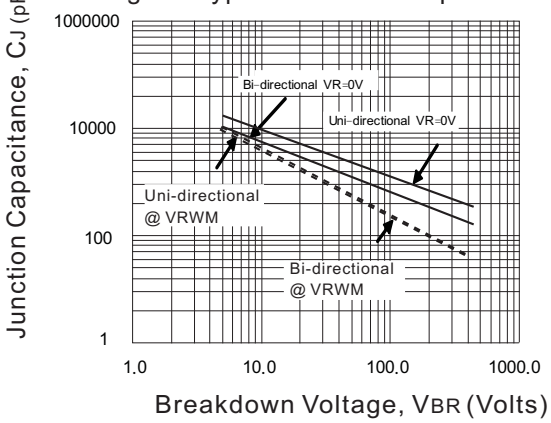
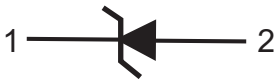


Fig.6 - Typical Junction Capacitance

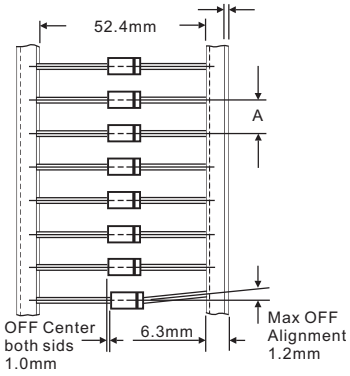


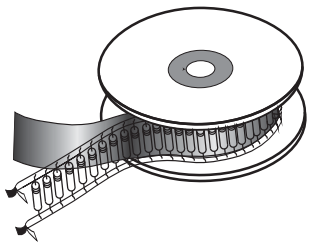
3KP SERIES

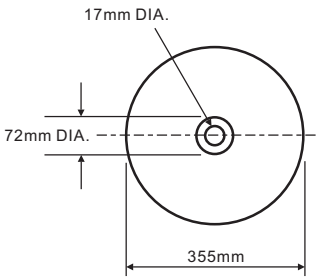
Pinning information

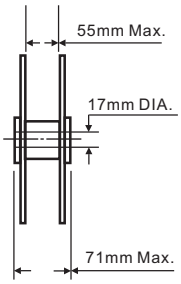
Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		
Bi-Directional		

Taping & bulk specifications for AXIAL devices









REEL PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / REEL)	COMPONENT SPACING "A" in FIG. A	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	1000	10 mm	360 * 340 * 370	4,000	9.5

AMMO PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	400	255 * 75 * 150	339 * 276 * 330	3,200	9.2

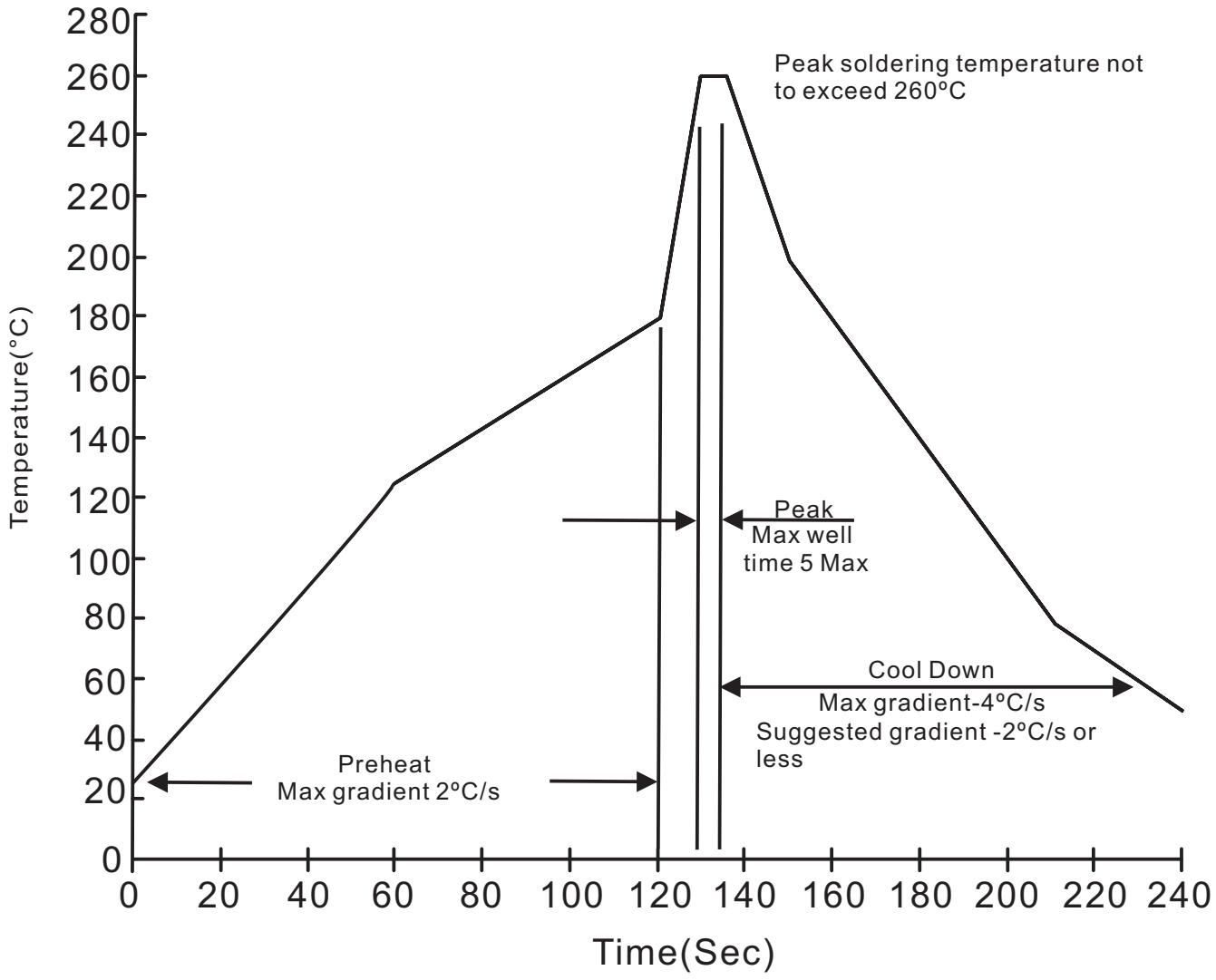
3KP SERIES

BULK PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	250	194 * 84 * 20	355 * 320 * 280	6,000	14.5

Suggested thermal profiles for soldering processes

1.Lead free temperature profile wave-soldering



3KP SERIES

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. Pull Test	2.0kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036
4. Bend Lead	2.0kg weight applied to each lead bending arc 90°±5° for 3 times.	MIL-STD-750D METHOD-2036
5. High Temperature Reverse Bias	V_{RWM}=80% rate at T_J=150°C for 168 hrs.	MIL-STD-750D METHOD-1038
6. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
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. Humidity	at T_A=85°C, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
9. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031