SM6NT22(C)A THRU SM6NT220(C)A

List

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600W Dual Flat No-Lead Unidirectional and Bidirectional Transient Voltage Suppressors 22V-220V

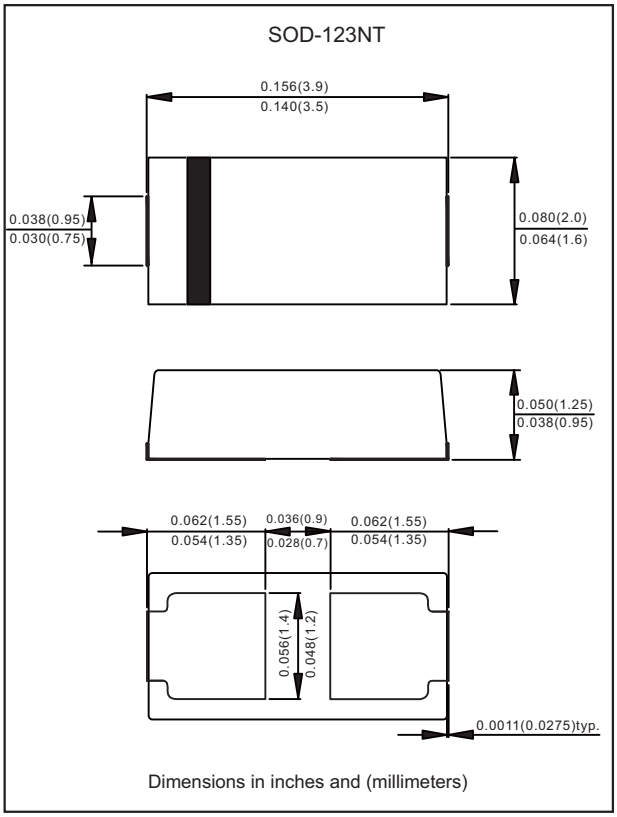
Features

- Well package design with solder pad on the bottom for best thermal performance
- Leads on two opposing sides of the body
- Tiny plastic DFN package
- 600W peak pulse power capability with a 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- Uni and Bidirectional unit
- Glass passivated chip junction
- Excellent clamping capability
- Low incremental surge resistance
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. SM6NT22A-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-123NT
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band(Uni-directional types only)
- Mounting Position : Any
- Weight : Approximated 0.022 gram

Package outline



Dimensions in inches and (millimeters)

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

Parameter	Conditions	Symbol	Value	Unit
Peak power dissipation	with a 10/1000μs waveform, Note 1, 2 & Fig. 1	P_{PPM}	600	W
Peak pulse current	with a 10/1000μs waveform	I_{PPM}	See Table	A
Steady state power dissipation	at T_L=75°C, Note 2	$P_{M(AV)}$	1.5	W
Operating junction temperature range		T_J	-55 to +150	°C
Storage temperature range		T_{STG}	-65 to +175	°C

Notes 1: Non-repetitive current pulse, per Fig. 3 and derated above T_A=25°C per Fig. 2
2: Mounted on copper pad area of 0.2"x0.2" (5.0x5.0 mm) per Fig 5

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

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		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	Uni	Bi
SM6NT22A	SM6NT22CA	22	24.4	26.9	1.0	35.5	16.91	5	6LX	6BX
SM6NT24A	SM6NT24CA	24	26.7	29.5	1.0	38.9	15.43	5	6LZ	6BZ
SM6NT26A	SM6NT26CA	26	28.9	31.9	1.0	42.1	14.26	5	6ME	6CE
SM6NT28A	SM6NT28CA	28	31.1	34.4	1.0	45.4	13.22	5	6MG	6CG
SM6NT30A	SM6NT30CA	30	33.3	36.8	1.0	48.4	12.40	5	6MK	6CK
SM6NT33A	SM6NT33CA	33	36.7	40.6	1.0	53.3	11.26	5	6MM	6CM
SM6NT36A	SM6NT36CA	36	40.0	44.2	1.0	58.1	10.33	5	6MP	6CP
SM6NT40A	SM6NT40CA	40	44.4	49.1	1.0	64.5	9.31	5	6MR	6CR
SM6NT43A	SM6NT43CA	43	47.8	52.8	1.0	69.4	8.65	5	6MT	6CT
SM6NT45A	SM6NT45CA	45	50.0	55.3	1.0	72.7	8.26	5	6MV	6CV
SM6NT48A	SM6NT48CA	48	53.3	58.9	1.0	77.4	7.76	5	6MX	6CX
SM6NT51A	SM6NT51CA	51	56.7	62.7	1.0	82.4	7.29	5	6MZ	6CZ
SM6NT54A	SM6NT54CA	54	60.0	66.3	1.0	87.1	6.89	5	6NE	6DE
SM6NT58A	SM6NT58CA	58	64.4	71.2	1.0	93.6	6.42	5	6NG	6DG
SM6NT60A	SM6NT60CA	60	66.7	73.7	1.0	96.8	6.20	5	6NK	6DK
SM6NT64A	SM6NT64CA	64	71.1	78.6	1.0	103	5.83	5	6NM	6DM
SM6NT70A	SM6NT70CA	70	77.8	86.0	1.0	113	5.31	5	6NP	6DP
SM6NT75A	SM6NT75CA	75	83.3	92.1	1.0	121	4.96	5	6NR	6DR
SM6NT78A	SM6NT78CA	78	86.7	95.8	1.0	126	4.77	5	6NT	6DT
SM6NT85A	SM6NT85CA	85	94.4	104	1.0	137	4.38	5	6NV	6DV
SM6NT90A	SM6NT90CA	90	100	111	1.0	146	4.11	5	6NX	6DX
SM6NT100A	SM6NT100CA	100	111	123	1.0	162	3.71	5	6NZ	6DZ
SM6NT110A	SM6NT110CA	110	122	135	1.0	177	3.39	5	6PE	6EE
SM6NT120A	SM6NT120CA	120	133	147	1.0	193	3.11	5	6PG	6EG
SM6NT130A	SM6NT130CA	130	144	159	1.0	209	2.88	5	6PK	6EK
SM6NT150A	SM6NT150CA	150	167	185	1.0	243	2.47	5	6PM	6EM
SM6NT160A	SM6NT160CA	160	178	197	1.0	259	2.32	5	6PP	6EP
SM6NT170A	SM6NT170CA	170	189	209	1.0	275	2.19	5	6PR	6ER
SM6NT180A	SM6NT180CA	180	201	222	1.0	292	2.06	5	6PT	6ET
SM6NT200A	SM6NT200CA	200	224	247	1.0	324	1.86	5	6PV	6EV
SM6NT220A	SM6NT220CA	220	246	272	1.0	356	1.69	5	6PX	6EX

Notes 1: Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices

2: Transient Voltage Suppressors (TVS) are devices used to protect vulnerable circuits from electrical overstress such as that caused by electrostatic discharge, inductive load switching and induced lightning. Within the TVS, damaging voltage spikes are limited by clamping or avalanche action of a rugged silicon pn junction which reduces the amplitude of the transient to a nondestructive level. See Fig. 6 & Fig. 7

Rating and characteristic curves

Fig.1 - Pealk Pulse Power Rating Curve

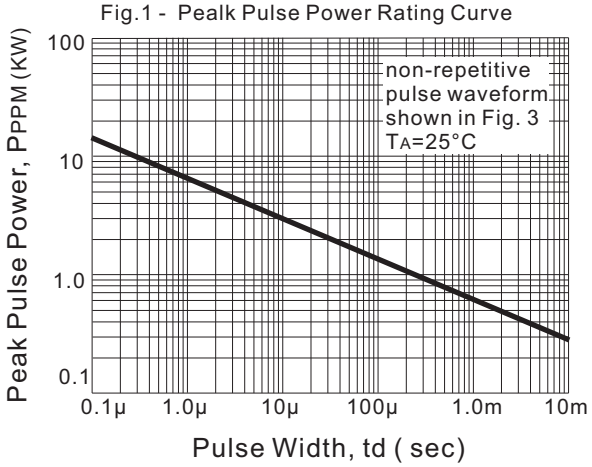


Fig.2 - Pulse Derating Curve

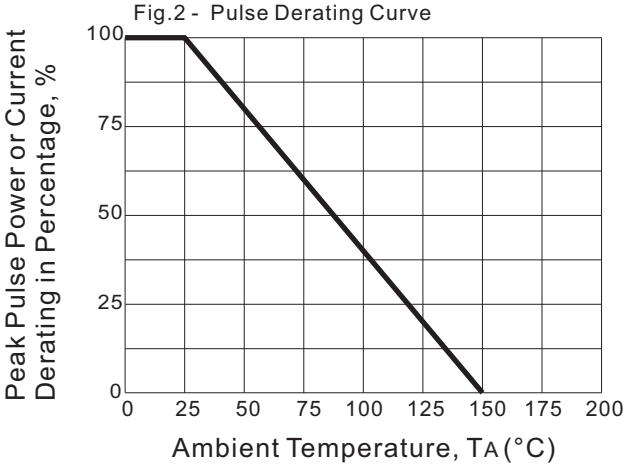


Fig.3 - Pulse Waveform

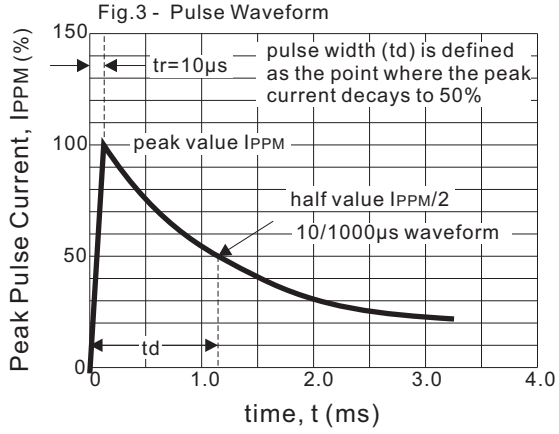


Fig.4 - Typical Junction Capacitance

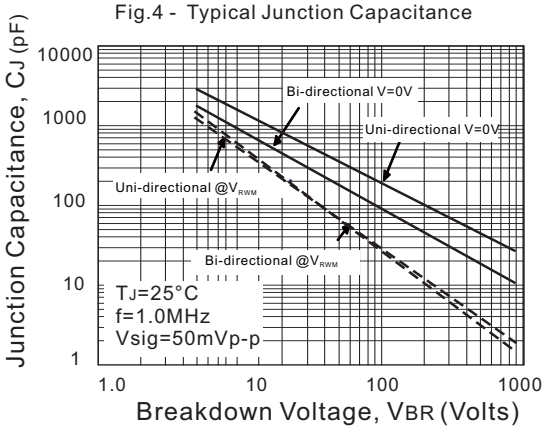
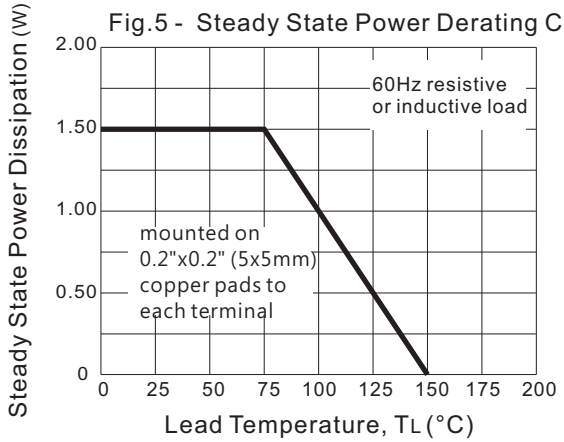


Fig.5 - Steady State Power Derating Curve



Rating and characteristic curves

Fig. 6 - Transients of several thousand volts can be clamped to a safe level by the TVS

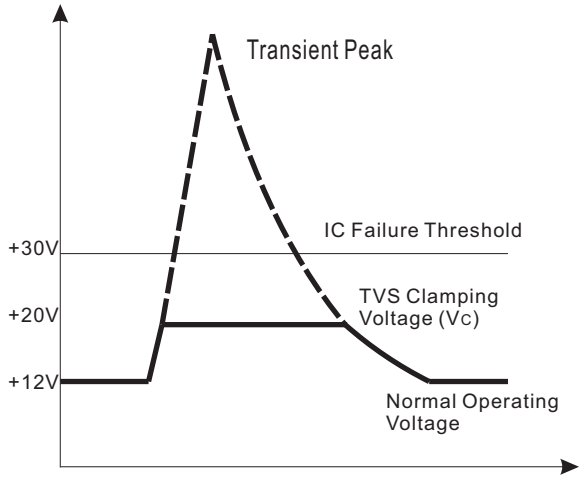
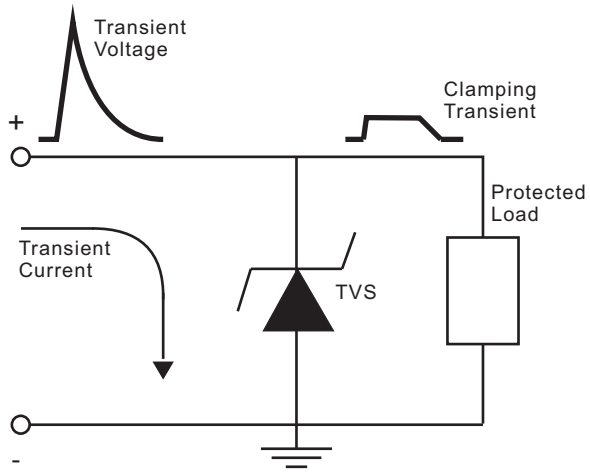


Fig. 7 - Transient current is divered to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level



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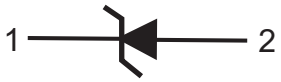
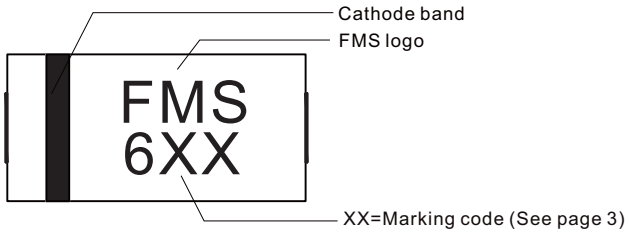
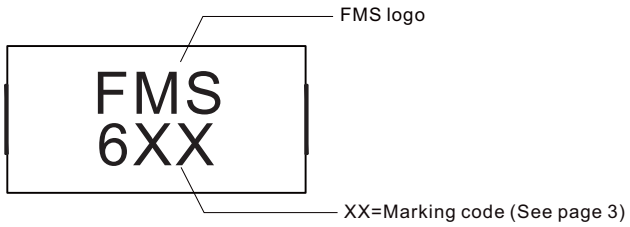
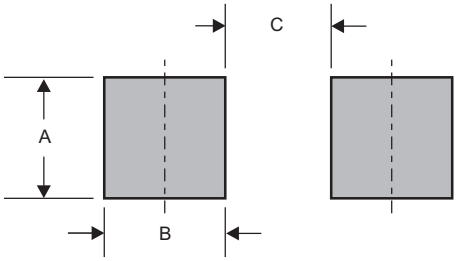
Pinning information

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

Marking

Type number	Example
Uni-Directional	
Bi-Directional	

Suggested solder pad layout

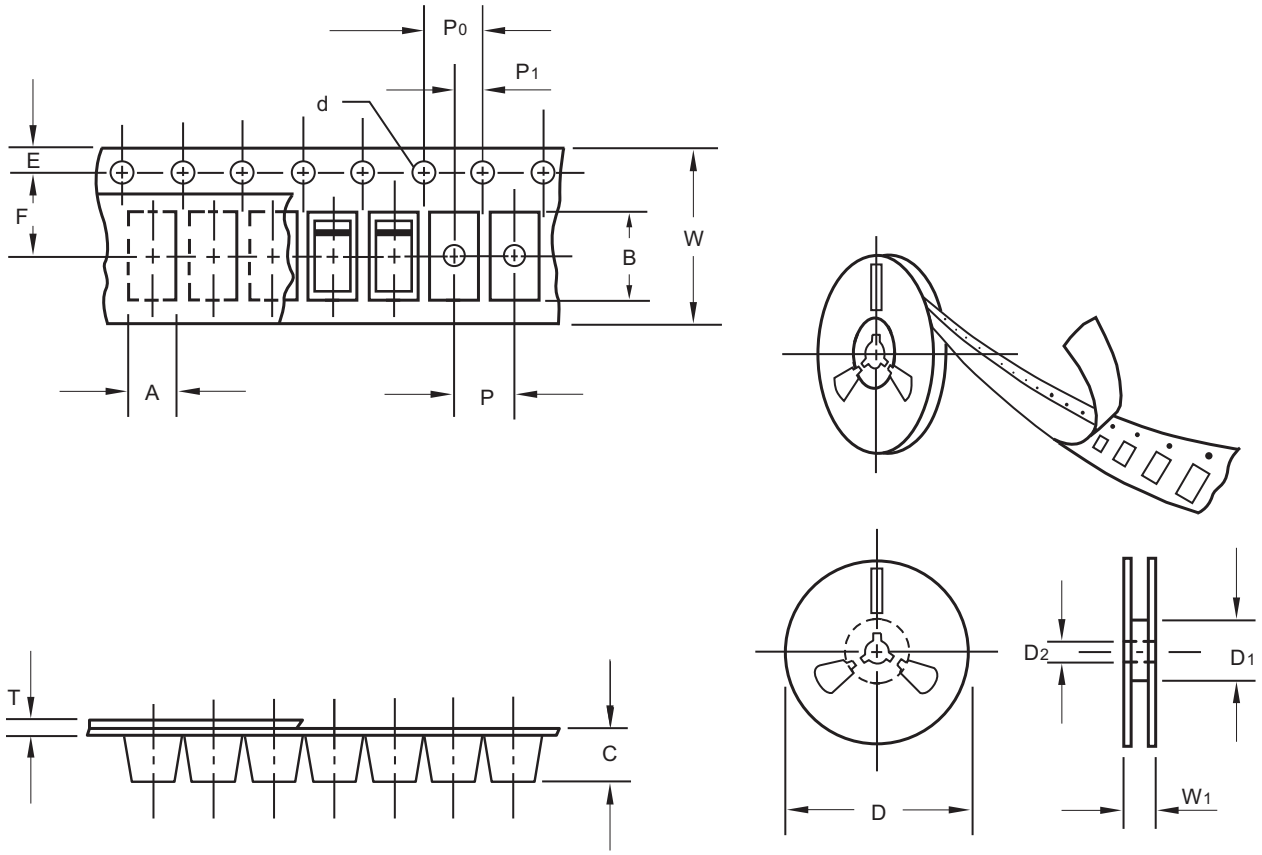


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-123NT	0.056 (1.40)	0.062(1.55)	0.028 (0.70)

SM6NT22(C)A THRU SM6NT220(C)A

Packing information



unit:mm

Item	Symbol	Tolerance	SOD-123NT
Carrier width	A	0.1	2.00
Carrier length	B	0.1	3.85
Carrier depth	C	0.1	1.10
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.

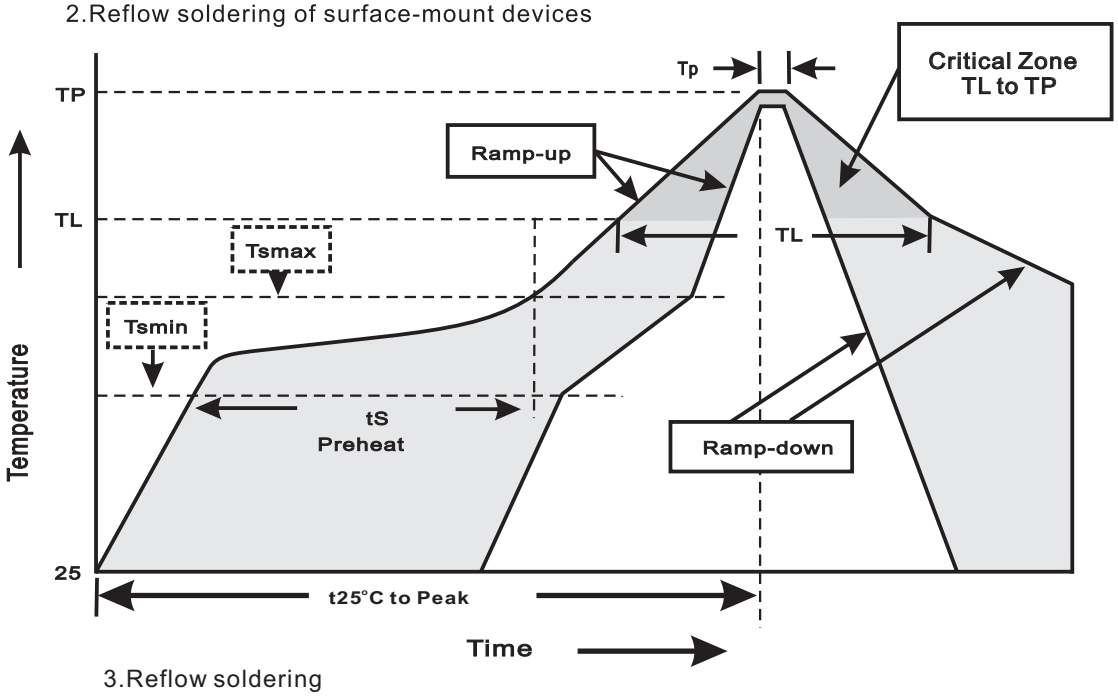
SM6NT22(C)A THRU SM6NT220(C)A

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-123NT	7"	3,000	4.0	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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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	<3°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.	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_{BR}=V_{BR} N_{OM}*80% at T_J=150°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at T_A=85°C, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031