SMA6HS5.0A THRU SMA6HS85A

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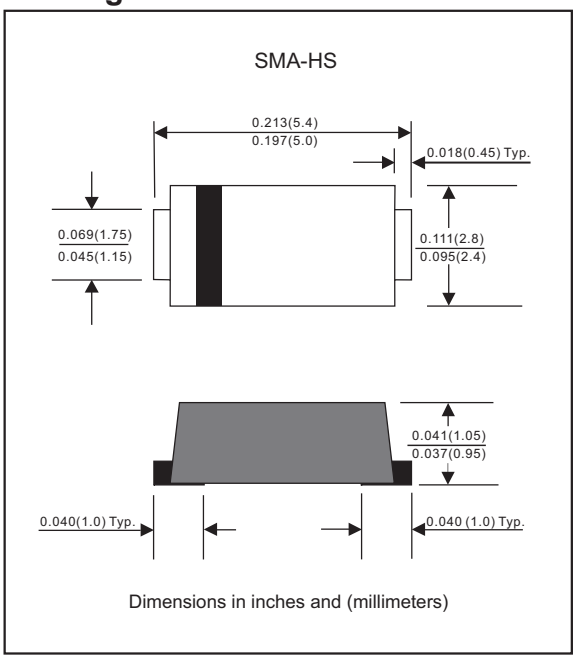
SMA6HS5.0A THRU SMA6HS85A

600W Surface Mount Unidirectional Transient Voltage Suppressors Diodes 5.0V-85V

Features

- Uni-directional
- Very low profile - typical height of 1.0 mm
- 600W peak pulse power capability with a 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- Low profile surface mounted application in order to optimize board space
- Excellent clamping capability
- Low incremental surge resistance
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. SMA6HS5.0A-H

Package outline



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic,DO-221AC / SMA-HS
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.037 gram

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 1	A
Steady state power dissipation	at T_L=75°C, Note 2	$P_{M(AV)}$	4.5	W
Peak forward surge current	8.3ms single half sine-wave, Note 3	I_{FSM}	60	A
Maximum instantaneours forward voltage	at I_F=25A For uni-directional types only, Note 4	V_F	3.5	V
Typical thermal resistance	Junction to case Junction to ambient	$R_{\theta JC}$ $R_{\theta JA}$	32 52	°C/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
3. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
4. V_F<3.5V for V_{BR}< 200V

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

Part No. (Uni)	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
SMA6HS5.0A	5.0	6.40	7.00	10	9.2	65.2	800	6AE
SMA6HS6.0A	6.0	6.67	7.37	10	10.3	58.3	800	6AG
SMA6HS6.5A	6.5	7.22	7.98	10	11.2	53.6	500	6AK
SMA6HS7.0A	7.0	7.78	8.60	10	12.0	50.0	200	6AM
SMA6HS7.5A	7.5	8.33	9.21	1.0	12.9	46.5	100	6AP
SMA6HS8.0A	8.0	8.89	9.83	1.0	13.6	44.1	50	6AR
SMA6HS8.5A	8.5	9.44	10.4	1.0	14.4	41.7	20	6AT
SMA6HS9.0A	9.0	10.0	11.1	1.0	15.4	39.0	10	6AV
SMA6HS10A	10	11.1	12.3	1.0	17.0	35.3	5	6AX
SMA6HS11A	11	12.2	13.5	1.0	18.2	33.0	5	6AZ
SMA6HS12A	12	13.3	14.7	1.0	19.9	30.2	5	6BE
SMA6HS13A	13	14.4	15.9	1.0	21.5	27.9	5	6BG
SMA6HS14A	14	15.6	17.2	1.0	23.2	25.9	5	6BK
SMA6HS15A	15	16.7	18.5	1.0	24.4	24.6	5	6BM
SMA6HS16A	16	17.8	19.7	1.0	26.0	23.0	5	6BP
SMA6HS17A	17	18.9	20.9	1.0	27.6	21.7	5	6BR
SMA6HS18A	18	20.0	22.1	1.0	29.2	20.5	5	6BT
SMA6HS20A	20	22.2	24.5	1.0	32.4	18.5	5	6BV
SMA6HS22A	22	24.4	26.9	1.0	35.5	16.9	5	6BX
SMA6HS24A	24	26.7	29.5	1.0	38.9	15.4	5	6BZ
SMA6HS26A	26	28.9	31.9	1.0	42.1	14.2	5	6CE
SMA6HS28A	28	31.1	34.4	1.0	45.4	13.2	5	6CG
SMA6HS30A	30	33.3	36.8	1.0	48.4	12.4	5	6CK
SMA6HS33A	33	36.7	40.6	1.0	53.3	11.2	5	6CM
SMA6HS36A	36	40.0	44.2	1.0	58.1	10.3	5	6CP
SMA6HS40A	40	44.4	49.1	1.0	64.5	9.3	5	6CR
SMA6HS43A	43	47.8	52.8	1.0	69.4	8.6	5	6CT
SMA6HS45A	45	50.0	55.3	1.0	72.7	8.2	5	6CV
SMA6HS48A	48	53.3	58.9	1.0	77.4	7.7	5	6CX
SMA6HS51A	51	56.7	62.7	1.0	82.4	7.2	5	6CZ
SMA6HS54A	54	60.0	66.3	1.0	87.1	6.9	5	6RE
SMA6HS58A	58	64.4	71.2	1.0	93.6	6.4	5	6RG
SMA6HS60A	60	66.7	73.7	1.0	96.8	6.2	5	6RK
SMA6HS64A	64	71.1	78.6	1.0	103.0	5.8	5	6RM
SMA6HS70A	70	77.8	86.0	1.0	113.0	5.3	5	6RP
SMA6HS75A	75	83.3	92.1	1.0	121.0	4.9	5	6RR
SMA6HS78A	78	86.7	95.8	1.0	126.0	4.7	5	6RT
SMA6HS85A	85	94.4	104	1.0	137.0	4.3	5	6RV

Notes 1. V_{BR} measured after I_T applied for 300μs, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. Suffix 'A' denotes 5% tolerance devices
4. All terms and symbols are consistent with ANS/IEEE C62.35
5. 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. 7 & Fig. 8

Rating and characteristic curves (SMA6HS SERIES)

Fig.1 - Pealk Pulse Power Rating Curve

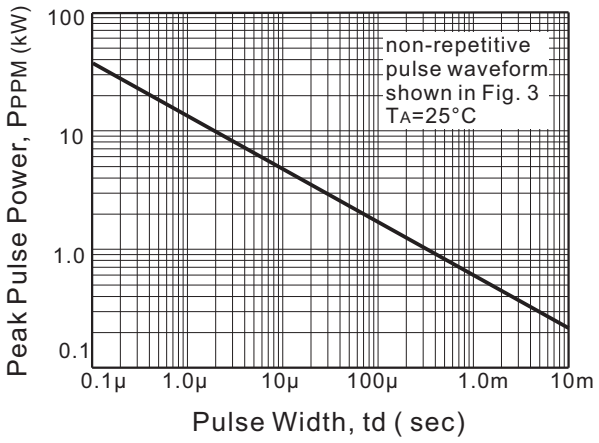


Fig.2 - Pulse Derating Curve

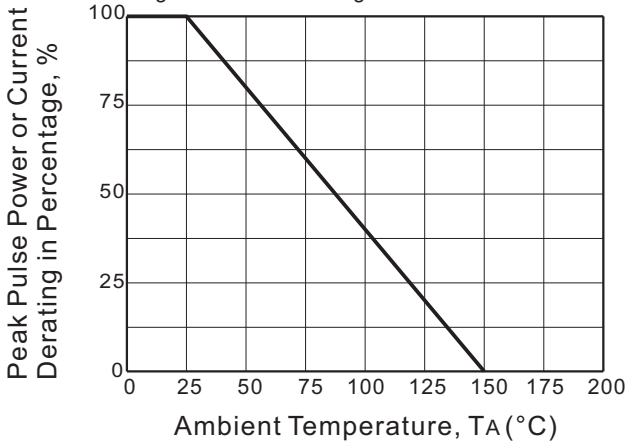


Fig.3 - Pulse Waveform

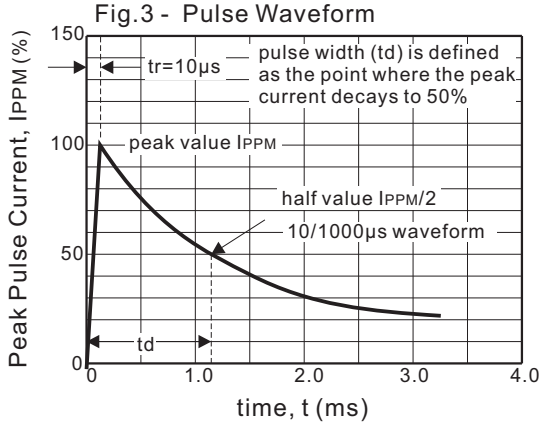


Fig.4 - Typical Junction Capacitance

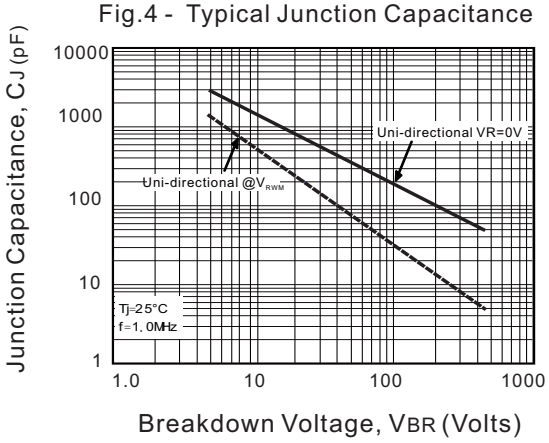


Fig.5 - Steady State Power Derating Curve

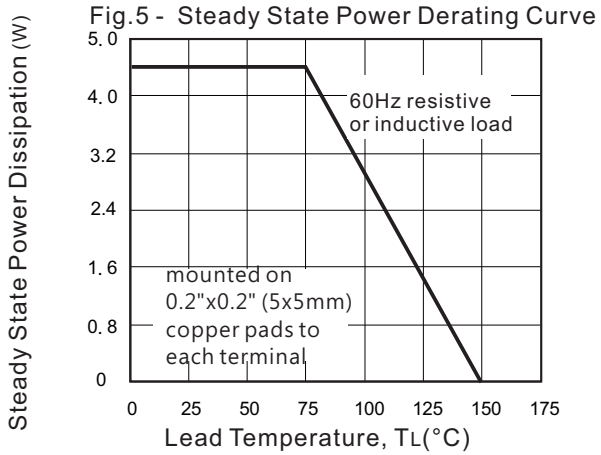
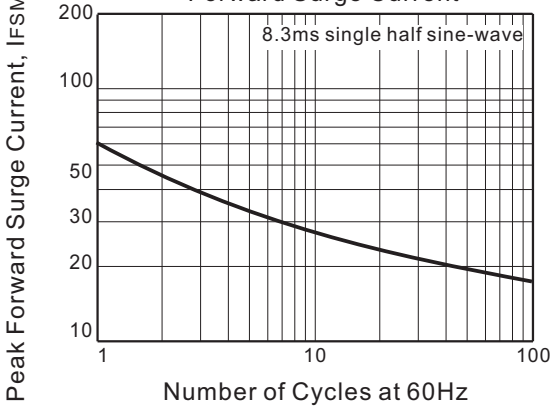


Fig.6 - Maximum Non-Repetitive Forward Surge Current



Rating and characteristic curves (SMA6HS SERIES)

Fig. 7 - Transients of several thousand volts can be clamped to a safe level by the TVS

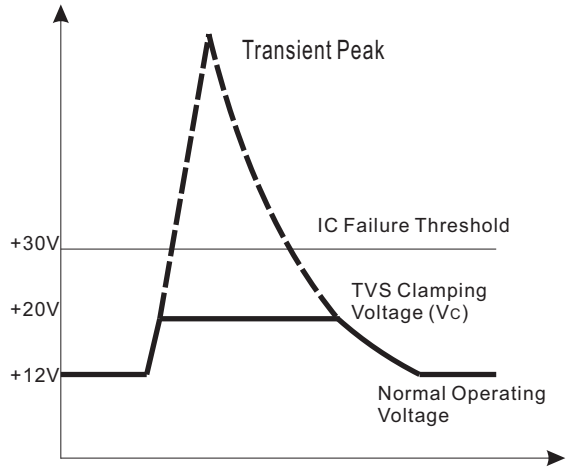
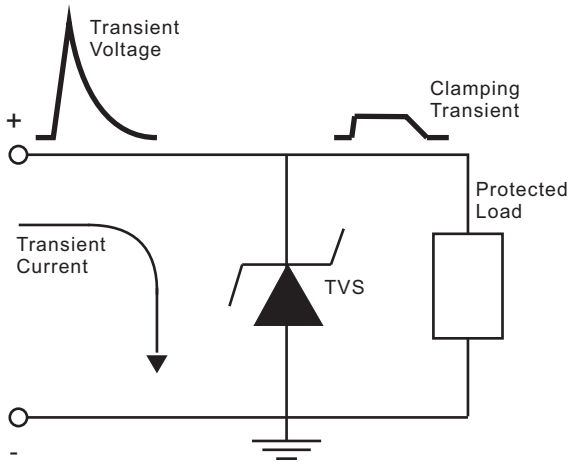
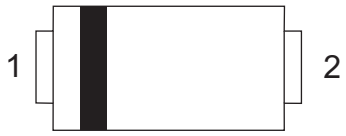
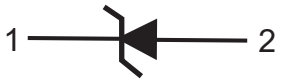


Fig. 8 - Transient current is divered to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level

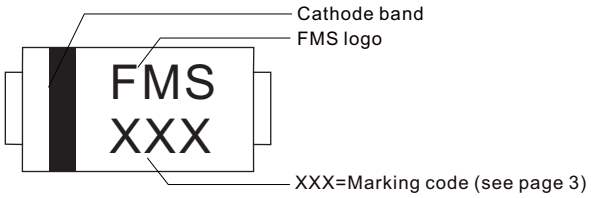


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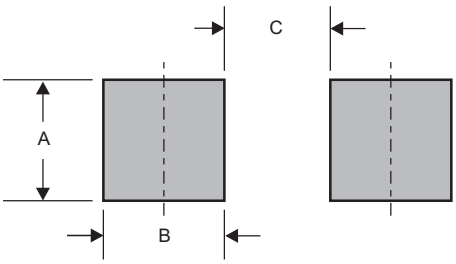
Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		

Marking

Type number	Example
Uni-Directional	

Suggested solder pad layout

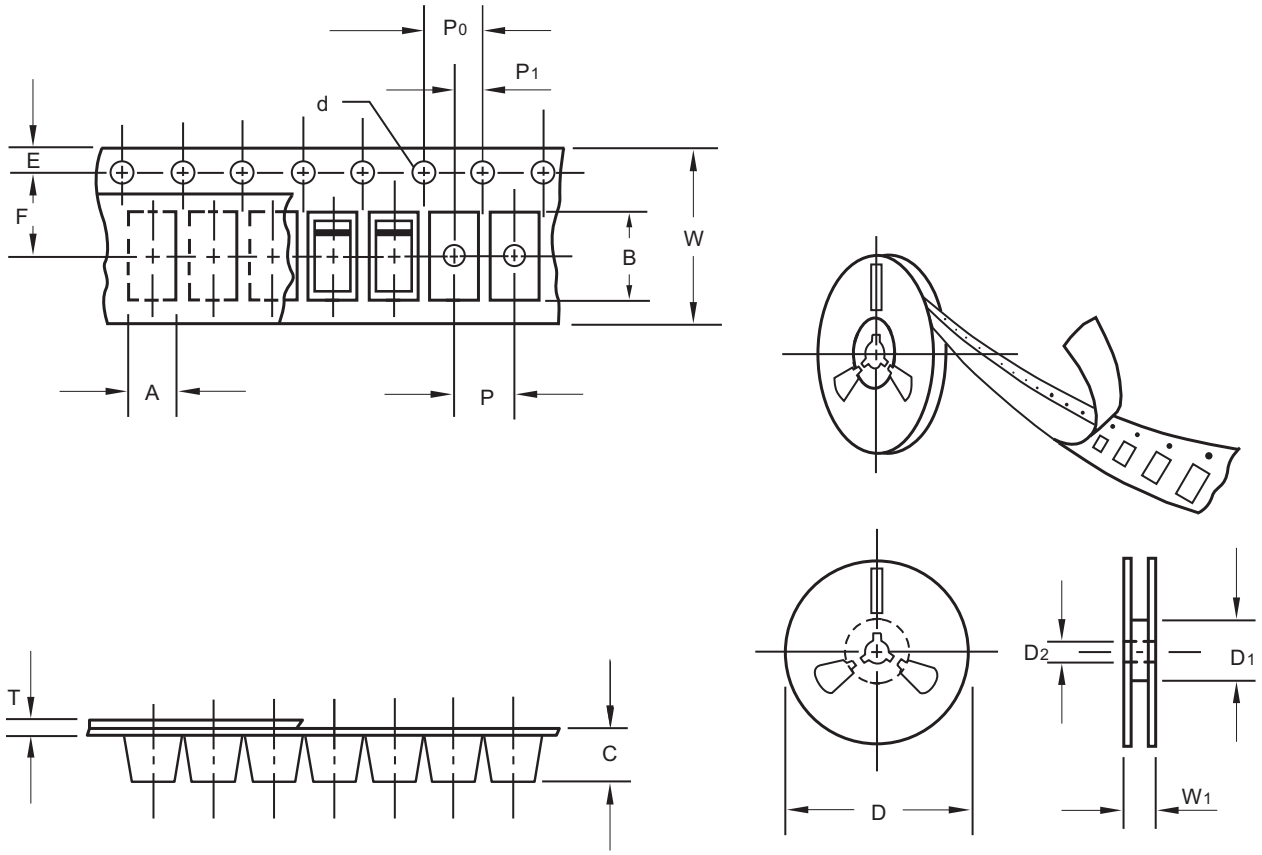


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMA-HS	0.060 (1.52)	0.048 (1.20)	0.123 (3.12)

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Packing information



unit:mm

Item	Symbol	Tolerance	SMA-HS
Carrier width	A	0.1	3.00
Carrier length	B	0.1	5.50
Carrier depth	C	0.1	1.20
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	0.25
Tape width	W	0.3	12.00
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.

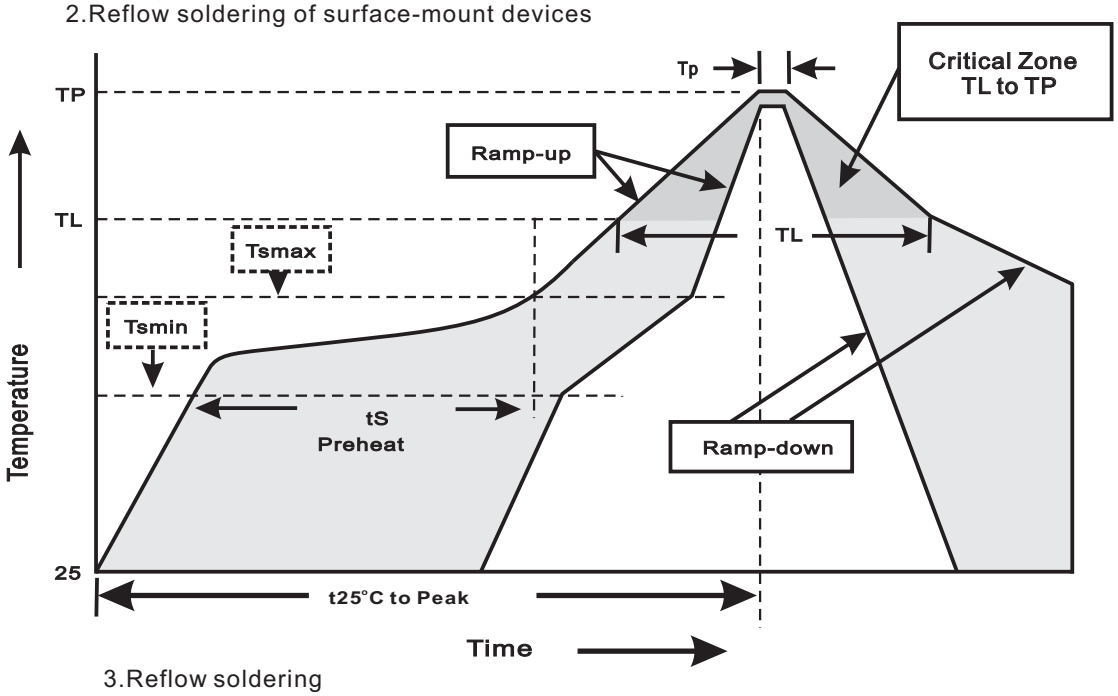
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Reel packing

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)
SMA-HS	7"	3,000	4.0	30,000	183*155*183	178	382*356*392	240,000	18.0
	13"	10,000	4.0	20,000	335*335*38	330	350*330*360	160,000	15.5

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	<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.	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} NOM*80% 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