

MMSZ4678-FL THRU MMSZ4717-FL

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MMSZ4678-FL THRU MMSZ4717-FL

500mW Surface Mount
Zener Diodes 1.8V-43V

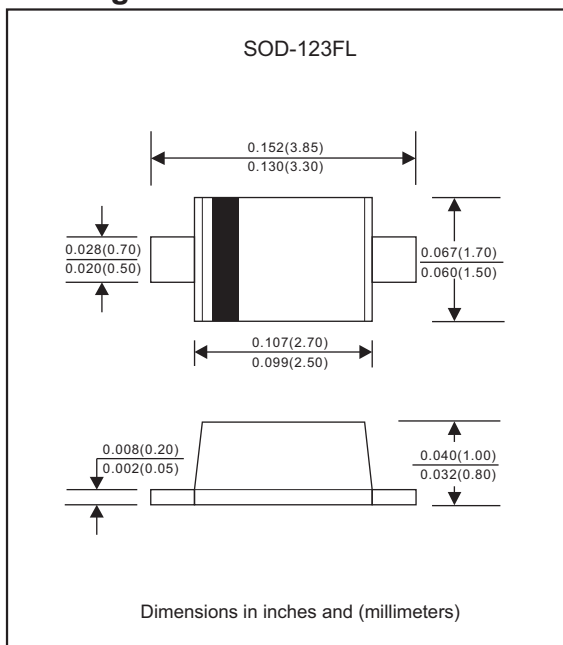
Features

- Low zener impedance.
- Up to 500mW power dissipation.
- Silicon epitaxial planar chip structure.
- Wide Zener voltage range selection, 1.8V to 43V.
- Small package size for high density applications.
- Ideally suited for automated assembly processes.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. MMSZ4678-FL-H.

Mechanical data

- Epoxy:UL94-VO rated flame retardant
- Case : Molded plastic, SOD-123F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.010 gram

Package Outline



Maximum ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Forward Voltage	$I_F = 10 \text{ mA}$	V_F			0.95	V
Power Dissipation (Note 1)	@ $T_L=75^\circ\text{C}$	PD			500	mW
Thermal Resistance Junction to Ambient		$R_{\theta JA}$			340	$^\circ\text{C/W}$
Thermal Resistance Junction to Case		$R_{\theta JC}$			150	$^\circ\text{C/W}$
Operating Junction Temperature Range		T_J	-55		+150	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55		+150	$^\circ\text{C}$

Note 1: Device mounted on ceramic PCB: 7.6mm×9.4mm×0.87mm with pad areas 25 mm²

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Electrical characteristics (at $T_A = 25^\circ\text{C}$ unless otherwise noted)

Part No.	Marking code	Zener voltage			Test current	Leakage current	
		V _Z @ I _{ZT} (Volts)			I _{ZT}	I _R	V _R
		Min	Nom	Max	uA	Max(uA)	Volts
MMSZ4678-FL	CC	1.71	1.8	1.89	50	7.5	1.0
MMSZ4679-FL	CD	1.90	2.0	2.10	50	5.0	1.0
MMSZ4680-FL	CE	2.09	2.2	2.31	50	4.0	1.0
MMSZ4681-FL	CF	2.28	2.4	2.52	50	2.0	1.0
MMSZ4682-FL	CH	2.57	2.7	2.84	50	1.0	1.0
MMSZ4683-FL	CJ	2.85	3.0	3.15	50	0.8	1.0
MMSZ4684-FL	CK	3.13	3.3	3.47	50	7.5	1.5
MMSZ4685-FL	CM	3.42	3.6	3.78	50	7.5	2.0
MMSZ4686-FL	CN	3.70	3.9	4.10	50	5.0	2.0
MMSZ4687-FL	CP	4.09	4.3	4.52	50	4.0	2.0
MMSZ4688-FL	CT	4.47	4.7	4.94	50	10	3.0
MMSZ4689-FL	CU	4.85	5.1	5.36	50	10	3.0
MMSZ4690-FL	CV	5.32	5.6	5.88	50	10	4.0
MMSZ4691-FL	CA	5.89	6.2	6.51	50	10	5.0
MMSZ4692-FL	CX	6.46	6.8	7.14	50	10	5.1
MMSZ4693-FL	CY	7.13	7.5	7.88	50	10	5.7
MMSZ4694-FL	CZ	7.79	8.2	8.61	50	1.0	6.2
MMSZ4695-FL	DC	8.27	8.7	9.14	50	1.0	6.6
MMSZ4696-FL	DD	8.65	9.1	9.56	50	1.0	6.9
MMSZ4697-FL	DE	9.50	10	10.50	50	1.0	7.6
MMSZ4698-FL	DF	10.45	11	11.55	50	0.05	8.4
MMSZ4699-FL	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700-FL	DJ	12.35	13	13.65	50	0.05	9.8
MMSZ4701-FL	DM	13.30	14	14.70	50	0.05	10.6
MMSZ4702-FL	DK	14.25	15	15.75	50	0.05	11.4
MMSZ4703-FL	DN	15.20	16	16.80	50	0.05	12.1
MMSZ4704-FL	DP	16.15	17	17.85	50	0.05	12.9
MMSZ4705-FL	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706-FL	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707-FL	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708-FL	DA	20.90	22	23.10	50	0.01	16.7
MMSZ4709-FL	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710-FL	DY	23.75	25	26.25	50	0.01	19.0
MMSZ4711-FL	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712-FL	EC	26.60	28	29.40	50	0.01	21.2
MMSZ4713-FL	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714-FL	EE	31.35	33	34.65	50	0.01	25.0
MMSZ4715-FL	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716-FL	EH	37.05	39	40.95	50	0.01	29.6
MMSZ4717-FL	EJ	40.85	43	45.15	50	0.01	32.6

Rating and characteristic curves (MMSZ4678-FL THRU MMSZ4717-FL)

FIG1. TEMPERATURE COEFFICIENTS
(TEMPERATURE RANGE -55°C TO +150°C)

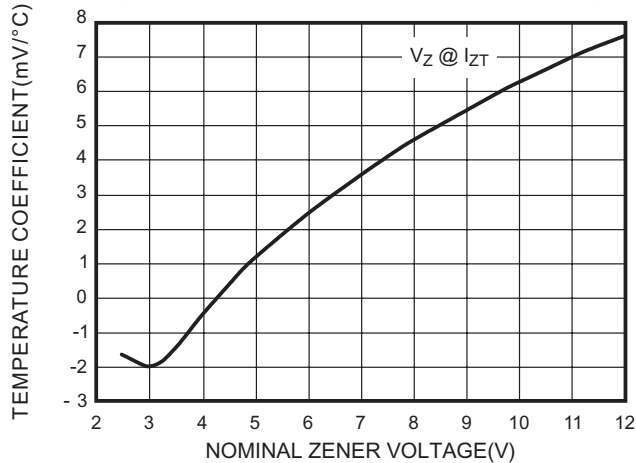


FIG 2. TEMPERATURE COEFFICIENTS
(TEMPERATURE RANGE -55°C TO +150°C)

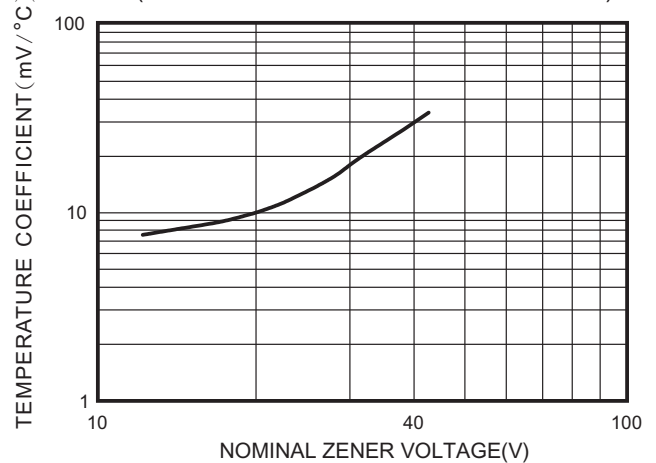


FIG3. STEADY STATE POWER DERATING

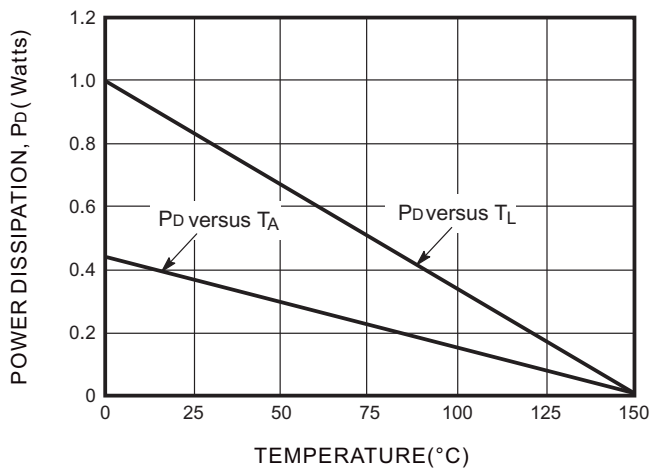


FIG4. Effect of Zener Voltage on Zener Impedance

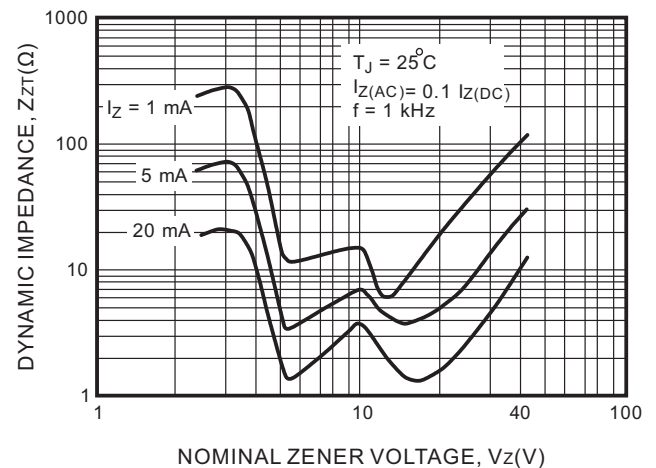


FIG5. TYPICAL FORWARD VOLTAGE

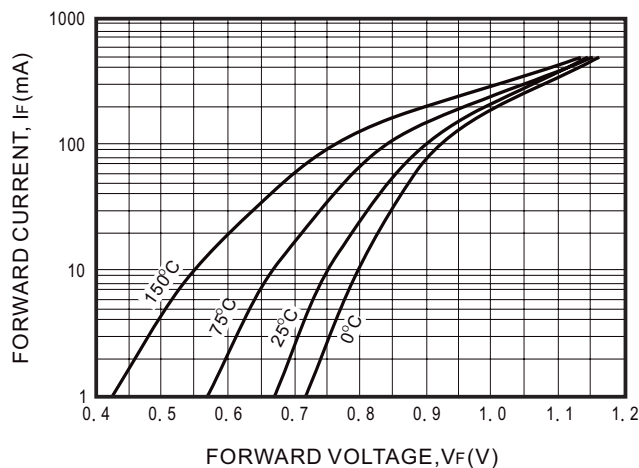
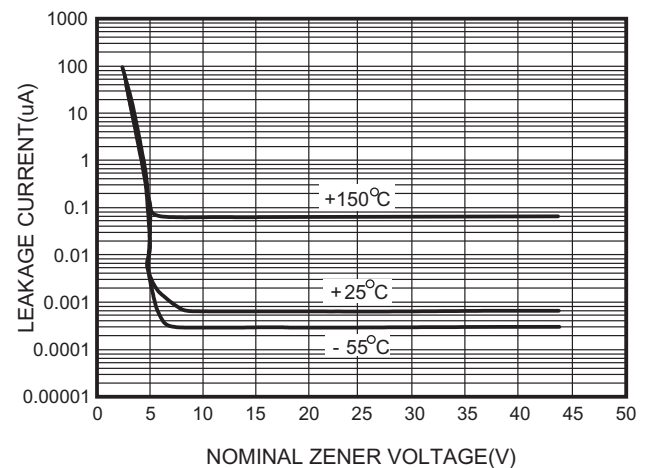


FIG6. TYPICAL LEAKAGE CURRENT



Rating and characteristic curves (MMSZ4678-FL THRU MMSZ4717-FL)

FIG7. Zener Voltage versus Zener Current
(Vz Up to 12 V)

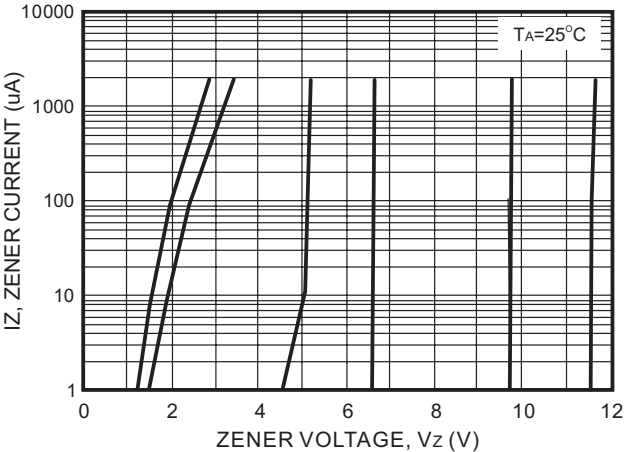


FIG8. Zener Voltage versus Zener Current
(12V to 39 V)

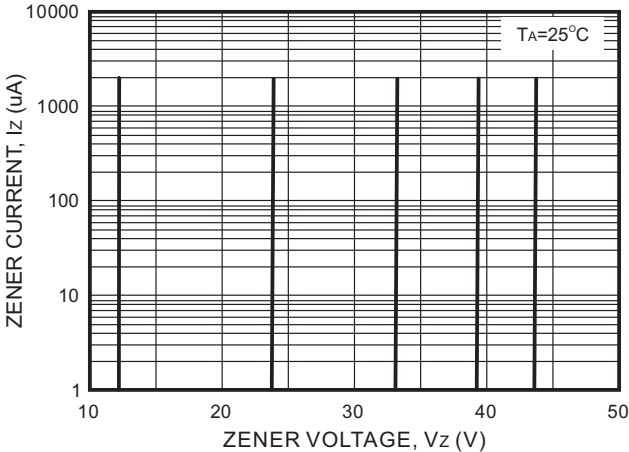
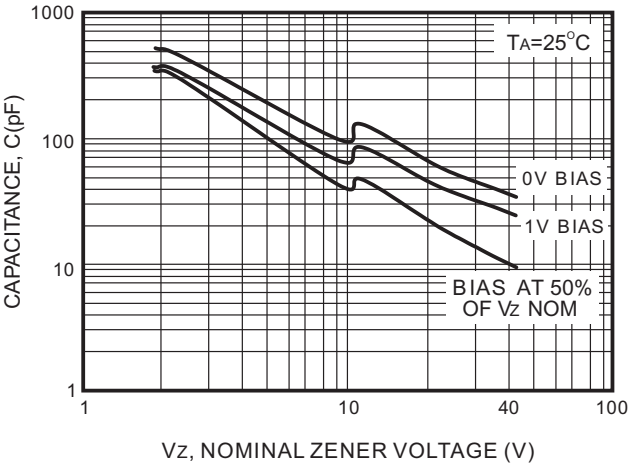


FIG9. Typical Capacitance

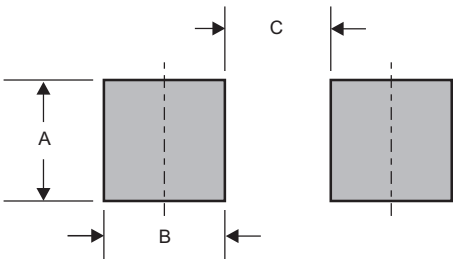


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Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

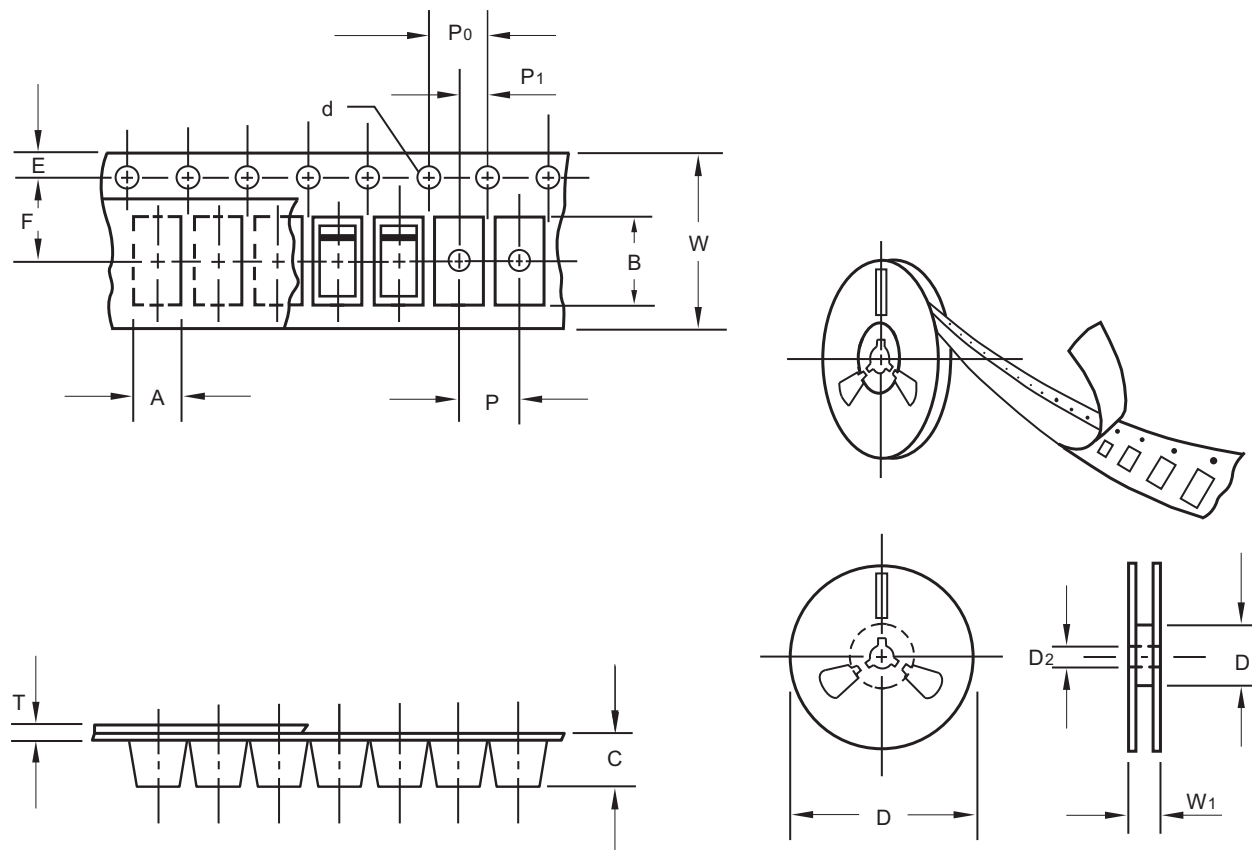


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-123F	0.048 (1.22)	0.036 (0.91)	0.093 (2.36)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-123F
Carrier width	A	0.1	1.85
Carrier length	B	0.1	3.94
Carrier depth	C	0.1	1.57
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 accordance with EIA standard RS-481-A and specifications listed above.

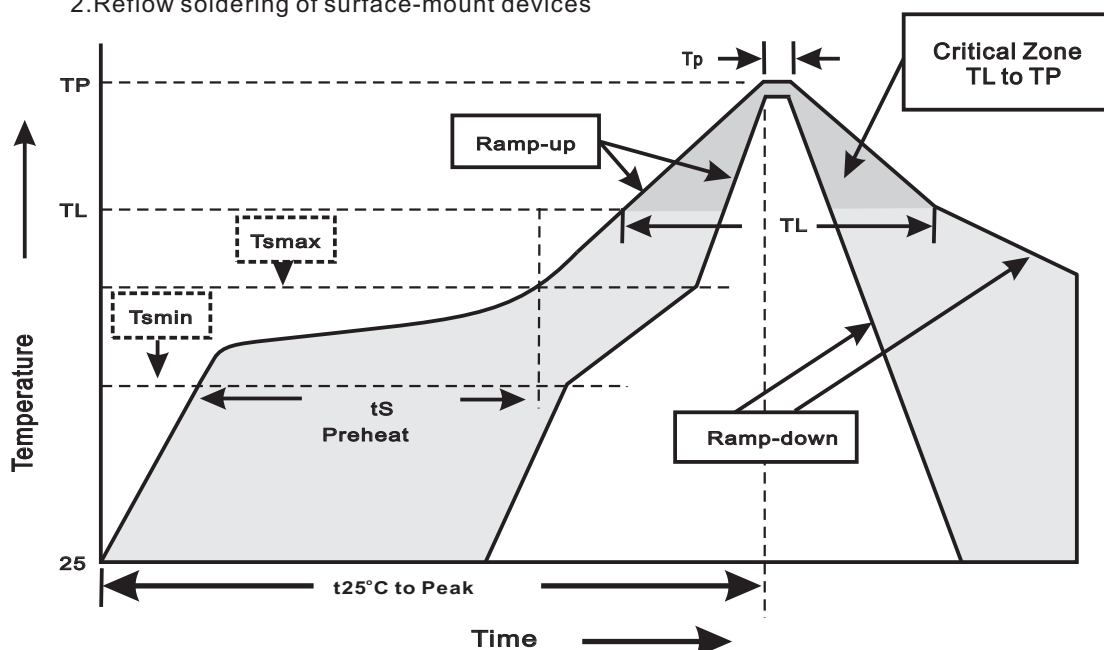
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Reel packing

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-123F	7"	3,000	4.0	30,000	183*183*123	178	382*262*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(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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(tp)	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 $260\pm5^{\circ}\text{C}$ for $10\pm2\text{sec.}$ immerse body into solder $1/16''\pm 1/32''$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R=80\%$ rate at $T_J=150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ at $T_A=121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A=85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 150°C for 1000 hrs.	MIL-STD-750D METHOD-1031