

MMSZ4678-Q1 THRU MMSZ4716-Q1**List**

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MMSZ4678-Q1 THRU MMSZ4716-Q1

**350mW Surface Mount
Zener Diodes 1.8V-39V**

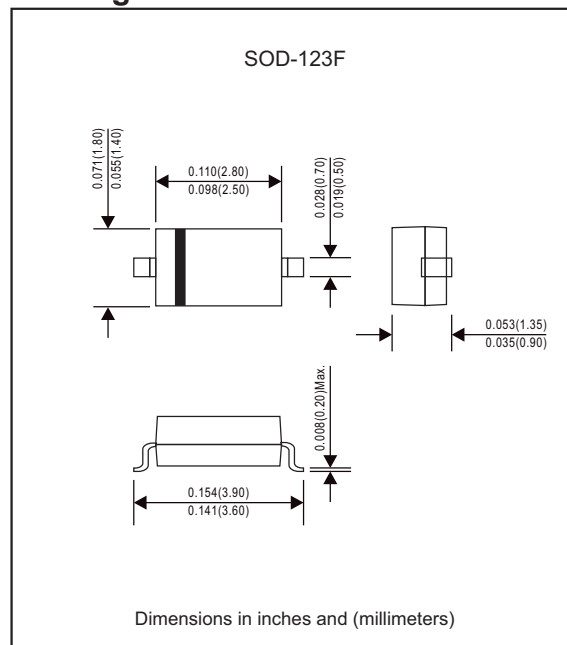
Features

- Low zener impedance
- Up to 350mW power dissipation
- Silicon epitaxial planar chip structure
- Wide zener voltage range selection, 1.8V to 39V
- Small package size for high density applications
- Ideally suited for automated assembly processes
- Lead-free parts meet RoHS requirements
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen free parts, ex. MMSZ4678-Q1-H

Mechanical data

- Epoxy: UL94-V0 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	Symbol	Value	Unit
Forward voltage at $I_F=10\text{mA}$	V_F	0.9	V
Power dissipation (Note 1)	P_D	350	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	357	$^\circ\text{C/W}$
Operating junction temperature range	T_J	-55 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

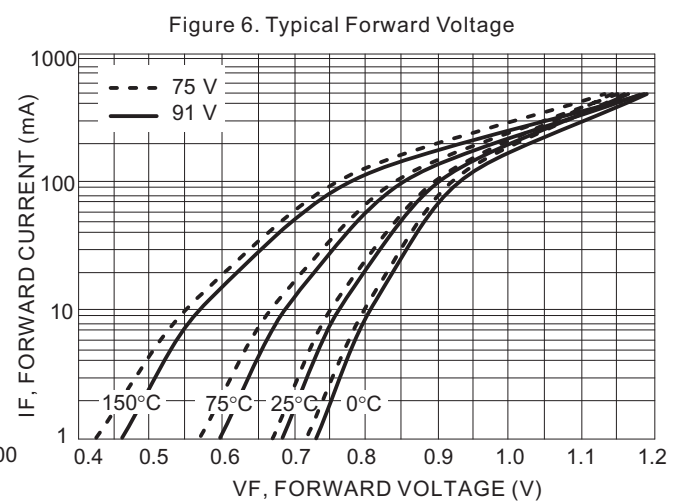
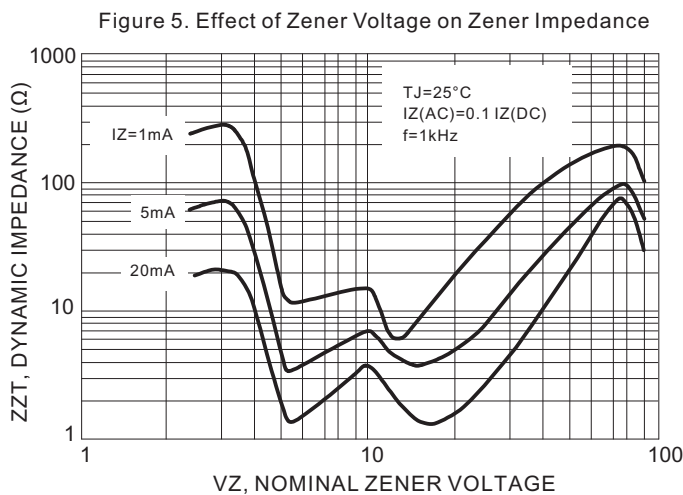
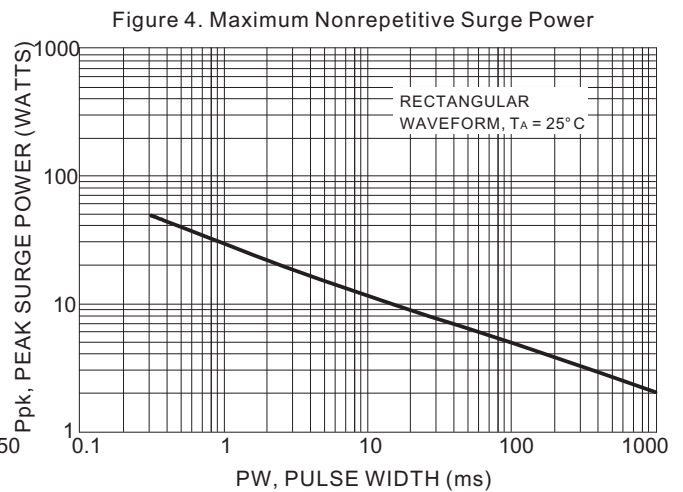
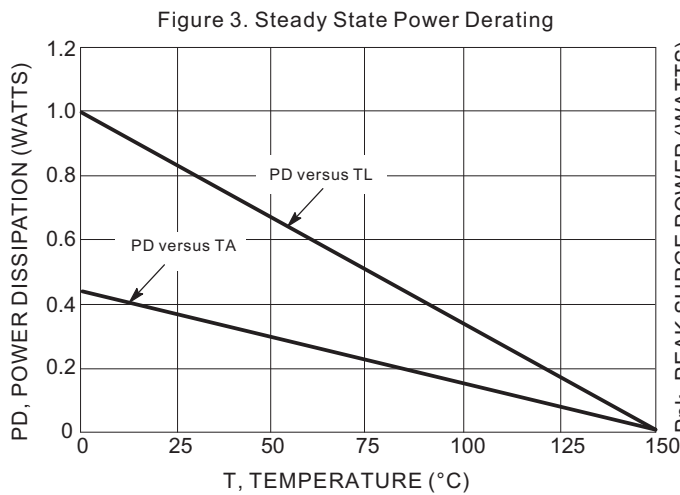
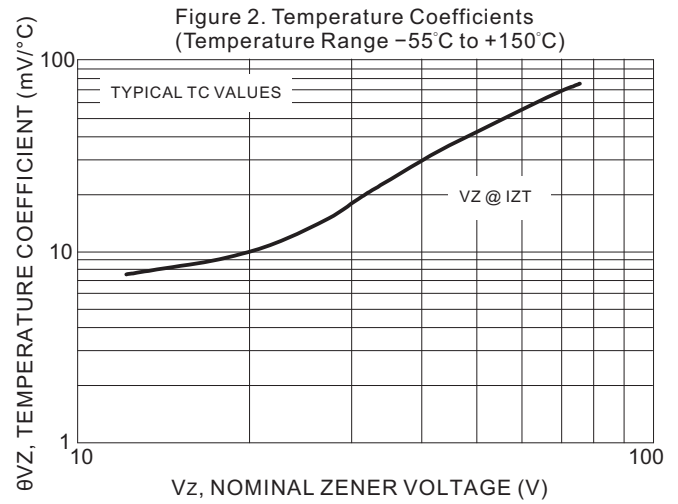
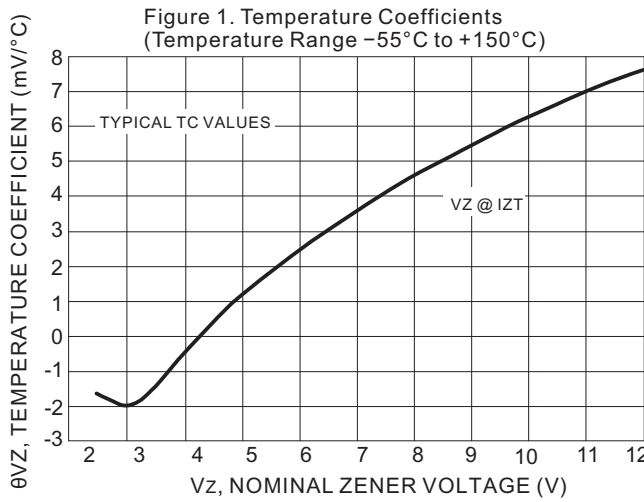
Note 1: Device mounted on ceramic PCB: 5.0mm×7.0mm with pad areas 35 mm²

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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.	μA	Max.(μA)	Volts
MMSZ4678-Q1	CC	1.71	1.8	1.89	50	7.5	1.0
MMSZ4679-Q1	CD	1.90	2.0	2.10	50	5.0	1.0
MMSZ4680-Q1	CE	2.09	2.2	2.31	50	4.0	1.0
MMSZ4681-Q1	CF	2.28	2.4	2.52	50	2.0	1.0
MMSZ4682-Q1	CH	2.57	2.7	2.84	50	1.0	1.0
MMSZ4683-Q1	CJ	2.85	3.0	3.15	50	0.8	1.0
MMSZ4684-Q1	CK	3.13	3.3	3.47	50	7.5	1.5
MMSZ4685-Q1	CM	3.42	3.6	3.78	50	7.5	2.0
MMSZ4686-Q1	CN	3.70	3.9	4.10	50	5.0	2.0
MMSZ4687-Q1	CP	4.09	4.3	4.52	50	4.0	2.0
MMSZ4688-Q1	CT	4.47	4.7	4.94	50	10	3.0
MMSZ4689-Q1	CU	4.85	5.1	5.36	50	10	3.0
MMSZ4690-Q1	CV	5.32	5.6	5.88	50	10	4.0
MMSZ4691-Q1	CA	5.89	6.2	6.51	50	10	5.0
MMSZ4692-Q1	CX	6.46	6.8	7.14	50	10	5.1
MMSZ4693-Q1	CY	7.13	7.5	7.88	50	10	5.7
MMSZ4694-Q1	CZ	7.79	8.2	8.61	50	1.0	6.2
MMSZ4695-Q1	DC	8.27	8.7	9.14	50	1.0	6.6
MMSZ4696-Q1	DD	8.65	9.1	9.56	50	1.0	6.9
MMSZ4697-Q1	DE	9.50	10	10.50	50	1.0	7.6
MMSZ4698-Q1	DF	10.45	11	11.55	50	0.05	8.4
MMSZ4699-Q1	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700-Q1	DJ	12.35	13	13.65	50	0.05	9.8
MMSZ4701-Q1	DK	13.30	14	14.70	50	0.05	10.6
MMSZ4702-Q1	DM	14.25	15	15.75	50	0.05	11.4
MMSZ4703-Q1	DN	15.20	16	16.80	50	0.05	12.1
MMSZ4704-Q1	DP	16.15	17	17.85	50	0.05	12.9
MMSZ4705-Q1	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706-Q1	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707-Q1	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708-Q1	DA	20.90	22	23.10	50	0.01	16.7
MMSZ4709-Q1	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710-Q1	DY	23.75	25	26.25	50	0.01	19.0
MMSZ4711-Q1	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712-Q1	EC	26.60	28	29.40	50	0.01	21.2
MMSZ4713-Q1	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714-Q1	EE	31.35	33	34.65	50	0.01	25.0
MMSZ4715-Q1	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716-Q1	EH	37.05	39	40.95	50	0.01	29.6

Rating and characteristic curves (MMSZ4678-Q1 THRU MMSZ4716-Q1)



Rating and characteristic curves (MMSZ4678-Q1 THRU MMSZ4716-Q1)

Figure 7. Typical Capacitance

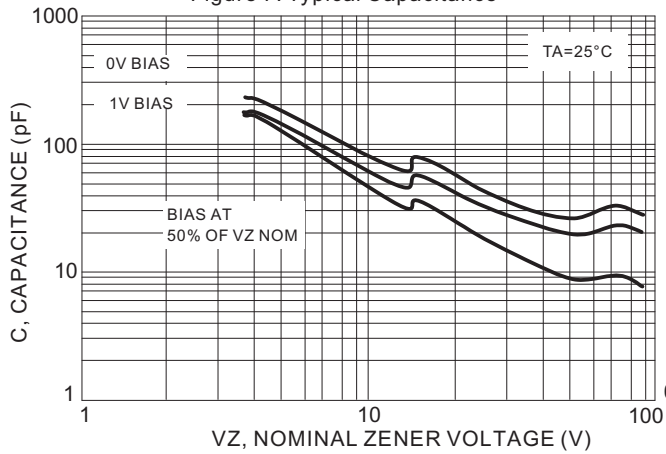


Figure 8. Typical Leakage Current

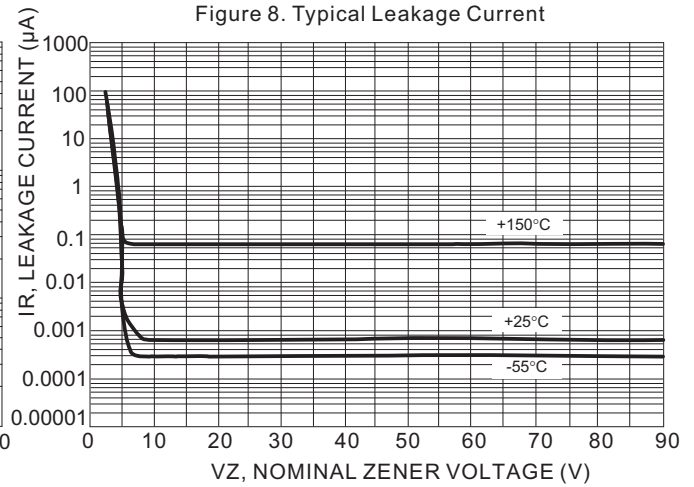


Figure 9. Zener Voltage versus Zener Current (VZ Up to 12 V)

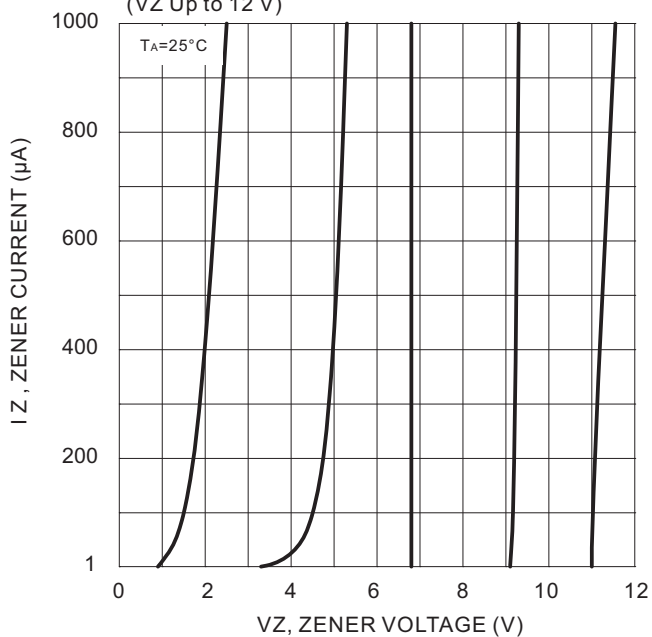
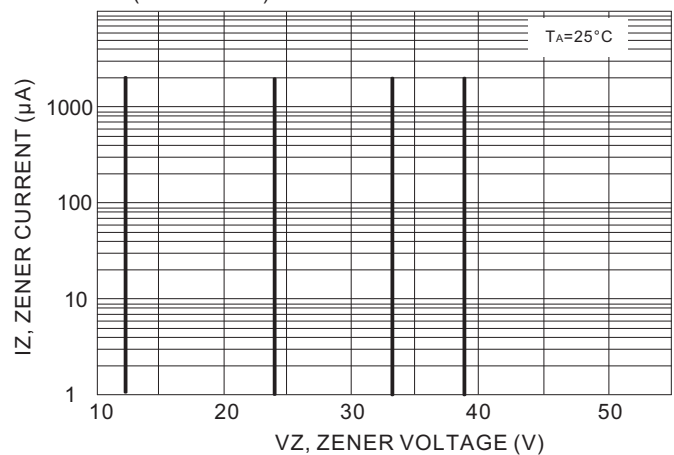


Figure 10. Zener Voltage versus Zener Current (12 V to 39 V)

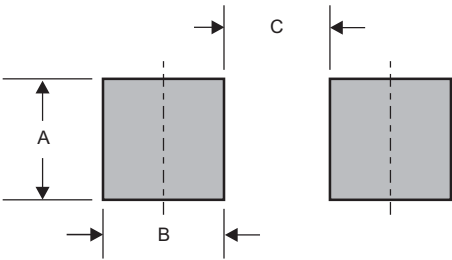


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Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

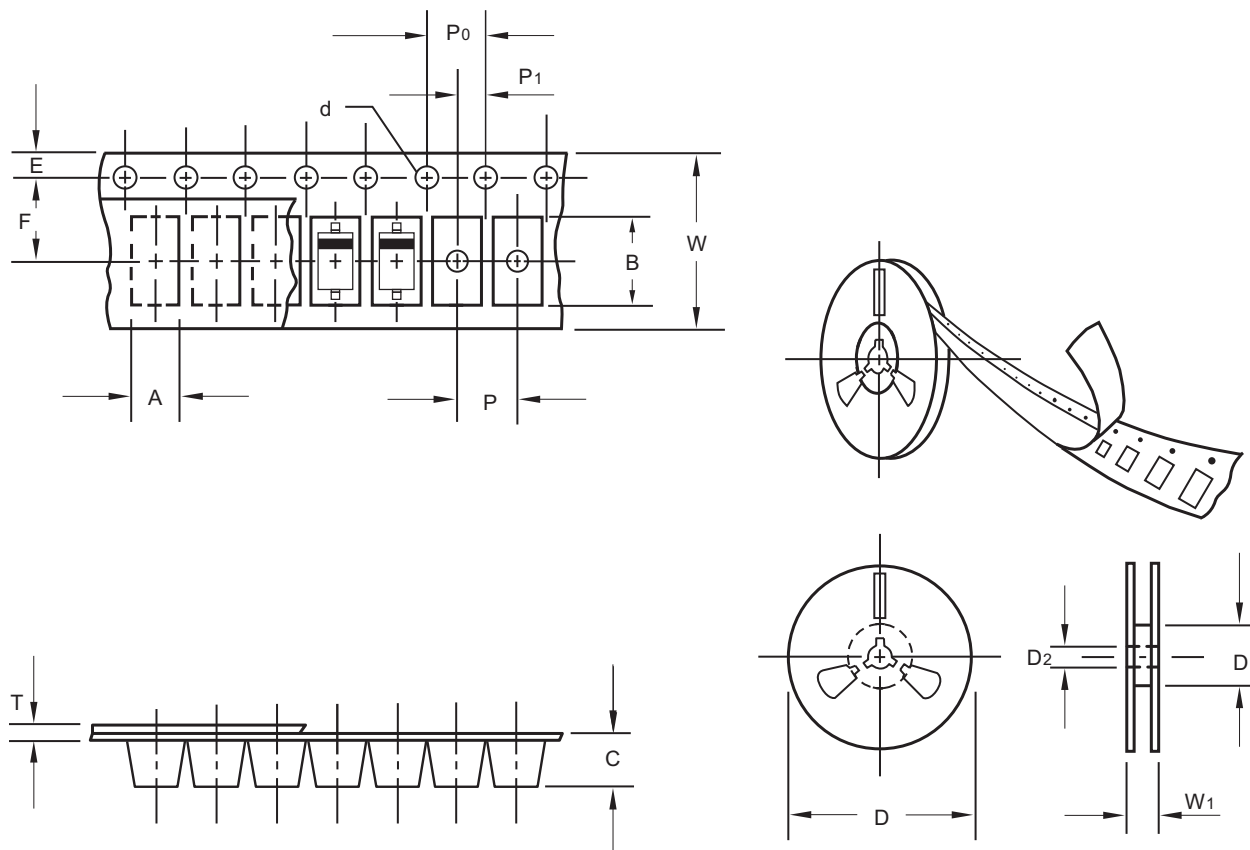


Dimensions in inches and (millimeters)

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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	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	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

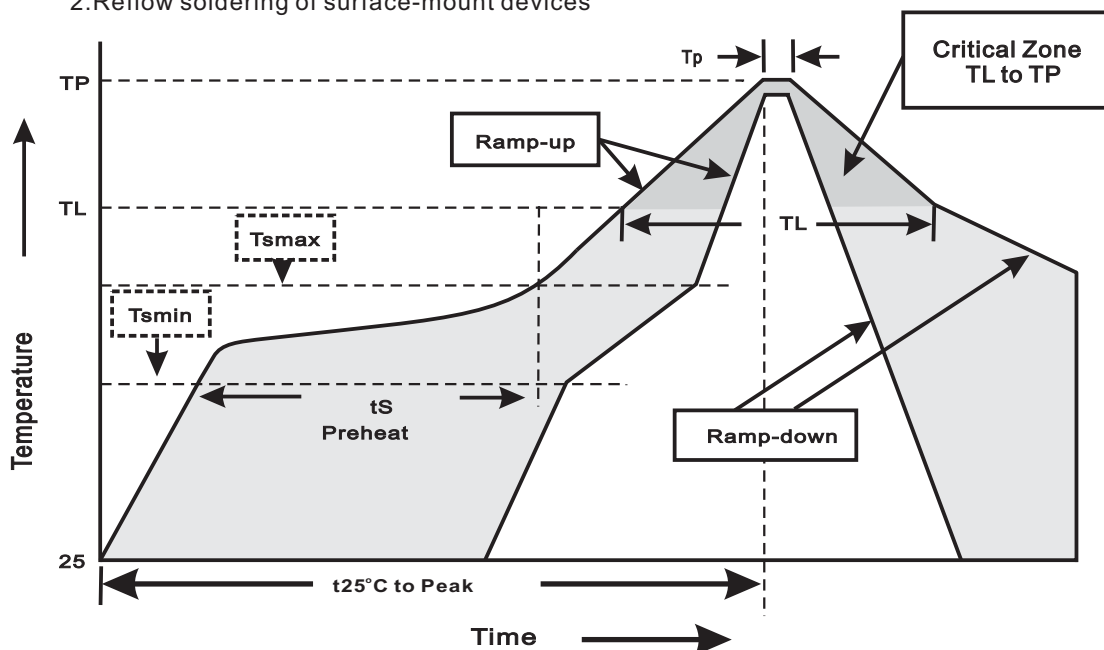
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Reel packing

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*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(T _{smin}) -Temperature Max(T _{smax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smax} 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. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	Vz=Vz Nom*80% (TJmax=150°C) Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C(15min) to 150°C(15min) Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
6. Solderability	245±5°C for 5sec	J-STD-002
7. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101