

MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1**List**

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MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1

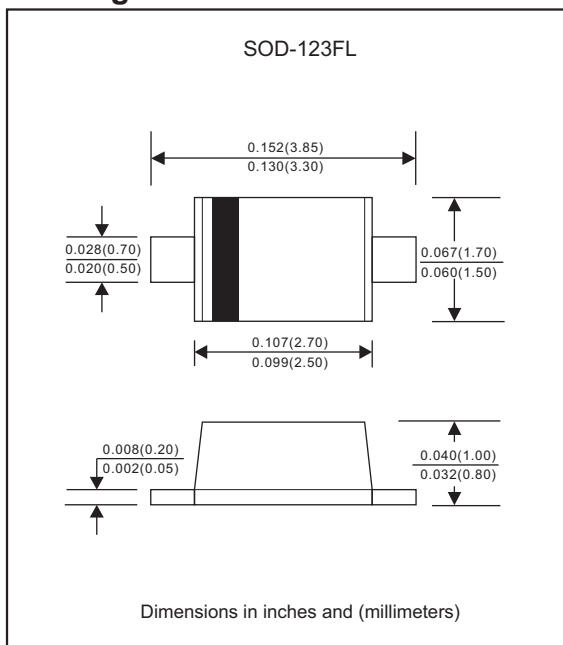
**500mW Surface Mount
Zener Diodes 1.8V-43V**

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.
- Qualified to AEC-Q101 standards for high reliability.
- Suffix "-H" indicates Halogen free parts, ex. MMSZ4678-FL-Q1-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-Q1	CC	1.71	1.8	1.89	50	7.5	1.0
MMSZ4679-FL-Q1	CD	1.90	2.0	2.10	50	5.0	1.0
MMSZ4680-FL-Q1	CE	2.09	2.2	2.31	50	4.0	1.0
MMSZ4681-FL-Q1	CF	2.28	2.4	2.52	50	2.0	1.0
MMSZ4682-FL-Q1	CH	2.57	2.7	2.84	50	1.0	1.0
MMSZ4683-FL-Q1	CJ	2.85	3.0	3.15	50	0.8	1.0
MMSZ4684-FL-Q1	CK	3.13	3.3	3.47	50	7.5	1.5
MMSZ4685-FL-Q1	CM	3.42	3.6	3.78	50	7.5	2.0
MMSZ4686-FL-Q1	CN	3.70	3.9	4.10	50	5.0	2.0
MMSZ4687-FL-Q1	CP	4.09	4.3	4.52	50	4.0	2.0
MMSZ4688-FL-Q1	CT	4.47	4.7	4.94	50	10	3.0
MMSZ4689-FL-Q1	CU	4.85	5.1	5.36	50	10	3.0
MMSZ4690-FL-Q1	CV	5.32	5.6	5.88	50	10	4.0
MMSZ4691-FL-Q1	CA	5.89	6.2	6.51	50	10	5.0
MMSZ4692-FL-Q1	CX	6.46	6.8	7.14	50	10	5.1
MMSZ4693-FL-Q1	CY	7.13	7.5	7.88	50	10	5.7
MMSZ4694-FL-Q1	CZ	7.79	8.2	8.61	50	1.0	6.2
MMSZ4695-FL-Q1	DC	8.27	8.7	9.14	50	1.0	6.6
MMSZ4696-FL-Q1	DD	8.65	9.1	9.56	50	1.0	6.9
MMSZ4697-FL-Q1	DE	9.50	10	10.50	50	1.0	7.6
MMSZ4698-FL-Q1	DF	10.45	11	11.55	50	0.05	8.4
MMSZ4699-FL-Q1	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700-FL-Q1	DJ	12.35	13	13.65	50	0.05	9.8
MMSZ4701-FL-Q1	DM	13.30	14	14.70	50	0.05	10.6
MMSZ4702-FL-Q1	DK	14.25	15	15.75	50	0.05	11.4
MMSZ4703-FL-Q1	DN	15.20	16	16.80	50	0.05	12.1
MMSZ4704-FL-Q1	DP	16.15	17	17.85	50	0.05	12.9
MMSZ4705-FL-Q1	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706-FL-Q1	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707-FL-Q1	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708-FL-Q1	DA	20.90	22	23.10	50	0.01	16.7
MMSZ4709-FL-Q1	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710-FL-Q1	DY	23.75	25	26.25	50	0.01	19.0
MMSZ4711-FL-Q1	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712-FL-Q1	EC	26.60	28	29.40	50	0.01	21.2
MMSZ4713-FL-Q1	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714-FL-Q1	EE	31.35	33	34.65	50	0.01	25.0
MMSZ4715-FL-Q1	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716-FL-Q1	EH	37.05	39	40.95	50	0.01	29.6
MMSZ4717-FL-Q1	EJ	40.85	43	45.15	50	0.01	32.6

Rating and characteristic curves (MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1)

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

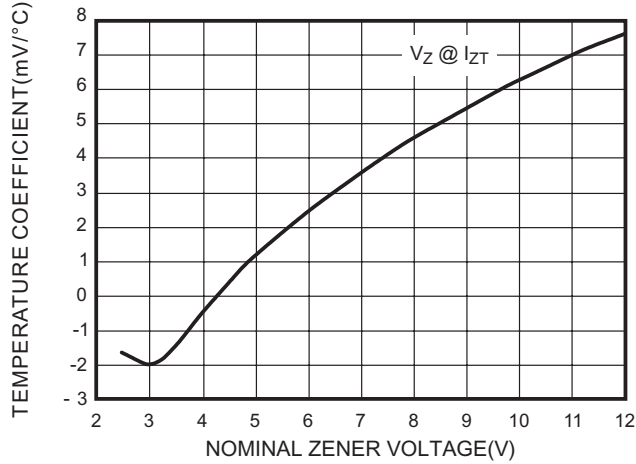


FIG 2. TEMPERATURE COEFFICIENTS
(TEMPERATURE RANGE -55°C TO +150°C)

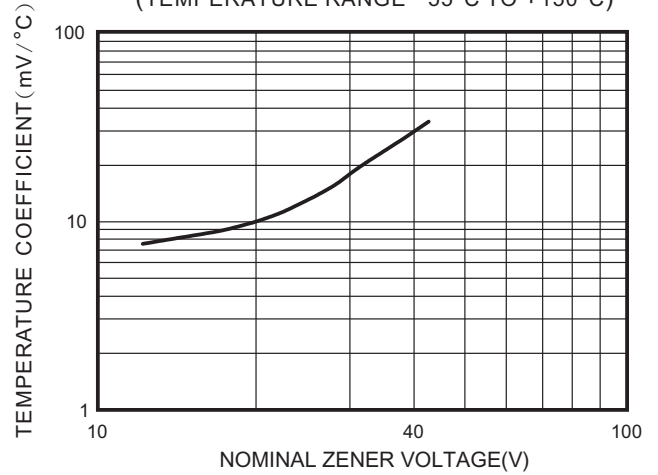


FIG3. STEADY STATE POWER DERATING

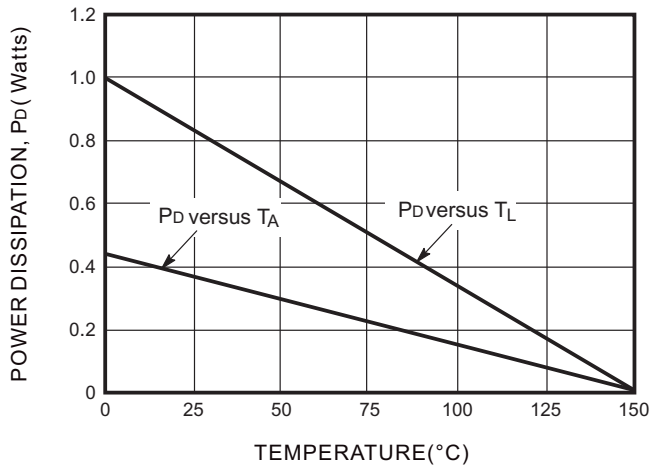


FIG4. Effect of Zener Voltage on Zener Impedance

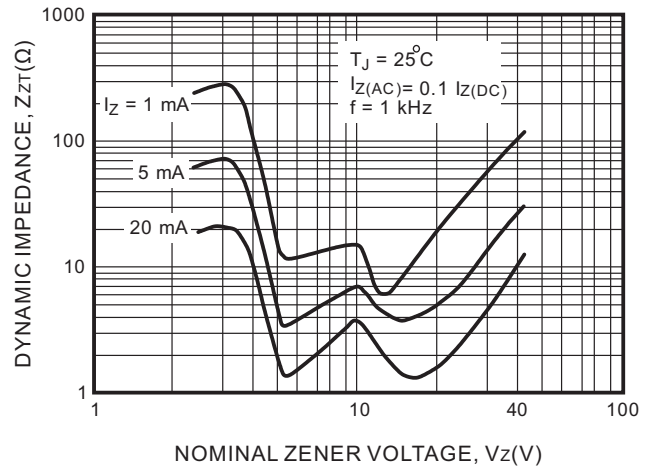


FIG5. TYPICAL FORWARD VOLTAGE

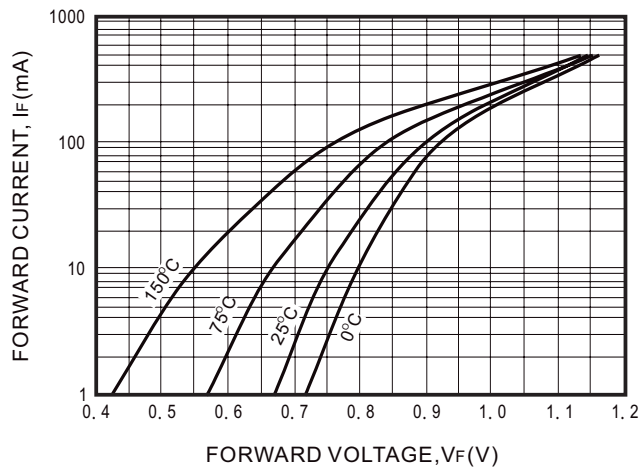
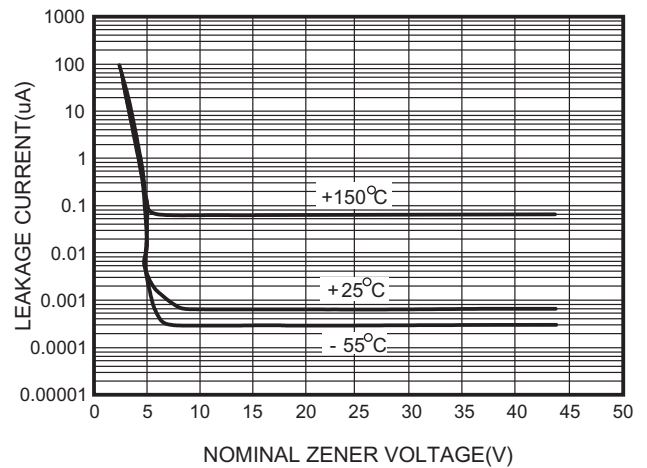


FIG6. TYPICAL LEAKAGE CURRENT



Rating and characteristic curves (MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1)

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

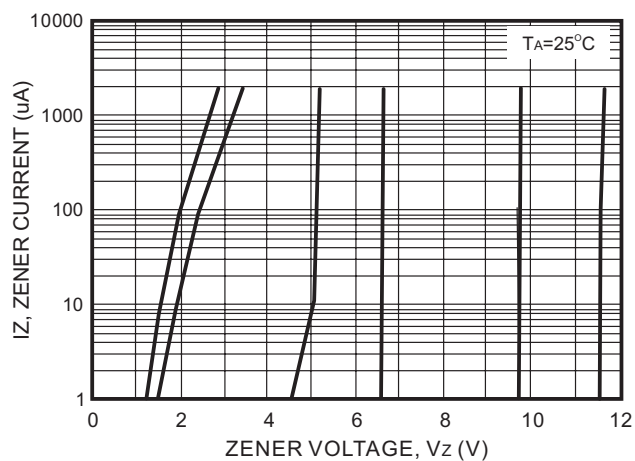


FIG8. Zener Voltage versus Zener Current
(12V to 39 V)

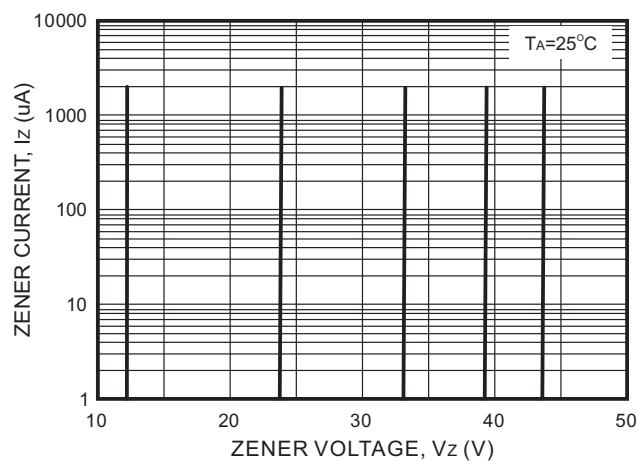
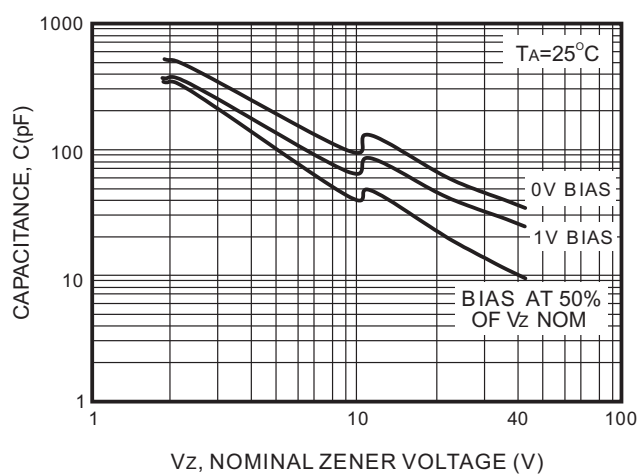


FIG9. Typical Capacitance

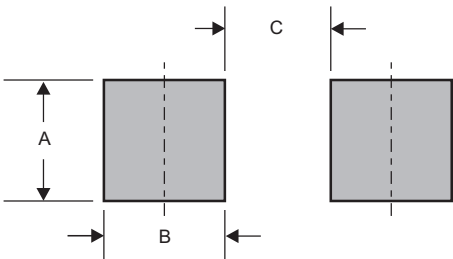


MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1

Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

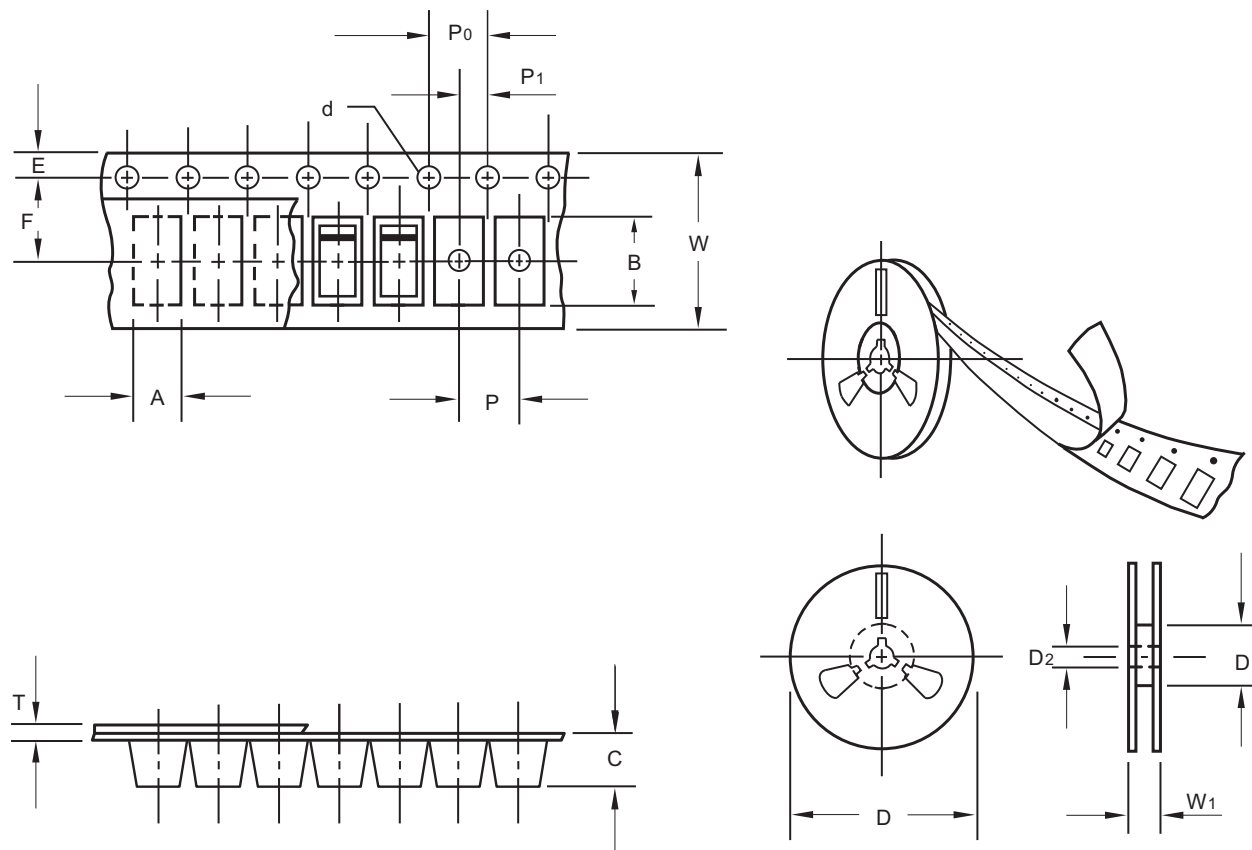


Dimensions in inches and (millimeters)

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.

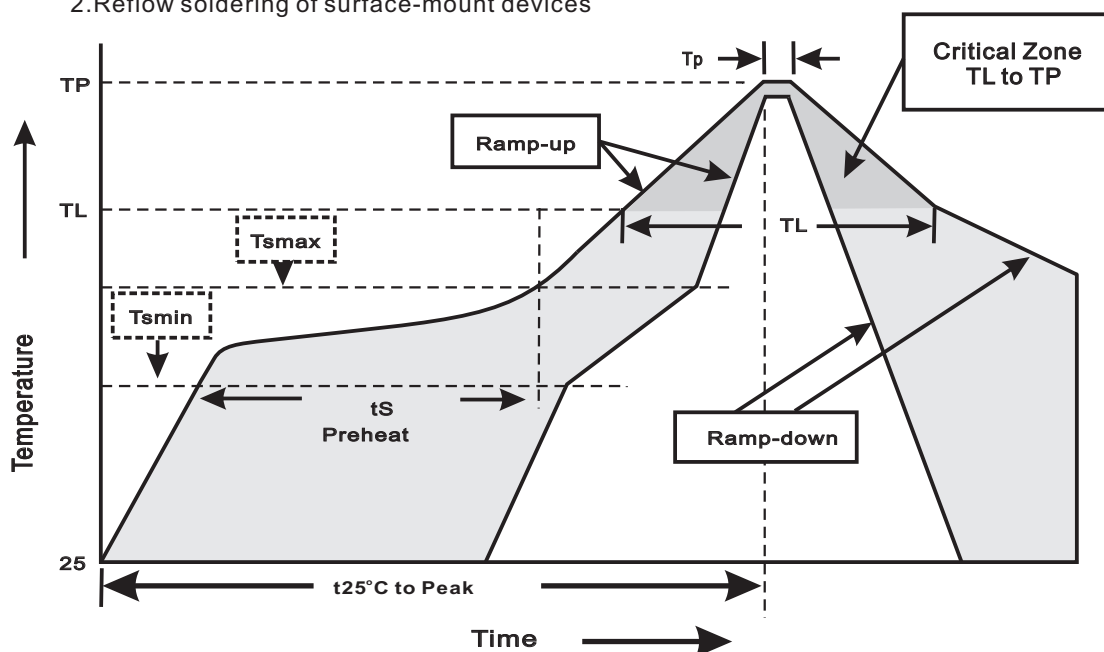
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Reel packing

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(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

MMSZ4678-FL-Q1 THRU MMSZ4717-FL-Q1**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. Operation Life	Ta=25°C, Rated Current (Io=Iomax.) Test Duration:1000hrs	MIL-STD-750E METHOD 1027.3
3. High Temperature Reverse Bias	80% Rated VR (Tj=Tjmax.) Test Duration:1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=125°C Test Duration: 1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C (15min) to 150°C (15min) Test Cycles: 1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
7. Intermittent Operational Life	Ta=25°C, On/Io Max. 2min, Off/2min, Test Cycles:15000cycles	MIL-STD-750E METHOD 1037
8. Solderability	245±5°C for 5sec	J-STD-002
9. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
10. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
11. 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