

FM120-MS THRU FM1200-MS

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FM120-MS THRU FM1200-MS

1.0A Surface Mount Schottky Barrier Rectifiers 20V-200V

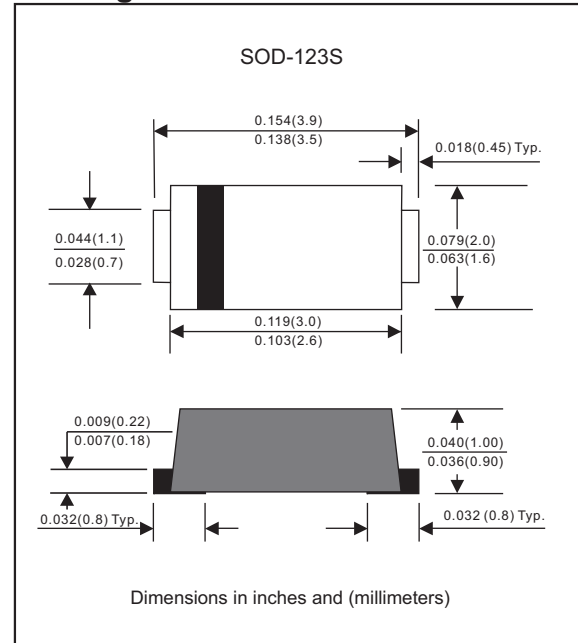
Features

- Batch process design, excellent power dissipation offers better reverse leakage current and thermal resistance.
- Low profile surface mounted application in order to optimize board space
- Tiny plastic SMD package
- Low power loss, high efficiency
- High current capability, low forward voltage drop
- High surge capability
- Guardring for overvoltage protection
- Ultra high-speed switching
- Silicon epitaxial planar chip, metal silicon junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. FM120-MS-H

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-123S/MINI SMA
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.0155 gram

Package outline



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

PARAMETER	SYMBOLS	FM120-MS	FM130-MS	FM140-MS	FM150-MS	FM160-MS	FM180-MS	FM1100-MS	FM1150-MS	FM1200-MS	UNIT
Maximum repetitive peak reverse voltage	V _{RRM}	20	30	40	50	60	80	100	150	200	V
Maximum RMS voltage	V _{RMS}	14	21	28	35	42	56	70	105	140	V
Maximum continuous reverse voltage	V _R	20	30	40	50	60	80	100	150	200	V
Maximum average forward rectified current	I _O	1.0									A
Non-repetitive peak forward surge current 8.3ms single half sine-wave	I _{FSM}	30									A
Typical junction capacitance (Note 1)	C _J	50									pF
Operating junction temperature range	T _J	-55 to +125			-55 to +150						°C
Storage temperature range	T _{STG}	-65 to +175									°C

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

PARAMETER	SYMBOLS	FM120-MS	FM130-MS	FM140-MS	FM150-MS	FM160-MS	FM180-MS	FM1100-MS	FM1150-MS	FM1200-MS	UNIT
Maximum instantaneous forward voltage at If=1.0A	V _F	0.50			0.70		0.85		0.90	0.92	V
Maximum reverse leakage current at rated V _R T _J =25°C T _J =100°C	I _R	0.5 10									mA mA

Thermal characteristics

PARAMETER	SYMBOLS	FM120-MS	FM130-MS	FM140-MS	FM150-MS	FM160-MS	FM180-MS	FM1100-MS	FM1150-MS	FM1200-MS	UNIT
Typical thermal resistance junction to ambient (Note2)	$R_{\theta JA}$	84									$^{\circ}\text{C/W}$
Typical thermal resistance junction to case (Note 2)	$R_{\theta JC}$	42									$^{\circ}\text{C/W}$

Notes1: Measured at 1MHz and applied reverse voltage of 4.0V D.C

2: Mounted on FR-4 PCB copper, minimum recommended pad layout

Rating and characteristic curves (FM120-MS THRU FM1200-MS)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

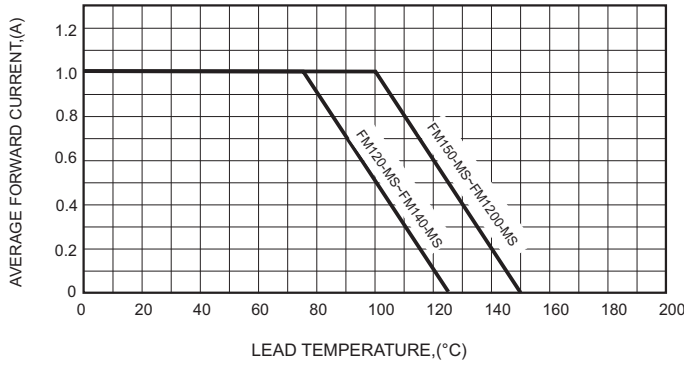


FIG.2-TYPICAL FORWARD CHARACTERISTICS

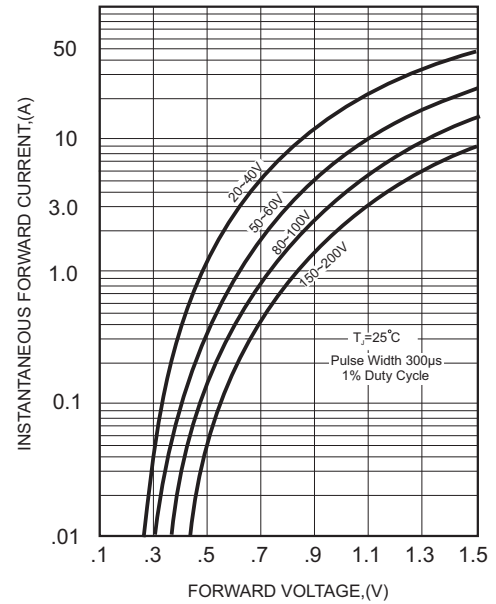


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

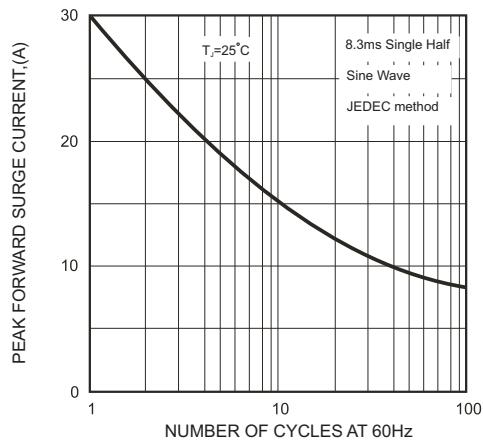


FIG.4-TYPICAL JUNCTION CAPACITANCE

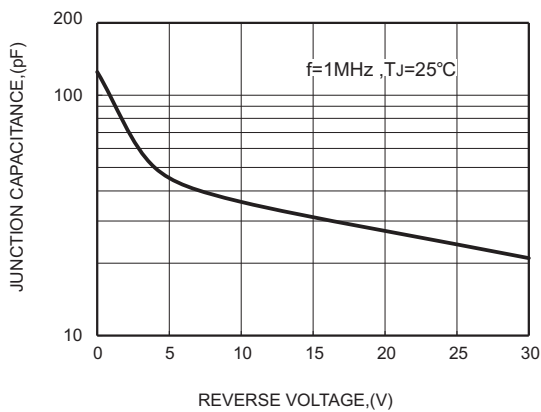
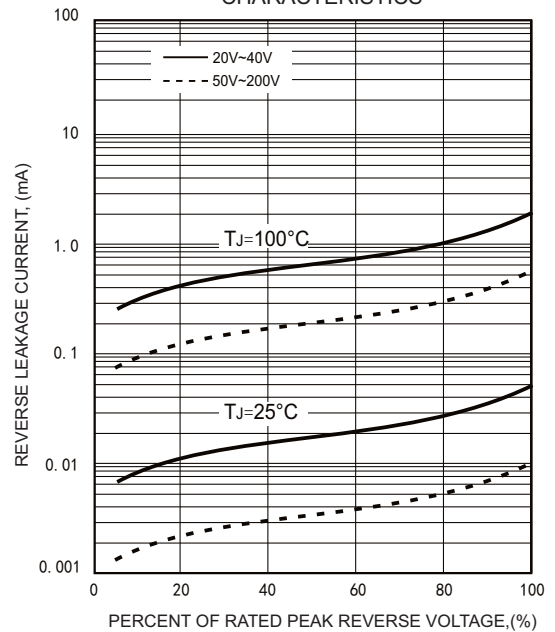


FIG.5 - TYPICAL REVERSE CHARACTERISTICS



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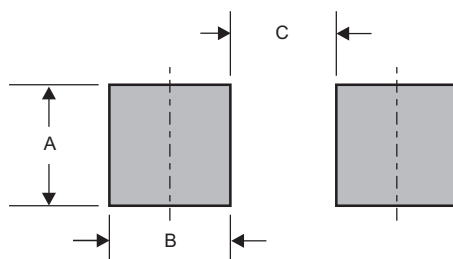
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
FM120-MS	12
FM130-MS	13
FM140-MS	14
FM150-MS	15
FM160-MS	16
FM180-MS	18
FM1100-MS	10
FM1150-MS	115
FM1200-MS	120

Suggested solder pad layout

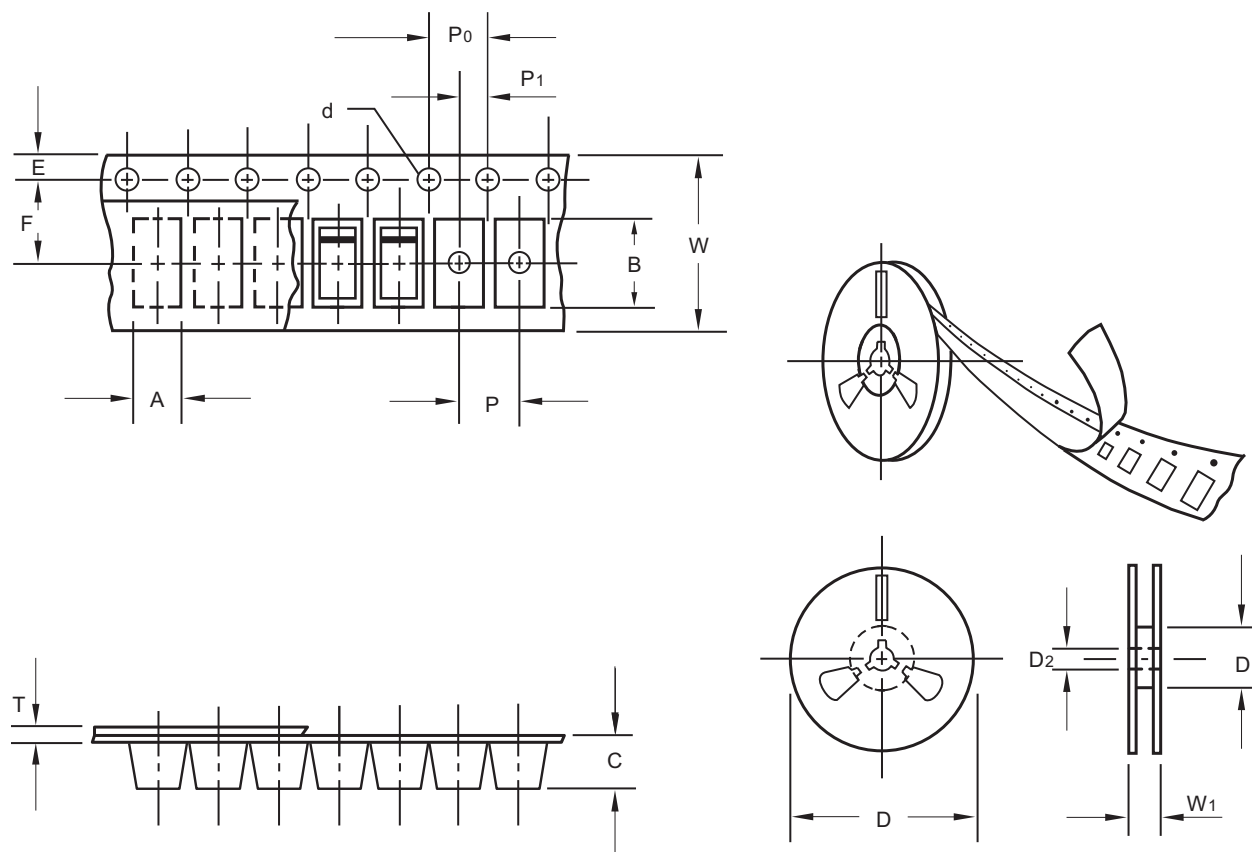


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-123S	0.044 (1.10)	0.040 (1.00)	0.079 (2.00)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-123S
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	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.

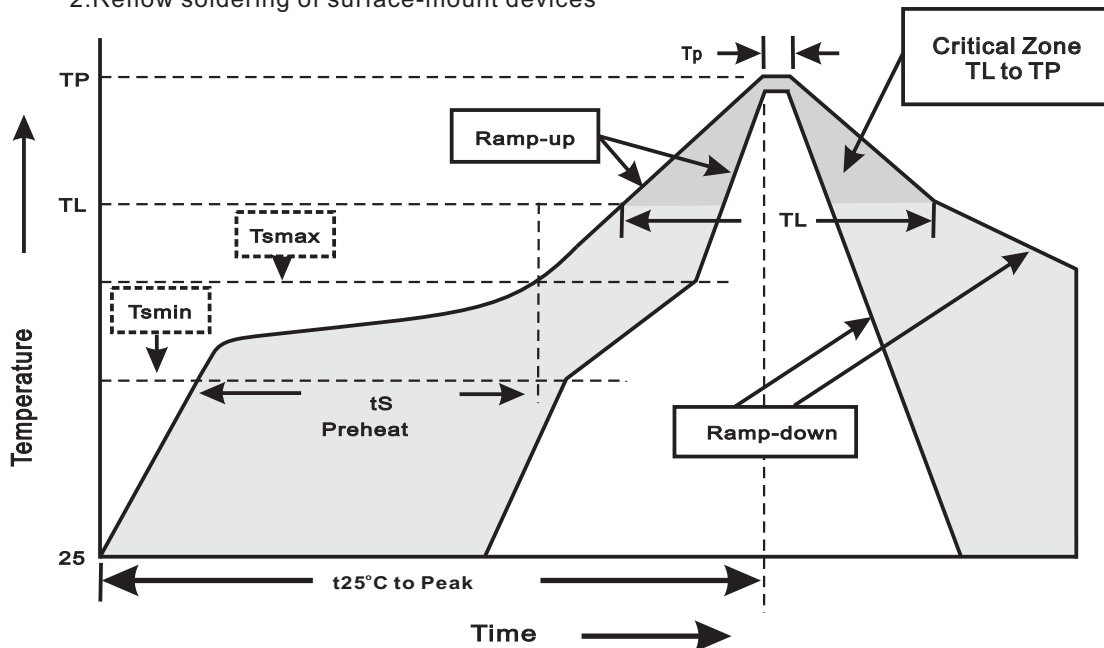
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Reel packing

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-123S	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 _{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

FM120-MS THRU FM1200-MS**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R = 80\%$ rate at $T_J = 125^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Forward Operation Life	Rated average rectifier current at $T_A = 25^{\circ}\text{C}$ for 500hrs.	MIL-STD-750D METHOD-1027
5. Intermittent Operation Life	$T_A = 25^{\circ}\text{C}$, $I_F = I_O$ On state: power on for 5 min. off state: power off for 5 min. on and off for 500 cycles.	MIL-STD-750D METHOD-1036
6. Pressure Cooker	$15P_{SIG}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
7. 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
8. Forward Surge	8.3ms single half sine-wave , one surge.	MIL-STD-750D METHOD-4066-2
9. Humidity	at $T_A = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
10. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031