

SFM11-M THRU SFM18-M

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SFM11-M THRU SFM18-M

1.0A Surface Mount Super Fast Rectifiers-50-600V

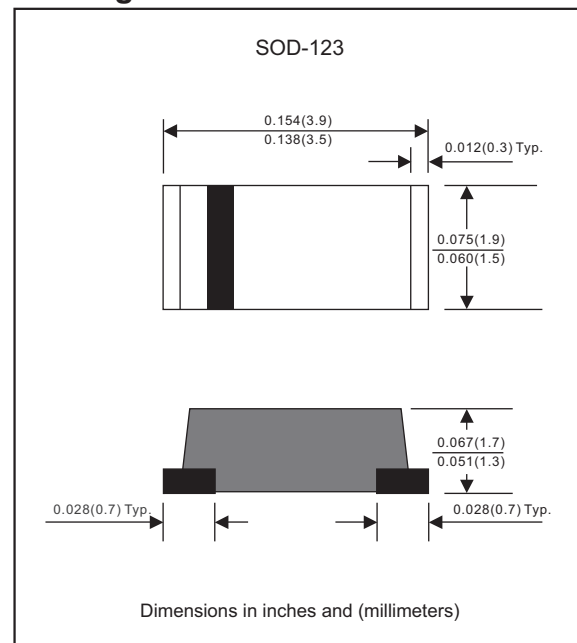
Features

- Batch process design, excellent power dissipation offers better reverse leakage current and thermal resistance
- Tiny plastic SMD package
- High current capability
- Superfast recovery time for switching mode application
- High surge current capability
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. SFM11-M-H

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-123 / MINI SMA
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.018 gram

Package outline

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

PARAMETER	SYMBOLS	SFM11-M	SFM12-M	SFM13-M	SFM14-M	SFM15-M	SFM16-M	SFM17-M	SFM18-M	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	50	100	150	200	300	400	500	600	V
Maximum RMS voltage	V_{RMS}	35	70	105	140	210	280	350	420	V
Maximum continuous reverse voltage	V_R	50	100	150	200	300	400	500	600	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}	25								A
Typical junction capacitance (Note 1)	C_J	10								pF
Operating junction temperature range	T_J	-55 to +150								$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-65 to +175								$^{\circ}\text{C}$

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

PARAMETER	SYMBOLS	SFM11-M	SFM12-M	SFM13-M	SFM14-M	SFM15-M	SFM16-M	SFM17-M	SFM18-M	UNIT
Maximum instantaneous forward voltage at $I_F=1.0A$	V_F	0.95				1.25		1.70		V
Maximum reverse leakage current $T_J=25^{\circ}C$ at rated V_R $T_J=125^{\circ}C$	I_R					5.0 100				μA μA
Maximum reverse recovery time (Note 2)	t_{rr}					35				ns

Thermal characteristics

PARAMETER	SYMBOLS	SFM11-M	SFM12-M	SFM13-M	SFM14-M	SFM15-M	SFM16-M	SFM17-M	SFM18-M	UNIT
Typical thermal resistance junction to ambient (3)	$R_{\theta JA}$	56								$^{\circ}\text{C}/\text{W}$
Typical thermal resistance junction to case(3)	$R_{\theta JC}$	41								$^{\circ}\text{C}/\text{W}$

Notes 1: Measured at 1 MHz and applied reverse voltage of 4.0 VDC

2: Measured with $I_F = 0.5\text{A}$, $I_R = 1\text{A}$, $I_{rr} = 0.25\text{A}$

3: Mounted on FR-4 PCB Copper, minimum recommended pad layout

Rating and characteristic curves (SFM11-M THRU SFM18-M)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

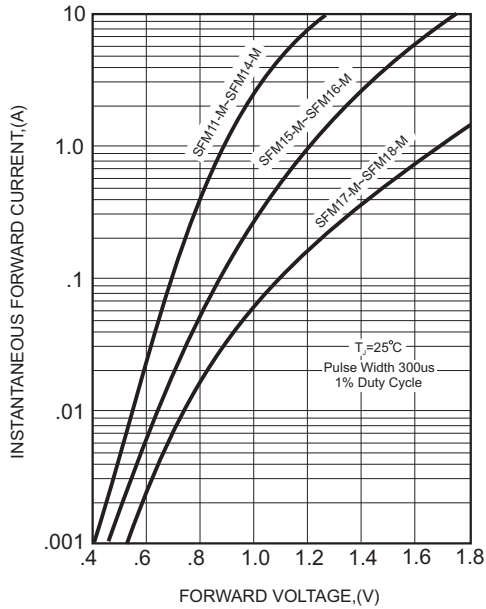


FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

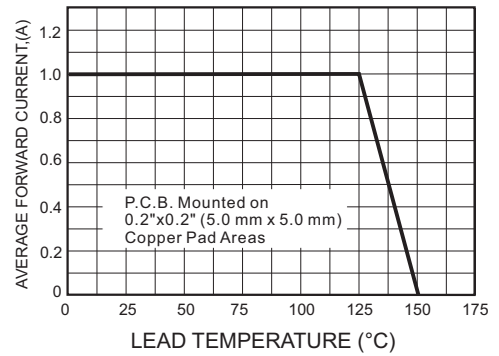


FIG.4-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

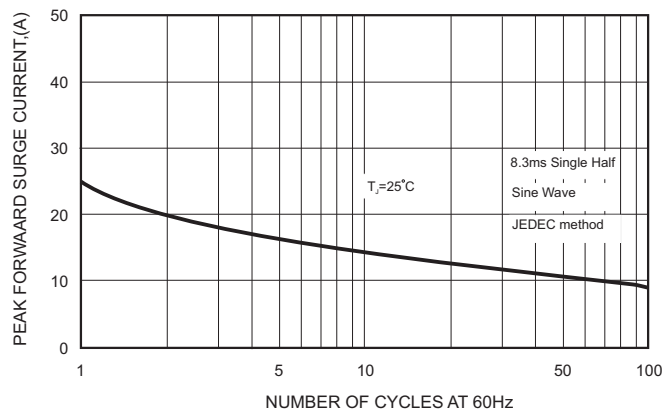
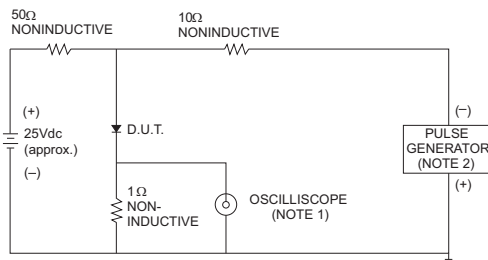


FIG.3- TEST CIRCUIT DIAGRAM AND REVERSE RECOVERY TIME CHARACTERISTICS



NOTES: 1. Rise Time= 7ns max., Input Impedance= 1 megohm, 22pF.
2. Rise Time= 10ns max., Source Impedance= 50 ohms.

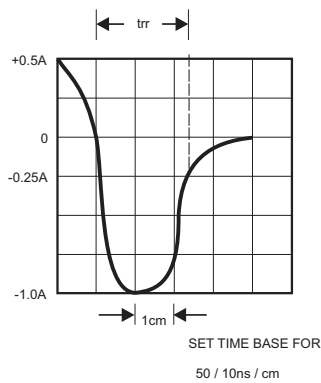
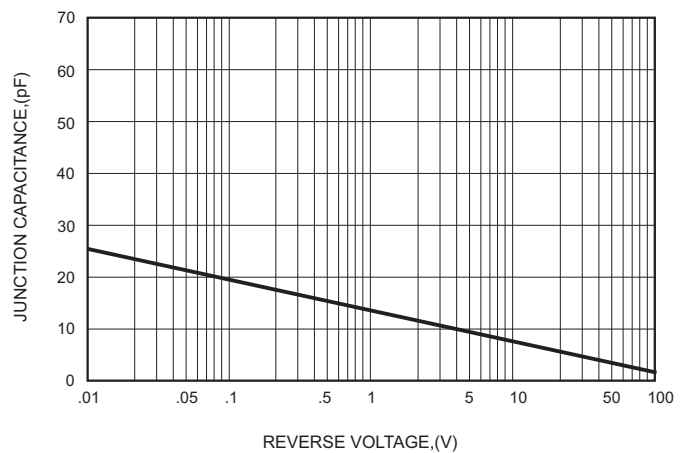


FIG.5-TYPICAL JUNCTION CAPACITANCE



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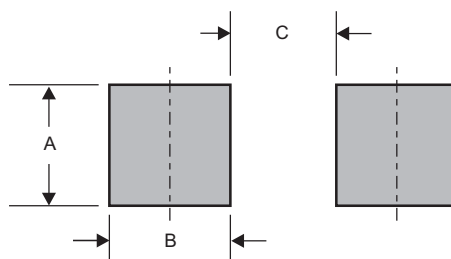
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
SFM11-M	S1
SFM12-M	S2
SFM13-M	S3
SFM14-M	S4
SFM15-M	S5
SFM16-M	S6
SFM17-M	S7
SFM18-M	S8

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-123	0.075 (1.90)	0.055 (1.40)	0.075 (1.90)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-123
Carrier width	A	0.1	1.90
Carrier length	B	0.1	3.90
Carrier depth	C	0.1	1.68
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.

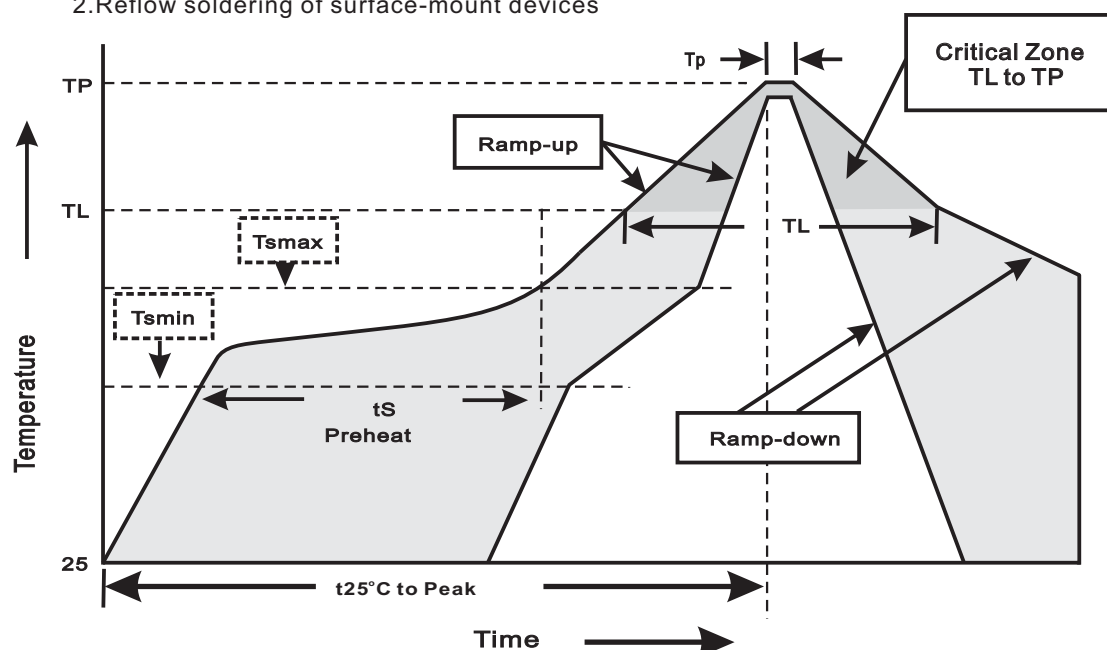
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Reel packing

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-123	7"	2,500	4.0	25,000	183*123*183	178	382*257*387	200,000	10.5

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(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	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 $260 \pm 5^\circ\text{C}$ 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 $T_J = 150^\circ\text{C}$ 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