

# SFM11-SF THRU SFM110-SF

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# SFM11-SF THRU SFM110-SF

## 1.0A Surface Mount Super Fast Rectifiers 50V-1000V

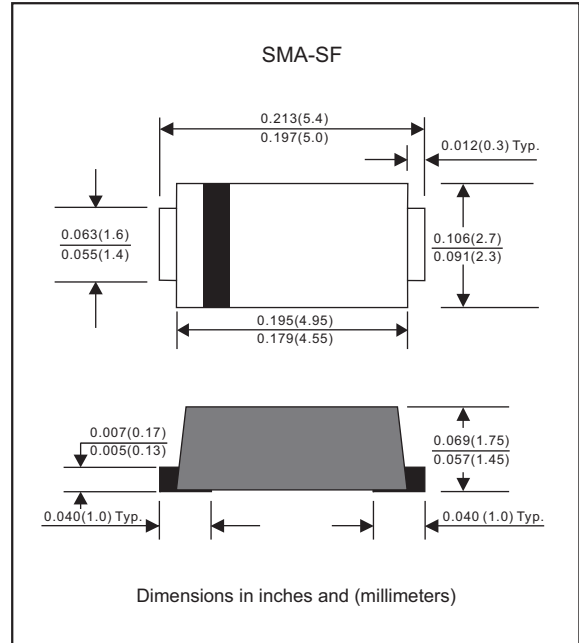
### Features

- Low profile surface mounted application in order to optimize board space
- High current capability
- Superfast recovery time for switching mode application
- High surge current capability
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. SFM11-SF-H

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SMA-SF
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.04 gram

### Package outline



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

PARAMETER	SYMBOLS	SFM11-SF	SFM12-SF	SFM13-SF	SFM14-SF	SFM15-SF	SFM16-SF	SFM17-SF	SFM18-SF	SFM19-SF	SFM110-SF	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	100	150	200	300	400	500	600	800	1000	V
Maximum RMS voltage	$V_{RMS}$	35	70	105	140	210	280	350	420	560	700	V
Maximum continuous reverse voltage	$V_R$	50	100	150	200	300	400	500	600	800	1000	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							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-SF	SFM12-SF	SFM13-SF	SFM14-SF	SFM15-SF	SFM16-SF	SFM17-SF	SFM18-SF	SFM19-SF	SFM110-SF	UNIT	
Maximum instantaneous forward voltage at $I_f=1.0\text{A}$	$V_f$	0.95				1.25		1.70		2.50		V	
Maximum reverse leakage current $T_J=25^{\circ}\text{C}$ at rated $V_R$ $T_J=125^{\circ}\text{C}$	$I_R$	5.0					100						$\mu\text{A}$ $\mu\text{A}$
Maximum reverse recovery time (Note 2)	$t_{rr}$	35											ns

### Thermal characteristics

PARAMETER	SYMBOLS	SFM11-SF	SFM12-SF	SFM13-SF	SFM14-SF	SFM15-SF	SFM16-SF	SFM17-SF	SFM18-SF	SFM19-SF	SFM110-SF	UNIT
Typical thermal resistance junction to ambient (Note 3)	$R_{\theta JA}$	50										$^{\circ}\text{C}/\text{W}$
Typical thermal resistance junction to case (Note 3)	$R_{\theta JC}$	30										$^{\circ}\text{C}/\text{W}$

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-SF THRU SFM110-SF)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

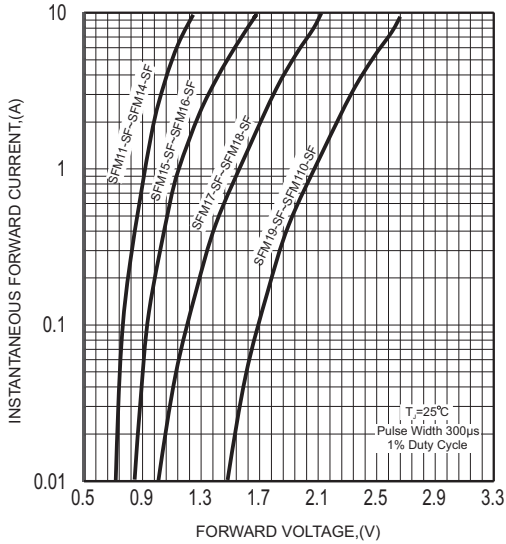


FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

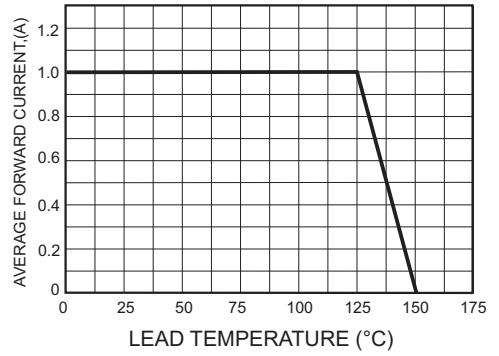


FIG.5-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

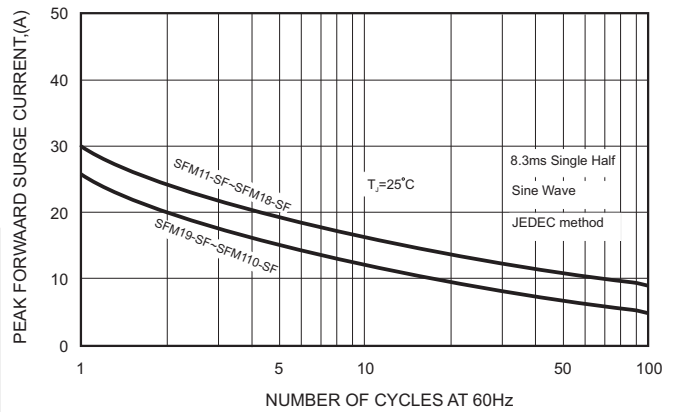
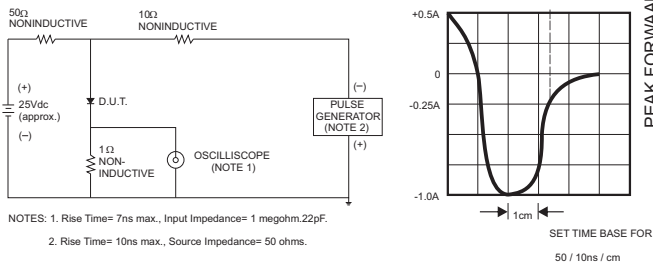


FIG.3- TEST CIRCUIT DIAGRAM AND REVERSE RECOVERY TIME CHARACTERISTICS



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

FIG.4 - TYPICAL REVERSE CHARACTERISTICS

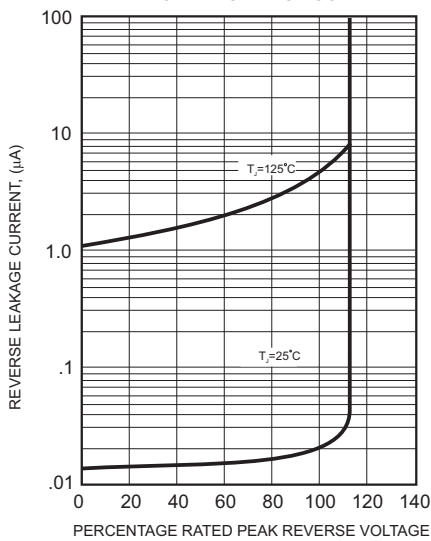
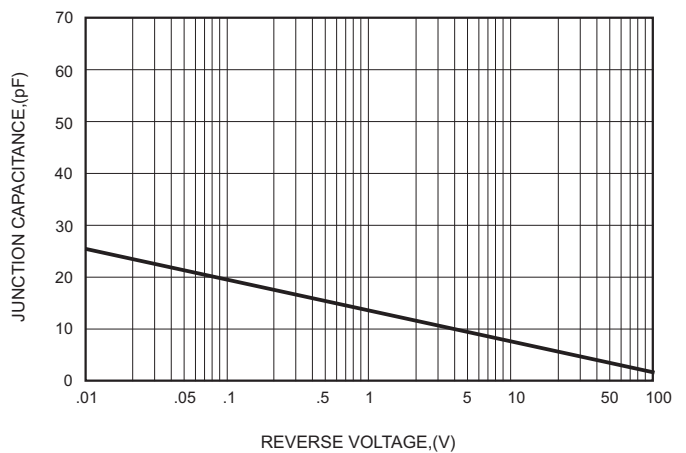




FIG.6-TYPICAL JUNCTION CAPACITANCE



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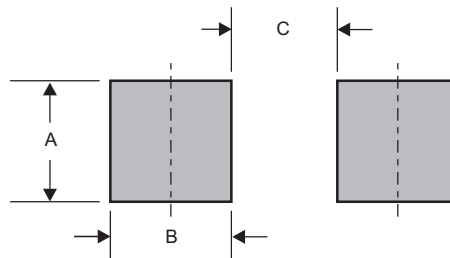
## Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

## Marking

Type number	Marking code
SFM11-SF	S11
SFM12-SF	S12
SFM13-SF	S13
SFM14-SF	S14
SFM15-SF	S15
SFM16-SF	S16
SFM17-SF	S17
SFM18-SF	S18
SFM19-SF	S19
SFM110-SF	S10

## Suggested solder pad layout

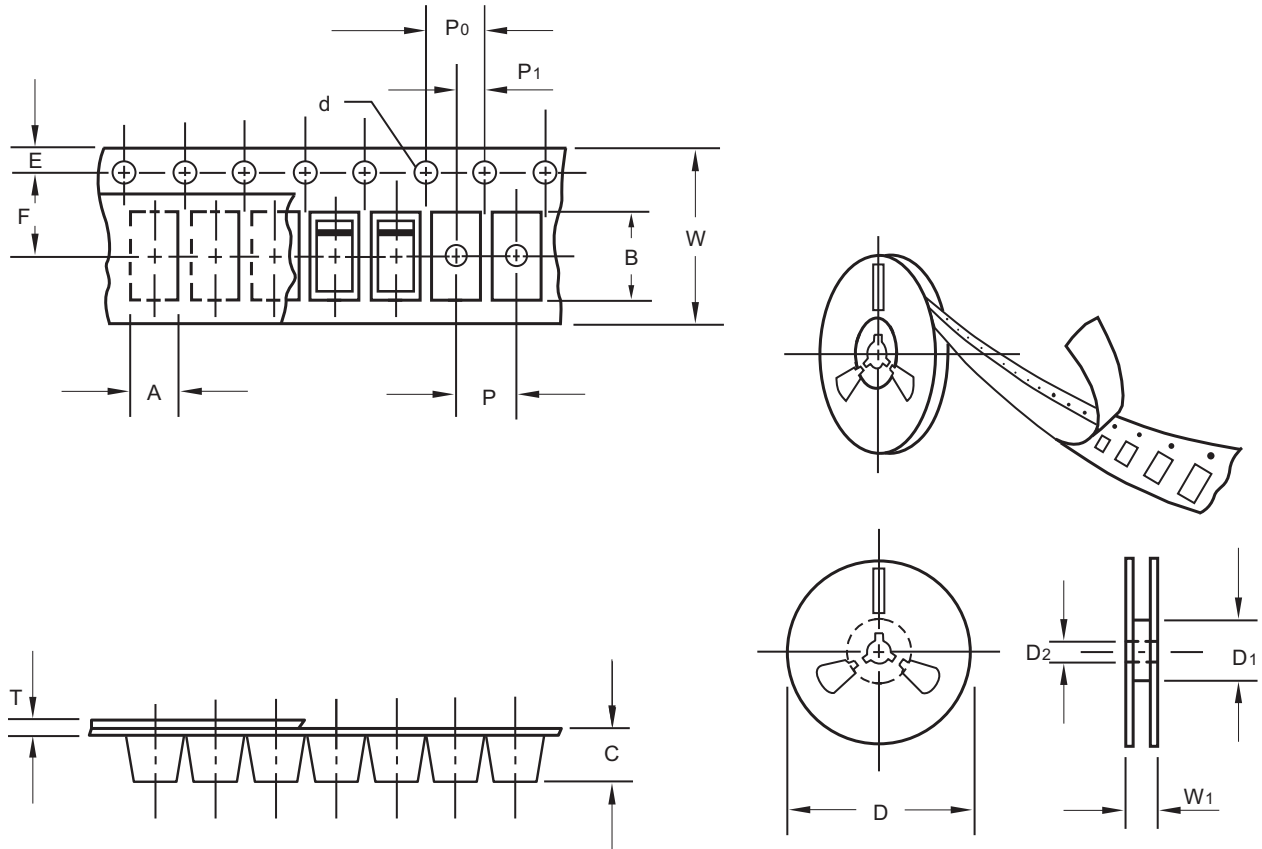


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMA-SF	0.063 (1.60)	0.059 (1.50)	0.110 (2.80)

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## Packing information



unit:mm

Item	Symbol	Tolerance	SMA-SF
Carrier width	A	0.1	2.90
Carrier length	B	0.1	5.50
Carrier depth	C	0.1	2.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	50.00
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	5.50
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	12.00
Reel width	W1	1.0	18.00

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

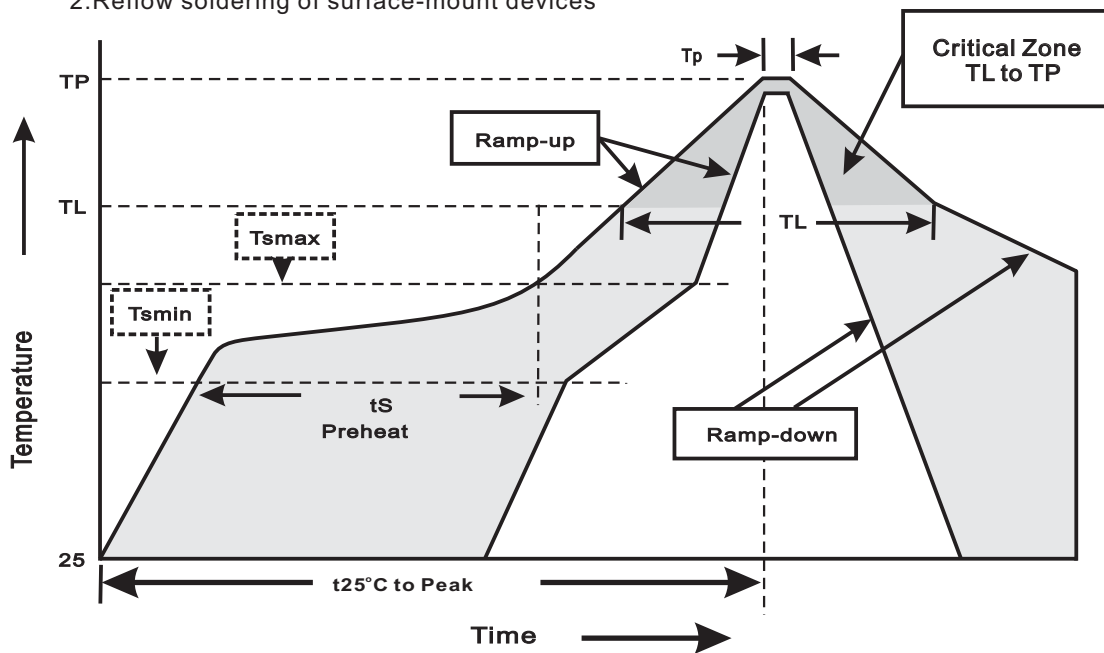
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## Reel packing

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)
SMA-SF	7"	2,000	4.0	20,000	183*155*183	178	382*356*392	160,000	12.0
	13"	7,500	4.0	15,000	335*335*38	330	350*330*360	120,000	11.5

## 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

**SFM11-SF THRU SFM110-SF****High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R=80\%$ rate at $T_J=T_{Jmax}$ 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 <sub>SIG</sub> at $T_A=121^\circ\text{C}$ for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to +125°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