

# SMF Series

Surface Mount — 200W

**HF** **RoHS**



SOD-123FL

## Additional Information



## Maximum Ratings and Characteristics ( $T_A=25^{\circ}\text{C}$ )

Rating	Symbol	Value
Peak pulse power dissipation at 10/1000 $\mu\text{s}$ waveform(Note1, Note2, Fig.1)	$P_{PPM}$	200W
Peak pulse power ( $t_p=8/20\mu\text{s}$ waveform)	$P_{PPM}$	1000W
Peak pulse current of at 10/1000 $\mu\text{s}$ waveform (Note 1, Fig.3)	$I_{PPM}$	See Table(A)
Steady state power dissipation at $T_J=75^{\circ}\text{C}$ (Fig.5)	$P_{M(AV)}$	1.0W
Maximum Instantaneous Forward Voltage at 12A for Unidirectional Only	$V_F$	3.5V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	$I_{FSM}$	20A
Operating junction and Storage Temperature Ranges	$T_J, T_{STG}$	$-55^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Typical thermal resistance junction to lead	$R_{\theta JL}$	100 $^{\circ}\text{C}/\text{W}$
Typical thermal resistance junction to ambient	$R_{\theta JA}$	220 $^{\circ}\text{C}/\text{W}$

Notes:

1. Non-repetitive current pulse, per Fig.3 and derating above  $T_A=25^{\circ}\text{C}$  per Fig.2.
2. Each terminal is surface Mounted on the 5.0mmx5.0mm(0.03mm thick) copper pads.
3. 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.

## Description

The SMF series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. SMF package is 50% smaller in footprint when compare to SMA package and delivering one of the low height profiles (1.2mm) in the industry.

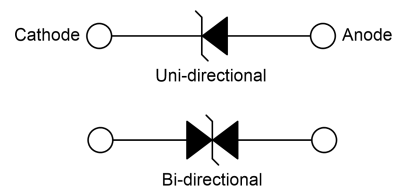
## Features

- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- SOD-123FL surface mount package
- Peak power dissipation of 1000W under 8/20 $\mu\text{s}$  waveform
- Low leakage current
- Solid-state silicon avalanche technology
- RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270 $^{\circ}\text{C}$
- Flammability rating UL 94V-0
- Meet MSL level1, per J-STD-020

## Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in telecom, computer, Industrial and consumer electronic applications.

## Functional Diagram



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## Electrical Characteristics (T<sub>A</sub>=25°C)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>		Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>R</sub>
Uni.	Bi.	Uni.	Bi.	V <sub>R</sub> (V)	V <sub>B Min.</sub> (V)	V <sub>B Max.</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
SMF5.0A	SMF5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	21.8	500
SMF6.0A	SMF6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	19.4	400
SMF6.5A	SMF6.5CA	KK	AK	6.5	7.22	7.98	10	11.2	17.9	350
SMF7.0A	SMF7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	16.7	200
SMF7.5A	SMF7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	15.5	100
SMF8.0A	SMF8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	14.7	50
SMF8.5A	SMF8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	13.9	20
SMF9.0A	SMF9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	13.0	10
SMF10A	SMF10CA	KX	AX	10.0	11.10	12.30	1	17.0	11.8	5
SMF11A	SMF11CA	KZ	AZ	11.0	12.20	13.50	1	18.2	11.0	3
SMF12A	SMF12CA	LE	BE	12.0	13.30	14.70	1	19.9	10.1	1
SMF13A	SMF13CA	LG	BG	13.0	14.40	15.90	1	21.5	9.3	1
SMF14A	SMF14CA	LK	BK	14.0	15.60	17.20	1	23.2	8.6	1
SMF15A	SMF15CA	LM	BM	15.0	16.70	18.50	1	24.4	8.2	1
SMF16A	SMF16CA	LP	BP	16.0	17.80	19.70	1	26.0	7.7	1
SMF17A	SMF17CA	LR	BR	17.0	18.90	20.90	1	27.6	7.3	1
SMF18A	SMF18CA	LT	BT	18.0	20.00	22.10	1	29.2	6.9	1
SMF20A	SMF20CA	LV	BV	20.0	22.20	24.50	1	32.4	6.2	1
SMF22A	SMF22CA	LX	BX	22.0	24.40	26.90	1	35.5	5.7	1
SMF24A	SMF24CA	LZ	BZ	24.0	26.70	29.50	1	38.9	5.2	1
SMF26A	SMF26CA	ME	CE	26.0	28.90	31.90	1	42.1	4.8	1
SMF28A	SMF28CA	MG	CG	28.0	31.10	34.40	1	45.4	4.4	1
SMF30A	SMF30CA	MK	CK	30.0	33.30	36.80	1	48.4	4.2	1
SMF33A	SMF33CA	MM	CM	33.0	36.70	40.60	1	53.3	3.8	1
SMF36A	SMF36CA	MP	CP	36.0	40.00	44.20	1	58.1	3.5	1

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Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$		Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_R$
Uni.	Bi.	Uni.	Bi.	$V_R$ (V)	$V_{B Min.}$ (V)	$V_{B Max.}$ (V)	$I_T$ (mA)	$V_C$ (V)	$I_{PP}$ (A)	$I_R$ ( $\mu$ A)
SMF40A	SMF40CA	MR	CR	40.0	44.40	49.10	1	64.5	3.1	1
SMF43A	SMF43CA	MT	CT	43.0	47.80	52.80	1	69.4	2.9	1
SMF45A	SMF45CA	MV	CV	45.0	50.00	55.30	1	72.7	2.8	1
SMF48A	SMF48CA	MX	CX	48.0	53.30	58.90	1	77.4	2.6	1
SMF51A	SMF51CA	MZ	CZ	51.0	56.70	62.70	1	82.4	2.5	1
SMF54A	SMF54CA	NE	DE	54.0	60.00	66.30	1	87.1	2.3	1
SMF58A	SMF58CA	NG	DG	58.0	64.40	71.20	1	93.6	2.2	1
SMF60A	SMF60CA	NK	DK	60.0	66.70	73.70	1	96.8	2.1	1
SMF64A	SMF64CA	NM	DM	64.0	71.10	78.60	1	103.0	2.0	1
SMF70A	SMF70CA	NP	DP	70.0	77.80	86.00	1	113.0	1.8	1
SMF75A	SMF75CA	NR	DR	75.0	83.30	92.10	1	121.0	1.7	1
SMF78A	SMF78CA	NT	DT	78.0	86.70	95.80	1	126.0	1.6	1
SMF85A	SMF85CA	NV	DV	85.0	94.40	104.00	1	137.0	1.5	1
SMF90A	SMF90CA	NX	DX	90.0	100.00	111.00	1	146.0	1.4	1
SMF100A	SMF100CA	NZ	DZ	100.0	111.00	123.00	1	162.0	1.3	1
SMF110A	SMF110CA	PE	EE	110.0	122.00	135.00	1	177.0	1.2	1
SMF120A	SMF120CA	PG	EG	120.0	133.00	147.00	1	193.0	1.1	1
SMF130A	SMF130CA	PK	EK	130.0	144.00	159.00	1	209.0	1.0	1
SMF150A	SMF150CA	PM	EM	150.0	167.00	185.00	1	243.0	0.8	1
SMF160A	SMF160CA	PP	EP	160.0	178.00	197.00	1	259.0	0.8	1
SMF170A	SMF170CA	PR	ER	170.0	189.00	209.00	1	275.0	0.8	1

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**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ )**

Figure 1. Peak Pulse Power Rating Curve

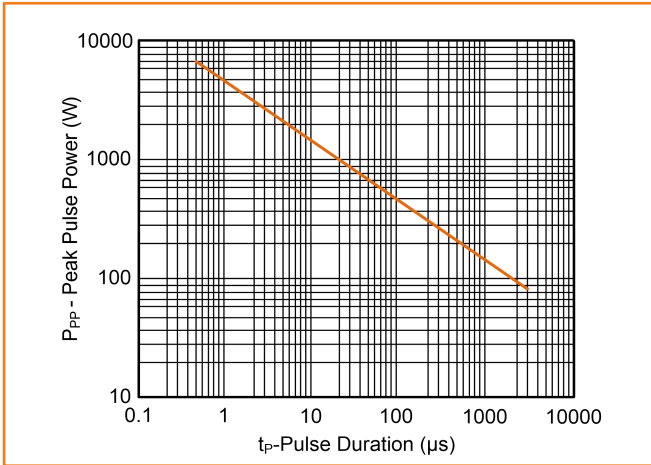


Figure 2. Pulse Derating Curve



Figure 3. Pulse Waveform



Figure 4. Typical Junction Capacitance

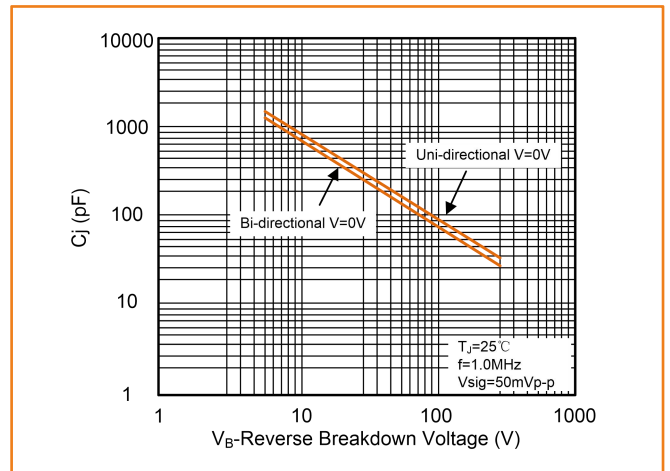


Figure 5. Steady State Power Dissipation Derating Curve

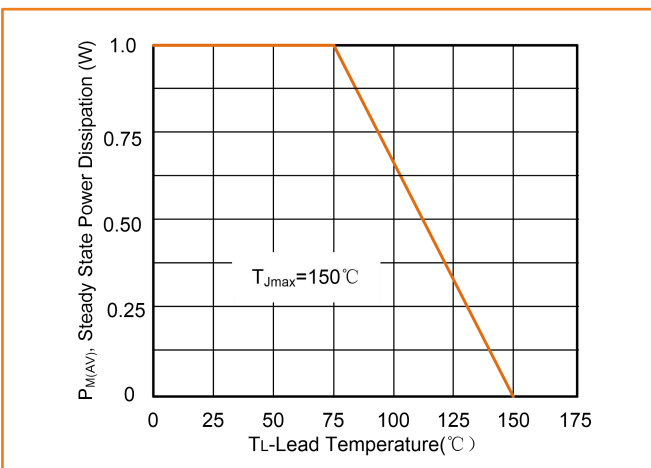
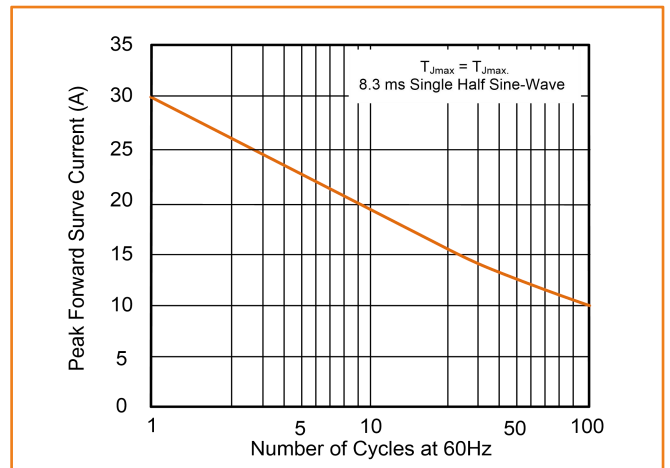


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional



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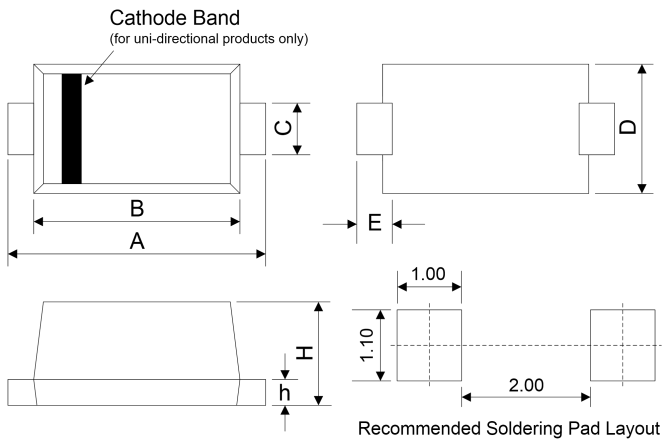
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## Soldering Parameters

Reflow Condition		Lead-free
Pre Heat	-Temperature Min ( $T_{S\ min}$ )	150°C
	-Temperature Max ( $T_{S\ max}$ )	200°C
	-Time (min to max) ( $t_s$ )	60 — 180 secs
Average ramp-up rate ( $T_L$ to $T_P$ )		3°C/second max.
$T_{S\ max}$ to $T_L$ -Ramp-up Rate		3°C/second max.
Time maintained above:	-Temperature ( $T_L$ )	217°C
	-Time ( $t_L$ )	60–150 seconds
Peak Temperature ( $T_P$ )		260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )		20–40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature		8 minutes max.



## Dimensions (SOD-123FL)

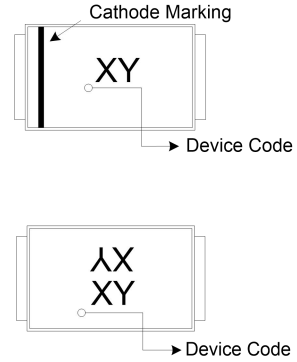
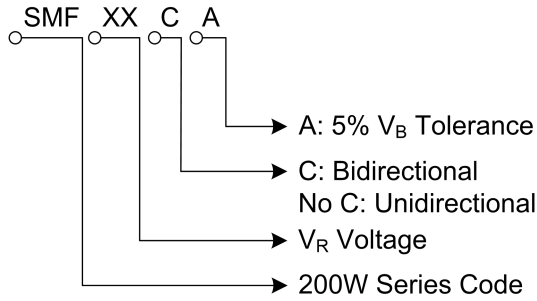


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.50	3.90	0.138	0.154
B	2.60	3.00	0.102	0.118
C	0.75	1.10	0.030	0.043
D	1.60	2.00	0.063	0.079
E	0.80Typ.		0.031Typ.	
H	0.90	1.35	0.035	0.053
h	0.12	0.22	0.005	0.009

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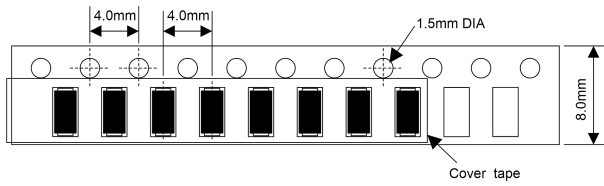
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## Part Number Code and Marking Code

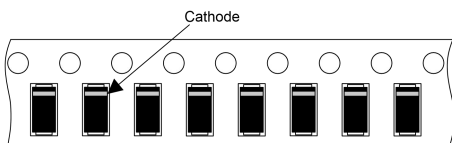


## Packaging Specification

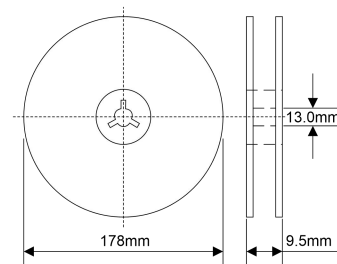
### Tape



### For Uni-Devices



### 7 Inches Reel



Quantity: 3000pcs/reel

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