

# Transient Voltage Suppressors SOD-123FL Package

SMF Series

MERITEK

## FEATURE

- Glass passivated chip
- Breakdown Voltage from 5.0 to 190V
- 200W peak pulse power capability with a 10/1000 $\mu$ s waveform, repetitive rate (duty cycle): 0.01%
- Glass passivated chip
- Excellent clamping capability, fast response time.
- Low incremental surge resistance, Low profile package
- Terminal: Solderable per MIL-STD-750, Method 2026
- Epoxy: UL 94V-0 rate flame retardant
- UL/cUL safety approved: certification No: E223045



## ELECTRICAL CHARACTERISTICS



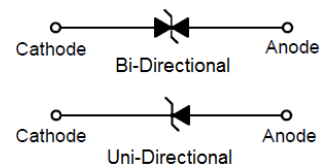
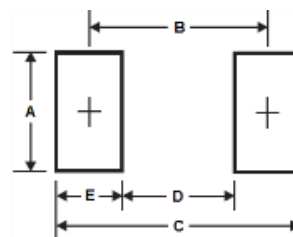
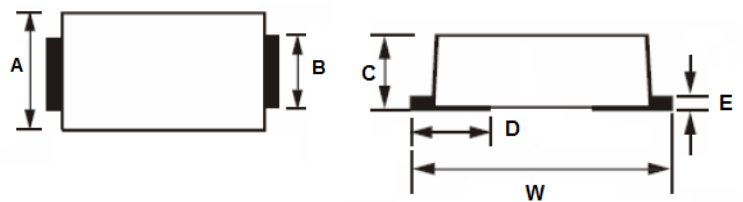
Parameter	Symbols	Value	Unit
Peak power dissipation with a 10/1000 $\mu$ s waveform(1)	$P_{PP}$	200	Watts
Peak power dissipation with a 8/20 $\mu$ s waveform(1)	$P_{PP}$	1000	Watts
Peak pulse current with a 10/1000 $\mu$ s waveform(1)	$I_{PP}$	See Next Table	Amps
Power dissipation on infinite heatsink at $T_L = 75^\circ\text{C}$	$P_D$	6.0	Watts
Peak forward surge current, 8.3 ms single half sine-wave unidirectional only. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.	$I_{FSM}$	300	Amps
Maximum instantaneous forward voltage at 25 A for unidirectional only. $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$	$V_F$	3.5/5.0	Volts
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Rating at 25 $^\circ\text{C}$ , ambient temperature unless otherwise specified. Single phase, half wave, 60 Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

1.Non-repetitive current pulse per Fig.5 and derated above  $T_A=25^\circ\text{C}$  per Fig.1

## DIMENSIONS

Item	SOD-123FL Milimeters	
	Min.	Max.
W	3.50	3.90
A	1.50	2.00
B	0.60	1.20
C	0.80	1.40
D	0.35	1.10
E	0.05	0.25



## SOLDERING PAD LAYOUT

A	B	C	D	E
0.7	3.7	4.9	2.5	1.2

Unit: mm

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## ELECTRICAL CHARACTERISTICS(Continued)

Device Type (Uni)	Device Type (Bi)	Marking Code		Breakdown Voltage VBR@IT			Working Peak Reverse Voltage VRWM(V)	Maximum Reverse Leakage IR @ VRWM(V)	Maximum Reverse Surge Current Ipp(A)	Maximum Clamping Voltage VC@Ipp
		Uni	Bi	Min(V)	Max(V)	IT(mA)				
SMF5.0A	SMF5.0CA	FE	KE	6.40	7.00	10	5.0	400	21.74	9.2
SMF6.0A	SMF6.0CA	FG	KG	6.67	7.37	10	6.0	400	19.42	10.3
SMF6.5A	SMF6.5CA	FK	KK	7.22	7.98	10	6.5	250	17.86	11.2
SMF7.0A	SMF7.0CA	FM	KM	7.78	8.60	10	7.0	100	16.67	12.0
SMF7.5A	SMF7.5CA	FP	KP	8.33	9.21	1.0	7.5	50	15.50	12.9
SMF8.0A	SMF8.0CA	FR	KR	8.89	9.83	1.0	8.0	25	14.71	13.6
SMF8.5A	SMF8.5CA	FT	KT	9.44	10.40	1.0	8.5	10	13.89	14.4
SMF9.0A	SMF9.0CA	FV	KV	10.00	11.10	1.0	9.0	5.0	12.99	15.4
SMF10A	SMF10CA	FX	KX	11.10	12.30	1.0	10.0	2.5	11.76	17.0
SMF11A	SMF11CA	FZ	KZ	12.20	13.50	1.0	11.0	2.5	10.99	18.2
SMF12A	SMF12CA	HE	LE	13.30	14.70	1.0	12.0	2.5	10.05	19.9
SMF13A	SMF13CA	HG	LG	14.40	15.90	1.0	13.0	1.0	9.30	21.5
SMF14A	SMF14CA	HK	LK	15.60	17.20	1.0	14.0	1.0	8.62	23.3
SMF15A	SMF15CA	HM	LM	16.70	18.50	1.0	15.0	1.0	8.20	24.4
SMF16A	SMF16CA	HP	LP	17.80	19.70	1.0	16.0	1.0	7.69	26.0
SMF17A	SMF17CA	HR	LR	18.90	20.90	1.0	17.0	1.0	7.25	27.6
SMF18A	SMF18CA	HT	LT	20.00	22.10	1.0	18.0	1.0	6.85	29.2
SMF19A	SMF19CA	HB	LB	21.10	23.30	1.0	19.0	1.0	6.54	30.6
SMF20A	SMF20CA	HV	LV	22.20	24.50	1.0	20.0	1.0	6.17	32.4
SMF22A	SMF22CA	HX	LX	24.40	26.90	1.0	22.0	1.0	5.63	35.5
SMF24A	SMF24CA	HZ	LZ	26.70	29.50	1.0	24.0	1.0	5.14	38.9
SMF26A	SMF26CA	JE	ME	28.90	31.90	1.0	26.0	1.0	4.75	42.1
SMF28A	SMF28CA	JG	MG	31.10	34.40	1.0	28.0	1.0	4.41	45.4
SMF30A	SMF30CA	JK	MK	33.30	36.80	1.0	30.0	1.0	4.13	48.4
SMF33A	SMF33CA	JM	MM	36.70	40.60	1.0	33.0	1.0	3.75	53.3
SMF36A	SMF36CA	JP	MP	40.00	44.20	1.0	36.0	1.0	3.44	58.1
SMF40A	SMF40CA	JR	MR	44.40	49.10	1.0	40.0	1.0	3.10	64.5
SMF43A	SMF43CA	JT	MT	47.80	52.80	1.0	43.0	1.0	2.88	69.4
SMF45A	SMF45CA	JV	MV	50.00	55.30	1.0	45.0	1.0	2.75	72.7
SMF48A	SMF48CA	JX	MX	53.30	58.90	1.0	48.0	1.0	2.58	77.4
SMF51A	SMF51CA	JZ	MZ	56.70	62.70	1.0	51.0	1.0	2.43	82.4
SMF54A	SMF54CA	XE	NE	60.00	66.30	1.0	54.0	1.0	2.30	87.1
SMF58A	SMF58CA	XG	NG	64.40	71.20	1.0	58.0	1.0	2.14	93.6
SMF60A	SMF60CA	XK	NK	66.70	73.70	1.0	60.0	1.0	2.07	96.8
SMF64A	SMF64CA	XM	NM	71.10	78.60	1.0	64.0	1.0	1.94	103
SMF70A	SMF70CA	XP	NP	77.80	86.00	1.0	70.0	1.0	1.77	113
SMF75A	SMF75CA	XR	NR	83.30	92.10	1.0	75.0	1.0	1.65	121
SMF78A	SMF78CA	XT	NT	86.70	95.80	1.0	78.0	1.0	1.59	126
SMF80A	SMF80CA	XB	NB	88.80	97.60	1.0	80.0	1.0	1.55	129
SMF85A	SMF85CA	XV	NV	94.40	104	1.0	85.0	1.0	1.46	137
SMF90A	SMF90CA	XX	NX	100	111	1.0	90.0	1.0	1.37	146
SMF100A	SMF100CA	XZ	NZ	111	123	1.0	100	1.0	1.23	162
SMF110A	SMF110CA	TE	PE	122	135	1.0	110	1.0	1.13	177
SMF120A	SMF120CA	TG	PG	133	147	1.0	120	1.0	1.04	193
SMF130A	SMF130CA	TK	PK	144	159	1.0	130	1.0	0.96	209
SMF140A	SMF140CA	TB	PB	155	171	1.0	140	1.0	0.89	224
SMF150A	SMF150CA	TM	PM	167	185	1.0	150	1.0	0.82	243
SMF160A	SMF160CA	TP	PP	178	197	1.0	160	1.0	0.77	259
SMF170A	SMF170CA	TR	PR	189	209	1.0	170	1.0	0.73	275
SMF180A	SMF180CA	TT	PT	200	220	1.0	180	1.0	0.69	292
SMF190A	SMF190CA	TV	PV	211	232	1.0	190	1.0	0.69	308

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## CHARACTERISTICS CURVES

Fig.1 Pulse Derating Curve

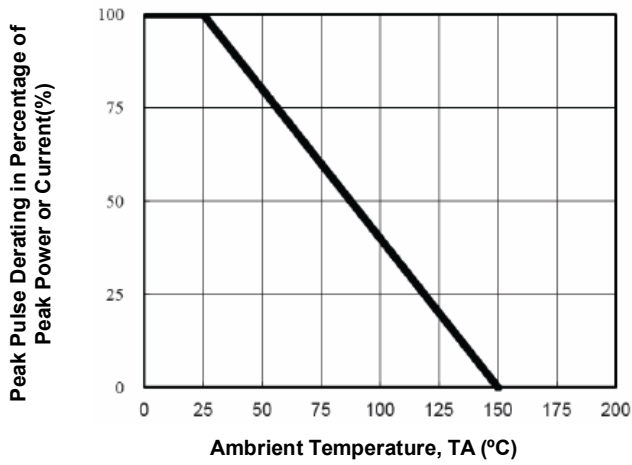


Fig 2. Maximum Non-Repetitive Surge Current

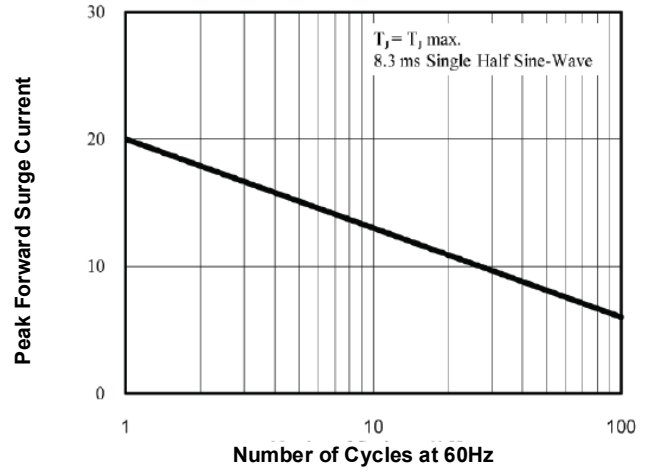


Fig 3. Steady State Power Derating Curve

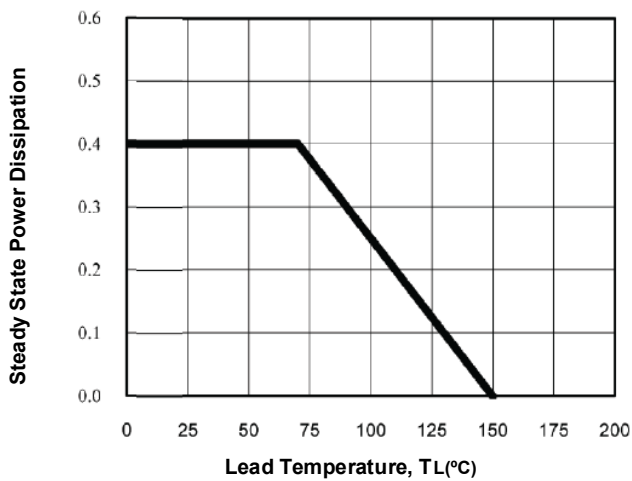


Fig 4. Peak Pulse Power Rating Curve

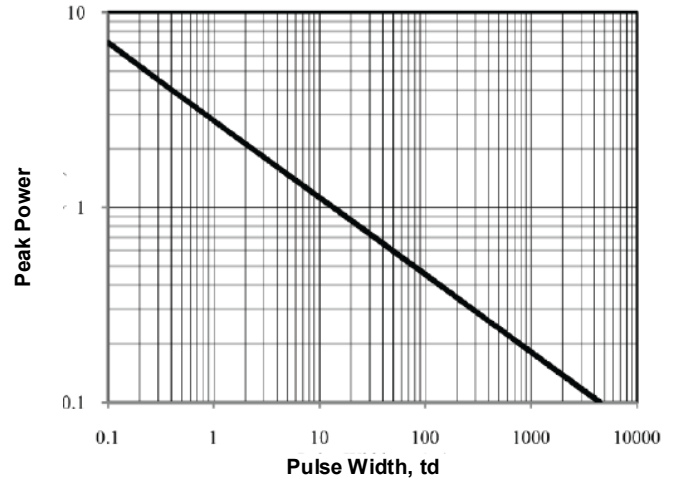


Fig 5. Pulse Waveform

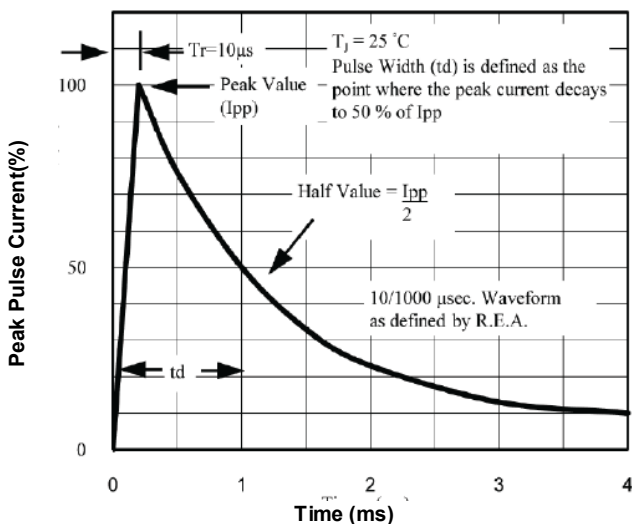
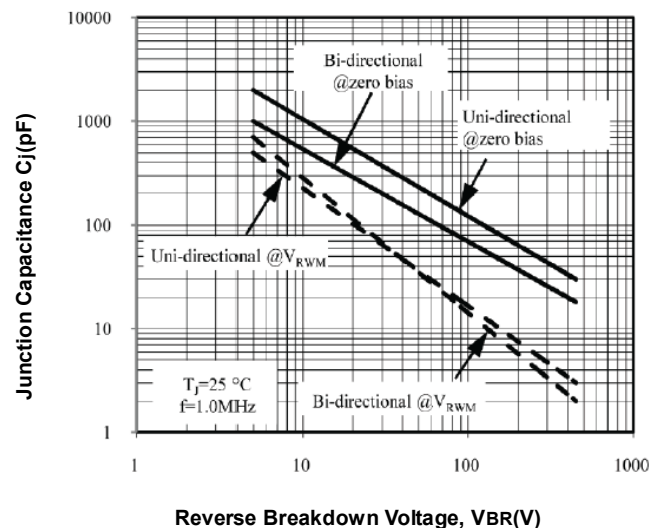


Fig 6. Typical Junction Capacitance

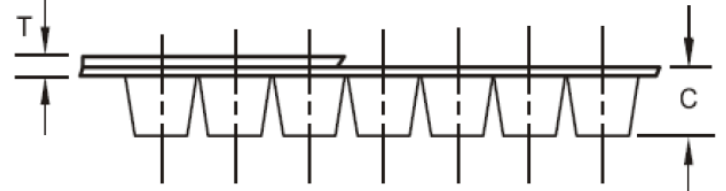
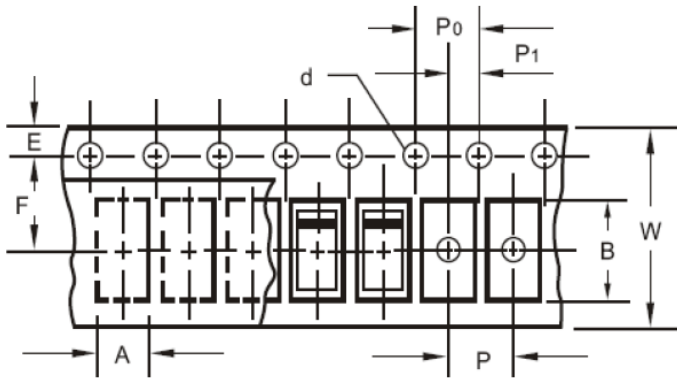


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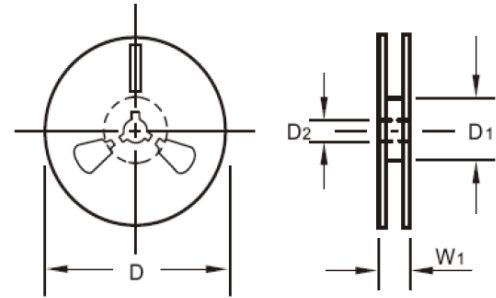
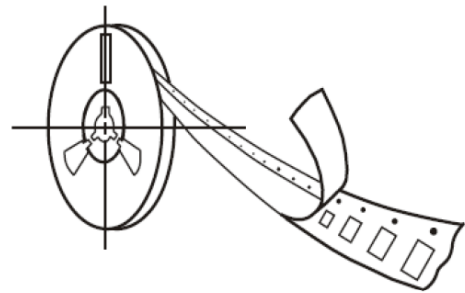
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## PACKAGING SPECIFICATION



Item	Symbol	SO-123FL (mm)
Carrier width	A	2.15±0.10
Carrier length	B	3.95±0.10
Carrier depth	C	1.35±0.10
Reel outside diameter	D	178.0±0.10
Reel inner diameter	D1	75±1.0
Feed hole diameter	D2	13.5±1.0
Sprocket hole diameter	d	1.50±1.0
Sprocket hole position	E	1.75±0.10
Punch hole position	F	3.50±0.5
Punch hole pitch	P	4.00±0.10
Sprocket hole pitch	P0	4.00±0.10
Embossment center	P1	2.00±0.10
Overall tape Thickness	T	0.23±0.05
Tape width	W	8.0±0.10
Reel width	W1	18.1±1.0



## RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Average Ramp-up Rate $T_L$ to $T_P$		3°C/second max.
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Tempe. Max $T_{s(max)}$	200°C
	Time (min. to max.) ( $t_s$ )	60-120 seconds
Ramp-up Rate $T_{s(max)}$ to $T_L$		3°C/second max.
Reflow	Temp. ( $T_L$ )	217°C
	Time ( $t_L$ )	60-260 seconds
Peak Temperature ( $T_P$ )		255 <sup>-0/+5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		10-30 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to peak Temp. ( $T_P$ )		6 minutes max.

