



### Surface Mount Transient Voltage Suppressors

#### DESCRIPTION

The SMF4L series of SOD-123FL small and flat lead lowprofile plastic package is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

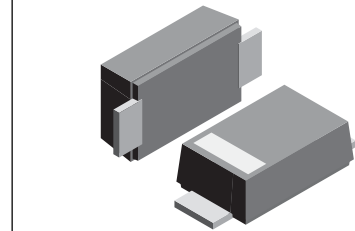
#### FEATURES

- > 400W peak pulsepower capability at 10/1000μs waveform
- > Fast response time: typically less than 1.0ns from 0 Volts to V<sub>BR</sub> min
- > Low inductance, excellent clamping capability
- > For surface mounted applications to optimize board space
- > Plastic package is flammability rated V-0 per Underwriters Laboratories
- > Typical failure mode is short from over-specified voltage or current
- > Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c

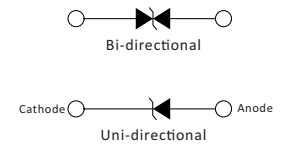
#### APPLICATIONS

SMF4L devices are ideal for the protection of portable devices/hard drives, notebooks, VCC busses, POS terminal, SSDs, power supplies, monitors, and vulnerable circuit used in other consumer applications.

#### SOD-123FL



#### PIN CONFIGURATION



#### MAXIMUM RATINGS @ 25°C UNLESS OTHERWISE SPECIFIED

PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation at 10/1000μs waveform (Note1, 2)	PPPM	400	Watts
Operating junction Temperature Range	T <sub>J</sub>	-55~125	°C
Storage Temperature Range	T <sub>STG</sub>	-55~150	°C
Typical thermal resistance junction to ambient	R <sub>θJA</sub>	220	°C/W

#### Notes:

1. Non-repetitive current pulse.
2. SMF4L5.0~SMF4L9.0A/CA Peak Pulse Power Dissipation is 370W min, 400W typical @10/1000μs.



### ELECTRICAL CHARACTERISTICS PER LINE@ 25°C UNLESS OTHERWISE SPECIFIED

Part Number		Device Marking Code		Reverse Stand-off Voltage	Breakdown Voltage Min.@IT	Breakdown Voltage Max.@IT	Test Current	Maximum Clamping Voltage @IPP	Peak Pulse Current	Reverse Leakage @V <sub>RM</sub>
UNT-POLAR	BI-POLAR	UNI	BI	V <sub>RM</sub> (V)	V <sub>BR</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (uA)
SMF 4L5.0A	SMF4 L5.0CA	KE	WE	5.0	6.40	7.00	10	9.2	43.5	800
SMF 4L6.0A	SMF4 L6.0CA	KG	WG	6.0	6.67	7.37	10	10.3	38.8	800
SMF 4L6.5A	SMF4 L6.5CA	KK	WK	6.5	7.22	7.98	10	11.2	35.7	500
SMF 4L7.0A	SMF4 L7.0CA	KM	WM	7.0	7.78	8.60	10	12.0	33.3	200
SMF 4L7.5A	SMF4 L7.5CA	KP	WP	7.5	8.33	9.21	1	12.9	31.0	100
SMF 4L8.0A	SMF4 L8.0CA	KR	WR	8.0	8.89	9.83	1	13.6	29.4	50
SMF 4L8.5A	SMF4 L8.5CA	KT	WT	8.5	9.44	10.40	1	14.4	27.8	20
SMF 4L9.0A	SMF4 L9.0CA	KV	WV	9.0	10.00	11.10	1	15.4	26.0	10
SMF4 L10A	SMF4 L10CA	KX	WX	10.0	11.10	12.30	1	17.0	23.5	5
SMF4 L11A	SMF4 L11CA	KZ	WZ	11.0	12.20	13.50	1	18.2	22.0	1
SMF4 L12A	SMF4 L12CA	LE	XE	12.0	13.30	14.70	1	19.9	20.1	1
SMF4 L13A	SMF4 L13CA	LG	XG	13.0	14.40	15.90	1	21.5	18.6	1
SMF4 L14A	SMF4 L14CA	LK	XK	14.0	15.60	17.20	1	23.2	17.2	1
SMF4 L15A	SMF4 L15CA	LM	XM	15.0	16.70	18.50	1	24.4	16.4	1
SMF4 L16A	SMF4 L16CA	LP	XP	16.0	17.80	19.70	1	26.0	15.4	1
SMF4 L17A	SMF4 L17CA	LR	XR	17.0	18.90	20.90	1	27.6	14.5	1
SMF4 L18A	SMF4 L18CA	LT	XT	18.0	20.00	22.10	1	29.2	13.7	1
SMF4 L20A	SMF4 L20CA	LV	XV	20.0	22.20	24.50	1	32.4	12.3	1
SMF4 L22A	SMF4 L22CA	LX	XX	22.0	24.40	26.90	1	35.5	11.3	1
SMF4 L24A	SMF4 L24CA	LZ	XZ	24.0	26.70	29.50	1	38.9	10.3	1
SMF4 L26A	SMF4 L26CA	ME	YE	26.0	28.90	31.90	1	42.1	9.5	1
SMF4 L28A	SMF4 L28CA	MG	YG	28.0	31.10	34.40	1	45.4	8.8	1
SMF4 L30A	SMF4 L30CA	MK	YK	30.0	33.30	36.80	1	48.4	8.3	1
SMF4 L33A	SMF4 L33CA	MM	YM	33.0	36.70	40.60	1	53.3	7.5	1
SMF4 L36A	SMF4 L36CA	MP	YP	36.0	40.00	44.20	1	58.1	6.9	1
SMF4 L40A	SMF4 L40CA	MR	YR	40.0	44.40	49.10	1	64.5	6.2	1
SMF4 L43A	SMF4 L43CA	MT	YT	43.0	47.80	52.80	1	69.4	5.8	1
SMF4 L45A	SMF4 L45CA	MV	YV	45.0	50.00	55.30	1	72.7	5.5	1
SMF4 L48A	SMF4 L48CA	MX	YX	48.0	53.30	58.90	1	77.4	5.2	1
SMF4 L51A	SMF4 L51CA	MZ	YZ	51.0	56.70	62.70	1	82.4	4.9	1
SMF4 L54A	SMF 4L54CA	NE	ZE	54.0	60.00	66.30	1	87.1	4.6	1
SMF4 L58A	SMF4 L58CA	NG	ZG	58	64.40	71.20	1	93.6	4.3	1



### ELECTRICAL CHARACTERISTICS PER LINE@ 25°C UNLESS OTHERWISE SPECIFIED

Part Number		Device Marking Code		Reverse Stand-off Voltage	Breakdown Voltage Min.@IT	Breakdown Voltage Max.@IT	Test Current	Maximum Clamping Voltage @IPP	Peak Pulse Current	Reverse Leakage @VRW M
UNT-POLAR	BI-POLAR	UNI	BI	VRW M(V)	VBR (V)	VBR (V)	IT(mA)	Vc(V)	IPP(A)	IR(uA)
SMF4 L60A	SMF4 L60CA	NK	ZK	60	66.70	73.70	1	96.8	4.1	1
SMF4 L64A	SMF4 L64CA	NM	ZM	64	71.10	78.60	1	103.0	3.9	1
SMF4 L70A	SMF4 L70CA	NP	ZP	70	77.80	86.00	1	113.0	3.5	1
SMF4 L75A	SMF4 L75CA	NR	ZR	75	83.30	92.10	1	121.0	3.3	1
SMF4 L78A	SMF4 L78CA	NT	ZT	78	86.70	95.80	1	126.0	3.2	1
SMF4 L85A	SMF4 L85CA	NV	ZV	85	94.40	104.00	1	137.0	2.9	1
SMF4 L90A	SMF4 L90CA	NX	ZX	90	100.00	111.00	1	146.0	2.7	1
SMF 4L100A	SMF4 L100CA	NZ	ZZ	100	111.00	123.00	1	162.0	2.5	1
SMF 4L110A	SMF4 L110CA	PE	VE	110	122.00	135.00	1	177.0	2.3	1
SMF 4L120A	SMF4 L120CA	PG	VG	120	133.00	147.00	1	193.0	2.1	1
SMF 4L130A	SMF4 L130CA	PK	VK	130	144.00	159.00	1	209.0	1.9	1
SMF 4L150A	SMF4 L150CA	PM	VM	150	167.00	185.00	1	243.0	1.6	1
SMF 4L160A	SMF4 L160CA	PP	VP	160	178.00	197.00	1	259.0	1.5	1
SMF 4L170A	SMF4 L170CA	PR	VR	170	189.00	209.00	1	275.0	1.5	1



### RATINGS AND CHARACTERISTIC CURVES ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

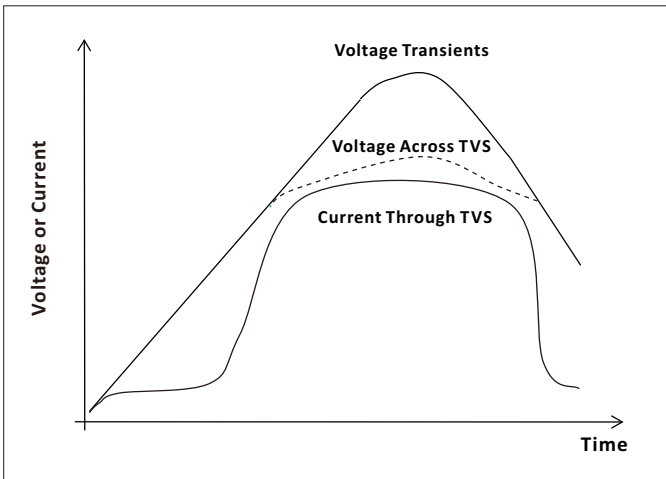


Figure 1 - TVS Transients Clamping Waveform

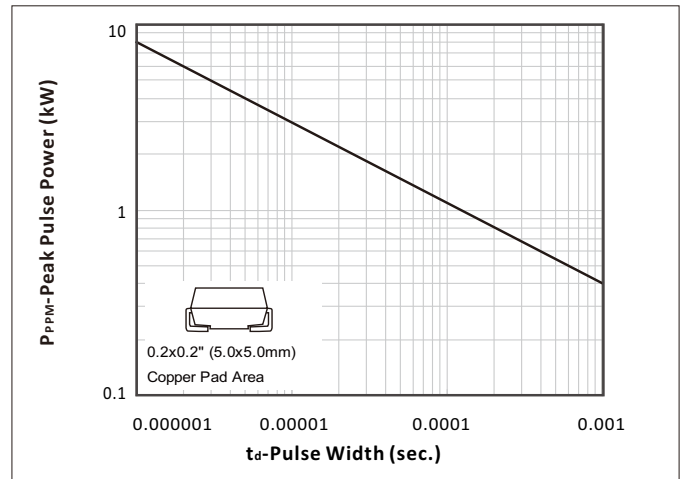


Figure 2 - Peak Pulse Power Rating Curve

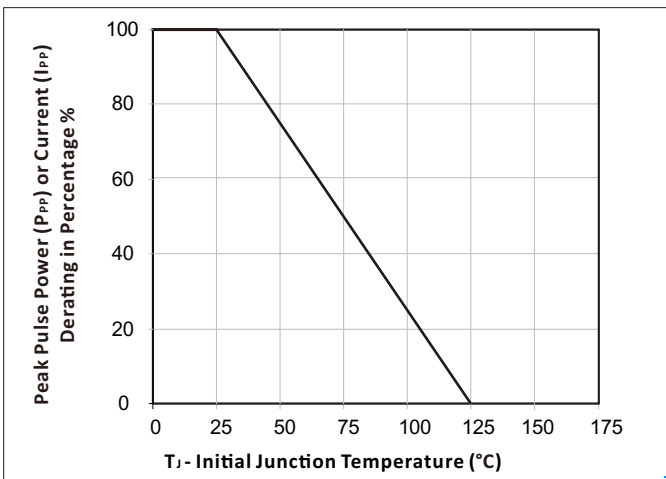


Figure 3 - Peak Pulse Power Derating Curve

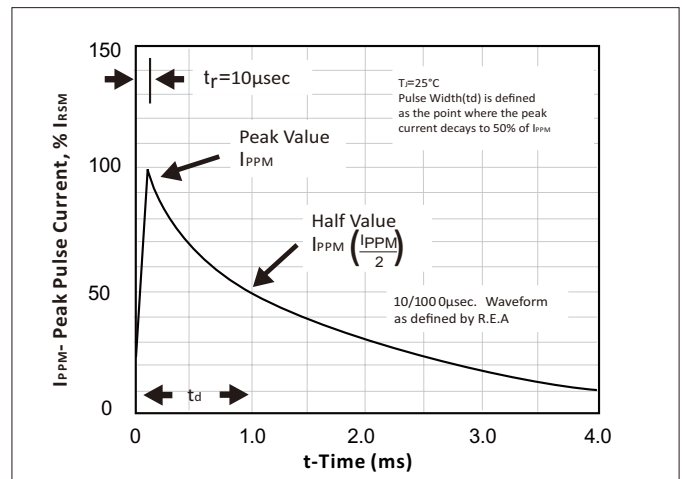


Figure 4 - Pulse Waveform - 10/1000µs

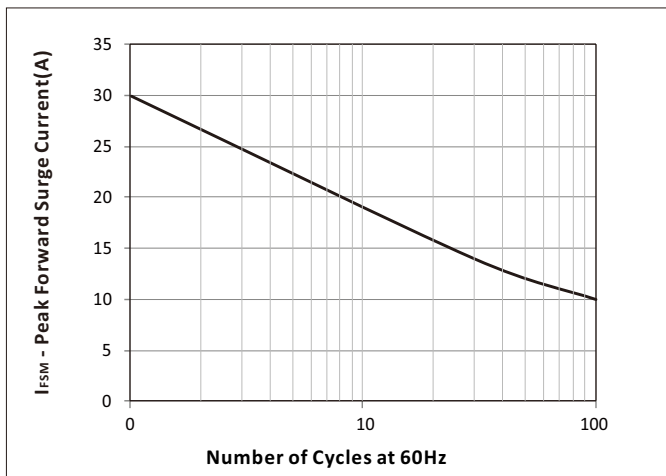
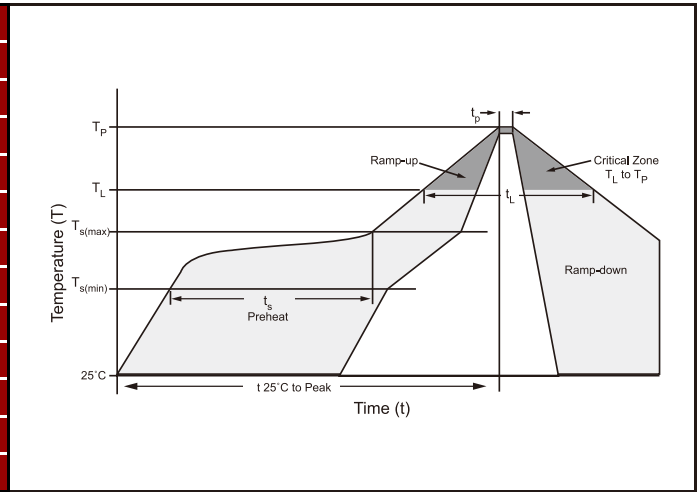


Figure 5 - Maximum Non-Repertive Forward Surge Current Uni-Directional Only

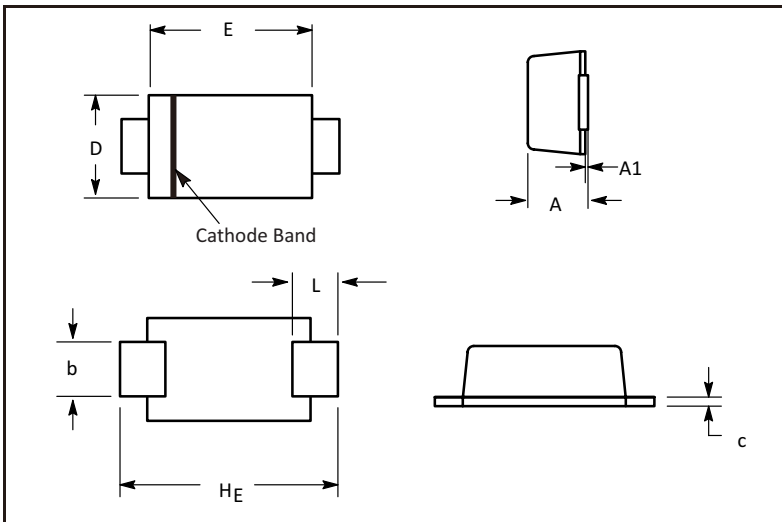


### SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Min (Ts(min))	150°C
	Temperature Max (Ts(max))	200°C
	Time (min to max) (ts)	60 – 180 secs
Average ramp up rate (Liquidus Temp (TL) to peak)		3°C/second max
Ts(max)to TL - Ramp-up Rate		3°C/second max
Reflow	Temperature (TL) (Liquidus)	217°C
	Time (min to max) (tl)	60 – 150 seconds
Peak Temperature (Tp)		260°C
Time within 5°C of actual peak Temperature (tp)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (Tp)		8 minutes Max.
Do not exceed		260°C



### SOD-123FL PACKAGE DIMENSION



DIM	MILLIMETERS		INCHES	
	Min.	Max.	Min.	Max.
A	0.95	1.45	0.037	0.057
A1	0.00	0.10	0.000	0.004
b	0.70	1.20	0.028	0.047
c	0.05	0.30	0.002	0.012
D	1.50	2.00	0.059	0.079
E	2.50	2.90	0.098	0.114
L	0.35	0.90	0.014	0.035
$\frac{H}{E}$	3.40	3.90	0.134	0.154

**NOTES:**  
 1. Dimensions are exclusive of mold flash and metal burrs  
 2. Cathode Band is only applicable to the unidirectional package

### RECOMMENDED PAD LAYOUT DIMENSIONS

DIM	MILLIMETERS	INCHES
A	4.19	0.165
B	0.91	0.036
C	1.22	0.048

