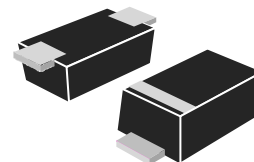


## Transient Voltage Suppression Diodes Surface Mount –400W

### Descriptions

Transient Voltage Suppressors (TVS) are semiconductor devices designed to provide protection against over voltage transients. When over voltage events occur, the silicon TVS activates from an very high impedance status to a very low impedance status by operating in the avalanche mode and uses a large junction area to absorb large transient currents in a fast response time, protecting voltage sensitive electronics equipment from damaging.

Boarden supplies unipolar and bipolar TVS devices with axial and SMD packages, with maximum working voltage 5V to 550V, maximum power dissipation from 200W-5000W.



**SOD123FL**

### Features

- Glass passivated chip junction in SOD123FL Package
- 400W peak pulse power @10/1000 $\mu$ s
- Typical  $I_R$  less than 1 $\mu$ A above 13V
- Low incremental surge resistance
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage/current
- Fast response time: typically less than 1.0ps from 0V to BV min
- EFT protection of data lines in accordance with IEC 61000-4-4
- UL94V-0 Flammability Rating
- Halogen free and RoHS compliant

### Applications

- Telecom and Network
- Industrial Products
- Business Machines
- Vehicles Electronics
- Power Adapter
- Consumer Products
- Security Protection

### Maximum Ratings and Thermal Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 $\mu$ s Test Waveform	P <sub>PPM</sub>	400	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R <sub>uJL</sub>	100	°C/W
Typical Thermal Resistance Junction to Ambient	R <sub>uJA</sub>	220	°C/W

**Notes:**

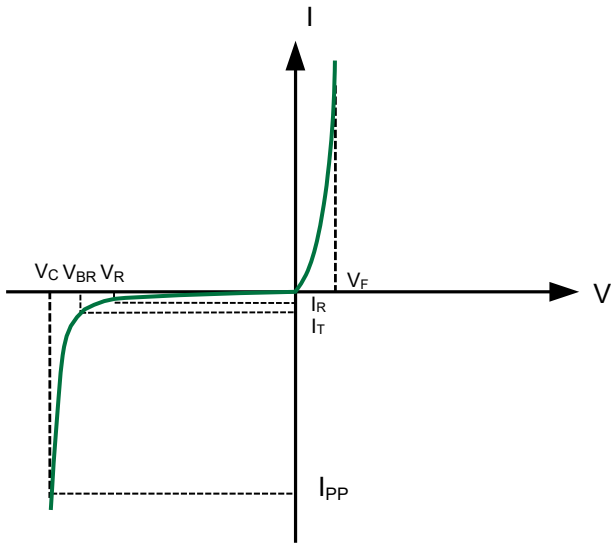
- 1) Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
- 2)  $V_F < 3.5V$  for devices of  $V_{BR} \leq 200V$  and  $V_F < 5.0V$  for devices of  $V_{BR} \geq 201V$ .

**Electrical Characteristics (TA=25°C unless otherwise noted)**

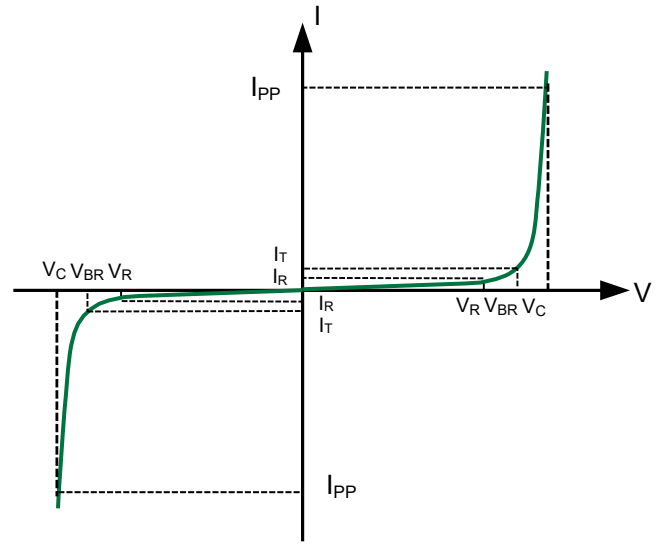
Type Number		V <sub>R</sub>	I <sub>R</sub> @V <sub>R</sub>	V <sub>BR</sub> @I <sub>T</sub> (V)			I <sub>T</sub>	V <sub>C</sub> @I <sub>PP</sub>	I <sub>PP</sub> MAX
Uni	Bi	(V)	(μA)	Min	Nom	Max	(mA)	(V)	(A)
SMF4L5.0A	SMF4L5.0CA	5.0	400	6.40	6.70	7.00	10	9.2	40.1
SMF4L6.0A	SMF4L6.0CA	6.0	400	6.67	7.02	7.37	10	10.3	35.9
SMF4L6.5A	SMF4L6.5CA	6.5	250	7.22	7.60	7.98	10	11.2	33.1
SMF4L7.0A	SMF4L7.0CA	7.0	100	7.78	8.19	8.60	10	12.0	30.9
SMF4L7.5A	SMF4L7.5CA	7.5	50	8.33	8.77	9.21	1	12.9	28.7
SMF4L8.0A	SMF4L8.0CA	8.0	25	8.89	9.36	9.83	1	13.6	27.2
SMF4L8.5A	SMF4L8.5CA	8.5	10	9.44	9.92	10.4	1	14.4	25.7
SMF4L9.0A	SMF4L9.0CA	9.0	5.0	10.0	10.6	11.1	1	15.4	24.1
SMF4L10A	SMF4L10CA	10	2.5	11.1	11.7	12.3	1	17.0	23.5
SMF4L11A	SMF4L11CA	11	2.5	12.2	12.9	13.5	1	18.2	22.0
SMF4L12A	SMF4L12CA	12	2.5	13.3	14.0	14.7	1	19.9	20.1
SMF4L13A	SMF4L13CA	13	1	14.4	15.2	15.9	1	21.5	18.6
SMF4L14A	SMF4L14CA	14	1	15.6	16.4	17.2	1	23.2	17.2
SMF4L15A	SMF4L15CA	15	1	16.7	17.6	18.5	1	24.4	16.4
SMF4L16A	SMF4L16CA	16	1	17.8	18.8	19.7	1	26.0	15.4
SMF4L17A	SMF4L17CA	17	1	18.9	19.9	20.9	1	27.6	14.5
SMF4L18A	SMF4L18CA	18	1	20.0	21.1	22.1	1	29.2	13.7
SMF4L20A	SMF4L20CA	20	1	22.2	23.4	24.5	1	32.4	12.3
SMF4L22A	SMF4L22CA	22	1	24.4	25.7	26.9	1	35.5	11.3
SMF4L24A	SMF4L24CA	24	1	26.7	28.1	29.5	1	38.9	10.3
SMF4L26A	SMF4L26CA	26	1	28.9	30.4	31.9	1	42.1	9.5
SMF4L28A	SMF4L28CA	28	1	31.1	32.8	34.4	1	45.4	8.8
SMF4L30A	SMF4L30CA	30	1	33.3	35.1	36.8	1	48.4	8.3
SMF4L33A	SMF4L33CA	33	1	36.7	38.7	40.6	1	53.3	7.5
SMF4L36A	SMF4L36CA	36	1	40.0	42.1	44.2	1	58.1	6.9
SMF4L40A	SMF4L40CA	40	1	44.4	46.8	49.1	1	64.5	6.2
SMF4L43A	SMF4L43CA	43	1	47.8	50.3	52.8	1	69.4	5.8
SMF4L45A	SMF4L45CA	45	1	50.0	52.7	55.3	1	72.7	5.5
SMF4L48A	SMF4L48CA	48	1	53.3	56.1	58.9	1	77.4	5.2
SMF4L51A	SMF4L51CA	51	1	56.7	59.7	62.7	1	82.4	4.9
SMF4L54A	SMF4L54CA	54	1	60.0	63.2	66.3	1	87.1	4.6
SMF4L58A	SMF4L58CA	58	1	64.4	67.8	71.2	1	93.6	4.3
SMF4L60A	SMF4L60CA	60	1	66.7	70.2	73.7	1	96.8	4.1
SMF4L64A	SMF4L64CA	64	1	71.1	74.9	78.6	1	103	3.9
SMF4L70A	SMF4L70CA	70	1	77.8	81.9	86.0	1	113	3.5
SMF4L75A	SMF4L75CA	75	1	83.3	87.7	92.1	1	121	3.3
SMF4L78A	SMF4L78CA	78	1	86.7	91.3	95.8	1	126	3.2
SMF4L85A	SMF4L85CA	85	1	94.4	99.2	104	1	137	2.9
SMF4L90A	SMF4L90CA	90	1	100	105.5	111	1	146	2.7
SMF4L100A	SMF4L100CA	100	1	111	117.0	123	1	162	2.4

For bidirectional type having V<sub>R</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

I-V Curve Characteristics



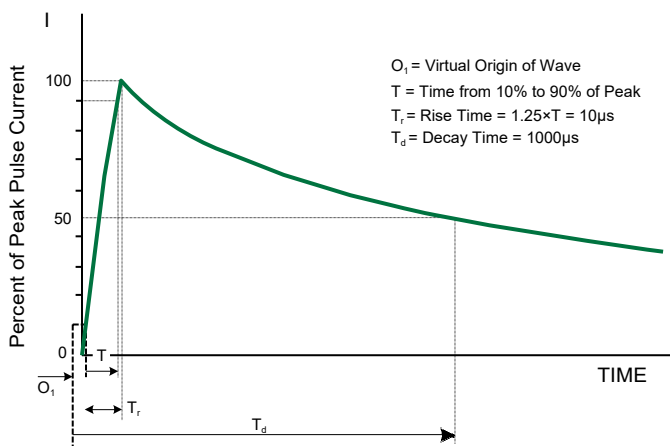
Uni-Directional TVS



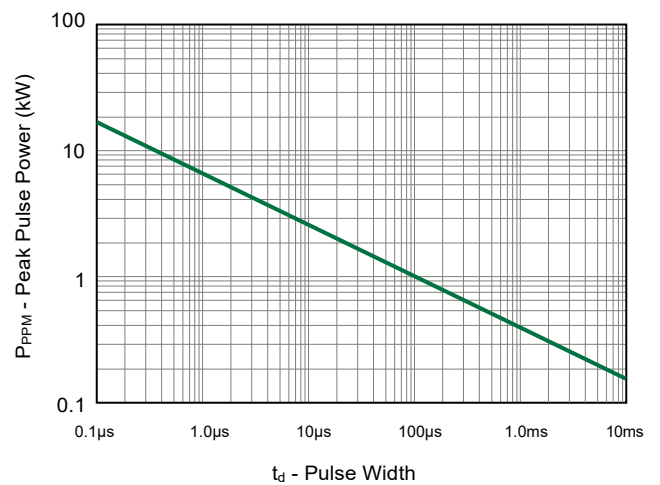
Bi-Directional TVS

- V<sub>R</sub> - Stand-Off Voltage** - Maximum voltage that can be applied to the TVS without operation
- V<sub>BR</sub> - Breakdown Voltage** - Maximum current that flows through the TVS at a specified test current ( $I_T$ )
- I<sub>T</sub> - Test Current** - Test Current
- V<sub>C</sub> - Clamping Voltage** - Peak voltage measured across the suppressor at a specified  $I_{PPM}$  (peak impulse current)
- I<sub>PP</sub> - Peak Pulse Current** - Maximum Reverse Peak Pulse Current
- P<sub>PP</sub> - Peak Pulse Power Dissipation** - Max power dissipation
- I<sub>R</sub> - Reverse Leakage Current** - Current measured at  $V_R$
- V<sub>F</sub> - Forward Voltage** - Drop for Uni-directional

Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

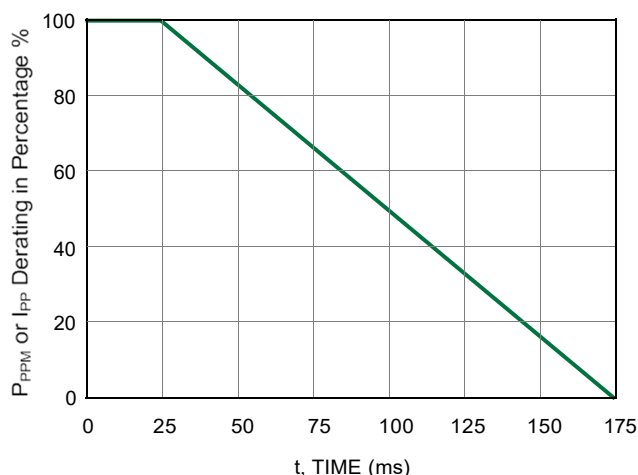


Pulse Waveform- 10/1000µs

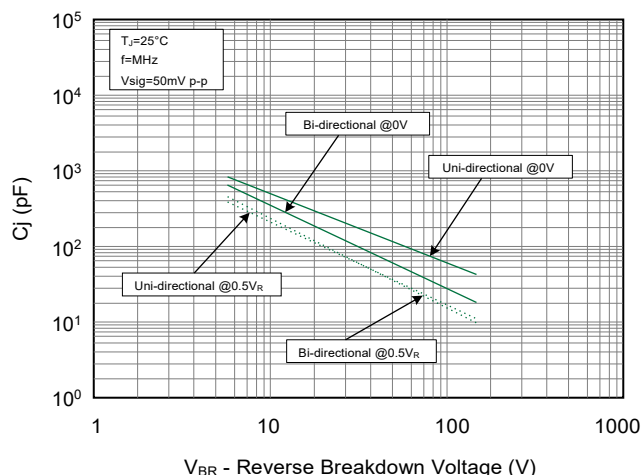


Peak Pulse Power Rating Curve

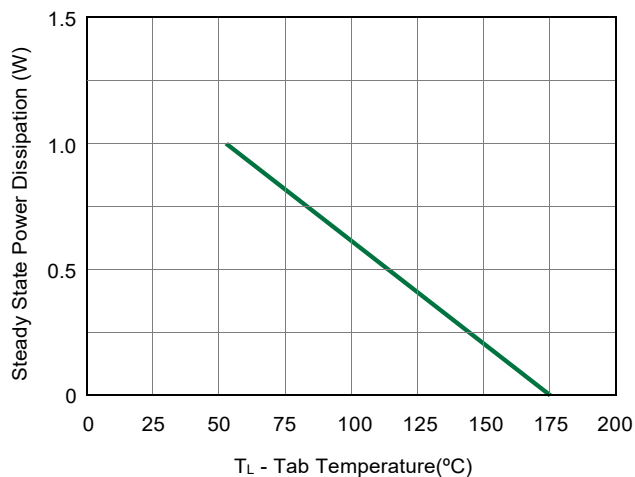
## Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



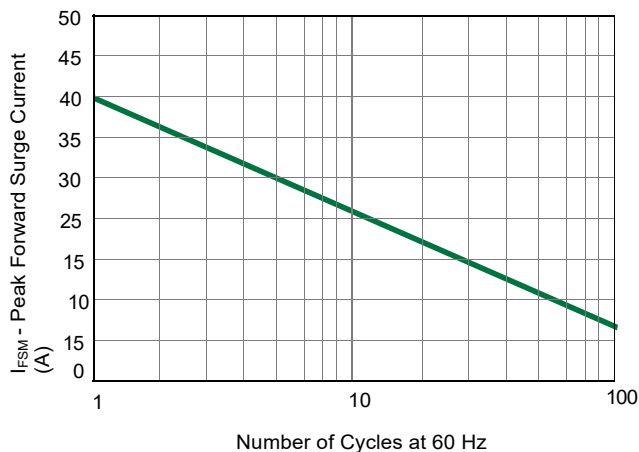
**Pulse Derating Curve**



**Typical Junction Capacitance**



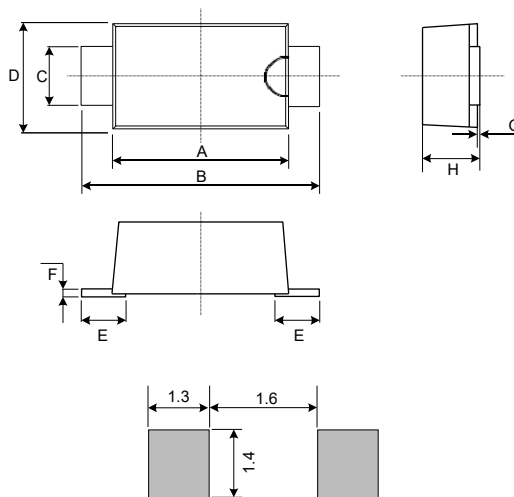
**Steady State Power Derating Curve**



**Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only**

## Product Dimensions

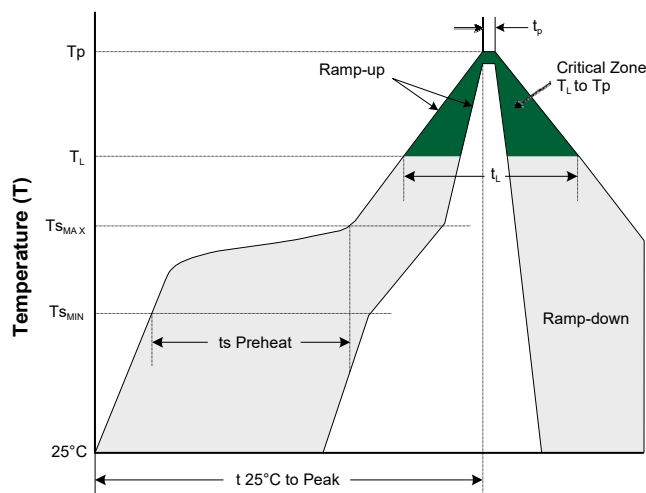
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.0984	0.1142	2.50	2.90
B	0.1339	0.1535	3.40	3.90
C	0.0275	0.0472	0.70	1.20
D	0.0591	0.0787	1.50	2.00
E	0.0138	0.0354	0.35	0.90
F	0.0020	0.0102	0.05	0.26
G	0.0000	0.0039	0.00	0.10
H	0.0354	0.0472	0.90	1.12



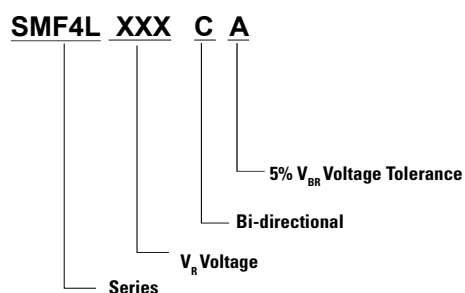
**Mounting Pad Layout (mm)**

## Soldering Parameters

Profile Feature	Lead-Free Assembly
Average Ramp-up Rate ( $T_{S_{MAX}}$ to $T_p$ ) Average Ramp-down Rate ( $T_p$ to $T_L$ )	3°C/second max. 6°C/second max.
<b>Preheat</b> • Temperature Min ( $T_{S_{MIN}}$ ) • Temperature Max ( $T_{S_{MAX}}$ ) • Time ( $t_s$ Preheat)	150°C 200°C 60-180 seconds
<b>Time maintained above:</b> • Temperature ( $T_L$ ) • Time ( $t_L$ )	217°C 60-150 seconds
<b>Peak/Classification Temperature</b> • Temperature ( $T_p$ )	260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual Peak</b> Time ( $t_p$ )	20-40 seconds
<b>Time 25°C to peak Temperature</b>	8 minutes max
<b>Do not exceed</b>	260 °C



## Part Numbering System



## Order Information

Device	Package	Quantity	Tape
SMF4Lseries	SOD-123FL	3000	7" Reel