

## Features

- Surface Mount SOD-123FL package
- Standoff Voltage: 5 to 85 volts
- Power Dissipation: 400 watts
- RoHS compliant\*
- AEC-Q101 compliant\*\*

## Applications

- Protection of power buses
- Protection of I/O interfaces
- Overvoltage transient protection
- Telecom, computer, industrial and consumer electronics applications

# SMF4L-Q Transient Voltage Suppressor Diode Series

### General Information

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package SOD-123FL size format. The Transient Voltage Suppressor series offers a choice of Working Peak Reverse Voltage from 5 V up to 85 V. Typical fast response times are less than 1.0 picosecond from 0 V to Breakdown Voltage.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and the flat configuration minimizes roll away.

### Additional Information

Click these links for more information:



### Absolute Maximum Ratings (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Value	Unit
Maximum Peak Pulse Power Dissipation (10/1000 μs) <sup>1</sup>	P <sub>PPM</sub>	400	W
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method)	I <sub>FSM</sub>	50	A
Operating Temperature Range	T <sub>J</sub>	-55 to +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

<sup>1</sup> Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C.

### Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Unidirectional Device		Breakdown Voltage V <sub>BR</sub> (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V <sub>RWM</sub>	Maximum Reverse Voltage @ I <sub>RSM</sub>	Maximum Reverse Surge Current
Part No.	Marking	Min.	Max.	@ I <sub>T</sub> (mA)	V <sub>RWM</sub> (V)	I <sub>R</sub> (μA)	V <sub>RSM</sub> (V)	I <sub>RSM</sub> (A)
SMF4L5.0A-Q	KEQ	6.4	7.00	10	5	400	9.2	21.7
SMF4L6.0A-Q	KGQ	6.67	7.37	10	6	400	10.3	19.4
SMF4L6.5A-Q	KKQ	7.22	7.98	10	6.5	250	11.2	17.9
SMF4L7.0A-Q	KMQ	7.78	8.6	10	7	100	12.0	16.7
SMF4L7.5A-Q	KPQ	8.33	9.21	1.0	7.5	50	12.9	15.5
SMF4L8.0A-Q	KRQ	8.89	9.83	1.0	8	25	13.6	14.7
SMF4L8.5A-Q	KTQ	9.44	10.4	1.0	8.5	10	14.4	13.9
SMF4L9.0A-Q	KVQ	10.0	11.1	1.0	9	5	15.4	13.0
SMF4L10A-Q	KXQ	11.1	12.3	1.0	10	2.5	17.0	11.8
SMF4L11A-Q	KZQ	12.2	13.5	1.0	11	2.5	18.2	11.0
SMF4L12A-Q	LEQ	13.3	14.7	1.0	12	1.0	19.9	20.1
SMF4L13A-Q	LGQ	14.4	15.9	1.0	13	1.0	21.5	18.6
SMF4L14A-Q	LKQ	15.6	17.2	1.0	14	1.0	23.2	17.2
SMF4L15A-Q	LMQ	16.7	18.5	1.0	15	1.0	24.4	16.4
SMF4L16A-Q	LPQ	17.8	19.7	1.0	16	1.0	26.0	15.4
SMF4L17A-Q	LRQ	18.9	20.9	1.0	17	1.0	27.6	14.5
SMF4L18A-Q	LTQ	20.0	22.1	1.0	18	1.0	29.2	13.7

~ Continued on next page ~



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.  
 \*\*"Q" part number suffix for automotive and other applications requiring appropriate AEC-Q101 compliance.

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# SMF4L-Q Transient Voltage Suppressor Diode Series

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## Electrical Characteristics - Continued (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Unidirectional Device		Breakdown Voltage V <sub>BR</sub> (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V <sub>RWM</sub>	Maximum Reverse Voltage @ I <sub>RSM</sub>	Maximum Reverse Surge Current
Part No.	Marking	Min.	Max.	@ I <sub>T</sub> (mA)	V <sub>RWM</sub> (V)	I <sub>R</sub> (μA)	V <sub>RSM</sub> (V)	I <sub>RSM</sub> (A)
SMF4L20A-Q	LVQ	22.2	24.5	1.0	20	1.0	32.4	12.3
SMF4L22A-Q	LXQ	24.4	26.9	1.0	22	1.0	35.5	11.3
SMF4L24A-Q	LZQ	26.7	29.5	1.0	24	1.0	38.9	10.3
SMF4L26A-Q	MEQ	28.9	31.9	1.0	26	1.0	42.1	9.5
SMF4L28A-Q	MGQ	31.1	34.4	1.0	28	1.0	45.4	8.8
SMF4L30A-Q	MKQ	33.3	36.8	1.0	30	1.0	48.4	8.3
SMF4L33A-Q	MMQ	36.7	40.6	1.0	33	1.0	53.3	7.5
SMF4L36A-Q	MPQ	40.0	44.2	1.0	36	1.0	58.1	6.9
SMF4L40A-Q	MRQ	44.4	49.1	1.0	40	1.0	64.5	6.2
SMF4L43A-Q	MTQ	47.8	52.8	1.0	43	1.0	69.4	5.8
SMF4L45A-Q	MVQ	50.0	55.3	1.0	45	1.0	72.7	5.5
SMF4L48A-Q	MXQ	53.3	58.9	1.0	48	1.0	77.4	5.2
SMF4L51A-Q	MZQ	56.7	62.7	1.0	51	1.0	82.4	4.9
SMF4L54A-Q	NEQ	60.0	66.3	1.0	54	1.0	87.1	4.6
SMF4L58A-Q	NGQ	64.4	71.2	1.0	58	1.0	93.6	4.3
SMF4L60A-Q	NKQ	66.7	73.7	1.0	60	1.0	96.8	3.6
SMF4L64A-Q	NMQ	71.1	78.6	1.0	64	1.0	103.0	3.4
SMF4L70A-Q	NPQ	77.8	86.0	1.0	70	1.0	113.0	3.0
SMF4L75A-Q	NRQ	83.3	92.1	1.0	75	1.0	121.0	2.8
SMF4L78A-Q	NTQ	86.7	95.8	1.0	78	1.0	126.0	2.8
SMF4L85A-Q	NVQ	94.4	104.0	1.0	85	1.0	137.0	2.6

**NEW!**

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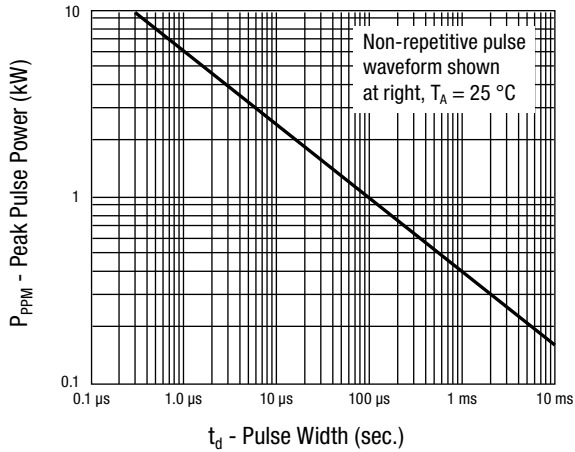
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# SMF4L-Q Transient Voltage Suppressor Diode Series

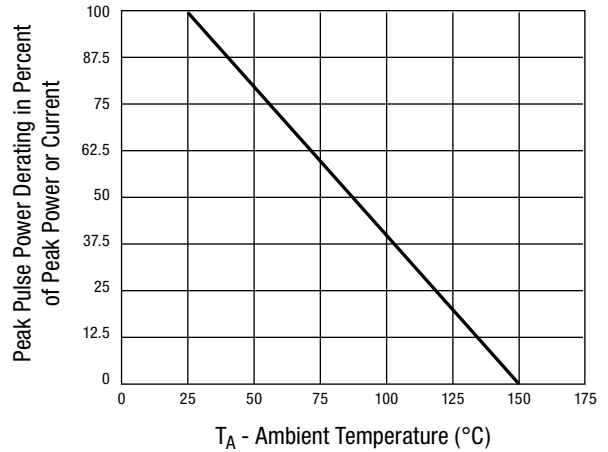


## Performance Graphs

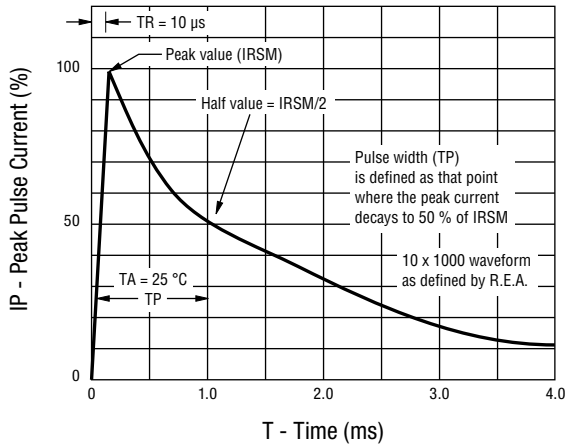
### Peak Pulse Power Derating Curve



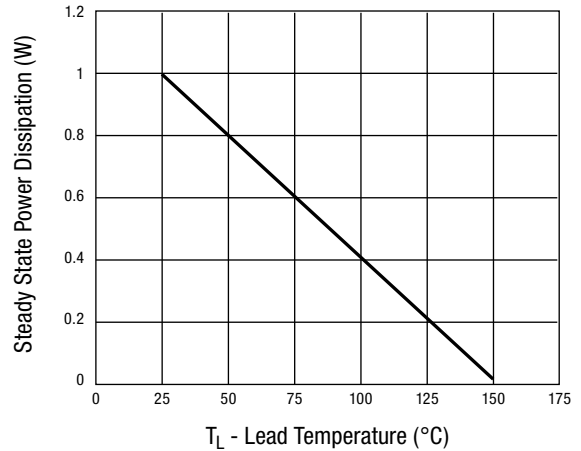
### Maximum Non-Repetitive Surge Current



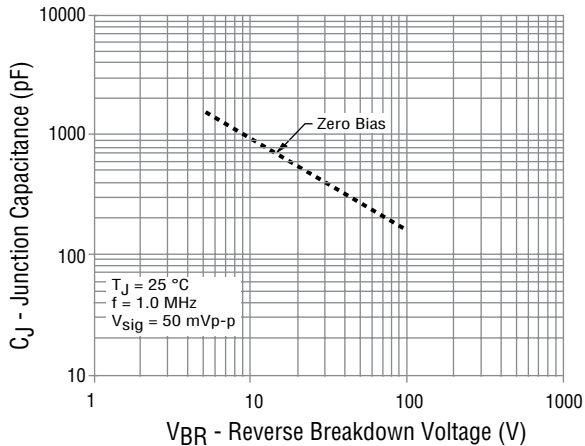
### Pulse Waveform



### Steady State Power Derating Curve



### Typ. Junction Capacitance vs. Reverse Breakdown Voltage

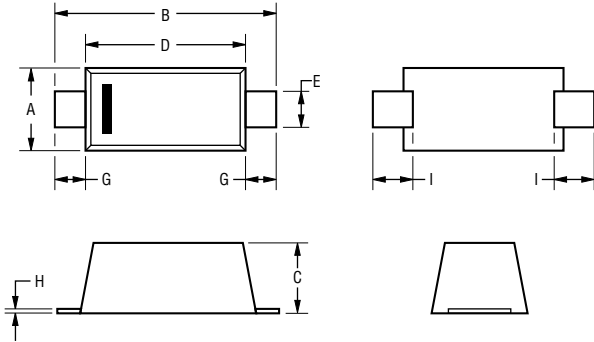


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# SMF4L-Q Transient Voltage Suppressor Diode Series



## Product Dimensions



Dimension	SMF (SOD-123FL)
A	$\frac{1.65 \pm 0.25}{(0.065 \pm 0.01)}$
B	$\frac{3.70 \pm 0.15}{(0.146 \pm 0.006)}$
C	$\frac{1.125 \pm 0.225}{(0.044 \pm 0.009)}$
D	$\frac{2.825 \pm 0.275}{(0.111 \pm 0.011)}$
E	$\frac{0.775 \pm 0.275}{(0.031 \pm 0.011)}$
G	$\frac{0.400 \pm 0.15}{(0.016 \pm 0.006)}$
H	$\frac{0.175 \pm 0.075}{(0.007 \pm 0.003)}$
I	$\frac{0.550 \pm 0.15}{(0.022 \pm 0.006)}$

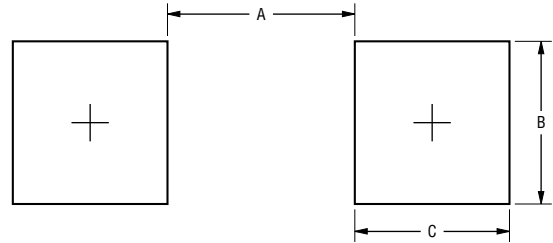
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Typical Part Marking



- CATHODE BAND
- MANUFACTURER'S TRADEMARK
- DEVICE CODE (MARKING CODE DEFINED ON PAGE 1)
- DATE CODE: MONTH AND YEAR OF MANUFACTURE  
Y: YEAR (LAST DIGIT)  
M: MONTH (JAN-SEPT = 1-9, OCT-DEC = A,B,C)

## Recommended Footprint



Dimension	SMF (SOD-123FL)
A (Max.)	$\frac{2.36}{(0.093)}$
B (Min.)	$\frac{1.22}{(0.048)}$
C (Min.)	$\frac{0.91}{(0.036)}$

DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Physical Specifications

Case ..... Molded plastic per UL Class 94V-0  
Polarity..... Cathode band indicates unidirectional device

## How to Order

Package SMF4L 5.0 A-Q  
 SMF4L = 400W SMF/SOD-123FL Package  
 Working Peak Reverse Voltage 5.0 = 5 V<sub>RWM</sub> (Volts)  
 Suffix A - Q  
 A = 5 % Tolerance Unidirectional Device  
 AEC-Q101 Suffix Q  
 Q = AEC-Q101 Compliant

## Environmental Specifications

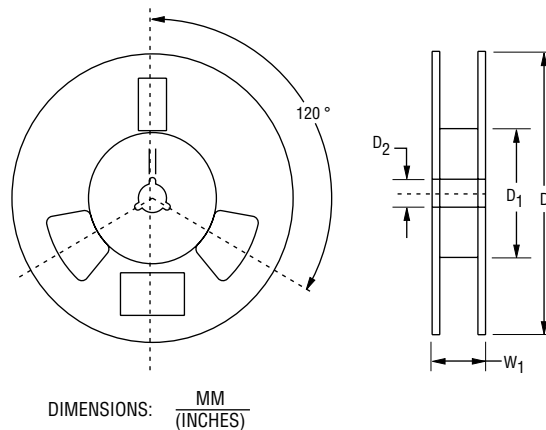
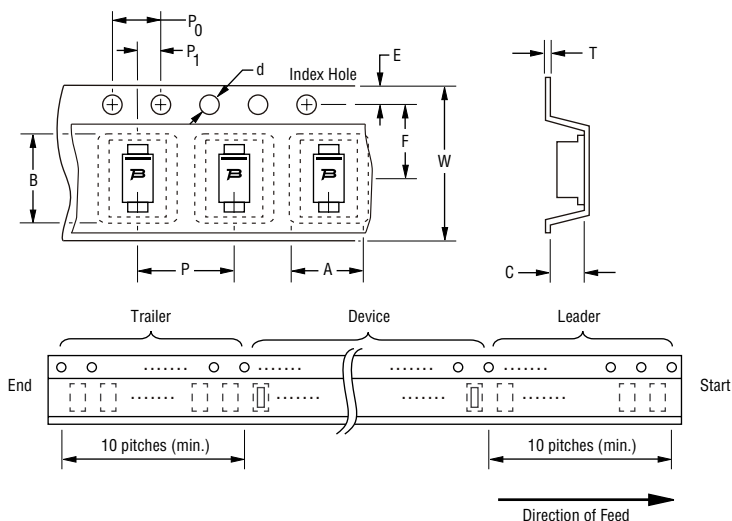
Moisture Sensitivity Level ..... 1  
ESD Classification (HBM) ..... 3B

# SMF4L-Q Transient Voltage Suppressor Diode Series

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## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Devices are packed in accordance with EIA 481 standard specifications shown here.

Item	Symbol	SMF4L-Q Series
Carrier Width	A	$\frac{1.9 \pm 0.20}{(0.075 \pm 0.008)}$
Carrier Length	B	$\frac{4.01 \pm 0.20}{(0.158 \pm 0.008)}$
Carrier Depth	C	$\frac{1.32 \pm 0.20}{(0.052 \pm 0.008)}$
Sprocket Hole	d	$\frac{1.50 + 0.10 / - 0.00}{(0.059 + 0.004 / - 0.00)}$
Reel Outside Diameter	D	$\frac{178}{(7.008)}$
Reel Inner Diameter	D <sub>1</sub>	$\frac{50.0}{(1.969)}$ MIN.
Feed Hole Diameter	D <sub>2</sub>	$\frac{13.0 + 0.50 / - 0.20}{(0.512 + 0.020 / - 0.008)}$
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
Punch Hole Position	F	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$
Punch Hole Pitch	P	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Sprocket Hole Pitch	P <sub>0</sub>	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Embossment Center	P <sub>1</sub>	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$
Overall Tape Thickness	T	$\frac{0.40}{(0.016)}$ MAX.
Tape Width	W	$\frac{8.00 \pm 0.30}{(0.315 \pm 0.012)}$
Reel Width	W <sub>1</sub>	$\frac{14.4}{(5.669)}$ MAX.
Quantity per Reel	--	2,500

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