

TVS Diode – SMF4L Series

Features

- Plastic package, excellent insulation strength.
- Glass passivated chip junction in SOD-123 package.
- Excellent voltage clamping capability.
- Low Zener impedance.
- 400W peak pulse power capability on 10/1000 μ s waveform.
- Typical leakage current less than 1 μ A above 11V.
- Very fast response time, typically less than 1.0ps from 0 volt to V_{BR} minimum.
- High temperature soldering guaranteed: 265°C/10 sec.
- MSL: JEDEC-J-STD-020, Level 1

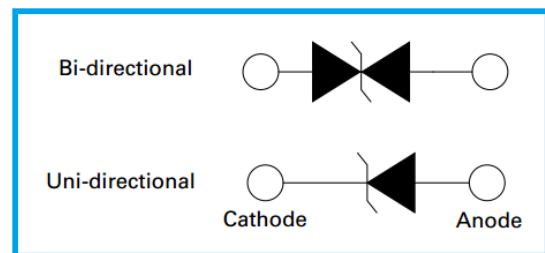


Applications

- I/O interface, V_{CC} bus
- Telecom
- Industrial and consumer electronic applications.
- Relay and electromagnetic valve surge absorption.

Agency Approval

- Pending



Mechanical and Physical Data

- Case: JEDEC SMF molded plastic.
- Surface mount device, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted cathode

Maximum Ratings and Thermal Characteristics

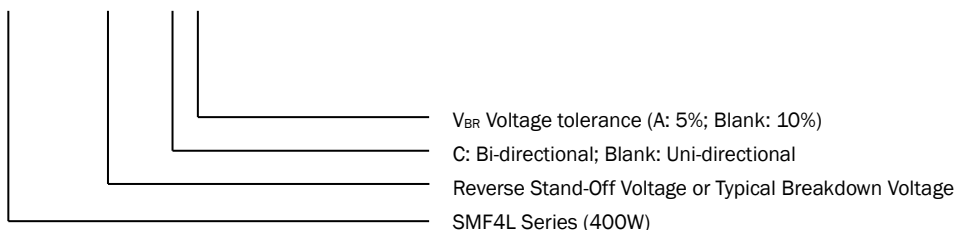
Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1, Fig.5).	P_{PPM}	Min 400 ⁽³⁾	W
Peak Pulse Current of 10/1000 μ s waveform (Note 1, Fig.3).	I_{PPM}	See Table	A
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2).	I_{FSM}	30	A
Maximum Instant Forward Voltage at 25A for Unidirectional Only	V_F	3.5	V
Operating Junction and Storage Temperature Range.	T_J, T_{STG}	-55~150	°C

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A = 25^\circ\text{C}$ per Fig.1
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
3. SMF4L5.0A~SMF4L15A Peak Pulse Power Dissipation is 350W min.

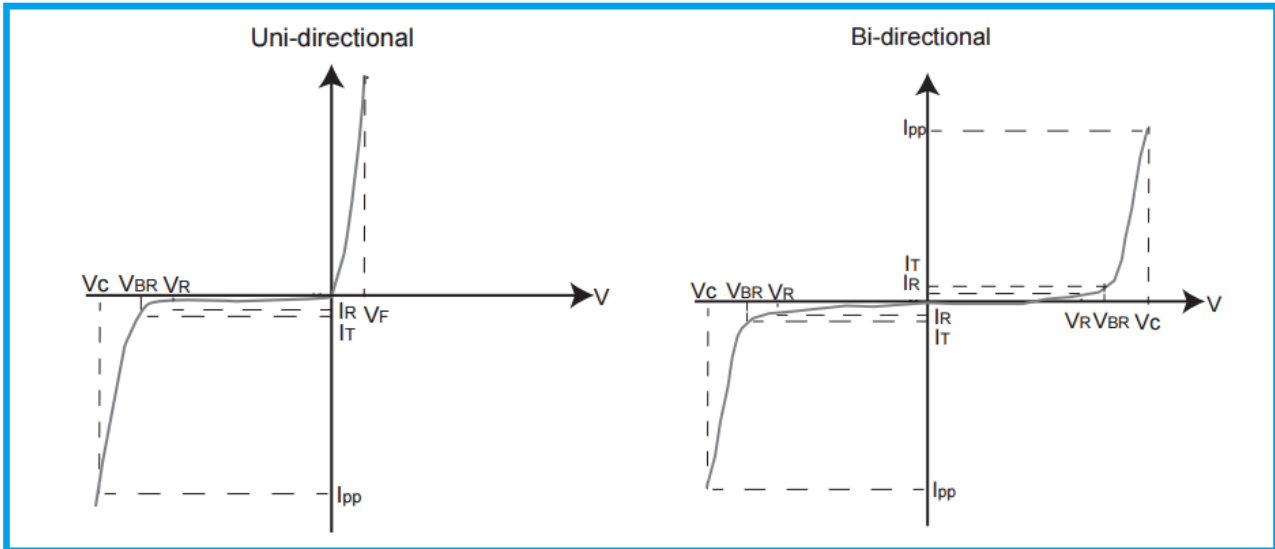
Part Number Code

SMF4L □□□ C A



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I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Maximum power dissipation

V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation

V_{BR} Breakdown Voltage – Maximum voltage that flows through the TVS at a specified test current (I_T)

V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (Peak Impulse Current)

I_R Reverse Leakage Current – Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

Electrical Characteristics

Part Number		Marking		Reverse Stand Off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C (V) @ I_{PPM}	Maximum Peak Pulse Current I_{PPM} (A)	Maximum Reverse Leakage I_R (μ A) @ V_R
Uni	Bi	Uni	Bi		Min.	Max.				
SMF4L5.0A	SMF4L5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	38.0	800
SMF4L6.0A	SMF4L6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	33.8	800
SMF4L6.5A	SMF4L6.5CA	KK	AA	6.5	7.22	7.98	10	11.2	31.2	500
SMF4L7.0A	SMF4L7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	29.1	200
SMF4L7.5A	SMF4L7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	27.1	100
SMF4L8.0A	SMF4L8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	25.7	50
SMF4L8.5A	SMF4L8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	24.3	20
SMF4L9.0A	SMF4L9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	22.7	10
SMF4L10A	SMF4L10CA	KX	AX	10	11.10	12.30	1	17.0	20.5	5
SMF4L11A	SMF4L11CA	KZ	AZ	11	12.20	13.50	1	18.2	19.2	1
SMF4L12A	SMF4L12CA	LE	BE	12	13.30	14.70	1	19.9	17.5	1
SMF4L13A	SMF4L13CA	LG	BG	13	14.40	15.90	1	21.5	16.2	1
SMF4L14A	SMF4L14CA	LK	BK	14	15.60	17.20	1	23.2	15.0	1
SMF4L15A	SMF4L15CA	LM	BM	15	16.70	18.50	1	24.4	14.3	1
SMF4L16A	SMF4L16CA	LP	BP	16	17.80	19.70	1	26.0	15.4	1
SMF4L17A	SMF4L17CA	LR	BR	17	18.90	20.90	1	27.6	14.5	1
SMF4L18A	SMF4L18CA	LT	BT	18	20.00	22.10	1	29.2	13.7	1

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Part Number		Marking		Reverse Stand Off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C (V) @ I_{PP}	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R (μ A) @ V_R
Uni	Bi	Uni	Bi		Min.	Max.				
SMF4L20A	SMF4L20CA	LV	BV	20	22.20	24.50	1	32.4	12.3	1
SMF4L22A	SMF4L22CA	LX	BX	22	24.40	26.90	1	35.5	11.3	1
SMF4L24A	SMF4L24CA	LZ	BZ	24	26.70	29.50	1	38.9	10.3	1
SMF4L26A	SMF4L26CA	ME	CE	26	28.90	31.90	1	42.1	9.5	1
SMF4L28A	SMF4L28CA	MG	CG	28	31.10	34.40	1	45.4	8.8	1
SMF4L30A	SMF4L30CA	MK	CK	30	33.30	36.80	1	48.4	8.3	1
SMF4L33A	SMF4L33CA	MM	CM	33	36.70	40.60	1	53.3	7.5	1
SMF4L36A	SMF4L36CA	MP	CP	36	40.00	44.20	1	58.1	6.9	1
SMF4L40A	SMF4L40CA	MR	CR	40	44.40	49.10	1	64.5	6.2	1
SMF4L43A	SMF4L43CA	MT	CT	43	47.80	52.80	1	69.4	5.8	1
SMF4L45A		MV		45	50.00	55.30	1	72.7	5.5	1
SMF4L48A		MX		48	53.30	58.90	1	77.4	5.2	1
SMF4L51A		MZ		51	56.70	62.70	1	82.4	4.9	1
SMF4L54A		NE		54	60.00	66.30	1	87.1	4.6	1
SMF4L58A		NG		58	64.40	71.20	1	93.6	4.3	1
SMF4L60A		NK		60	66.70	73.70	1	96.8	4.1	1
SMF4L64A		NM		64	71.10	78.60	1	103.0	3.9	1
SMF4L70A		NP		70	77.80	86.00	1	113.0	3.5	1
SMF4L75A		NR		75	83.30	92.10	1	121.0	3.3	1
SMF4L78A		NT		78	86.70	95.80	1	126.0	3.2	1
SMF4L85A		NV		85	94.40	104.0	1	137.0	2.9	1

Note:

1. For SMF4L5.0A~SMF4L15A Peak Pulse Power Dissipation is 350W min.

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Ratings and Characteristic Curves

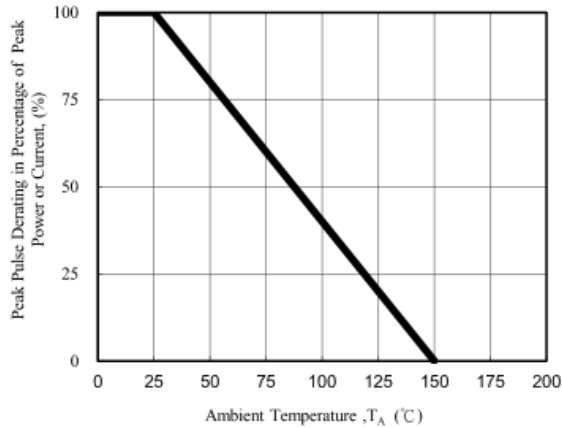


Fig. 1 - Pulse Derating Curve

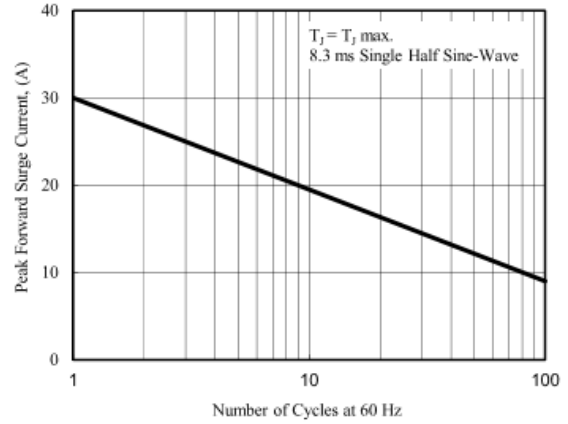


Fig. 2 - Maximum Non-Repetitive

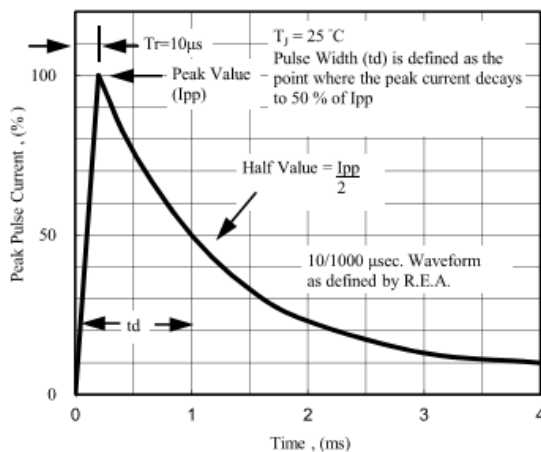


Fig. 3 - Pulse Waveform

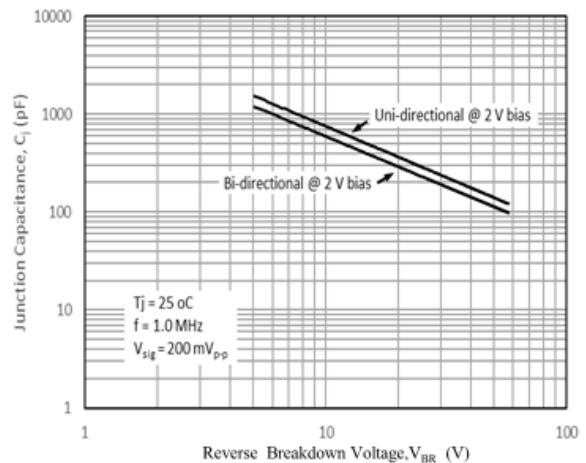


Fig. 4 - Typical Junction Capacitance

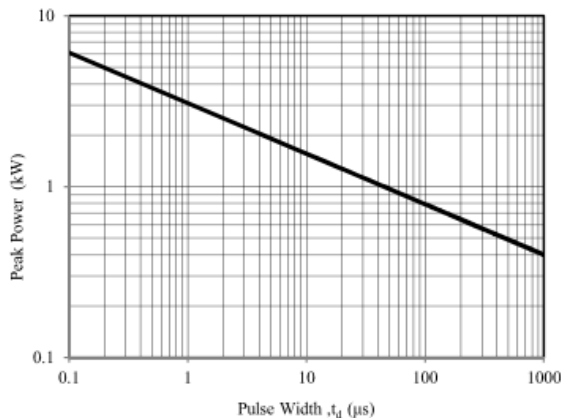
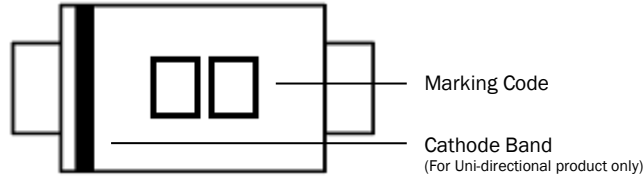


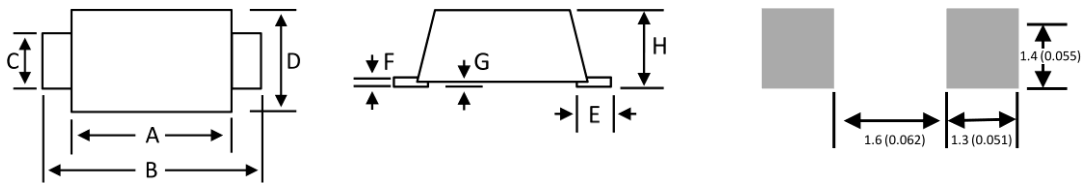
Fig. 5 - Steady State Power Derating Curve

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Marking Definitions



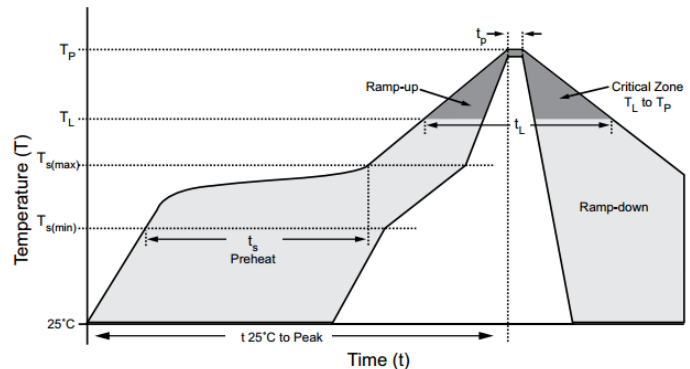
Physical Dimensions



Dimension	Millimeters		Inches	
	Min	Max	Min	Max
A	2.50	2.90	0.0984	0.1142
B	3.40	3.90	0.1339	0.1535
C	0.70	1.20	0.0275	0.0472
D	1.50	2.00	0.0591	0.0787
E	0.35	0.90	0.0138	0.0354
F	0.05	0.26	0.0020	0.0102
G	-	0.10	-	0.0039
H	0.95	1.30	0.0374	0.0512

Lead Free Reflow Soldering Recommendations

Preheat	
- Temperature Min (T_{s_min})	150°C
- Temperature Max (T_{s_max})	200°C
- Time (T_{s_min} to T_{s_max})	60-180 seconds
- Average Ramp-Up Rate	1~3°C/second
Peak Temperature	260°C max.
Time within 5°C of actual Peak Temperature (t_p)	40 seconds max.
Ramp-Down Rate	6 °C /second max.



Note: If the soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.

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Packaging Information

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMF4L Series	SOD-123	3000	Tape & Reel – 8mm tape/7" reel	EIA STD RS-481

Tape and Reel Specifications

