

TPSMF4L Series

Surface Mount – 400W

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number	Marking Code	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Reverse Stand off Voltage V_R (V)	Maximum Reverse Leakage @ V_R , I_R (μA)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Clamping Voltage @ I_{PP} , V_C (V)	Agency Approval
		Min	Max						
TPSMF4L5.0A	KEA	6.40	7.00	10	5.0	800	40.1	9.2	X
TPSMF4L6.0A	KGA	6.67	7.37	10	6.0	800	35.9	10.3	X
TPSMF4L6.5A	KKA	7.22	7.98	10	6.5	500	33.1	11.2	X
TPSMF4L7.0A	KMA	7.78	8.60	10	7.0	200	30.9	12.0	X
TPSMF4L7.5A	KPA	8.33	9.21	1	7.5	100	28.7	12.9	X
TPSMF4L8.0A	KRA	8.89	9.83	1	8.0	50	27.2	13.6	X
TPSMF4L8.5A	KTA	9.44	10.40	1	8.5	20	25.7	14.4	X
TPSMF4L9.0A	KVA	10.00	11.10	1	9.0	5	26.4	15.4	X
TPSMF4L10A	KXA	11.10	12.30	1	10	5	23.5	17.0	X
TPSMF4L11A	KZA	12.20	13.50	1	11	1	22.0	18.2	X
TPSMF4L12A	LEA	13.30	14.70	1	12	1	20.1	19.9	X
TPSMF4L13A	LGA	14.40	15.90	1	13	1	18.6	21.5	X
TPSMF4L14A	LKA	15.60	17.20	1	14	1	17.2	23.2	X
TPSMF4L15A	LMA	16.70	18.50	1	15	1	16.4	24.4	X
TPSMF4L16A	LPA	17.80	19.70	1	16	1	15.4	26.0	X
TPSMF4L17A	LRA	18.90	20.90	1	17	1	14.5	27.6	X
TPSMF4L18A	LTA	20.00	22.10	1	18	1	13.7	29.2	X
TPSMF4L20A	LVA	22.20	24.50	1	20	1	12.3	32.4	X
TPSMF4L22A	LXA	24.40	26.90	1	22	1	11.3	35.5	X
TPSMF4L24A	LZA	26.70	29.50	1	24	1	10.3	38.9	X
TPSMF4L26A	MEA	28.90	31.90	1	26	1	9.5	42.1	X
TPSMF4L28A	MGA	31.10	34.40	1	28	1	8.8	45.4	X
TPSMF4L30A	MKA	33.30	36.80	1	30	1	8.3	48.4	X
TPSMF4L33A	MMA	36.70	40.60	1	33	1	7.5	53.3	X
TPSMF4L36A	MPA	40.00	44.20	1	36	1	6.9	58.1	X
TPSMF4L40A	MRA	44.40	49.10	1	40	1	6.2	64.5	X
TPSMF4L43A	MTA	47.80	52.80	1	43	1	5.8	69.4	X
TPSMF4L45A	MVA	50.00	55.30	1	45	1	5.5	72.7	X
TPSMF4L48A	MXA	53.30	58.90	1	48	1	5.2	77.4	X
TPSMF4L51A	MZA	56.70	62.70	1	51	1	4.9	82.4	X
TPSMF4L54A	NEA	60.00	66.30	1	54	1	4.6	87.1	X
TPSMF4L58A	NGA	64.40	71.20	1	58	1	4.3	93.6	X
TPSMF4L60A	NKA	66.70	73.70	1	60	1	4.1	96.8	X
TPSMF4L64A	NMA	71.10	78.60	1	64	1	3.9	103.0	X
TPSMF4L70A	NPA	77.80	86.00	1	70	1	3.5	113.0	X
TPSMF4L75A	NRA	83.30	92.10	1	75	1	3.3	121.0	X
TPSMF4L78A	NTA	86.70	95.80	1	78	1	3.2	126.0	X
TPSMF4L85A	NVA	94.40	104.00	1	85	1	2.9	137.0	X

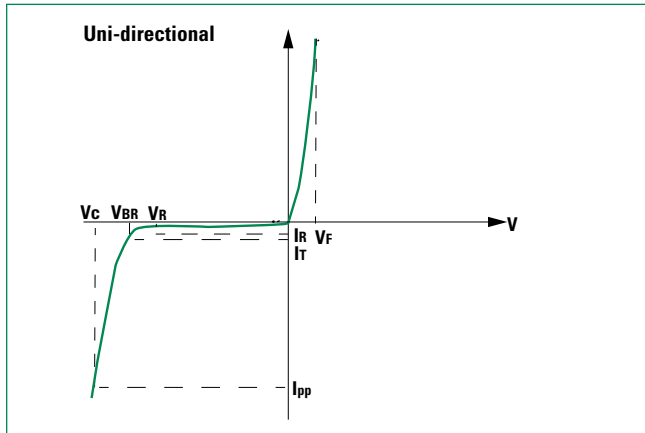
Notes:

1. V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent.
2. Surge current waveform per 10/1000 μs exponential wave and derated per Fig.3.
3. All terms and symbols are consistent with ANSI/IEEE C62.35.

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I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation – Max 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_r)
 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

Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Figure 1 -
TVS Transients Clamping Waveform

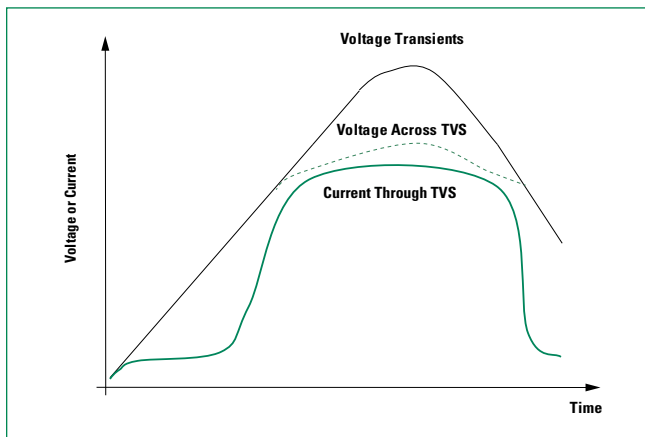
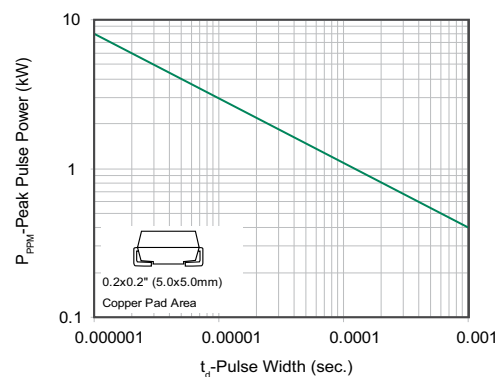


Figure 2 -
Peak Pulse Power Rating Curve



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Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

Figure 3 -
Peak Pulse Power Derating Curve

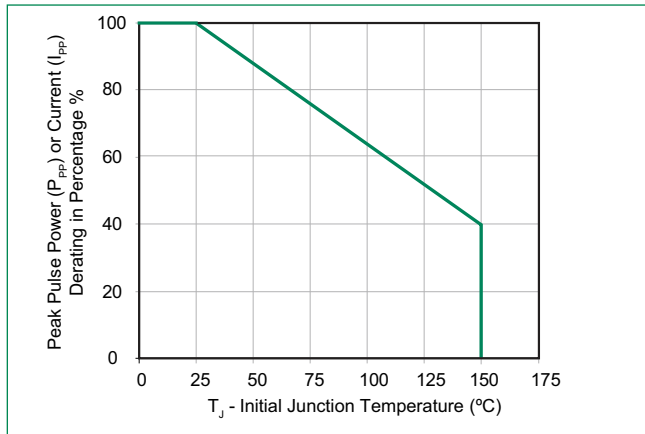


Figure 4 -
Pulse Waveform - 10/1000 μs

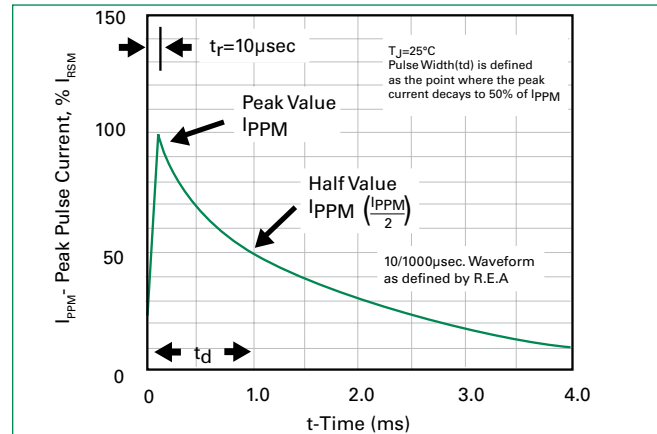


Figure 5 -
Forward Voltage

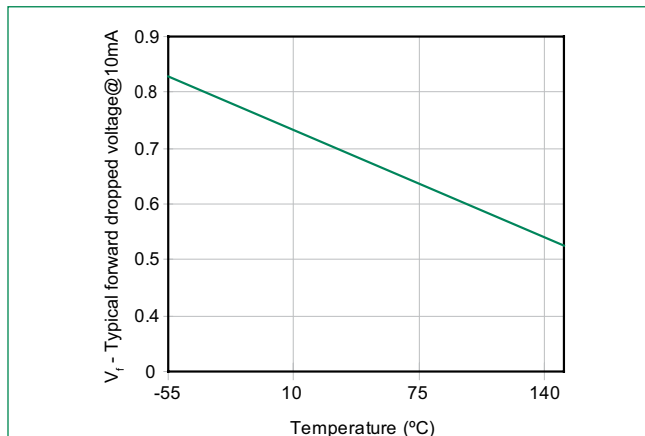


Figure 6 -
Typical Junction Capacitance

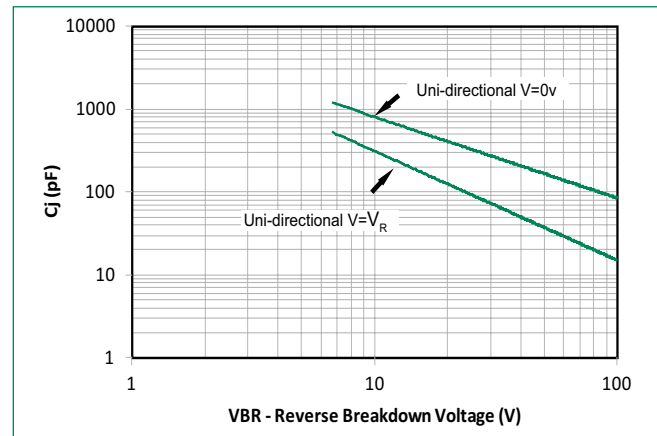


Figure 7 -
Peak Forward Voltage Drop vs. Peak Forward Current

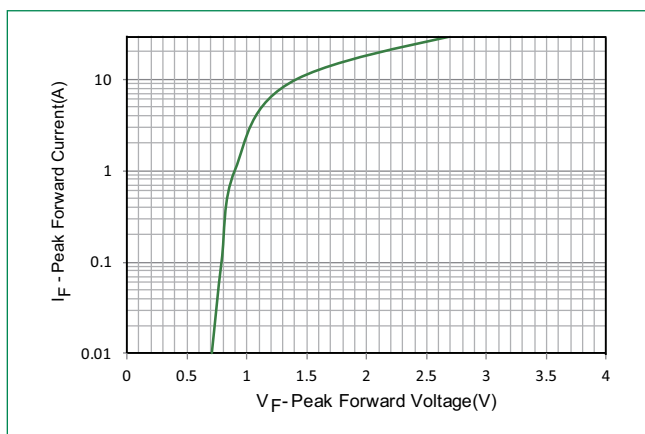
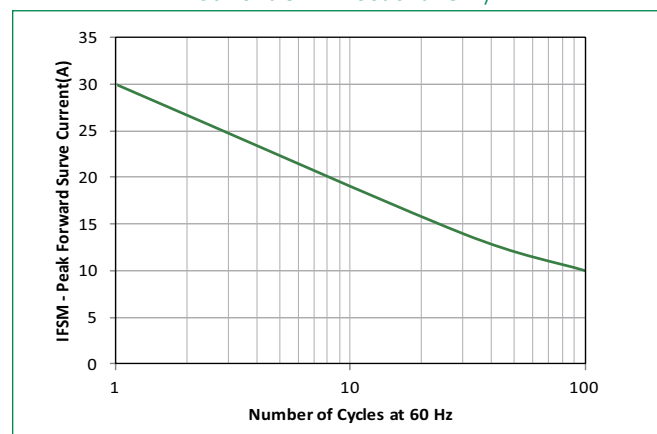


Figure 8 -
Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

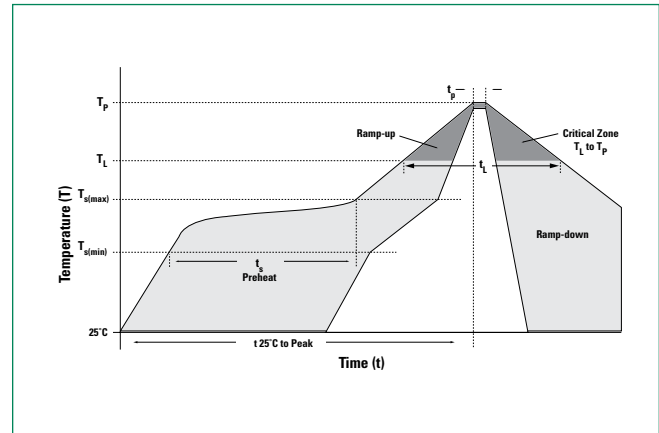


TPSMF4L Series

Surface Mount – 400W

Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus Temp (T_L) to peak $T_{S(max)}$) to T_L - Ramp-up Rate		3°C/second Max
Reflow		3°C/second Max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_L)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds Max
Ramp-down Rate		6°C/second Max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		260°C



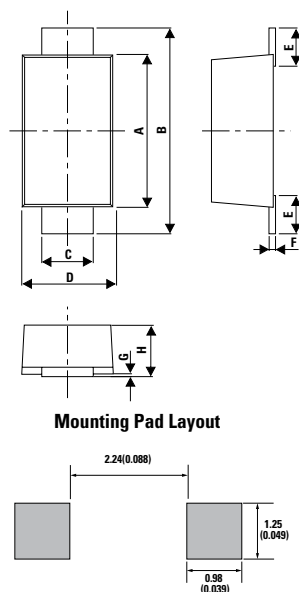
Physical Specifications

Case	SOD-123FL plastic over glass passivated junction
Polarity	Color band denotes cathode except bipolar
Terminal	Matte tin-plated leads, solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-A111

Dimensions - SOD-123FL Package

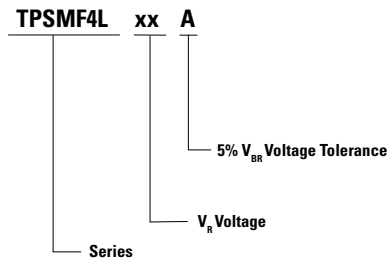


Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	2.90	3.10	0.114	0.122
B	3.50	3.90	0.138	0.154
C	0.85	1.05	0.033	0.041
D	1.70	2.00	0.067	0.079
E	0.43	0.83	0.017	0.033
F	0.10	0.25	0.004	0.010
G	0.00	0.10	0.000	0.004
H	0.90	1.08	0.035	0.043

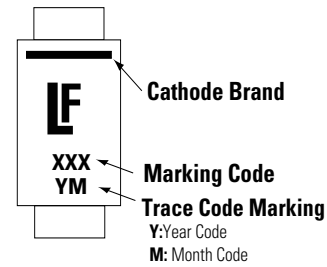
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Part Numbering System



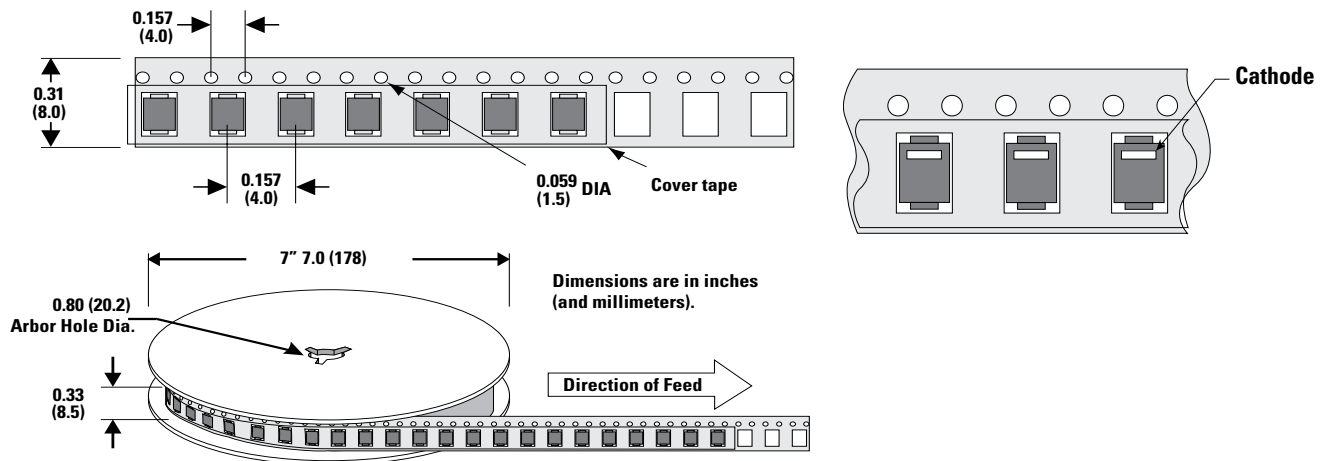
Part Marking System



Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMF4LXXX	SOD-123FL	3000	Tape & Reel – 8mm tape/7" reel	EIA RS-481

Tape and Reel Specification



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