

TVS Diode – TPSMF4L Series

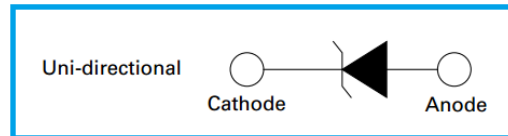
Features

- 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 $^{\circ}$ C/10 sec.
- MSL: JEDEC-J-STD-020, Level 1
- Automotive grade AEC-Q101 qualified



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

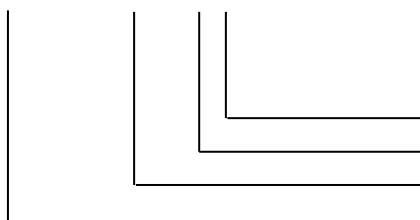
Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1, Fig.5).	P_{PPM}	Min 400 ⁽³⁾	W
Peak Pulse Current of 10/1000 μ s waveform (Note 1, Fig.3).	I_{PPM}	See Table	A
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2).	I_{FSM}	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	$^{\circ}$ C

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A = 25^{\circ}$ C per Fig.1
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
3. TPSMF4L5.0A~TPSMF4L15A Peak Pulse Power Dissipation is 350W min.

Part Number Code

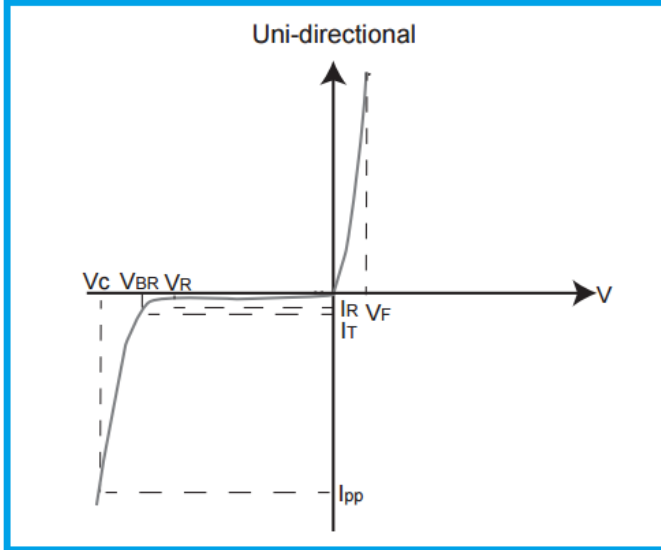
TPSMF4L □□□ C A



V_{BR} Voltage tolerance (A: 5%; Blank: 10%)
C: Bi-directional; Blank: Uni-directional
Reverse Stand-Off Voltage or Typical Breakdown Voltage
TPSMF4L Series (400W)

TVS Diode – TPSMF4L Series

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 _{PP}	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R (μA) @ V _R
			Min.	Max.				
TPSMF4L5.0A	KET	5.0	6.40	7.00	10	9.2	38.0	800
TPSMF4L6.0A	KGT	6.0	6.67	7.37	10	10.3	33.8	800
TPSMF4L6.5A	KKT	6.5	7.22	7.98	10	11.2	31.2	500
TPSMF4L7.0A	KMT	7.0	7.78	8.60	10	12.0	29.1	200
TPSMF4L7.5A	KPT	7.5	8.33	9.21	1	12.9	27.1	100
TPSMF4L8.0A	KRT	8.0	8.89	9.83	1	13.6	25.7	50
TPSMF4L8.5A	KTT	8.5	9.44	10.40	1	14.4	24.3	20
TPSMF4L9.0A	KVT	9.0	10.00	11.10	1	15.4	22.7	10
TPSMF4L10A	KXT	10	11.10	12.30	1	17.0	20.5	5
TPSMF4L11A	KZT	11	12.20	13.50	1	18.2	19.2	1
TPSMF4L12A	LET	12	13.30	14.70	1	19.9	17.5	1
TPSMF4L13A	LGT	13	14.40	15.90	1	21.5	16.2	1
TPSMF4L14A	LKT	14	15.60	17.20	1	23.2	15.0	1
TPSMF4L15A	LMT	15	16.70	18.50	1	24.4	14.3	1
TPSMF4L16A	LPT	16	17.80	19.70	1	26.0	15.4	1
TPSMF4L17A	LRT	17	18.90	20.90	1	27.6	14.5	1
TPSMF4L18A	LTT	18	20.00	22.10	1	29.2	13.7	1

TVS Diode – TPSMF4L Series

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
			Min.	Max.				
TPSMF4L20A	LVT	20	22.20	24.50	1	32.4	12.3	1
TPSMF4L22A	LXT	22	24.40	26.90	1	35.5	11.3	1
TPSMF4L24A	LZT	24	26.70	29.50	1	38.9	10.3	1
TPSMF4L26A	MET	26	28.90	31.90	1	42.1	9.5	1
TPSMF4L28A	MGT	28	31.10	34.40	1	45.4	8.8	1
TPSMF4L30A	MKT	30	33.30	36.80	1	48.4	8.3	1
TPSMF4L33A	MMT	33	36.70	40.60	1	53.3	7.5	1
TPSMF4L36A	MPT	36	40.00	44.20	1	58.1	6.9	1
TPSMF4L40A	MRT	40	44.40	49.10	1	64.5	6.2	1
TPSMF4L43A	MTT	43	47.80	52.80	1	69.4	5.8	1
TPSMF4L45A	MVT	45	50.00	55.30	1	72.7	5.5	1
TPSMF4L48A	MXT	48	53.30	58.90	1	77.4	5.2	1
TPSMF4L51A	MZT	51	56.70	62.70	1	82.4	4.9	1
TPSMF4L54A	NET	54	60.00	66.30	1	87.1	4.6	1
TPSMF4L58A	NGT	58	64.40	71.20	1	93.6	4.3	1
TPSMF4L60A	NKT	60	66.70	73.70	1	96.8	4.1	1
TPSMF4L64A	NMT	64	71.10	78.60	1	103.0	3.9	1
TPSMF4L70A	NPT	70	77.80	86.00	1	113.0	3.5	1
TPSMF4L75A	NRT	75	83.30	92.10	1	121.0	3.3	1
TPSMF4L78A	NTT	78	86.70	95.80	1	126.0	3.2	1
TPSMF4L85A	NVT	85	94.40	104.0	1	137.0	2.9	1

Note:

1. For TPSMF4L5.0A~TPSMF4L15A Peak Pulse Power Dissipation is 350W min.

TVS Diode – TP5MF4L Series

Ratings and Characteristic Curves

Fig. 1 - Pulse Derating Curve

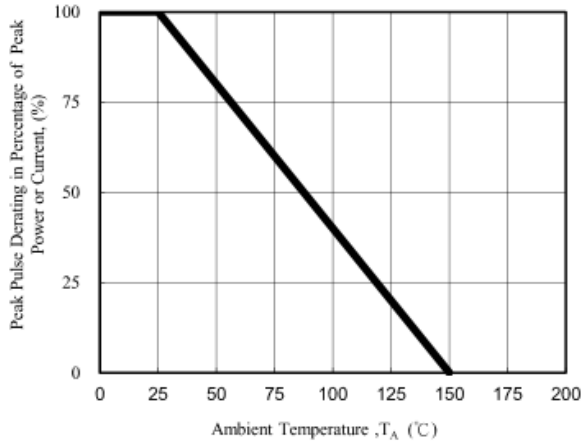


Fig. 2 - Maximum Non-Repetitive

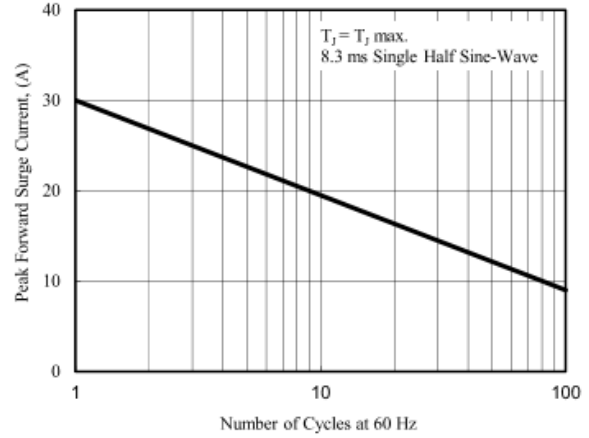


Fig. 3 - Pulse Waveform

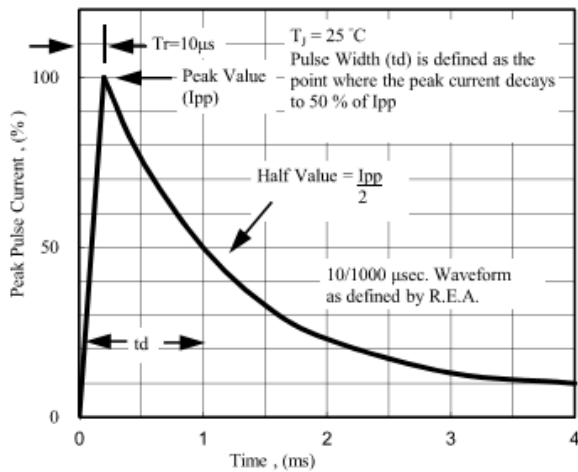


Fig. 4 - Typical Junction Capacitance

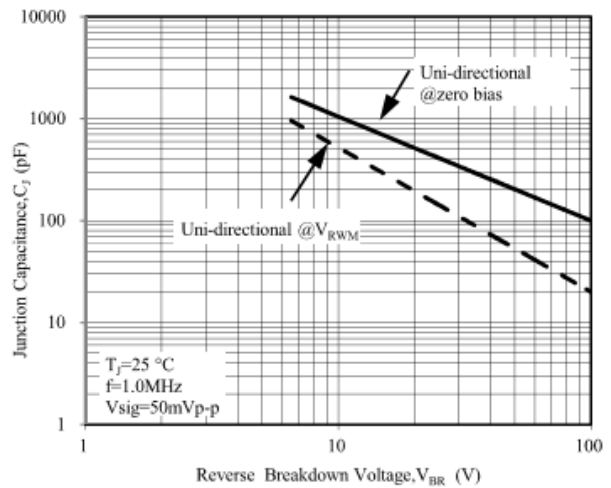
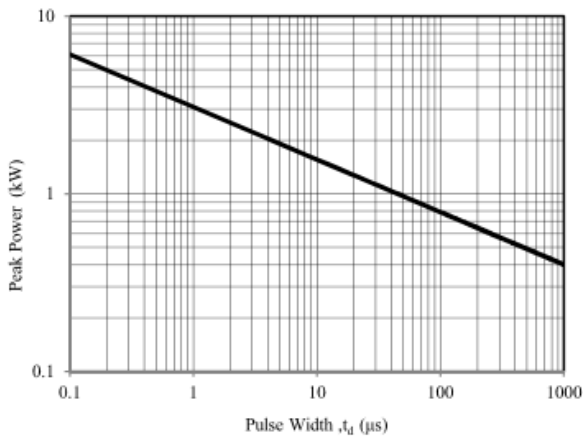
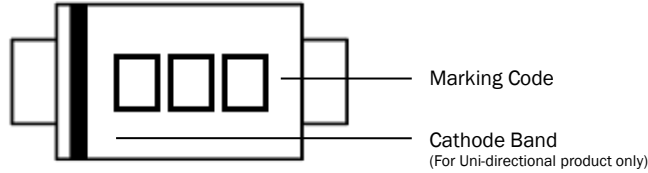


Fig. 5 - Steady State Power Derating Curve

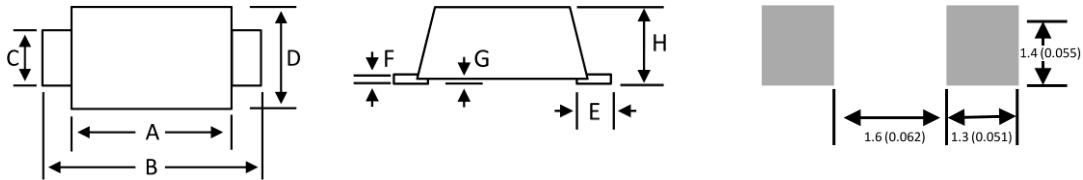


TVS Diode – TPMSF4L Series

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.

TVS Diode – TPSMF4L Series

Packaging Information

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMF4L Series	SOD-123	3000	Tape & Reel – 8mm tape/7" reel	EIA STD RS-481

Tape and Reel Specifications

