

# TPSMD-E Series

## Surface Mount – 3000 W



### Agency Approvals

Agency	Agency File Number
	E230531

### Maximum Ratings and Thermal Characteristics

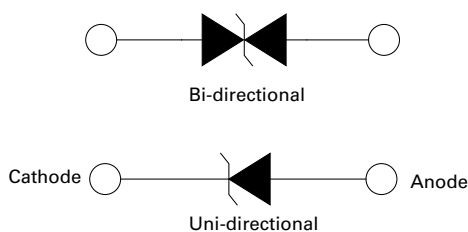
( $T_A=25\text{ }^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with 10/1000 $\mu\text{s}$ exponential pulse	$P_{PPM}$	3000	W
Peak Forward Surge Current 8.3 ms. (Jedec Method) (Note 1)(Note 2)	$I_{FSM}$	200	A
Max. Forward Voltage Drop at $I_F = 100\text{ A}$ (Note 1)	$V_F$	3.5	V
Operating Junction Temperature Range	$T_J$	-65 to 175	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to 175	$^\circ\text{C}$

#### Notes:

- Only for Unidirectional
- Mounted on 0.31 x 0.31" (8.0 x 8.0 mm) copper pads to each terminal

### Functional Diagram



## Description

Littelfuse TPSMD-E Series of Transient Voltage Suppression (TVS) Diodes can provide secondary transient voltage protection from transients induced by load dump and other transient voltage events for sensitive electronics. The TPSMD-E Series offers superior electrical performance in a small footprint DO-214AB package, allowing designers to upgrade their circuit protection without altering their existing design footprint or provide more robust protection in new circuit layouts.

## Features

- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260  $^\circ\text{C}$
- Meets ESD HBM: 8 kV and M4 machine model: 400 V
- Low profile package
- Ideal for automated placement
- 3000 peak pulse power capability with a 10/1000  $\mu\text{s}$  waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Solder dip 260  $^\circ\text{C}$ , 10s
- Available in uni-directional and bi-directional
- Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC
- Manufactured Front-End in Spain and Back-End in Thailand, these products support reliable global production scalability and long-term supply chain resiliency.

## Applications

Used in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for industrial, automotive and telecommunication.


### Physical Specifications

<b>Weight</b>	0.007 ounce, 0.211 grams
<b>Case</b>	DO-214AB (SMC). Epoxy meets UL 94V-0 flammability rating.
<b>Polarity</b>	For unidirectional types color band denotes cathode end. No marking on bidirectional types.
<b>Terminal</b>	Matte tin plated leads, solderable per MIL-ED-750 Method 2026, J-ED-002 and JESD22-B102. Consumer grade, meets JESD 201 class 1A whisker test.

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

Part Number (Uni)	Marking Code	Breakdown Voltage $V_{BR}$ at $I_R$ (V) <sup>(1)</sup>			$I_R$ @ $V_R$		IRM @ $T_J = 150\text{ }^\circ\text{C}$ ( $\mu\text{A}$ )	$V_{CL}$ @ $I_{PP}$ 10/1000 $\mu\text{s}$		RD 10/1000 $\mu\text{s}$ ( $\Omega$ )	$V_{CL}$ @ $I_{PP}$ 8/20 $\mu\text{s}$		RD 8/20 $\mu\text{s}$ ( $\Omega$ )	$\alpha T$ (%/ $^\circ\text{C}$ )	Agency Approval 
		Min.	Max.	(mA)	(V)	( $\mu\text{A}$ )		(V)	(A)		(V)	(A)			
TPSMD8.5A-E	CAT	9.44	10.4	1.0	8.5	10.0	50	14.4	208.4	0.020	19.9	1389	0.006	0.070	X
TPSMD10A-E	CAA	11.1	12.3	1.0	10	5.0	50	17.0	177.0	0.026	22.5	1217	0.008	0.075	X
TPSMD11A-E	CAB	12.2	13.5	1.0	11	5.0	50	18.2	165.0	0.028	23.7	1156	0.009	0.075	X
TPSMD12A-E	CAC	13.3	14.7	1.0	12	2.0	20	19.9	151.0	0.034	25.4	1078	0.010	0.080	X
TPSMD13A-E	CAD	14.4	15.9	1.0	13	2.0	20	21.5	140.0	0.040	27.0	1014	0.011	0.080	X
TPSMD14A-E	CAE	15.6	17.2	1.0	14	1.0	10	23.2	129.0	0.046	28.7	955	0.012	0.085	X
TPSMD15A-E	CAF	16.7	18.5	1.0	15	1.0	10	24.4	123.0	0.048	30.0	910	0.013	0.085	X
TPSMD16A-E	CAG	17.8	19.7	1.0	16	1.0	10	26.0	115.0	0.055	31.5	870	0.013	0.085	X
TPSMD17A-E	CAH	18.9	20.9	1.0	17	1.0	10	27.6	109.0	0.061	33.1	827	0.015	0.075	X
TPSMD18A-E	CAI	20.0	22.1	1.0	18	1.0	10	29.2	103.0	0.069	35.0	790	0.016	0.090	X
TPSMD20A-E	CAJ	22.2	24.5	1.0	20	1.0	10	32.4	92.6	0.085	37.5	730	0.018	0.090	X
TPSMD22A-E	CAK	24.4	26.9	1.0	22	1.0	10	35.5	84.5	0.102	40.5	680	0.020	0.095	X
TPSMD24A-E	CAL	26.7	29.5	1.0	24	1.0	10	38.9	77.1	0.122	43.9	630	0.023	0.095	X
TPSMD26A-E	CAM	28.9	31.9	1.0	26	1.0	10	42.1	71.3	0.143	42.0	600	0.025	0.095	X
TPSMD28A-E	CAN	31.1	34.4	1.0	28	1.0	10	45.4	66.1	0.166	50.0	560	0.028	0.095	X
TPSMD30A-E	CAO	33.3	36.8	1.0	30	1.0	15	48.4	62.0	0.187	53.0	530	0.030	0.095	X
TPSMD33A-E	CAP	36.7	40.6	1.0	33	1.0	15	53.3	56.3	0.226	58.0	490	0.035	0.100	X
TPSMD36A-E	CAQ	40.0	44.2	1.0	36	1.0	20	58.1	51.6	0.269	62.7	437	0.042	0.100	X
TPSMD40A-E	CAR	44.4	49.1	1.0	40	1.0	20	64.5	46.5	0.331	69.0	396	0.050	0.105	X
TPSMD43A-E	CAS	47.8	52.8	1.0	43	1.0	20	69.4	43.2	0.384	73.9	371	0.057	0.105	X
TPSMD45A-E	CAU	50.0	55.3	1.0	45	2.0	20	72.7	41.3	0.421	77.4	354	0.062	0.105	X
TPSMD48A-E	CAV	53.3	58.9	1.0	48	2.0	20	77.4	38.8	0.477	82.0	334	0.069	0.105	X
TPSMD51A-E	CAW	56.7	62.7	1.0	51	2.0	20	82.4	36.4	0.541	87.0	314	0.077	0.105	X
TPSMD54A-E	CAX	60.0	66.3	1.0	54	2.0	20	87.1	34.4	0.605	91.7	298	0.085	0.105	X
TPSMD58A-E	CAY	64.4	71.2	1.0	58	2.0	20	93.6	32.1	0.698	98.3	278	0.097	0.110	X
TPSMD60A-E	CAZ	66.7	73.7	1.0	60	2.0	20	96.8	31.0	0.745	102.0	268	0.106	0.110	X
TPSMD64A-E	CCA	71.1	78.6	1.0	64	2.0	20	103.0	29.1	0.838	108.0	253	0.116	0.110	X
TPSMD70A-E	CCB	77.8	86.0	1.0	70	2.0	20	113.0	26.5	1.019	118.0	232	0.138	0.110	X
TPSMD75A-E	CCC	83.3	92.1	1.0	75	2.0	20	121.0	24.8	1.165	126.0	217	0.156	0.110	X
TPSMD78A-E	CCD	86.7	95.8	1.0	78	2.0	20	126.0	23.8	1.269	132.0	207	0.175	0.110	X

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		Min.	Max.	(mA)	(V)	( $\mu\text{A}$ )		(V)	(A)		(V)	(A)			
TPSMD8.5CA-E	CBT	9.44	10.4	1.0	8.5	10.0	50	14.4	208.4	0.02	19.9	1389	0.006	0.070	X
TPSMD10CA-E	CBU	11.1	12.3	1.0	10	5.0	50	17.0	177.0	0.026	22.5	1217	0.008	0.075	X
TPSMD11CA-E	CBV	12.2	13.5	1.0	11	5.0	50	18.2	165.0	0.028	23.7	1156	0.009	0.075	X
TPSMD12CA-E	CBW	13.3	14.7	1.0	12	2.0	20	19.9	151.0	0.034	25.4	1078	0.010	0.080	X
TPSMD13CA-E	CBX	14.4	15.9	1.0	13	2.0	20	21.5	140.0	0.04	27.0	1014	0.011	0.080	X
TPSMD14CA-E	CBY	15.6	17.2	1.0	14	1.0	10	23.2	129.0	0.046	28.7	955	0.012	0.085	X
TPSMD15CA-E	CBZ	16.7	18.5	1.0	15	1.0	10	24.4	123.0	0.048	30.0	910	0.013	0.085	X
TPSMD16CA-E	CCE	17.8	19.7	1.0	16	1.0	10	26.0	115.0	0.055	31.5	870	0.013	0.085	X
TPSMD17CA-E	CCF	18.9	20.9	1.0	17	1.0	10	27.6	109.0	0.061	33.1	827	0.015	0.075	X
TPSMD18CA-E	CCG	20.0	22.1	1.0	18	1.0	10	29.2	103.0	0.069	35.0	790	0.016	0.090	X
TPSMD20CA-E	CCH	22.2	24.5	1.0	20	1.0	10	32.4	92.6	0.085	37.5	730	0.018	0.090	X
TPSMD22CA-E	CBA	24.4	26.9	1.0	22	1.0	10	35.5	84.5	0.102	40.5	680	0.020	0.095	X
TPSMD24CA-E	CBB	26.7	29.5	1.0	24	1.0	10	38.9	77.1	0.122	43.9	630	0.023	0.095	X
TPSMD26CA-E	CBC	28.9	31.9	1.0	26	1.0	10	42.1	71.3	0.143	42.0	600	0.025	0.095	X
TPSMD28CA-E	CBD	31.1	34.4	1.0	28	1.0	10	45.4	66.1	0.166	50.0	560	0.028	0.095	X
TPSMD30CA-E	CBE	33.3	36.8	1.0	30	1.0	15	48.4	62.0	0.187	53.0	530	0.030	0.095	X
TPSMD33CA-E	CBF	36.7	40.6	1.0	33	1.0	15	53.3	56.3	0.226	58.0	490	0.035	0.100	X
TPSMD36CA-E	CBG	40.0	44.2	1.0	36	1.0	20	58.1	51.6	0.269	62.7	437	0.042	0.100	X
TPSMD40CA-E	CBH	44.4	49.1	1.0	40	1.0	20	64.5	46.5	0.331	69.0	396	0.050	0.105	X
TPSMD43CA-E	CBI	47.8	52.8	1.0	43	1.0	20	69.4	43.2	0.384	73.9	371	0.057	0.105	X
TPSMD45CA-E	CBJ	50.0	55.3	1.0	45	2.0	20	72.7	41.3	0.421	77.4	354	0.062	0.105	X
TPSMD48CA-E	CBK	53.3	58.9	1.0	48	2.0	20	77.4	38.8	0.477	82.0	334	0.069	0.105	X
TPSMD51CA-E	CBL	56.7	62.7	1.0	51	2.0	20	82.4	36.4	0.541	87.0	314	0.077	0.105	X
TPSMD54CA-E	CBM	60.0	66.3	1.0	54	2.0	20	87.1	34.4	0.605	91.7	298	0.085	0.105	X
TPSMD58CA-E	CBN	64.4	71.2	1.0	58	2.0	20	93.6	32.1	0.698	98.3	278	0.097	0.110	X
TPSMD60CA-E	CBO	66.7	73.7	1.0	60	2.0	20	96.8	31.0	0.745	102.0	268	0.106	0.110	X
TPSMD64CA-E	CBP	71.1	78.6	1.0	64	2.0	20	103.0	29.1	0.838	108.0	253	0.116	0.110	X
TPSMD70CA-E	CBQ	77.8	86.0	1.0	70	2.0	20	113.0	26.5	1.019	118.0	232	0.138	0.110	X
TPSMD75CA-E	CBR	83.3	92.1	1.0	75	2.0	20	121.0	24.8	1.165	126.0	217	0.156	0.110	X
TPSMD78CA-E	CBS	86.7	95.8	1.0	78	2.0	20	126.0	23.8	1.269	132.0	207	0.175	0.110	X

**Notes:**

1. Pulses test:  $t_p \leq 50\text{ ms}$
2. Surge current waveform per fig3 and derate per fig2
3. All terms and symbols are consistent with ANSI / IEEE C62.35

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

Figure 1 - Peak Pulse Power Rating Curve

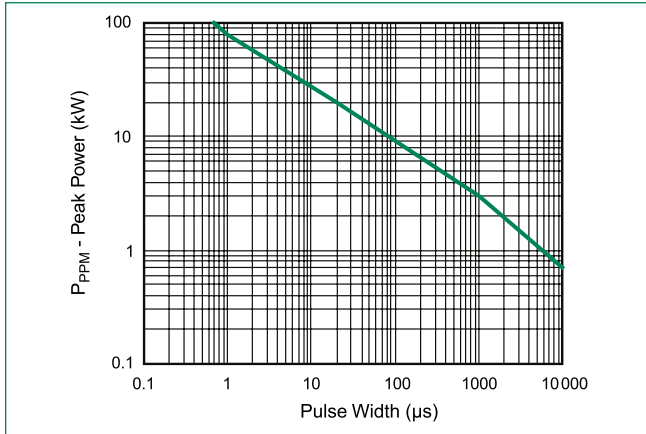


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

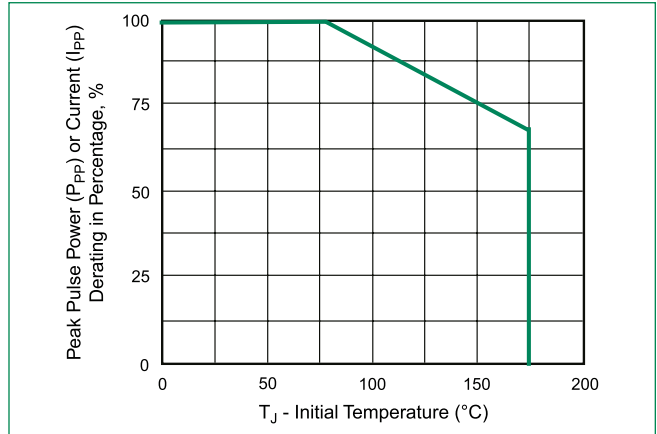


Figure 3 - Pulse Waveform

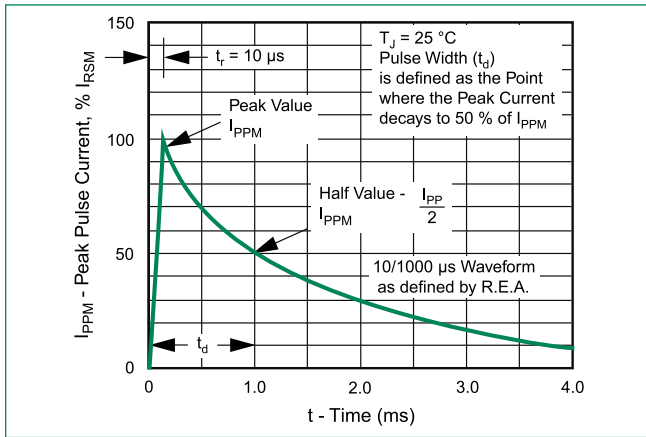


Figure 4 - Typical Junction Capacitance

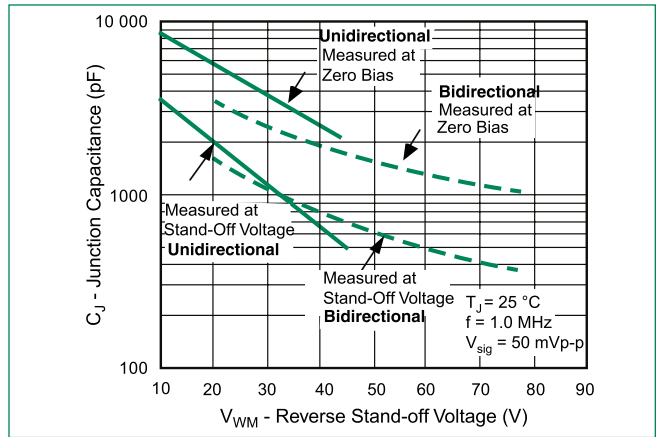


Figure 5 - Maximum Non-Repetitive/Peak Forward Surge Current

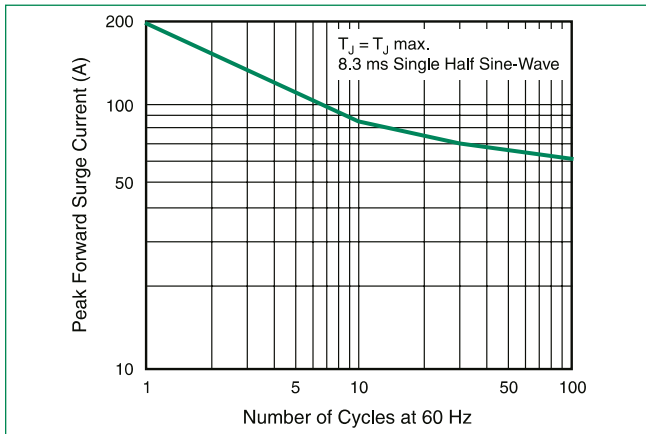
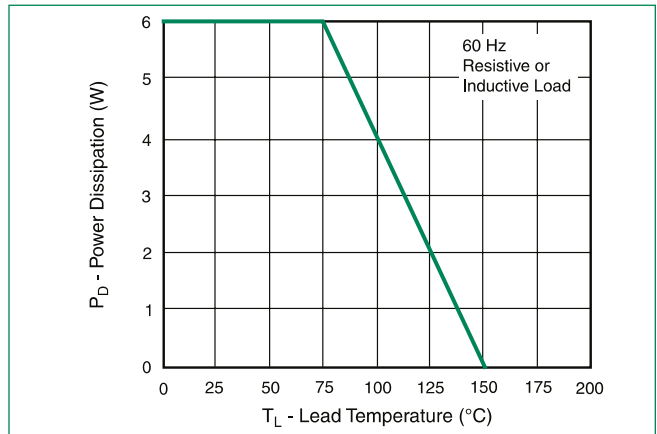


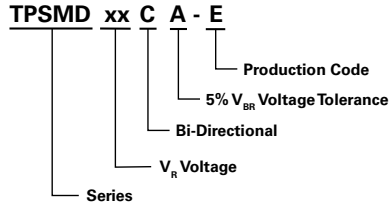
Figure 6 - Power Derating Curve



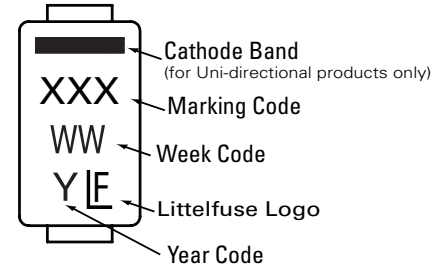
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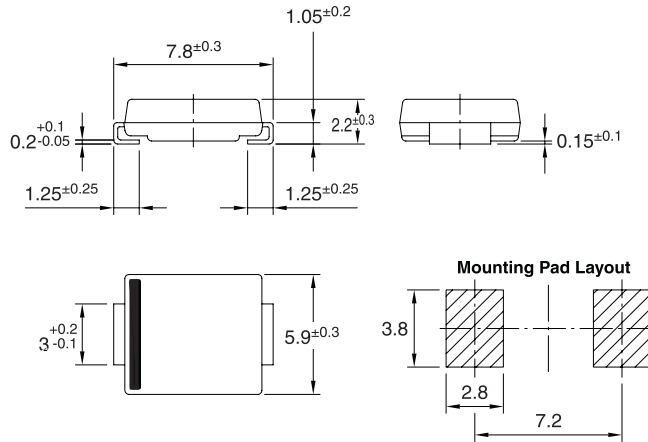
### Part Numbering System



### Part Marking System



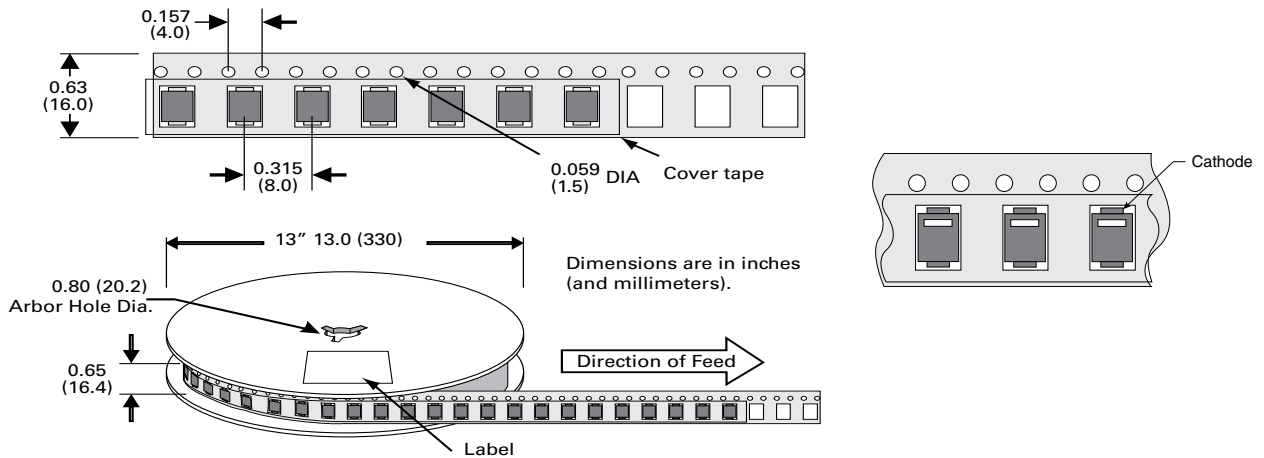
### Dimensions - DO-214AB Package



### Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMDxxXX-E	DO-214AB	3500	13" diameter tape and reel	EIA RS-481

### Tape and Reel Specification



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