

TPSMD-E Series

Surface Mount – 3000 W



Agency Approvals

Agency	Agency File Number
	E230531

Maximum Ratings and Thermal Characteristics

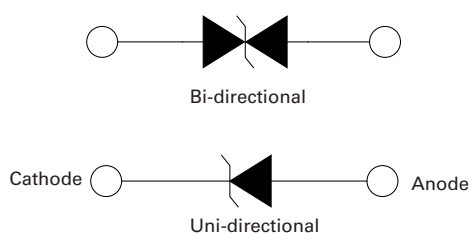
($T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with 10/1000 μs 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 μs 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

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

Weight	0.007 ounce, 0.211 grams
Case	DO-214AB (SMC). Epoxy meets UL 94V-0 flammability rating.
Polarity	For unidirectional types color band denotes cathode end. No marking on bidirectional types.
Terminal	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) ⁽¹⁾			I_R @ V_R		IRM @ $T_J = 150\text{ }^\circ\text{C}$ (μA)	V_{CL} @ I_{PP} 10/1000 μs		RD 10/1000 μs (Ω)	V_{CL} @ I_{PP} 8/20 μs		RD 8/20 μs (Ω)	αT (%/ $^\circ\text{C}$)	Agency Approval 
		Min.	Max.	(mA)	(V)	(μA)		(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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Electrical Characteristics ($T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

Part Number (Bi)	Marking Code	Breakdown Voltage V_{BR} at I_R (V) ⁽¹⁾			I_R @ V_R		IRM @ $T_J = 150\text{ }^\circ\text{C}$ (μA)	V_{CL} @ I_{PP} 10/1000 μs		RD 10/1000 μs (Ω)	V_{CL} @ I_{PP} 8/20 μs		RD 8/20 μs (Ω)	αT (%/ $^\circ\text{C}$)	Agency Approval 
		Min.	Max.	(mA)	(V)	(μA)		(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

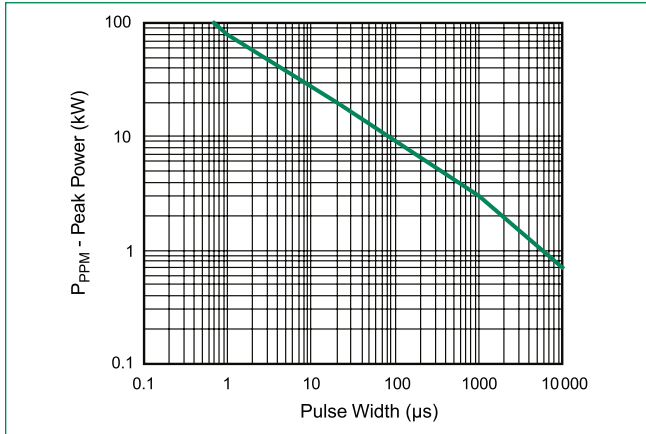


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

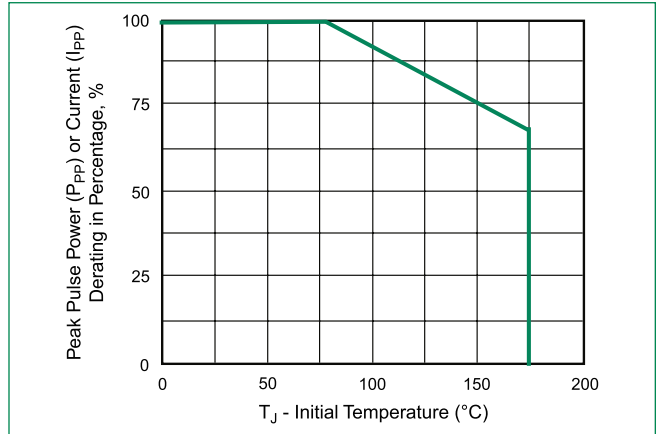


Figure 3 - Pulse Waveform

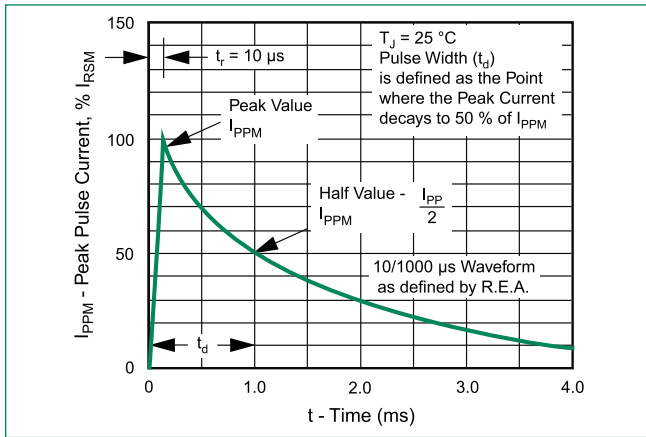


Figure 4 - Typical Junction Capacitance

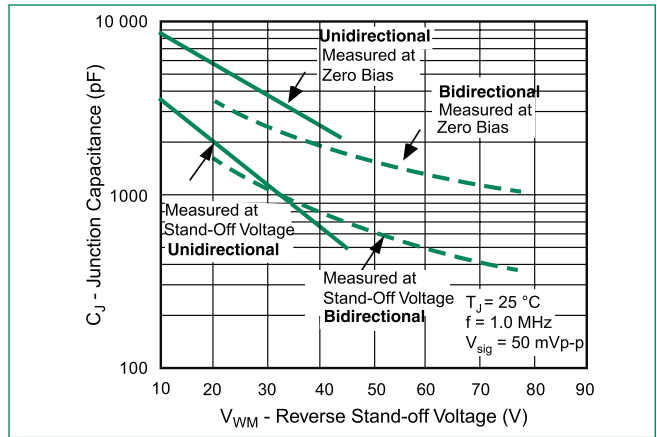


Figure 5 - Maximum Non-Repetitive/Peak Forward Surge Current

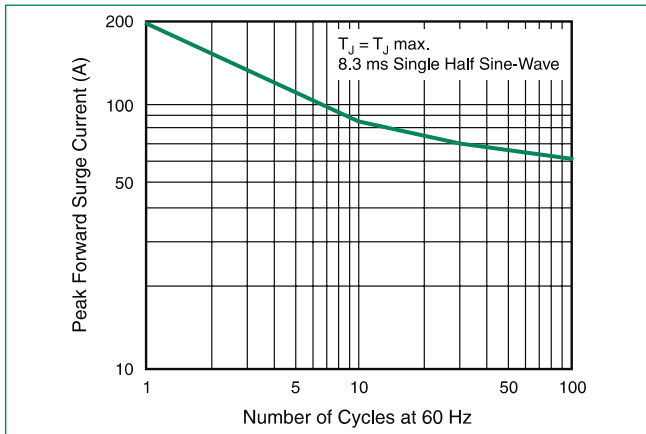
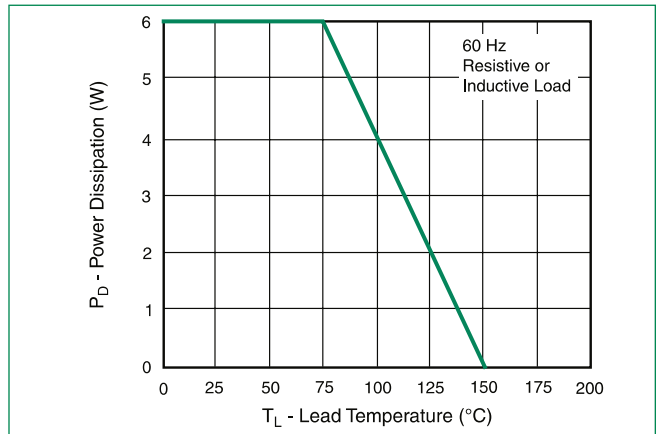


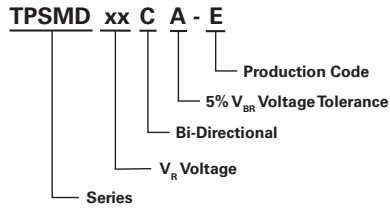
Figure 6 - Power Derating Curve



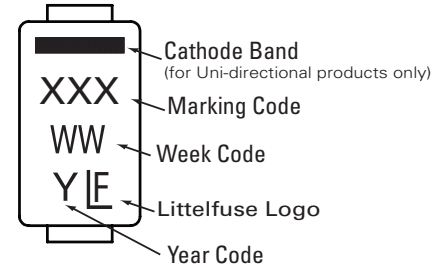
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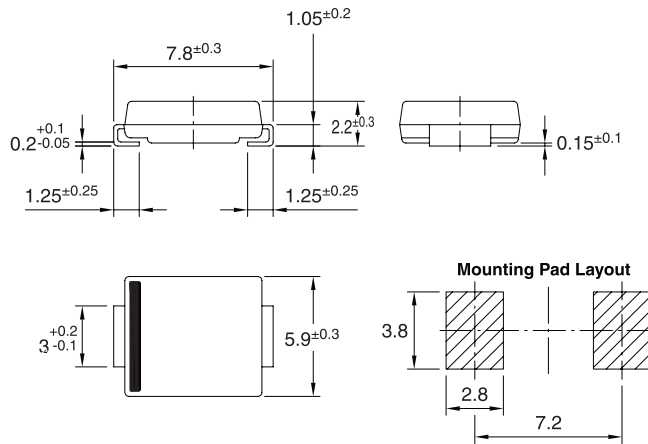
Part Numbering System



Part Marking System



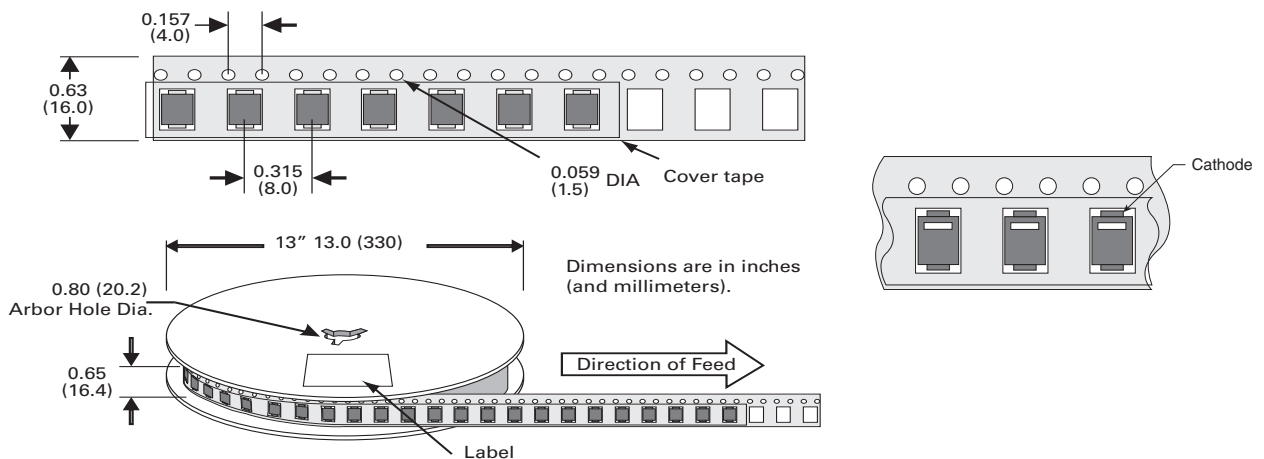
Dimensions - DO-214AB Package



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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