

TPSMC-E Series

Surface Mount – 1500 W



Agency Approvals

Agency	Agency File Number
	E230531

Maximum Ratings and Thermal Characteristics

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with 10/1000 μs exponential pulse	P_{PPM}	1500	W
Peak Forward Surge Current 8.3 ms. (Jedec Method) (Note 1)(Note 2)	I_{FSM}	200	A
Max. Forward Voltage Drop at $I_F = 100\text{ A}$	V_F	3.5	V
Operating Temperature Range (Note 3)(Note 4)	$V_{\text{BR}} \leq 43\text{ V}$	T_J	-65 to 175
	$V_{\text{BR}} > 43\text{ V}$		-65 to 150
Storage Temperature Range	T_{STG}	-65 to 175	$^\circ\text{C}$
Typical Thermal Resistance Junction to Ambient	$R_{\text{th(j-A)}}$	140 (Note3)	$^\circ\text{C/W}$
	$R_{\text{th(j-l)}}$	75 (Note4)	
Typical Thermal Resistance Junction to Lead	$R_{\text{th(j-l)}}$	15	$^\circ\text{C/W}$

Notes:

- Only for Unidirectional
- Mounted on $0.31 \times 0.31''$ (8.0 x 8.0 mm) copper pads to each terminal
- Device mounted on an FR4 PCB, standard footprint
- Device mounted on an Al2O3 PCB, standard footprint

Functional Diagram



Bi-directional



Uni-directional

Description

Littelfuse TPSMC-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 TPSMC-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°C
- Meets ESD HBM: 8 kV and M4 machine model: 400 V
- Low profile package
- Ideal for automated placement
- 1500 peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- 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

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	Maximum Reverse Leakage Current I_{RM} at V_{RM}		Breakdown Voltage V_{BR} at I_R (V) ⁽¹⁾				Max. Clamping Voltage V_{CL} at I_{PP} max. 1ms. Expo.		Agency Approval 
		(μA)	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)	
TPSMC6.8A-E	UAB	1000	5.80	6.45	6.80	7.14	10	10.5	143.0	-
TPSMC7.5A-E	UAD	500	6.40	7.13	7.50	7.88	10	11.3	132.0	-
TPSMC8.2A-E	UAF	200	7.02	7.79	8.20	8.61	10	12.1	124.0	-
TPSMC9.1A-E	UAH	50	7.78	8.65	9.10	9.55	1	13.4	112.0	-
TPSMC10A-E	UAL	10	8.55	9.50	10.00	10.50	1	14.5	103.0	-
TPSMC11A-E	UAN	5	9.40	10.50	11.00	11.60	1	15.6	96.0	X
TPSMC12A-E	UAR	5	10.20	11.40	12.00	12.60	1	16.7	90.0	X
TPSMC13A-E	UAT	5	11.10	12.40	13.00	13.70	1	18.2	82.0	X
TPSMC15A-E	UAV	5	12.80	14.30	15.00	15.80	1	21.2	71.0	X
TPSMC16A-E	UAX	5	13.60	15.20	16.00	16.80	1	22.5	67.0	X
TPSMC18A-E	UAZ	5	15.30	17.10	18.00	18.90	1	25.5	59.5	X
TPSMC20A-E	UBB	5	17.10	19.00	20.00	21.00	1	27.7	54.0	X
TPSMC22A-E	UBD	5	18.80	20.90	22.00	23.10	1	30.6	49.0	X
TPSMC24A-E	UBF	5	20.50	22.80	24.00	25.20	1	33.2	45.0	X
TPSMC27A-E	UBH	5	23.10	25.70	27.00	28.40	1	37.5	40.0	X
TPSMC30A-E	UBL	5	25.60	28.50	30.00	31.50	1	41.4	36.0	X
TPSMC33A-E	UBN	5	28.20	31.40	33.00	34.70	1	45.7	33.0	X
TPSMC36A-E	UBR	5	30.80	34.20	36.00	37.80	1	49.9	30.0	X
TPSMC39A-E	UBT	5	33.30	37.10	39.00	41.00	1	53.9	28.0	X
TPSMC43A-E	UBV	5	36.80	40.90	43.00	45.20	1	59.3	25.3	X
TPSMC47A-E	UBX	5	40.20	44.70	47.00	49.40	1	64.8	23.2	X
TPSMC51A-E	UBZ	5	43.60	48.50	51.00	53.60	1	70.1	21.4	X
TPSMC56A-E	UCB	5	47.80	53.20	56.00	58.80	1	77.0	19.5	X
TPSMC62A-E	UCD	5	53.00	58.90	62.00	65.10	1	85.0	17.7	X
TPSMC68A-E	UCF	5	58.10	64.60	68.00	71.40	1	92.0	16.3	X
TPSMC75A-E	UCH	5	64.10	71.30	75.00	78.80	1	103.0	14.6	X
TPSMC82A-E	UCL	5	70.10	77.90	82.00	86.10	1	113.0	13.3	X
TPSMC91A-E	UCN	5	77.80	86.50	91.00	95.50	1	125.0	12.0	X
TPSMC100A-E	UCR	5	85.50	95.00	100.00	105.00	1	137.0	11.0	X
TPSMC110A-E	UCT	5	94.00	105.00	110.00	116.00	1	152.0	9.9	X
TPSMC120A-E	UCV	5	102.00	114.00	120.00	126.00	1	165.0	9.1	X
TPSMC130A-E	UCX	5	111.00	124.00	130.00	137.00	1	179.0	8.4	X
TPSMC150A-E	UCZ	5	128.00	143.00	150.00	158.00	1	207.0	7.2	X
TPSMC160A-E	UDB	5	136.00	152.00	160.00	168.00	1	219.0	6.8	X
TPSMC170A-E	UDD	5	145.00	162.00	170.00	179.00	1	234.0	6.4	X
TPSMC180A-E	UDF	5	154.00	171.00	180.00	189.00	1	246.0	6.1	X
TPSMC200A-E	UDH	5	171.00	190.00	200.00	210.00	1	274.0	5.5	X
TPSMC220A-E	UDL	5	185.00	209.00	220.00	231.00	1	328.0	4.6	X
TPSMC250A-E	UDI	5	214.00	237.00	250.00	262.00	1	344.0	4.4	X
TPSMC300A-E	UDJ	5	256.00	285.00	300.00	315.00	1	414.0	3.6	X
TPSMC350A-E	UDQ	5	300.00	333.00	350.00	368.00	1	482.0	3.1	X
TPSMC400A-E	UDU	5	342.00	380.00	400.00	420.00	1	548.0	2.7	X
TPSMC440A-E	UDV	5	376.00	418.00	440.00	482.00	1	602.0	2.5	X
TPSMC480A-E	UDM	5	408.00	456.00	480.00	504.00	1	658.0	2.3	X
TPSMC510A-E	UDN	5	434.00	485.00	510.00	535.00	1	698.0	2.2	X
TPSMC540A-E	UDP	5	459.00	513.00	540.00	567.00	1	740.0	2.0	X

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		(μA)	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)	
TPSMC6.8CA-E	BGB	1000	5.80	6.45	6.80	7.14	10	10.5	143.0	-
TPSMC7.5CA-E	BGD	500	6.40	7.13	7.50	7.88	10	11.3	132.0	-
TPSMC8.2CA-E	BGF	200	7.02	7.79	8.20	8.61	10	12.1	124.0	-
TPSMC9.1CA-E	BGH	50	7.78	8.65	9.10	9.55	1	13.4	112.0	-
TPSMC10CA-E	BGL	10	8.55	9.50	10.00	10.50	1	14.5	103.0	-
TPSMC11CA-E	BGN	5	9.40	10.50	11.00	11.60	1	15.6	96.0	X
TPSMC12CA-E	BGR	5	10.20	11.40	12.00	12.60	1	16.7	90.0	X
TPSMC13CA-E	BGT	5	11.10	12.40	13.00	13.70	1	18.2	82.0	X
TPSMC15CA-E	BGV	5	12.80	14.30	15.00	15.80	1	21.2	71.0	X
TPSMC16CA-E	BGX	5	13.60	15.20	16.00	16.80	1	22.5	67.0	X
TPSMC18CA-E	BGZ	5	15.30	17.10	18.00	18.90	1	25.5	59.5	X
TPSMC20CA-E	BHB	5	17.10	19.00	20.00	21.00	1	27.7	54.0	X
TPSMC22CA-E	BHD	5	18.80	20.90	22.00	23.10	1	30.6	49.0	X
TPSMC24CA-E	BHF	5	20.50	22.80	24.00	25.20	1	33.2	45.0	X
TPSMC27CA-E	BHH	5	23.10	25.70	27.00	28.40	1	37.5	40.0	X
TPSMC30CA-E	BHL	5	25.60	28.50	30.00	31.50	1	41.4	36.0	X
TPSMC33CA-E	BHN	5	28.20	31.40	33.00	34.70	1	45.7	33.0	X
TPSMC36CA-E	BHR	5	30.80	34.20	36.00	37.80	1	49.9	30.0	X
TPSMC39CA-E	BHT	5	33.30	37.10	39.00	41.00	1	53.9	28.0	X
TPSMC43CA-E	BHV	5	36.80	40.90	43.00	45.20	1	59.3	25.3	X
TPSMC47CA-E	BHX	5	40.20	44.70	47.00	49.40	1	64.8	23.2	X
TPSMC51CA-E	BHZ	5	43.60	48.50	51.00	53.60	1	70.1	21.4	X
TPSMC56CA-E	BKB	5	47.80	53.20	56.00	58.80	1	77.0	19.5	X
TPSMC62CA-E	BKD	5	53.00	58.90	62.00	65.10	1	85.0	17.7	X
TPSMC68CA-E	BKF	5	58.10	64.60	68.00	71.40	1	92.0	16.3	X
TPSMC75CA-E	BKH	5	64.10	71.30	75.00	78.80	1	103.0	14.6	X
TPSMC82CA-E	BKL	5	70.10	77.90	82.00	86.10	1	113.0	13.3	X
TPSMC91CA-E	BKN	5	77.80	86.50	91.00	95.50	1	125.0	12.0	X
TPSMC100CA-E	BKR	5	85.50	95.00	100.00	105.00	1	137.0	11.0	X
TPSMC110CA-E	BKT	5	94.00	105.00	110.00	116.00	1	152.0	9.9	X
TPSMC120CA-E	BKV	5	102.00	114.00	120.00	126.00	1	165.0	9.1	X
TPSMC130CA-E	BKX	5	111.00	124.00	130.00	137.00	1	179.0	8.4	X
TPSMC150CA-E	BKZ	5	128.00	143.00	150.00	158.00	1	207.0	7.2	X
TPSMC160CA-E	BLB	5	136.00	152.00	160.00	168.00	1	219.0	6.8	X
TPSMC170CA-E	BLD	5	145.00	162.00	170.00	179.00	1	234.0	6.4	X
TPSMC180CA-E	BLF	5	154.00	171.00	180.00	189.00	1	246.0	6.1	X
TPSMC200CA-E	BLH	5	171.00	190.00	200.00	210.00	1	274.0	5.5	X
TPSMC220CA-E	BLL	5	185.00	209.00	220.00	231.00	1	328.0	4.6	X
TPSMC250CA-E	BHJ	5	214.00	237.00	250.00	262.00	1	344.0	4.4	X

Notes:

1. Tested with pulses Pulse test: $t_p \leq 50$ ms; $\delta < 2\%$

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

Figure 1 - Pulse Waveform

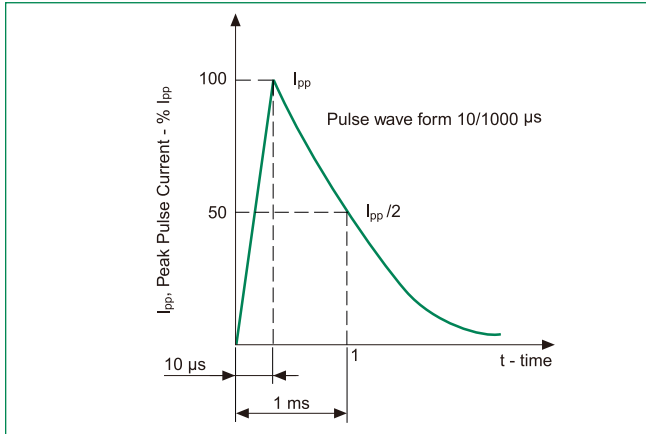


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

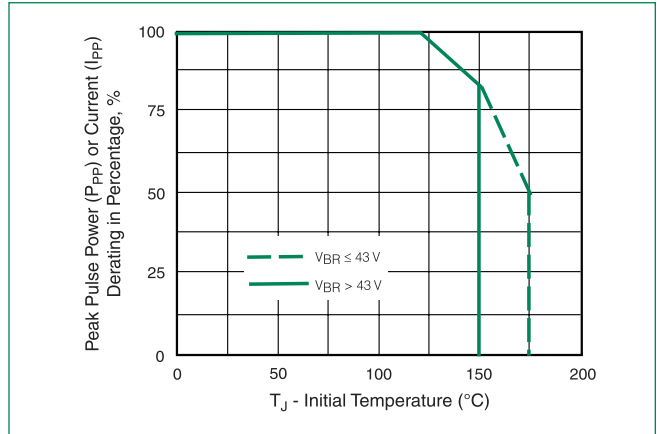


Figure 3 - Peak Pulse Power Rating Curve

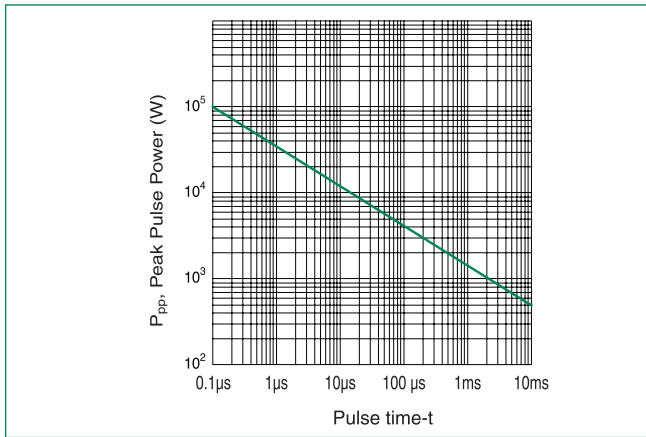
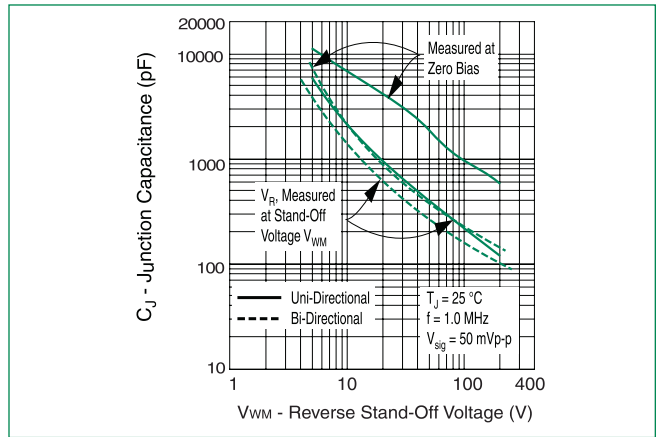
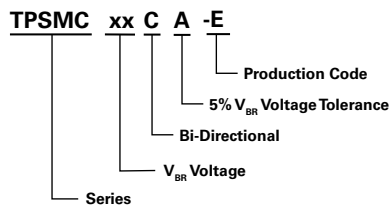


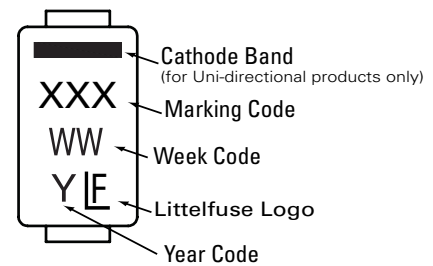
Figure 4 - Typical Junction Capacitance



Part Numbering System



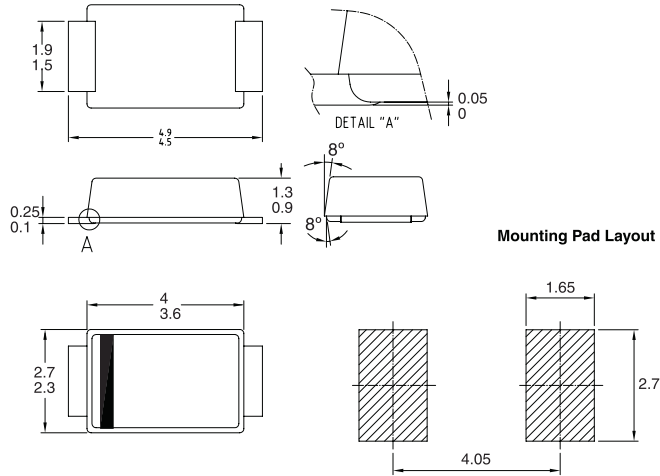
Part Marking System



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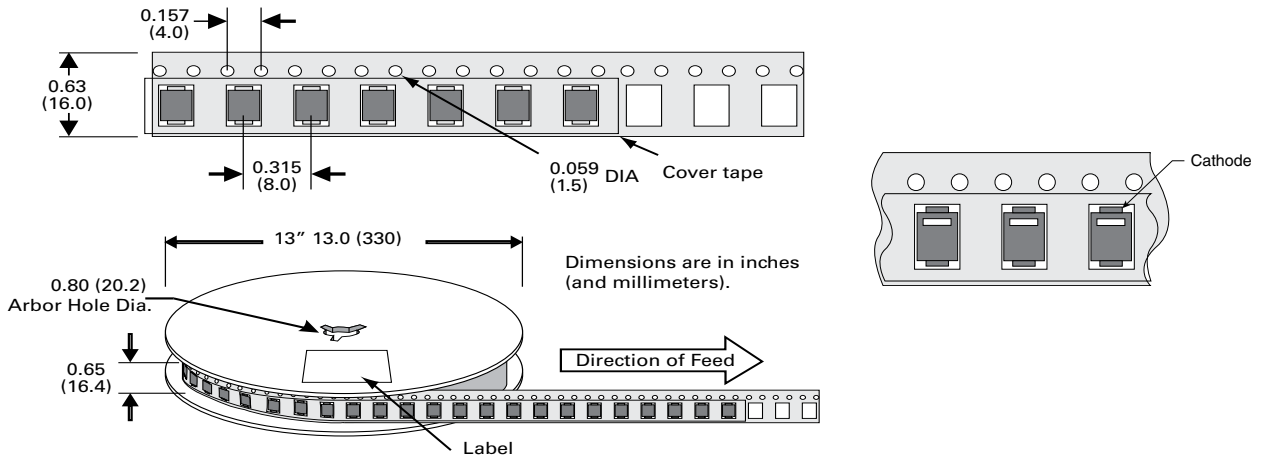
Dimensions - DO-214AB Package



Packaging Options

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

Tape and Reel Specification



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