

# TPSMB-E Series

## Surface Mount – 600 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	$P_{PPM}$	600	W
Peak Forward Surge Current 8.3 ms. (Jedec Method) (Note 1) (Note 2)	$I_{FSM}$	100	A
Max. Forward Voltage Drop at $I_F = 50\text{ A}$ (Note 1)	$V_F$	3.5	V
Operating Temperature Range	$V_{BR} \leq 43\text{ V}$	$T_J$	-65 to 175
	$V_{BR} > 43\text{ V}$		-65 to 150
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



Bi-directional



Uni-directional

## Description

Littelfuse TPSMB-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 TPSMB-E Series offers superior electrical performance in a small footprint DO-214AA 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
- 600 W 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
- Low incremental surge resistance
- Available in uni-directional and bi-directional
- Solder dip 260  $^\circ\text{C}$ , 10s
- 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

<b>Weight</b>	0.0082 grams
<b>Case</b>	DO-214AA (SMB). 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	Maximum Reverse Leakage Current $I_{RM}$ at $V_{RM}$		Breakdown Voltage $V_{BR}$ at $I_R$ (V) <sup>(1)</sup>				Max. Clamping Voltage $V_{CL}$ at $I_{PP}$ max. 1ms. Expo.		Agency Approval 
		( $\mu\text{A}$ )	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)	
TPSMB6.8A-E	KE	1000	5.80	6.50	6.80	7.10	10	10.5	57.0	X
TPSMB7.5A-E	KG	500	6.40	7.10	7.50	7.90	10	11.3	53.0	X
TPSMB8.2A-E	KK	200	7.02	7.80	8.20	8.60	10	12.1	50.0	X
TPSMB9.1A-E	KM	50	7.78	8.70	9.00	9.60	1	13.4	45.0	X
TPSMB10A-E	KP	10	8.55	9.50	10.00	10.50	1	14.5	41.0	X
TPSMB11A-E	KR	5	9.40	10.50	11.00	11.60	1	15.6	38.0	X
TPSMB12A-E	KT	5	10.20	11.40	12.00	12.60	1	16.7	36.0	X
TPSMB13A-E	KV	5	11.10	12.40	13.00	13.70	1	18.2	33.0	X
TPSMB15A-E	KX	1	12.80	14.30	15.00	15.80	1	21.2	28.0	X
TPSMB16A-E	KZ	1	13.60	15.20	16.00	16.80	1	22.5	27.0	X
TPSMB18A-E	LE	1	15.30	17.10	18.00	18.90	1	25.5	24.0	X
TPSMB20A-E	LG	1	17.10	19.00	20.00	21.00	1	27.7	22.0	X
TPSMB22A-E	LK	1	18.80	20.90	22.00	23.10	1	30.6	20.0	X
TPSMB24A-E	LM	1	20.50	22.80	24.00	25.20	1	33.2	18.0	X
TPSMB27A-E	LP	1	23.10	25.70	27.00	28.40	1	37.5	16.0	X
TPSMB30A-E	LR	1	25.60	28.50	30.00	31.50	1	41.4	14.4	X
TPSMB33A-E	LT	1	28.20	31.40	33.00	34.70	1	45.7	13.2	X
TPSMB36A-E	LV	1	30.80	34.20	36.00	37.80	1	49.9	12.0	X
TPSMB39A-E	LX	1	33.30	37.10	39.00	41.00	1	53.9	11.2	X
TPSMB43A-E	LZ	1	36.80	40.90	43.00	45.20	1	59.3	10.1	X
TPSMB47A-E	ME	1	40.20	44.70	47.00	49.40	1	64.8	9.3	X
TPSMB51A-E	MG	1	43.60	48.50	51.00	53.60	1	70.1	8.6	X
TPSMB56A-E	MK	1	47.80	53.20	56.00	58.80	1	77.0	7.8	X
TPSMB62A-E	MM	1	53.00	58.90	62.00	65.10	1	85.0	7.1	X
TPSMB68A-E	MP	1	58.10	64.60	68.00	71.40	1	92.0	6.5	X
TPSMB75A-E	MR	1	64.10	71.30	75.00	78.80	1	103.0	5.8	X
TPSMB82A-E	MT	1	70.10	77.90	82.00	86.10	1	113.0	5.3	X
TPSMB91A-E	MV	1	77.80	86.50	91.00	95.50	1	125.0	4.8	X
TPSMB100A-E	MX	1	85.50	95.00	100.00	105.00	1	137.0	4.4	X
TPSMB110A-E	MZ	1	94.00	105.00	110.00	116.00	1	152.0	4.0	X
TPSMB120A-E	NE	1	102.00	114.00	120.00	126.00	1	165.0	3.6	X
TPSMB130A-E	NG	1	111.00	124.00	130.00	137.00	1	179.0	3.3	X
TPSMB150A-E	NK	1	128.00	143.00	150.00	158.00	1	207.0	2.9	X
TPSMB160A-E	NM	1	136.00	152.00	160.00	168.00	1	219.0	2.7	X
TPSMB170A-E	NP	1	145.00	162.00	170.00	179.00	1	234.0	2.6	X
TPSMB180A-E	NR	1	154.00	171.00	180.00	189.00	1	246.0	2.4	X
TPSMB200A-E	NT	1	171.00	190.00	200.00	210.00	1	274.0	2.2	X
TPSMB220A-E	NV	1	185.00	209.00	220.00	231.00	1	328.0	1.8	X
TPSMB250A-E	NX	1	214.00	237.00	250.00	263.00	1	344.0	1.8	X
TPSMB300A-E	NZ	1	256.00	285.00	300.00	315.00	1	414.0	1.5	X
TPSMB350A-E	YW	1	300.00	333.00	350.00	368.00	1	482.0	1.2	X
TPSMB400A-E	YX	1	342.00	380.00	400.00	420.00	1	548.0	1.1	X
TPSMB440A-E	YY	1	376.00	418.00	440.00	462.00	1	602.0	1.0	X
TPSMB480A-E	KA	1	408.00	456.00	480.00	504.00	1	658.0	0.9	X
TPSMB510A-E	YZ	1	434.00	485.00	510.00	535.00	1	698.0	0.9	X
TPSMB540A-E	KB	1	459.00	513.00	540.00	567.00	1	740.0	0.8	X

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Part Number (Bi)	Marking Code	Maximum Reverse Leakage		Breakdown Voltage				Max. Clamping Voltage		Agency Approva 
		Current $I_{RM}$ at $V_{RM}$		$V_{BR}$ at $I_R$ (V) <sup>(1)</sup>				$V_{CL}$ at $I_{PP}$ max. 1ms. Expo.		
		( $\mu\text{A}$ )	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)	
TPSMB6.8CA-E	PE	1000	5.80	6.45	6.80	7.14	10	10.5	57.0	X
TPSMB7.5CA-E	PG	500	6.40	7.13	7.50	7.88	10	11.3	53.0	X
TPSMB8.2CA-E	PK	200	7.02	7.79	8.20	8.61	10	12.1	50.0	X
TPSMB9.1CA-E	PM	50	7.78	8.65	9.00	9.55	1	13.4	45.0	X
TPSMB10CA-E	PP	10	8.55	9.50	10.00	10.50	1	14.5	41.0	X
TPSMB11CA-E	PR	5	9.40	10.50	11.00	11.60	1	15.6	38.0	X
TPSMB12CA-E	PT	5	10.20	11.40	12.00	12.60	1	16.7	36.0	X
TPSMB13CA-E	PV	5	11.10	12.40	13.00	13.70	1	18.2	33.0	X
TPSMB15CA-E	PX	1	12.80	14.30	15.00	15.80	1	21.2	28.0	X
TPSMB16CA-E	PZ	1	13.60	15.20	16.00	16.80	1	22.5	27.0	X
TPSMB18CA-E	QE	1	15.30	17.10	18.00	18.90	1	25.5	24.0	X
TPSMB20CA-E	QG	1	17.10	19.00	20.00	21.00	1	27.7	22.0	X
TPSMB22CA-E	QK	1	18.80	20.90	22.00	23.10	1	30.6	20.0	X
TPSMB24CA-E	QM	1	20.50	22.80	24.00	25.20	1	33.2	18.0	X
TPSMB27CA-E	QP	1	23.10	25.70	27.00	28.40	1	37.5	16.0	X
TPSMB30CA-E	QR	1	25.60	28.50	30.00	31.50	1	41.4	14.4	X
TPSMB33CA-E	QT	1	28.20	31.40	33.00	34.70	1	45.7	13.2	X
TPSMB36CA-E	QV	1	30.80	34.20	36.00	37.80	1	49.9	12.0	X
TPSMB39CA-E	QX	1	33.30	37.10	39.00	41.00	1	53.9	11.2	X
TPSMB43CA-E	QZ	1	36.80	40.90	43.00	45.20	1	59.3	10.1	X
TPSMB47CA-E	TE	1	40.20	44.70	47.00	49.40	1	64.8	9.3	X
TPSMB51CA-E	TG	1	43.60	48.50	51.00	53.60	1	70.1	8.6	X
TPSMB56CA-E	TK	1	47.80	53.20	56.00	58.80	1	77.0	7.8	X
TPSMB62CA-E	TM	1	53.00	58.90	62.00	65.10	1	85.0	7.1	X
TPSMB68CA-E	TP	1	58.10	64.60	68.00	71.40	1	92.0	6.5	X
TPSMB75CA-E	TR	1	64.10	71.30	75.00	78.80	1	103.0	5.8	X
TPSMB82CA-E	TT	1	70.10	77.90	82.00	86.10	1	113.0	5.3	X
TPSMB91CA-E	TV	1	77.80	86.50	91.00	95.50	1	125.0	4.8	X
TPSMB100CA-E	TX	1	85.50	95.00	100.00	105.00	1	137.0	4.4	X
TPSMB110CA-E	TZ	1	94.00	105.00	110.00	116.00	1	152.0	4.0	X
TPSMB120CA-E	VE	1	102.00	114.00	120.00	126.00	1	165.0	3.6	X
TPSMB130CA-E	VG	1	111.00	124.00	130.00	137.00	1	179.0	3.3	X
TPSMB150CA-E	VK	1	128.00	143.00	150.00	158.00	1	207.0	2.9	X
TPSMB160CA-E	VM	1	136.00	152.00	160.00	168.00	1	219.0	2.7	X
TPSMB170CA-E	VP	1	145.00	162.00	170.00	179.00	1	234.0	2.6	X
TPSMB180CA-E	VR	1	154.00	171.00	180.00	189.00	1	246.0	2.4	X
TPSMB200CA-E	VT	1	171.00	190.00	200.00	210.00	1	274.0	2.2	X
TPSMB220CA-E	VV	1	185.00	209.00	220.00	231.00	1	328.0	1.8	X
TPSMB250CA-E	VX	1	214.00	237.00	250.00	263.00	1	344.0	1.8	X
TPSMB260CA-E	KI	1	232.00	247.00	260.00	273.00	1	360.0	1.7	X

**Notes:**

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

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## Surface Mount – 600 W

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

Figure 1 - Pulse Waveform

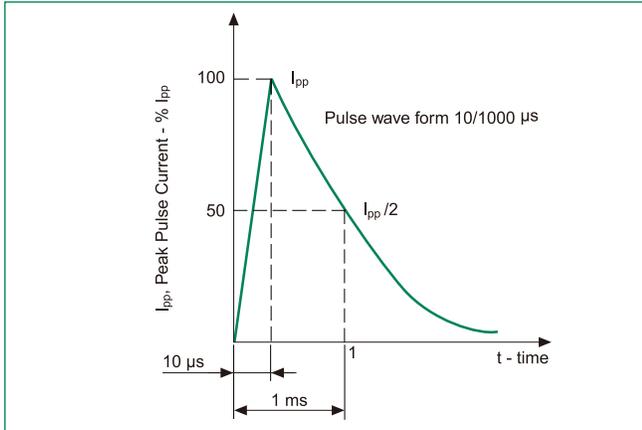


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

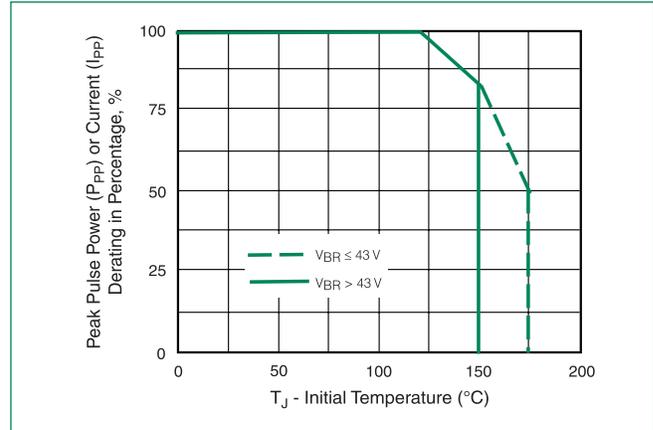


Figure 3 - Peak Pulse Power Rating Curve

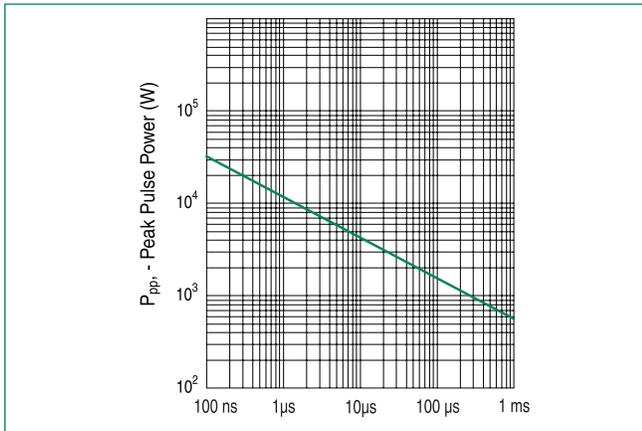
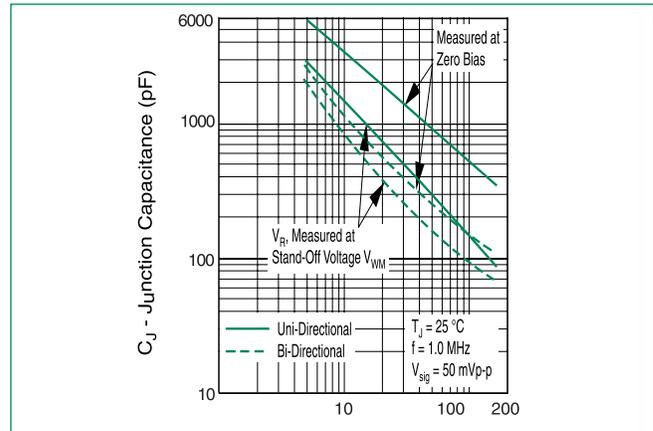
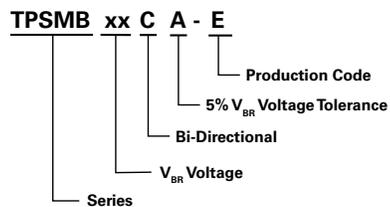


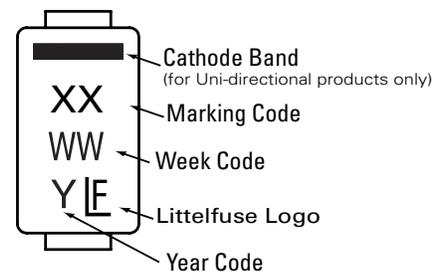
Figure 4 - Typical Junction Capacitance



### Part Numbering System



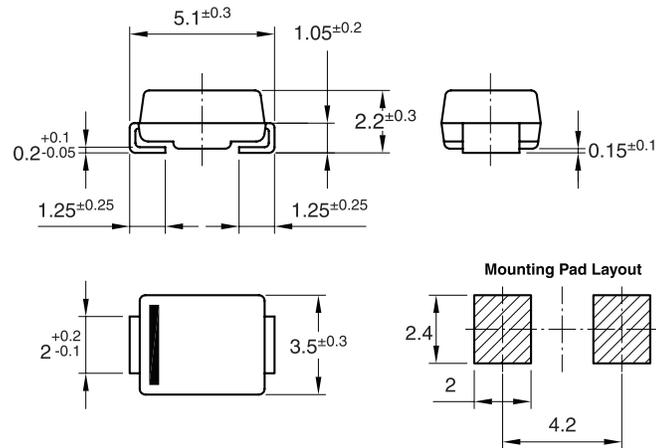
### Part Marking System



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## Surface Mount – 600 W

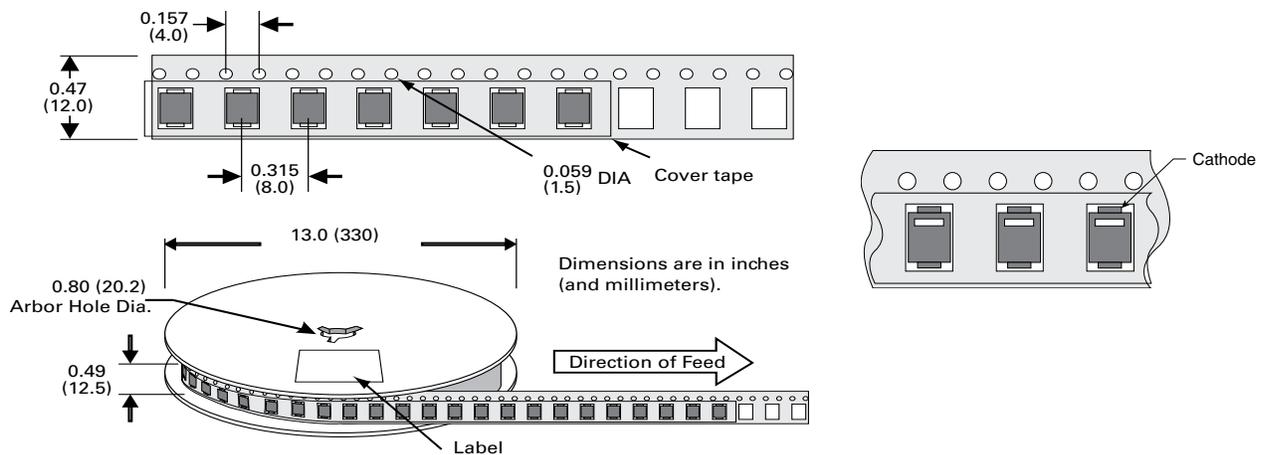
### Dimensions - DO-214AA Package



### Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMBxxXX-E	DO-214AA	3200	13" diameter tape and reel	EIA RS-481

### Tape and Reel Specification



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