TPSMA-E Series
Surface Mount – 400 W

AUTOMOTIVE GRADE RoHS Pb e3

Description

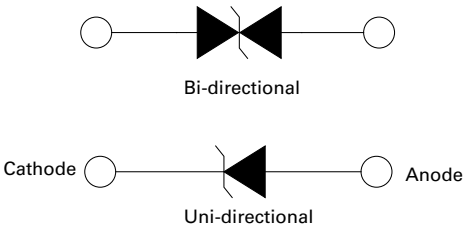
Littelfuse TPSMA-E Series of Transient Voltage Suppression (TVS) Diodes can provide secondary transient voltage protection from transients induced by load dump and other transient voltage events for sensitive electronics. The TPSMA-E Series offers superior electrical performance in a small footprint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

Maximum Ratings and Thermal Characteristics
(T_A=25 °C unless otherwise noted)

Parameter		Symbol	Value	Unit
Peak Pulse Power Dissipation with 10/1000 µs Exponential Pulse	below 250V	P_{PPM}	400	W
	above 250V		300	
Peak Forward Surge Current 8.3 ms. (Jedec Method) (Note 1) (Note 2)		I_{FSM}	40	A
Max. Forward Voltage Drop at I_F = 25 A (Note 1)		V_F	3.5	V
Operating Temperature Range	$V_{BR} \leq 43$ V	T_J	-65 to 175	°C
	$V_{BR} > 43$ V		-65 to 150	
Storage Temperature Range		T_{STG}	-65 to 175	°C

Notes:
1. Only for Unidorectional
2. Mounted on 0.31 x 0.31" (8.0 x 8.0 mm) copper pads to each terminal

Functional Diagram



Features

- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- ESD meets HBM: 8 kV and M4 machine model: 400 V
- Low profile package
- Ideal for automated placement
- 400 W 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
- Solder dip 260 °C, 10s
- Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC
- Halogen-free avalaible according to IEC 61249-2-21 denifition

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	0.060 grams
Case	DO-214AC (SMA). 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-STD-750 Method 2026, J-STD-002 and JESD22-B102. Consumer grade, meets JESD 201 class 1A whisker test.

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Electrical Characteristics (T_A=25 °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.	
		(µA)	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)
TPSMA6.8A-E	AE	1000	5.80	6.45	6.80	7.14	10	10.5	40.0
TPSMA7.5A-E	AG	500	6.40	7.13	7.50	7.88	10	11.3	37.0
TPSMA8.2A-E	AK	200	7.00	7.79	8.20	8.61	10	12.1	35.0
TPSMA9.1A-E	AM	50	7.80	8.65	9.10	9.55	1	13.4	31.0
TPSMA10A-E	AP	10	8.60	9.50	10.00	10.50	1	14.5	29.0
TPSMA11A-E	AR	5	9.4	10.5	11.0	11.6	1	15.6	27.0
TPSMA12A-E	AT	1	10.2	11.4	12.0	12.6	1	16.7	25.0
TPSMA13A-E	AV	1	11.1	12.4	13.0	13.7	1	18.2	23.0
TPSMA15A-E	AX	1	12.8	14.3	15.0	15.8	1	21.2	20.0
TPSMA16A-E	AZ	1	13.6	15.2	16.0	16.8	1	22.5	19.0
TPSMA18A-E	BE	1	15.3	17.1	18.0	18.9	1	25.5	17.0
TPSMA20A-E	BG	1	17.1	19.0	20.0	21.0	1	27.7	15.0
TPSMA22A-E	BK	1	18.8	20.9	22.0	23.1	1	30.6	14.0
TPSMA24A-E	BM	1	20.5	22.8	24.0	25.2	1	33.2	13.0
TPSMA27A-E	BP	1	23.1	25.7	27.0	28.4	1	37.5	11.2
TPSMA30A-E	BR	1	25.6	28.5	30.0	31.5	1	41.4	10.0
TPSMA33A-E	BT	1	28.2	31.4	33.0	34.7	1	45.7	9.0
TPSMA36A-E	BV	1	30.8	34.2	36.0	37.8	1	49.9	8.4
TPSMA39A-E	BX	1	33.3	37.1	39.0	41.0	1	53.9	7.8
TPSMA43A-E	BZ	1	36.8	40.9	43.0	45.2	1	59.3	7.1
TPSMA47A-E	CE	1	40.2	44.7	47.0	49.4	1	64.8	6.4
TPSMA51A-E	CG	1	43.6	48.5	51.0	53.6	1	70.1	6.0
TPSMA56A-E	CK	1	47.8	53.2	56.0	58.8	1	77.0	5.5
TPSMA62A-E	CM	1	53.0	58.9	62.0	65.1	1	85.0	5.0
TPSMA68A-E	CP	1	58.1	64.6	68.0	71.4	1	92.0	4.6
TPSMA75A-E	CR	1	64.1	71.3	75.0	78.8	1	103.0	4.1
TPSMA82A-E	CT	1	70.1	77.9	82.0	86.1	1	113.0	3.7
TPSMA91A-E	CV	1	77.8	86.5	91.0	95.5	1	125.0	3.4
TPSMA100A-E	CX	1	85.5	95.0	100.0	105.0	1	137.0	3.1
TPSMA110A-E	CZ	1	94.0	105.0	110.0	116.0	1	152.0	2.8
TPSMA120A-E	DE	1	102.0	114.0	120.0	126.0	1	165.0	2.5
TPSMA130A-E	DG	1	111.0	124.0	130.0	137.0	1	179.0	2.3
TPSMA150A-E	DL	1	128.0	143.0	150.0	158.0	1	207.0	2.0
TPSMA160A-E	DN	1	136.0	152.0	160.0	168.0	1	219.0	1.9
TPSMA170A-E	DQ	1	145.0	162.0	170.0	179.0	1	234.0	1.8
TPSMA180A-E	DS	1	154.0	171.0	180.0	189.0	1	246.0	1.7
TPSMA200A-E	DU	1	171.0	190.0	200.0	210.0	1	274.0	1.5
TPSMA220A-E	DX	1	185.0	209.0	220.0	231.0	1	328.0	1.2
TPSMA250A-E	DW	1	214.0	237.0	250.0	263.0	1	344.0	0.9
TPSMA300A-E	DY	1	256.0	285.0	300.0	315.0	1	414.0	0.7
TPSMA350A-E	DZ	1	300.0	333.0	350.0	368.0	1	482.0	0.6
TPSMA400A-E	DJ	1	342.0	380.0	400.0	420.0	1	548.0	0.6
TPSMA440A-E	DK	1	376.0	418.0	440.0	462.0	1	602.0	5.0
TPSMA480A-E	WJ	1	408.0	456.0	480.0	504.0	1	658.0	0.5
TPSMA510A-E	WL	1	434.0	485.0	510.0	535.0	1	698.0	0.4
TPSMA540A-E	WN	1	459.0	513.0	540.0	567.0	1	740.0	0.4

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		(µA)	(V)	Min.	Nom.	Max.	(mA)	(V)	(A)
TPSMA6.8CA-E	RB	1000	5.80	6.45	6.80	7.14	10	10.5	38.1
TPSMA7.5CA-E	RD	500	6.40	7.13	7.50	7.88	10	11.3	35.4
TPSMA8.2CA-E	RF	200	7.02	7.79	8.20	8.61	10	12.1	33.1
TPSMA9.1CA-E	RH	50	7.78	8.65	9.10	9.55	1	13.4	29.9
TPSMA10CA-E	RJ	10	8.55	9.50	10.00	10.50	1	14.5	27.6
TPSMA11CA-E	RL	5	9.4	10.5	11.0	11.6	1	15.6	25.6
TPSMA12CA-E	RN	1	10.2	11.4	12.0	12.6	1	16.7	24.0
TPSMA13CA-E	RP	1	11.1	12.4	13.0	13.7	1	18.2	22.0
TPSMA15CA-E	RS	1	12.8	14.3	15.0	15.8	1	21.2	18.9
TPSMA16CA-E	RU	1	13.6	15.2	16.0	16.8	1	22.5	17.8
TPSMA18CA-E	CC	1	15.3	17.1	18.0	18.9	1	25.5	17.0
TPSMA20CA-E	RY	1	17.1	19.0	20.0	21.0	1	27.7	14.4
TPSMA22CA-E	SA	1	18.8	20.9	22.0	23.1	1	30.6	13.1
TPSMA24CA-E	SC	1	20.5	22.8	24.0	25.2	1	33.2	12.0
TPSMA27CA-E	SE	1	23.1	25.7	27.0	28.4	1	37.5	10.9
TPSMA30CA-E	SG	1	25.6	28.5	30.0	31.5	1	41.4	9.7
TPSMA33CA-E	SI	1	28.2	31.4	33.0	34.7	1	45.7	9.0
TPSMA36CA-E	SK	1	30.8	34.2	36.0	37.8	1	49.9	8.0
TPSMA39CA-E	SM	1	33.3	37.1	39.0	41.0	1	53.9	7.4
TPSMA43CA-E	SO	1	36.8	40.9	43.0	45.2	1	59.3	6.7
TPSMA47CA-E	SR	1	40.2	44.7	47.0	49.4	1	64.8	6.2
TPSMA51CA-E	CA	1	43.6	48.5	51.0	53.6	1	70.1	5.7
TPSMA56CA-E	CB	1	47.8	53.2	56.0	58.8	1	77.0	5.2
TPSMA62CA-E	CI	1	53.0	58.9	62.0	65.1	1	85.0	4.7
TPSMA68CA-E	UY	1	58.1	64.6	68.0	71.4	1	92.0	4.3
TPSMA75CA-E	SZ	1	64.1	71.3	75.0	78.8	1	103.0	3.9
TPSMA82CA-E	PB	1	70.1	77.9	82.0	86.1	1	113.0	3.5
TPSMA91CA-E	PC	1	77.8	86.5	91.0	95.5	1	125.0	3.2
TPSMA100CA-E	CJ	1	85.5	95.0	100.0	105.0	1	137.0	2.9
TPSMA110CA-E	PJ	1	94.0	105.0	110.0	116.0	1	152.0	2.7
TPSMA120CA-E	PO	1	102.0	114.0	120.0	126.0	1	165.0	2.5
TPSMA130CA-E	NA	1	111.0	124.0	130.0	137.0	1	179.0	2.3
TPSMA150CA-E	NB	1	128.0	143.0	150.0	158.0	1	207.0	2.0
TPSMA160CA-E	NC	1	136.0	152.0	160.0	168.0	1	219.0	1.9
TPSMA170CA-E	NI	1	145.0	162.0	170.0	179.0	1	234.0	1.8
TPSMA180CA-E	NO	1	154.0	171.0	180.0	189.0	1	246.0	1.7
TPSMA200CA-E	MA	1	171.0	190.0	200.0	210.0	1	274.0	1.5
TPSMA220CA-E	MB	1	185.0	209.0	220.0	231.0	1	328.0	1.2
TPSMA250CA-E	MJ	1	214.0	237.0	250.0	263.0	1	344.0	1.2
TPSMA260CA-E	MO	1	232.0	247.0	260.0	273.0	1	360.0	1.1

Notes:
1. Tested with pulses Pulse test: tp ≤ 50 ms; δ < 2%

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Ratings and Characteristic Curves (T_A=25 °C unless otherwise noted)

Figure 1 - Pulse Waveform

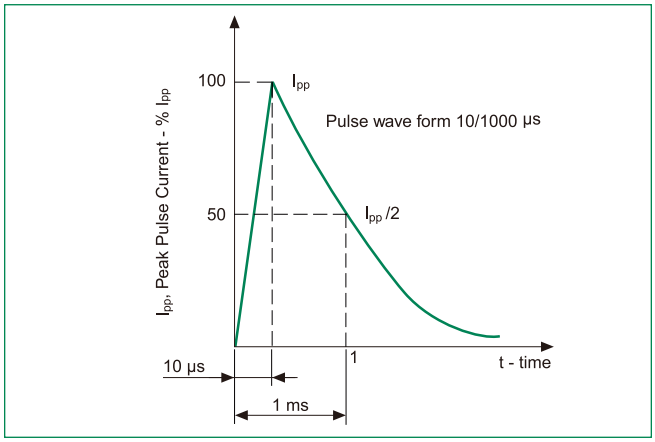


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

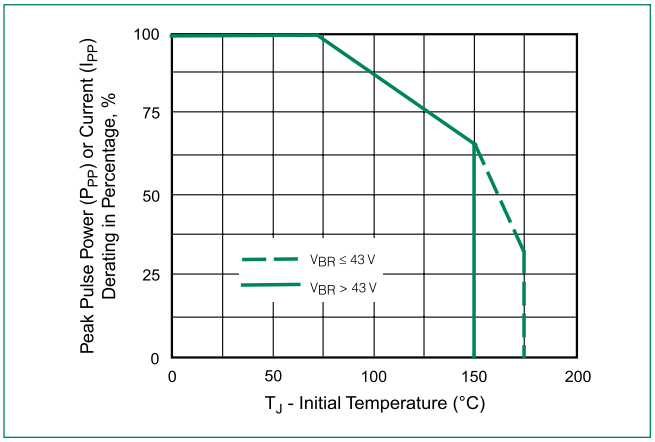


Figure 3 - Peak Pulse Power Rating Curve

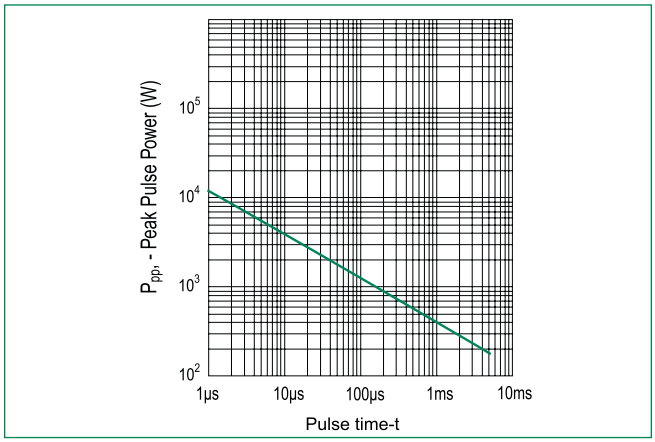
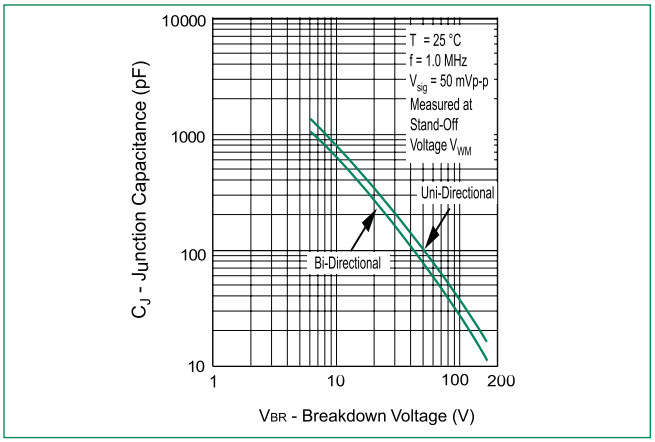
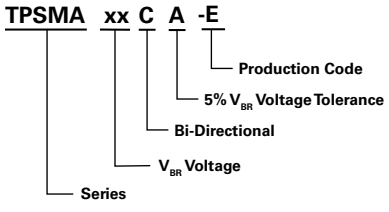


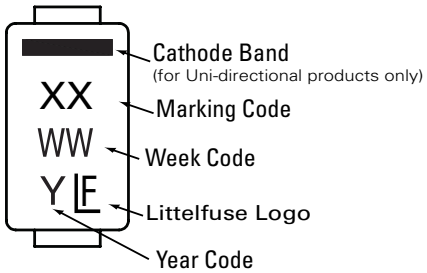
Figure 4 - Typical Junction Capacitance



Part Numbering System



Part Marking System



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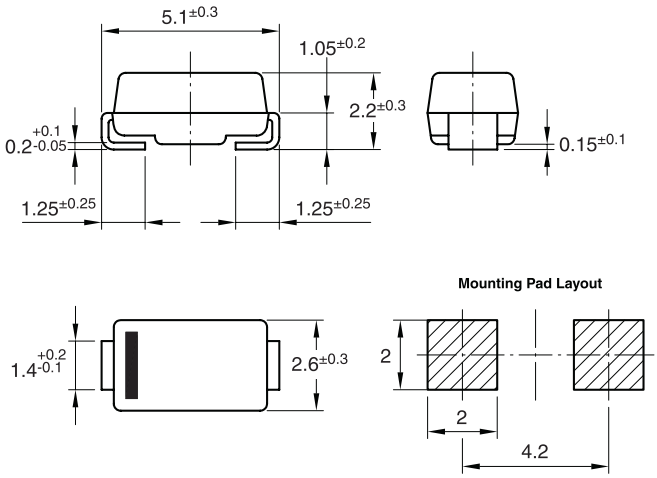
Dimensions - DO-214AC Package



Packaging Options

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
TPSMAxxXX-E	DO-214AC	7500	13" diameter tape and reel	EIA RS-481

Tape and Reel Specification