



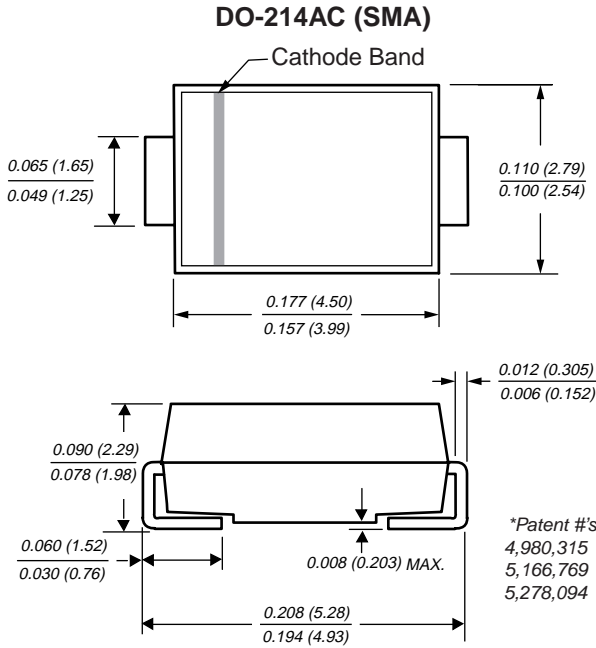
# TPSMA6.8 thru TPSMA43A

Vishay Semiconductors  
formerly General Semiconductor



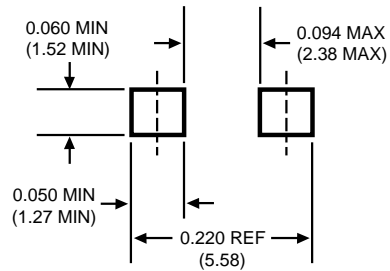
## Surface Mount Automotive Transient Voltage Suppressors

**Breakdown Voltage** 6.8 to 43.0V  
**Peak Pulse Power** 400W



Patented\*

### Mounting Pad Layout



Available in uni-directional only

### Mechanical Data

**Case:** JEDEC DO-214AC molded plastic body over passivated chip

**Terminals:** Solder plated, solderable per MIL-STD-750, Method 2026

**Polarity:** The color band denotes the cathode, which is positive with respect to the anode under normal TVS operation

**Mounting Position:** Any

**Weight:** 0.002 oz., 0.064 g

**Packaging codes/options:**

5A/7.5K per 13" Reel (12mm Tape), 90K/box  
11/1.8K per 7" Reel (12mm Tape), 36K/box

### Features

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Ideal for automated placement
- Low profile package
- Built-in strain relief
- Exclusive patented PAR<sup>®</sup> oxide passivated chip construction
- 400W peak pulse power capability with a 10/1000ms waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- For devices with  $V_{(BR)} \geq 10V$   $I_D$  are typically less than 1.0mA at  $T_A = 150^\circ C$
- Designed for under the hood surface mount applications
- High temperature soldering: 250°C/10 seconds at terminals

### Maximum Ratings and Thermal Characteristics ( $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000 $\mu s$ waveform <sup>(1)(2)</sup> (Fig. 3)	PPPM	Minimum 400	W
Peak power pulse current with a 10/1000 $\mu s$ waveform <sup>(1)</sup> (Fig. 1)	IPPM	See Next Table	A
Peak forward surge current 8.3ms single half sine-wave <sup>(3)</sup>	IFSM	40	A
Maximum instantaneous forward voltage at 25A <sup>(3)</sup>	V <sub>F</sub>	3.5	V
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +185	°C

**Notes:** (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ C$  per Fig. 2

(2) Mounted on P.C.B. with 0.2 x 0.2" (5.0 x 0.5mm) copper pads attached to each terminal

(3) Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minutes maximum

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## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Device	Device Marking Code	Breakdown Voltage V <sub>(BR)</sub> <sup>(1)</sup> at I <sub>T</sub> (V)		Test Current I <sub>T</sub> (mA)	Stand-off Voltage V <sub>WM</sub> (Volts)	Maximum Reverse Leakage at V <sub>WM</sub> I <sub>R</sub> (μA)	T <sub>J</sub> = 150°C Maximum Reverse Leakage at V <sub>WM</sub> I <sub>D</sub> (μA)	Maximum Peak Pulse Surge Current I <sub>PPM</sub> (Note 2) (Amps)	Maximum Clamping Voltage at I <sub>PPM</sub> V <sub>C</sub> (Volts)
		Min.	Max.						
TPSMA6.8	ADP	6.12	7.48	10	5.50	300	1000	37.0	10.8
TPSMA6.8A	AEP	6.45	7.14	10	5.80	300	1000	38.1	10.5
TPSMA7.5	AFP	6.75	8.25	10	6.05	150	500	34.2	11.7
TPSMA7.5A	AGP	7.13	7.88	10	6.40	150	500	35.4	11.3
TPSMA8.2	AHP	7.38	9.02	10	6.63	50	200	32.0	12.5
TPSMA8.2A	AKP	7.79	8.61	10	7.02	50	200	33.1	12.1
TPSMA9.1	ALP	8.19	10.00	1.0	7.37	10	50	29.0	13.8
TPSMA9.1A	AMP	8.65	9.55	1.0	7.78	10	50	29.9	13.
TPSMA10	ANP	9.00	11.00	1.0	8.10	5.0	20	26.7	15.0
TPSMA10A	APP	9.50	10.50	1.0	8.65	5.0	20	27.6	14.5
TPSMA11	AQP	9.90	12.10	1.0	8.92	1.0	5.0	24.7	16.2
TPSMA11A	ARP	10.50	11.60	1.0	9.40	1.0	5.0	25.6	15.6
TPSMA12	ASP	10.80	13.20	1.0	9.72	1.0	5.0	23.1	17.3
TPSMA12A	ATP	11.40	12.60	1.0	10.20	1.0	5.0	24.0	16.7
TPSMA13	AUP	11.70	14.30	1.0	10.50	1.0	5.0	21.1	19.0
TPSMA13A	AVP	12.40	13.70	1.0	11.10	1.0	5.0	22.0	18.2
TPSMA15	AWP	13.50	16.30	1.0	12.10	1.0	5.0	18.2	22.0
TPSMA15A	AXP	14.30	15.80	1.0	12.80	1.0	5.0	18.9	21.2
TPSMA16	AYP	14.40	17.60	1.0	12.90	1.0	5.0	17.0	23.5
TPSMA16A	AZP	15.20	16.80	1.0	13.60	1.0	5.0	17.8	22
TPSMA18	BDP	16.20	19.80	1.0	14.50	1.0	5.0	15.1	26.5
TPSMA18A	BEP	17.10	18.90	1.0	15.30	1.0	5.0	15.9	25.5
TPSMA20	BFP	18.00	22.00	1.0	16.20	1.0	5.0	13.7	29.1
TPSMA20A	BGP	19.00	21.00	1.0	17.10	1.0	5.0	14.4	27.7
TPSMA22	BHP	19.80	24.20	1.0	17.80	1.0	5.0	12.5	31.9
TPSMA22A	BKP	20.90	23.10	1.0	18.80	1.0	5.0	13.1	30.6
TPSMA24	BLP	21.60	26.40	1.0	19.40	1.0	5.0	11.5	34.7
TPSMA24A	BMP	22.80	25.20	1.0	20.50	1.0	5.0	12.0	33.2
TPSMA27	BNP	24.30	29.70	1.0	21.80	1.0	5.0	10.2	39.1
TPSMA27A	BPP	25.70	28.40	1.0	23.10	1.0	5.0	10.7	37.5
TPSMA30	BQP	27.00	33.00	1.0	24.30	1.0	5.0	9.2	43.5
TPSMA30A	BRP	28.50	31.50	1.0	25.60	1.0	5.0	9.7	41.4
TPSMA33	BSP	29.70	36.30	1.0	26.80	1.0	5.0	8.4	47.
TPSMA33A	BTP	31.40	34.70	1.0	28.20	1.0	5.0	8.8	45.7
TPSMA36	BUP	32.40	39.60	1.0	29.10	1.0	5.0	7.7	52.0
TPSMA36A	BVP	34.20	37.80	1.0	30.80	1.0	5.0	8.0	49.9
TPSMA39	BWP	35.10	42.90	1.0	31.60	1.0	5.0	7.1	56.4
TPSMA39A	BXP	37.10	41.00	1.0	33.30	1.0	5.0	7.4	53.9
TPSMA43	BYP	38.70	47.30	1.0	34.80	1.0	5.0	6.5	61.9
TPSMA43A	BZP	40.90	45.20	1.0	36.80	1.0	5.0	6.7	59.3

### Notes:

(1) V<sub>(BR)</sub> measured after I<sub>T</sub> applied for 300μs, I<sub>T</sub>=square wave pulse or equivalent

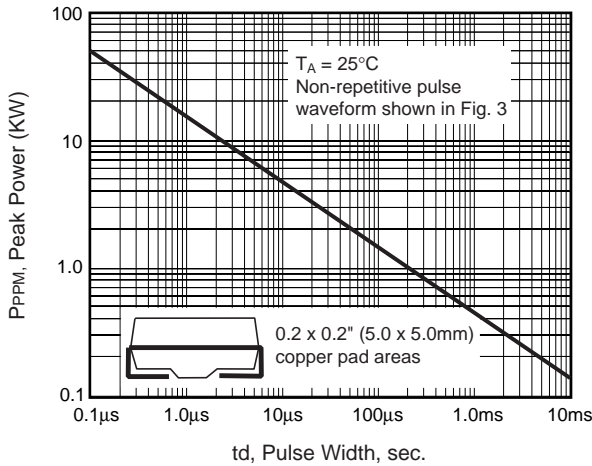
(2) Surge current waveform per Fig. 3 and derate per Fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE C62.35

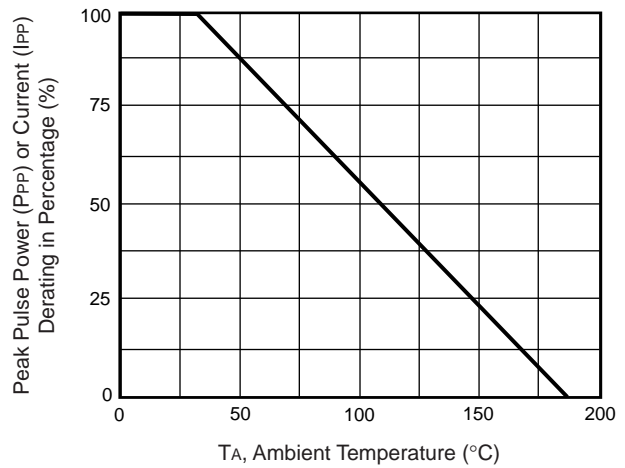


**Ratings and Characteristic Curves** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

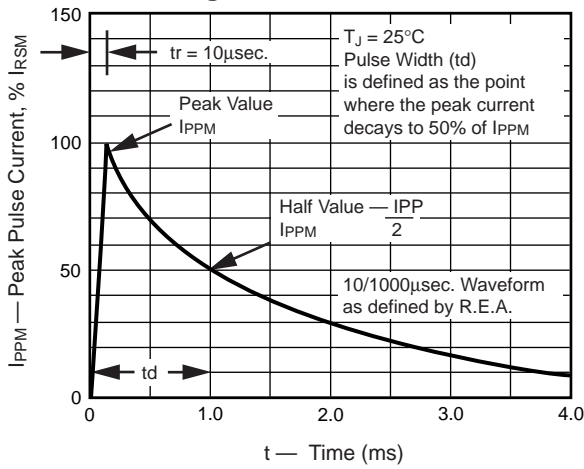
**Fig.1 – Peak Pulse Power Rating Curve**



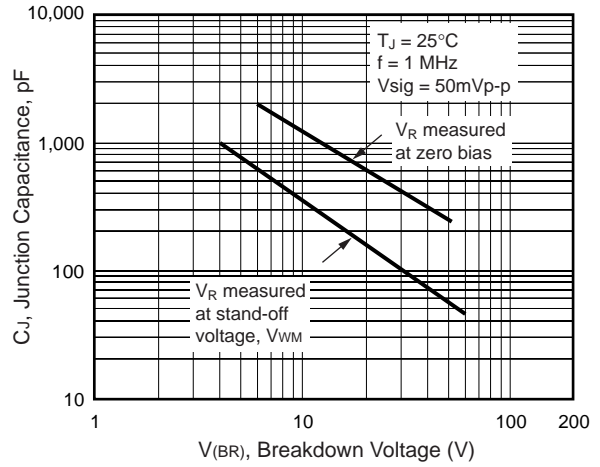
**Fig. 2 – Pulse Derating Curve**



**Fig. 3 – Pulse Waveform**



**Fig. 4 – Typical Junction Capacitance**



**Fig. 5 – Maximum Non-Repetitive Peak Forward Surge Current**

