

## High Power Density Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

### eSMP<sup>®</sup> Series


**DO-220AA (SMP)**

PRIMARY CHARACTERISTICS	
$V_{BR}$	6.8 V to 43 V
$P_{PPM}$ (for $V_{BR}$ 6.8 V)	250 W
$P_{PPM}$ (for $V_{BR}$ 7.5 V to 12 V)	300 W
$P_{PPM}$ (for $V_{BR}$ 13 V to 43 V)	400 W
$V_{WM}$	5.5 V to 36.8 V
$P_D$	2.5 W
$I_{FSM}$	40 A
$T_J$ max.	185 °C
Polarity	Uni-directional
Package	DO-220AA (SMP)

### TYPICAL APPLICATIONS

Protection for ICs, drive transistors, signal lines of sensor units, and electronic units in consumer, computer, industrial and automotive applications.

### FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$  °C capability suitable for high reliability and automotive requirement
- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Uni-direction only
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### MECHANICAL DATA

**Case:** DO-220AA (SMP)

Molding compound meets UL 94 V-0 flammability rating Base P/NHM3 - halogen-free, RoHS-compliant, and automotive grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation with a 10/1000 $\mu$ s waveform (fig. 1 and 3) <sup>(1)(2)</sup>	$P_{PPM}$	See table next page	W
Peak power pulse current with a 10/1000 $\mu$ s waveform (fig. 1) <sup>(1)</sup>	$I_{PPM}$	See table next page	A
Power dissipation on infinite heatsink, $T_A = 75$ °C	$P_D$	2.5	W
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	40	A
Maximum instantaneous forward voltage at 25 A <sup>(3)</sup>	$V_F$	2.5	V
Operating junction and storage temperature range	$T_J, T_{STG}$	- 65 to + 185	°C

### Notes

- (1) Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2
- (2) Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal
- (3) Pulse test: 300  $\mu$ s pulse width, 1 % duty cycle



ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)										
DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE $V_{BR}^{(1)}$ AT $I_T$ (V)		TEST CURRENT $I_T$ (mA)	STAND-OFF VOLTAGE $V_{WM}$ (V)	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_R$ ( $\mu\text{A}$ )	MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $T_J = 150\text{ }^\circ\text{C}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{BR}$ ( $\%/^\circ\text{C}$ )
		MIN.	MAX.							
TPSMP6.8	ADP	6.12	7.48	10.0	5.50	300	1000	23.2	10.8	0.057
TPSMP6.8A	AEP	6.45	7.14	10.0	5.80	300	1000	23.8	10.5	0.057
TPSMP7.5	AFP	6.75	8.25	10.0	6.05	150	500	25.6	11.7	0.060
TPSMP7.5A	AGP	7.13	7.88	10.0	6.40	150	500	26.5	11.3	0.061
TPSMP8.2	AHP	7.38	9.02	10.0	6.63	50.0	200	24.0	12.5	0.065
TPSMP8.2A	AKP	7.79	8.61	10.0	7.02	50.0	200	24.8	12.1	0.065
TPSMP9.1	ALP	8.19	10.0	1.0	7.37	10.0	50.0	21.7	13.8	0.068
TPSMP9.1A	AMP	8.65	9.55	1.0	7.78	10.0	50.0	22.4	13.4	0.068
TPSMP10	ANP	9.00	11.0	1.0	8.10	5.0	20.0	20.0	15.0	0.073
TPSMP10A	APP	9.50	10.5	1.0	8.55	5.0	20.0	20.7	14.5	0.073
TPSMP11	AQP	9.90	12.1	1.0	8.92	2.0	10.0	18.5	16.2	0.075
TPSMP11A	ARP	10.5	11.6	1.0	9.40	2.0	10.0	19.2	15.6	0.075
TPSMP12	ASP	10.8	13.2	1.0	9.72	1.0	5.0	17.3	17.3	0.076
TPSMP12A	ATP	11.4	12.6	1.0	10.2	1.0	5.0	18.0	16.7	0.078
TPSMP13	AUP	11.7	14.3	1.0	10.5	1.0	5.0	21.1	19.0	0.081
TPSMP13A	AVP	12.4	13.7	1.0	11.1	1.0	5.0	22.0	18.2	0.081
TPSMP15	AWP	13.5	16.3	1.0	12.1	1.0	5.0	18.2	22.0	0.084
TPSMP15A	AXP	14.3	15.8	1.0	12.8	1.0	5.0	18.9	21.2	0.084
TPSMP16	AYP	14.4	17.6	1.0	12.9	1.0	5.0	17.0	23.5	0.086
TPSMP16A	AZP	15.2	16.8	1.0	13.6	1.0	5.0	17.8	22.5	0.086
TPSMP18	BDP	16.2	19.8	1.0	14.5	1.0	5.0	15.1	26.5	0.088
TPSMP18A	BEP	17.1	18.9	1.0	15.3	1.0	5.0	15.9	25.5	0.088
TPSMP20	BFP	18.0	22.0	1.0	16.2	1.0	5.0	13.7	29.1	0.090
TPSMP20A	BGP	19.0	21.0	1.0	17.1	1.0	5.0	14.4	27.7	0.090
TPSMP22	BHP	19.8	24.2	1.0	17.8	1.0	5.0	12.5	31.9	0.092
TPSMP22A	BKP	20.9	23.1	1.0	18.8	1.0	5.0	13.1	30.6	0.092
TPSMP24	BLP	21.6	26.4	1.0	19.4	1.0	5.0	11.5	34.7	0.094
TPSMP24A	BMP	22.8	25.2	1.0	20.5	1.0	5.0	12.0	33.2	0.094
TPSMP27	BNP	24.3	29.7	1.0	21.8	1.0	5.0	10.2	39.1	0.100
TPSMP27A	BPP	25.7	28.4	1.0	23.1	1.0	5.0	10.7	37.5	0.096
TPSMP30	BQP	27.0	33.0	1.0	24.3	1.0	5.0	9.2	43.5	0.097
TPSMP30A	BRP	28.5	31.5	1.0	25.6	1.0	5.0	9.7	41.4	0.097
TPSMP33	BSP	29.7	36.3	1.0	26.8	1.0	5.0	8.4	47.7	0.098
TPSMP33A	BTP	31.4	34.7	1.0	28.2	1.0	5.0	8.8	45.7	0.098
TPSMP36	BUP	32.4	39.6	1.0	29.1	1.0	5.0	7.7	52.0	0.099
TPSMP36A	BVP	34.2	37.8	1.0	30.8	1.0	5.0	8.0	49.9	0.099
TPSMP39	BWP	35.1	42.9	1.0	31.6	1.0	5.0	7.1	56.4	0.100
TPSMP39A	BXP	37.1	41.0	1.0	33.3	1.0	5.0	7.4	53.9	0.100
TPSMP43	BYP	38.7	47.3	1.0	34.8	1.0	5.0	6.5	61.9	0.101
TPSMP43A	BZP	40.9	45.2	1.0	36.8	1.0	5.0	6.7	59.3	0.101

**Notes**(1)  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu\text{s}$ ,  $I_T$  = square wave pulse or equivalent

(2) Surge current waveform per fig. 3 and derated per fig. 2

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



ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TPSMP6.8AHM3/84A <sup>(1)</sup>	0.024	84A	3000	7" diameter plastic tape and reel
TPSMP6.8AHM3/85A <sup>(1)</sup>	0.024	85A	10 000	13" diameter plastic tape and reel

**Note**

<sup>(1)</sup> Automotive grade

**RATINGS AND CHARACTERISTICS CURVES**

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

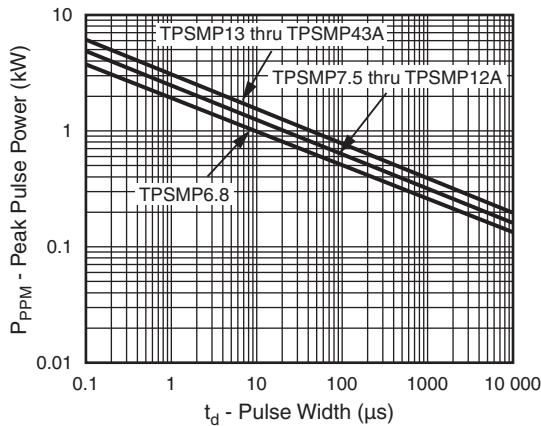


Fig. 1 - Peak Pulse Power Rating Curve

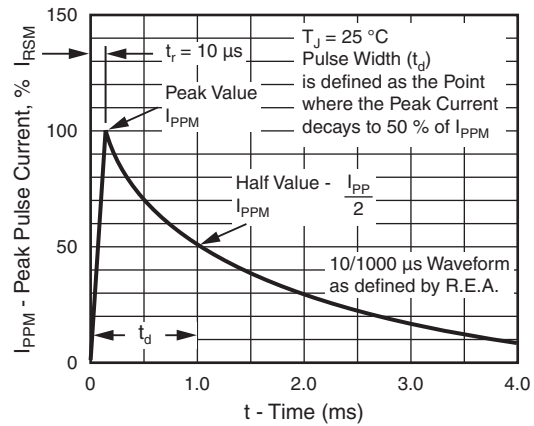


Fig. 3 - Pulse Waveform

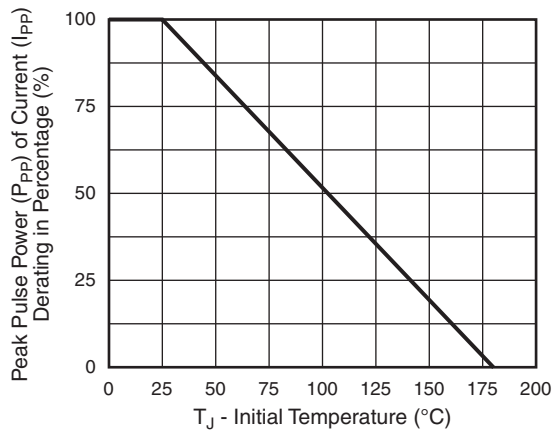


Fig. 2 - Pulse Derating Curve

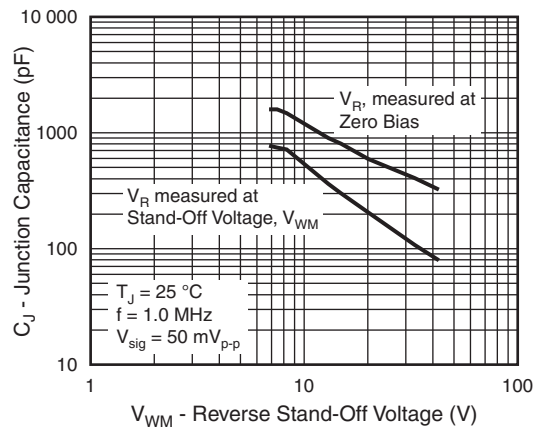


Fig. 4 - Typical Junction Capacitance

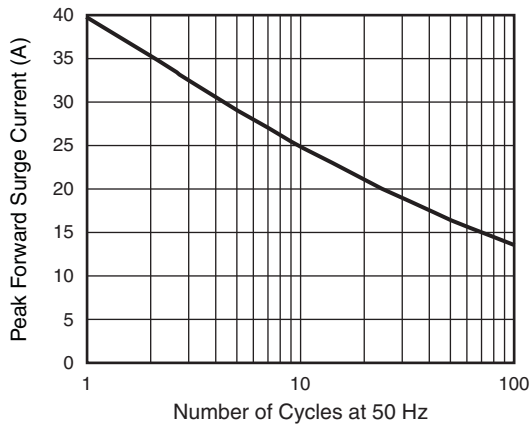


Fig. 5 - Maximum Peak Forward Surge Current

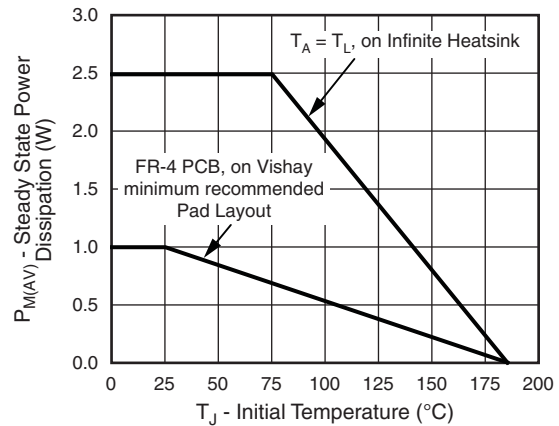
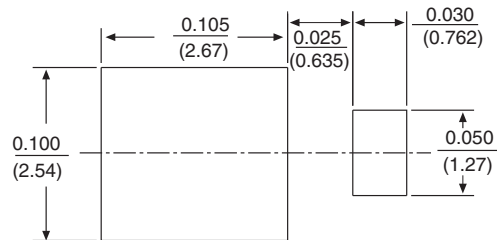
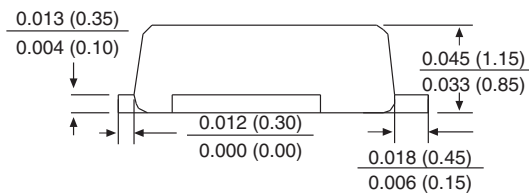
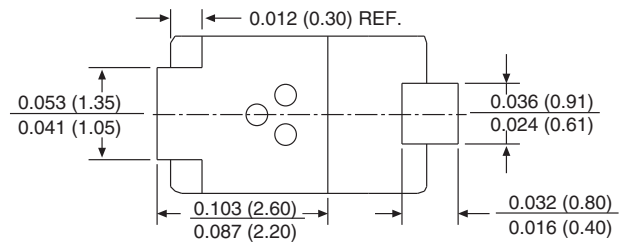
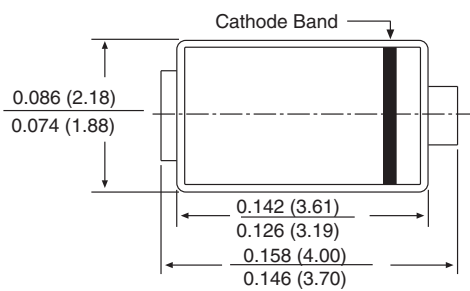


Fig. 6 - Steady State Power Derating Curve

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.