



# Surface Mount Power Voltage-Regulating Diodes

eSMP® Series



DO-220AA (SMP)

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Low Zener impedance
- Low regulation factor
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT HALOGEN FREE

### MECHANICAL DATA

Case: DO-220AA (SMP)

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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

M3 suffix meets JESD 201 class 1A whisker test

Polarity: Color band denotes cathode end

PRIMARY CHARACTERISTICS	
V <sub>Z</sub>	5.6 V to 43 V
P <sub>tot</sub> at T <sub>L</sub> = 75 °C	1500 mW
P <sub>tot</sub> at T <sub>L</sub> = 25 °C	500 mW
T <sub>J</sub> max.	150 °C
V <sub>Z</sub> specification	Pulse current
Int. construction	Single

### TYPICAL APPLICATIONS

For general purpose regulation and protection applications.

PACKAGE				
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
DO-220AA (SMP)	24 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Power dissipation at T <sub>L</sub> = 75 °C (fig. 1) <sup>(1)</sup>	P <sub>tot</sub>	1500	mW
Power dissipation at T <sub>A</sub> = 25 °C (fig. 1) <sup>(2)</sup>	P <sub>tot</sub>	500	mW
Maximum instantaneous forward voltage at 200 mA for all types <sup>(3)</sup>	V <sub>F</sub>	1.5	V
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	- 65 to + 150	°C

#### Notes

- <sup>(1)</sup> Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal
- <sup>(2)</sup> Mounted on minimum recommended pad layout
- <sup>(3)</sup> Pulse test: 300 µs pulse width, 1 % duty cycle

ELECTRICAL CHARACTERISTICS	
SYMBOL	PARAMETER
$V_Z$	Reverse Zener voltage at $I_{ZT}$
$I_{ZT}$	Reverse current
$Z_{ZT}$	Maximum Zener impedance at $I_{ZT}$
$I_{ZK}$	Reverse current
$Z_{ZK}$	Maximum Zener impedance at $I_{ZK}$
$I_R$	Reverse leakage current at $V_R$
$V_R$	Reverse voltage
$I_F$	Forward current
$V_F$	Forward voltage at $I_F$
$I_{ZM}$	Maximum DC Zener current



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)											
PART NUMBER	DEVICE MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		MAXIMUM ZENER IMPEDANCE		MAXIMUM REVERSE LEAKAGE CURRENT		MAXIMUM ZENER CURRENT
		$V_Z$ at $I_{ZT}$			$I_{ZT}$	$I_{ZK}$	$Z_{ZT}$ AT $I_{ZT}$	$Z_{ZK}$ AT $I_{ZK}$	$I_R$ AT $V_R$		$I_{ZM}$
		V			mA		$\Omega$		$\mu\text{A}$	V	mA
		MIN.	NOM.	MAX.			MAX.	MAX.	MAX.		MAX.
SMPZ3919B	19B	5.32	5.6	5.88	66.9	1.0	5.0	700	200	3.0	268
SMPZ3920B	20B	5.89	6.2	6.51	60.5	1.0	2.0	700	200	4.0	242
SMPZ3921B	21B	6.46	6.8	7.14	55.1	1.0	2.5	400	200	5.2	221
SMPZ3922B	22B	7.12	7.5	7.88	50.0	0.5	3.0	400	150	6.0	200
SMPZ3923B	23B	7.79	8.2	8.61	45.7	0.5	3.5	400	50	6.5	183
SMPZ3924B	24B	8.64	9.1	9.56	41.2	0.5	4.0	500	10	7.0	165
SMPZ3925B	25B	9.5	10	10.5	37.5	0.25	4.5	500	2.5	8.0	150
SMPZ3926B	26B	10.5	11	11.6	34.1	0.25	5.5	550	0.5	8.4	136
SMPZ3927B	27B	11.4	12	12.6	31.2	0.25	6.5	550	0.5	9.1	125
SMPZ3928B	28B	12.4	13	13.7	28.8	0.25	7.0	550	0.5	9.9	115
SMPZ3929B	29B	14.3	15	15.8	25	0.25	9.0	600	0.5	11.4	100
SMPZ3930B	30B	15.2	16	16.8	23.4	0.25	10.0	600	0.5	12.2	94
SMPZ3931B	31B	17.1	18	18.9	20.8	0.25	12.0	650	0.5	13.7	83
SMPZ3932B	32B	19.0	20	21	18.7	0.25	14.0	650	0.5	15.2	75
SMPZ3933B	33B	20.9	22	23.1	17.0	0.25	17.5	650	0.5	16.7	68
SMPZ3934B	34B	22.8	24	25.2	15.6	0.25	19.0	700	0.5	18.2	63
SMPZ3935B	35B	25.7	27	28.4	13.9	0.25	23.0	700	0.5	20.6	56
SMPZ3936B	36B	28.5	30	31.5	12.5	0.25	26.0	750	0.5	22.8	50
SMPZ3937B	37B	31.4	33	34.7	11.4	0.25	33.0	800	0.5	25.1	45
SMPZ3938B	38B	34.2	36	37.8	10.4	0.25	38.0	850	0.5	27.4	42
SMPZ3939B	39B	37.1	39	41	9.6	0.25	45.0	900	0.5	29.7	38
SMPZ3940B	40B	40.9	43	45.2	8.7	0.25	53.0	950	0.5	32.7	35

THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Typical thermal resistance, junction to lead <sup>(1)</sup>	$R_{\theta JL}$	50	$^\circ\text{C/W}$
Typical thermal resistance, junction to ambient <sup>(2)</sup>	$R_{\theta JA}$	250	$^\circ\text{C/W}$

**Notes**

- (1) Mounted on PCB with 5.0 mm x 5.0 mm copper pad areas attached to each terminal  
 (2) Mounted on minimum recommended pad layout



ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMPZ3919B-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
SMPZ3919B-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel

**RATINGS AND CHARACTERISTICS CURVES**

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

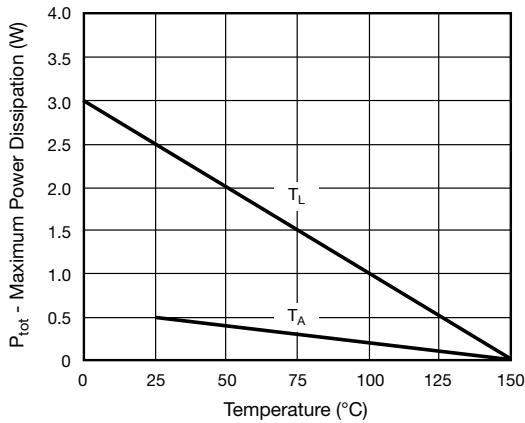


Fig. 1 - Steady State Power Derating

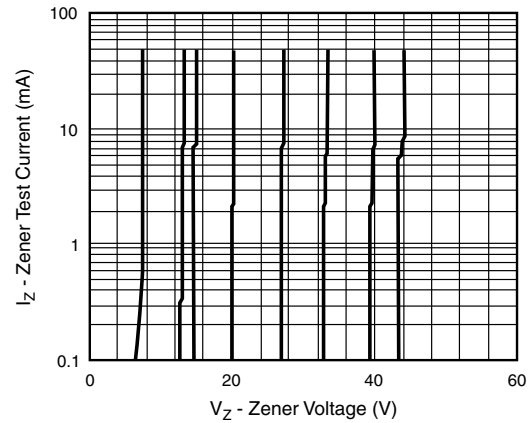


Fig. 3 - Typical Zener Voltage

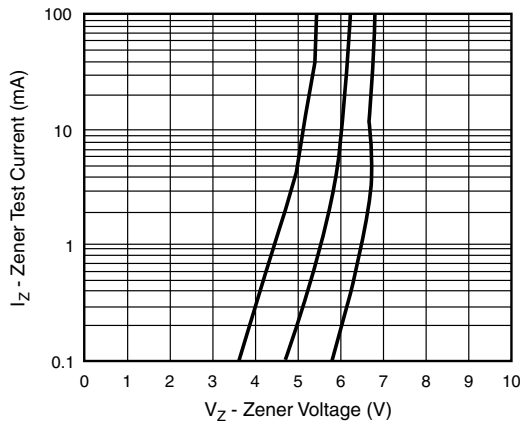


Fig. 2 - Typical Zener Voltage

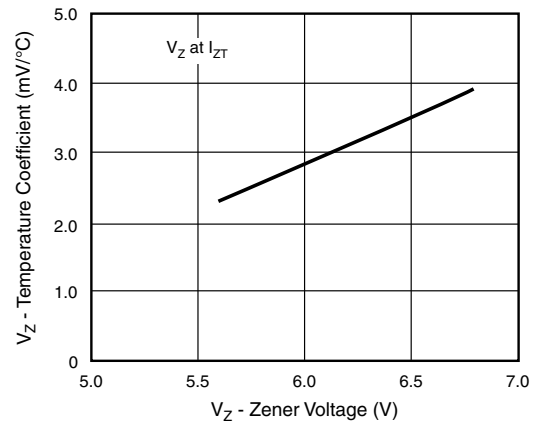


Fig. 4 - Typical temperature Coefficients

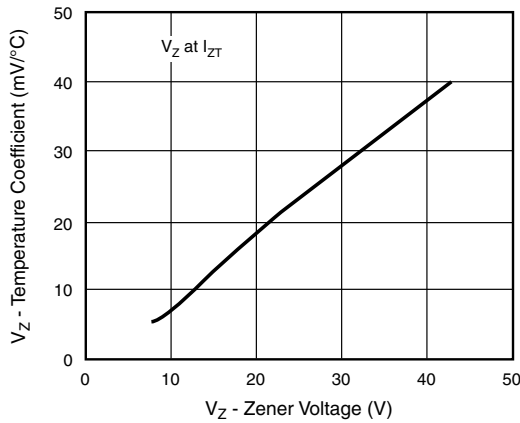


Fig. 5 - Typical Transient Temperature Coefficients

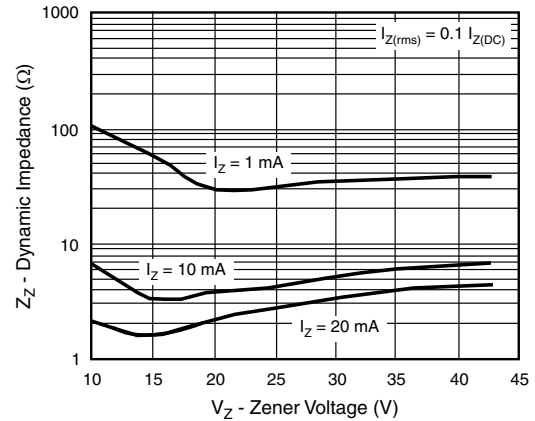


Fig. 7 - Typical Zener Impedance

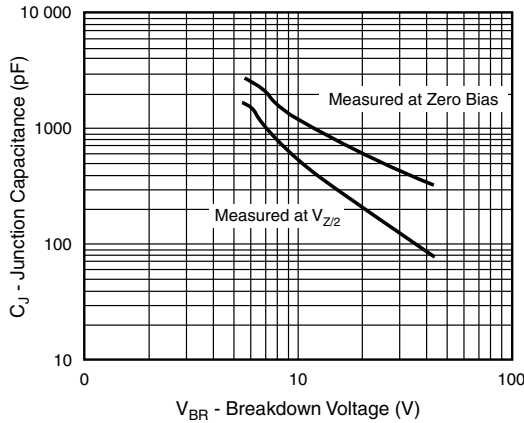
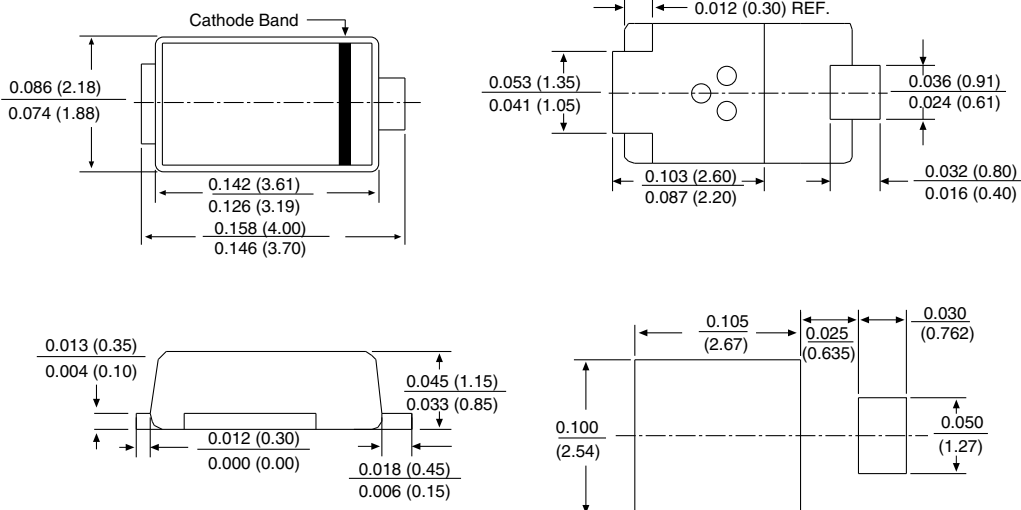


Fig. 6 - Typical Junction Capacitance

## 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.