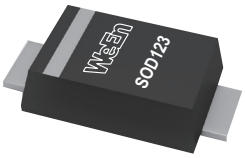
P4SOD Series

400W Transient Voltage Suppressor

Rev.01 - 08 February 2021 Product data sheet

1. General description

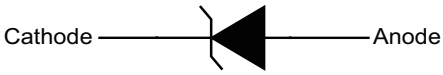
400W transient voltage suppressor (TVS) in SOD123 package, designed to protect electronic circuit which induced by lightning surge or other transient voltage situation.



2. Features and benefits

- Peak pulse power 400W @ 10/1000μs waveform
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and board space saving
- Fast response time: Typically less than 1.0ps from 0V to BV min
- IEC 61000-4-2 ESD 30kV (Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- High temperature to reflow soldering guaranteed: 260°C/10sec
- Meet UL94V-0 flammability classification which guaranteed by mold compound
- Meet MSL level1, per J-STD-020
- Lead free lead finish
- Halogen free and RoHS compliant

Bi-directional



Uni-directional

3. Applications

- Power supply protection
- Industrial application
- Power management
- I/O interface protection

4. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
P4SODxxxXX	SOD123	P4SODxxxXXX	Tape and reel	3000	SOD123J	18-Oct-2020
eg. P4SOD5.0CA	SOD123	P4SOD5.0CAX	Tape and reel	3000	SOD123J	18-Oct-2020

5. Absolute maximum ratings

In accordance with the Absolute Maximum Rating System (IEC 60134).
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Values	Unit
Absolute maximum rating				
P_{PPM}	peak pulse power	[1]	400	W
$P_{M(AV)}$	steady state power dissipation	on infinite heatsink at T_a = 50 °C	1	W
T_{stg}	storage temperature range		-65 to 150	°C
T_j	operating temperature range		-65 to 150	°C

[1] In accordance with IEC 61643-321 (10/1000 μs current waveform).

6. Characteristics

T_j = 25 °C unless otherwise specified.

PN (Uni)	PN (Bi)	Reverse Stand off Voltage V_R (V)	Breakdown Voltage V_{BR} @ I_T (V)		Test current I_T (mA)	Max. Clamping Voltage V_C @ I_{pp} (V)	Max. Peak Pulse Current I_{pp} (A)	Maximum Reverse Leakage I_R @ V_R (µA)	Marking	
			Min	Max					Uni	Bi
P4SOD5.0A	P4SOD5.0CA	5	6.4	7	10	9.2	43.5	200	05	05
P4SOD6.0A	P4SOD6.0CA	6	6.67	7.37	10	10.3	38.8	200	06	06
P4SOD6.5A	P4SOD6.5CA	6.5	7.22	7.98	10	11.2	35.7	125	6F	6F
P4SOD7.0A	P4SOD7.0CA	7	7.78	8.6	10	12	33.3	75	07	07
P4SOD8.0A	P4SOD8.0CA	8	8.89	9.83	1	13.6	29.4	25	08	08
P4SOD9.0A	P4SOD9.0CA	9	10	11.1	1	15.4	26	5	09	09
P4SOD10A	P4SOD10CA	10	11.1	12.3	1	17	23.5	2.5	10	10
P4SOD11A	P4SOD11CA	11	12.2	13.5	1	18.2	22	1	11	11
P4SOD12A	P4SOD12CA	12	13.3	14.7	1	19.9	20.1	1	12	12
P4SOD13A	P4SOD13CA	13	14.4	15.9	1	21.5	18.6	1	13	13
P4SOD14A	P4SOD14CA	14	15.6	17.2	1	23.2	17.2	1	14	14
P4SOD15A	P4SOD15CA	15	16.7	18.5	1	24.4	16.4	1	15	15
P4SOD16A	P4SOD16CA	16	17.8	19.7	1	26	15.4	1	16	16
P4SOD17A	P4SOD17CA	17	18.9	20.9	1	27.6	14.5	1	17	17
P4SOD18A	P4SOD18CA	18	20	22.1	1	29.2	13.7	1	18	18
P4SOD20A	P4SOD20CA	20	22.2	24.5	1	32.4	12.3	1	20	20
P4SOD22A	P4SOD22CA	22	24.4	26.9	1	35.5	11.3	1	22	22
P4SOD24A	P4SOD24CA	24	26.7	29.5	1	38.9	10.3	1	24	24
P4SOD26A	P4SOD26CA	26	28.9	31.9	1	42.1	9.5	1	26	26
P4SOD28A	P4SOD28CA	28	31.1	34.4	1	45.4	8.8	1	28	28
P4SOD30A	P4SOD30CA	30	33.3	36.8	1	48.4	8.3	1	30	30
P4SOD33A	P4SOD33CA	33	36.7	40.6	1	53.3	7.5	1	33	33
P4SOD36A	P4SOD36CA	36	40	44.2	1	58.1	6.9	1	36	36
P4SOD40A	P4SOD40CA	40	44.4	49.1	1	64.5	6.2	1	40	40
P4SOD43A	P4SOD43CA	43	47.8	52.8	1	69.4	5.8	1	43	43
P4SOD45A	P4SOD45CA	45	50	55.3	1	72.7	5.5	1	45	45
P4SOD48A	P4SOD48CA	48	53.3	58.9	1	77.4	5.2	1	48	48
P4SOD51A	P4SOD51CA	51	56.7	62.7	1	82.4	4.9	1	51	51
P4SOD54A	P4SOD54CA	54	60	66.3	1	87.1	4.6	1	54	54
P4SOD58A	P4SOD58CA	58	64.4	71.2	1	93.6	4.3	1	58	58
P4SOD60A	P4SOD60CA	60	66.7	73.7	1	96.8	4.1	1	60	60
P4SOD64A	P4SOD64CA	64	71.1	78.6	1	103	3.9	1	64	64
P4SOD70A	P4SOD70CA	70	77.8	86	1	113	3.5	1	70	70
P4SOD75A	P4SOD75CA	75	83.3	92.1	1	121	3.3	1	75	75
P4SOD78A	P4SOD78CA	78	86.7	95.8	1	126	3.2	1	78	78
P4SOD85A	P4SOD85CA	85	94.4	104	1	137	2.9	1	85	85

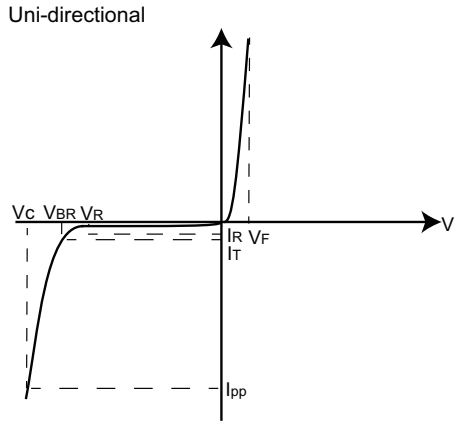


Fig. 1. I-V curve characteristics; Uni-directional

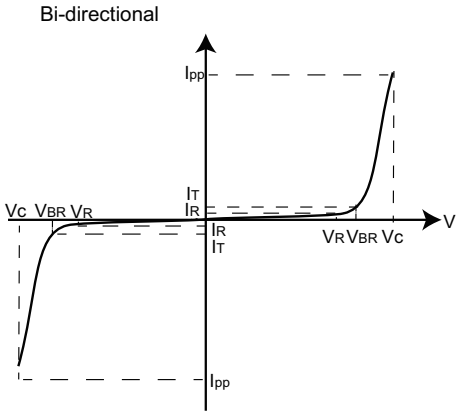


Fig. 2. I-V curve characteristics; Bi-directional

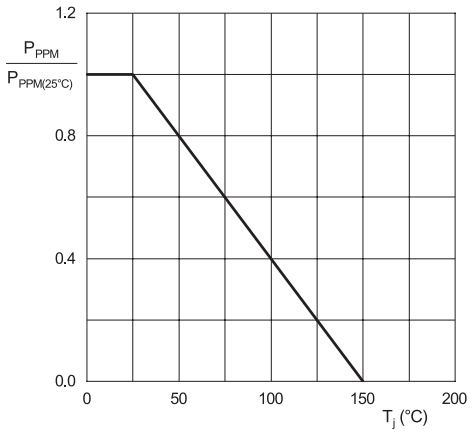


Fig. 3. Peak pulse power derating curve

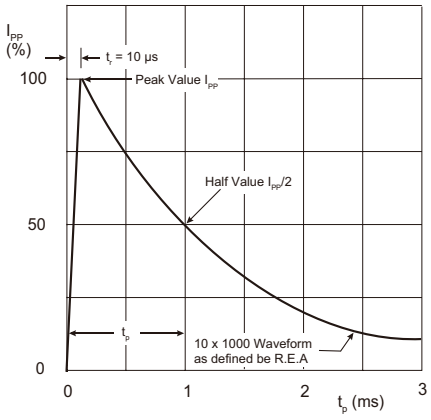


Fig. 4. Pulse waveform

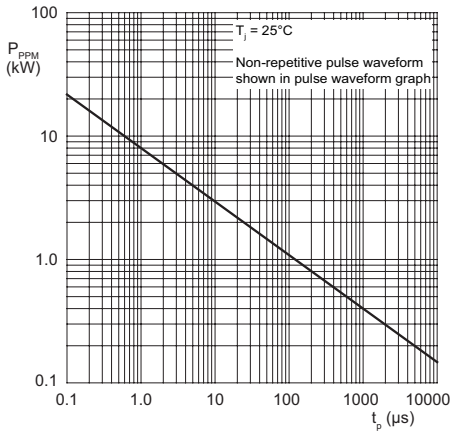


Fig. 5. Pulse rating curve

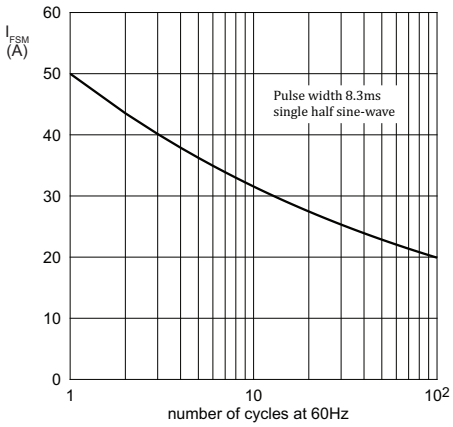


Fig. 6. Maximum non-repetitive surge current

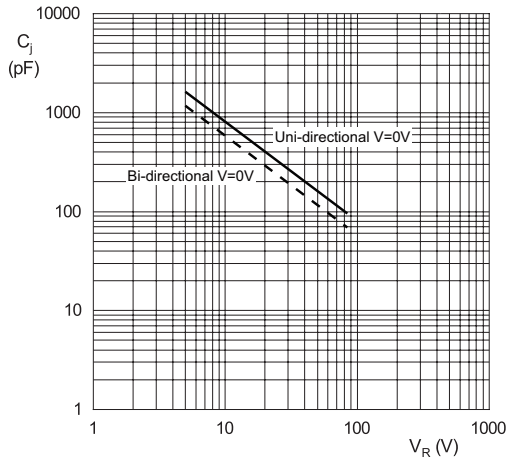


Fig. 7. Typical junction capacitance

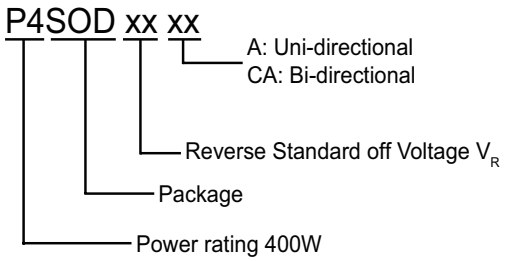


Fig. 8. Part numbering

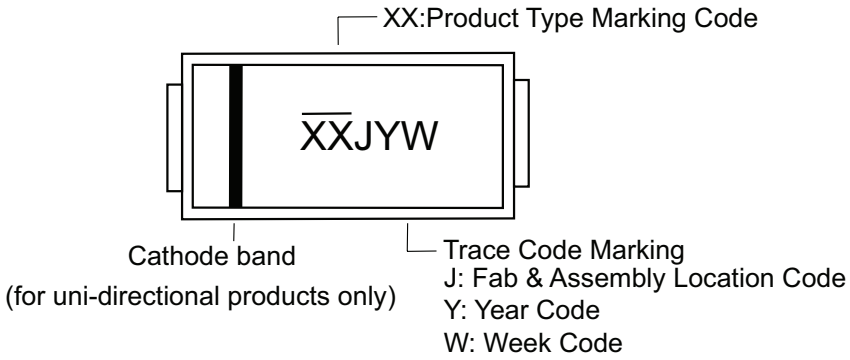
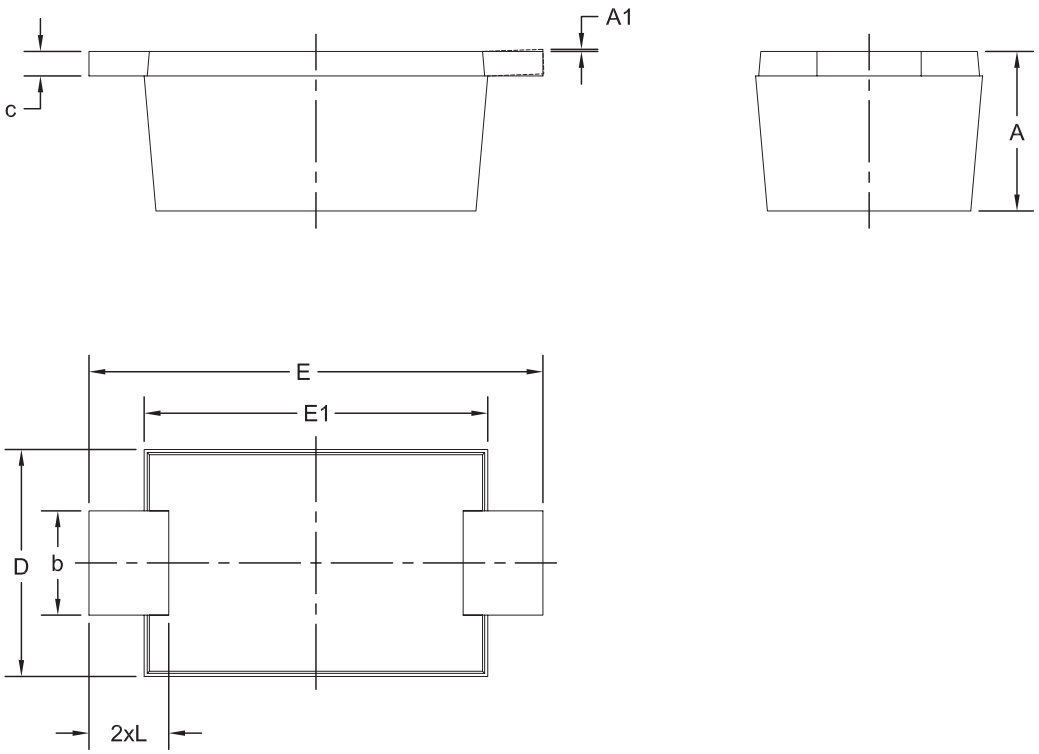


Fig. 9. Part marking

7. Package outline

SOD123



UNIT		A	A1	b	c	D	E	E1	L
mm	Max	1.35	0.20	0.90	0.25	1.95	4.05	3.05	0.95
	Min	1.10	0.00	0.70	0.15	1.65	3.35	2.55	0.35

Remark: Dimensions D and E1 do not include mold flash & gate remain.

8. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.ween-semi.com.

Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. WeEn Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local WeEn Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between WeEn Semiconductors and its customer, unless WeEn Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the WeEn Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, WeEn Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. WeEn Semiconductors takes no responsibility for the content in this document if provided by an information source outside of WeEn Semiconductors.

In no event shall WeEn Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, WeEn Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of WeEn Semiconductors.

Right to make changes — WeEn Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — WeEn Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an WeEn Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. WeEn Semiconductors and its suppliers accept no liability for inclusion and/or use of WeEn Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. WeEn Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using WeEn Semiconductors products, and WeEn Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the WeEn Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

WeEn Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using WeEn Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). WeEn does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific WeEn Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. WeEn Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without WeEn Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond WeEn Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies WeEn Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond WeEn Semiconductors' standard warranty and WeEn Semiconductors' product specifications.