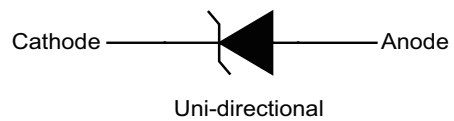


1. General description

600W transient voltage suppressor (TVS) in SMA package, designed to protect electronic circuit which induced by lightning surge or other transient voltage situation.

2. Features and benefits

- Peak pulse power 600W @ 10/1000 μ s waveform
- SMA low profile package: less than 1.1 mm
- Excellent clamping capability
- Low incremental surge resistance
- Surface mount package for easy assembly and board space saving
- Typical $I_R < 1\mu$ A When $V_R > 12$ V
- 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 $^{\circ}$ 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



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
P6SMALxxxXX	SMAL	P6SMALxxxXX	Tape and reel	3000	SMALH	18-Oct-2020
eg. P6SMAL5.0A	SMAL	P6SMAL5.0AX	Tape and reel	3000	SMALH	18-Oct-2020

5. Absolute maximum ratings

In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_j = 25^{\circ}$ C unless otherwise specified.

Symbol	Parameter	Conditions	Values	Unit
Absolute maximum rating				
P_{PPM}	peak pulse power	[1]	600	W
$P_{M(AV)}$	steady state power dissipation	on infinite heatsink at $T_a = 50^{\circ}$ C	3	W
I_{FSM}	peak forward surge current	$t_p = 8.3$ ms; single half sine-wave pulse; duty cycle = 4 pulses per minute maximum; unidirectional units only	60	A
V_F	forward on-state voltage	$I_F = 25$ A; unidirectional units only	3.5	V
T_{stg}	storage temperature range		-65 to 150	$^{\circ}$ C
T_j	operating temperature range		-65 to 150	$^{\circ}$ C

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

6. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

PN	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					
P6SMAL5.0A	5	6.4	7	10	9.2	65.3	400	6A005H
P6SMAL6.0A	6	6.67	7.37	10	10.3	58.3	400	6A006H
P6SMAL6.5A	6.5	7.22	7.98	10	11.2	53.6	250	6A06FH
P6SMAL7.0A	7	7.78	8.6	10	12	50	100	6A007H
P6SMAL8.0A	8	8.89	9.83	1	13.6	44.2	50	6A008H
P6SMAL9.0A	9	10	11.1	1	15.4	39	10	6A009H
P6SMAL10A	10	11.1	12.3	1	17	35.3	5	6A010H
P6SMAL11A	11	12.2	13.5	1	18.2	33	1	6A011H
P6SMAL12A	12	13.3	14.7	1	19.9	30.2	1	6A012H
P6SMAL13A	13	14.4	15.9	1	21.5	28	1	6A013H
P6SMAL14A	14	15.6	17.2	1	23.2	25.9	1	6A014H
P6SMAL15A	15	16.7	18.5	1	24.4	24.6	1	6A015H
P6SMAL16A	16	17.8	19.7	1	26	23.1	1	6A016H
P6SMAL17A	17	18.9	20.9	1	27.6	21.8	1	6A017H
P6SMAL18A	18	20	22.1	1	29.2	20.6	1	6A018H
P6SMAL20A	20	22.2	24.5	1	32.4	18.6	1	6A020H
P6SMAL22A	22	24.4	26.9	1	35.5	16.9	1	6A022H
P6SMAL24A	24	26.7	29.5	1	38.9	15.5	1	6A024H
P6SMAL26A	26	28.9	31.9	1	42.1	14.3	1	6A026H
P6SMAL28A	28	31.1	34.4	1	45.4	13.3	1	6A028H
P6SMAL30A	30	33.3	36.8	1	48.4	12.4	1	6A030H
P6SMAL33A	33	36.7	40.6	1	53.3	11.3	1	6A033H
P6SMAL36A	36	40	44.2	1	58.1	10.4	1	6A036H
P6SMAL40A	40	44.4	49.1	1	64.5	9.3	1	6A040H
P6SMAL43A	43	47.8	52.8	1	69.4	8.7	1	6A043H
P6SMAL45A	45	50	55.3	1	72.7	8.3	1	6A045H
P6SMAL48A	48	53.3	58.9	1	77.4	7.8	1	6A048H
P6SMAL51A	51	56.7	62.7	1	82.4	7.3	1	6A051H
P6SMAL54A	54	60	66.3	1	87.1	6.9	1	6A054H
P6SMAL58A	58	64.4	71.2	1	93.6	6.5	1	6A058H
P6SMAL60A	60	66.7	73.7	1	96.8	6.2	1	6A060H
P6SMAL64A	64	71.1	78.6	1	103	5.9	1	6A064H
P6SMAL70A	70	77.8	86	1	113	5.3	1	6A070H
P6SMAL75A	75	83.3	92.1	1	121	5	1	6A075H
P6SMAL78A	78	86.7	95.8	1	126	4.8	1	6A078H
P6SMAL85A	85	94.4	104	1	137	4.4	1	6A085H

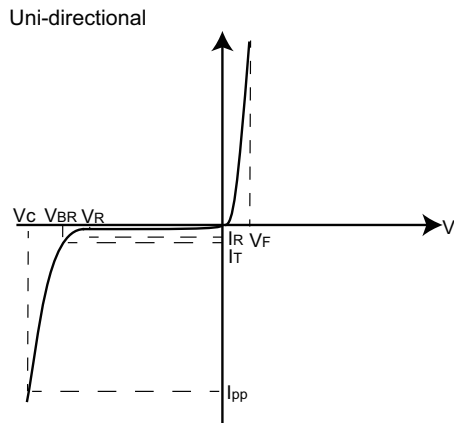


Fig. 1. I-V curve characteristics; Uni-directional

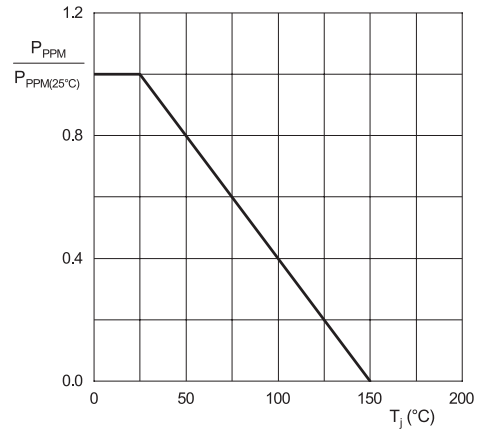


Fig. 2. Peak pulse power derating curve

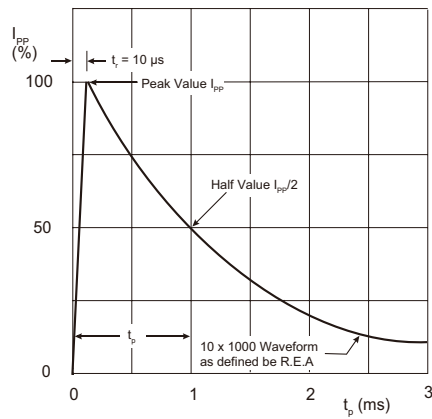


Fig. 3. Pulse waveform

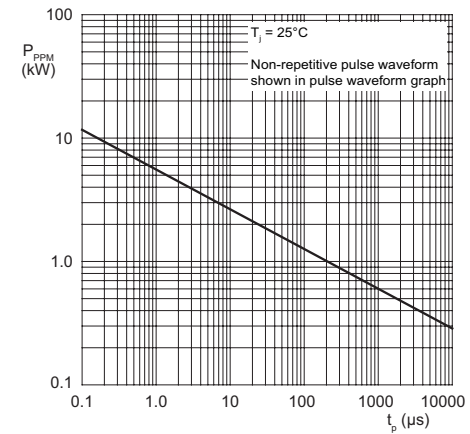


Fig. 4. Pulse rating curve

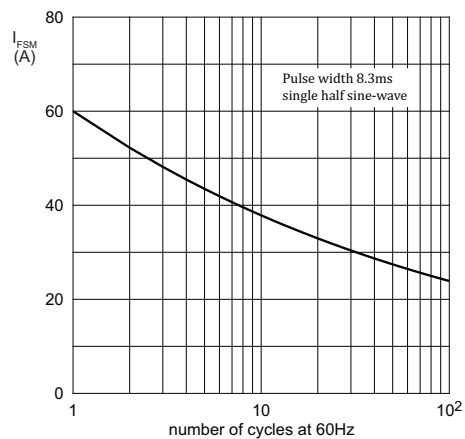


Fig. 5. Maximum non-repetitive surge current

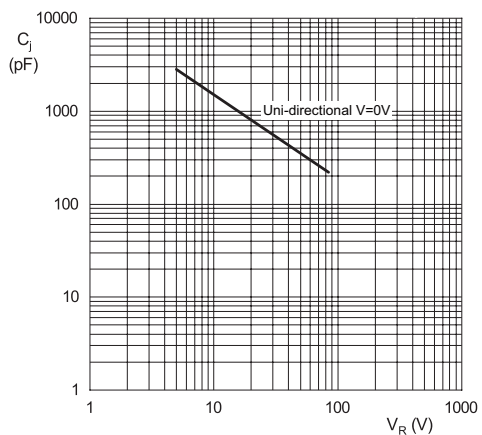


Fig. 6. Typical junction capacitance

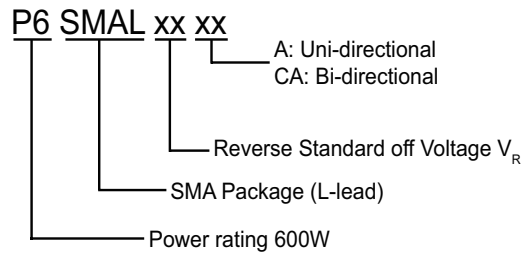


Fig. 7. Part numbering

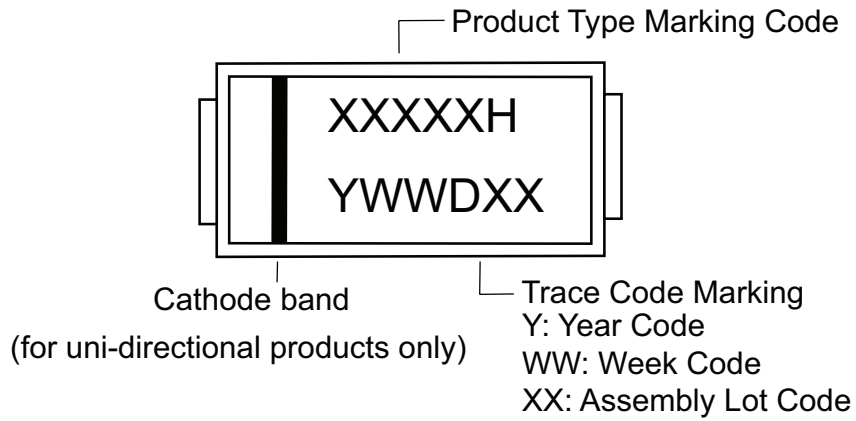
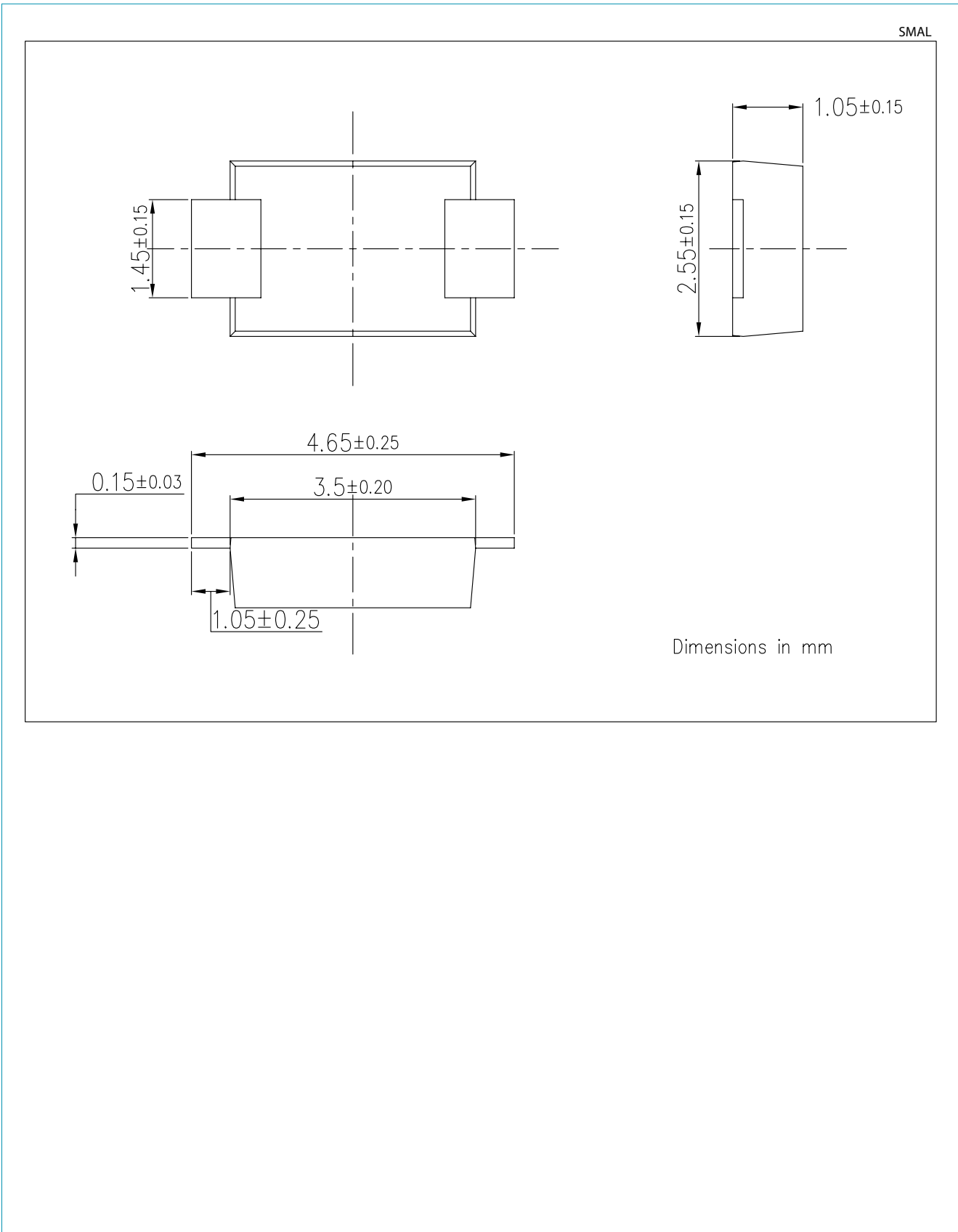


Fig. 8. Part marking

7. Package outline



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.