

Vishay General Semiconductor

# **Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors**

High Temperature Stability and High Reliability Conditions



www.vishay.com

**DO-218 Compatible** 

PRIMARY CHARACTERISTICS				
V <sub>BR</sub>	11.1 V to 52.8 V			
P <sub>PPM</sub> (10 x 1000 μs)	6600 W			
P <sub>PPM</sub> (10 x 10 000 μs)	5200 W			
PD	8 W			
V <sub>WM</sub>	10 V to 43 V			
I <sub>FSM</sub>	700 A			
T <sub>J</sub> max.	175 °C			
Polarity	Uni-directional			
Package	DO-218AC			

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- T<sub>J</sub> = 175 °C capability suitable for high reliability and automotive requirement

Available in uni-directional polarity only

- Low leakage current
- Low leakage current
  Low forward voltage drop
- High surge capability
- Meets ISO7637-2 surge specification (varied by test condition)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- AEC-Q101 qualified
   Automotive ordering code: base P/NHE3
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

## **TYPICAL APPLICATIONS**

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

## MECHANICAL DATA

Case: DO-218AC

Molding compound meets UL 94 V-0 flammability rating Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

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

HE3 suffix meets JESD 201 class 2 whisker test

Polarity: heatsink is anode

<b>MAXIMUM RATINGS</b> (T <sub>C</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	VALUE	UNIT			
Peak pulse power dissipation	with 10/1000 µs waveform	P	6600	14/		
	with 10/10 000 µs waveform	P <sub>PPM</sub>	5200	W		
Power dissipation on infinite heats	PD	8.0	W			
Peak pulse current with 10/1000 µ	I <sub>PPM</sub> <sup>(1)</sup>	See next table	А			
Peak forward surge current 8.3 m	I <sub>FSM</sub>	700	А			
Operating junction and storage te	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C			

### Note

<sup>(1)</sup> Non-repetitive current pulse derated above  $T_A = 25 \ ^{\circ}C$ 

Revision: 03-Dec-2018

1

For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>

# SM8S10AT thru SM8S43AT



# www.vishay.com

# Vishay General Semiconductor

<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>C</sub> = 25 °C unless otherwise noted)										
DEVICE	BREAKDOWN VOLTAGE V <sub>BR</sub> (V)			TEST CURRENT	STAND-OFF VOLTAGE	MAXIMUM REVERSE LEAKAGE	MAXIMUM REVERSE LEAKAGE	MAX. PEAK PULSE CURRENT	MAXIMUM CLAMPING VOLTAGE	TYPICAL TEMP. COEFFICIENT
TYPE	MIN.	NOM.	MAX.	l <sub>T</sub> (mA)	V <sub>WM</sub> (V)			AT 10/1000 μs WAVEFORM (A)	AT I <sub>PPM</sub> V <sub>C</sub> (V)	OF V <sub>BR</sub> <sup>(1)</sup> αΤ (%/°C)
SM8S10AT	11.1	11.7	12.3	5.0	10.0	15	250	388	17.0	0.069
SM8S11AT	12.2	12.9	13.5	5.0	11.0	10	150	363	18.2	0.072
SM8S12AT	13.3	14.0	14.7	5.0	12.0	10	150	332	19.9	0.074
SM8S13AT	14.4	15.2	15.9	5.0	13.0	10	150	307	21.5	0.076
SM8S14AT	15.6	16.4	17.2	5.0	14.0	10	150	284	23.2	0.078
SM8S15AT	16.7	17.6	18.5	5.0	15.0	10	150	270	24.4	0.080
SM8S16AT	17.8	18.8	19.7	5.0	16.0	10	150	254	26.0	0.081
SM8S17AT	18.9	19.9	20.9	5.0	17.0	10	150	239	27.6	0.082
SM8S18AT	20.0	21.1	22.1	5.0	18.0	10	150	226	29.2	0.083
SM8S20AT	22.2	23.4	24.5	5.0	20.0	10	150	204	32.4	0.085
SM8S22AT	24.4	25.7	26.9	5.0	22.0	10	150	186	35.5	0.086
SM8S24AT	26.7	28.1	29.5	5.0	24.0	10	150	170	38.9	0.087
SM8S26AT	28.9	30.4	31.9	5.0	26.0	10	150	157	42.1	0.088
SM8S28AT	31.1	32.8	34.4	5.0	28.0	10	150	145	45.4	0.089
SM8S30AT	33.3	35.1	36.8	5.0	30.0	10	150	136	48.4	0.090
SM8S33AT	36.7	38.7	40.6	5.0	33.0	10	150	124	53.3	0.091
SM8S36AT	40.0	42.1	44.2	5.0	36.0	10	150	114	58.1	0.091
SM8S40AT	44.4	46.8	49.1	5.0	40	10	150	102	64.5	0.092
SM8S43AT	47.8	50.3	52.8	5.0	43	10	150	95.1	69.4	0.093

#### Note

For all types maximum V<sub>F</sub> = 1.8 V at I<sub>F</sub> = 100 A measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

<sup>(2)</sup> To calculate V<sub>BR</sub> vs. junction temperature, use the following formula: V<sub>BR</sub> at T<sub>J</sub> = V<sub>BR</sub> at 25 °C x (1 +  $\alpha$ T x (T<sub>J</sub> - 25))

<b>THERMAL CHARACTERISTICS</b> ( $T_c = 25 \text{ °C}$ unless otherwise noted)					
PARAMETER	SYMBOL	VALUE	UNIT		
Typical thermal resistance, junction to case	$R_{ ext{ heta}JC}$	0.90	°C/W		

ORDERING INFORMATION (Example)						
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE		
SM8S10ATHE3/I <sup>(1)</sup>	2.605	I	750	13" diameter plastic tape and reel, anode towards the sprocket hole		

Note

(1) AEC-Q101 qualified



Vishay General Semiconductor

## **RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25$ °C unless otherwise noted)

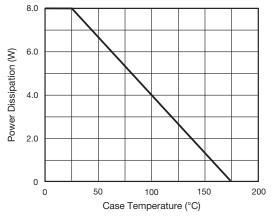


Fig. 1 - Power Derating Curve

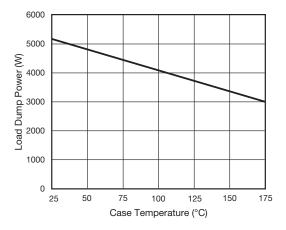


Fig. 2 - Load Dump Power Characteristics (10 ms Exponential Waveform)

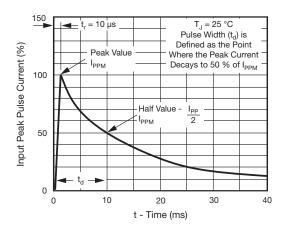
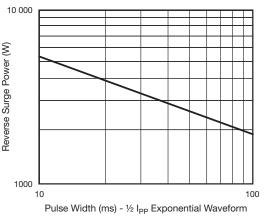


Fig. 3 - Pulse Waveform





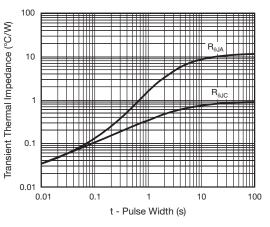


Fig. 5 - Typical Transient Thermal Impedance

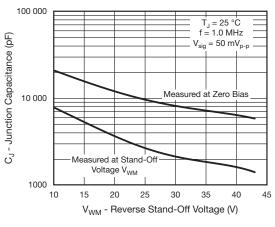


Fig. 6 - Typical Junction Capacitance

Revision: 03-Dec-2018

3

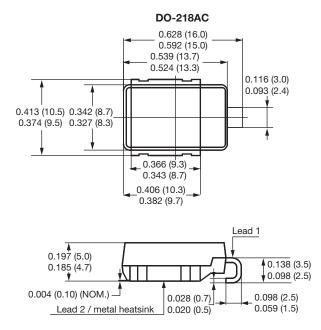
For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>

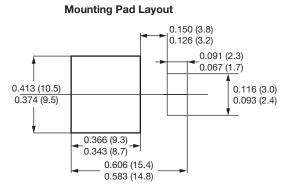


# SM8S10AT thru SM8S43AT

Vishay General Semiconductor

### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)







Vishay

# 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.