

## 400W, 12V - 60V Surface Mount Transient Voltage Suppressor

### FEATURES

- AEC-Q101 qualified
- Glass passivated chip junction
- Maximum  $V_{BR}$  temperature coefficient: 0.095%/°C
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Switching mode power supply (SMPS)
- Motor for BLDC
- Lighting application
- Battery Management System
- Automotive

### MECHANICAL DATA

- Case: SOD-128
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Uni-directional
- Weight: 0.028g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{WM}$	12 - 60	V
$V_{BR}$	13.4 - 74.1	V
$P_{PPM}$	400	W
$T_{JMAX}$	175	°C
Package	SOD-128	



SOD-128



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Non-repetitive peak impulse power dissipation with 10/1000us waveform <sup>(1)</sup>	$P_{PPM}$	400	W
Steady state power dissipation at $T_L = 25^\circ\text{C}$ <sup>(2)</sup>	$P_D$	7.5	W
Forward Voltage @ $I_F = 25\text{A}$ for Uni-directional only <sup>(3)</sup>	$V_F$	3.5	V
Junction temperature	$T_J$	-55 to +175	°C
Storage temperature	$T_{STG}$	-55 to +175	°C

#### Notes:

1. Non-repetitive current pulse per fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 1
2. Units mounted on PCB (5mm x 5mm Cu pad test board)
3. Pulse test with  $PW = 0.3\text{ms}$

<b>THERMAL PERFORMANCE</b>			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>UNIT</b>
Junction-to-lead thermal resistance	$R_{\theta JL}$	20	$^{\circ}C/W$
Junction-to-ambient thermal resistance	$R_{\theta JA}$	62	$^{\circ}C/W$
Junction-to-case thermal resistance	$R_{\theta JC}$	16	$^{\circ}C/W$

**Thermal Performance Note:** Units mounted on PCB (5mm x 5mm Cu pad test board)

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^{\circ}C$ unless otherwise noted)								
Part number	Marking code	Breakdown voltage $V_{BR}@I_T$ (V) (Note 1)		Test current $I_T$ (mA)	Working stand-off voltage $V_{WM}$ (V)	Maximum blocking leakage current $I_R@V_{WM}$ ( $\mu A$ ) (Note 1)	Maximum peak impulse current $I_{PPM}$ (A) $t_p = 10/1000 \mu s$	Maximum clamping voltage $V_C@I_{PPM}$ (V)
		Min	Max					
SMA4S12AH	4S012	13.4	14.8	1	12	1	20.5	19.5
SMA4S15AH	4S015	16.8	18.5	1	15	1	16.4	24.4
SMA4S18AH	4S018	20.1	22.2	1	18	1	13.7	29.2
SMA4S20AH	4S020	22.4	24.7	1	20	1	12.3	32.5
SMA4S21AH	4S021	23.5	25.9	1	21	1	11.7	34.1
SMA4S22AH	4S022	24.6	27.2	1	22	1	11.2	35.7
SMA4S24AH	4S024	26.8	29.6	1	24	1	10.3	39.0
SMA4S25AH	4S025	27.9	30.9	1	25	1	9.9	40.6
SMA4S26AH	4S026	29.1	32.1	1	26	1	9.5	42.2
SMA4S30AH	4S030	33.5	37.1	1	30	1	8.2	48.7
SMA4S33AH	4S033	36.9	40.8	1	33	1	7.5	53.6
SMA4S36AH	4S036	40.2	44.5	1	36	1	6.8	58.4
SMA4S39AH	4S039	43.6	48.2	1	39	1	6.3	63.3
SMA4S40AH	4S040	44.7	49.4	1	40	1	6.2	64.9
SMA4S43AH	4S043	48.1	53.1	1	43	1	5.7	69.8
SMA4S47AH	4S047	52.5	58.1	1	47	1	5.2	76.3
SMA4S51AH	4S051	57.0	63.0	1	51	1	4.8	82.8
SMA4S56AH	4S056	62.6	69.2	1	56	1	4.4	90.9
SMA4S60AH	4S060	67.1	74.1	1	60	1	4.1	97.4

**Note:**

1. Pulse test with  $PW = 30ms$

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE<sup>(1)</sup></b>	<b>PACKAGE</b>	<b>PACKING</b>
SMA4SxxAH	SOD-128	14,000 / Tape & Reel

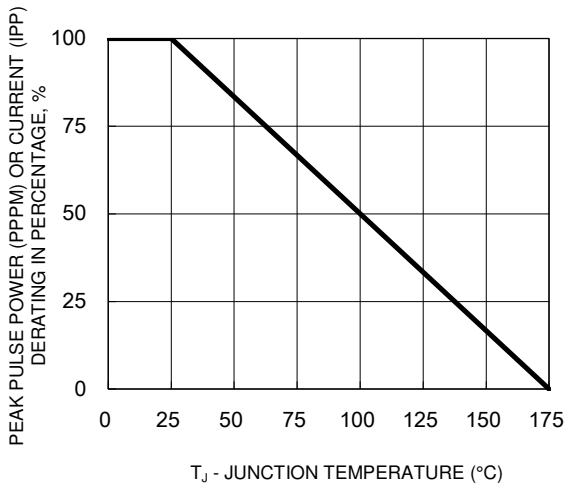
**Note:**

(1) "xx" defines voltage from 12V (SMA4S12AH) to 60V (SMA4S60AH)

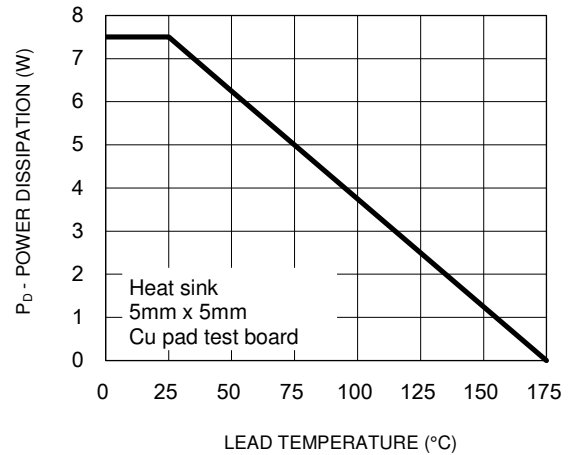
**CHARACTERISTICS CURVES**

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

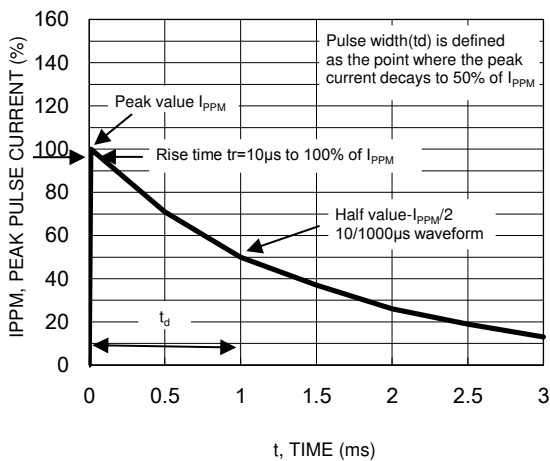
**Fig.1 Pulse Power or Current vs. Initial Junction Temperature**



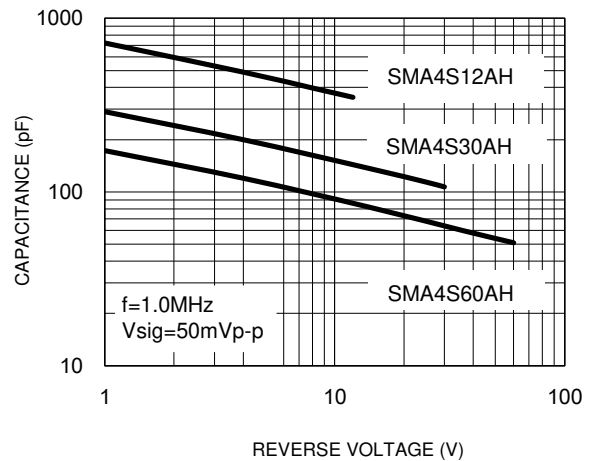
**Fig.2 Steady State Power Derating**



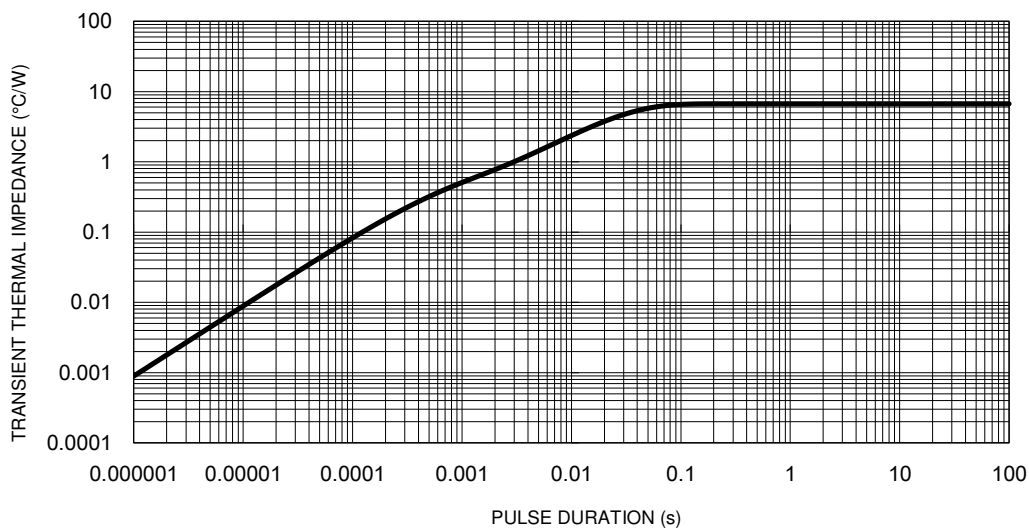
**Fig.3 Clamping Power Pulse Waveform**



**Fig.4 Typical Junction Capacitance**

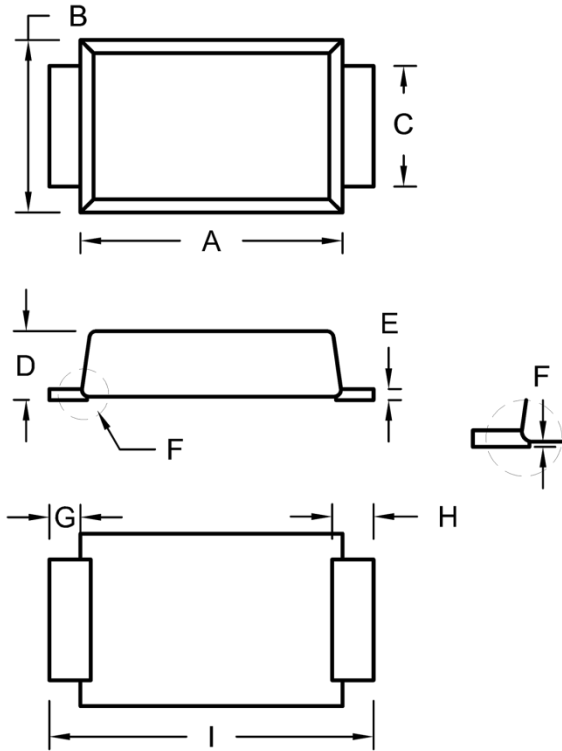


**Fig.5 Typical Transient Thermal Impedance**



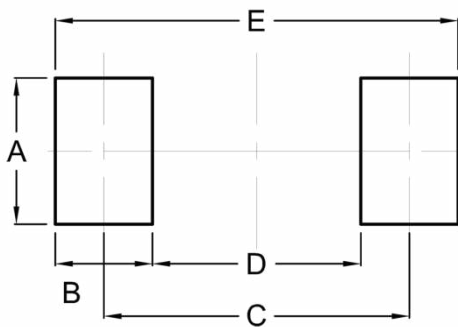
**PACKAGE OUTLINE DIMENSIONS**

SOD-128



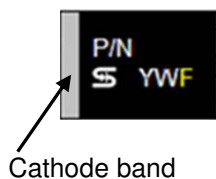
DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	3.60	4.00	0.142	0.157
B	2.30	2.70	0.091	0.106
C	1.60	1.90	0.063	0.075
D	0.90	1.10	0.035	0.043
E	0.10	0.22	0.004	0.009
F	0.00	0.10	0.000	0.004
G	0.30	0.60	0.012	0.024
H	0.40	0.80	0.016	0.031
I	4.40	5.00	0.173	0.197

**SUGGESTED PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	2.10	0.083
B	1.40	0.055
C	4.40	0.173
D	3.00	0.118
E	5.80	0.228

**MARKING DIAGRAM**



- P/N = Marking Code
- YW = Date Code
- F = Factory Code

## **Notice**

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability for application assistance or the design of Purchasers' products.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.