

600W, 12V – 60V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Glass passivated junction chip
- Maximum V_{BR} temperature coefficient: 0.094%/°C
- Moisture sensitivity level: level 1, per J-STD-020
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- 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: 29.3mg

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
V_{WM}	12 – 60	V
V_{BR}	13.4 – 74.1	V
P_{PPM}	600	W
$T_{J\ MAX}$	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 ⁽¹⁾	P_{PPM}	600	W
Steady state power dissipation at $T_L = 25^\circ\text{C}$ ⁽²⁾	P_D	7.14	W
Forward Voltage @ $I_F = 25\text{A}$ for Uni-directional only ⁽³⁾	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 ms

THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance per diode	$R_{\theta JL}$	21	°C/W
Junction-to-ambient thermal resistance per diode	$R_{\theta JA}$	62	°C/W
Junction-to-case thermal resistance per diode	$R_{\theta JC}$	16	°C/W

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

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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 $I_R@V_{WM}$ (μA) (Note 1)	Maximum peak impulse current I_{PPM} (A) $t_p = 10/1000 \mu\text{s}$	Maximum clamping voltage $V_C@I_{PPM}$ (V)
		Min.	Max.					
SMA6S12AH	6S012	13.4	14.8	1	12	1	30.8	19.5
SMA6S15AH	6S015	16.8	18.5	1	15	1	24.6	24.4
SMA6S18AH	6S018	20.1	22.2	1	18	1	20.5	29.2
SMA6S20AH	6S020	22.4	24.7	1	20	1	18.5	32.5
SMA6S21AH	6S021	23.5	25.9	1	21	1	17.6	34.1
SMA6S22AH	6S022	24.6	27.2	1	22	1	16.8	35.7
SMA6S24AH	6S024	26.8	29.6	1	24	1	15.4	39.0
SMA6S25AH	6S025	27.9	30.9	1	25	1	14.8	40.6
SMA6S26AH	6S026	29.1	32.1	1	26	1	14.2	42.2
SMA6S30AH	6S030	33.5	37.1	1	30	1	12.3	48.7
SMA6S33AH	6S033	36.9	40.8	1	33	1	11.2	53.6
SMA6S36AH	6S036	40.2	44.5	1	36	1	10.3	58.4
SMA6S39AH	6S039	43.6	48.2	1	39	1	9.5	63.3
SMA6S40AH	6S040	44.7	49.4	1	40	1	9.2	64.9
SMA6S43AH	6S043	48.1	53.1	1	43	1	8.6	69.8
SMA6S47AH	6S047	52.5	58.1	1	47	1	7.9	76.3
SMA6S51AH	6S051	57.0	63.0	1	51	1	7.2	82.8
SMA6S56AH	6S056	62.6	69.2	1	56	1	6.6	90.9
SMA6S60AH	6S060	67.1	74.1	1	60	1	6.2	97.4

Note:

1. Pulse test with $PW=30 \text{ ms}$

ORDERING INFORMATION

ORDERING CODE (Note 1)	PACKAGE	PACKING
SMA6SxxAH MWG	SOD-128	3,500 / 7" Plastic reel
SMA6SxxAH MXG	SOD-128	14,000 / 13" Plastic reel

Note:

- "xx" defines voltage from 12V (SMA6S12AH) to 60V (SMA6S60AH)

CHARACTERISTICS CURVES

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

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

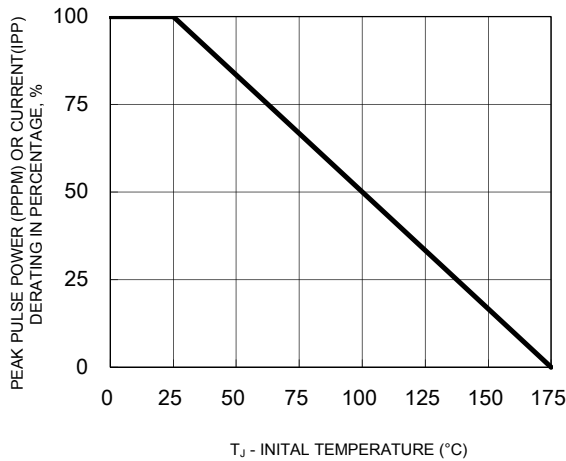


Fig.2 Steady State Power Derating

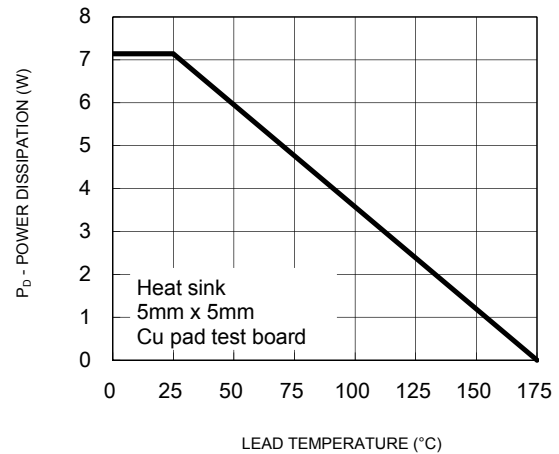


Fig.3 Clamping Power Pulse Waveform

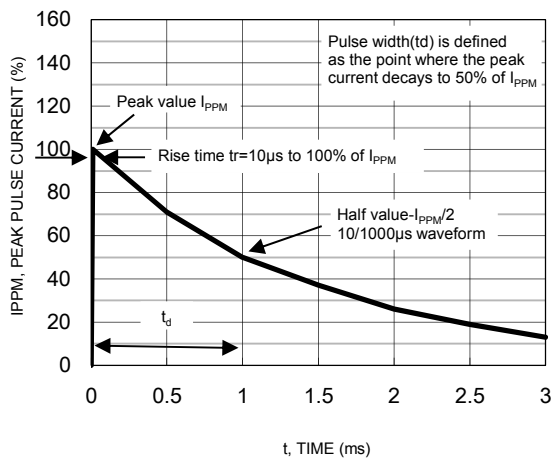


Fig.4 Typical Junction Capacitance

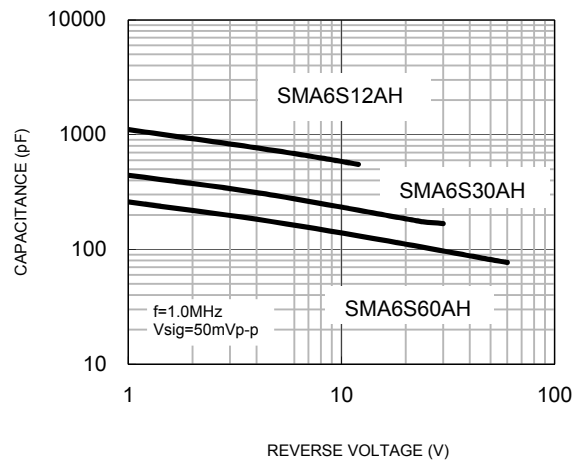
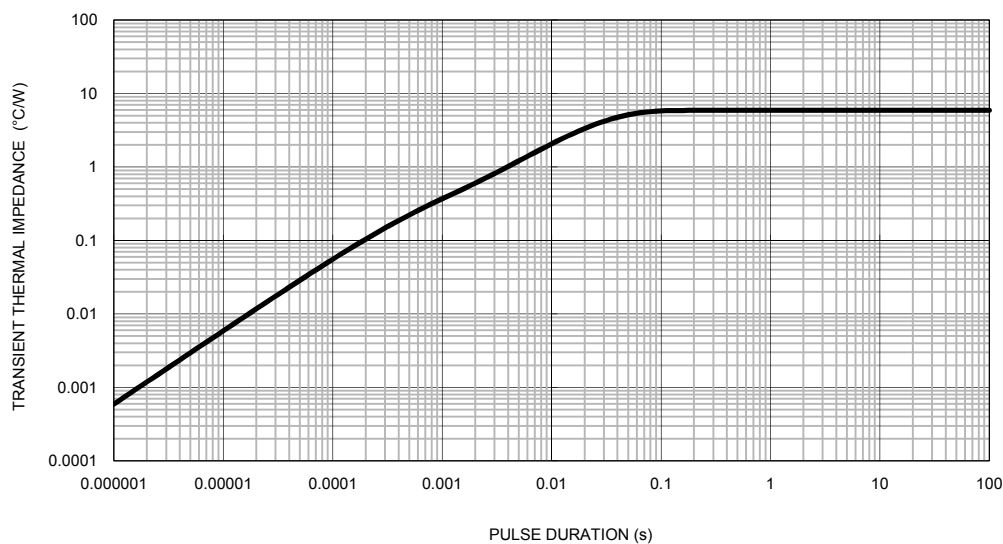
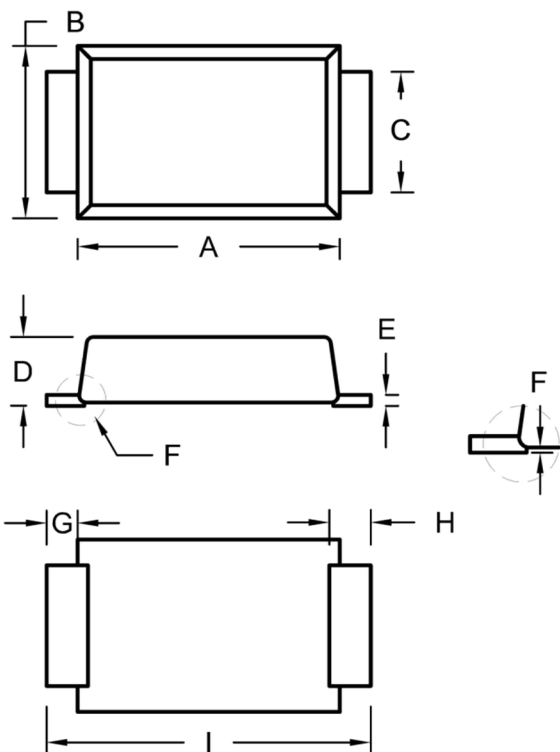


Fig.5 Typical Transient Thermal Impedance



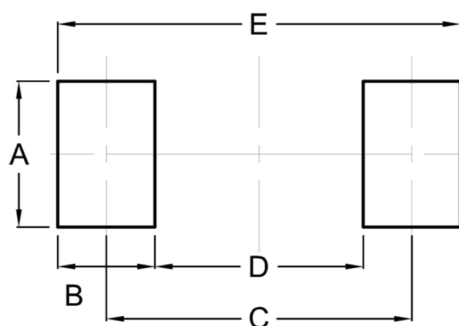
PACKAGE OUTLINE DIMENSIONS

SOD-128



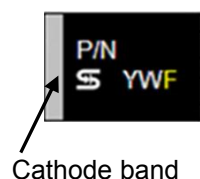
DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	3.60	4.00	0.142	0.157
B	2.30	2.70	0.091	0.106
C	1.60	1.90	0.063	0.075
D	0.90	1.10	0.035	0.043
E	0.10	0.22	0.004	0.009
F	0.00	0.10	0.000	0.004
G	0.30	0.60	0.012	0.024
H	0.40	0.80	0.016	0.031
I	4.40	5.00	0.173	0.197

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.