400W, 12V – 60V Surface Mount Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified
- Glass passivated junction chip
- Maximum V_{BR} temperature coefficient: 0.095%/°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

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

Pb-Free RoHS COMPLIANT HALOGEN FREE

APPLICATIONS

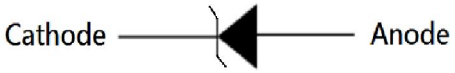
- Switching mode power supply (SMPS)
- Motor for BLDC
- Lighting application
- Battery Management System
- Automotive

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: 28.6mg (approximately)



SOD-128



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Non-repetitive peak impulse power dissipation with 10/1000us waveform (1)	P_{PPM}	400	W
Steady state power dissipation at T_L=25°C (2)	P_D	7.5	W
Forward Voltage @ I_F=25A 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°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	$R_{\Theta JL}$	20	°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°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) tp =10/1000 μs	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=30 ms

ORDERING INFORMATION		
ORDERING CODE (Note 1)	**PACKAGE**	**PACKING**
SMA4SxxAH MWG	SOD-128	3,500 / 7” Plastic reel
SMA4SxxAH MXG	SOD-128	14,000 / 13” Plastic reel

Note:

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

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

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

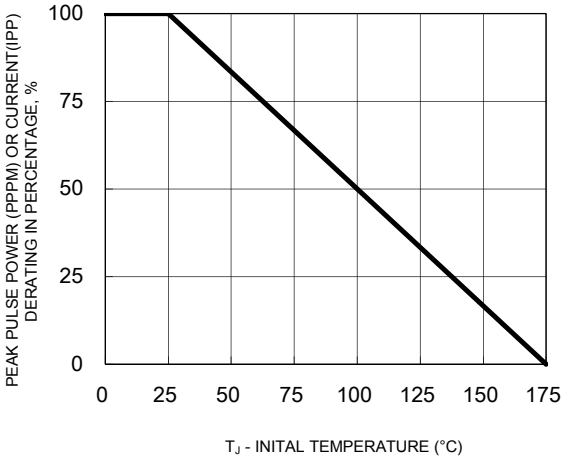


Fig.2 Steady State Power Derating

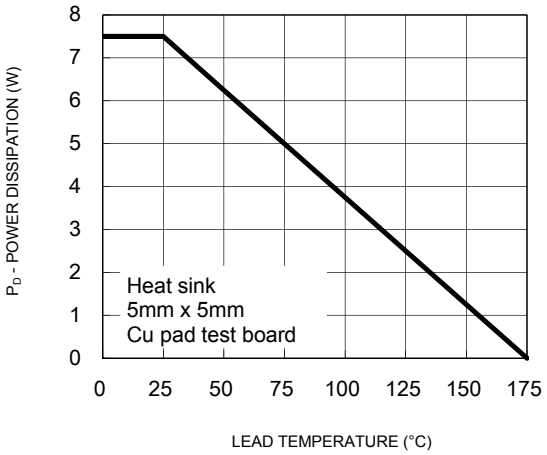


Fig.3 Clamping Power Pulse Waveform

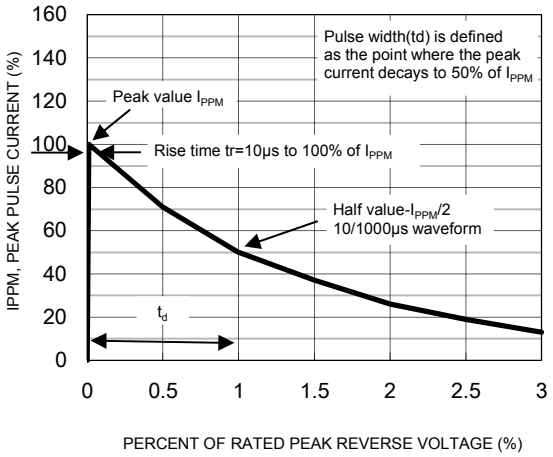


Fig.4 Typical Junction Capacitance

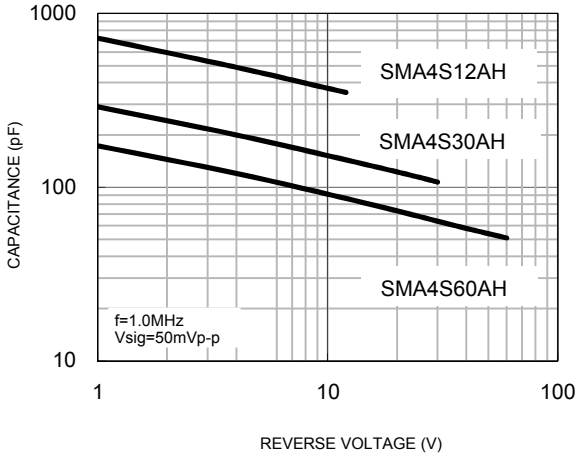
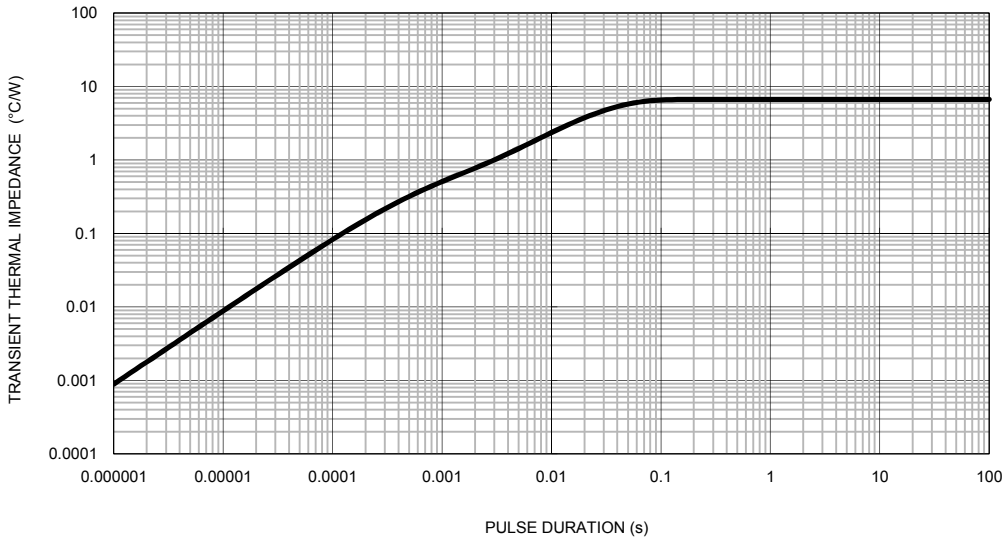
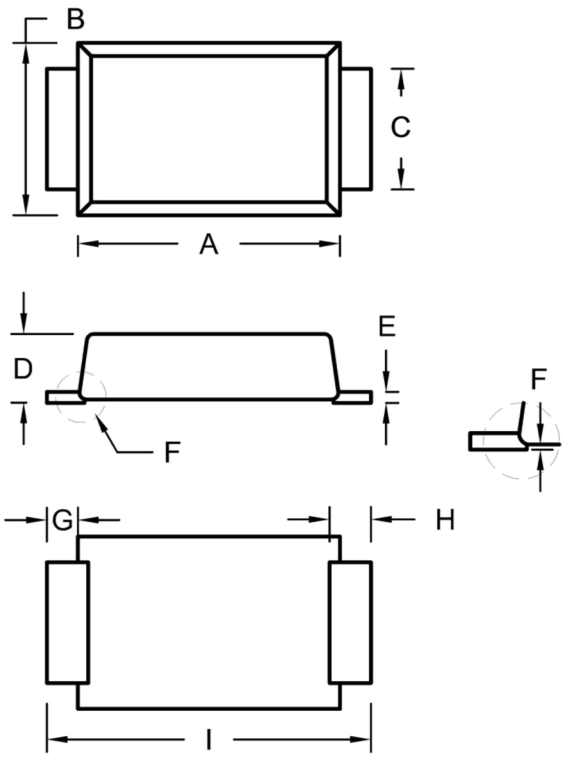


Fig.5 Typical Transient Thermal Impedance



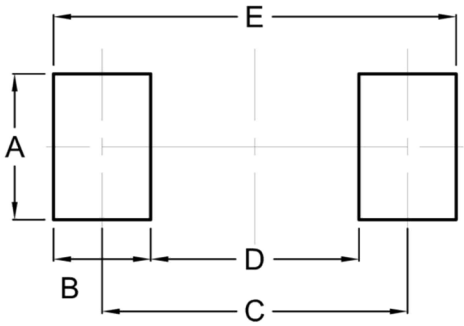
PACKAGE OUTLINE DIMENSIONS

SOD-128



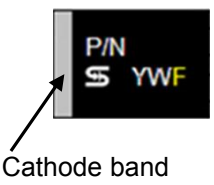
DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	3.60	4.00	0.142	0.157
B	2.30	2.70	0.091	0.106
C	1.60	1.90	0.063	0.075
D	0.90	1.10	0.035	0.043
E	0.10	0.22	0.004	0.009
F	0.00	0.10	0.000	0.004
G	0.30	0.60	0.012	0.024
H	0.40	0.80	0.016	0.031
I	4.40	5.00	0.173	0.197

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



Cathode band

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

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