

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: Thin SMA
- 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: 31mg

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	Thin SMA	



Thin SMA



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.					
SMA6F12AH	6F012	13.4	14.8	1	12	1	30.8	19.5
SMA6F15AH	6F015	16.8	18.5	1	15	1	24.6	24.4
SMA6F18AH	6F018	20.1	22.2	1	18	1	20.5	29.2
SMA6F20AH	6F020	22.4	24.7	1	20	1	18.5	32.5
SMA6F21AH	6F021	23.5	25.9	1	21	1	17.6	34.1
SMA6F22AH	6F022	24.6	27.2	1	22	1	16.8	35.7
SMA6F24AH	6F024	26.8	29.6	1	24	1	15.4	39.0
SMA6F25AH	6F025	27.9	30.9	1	25	1	14.8	40.6
SMA6F26AH	6F026	29.1	32.1	1	26	1	14.2	42.2
SMA6F30AH	6F030	33.5	37.1	1	30	1	12.3	48.7
SMA6F33AH	6F033	36.9	40.8	1	33	1	11.2	53.6
SMA6F36AH	6F036	40.2	44.5	1	36	1	10.3	58.4
SMA6F39AH	6F039	43.6	48.2	1	39	1	9.5	63.3
SMA6F40AH	6F040	44.7	49.4	1	40	1	9.2	64.9
SMA6F43AH	6F043	48.1	53.1	1	43	1	8.6	69.8
SMA6F47AH	6F047	52.5	58.1	1	47	1	7.9	76.3
SMA6F51AH	6F051	57.0	63.0	1	51	1	7.2	82.8
SMA6F56AH	6F056	62.6	69.2	1	56	1	6.6	90.9
SMA6F60AH	6F060	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
SMA6FxxAH MWG	Thin SMA	3,500 / 7" Plastic reel
SMA6FxxAH MXG	Thin SMA	14,000 / 13" Plastic reel

Note:

- "xx" defines voltage from 12V (SMA6F12AH) to 60V (SMA6F60AH)

CHARACTERISTICS CURVES

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

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

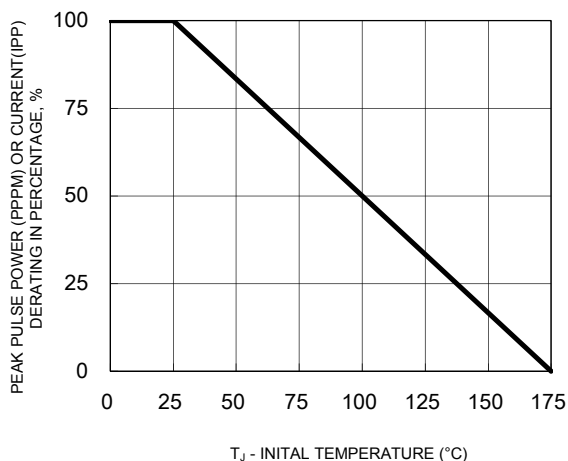


Fig.2 Steady State Power Derating

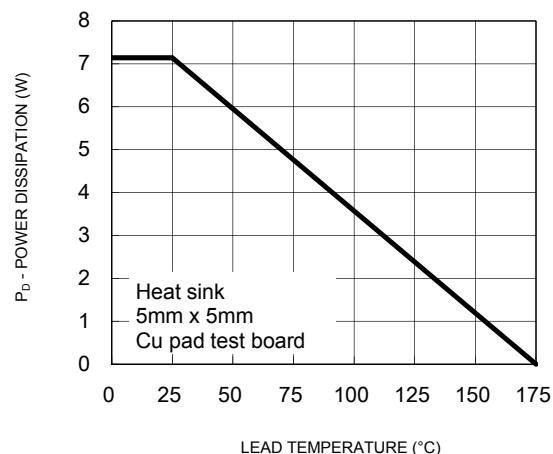


Fig.3 Clamping Power Pulse Waveform

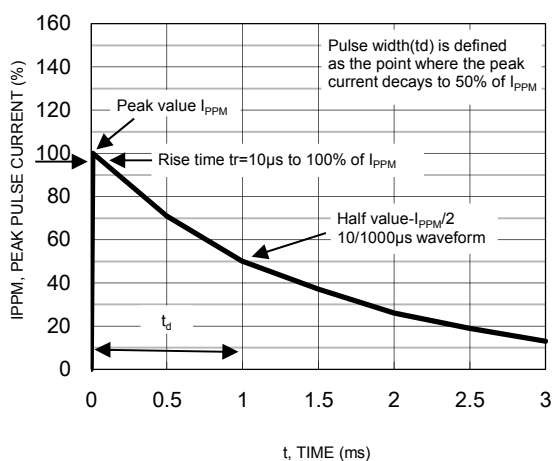


Fig.4 Typical Junction Capacitance

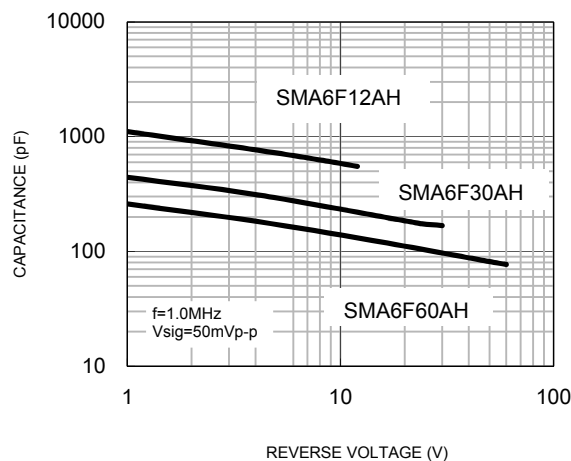
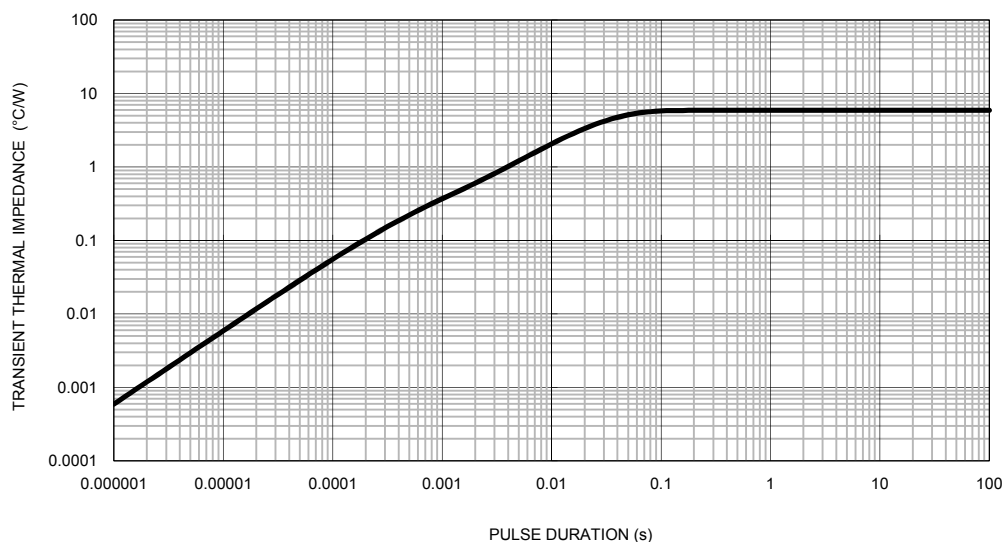
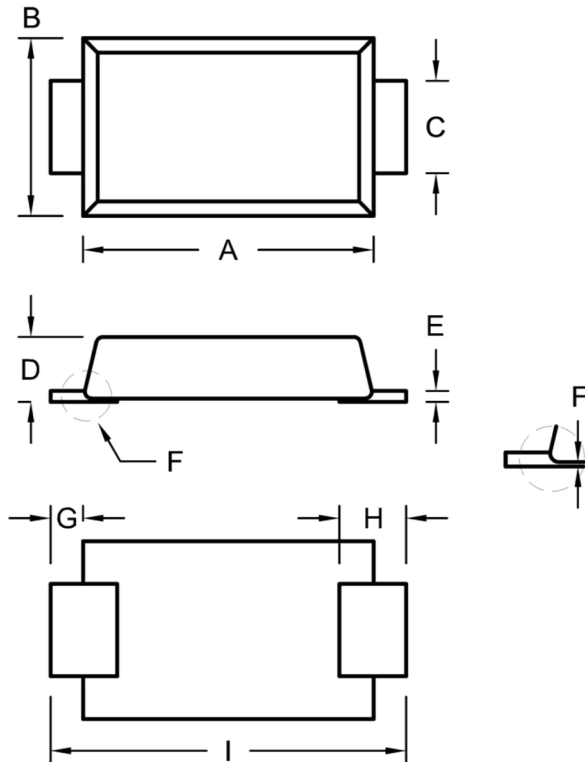


Fig.5 Typical Transient Thermal Impedance



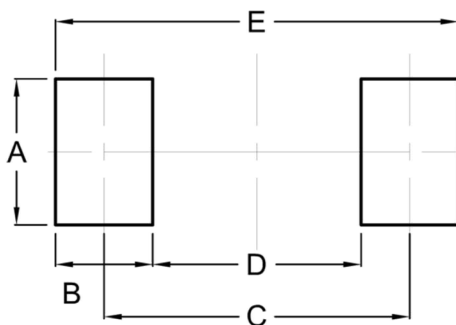
PACKAGE OUTLINE DIMENSIONS

Thin SMA



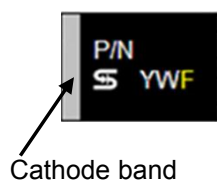
DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	4.15	4.35	0.163	0.171
B	2.50	2.70	0.098	0.106
C	1.25	1.45	0.049	0.057
D	0.90	1.00	0.035	0.039
E	0.10	0.22	0.004	0.009
F	0.00	0.10	0.000	0.004
G	0.30	0.60	0.012	0.024
H	0.75	1.20	0.030	0.047
I	5.05	5.35	0.199	0.211

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

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