

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

FEATURES

- AEC-Q101 qualified
- Unidirectional and bidirectional are available
- Maximum V_{BR} temperature coefficient: 0.094%/°C
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free

APPLICATIONS

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

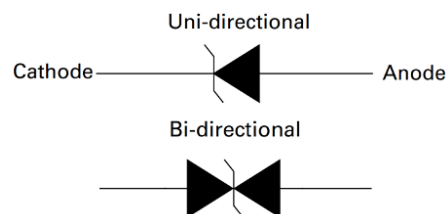
MECHANICAL DATA

- 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: Indicated by cathode band
- Weight: 0.031g (approximately)

KEY PARAMETERS			
PARAMETER		VALUE	UNIT
V_{WM}	Uni	12 - 60	V
	Bi	12 - 56	V
V_{BR}	Uni	13.4 - 74.1	V
	Bi	13.4 - 69.2	V
P_{PPM}		600	W
$T_{J\ MAX}$		175	°C
Package		Thin SMA	


**HALOGEN
FREE**


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 10/1000 μs 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.2 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 $PW = 0.3\text{ms}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance for uni-directional	$R_{\theta JL}$	21	°C/W
Junction-to-ambient thermal resistance for uni-directional	$R_{\theta JA}$	62	°C/W
Junction-to-case thermal resistance for uni-directional	$R_{\theta JC}$	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 (Unidirectional)	Device marking	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

Notes:

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

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

Part number (Bidirectional)	Device marking	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					
SMA6F12CAH	6F012	13.4	14.8	1	12	1	30.8	19.5
SMA6F15CAH	6F015	16.8	18.5	1	15	1	24.6	24.4
SMA6F18CAH	6F018	20.1	22.2	1	18	1	20.5	29.2
SMA6F20CAH	6F020	22.4	24.7	1	20	1	18.5	32.5
SMA6F21CAH	6F021	23.5	25.9	1	21	1	17.6	34.1
SMA6F22CAH	6F022	24.6	27.2	1	22	1	16.8	35.7
SMA6F24CAH	6F024	26.8	29.6	1	24	1	15.4	39.0
SMA6F25CAH	6F025	27.9	30.9	1	25	1	14.8	40.6
SMA6F26CAH	6F026	29.1	32.1	1	26	1	14.2	42.2
SMA6F30CAH	6F030	33.5	37.1	1	30	1	12.3	48.7
SMA6F33CAH	6F033	36.9	40.8	1	33	1	11.2	53.6
SMA6F36CAH	6F036	40.2	44.5	1	36	1	10.3	58.4
SMA6F39CAH	6F039	43.6	48.2	1	39	1	9.5	63.3
SMA6F40CAH	6F040	44.7	49.4	1	40	1	9.2	64.9
SMA6F43CAH	6F043	48.1	53.1	1	43	1	8.6	69.8
SMA6F47CAH	6F047	52.5	58.1	1	47	1	7.9	76.3
SMA6F51CAH	6F051	57.0	63.0	1	51	1	7.2	82.8
SMA6F56CAH	6F056	62.6	69.2	1	56	1	6.6	90.9

Notes:

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

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
SMA6FxAH ⁽¹⁾	Thin SMA	14,000 / Tape & Reel
SMA6FxCAH ⁽²⁾	Thin SMA	14,000 / Tape & Reel

Notes:

1. "x" defines voltage from 12V (SMA6F12AH) to 60V (SMA6F60AH) for unidirectional
2. "x" defines voltage from 12V (SMA6F12CAH) to 56V (SMA6F56CAH) for bidirectional

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Derating Curve

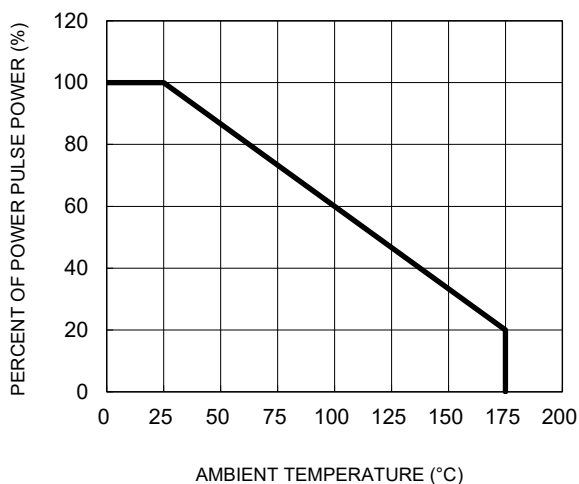


Fig.2 Non-Repetitive Peak Pulse Power vs. Pulse Time

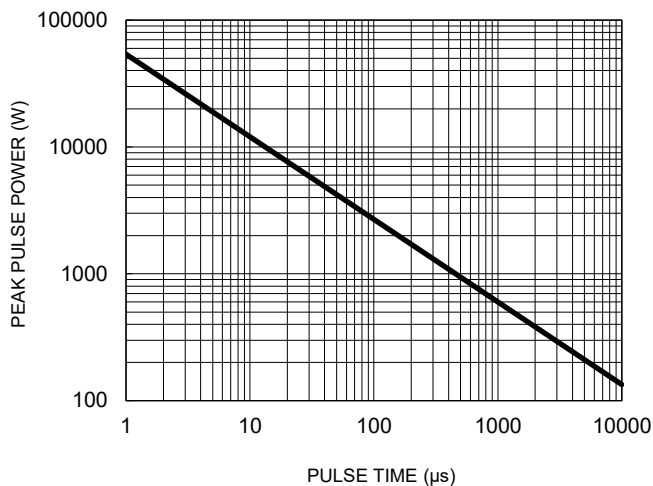


Fig.3 Steady State Power Derating

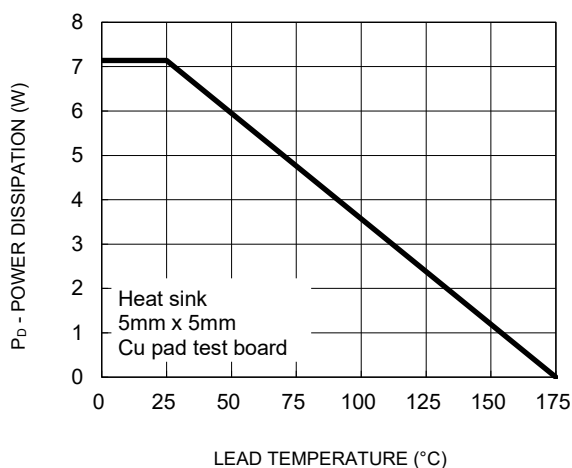


Fig.4 Typical Junction Capacitance

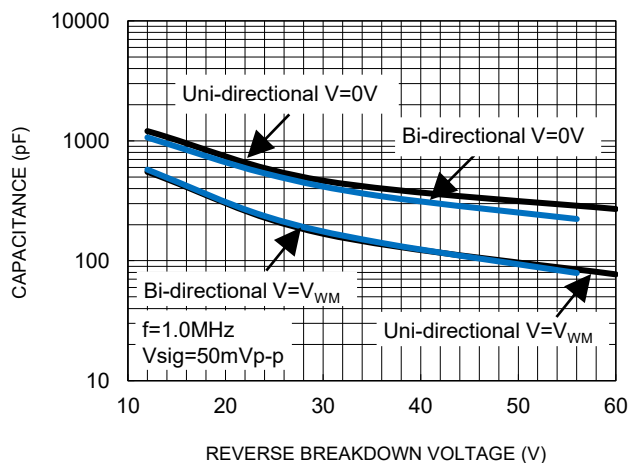
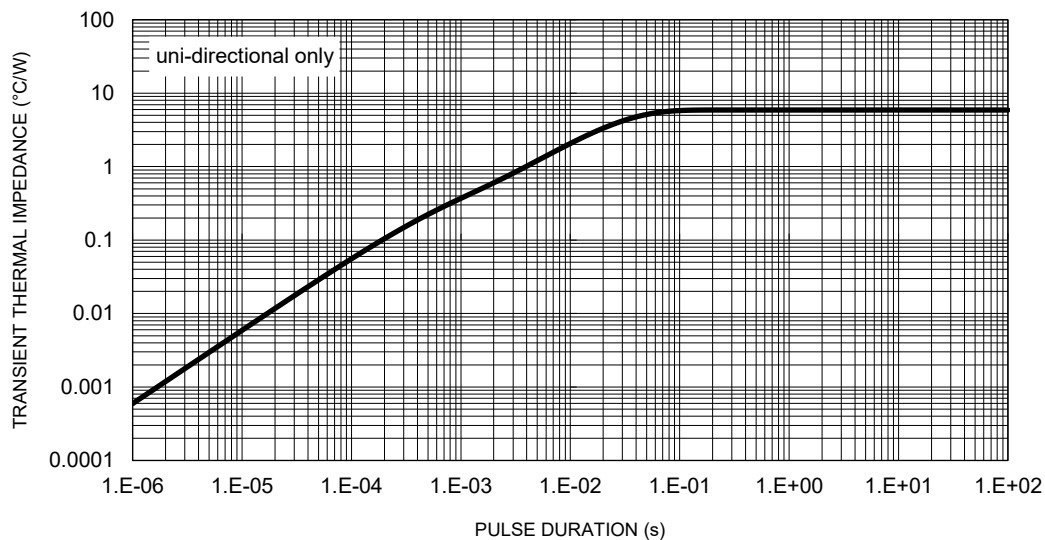


Fig.5 Typical Transient Thermal Impedance



CHARACTERISTICS CURVES

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

Fig.6 10/1000 μs pulse waveform

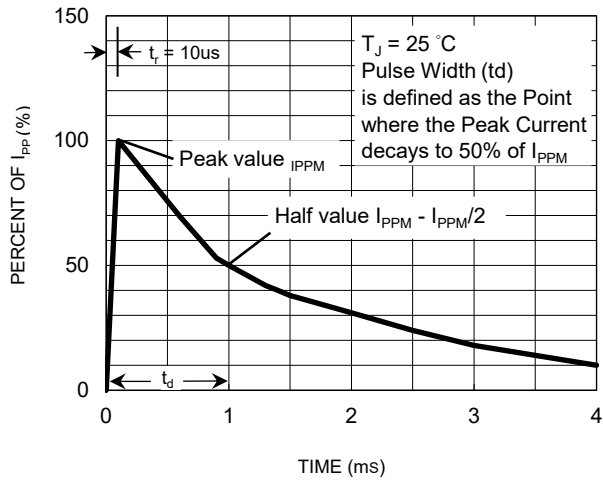
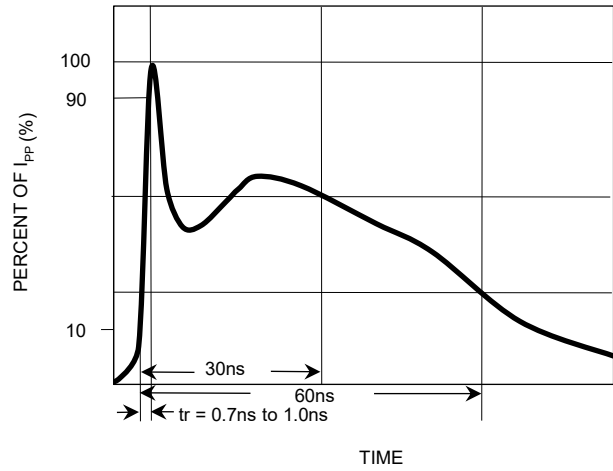
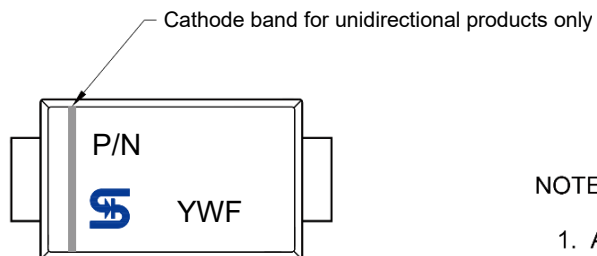
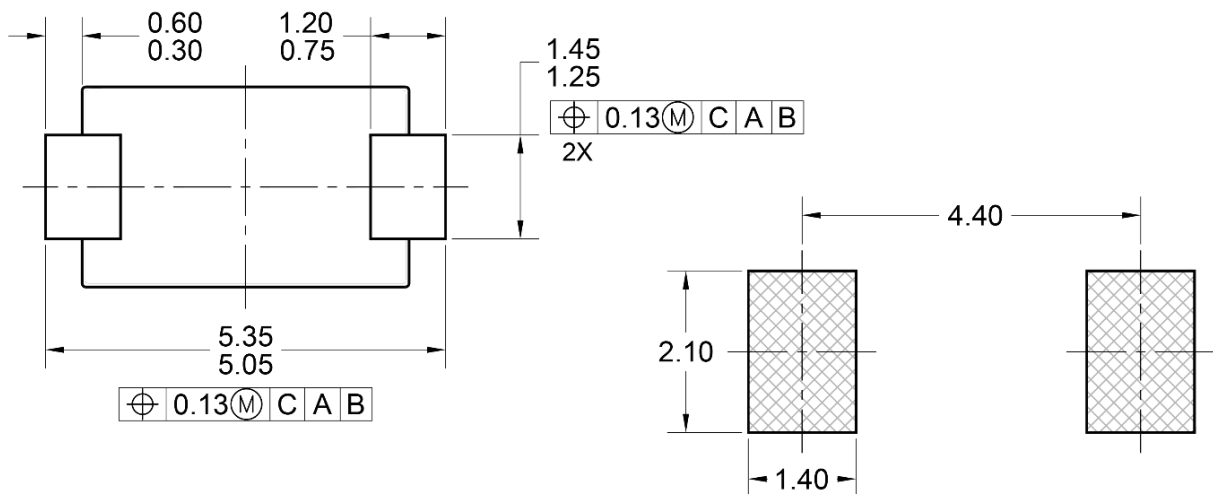
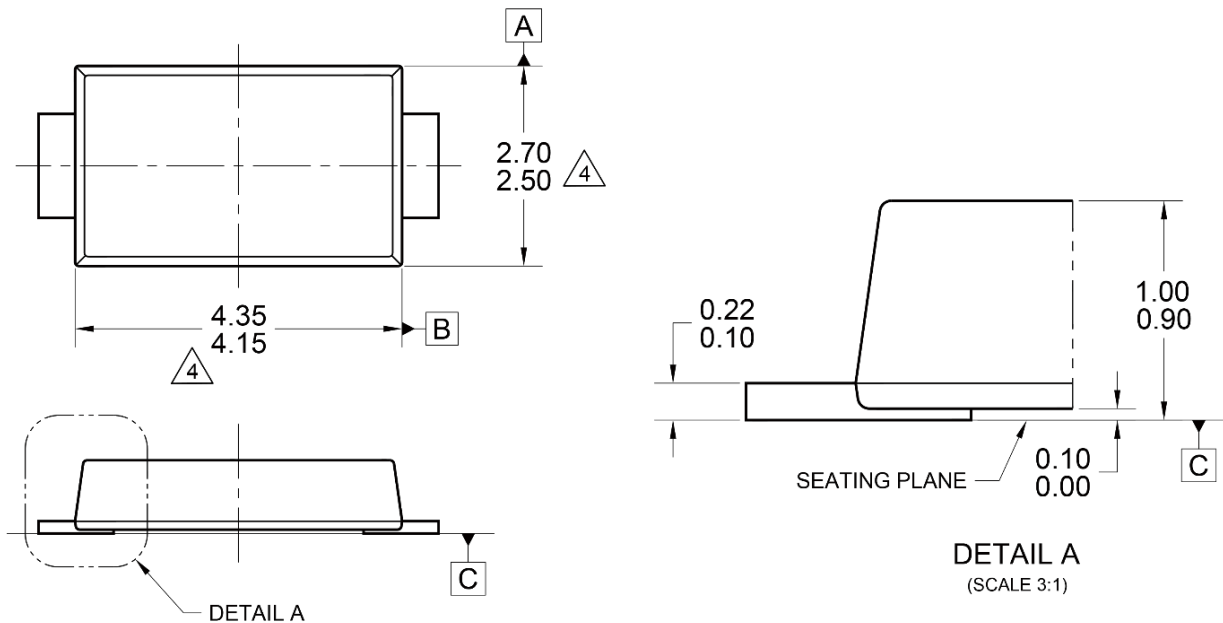


Fig.7 ESD pulse waveform



PACKAGE OUTLINE DIMENSIONS

Thin SMA



MARKING DIAGRAM

P/N = Device marking
YWF = Date code
F = Factory code

SUGGESTED PAD LAYOUT

NOTES: UNLESS OTHERWISE SPECIFIED

- ALL DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
- PACKAGE OUTLINE REFERENCE: JEDEC DO-221, VARIATION AC, ISSUE B.
- MODED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
- SUGGESTED PAD LAYOUT IS FOR REFERENCE PURPOSE ONLY.
- DWG NO. REF: HQ2SD07-TSMA-074 REV A.

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