

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

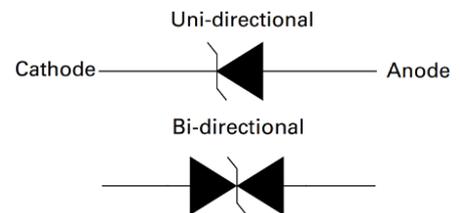
MECHANICAL DATA

- Case: 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: Indicated by cathode band
- Weight: 0.029g (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_{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 10/1000 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					
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

Notes:

1. Pulse test with PW = 30ms

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

Part number (Bidirectional)	Device marking	Breakdown voltage V _{BR@IT} (V) (Note 1)		Test current I _T (mA)	Working stand-off voltage V _{WM} (V)	Maximum blocking leakage current I _{R@VWM} (μA) (Note 1)	Maximum peak impulse current I _{PPM} (A) tp = 10/1000 μs	Maximum clamping voltage V _{C@IPPM} (V)
		Min	Max					
SMA6S12CAH	6S012	13.4	14.8	1	12	1	30.8	19.5
SMA6S15CAH	6S015	16.8	18.5	1	15	1	24.6	24.4
SMA6S18CAH	6S018	20.1	22.2	1	18	1	20.5	29.2
SMA6S20CAH	6S020	22.4	24.7	1	20	1	18.5	32.5
SMA6S21CAH	6S021	23.5	25.9	1	21	1	17.6	34.1
SMA6S22CAH	6S022	24.6	27.2	1	22	1	16.8	35.7
SMA6S24CAH	6S024	26.8	29.6	1	24	1	15.4	39.0
SMA6S25CAH	6S025	27.9	30.9	1	25	1	14.8	40.6
SMA6S26CAH	6S026	29.1	32.1	1	26	1	14.2	42.2
SMA6S30CAH	6S030	33.5	37.1	1	30	1	12.3	48.7
SMA6S33CAH	6S033	36.9	40.8	1	33	1	11.2	53.6
SMA6S36CAH	6S036	40.2	44.5	1	36	1	10.3	58.4
SMA6S39CAH	6S039	43.6	48.2	1	39	1	9.5	63.3
SMA6S40CAH	6S040	44.7	49.4	1	40	1	9.2	64.9
SMA6S43CAH	6S043	48.1	53.1	1	43	1	8.6	69.8
SMA6S47CAH	6S047	52.5	58.1	1	47	1	7.9	76.3
SMA6S51CAH	6S051	57.0	63.0	1	51	1	7.2	82.8
SMA6S56CAH	6S056	62.6	69.2	1	56	1	6.6	90.9

Notes:

1. Pulse test with PW = 30ms

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
SMA6SxAH ⁽¹⁾	SOD-128	14,000 / Tape & Reel
SMA6SxCAH ⁽²⁾	SOD-128	14,000 / Tape & Reel

Notes:

1. "x" defines voltage from 12V (SMA6S12AH) to 60V (SMA6S60AH) for unidirectional
2. "x" defines voltage from 12V (SMA6S12CAH) to 56V (SMA6S56CAH) for bidirectional

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Derating Curve

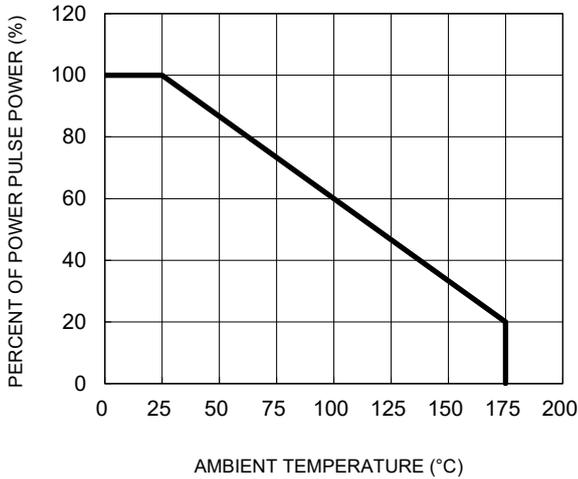


Fig.2 Non-Repetitive Peak Pulse Power vs. Pulse Time

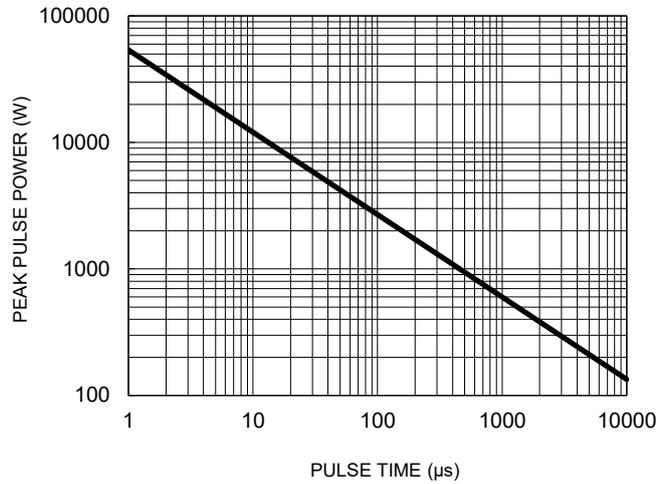


Fig.3 Steady State Power Derating

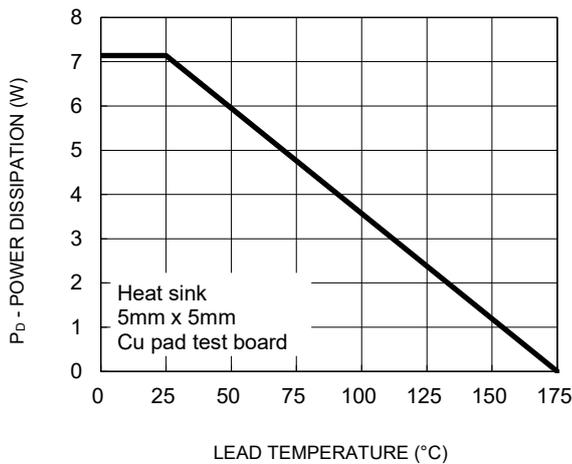


Fig.4 Typical Junction Capacitance

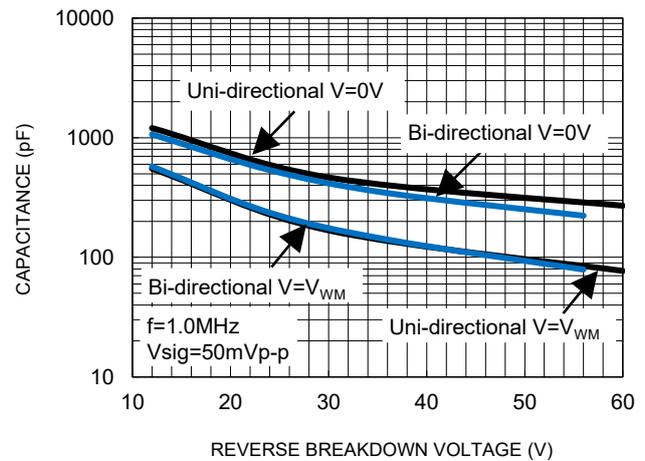
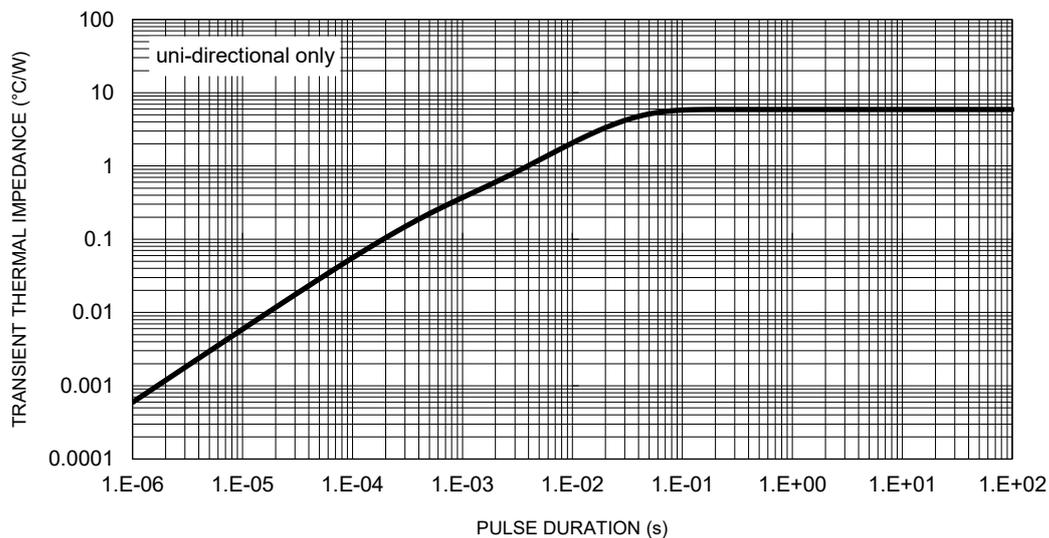


Fig.5 Typical Transient Thermal Impedance



CHARACTERISTICS CURVES

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

Fig.6 10/1000 μs pulse waveform

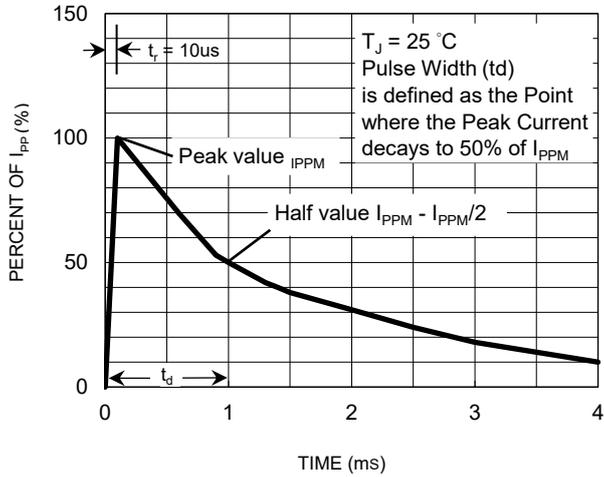
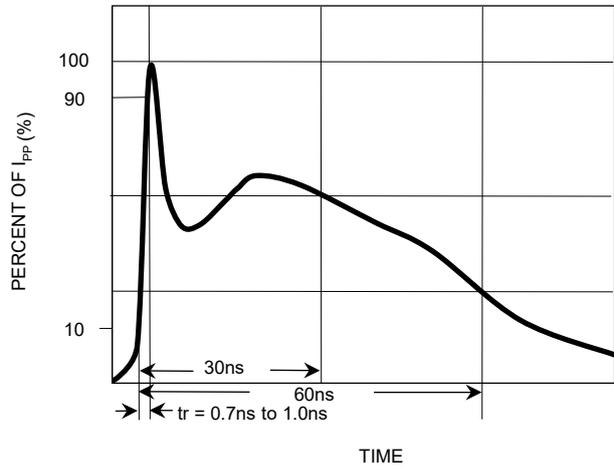
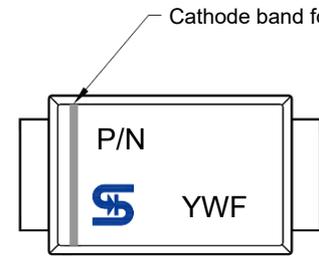
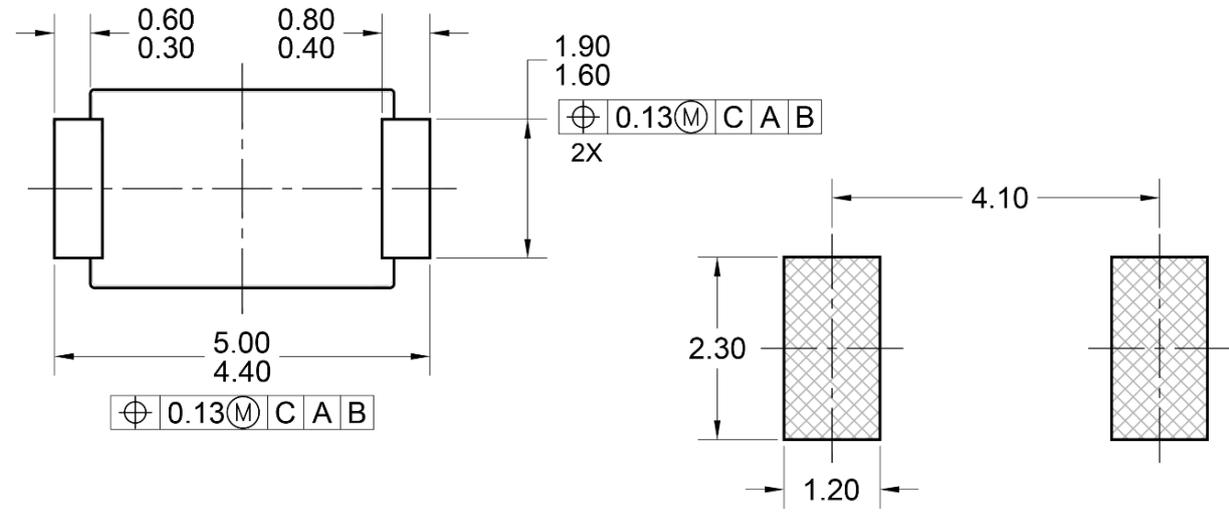
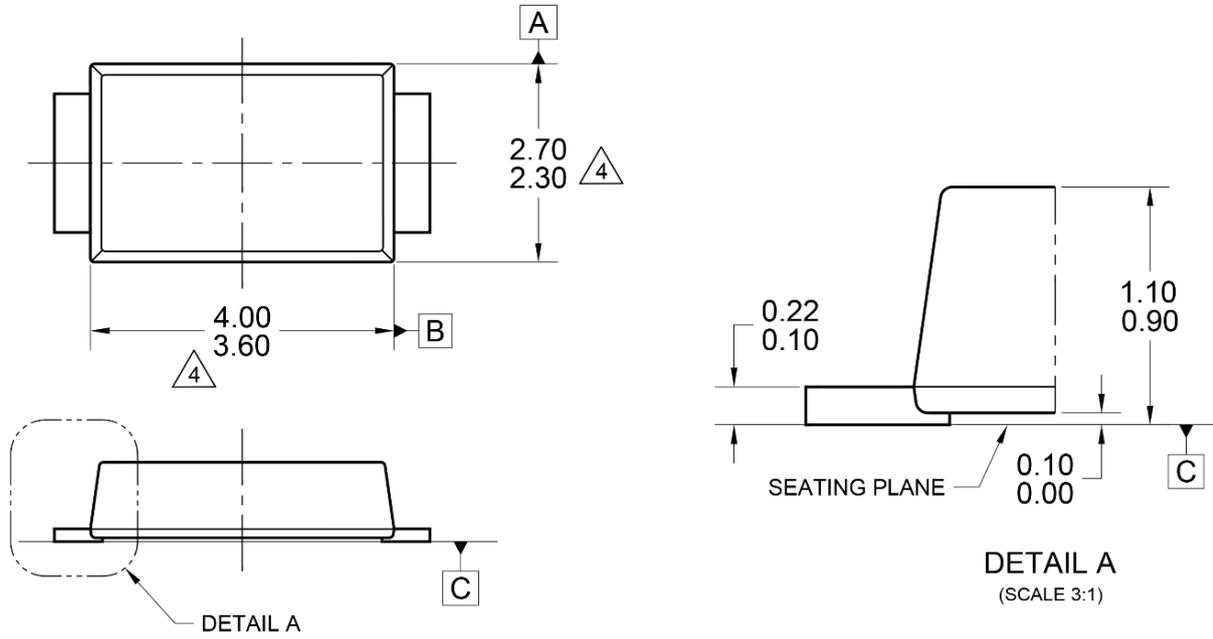


Fig.7 ESD pulse waveform



PACKAGE OUTLINE DIMENSIONS

SOD-128



MARKING DIAGRAM

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

SUGGESTED PAD LAYOUT

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
3. PACKAGE OUTLINE REFERENCE: JEDEC DO-221, VARIATION AD, ISSUE B.
4. MODDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
5. DWG NO. REF: HQ2SD07-SOD128-039 REV A.

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