

400W, 5V - 75V Surface Mount Transient Voltage Suppressor

FEATURES

- Junction passivation optimized design technology
- Low power loss, high efficiency
- Ideal for automated placement
- Excellent clamping capability
- 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

- Protect sensitive circuit from damage by high voltage transients.
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system

MECHANICAL DATA

- Case: SOD-123W
- 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: 0.015g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
V_{WM}	5 - 75	V
V_{BR}	6.4 - 92.1	V
P_{PPM}	400	W
T_{JMAX}	175	°C
Package	SOD-123W	
Configuration	Single die	


SOD-123W


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}	400	W
Steady state power dissipation at $T_L = 50^\circ\text{C}$ ⁽²⁾	P_D	7.9	W
Junction temperature	T_J	-55 to +175	°C
Storage temperature	T_{STG}	-55 to +175	°C

Notes:

1. Non-repetitive current pulse per Fig.6 and derated above $T_A = 25^\circ\text{C}$ per Fig.1
2. Units mounted on PCB (5mm x 5mm Cu pad test board)

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance	$R_{\theta JL}$	15.9	$^{\circ}\text{C/W}$
Junction-to-ambient thermal resistance	$R_{\theta JA}$	65.1	$^{\circ}\text{C/W}$
Junction-to-case thermal resistance	$R_{\theta JC}$	14.4	$^{\circ}\text{C/W}$

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					
SMF4L5.0A	4W05U	6.40	7.00	10	5	800	40.1	9.2
SMF4L6.0A	4W06U	6.67	7.37	10	6	800	35.9	10.3
SMF4L6.5A	4W6U5	7.22	7.98	10	6.5	500	33.1	11.2
SMF4L7.0A	4W07U	7.78	8.60	10	7	200	30.9	12.0
SMF4L7.5A	4W7U5	8.33	9.21	1	7.5	100	28.7	12.9
SMF4L8.0A	4W08U	8.89	9.83	1	8	50	27.2	13.6
SMF4L8.5A	4W8U5	9.44	10.4	1	8.5	20	25.7	14.4
SMF4L9.0A	4W09U	10.0	11.1	1	9	5	26.4	15.4
SMF4L10A	4W10U	11.1	12.3	1	10	5	23.5	17.0
SMF4L11A	4W11U	12.2	13.5	1	11	1	22.0	18.2
SMF4L12A	4W12U	13.3	14.7	1	12	1	20.1	19.9
SMF4L13A	4W13U	14.4	15.9	1	13	1	18.6	21.5
SMF4L14A	4W14U	15.6	17.2	1	14	1	17.2	23.2
SMF4L15A	4W15U	16.7	18.5	1	15	1	16.4	24.4
SMF4L16A	4W16U	17.8	19.7	1	16	1	15.4	26.0
SMF4L17A	4W17U	18.9	20.9	1	17	1	14.5	27.6
SMF4L18A	4W18U	20.0	22.1	1	18	1	13.7	29.2
SMF4L20A	4W20U	22.2	24.5	1	20	1	12.3	32.4
SMF4L22A	4W22U	24.4	26.9	1	22	1	11.3	35.5
SMF4L24A	4W24U	26.7	29.5	1	24	1	10.3	38.9
SMF4L26A	4W26U	28.9	31.9	1	26	1	9.5	42.1
SMF4L28A	4W28U	31.1	34.4	1	28	1	8.8	45.4
SMF4L30A	4W30U	33.3	36.8	1	30	1	8.3	48.4
SMF4L33A	4W33U	36.7	40.6	1	33	1	7.5	53.3
SMF4L36A	4W36U	40.0	44.2	1	36	1	6.9	58.1
SMF4L40A	4W40U	44.4	49.1	1	40	1	6.2	64.5
SMF4L43A	4W43U	47.8	52.8	1	43	1	5.8	69.4

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					
SMF4L45A	4W45U	50.0	55.3	1	45	1	5.5	72.7
SMF4L48A	4W48U	53.3	58.9	1	48	1	5.2	77.4
SMF4L51A	4W51U	56.7	62.7	1	51	1	4.9	82.4
SMF4L54A	4W54U	60.0	66.3	1	54	1	4.6	87.1
SMF4L58A	4W58U	64.4	71.2	1	58	1	4.3	93.6
SMF4L60A	4W60U	66.7	73.7	1	60	1	4.1	96.8
SMF4L64A	4W64U	71.1	78.6	1	64	1	3.9	103.0
SMF4L70A	4W70U	77.8	86.0	1	70	1	3.5	113.0
SMF4L75A	4W75U	83.3	92.1	1	75	1	3.3	121.0

Notes:

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

ORDERING INFORMATION		
ORDERING CODE⁽¹⁾	PACKAGE	PACKING
SMF4LxA	SOD-123W	10,000 / Tape & Reel

Notes:

1. "x" defines voltage from 5V(SMF4L5.0A) to 75V(SMF4L75A)

CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Derating Curve

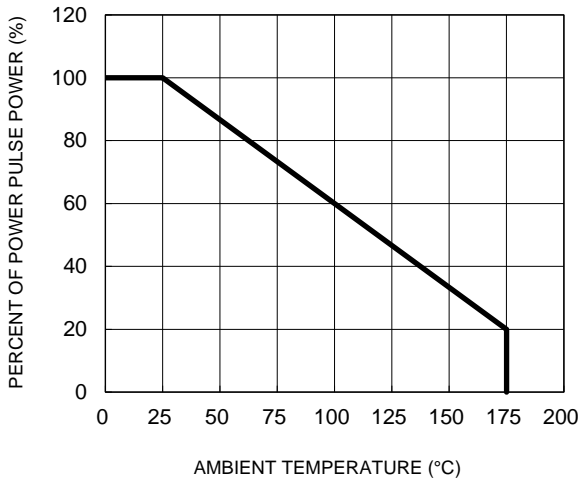


Fig.2 Non-Repetitive Peak Pulse Power vs. Pulse Time

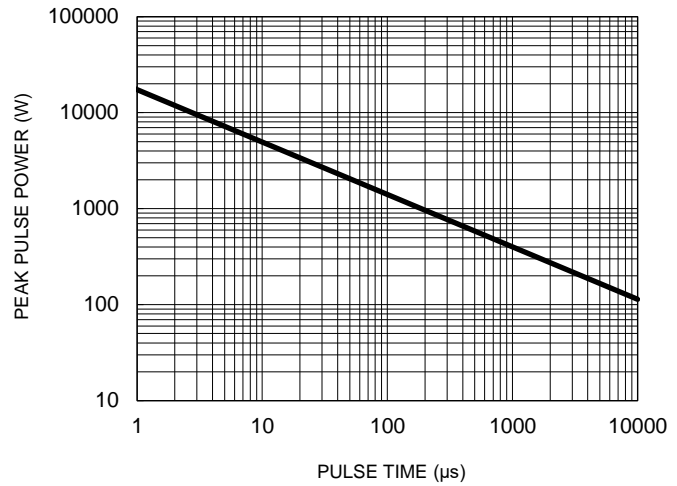


Fig.3 Forward Voltage vs. Peak Forward Current

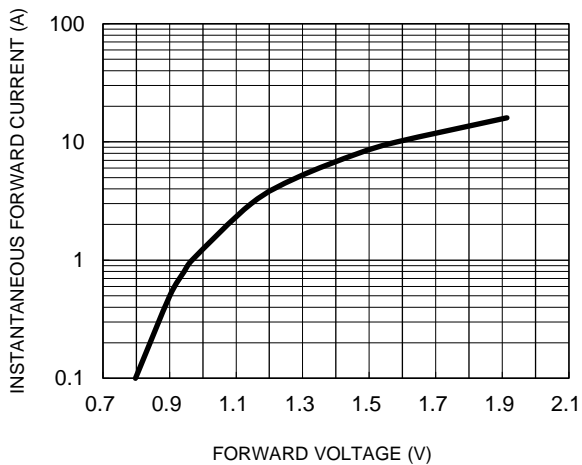


Fig.4 Typical Junction Capacitance

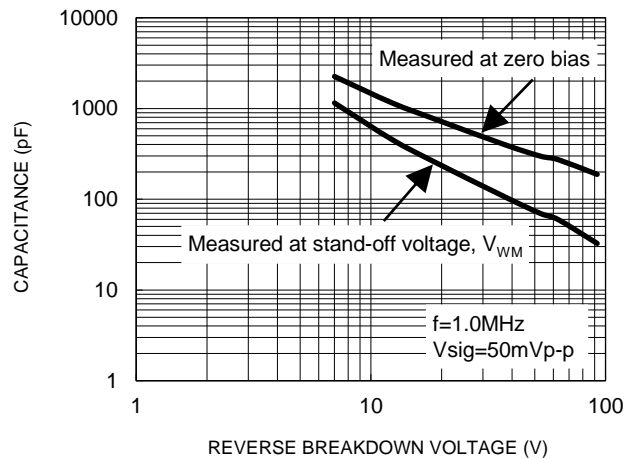
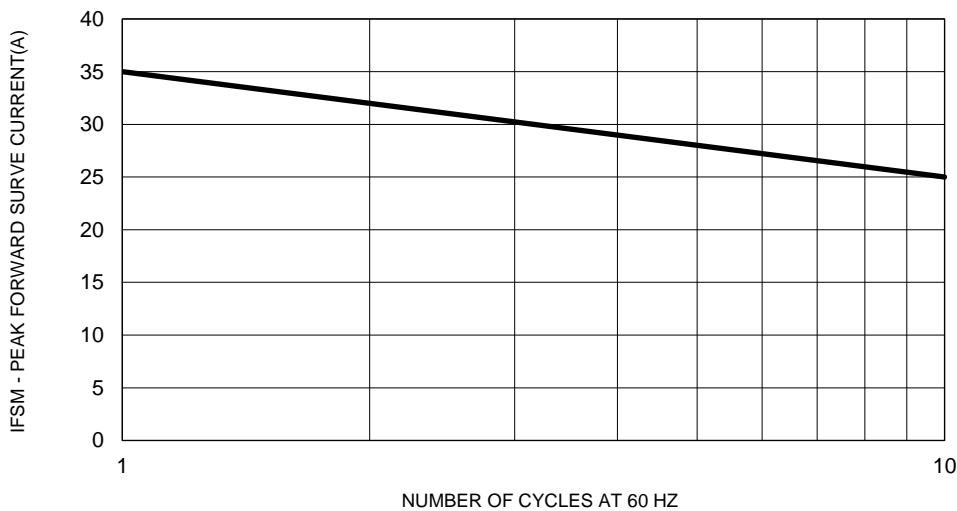


Fig.5 Maximum Non-Repetitive Forward Surge Current



CHARACTERISTICS CURVES

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

Fig.6 10/1000 μs pulse waveform

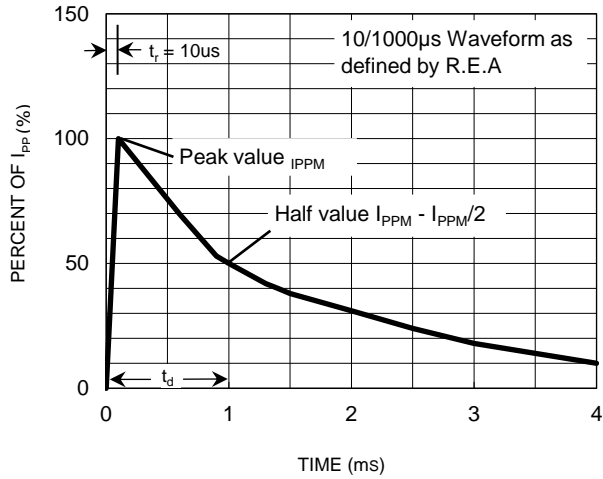
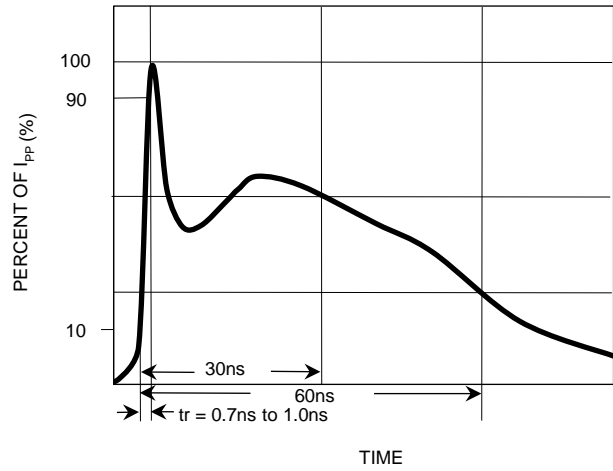
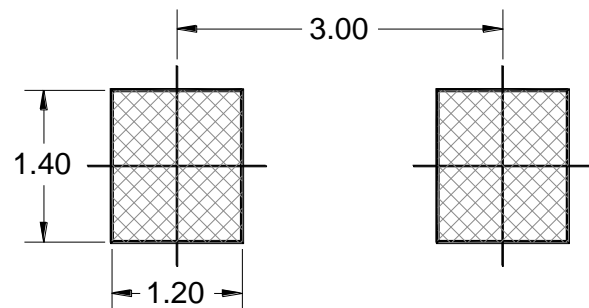
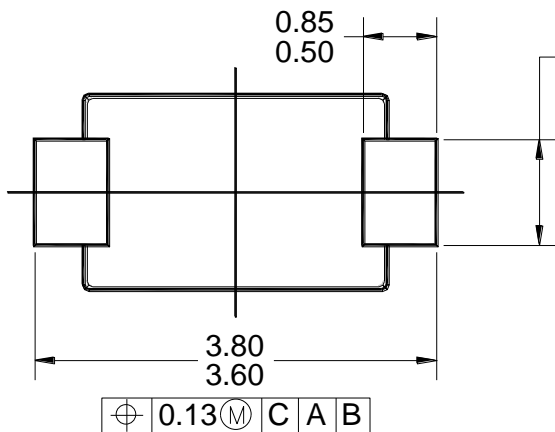
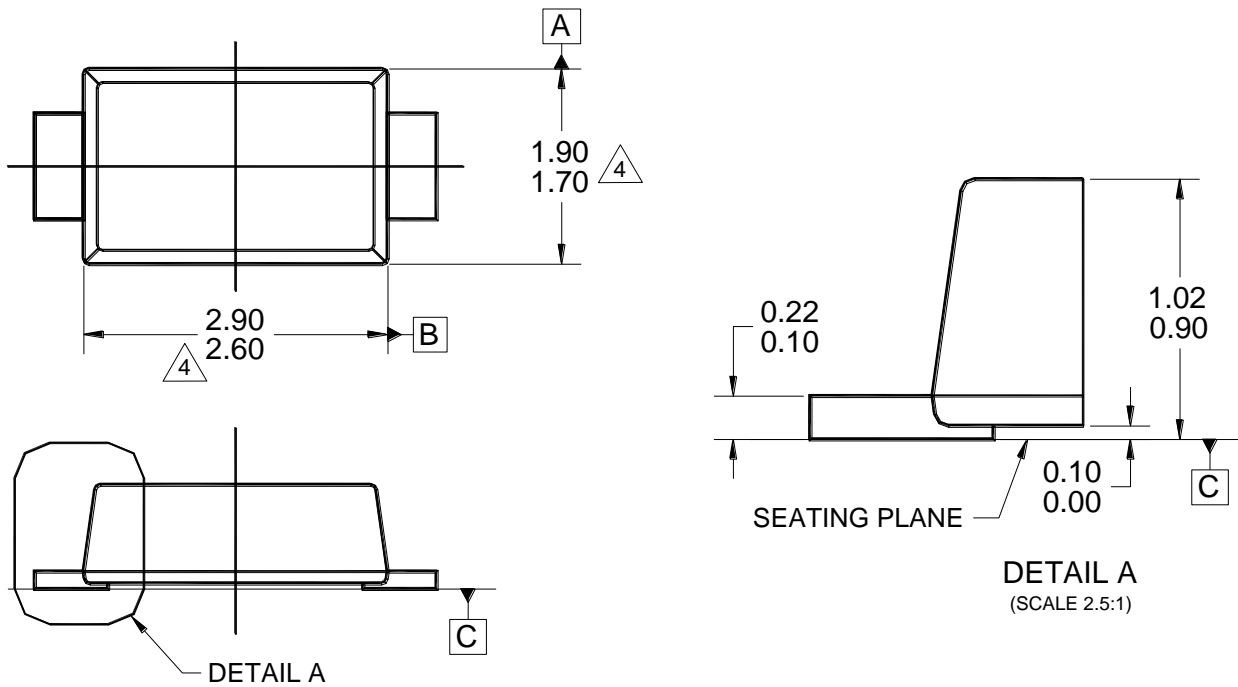


Fig.7 ESD pulse waveform

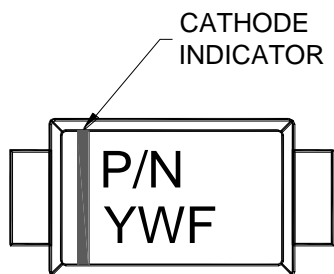


PACKAGE OUTLINE DIMENSIONS

SOD-123W



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

P/N = MARKING CODE
 YW = DATE CODE
 F = FACTORY CODE

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-219, VARIATION AB, ISSUE C.
4. MODIFIED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
5. DWG NO. REF: HQ2SD07-SOD123W-037 REV A.

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