

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

## FEATURES

- " AEC-Q101 qualified
- " 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

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

## 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)

SOD-123W

| ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C unless otherwise noted)              |                  |             |      |
|--------------------------------------------------------------------------------------|------------------|-------------|------|
| PARAMETER                                                                            | SYMBOL           | VALUE       | UNIT |
| Non-repetitive peak impulse power dissipation with 10/1000us waveform <sup>(1)</sup> | P <sub>PPM</sub> | 400         | W    |
| Steady state power dissipation at T <sub>L</sub> = 50°C <sup>(2)</sup>               | P <sub>D</sub>   | 7.9         | W    |
| Junction temperature                                                                 | T <sub>J</sub>   | -55 to +175 | °C   |
| Storage temperature                                                                  | T <sub>STG</sub> | -55 to +175 | °C   |

Notes :

1.

## THERMAL PERFORMANCE

| PARAMETER                              | SYMBOL          | TYP  | UNIT |
|----------------------------------------|-----------------|------|------|
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 15.9 | °C/W |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 65.1 | °C/W |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 14.4 | °C/W |

Thermal Performance Note: Units mounted on PCB (5mm x 5mm Cu pad test board)

ELECTRICAL SPECIFICATIONS (T<sub>A</sub> = 25°C unless otherwise noted)

| Part number | Marking code | Breakdown voltage<br>V <sub>BR</sub> @I <sub>T</sub><br>(V)<br>(Note 1) |      | Test current<br>I <sub>T</sub><br>(mA) | Working stand-off voltage<br>V <sub>WM</sub><br>(V) | Maximum blocking leakage current<br>I <sub>R</sub> @V <sub>WM</sub><br>(μA)<br>(Note 1) | Maximum peak impulse current<br>I <sub>PPM</sub><br>(A)<br>W S | Maximum clamping voltage<br>V <sub>C</sub> @I <sub>PPM</sub><br>(V) |
|-------------|--------------|-------------------------------------------------------------------------|------|----------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------|
|             |              | Min                                                                     | Max  |                                        |                                                     |                                                                                         |                                                                |                                                                     |
| SMF4L5.0AH  | 4W05U        | 6.40                                                                    | 7.00 | 10                                     | 5                                                   | 800                                                                                     | 40.1                                                           | 9.2                                                                 |
| SMF4L6.0AH  | 4W06U        | 6.67                                                                    | 7.37 | 10                                     | 6                                                   | 800                                                                                     | 35.9                                                           | 10.3                                                                |
| SMF4L6.5AH  | 4W6U5        | 7.22                                                                    | 7.98 | 10                                     | 6.5                                                 | 500                                                                                     | 33.1                                                           | 11.2                                                                |
| SMF4L7.0AH  | 4W07U        | 7.78                                                                    | 8.60 | 10                                     | 7                                                   | 200                                                                                     | 30.9                                                           | 12.0                                                                |
| SMF4L7.5AH  | 4W7U5        | 8.33                                                                    | 9.21 | 1                                      | 7.5                                                 | 100                                                                                     | 28.7                                                           | 12.9                                                                |
| SMF4L8.0AH  | 4W08U        | 8.89                                                                    | 9.83 | 1                                      | 8                                                   | 50                                                                                      | 27.2                                                           | 13.6                                                                |
| SMF4L8.5AH  | 4W8U5        | 9.44                                                                    | 10.4 | 1                                      | 8.5                                                 | 20                                                                                      | 25.7                                                           | 14.4                                                                |
| SMF4L9.0AH  | 4W09U        | 10.0                                                                    | 11.1 | 1                                      | 9                                                   | 5                                                                                       | 26.4                                                           | 15.4                                                                |
| SMF4L10AH   | 4W10U        | 11.1                                                                    | 12.3 | 1                                      | 10                                                  | 5                                                                                       | 23.5                                                           | 17.0                                                                |
| SMF4L11AH   | 4W11U        | 12.2                                                                    | 13.5 | 1                                      | 11                                                  | 1                                                                                       | 22.0                                                           | 18.2                                                                |
| SMF4L12AH   | 4W12U        | 13.3                                                                    | 14.7 | 1                                      | 12                                                  | 1                                                                                       | 20.1                                                           | 19.9                                                                |
| SMF4L13AH   | 4W13U        | 14.4                                                                    | 15.9 | 1                                      | 13                                                  | 1                                                                                       | 18.6                                                           | 21.5                                                                |
| SMF4L14AH   | 4W14U        | 15.6                                                                    | 17.2 | 1                                      | 14                                                  | 1                                                                                       | 17.2                                                           | 23.2                                                                |
| SMF4L15AH   | 4W15U        | 16.7                                                                    | 18.5 | 1                                      | 15                                                  | 1                                                                                       | 16.4                                                           | 24.4                                                                |
| SMF4L16AH   | 4W16U        | 17.8                                                                    | 19.7 | 1                                      | 16                                                  | 1                                                                                       | 15.4                                                           | 26.0                                                                |
| SMF4L17AH   | 4W17U        | 18.9                                                                    | 20.9 | 1                                      | 17                                                  | 1                                                                                       | 14.5                                                           | 27.6                                                                |
| SMF4L18AH   | 4W18U        | 20.0                                                                    | 22.1 | 1                                      | 18                                                  | 1                                                                                       | 13.7                                                           | 29.2                                                                |
| SMF4L20AH   | 4W20U        | 22.2                                                                    | 24.5 | 1                                      | 20                                                  | 1                                                                                       | 12.3                                                           | 32.4                                                                |
| SMF4L22AH   | 4W22U        | 24.4                                                                    | 26.9 | 1                                      | 22                                                  | 1                                                                                       | 11.3                                                           | 35.5                                                                |
| SMF4L24AH   | 4W24U        | 26.7                                                                    | 29.5 | 1                                      | 24                                                  | 1                                                                                       | 10.3                                                           | 38.9                                                                |
| SMF4L26AH   | 4W26U        | 28.9                                                                    | 31.9 | 1                                      | 26                                                  | 1                                                                                       | 9.5                                                            | 42.1                                                                |
| SMF4L28AH   | 4W28U        | 31.1                                                                    | 34.4 | 1                                      | 28                                                  | 1                                                                                       | 8.8                                                            | 45.4                                                                |
| SMF4L30AH   | 4W30U        | 33.3                                                                    | 36.8 | 1                                      | 30                                                  | 1                                                                                       | 8.3                                                            | 48.4                                                                |
| SMF4L33AH   | 4W33U        | 36.7                                                                    | 40.6 | 1                                      | 33                                                  | 1                                                                                       | 7.5                                                            | 53.3                                                                |
| SMF4L36AH   | 4W36U        | 40.0                                                                    | 44.2 | 1                                      | 36                                                  | 1                                                                                       | 6.9                                                            | 58.1                                                                |
| SMF4L40AH   | 4W40U        | 44.4                                                                    | 49.1 | 1                                      | 40                                                  | 1                                                                                       | 6.2                                                            | 64.5                                                                |
| SMF4L43AH   | 4W43U        | 47.8                                                                    | 52.8 | 1                                      | 43                                                  | 1                                                                                       | 5.8                                                            | 69.4                                                                |

| ELECTRICAL SPECIFICATIONS (T <sub>A</sub> = 25°C unless otherwise noted) |              |                                                                         |      |                                        |                                                     |                                                                                         |                                                                |                                                                     |
|--------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------|------|----------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------|
| Part number                                                              | Marking code | Breakdown voltage<br>V <sub>BR</sub> @I <sub>T</sub><br>(V)<br>(Note 1) |      | Test current<br>I <sub>T</sub><br>(mA) | Working stand-off voltage<br>V <sub>WM</sub><br>(V) | Maximum blocking leakage current<br>I <sub>R</sub> @V <sub>WM</sub><br>(μA)<br>(Note 1) | Maximum peak impulse current<br>I <sub>PPM</sub><br>(A)<br>W S | Maximum clamping voltage<br>V <sub>C</sub> @I <sub>PPM</sub><br>(V) |
|                                                                          |              | Min                                                                     | Max  |                                        |                                                     |                                                                                         |                                                                |                                                                     |
| SMF4L45AH                                                                | 4W45U        | 50.0                                                                    | 55.3 | 1                                      | 45                                                  | 1                                                                                       | 5.5                                                            | 72.7                                                                |
| SMF4L48AH                                                                | 4W48U        | 53.3                                                                    | 58.9 | 1                                      | 48                                                  | 1                                                                                       | 5.2                                                            | 77.4                                                                |
| SMF4L51AH                                                                | 4W51U        | 56.7                                                                    | 62.7 | 1                                      | 51                                                  | 1                                                                                       | 4.9                                                            | 82.4                                                                |
| SMF4L54AH                                                                | 4W54U        | 60.0                                                                    | 66.3 | 1                                      | 54                                                  | 1                                                                                       | 4.6                                                            | 87.1                                                                |
| SMF4L58AH                                                                | 4W58U        | 64.4                                                                    | 71.2 | 1                                      | 58                                                  | 1                                                                                       | 4.3                                                            | 93.6                                                                |
| SMF4L60AH                                                                | 4W60U        | 66.7                                                                    | 73.7 | 1                                      | 60                                                  | 1                                                                                       | 4.1                                                            | 96.8                                                                |
| SMF4L64AH                                                                | 4W64U        | 71.1                                                                    | 78.6 | 1                                      | 64                                                  | 1                                                                                       | 3.9                                                            | 103.0                                                               |
| SMF4L70AH                                                                | 4W70U        | 77.8                                                                    | 86.0 | 1                                      | 70                                                  | 1                                                                                       | 3.5                                                            | 113.0                                                               |
| SMF4L75AH                                                                | 4W75U        | 83.3                                                                    | 92.1 | 1                                      | 75                                                  | 1                                                                                       | 3.3                                                            | 121.0                                                               |

Notes:

1. Pulse test with PW = 30ms

| ORDERING INFORMATION         |          |                      |
|------------------------------|----------|----------------------|
| ORDERING CODE <sup>(1)</sup> | PACKAGE  | PACKING              |
| SMF4LxAH                     | SOD-123W | 10,000 / Tape & Reel |

Notes:

1. "x" defines voltage from 5V(SMF4L5.0AH) to 75V(SMF4L75AH)

## CHARACTERISTICS CURVES

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

Fig.1 Peak Pulse Power Derating Curve

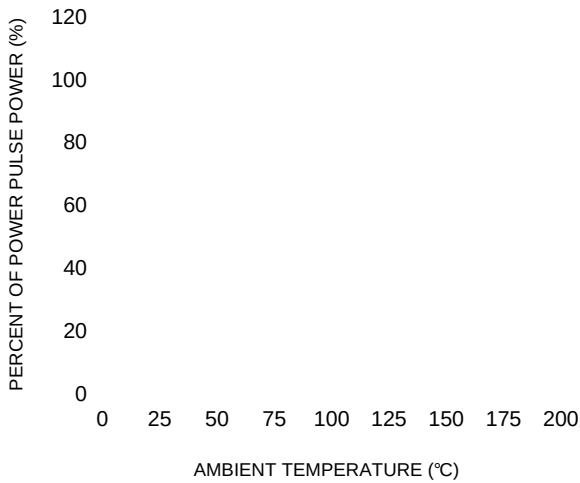


Fig.2 Non-Repetitive Peak Pulse Power vs. Pulse Time

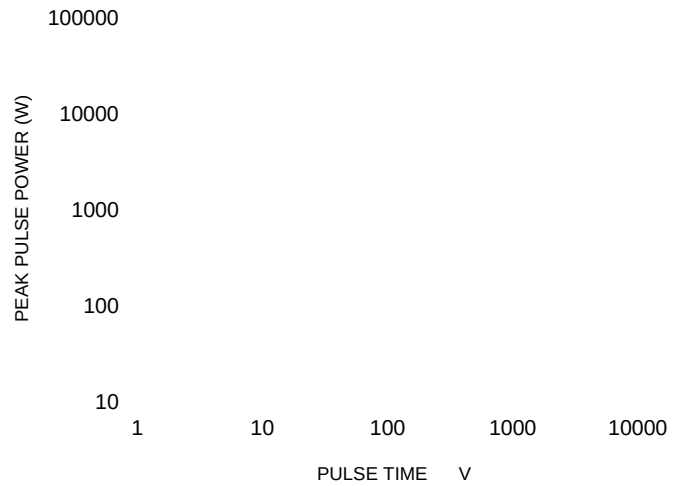


Fig.3 Forward Voltage vs. Peak Forward Current

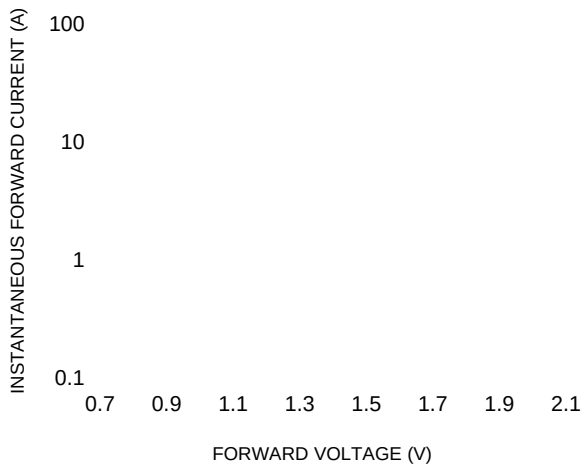


Fig.4 Typical Junction Capacitance

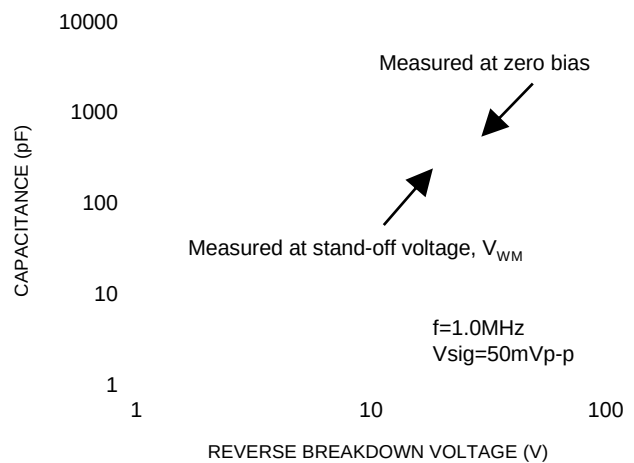
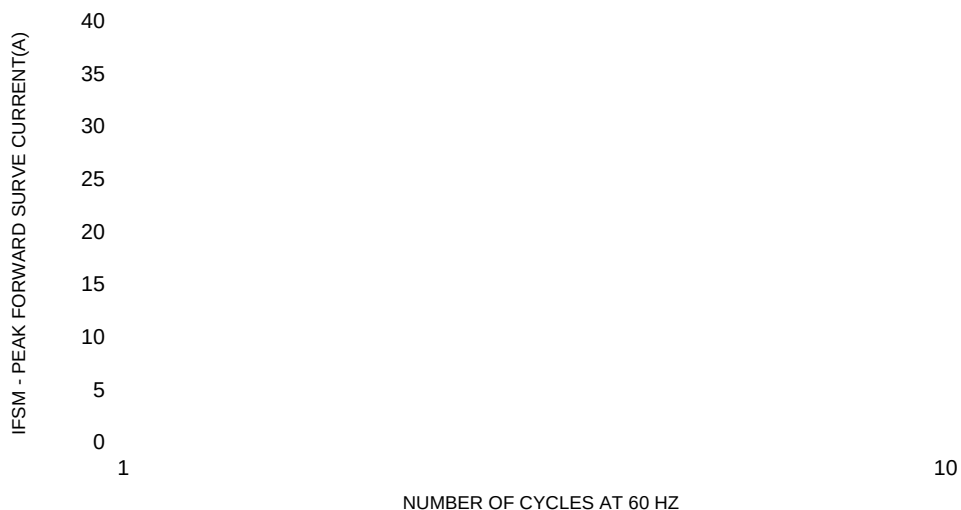


Fig.5 Maximum Non -Repetitive Forward Surge Current

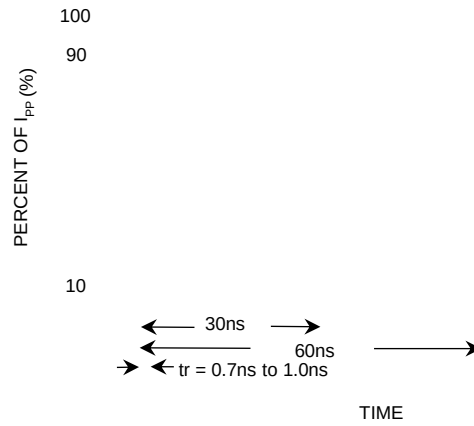
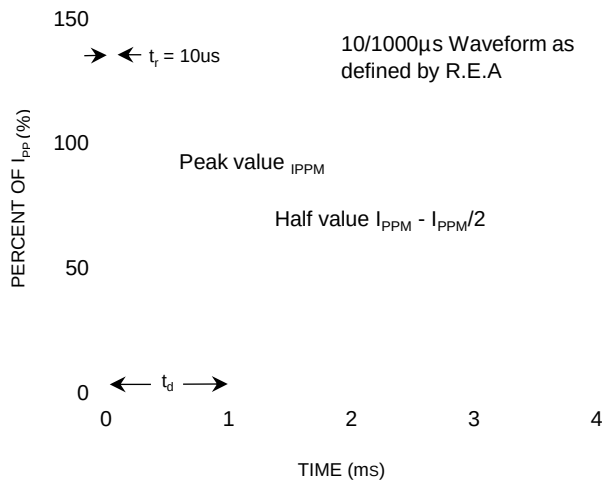


## CHARACTERISTICS CURVES

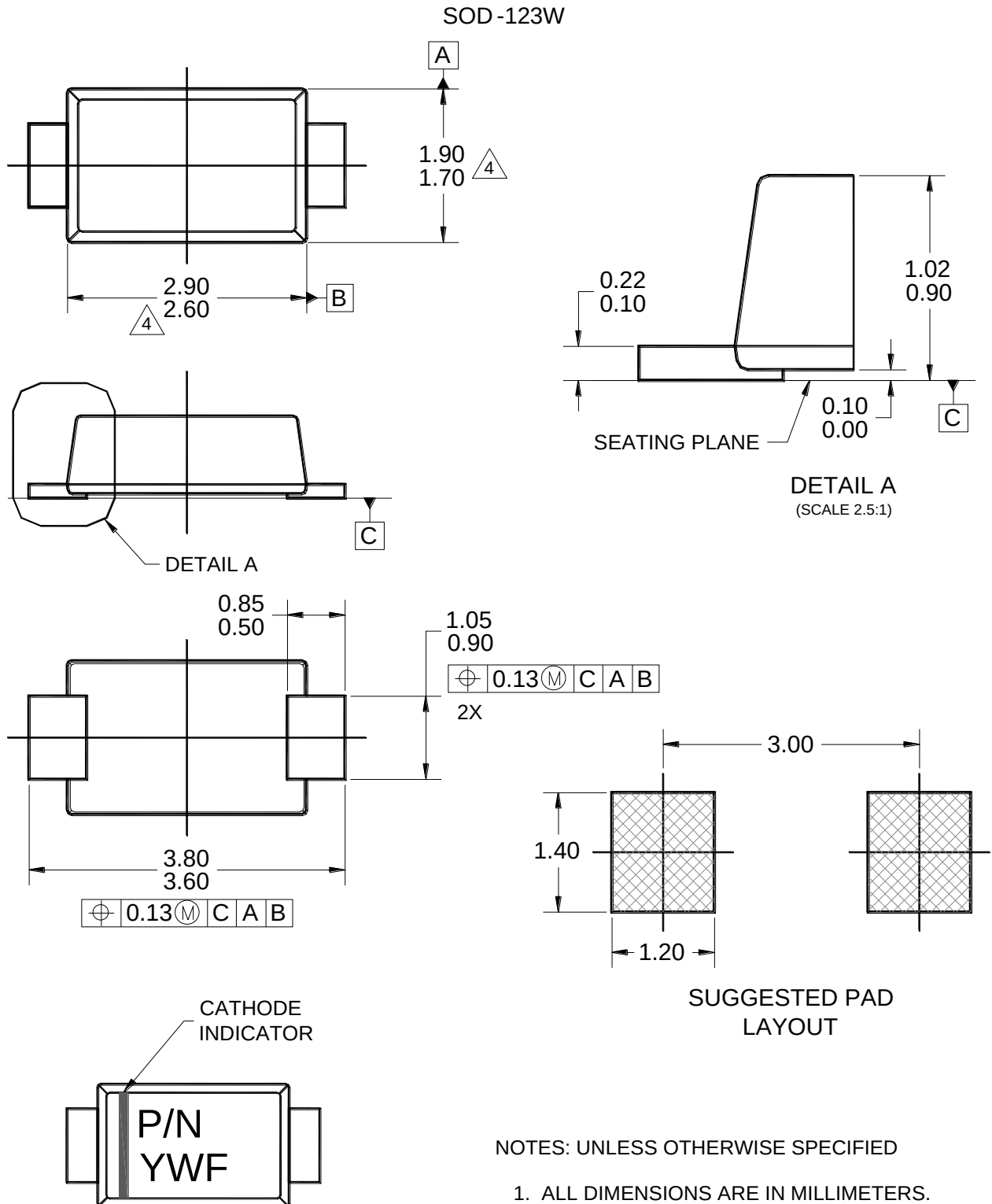
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Fig.6 10/1000 V S X O V H Z D Y H I R

Fig.7 ESD pulse waveform



PACKAGE OUTLINE DIMENSIONS



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.

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

## Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability  
IRU DSSOLF DWLRQ DVVLVWDQFH RU WKH GHVLJQ RI 3XUFKDVHUV¶ SURGX

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this G R F X P H Q W ([ F H S W D V S U R Y L G H G L Q 7 6 & ¶ V sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.