

# NSQA6V8AW5T2 Series

## Low Capacitance Quad Array for ESD Protection

This integrated transient voltage suppressor device (TVS) is designed for applications requiring transient overvoltage protection. It is intended for use in sensitive equipment such as computers, printers, business machines, communication systems, medical equipment, and other applications. Its integrated design provides very effective and reliable protection for four separate lines using only one package. These devices are ideal for situations where board space is at a premium.

### Features

- ESD Protection: IEC61000-4-2: Level 4  
MILSTD 883C – Method 3015-6: Class 3
- Four Separate Unidirectional Configurations for Protection
- Low Leakage Current < 1  $\mu$ A
- Power Dissipation: 380 mW
- Small SC-88A SMT Package
- Low Capacitance
- Pb-Free Package is Available

### Benefits

- Provides Protection for ESD Industry Standards: IEC 61000, HBM
- Minimize Power Consumption of the System
- Minimize PCB Board Space

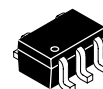
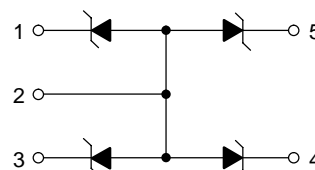
### Typical Applications

- Instrumentation Equipment
- Serial and Parallel Ports
- Microprocessor Based Equipment
- Notebooks, Desktops, Servers
- Cellular and Portable Equipment



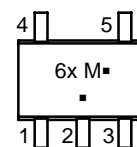
**ON Semiconductor®**

<http://onsemi.com>



**SC-88A/SOT-323  
CASE 419A**

### MARKING DIAGRAM



- x = H for NSQA6V8AW5T2  
X for NSQA12VAW5T2
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device        | Package             | Shipping†        |
|---------------|---------------------|------------------|
| NSQA6V8AW5T2  | SC-88A              | 3000/Tape & Reel |
| NSQA6V8AW5T2G | SC-88A<br>(Pb-Free) | 3000/Tape & Reel |
| NSQA12VAW5T2  | SC-88A              | 3000/Tape & Reel |
| NSQA12VAW5T2G | SC-88A<br>(Pb-Free) | 3000/Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## NSQA6V8AW5T2 Series

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

| Rating   | Symbol          | Value       | Unit          |
|--|-----------------|-------------|---------------|
| Peak Power Dissipation<br>8 × 20 μsec Double Exponential Waveform (Note 1) | $P_{PK}$        | 20          | W             |
| Steady State Power – 1 Diode (Note 2)                                      | $P_D$           | 380         | mW            |
| Thermal Resistance –<br>Junction-to-Ambient<br>Above 25°C, Derate          | $R_{\theta JA}$ | 327<br>3.05 | °C/W<br>mW/°C |
| Operating Junction Temperature Range                                       | $T_J$           | -40 to +125 | °C            |
| Storage Temperature Range  | $T_{stg}$       | -55 to +150 | °C            |
| Lead Solder Temperature – Maximum 10 Seconds Duration                      | $T_L$           | 260         | °C            |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Non-repetitive current pulse per Figure 1.
2. Only 1 diode under power. For all 4 diodes under power,  $P_D$  will be 25%. Mounted on FR4 board with min pad.

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

#### NSQA6V8AW5T2

| Characteristic  | Symbol   | Min | Typ       | Max       | Unit |
|---|----------|-----|-----------|-----------|------|
| Breakdown Voltage ( $I_T = 1\text{ mA}$ ) (Note 3)  | $V_{BR}$ | 6.4 | 6.8       | 7.1       | V    |
| Leakage Current ( $V_{RWM} = 5.0\text{ V}$ )  | $I_R$    | –   | –         | 1.0       | μA   |
| Clamping Voltage 1 ( $I_{PP} = 1.6\text{ A}$ , 8 × 20 μsec Waveform)  | $V_C$    | –   | –         | 13        | V    |
| Maximum Peak Pulse Current (8 × 20 μsec Waveform)   | $I_{PP}$ | –   | –         | 1.6       | A    |
| Junction Capacitance – ( $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ )<br>– ( $V_R = 3.0\text{ V}$ , $f = 1\text{ MHz}$ ) | $C_J$    | –   | 12<br>6.7 | 15<br>9.5 | pF   |

#### NSQA12VAW5T2

|  |          |      |      |      |    |
|--|----------|------|------|------|----|
| Breakdown Voltage ( $I_T = 5\text{ mA}$ ) (Note 3)                   | $V_{BR}$ | 11.4 | 12.0 | 12.7 | V  |
| Leakage Current ( $V_{RWM} = 9.0\text{ V}$ )                         | $I_R$    | –    | –    | 0.05 | μA |
| Zener Impedance ( $I_T = 5\text{ mA}$ )                              | $Z_Z$    | –    | –    | 30   | Ω  |
| Clamping Voltage 1 ( $I_{PP} = 0.9\text{ A}$ , 8 × 20 μsec Waveform) | $V_C$    | –    | –    | 23   | V  |
| Maximum Peak Pulse Current (8 × 20 μsec Waveform)                    | $I_{PP}$ | –    | –    | 0.9  | A  |
| Junction Capacitance – ( $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ )   | $C_J$    | –    | –    | 15   | pF |

3.  $V_{BR}$  is measured at pulse test current  $I_T$ .

# NSQA6V8AW5T2 Series

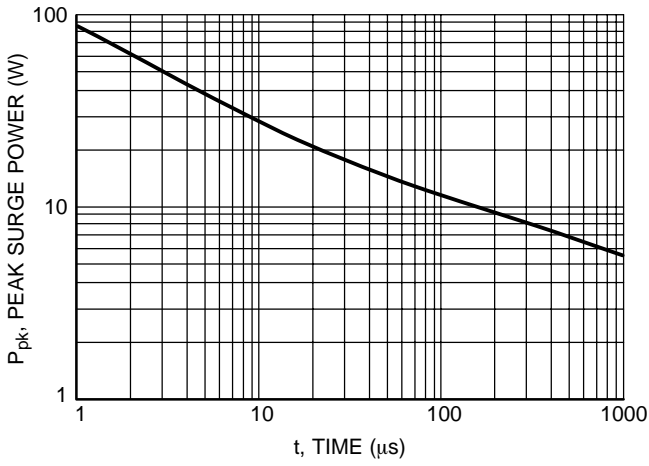


Figure 1. Pulse Width

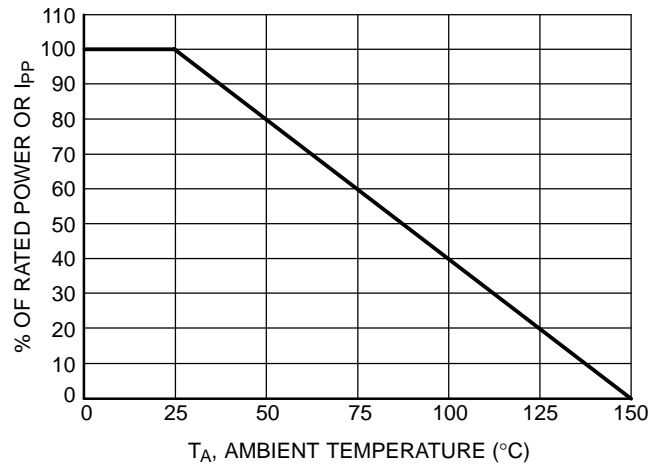


Figure 2. Power Derating Curve

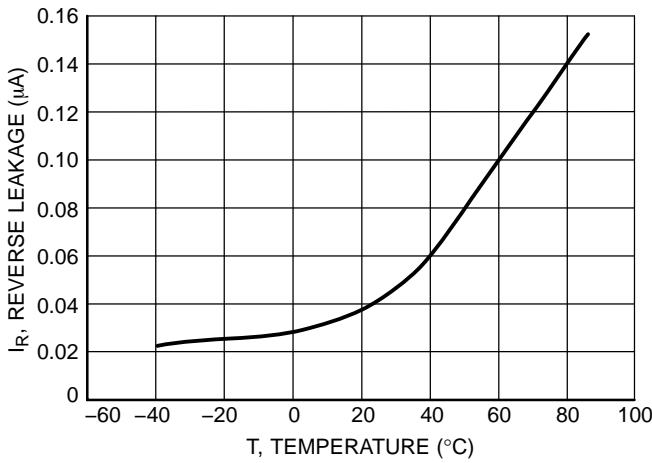


Figure 3. Reverse Leakage versus Temperature

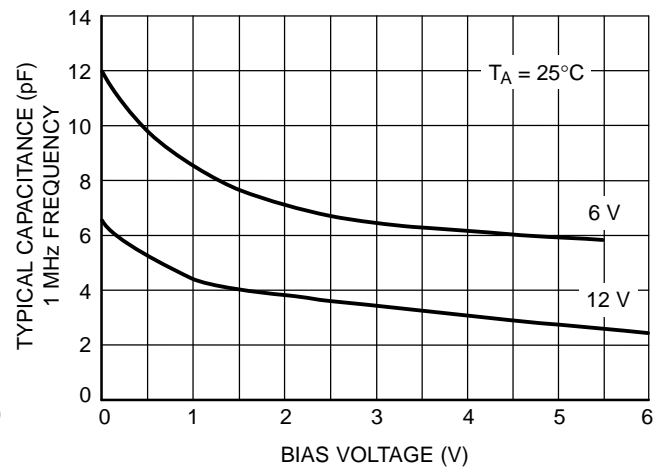


Figure 4. Capacitance

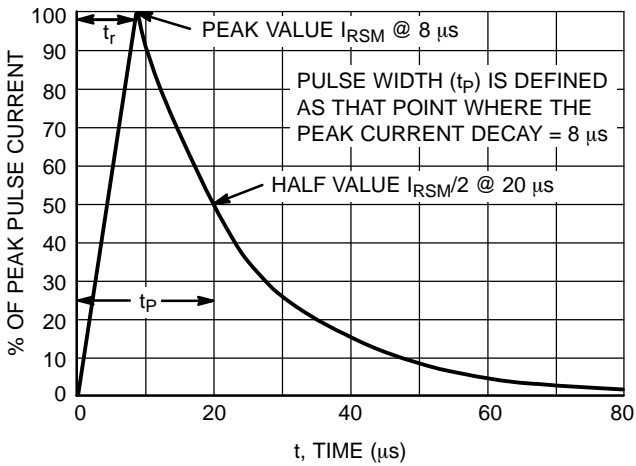


Figure 5.  $8 \times 20 \mu$ s Pulse Waveform

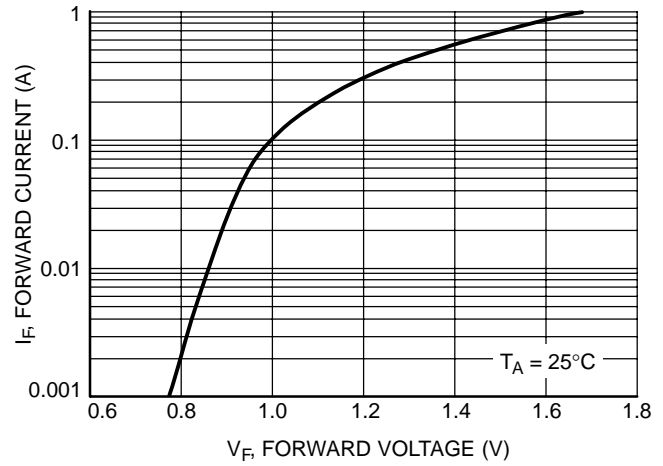
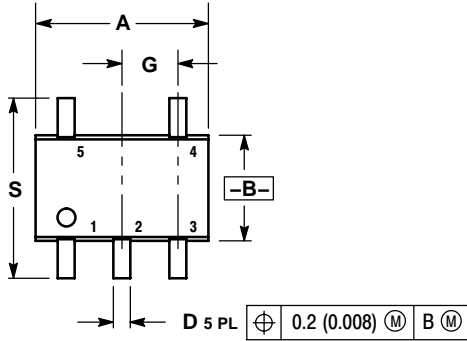


Figure 6. Forward Voltage

# NSQA6V8AW5T2 Series

## PACKAGE DIMENSIONS

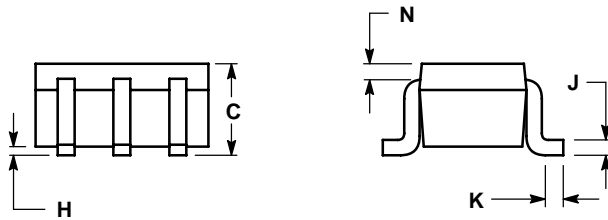
SC-88A/SOT-323/SC-70  
5-LEAD PACKAGE  
CASE 419A-02  
ISSUE J



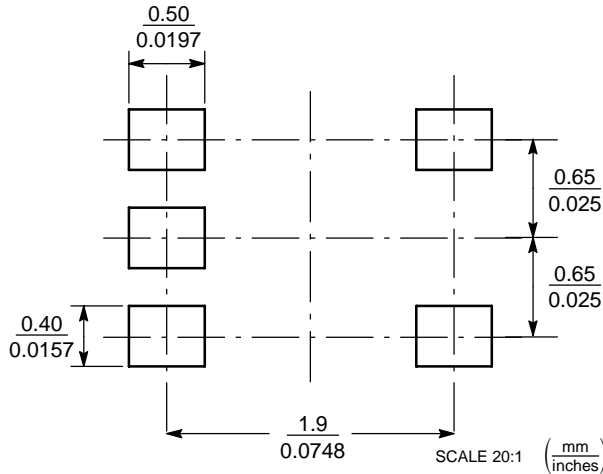
**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | INCHES    |       | MILLIMETERS |      |
|-----|-----------|-------|-------------|------|
|     | MIN       | MAX   | MIN         | MAX  |
| A   | 0.071     | 0.087 | 1.80        | 2.20 |
| B   | 0.045     | 0.053 | 1.15        | 1.35 |
| C   | 0.031     | 0.043 | 0.80        | 1.10 |
| D   | 0.004     | 0.012 | 0.10        | 0.30 |
| G   | 0.026 BSC |       | 0.65 BSC    |      |
| H   | ---       | 0.004 | ---         | 0.10 |
| J   | 0.004     | 0.010 | 0.10        | 0.25 |
| K   | 0.004     | 0.012 | 0.10        | 0.30 |
| N   | 0.008 REF |       | 0.20 REF    |      |
| S   | 0.079     | 0.087 | 2.00        | 2.20 |



### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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