

# Zener Protection Diode

## NZ8DH Series

The NZ8DH devices are designed for applications requiring transient overvoltage ESD protection. They are intended to protect voltage sensitive components from ESD and other harmful transient voltage events. This device provides a single channel of bidirectional protection in an, ultra-compact XDFNW2 1.0 x 0.6 mm package. This device is ideal to replace SOT23 or other dual diode 3 pin devices used as single line bi-directional protection.

### Features

- Precise Clamping Voltage
- High ESD Ratings
- Wettable Flank Package for optimal Automated Optical Inspection (AOI)
- 175°C T<sub>J(MAX)</sub> – Rated for High Temperature, Mission Critical Applications
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Typical Applications

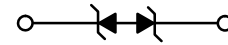
- Automotive ECU's
- In Vehicle Networking (IVN)
- Voltage Sensitive Circuits

### MAXIMUM RATINGS

| Rating   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| IEC 61000-4-2 Contact (Note 1)                           | ESD                               | ±30         | kV   |
| IEC 61000-4-2 Air  |                                   | ±30         | kV   |
| ISO 10605 Contact (330 pF / 330 Ω)                       |                                   | ±30         | kV   |
| ISO 10605 Contact (330 pF / 2 kΩ)                        |                                   | ±30         | kV   |
| ISO 10605 Contact (150 pF / 2 kΩ)                        |                                   | ±30         | kV   |
| Maximum Peak Pulse Current (8/20 μs) (Note 2)            | I <sub>pp</sub>                   | 4.5         | A    |
| Total Power Dissipation (Note 3 @ T <sub>A</sub> = 25°C) | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction-to-Ambient                  | R <sub>θJA</sub>                  | 400         | °C/W |
| Junction and Storage Temperature Range                   | T <sub>J</sub> , T <sub>stg</sub> | -55 to +175 | °C   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non-repetitive current pulse at T<sub>A</sub> = 25°C, per IEC61000-4-2 waveform.
2. Non-repetitive current pulse per figure 1.
3. Mounted with recommended minimum pad size, DC board FR-4



XDFNW2  
CASE 521AE

### DEVICE MARKING INFORMATION



D = Specific Device Code  
M = Date Code

### ORDERING INFORMATION

| Device            | Package             | Shipping†             |
|-------------------|---------------------|-----------------------|
| NZ8DHxxxxMXWT5G   | XDFNW2<br>(Pb-Free) | 8000 / Tape<br>& Reel |
| SZNZ8DHxxxxMXWT5G |                     |                       |

†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.

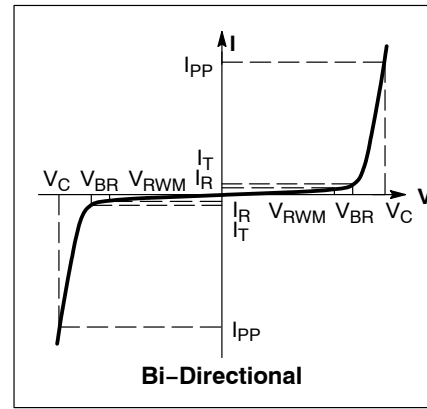
## NZ8DH Series

### ELECTRICAL CHARACTERISTICS

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

| Symbol    | Parameter  |
|-----------|--|
| $I_{PP}$  | Maximum Reverse Peak Pulse Current (8/20 $\mu\text{s}$ ) |
| $V_C$     | Clamping Voltage @ $I_{PP}$                              |
| $V_{RWM}$ | Working Peak Reverse Voltage                             |
| $I_R$     | Maximum Reverse Leakage Current @ $V_{RWM}$              |
| $V_{BR}$  | Breakdown Voltage @ $I_T$                                |
| $I_T$     | Test Current   |

\*See Application Note AND8308/D for detailed explanations of datasheet parameters.



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

| Device*        | Device Marking | $V_{RWM}$ Max | $V_{BR}$<br>$I_T = 5 \text{ mA}$ (Note 4) |       | $I_R$ ( $\mu\text{A}$ ) Max @<br>$V_{RWM}$ | $V_C$ Typ<br>@ $I_{PP} = 1.0 \text{ A}$ | $C$ (pF) Typ @<br>$V_R = 0 \text{ V}$ ,<br>$f = 1 \text{ MHz}$ |
|----------------|----------------|---------------|---|-------|--|---|--|
|                |                |               | Min                                       | Max   |  |   |  |
| NZ8DH2V4†      |                | 1             | 3.00                                      | 3.60  | 50   | 3.70                                    | 60   |
| NZ8DH2V7†      |                | 1             | 3.28                                      | 3.92  | 20   | 4.00                                    | 55   |
| NZ8DH3V0†      |                | 1             | 3.55                                      | 4.25  | 10   | 4.30                                    | 54   |
| NZ8DH3V3†      |                | 1             | 3.82                                      | 4.58  | 10   | 4.60                                    | 50   |
| NZ8DH3V6†      |                | 1             | 4.10                                      | 4.91  | 10   | 4.90                                    | 48   |
| NZ8DH3V9†      |                | 1             | 4.37                                      | 5.23  | 5  | 5.20                                    | 45   |
| NZ8DH4V3†      |                | 1             | 4.73                                      | 5.67  | 5  | 5.60                                    | 42   |
| NZ8DH4V7†      |                | 1             | 5.10                                      | 6.10  | 2  | 6.10                                    | 40   |
| NZ8DH5V1†      |                | 1.5           | 5.46                                      | 6.54  | 2  | 6.50                                    | 38   |
| NZ8DH5V6†      |                | 2.5           | 5.92                                      | 7.09  | 1  | 7.10                                    | 36   |
| NZ8DH6V2†      |                | 3             | 6.46                                      | 7.74  | 1  | 7.70                                    | 35   |
| NZ8DH6V8†      |                | 3.5           | 7.01                                      | 8.39  | 0.5  | 8.40                                    | 32   |
| NZ8DH7V5†      |                | 4             | 7.64                                      | 9.16  | 0.5  | 9.20                                    | 30   |
| NZ8DH8V2†      |                | 5             | 8.28                                      | 9.92  | 0.5  | 9.90                                    | 28   |
| NZ8DH9V1MXWT5G |                | 6             | 9.30                                      | 10.70 | 0.5  | 10.90                                   | 25   |
| NZ8DH10V†      |                | 7             | 10.14                                     | 11.66 | 0.1  | 11.90                                   | 23   |
| NZ8DH11V†      |                | 8             | 11.07                                     | 12.73 | 0.1  | 13.00                                   | 22   |
| NZ8DH12V†      |                | 9             | 12.00                                     | 13.80 | 0.1  | 14.10                                   | 20   |
| NZ8DH13V†      |                | 10            | 12.93                                     | 14.87 | 0.1  | 15.20                                   | 19   |
| NZ8DH15V†      |                | 11            | 14.79                                     | 17.01 | 0.1  | 17.40                                   | 18   |
| NZ8DH16V†      |                | 12            | 15.72                                     | 18.08 | 0.1  | 18.50                                   | 18   |
| NZ8DH18V†      |                | 14            | 17.58                                     | 20.22 | 0.1  | 20.70                                   | 17   |
| NZ8DH20V†      |                | 15.4          | 19.44                                     | 22.36 | 0.1  | 22.90                                   | 16   |
| NZ8DH22V†      |                | 16.8          | 21.30                                     | 24.50 | 0.1  | 25.10                                   | 14   |
| NZ8DH24V†      |                | 18.9          | 23.16                                     | 26.64 | 0.1  | 27.30                                   | 12   |
| NZ8DH27V†      |                | 22            | 25.95                                     | 29.85 | 0.1  | 30.70                                   | 12   |
| NZ8DH33V†      |                | 26            | 31.53                                     | 36.27 | 0.1  | 37.30                                   | 10   |
| NZ8DH47V†      |                | 38            | 44.55                                     | 51.25 | 0.1  | 52.70                                   | 8  |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

\*Includes SZ prefix where applicable: SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

†Consult factory on availability.

4. Breakdown voltage is tested from pin 1 to 2 and pin 2 to 1.

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

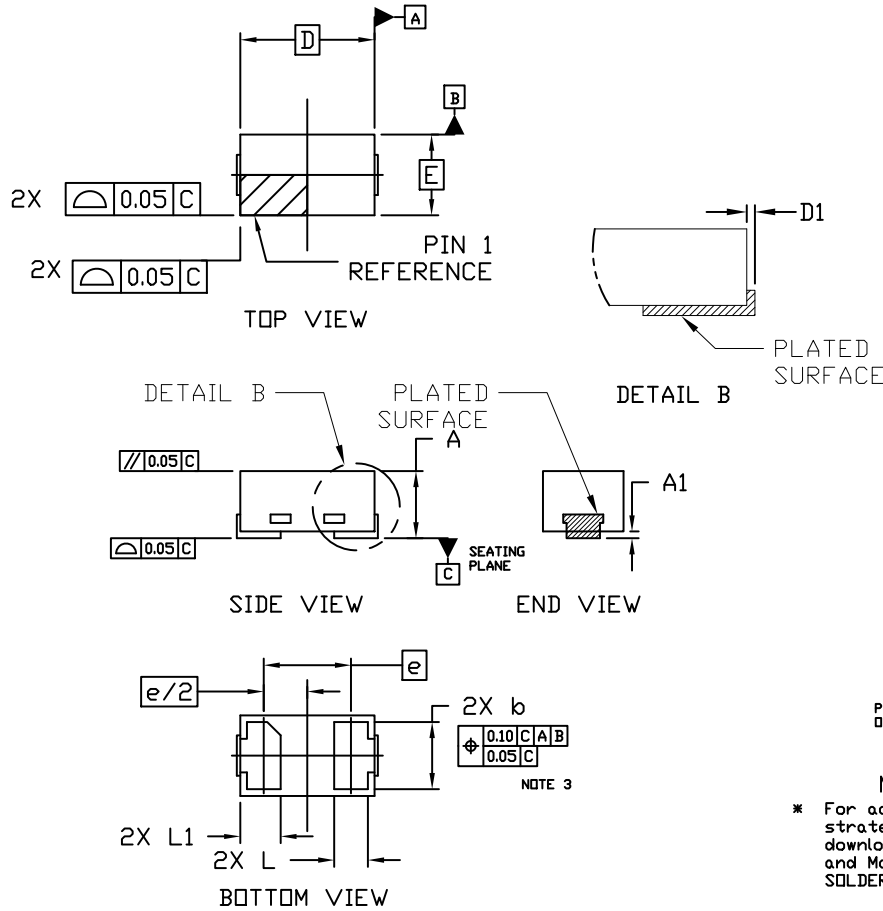
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SCALE 8:1

**XDFNW2 1.0x0.6, 0.65P**  
CASE 521AE  
ISSUE A

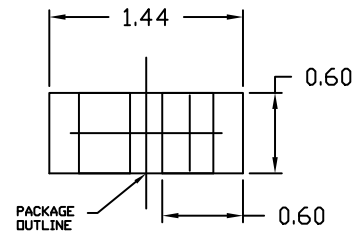
DATE 24 AUG 2021



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO THE PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 FROM THE TERMINAL TIP.

| DIM | MILLIMETERS |       |      |
|-----|-------------|-------|------|
|     | MIN.        | NDM.  | MAX. |
| A   | 0.45        | 0.50  | 0.55 |
| A1  | ---         | ---   | 0.05 |
| b   | 0.45        | 0.50  | 0.55 |
| D   | 0.90        | 1.00  | 1.10 |
| D1  | ---         | ---   | 0.05 |
| E   | 0.50        | 0.60  | 0.70 |
| e   | 0.65 BSC    |       |      |
| L   | 0.22 REF    |       |      |
| L1  | 0.24        | 0.285 | 0.34 |



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

**GENERIC MARKING DIAGRAM\***



XX = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G", may or not be present. Some products may not follow the Generic Marking.

|                         |                              |  |
|-------------------------|------------------------------|--|
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| <b>DESCRIPTION:</b>     | <b>XDFNW2 1.0X0.6, 0.65P</b> | <b>PAGE 1 OF 1</b>   |

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