

# ESD Protection Diode Array

## Low Capacitance ESD Protection Diode for High Speed Data Line

### ESD1014

The ESD1014 surge protection is designed to protect high speed data lines from ESD, EFT, and lightning.

#### Features

- Low Capacitance (6 pF Maximum Between I/O Lines and GND)
- ESD Rating of Class 3B (Exceeding 8 kV) per Human Body model and Class C (Exceeding 400 V) per Machine Model
- Protection for the Following IEC Standards:  
IEC 61000-4-2 (ESD) Level 4 – 30 kV (Contact)
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device

#### Typical Applications

- High Speed Communication Line Protection
- USB 1.1 and 2.0 Power and Data Line Protection
- Digital Video Interface (DVI)
- Monitors and Flat Panel Displays
- T1/E1 and T3/E3
- 10/100/1000 Ethernet Protection
- Gigabit Ethernet Protection

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

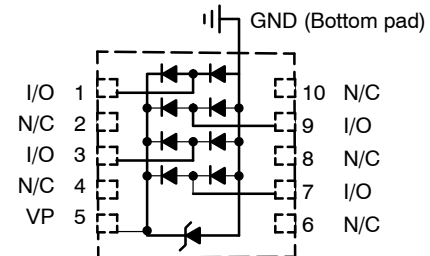
| Rating                                                                      | Symbol    | Value           | Unit             |
|-----------------------------------------------------------------------------|-----------|-----------------|------------------|
| Peak Power Dissipation (Note 1)                                             | $P_{pk}$  | 450             | W                |
| Maximum Peak Pulse Current (Note 1)                                         | $I_{pp}$  | 30              | A                |
| Operating Junction Temperature Range                                        | $T_J$     | -40 to +125     | $^\circ\text{C}$ |
| Storage Temperature Range                                                   | $T_{stg}$ | -55 to +150     | $^\circ\text{C}$ |
| Lead Solder Temperature – Maximum (10 Seconds)                              | $T_L$     | 260             | $^\circ\text{C}$ |
| Machine Model (MM)<br>Human Body Model (HBM)<br>IEC 61000-4-2 Contact (ESD) | ESD       | 0.4<br>16<br>30 | kV               |

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. 8/20  $\mu\text{s}$  Waveform per Figure 2 (@  $T_A = 25^\circ\text{C}$ ).

## LOW CAPACITANCE DIODE SURGE PROTECTION ARRAY

#### PIN CONFIGURATION AND SCHEMATIC



UDFN10  
CASE 517AN

#### MARKING DIAGRAM



- 1014 = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
■ = Pb-Free Package

#### ORDERING INFORMATION

| Device         | Package             | Shipping†          |
|----------------|---------------------|--------------------|
| ESD1014MUTAG   | UDFN10<br>(Pb-Free) | 3000 / Tape & Reel |
| SZESD1014MUTAG | UDFN10<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 Specification Brochure, BRD8011/D.

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

| Parameter                  | Symbol    | Conditions                                                                                      | Min | Typ | Max              | Unit          |
|----------------------------|-----------|-------------------------------------------------------------------------------------------------|-----|-----|------------------|---------------|
| Reverse Working Voltage    | $V_{RWM}$ | (Note 2)                                                                                        |     |     | 3.3              | V             |
| Breakdown Voltage          | $V_{BR}$  | $I_T = 1\text{ mA}$ , (Note 3)                                                                  | 5.0 | 5.3 |                  | V             |
| Reverse Leakage Current    | $I_R$     | $V_{RWM} = 3.3\text{ V}$                                                                        |     |     | 5.0              | $\mu\text{A}$ |
| Clamping Voltage           | $V_C$     | Pin 5 to GND, $I_{PP} = 1\text{ A}$                                                             |     |     | 6.2              | V             |
| Clamping Voltage           | $V_C$     | Any I/O pin to GND<br>$I_{PP} = 1\text{ A}$<br>$I_{PP} = 10\text{ A}$<br>$I_{PP} = 25\text{ A}$ |     |     | 7.5<br>9.0<br>11 | V             |
| Maximum Peak Pulse Current | $I_{PP}$  | 8/20 $\mu\text{s}$ Waveform per Figure 2                                                        |     |     | 30               | A             |
| Junction Capacitance       | $C_J$     | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ between I/O Pins and GND                                |     | 3.8 | 5.0              | pF            |
|                            |           | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ between I/O Pins                                        |     | 1.5 | 3.0              |               |

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.

- Surge protection devices are normally selected according to the working peak reverse voltage ( $V_{RWM}$ ), which should be equal or greater than the DC or continuous peak operating voltage level.
- $V_{BR}$  is measured at pulse test current  $I_T$ .

## TYPICAL PERFORMANCE CURVES

( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)

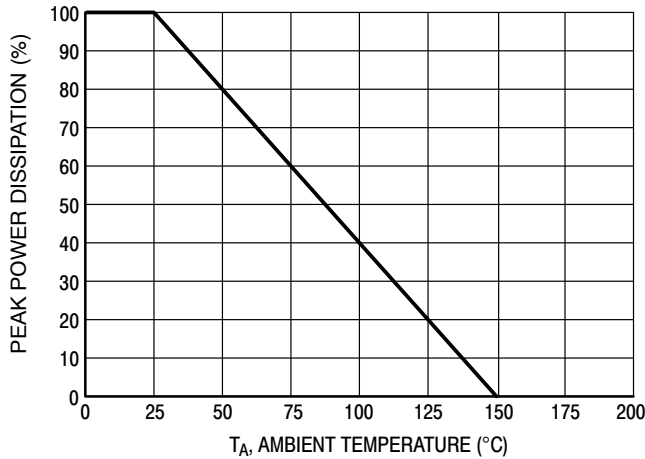


Figure 1. Pulse Derating Curve

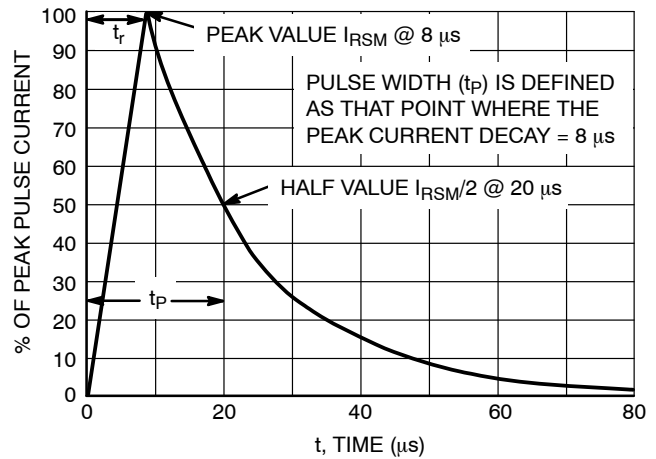


Figure 2. 8/20  $\mu\text{s}$  Pulse Waveform

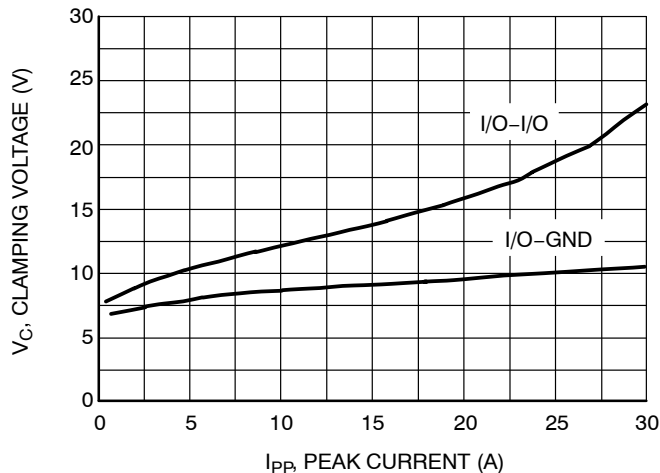


Figure 3. Clamping Voltage, 8/20  $\mu\text{s}$  Waveform



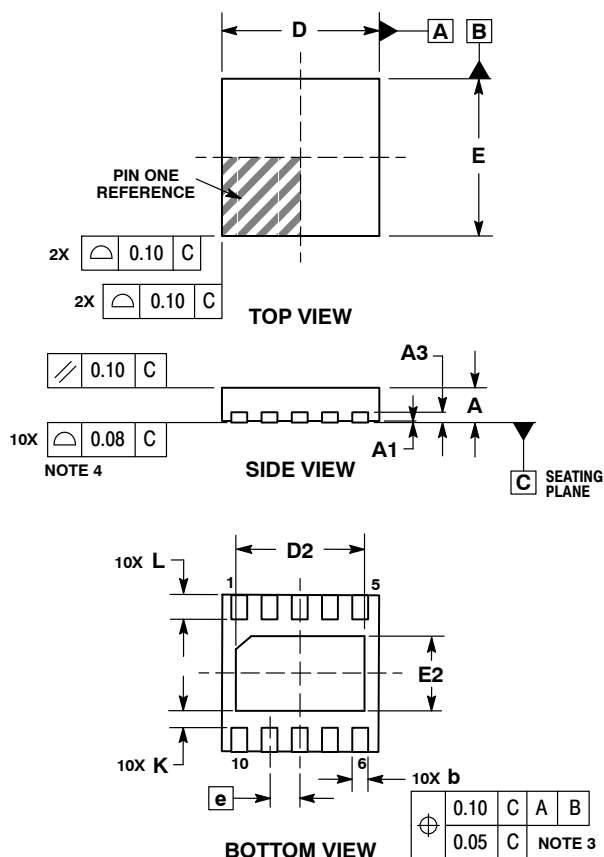
SCALE 2:1

### UDFN10 2.6x2.6, 0.5P

#### CASE 517AN

#### ISSUE B

DATE 03 OCT 2012

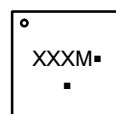


#### NOTES:

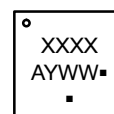
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.45        | 0.55 |
| A1  | 0.00        | 0.05 |
| A3  | 0.127 REF   |      |
| b   | 0.20        | 0.30 |
| D   | 2.60 BSC    |      |
| D2  | 2.00        | 2.25 |
| E   | 2.60 BSC    |      |
| E2  | 1.11        | 1.36 |
| e   | 0.50 BSC    |      |
| K   | 0.20        | ---  |
| L   | 0.30        | 0.40 |

#### GENERIC MARKING DIAGRAMS\*



IC



Discrete

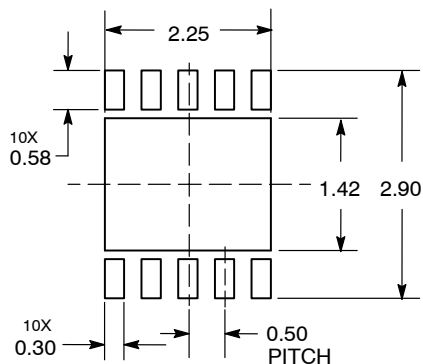
XXX = Specific Device Code  
M = Month Code  
▪ = Pb-Free Package

XXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(\*Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking.  
Pb-Free indicator, "G" or microdot "▪", may or may not be present.

#### SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*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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| DESCRIPTION:     | UDFN10 2.6X2.6, 0.5P | PAGE 1 OF 1                                                                                                                                                                         |

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