# ESDR0524P

# ESD Protection Diode

## Low Capacitance ESD Protection for High Speed Data

The ESDR0524P surge protection is designed to protect high speed data lines from ESD. Ultra−low capacitance and low ESD clamping voltage make this device an ideal solution for protecting voltage sensitive high speed data lines. The flow−through style package allows for easy PCB layout and matched trace lengths necessary to maintain consistent impedance between high speed differential lines such as HDMI.

### Features

- Low Capacitance (0.3 pF Typical, I/O to I/O)
- 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 (±8 kV Contact)
- UL Flammability Rating of 94 V−0
- This is a Pb−Free Device

### Typical Applications

- HDMI
- DVI
- Display Port
- MDDI
- eSATA

**MAXIMUM RATINGS** ($T_J$ = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Operating Junction Temperature Range | $T_J$ | −55 to +125 | °C |
| Storage Temperature Range | $T_{stg}$ | −55 to +150 | °C |
| Lead Solder Temperature − Maximum (10 Seconds) | $T_L$ | 260 | °C |
| IEC 61000−4−2 Contact (ESD)<br>IEC 61000−4−2 Air (ESD) | ESD<br>ESD | ±12<br>±15 | kV<br>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.

See Application Note AND8308/D for further description of survivability specs.

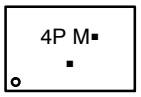
**ON Semiconductor®**

www.onsemi.com

**MARKING DIAGRAM**

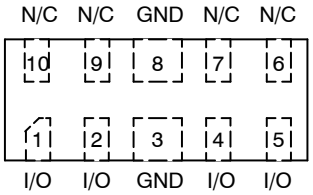


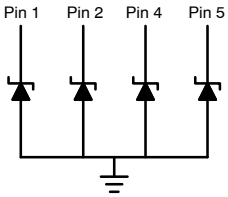
**UDFN10**
**CASE 517BB**



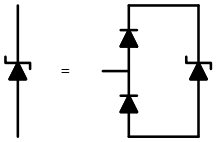

4P = Specific Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)
*Date Code orientation and/or position may vary depending upon manufacturing location.

**PIN CONFIGURATION AND SCHEMATIC**




Pins 3, 8




**ORDERING INFORMATION**

| Device | Package | Shipping |
|---|---|---|
| ESDR0524PMUTAG | UDFN10 (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.

© Semiconductor Components Industries, LLC, 2013

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse Working Voltage | $V_{RWM}$ | I/O Pin to GND (Note 1) | | | 5.0 | V |
| Breakdown Voltage | $V_{BR}$ | $I_T$ = 1 mA, I/O Pin to GND | 5.5 | | | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 5 V, I/O Pin to GND | | | 1.0 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1 A, I/O Pin to GND (8 x 20 μs pulse) | | | 15 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0 V, f = 1 MHz between I/O Pins | | 0.3 | 0.4 | pF |
| Junction Capacitance | $C_J$ | $V_R$ = 0 V, f = 1 MHz between I/O Pins and GND | | 0.5 | 0.8 | pF |

1. 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.

## TYPICAL CHARACTERISTICS

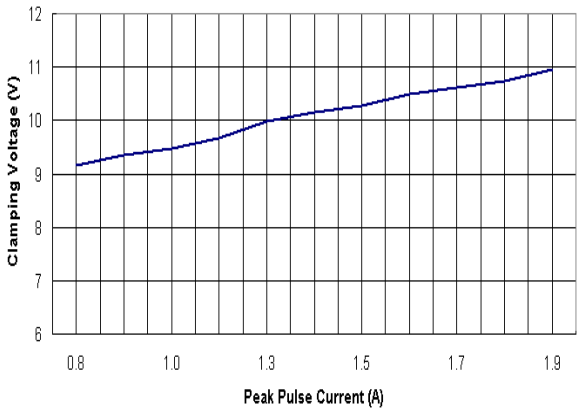



**Figure 1. Clamping Voltage vs. Peak Pulse Current**

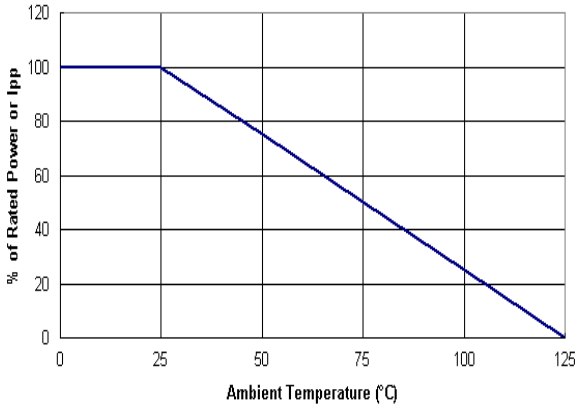



**Figure 2. Power Derating Curve**

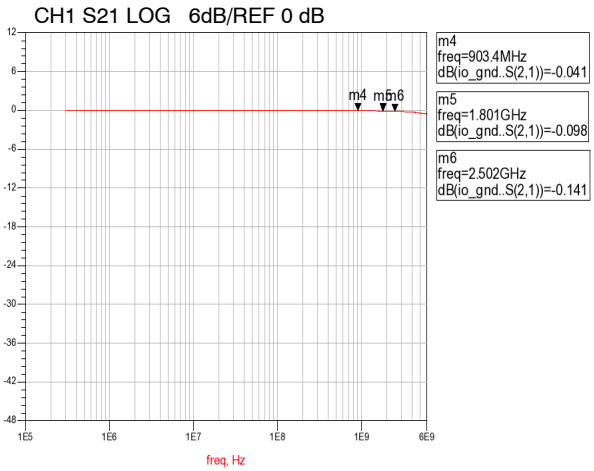



**Figure 3. Insertion Loss S21 – I/O to GND**

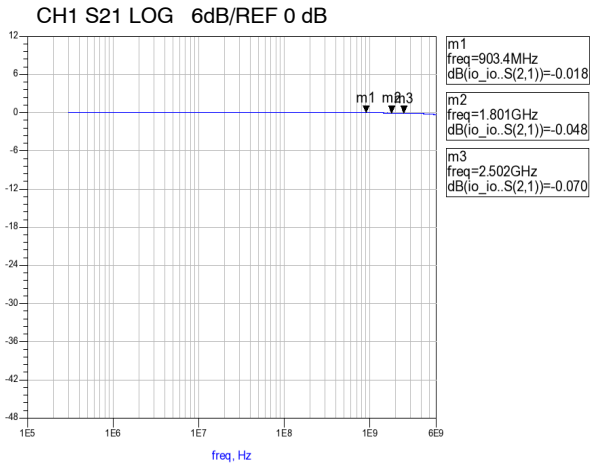



**Figure 4. Insertion Loss S21 – I/O to I/O**

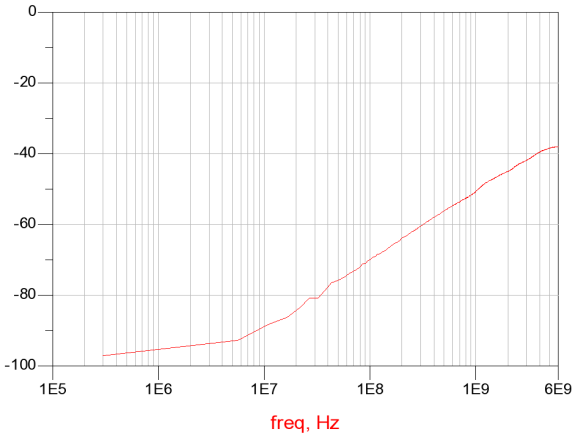



**Figure 5. Analog Crosstalk – I/O to I/O**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

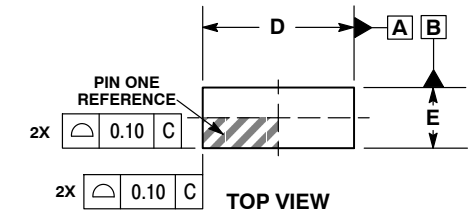
ON Semiconductor®

**UDFN10 2.5x1, 0.5P**
CASE 517BB−01
ISSUE O

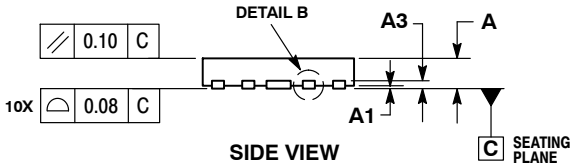
DATE 17 NOV 2009



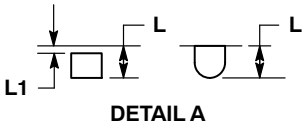
**SCALE 4:1**



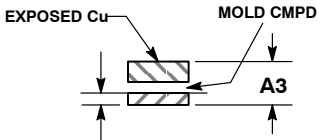

**TOP VIEW**



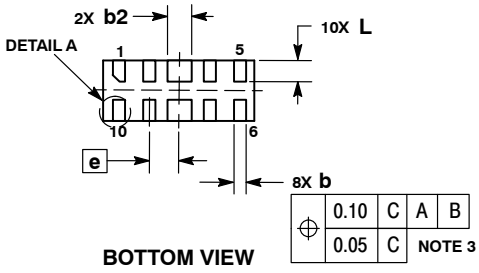

**SIDE VIEW**




**DETAIL A**
**OPTIONAL CONSTRUCTIONS**




**DETAIL B**
**OPTIONAL CONSTRUCTION**

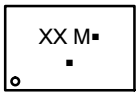



**BOTTOM VIEW**

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.

| | MILLIMETERS | |
|---|---|---|
| DIM | MIN | MAX |
| A | 0.45 | 0.55 |
| A1 | 0.00 | 0.05 |
| A3 | 0.13 REF | |
| b | 0.15 | 0.25 |
| b2 | 0.35 | 0.45 |
| D | 2.50 BSC | |
| E | 1.00 BSC | |
| e | 0.50 BSC | |
| L | 0.30 | 0.40 |
| L1 | --- | 0.05 |

### GENERIC MARKING DIAGRAM*

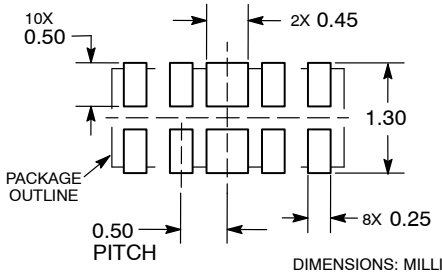



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(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.

### RECOMMENDED 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.

| | | |
|---|---|---|
| **DOCUMENT NUMBER:** | **98AON47059E** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
| **DESCRIPTION:** | **UDFN10 2.5X1, 0.5P** | **PAGE 1 OF 1** |

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

© Semiconductor Components Industries, LLC, 2019

**onsemi**, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales