

# ESD Protection Diode

## Low Capacitance ESD Protection for High Speed Data

### ESDR0524P

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 ( $\pm 8$  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 ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Operating Junction Temperature Range	$T_J$	-55 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	$^\circ\text{C}$
IEC 61000-4-2 Contact (ESD)	ESD	$\pm 12$	kV
IEC 61000-4-2 Air (ESD)	ESD	$\pm 15$	kV

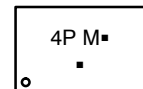
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

#### MARKING DIAGRAM



UDFN10  
CASE 517BB

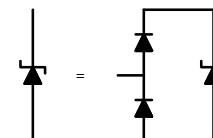
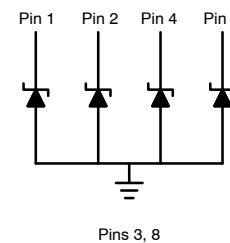
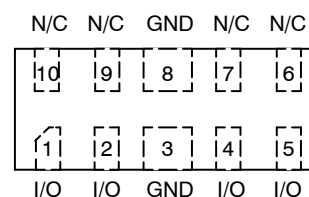


- 4P = Specific Device Code
- M = Date Code\*
- = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

#### PIN CONFIGURATION AND SCHEMATIC



#### 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.

## ESDR0524P

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ 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	$V_{BR}$	$I_T = 1\text{ mA}$ , I/O Pin to GND	5.5			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 5\text{ V}$ , I/O Pin to GND			1.0	$\mu\text{A}$
Clamping Voltage	$V_C$	$I_{PP} = 1\text{ A}$ , I/O Pin to GND (8 x 20 $\mu\text{s}$ pulse)			15	V
Junction Capacitance	$C_J$	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ between I/O Pins		0.3	0.4	pF
Junction Capacitance	$C_J$	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ 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.

# ESDR0524P

## TYPICAL CHARACTERISTICS

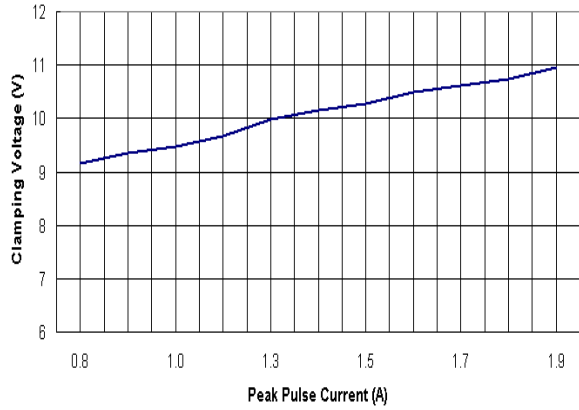


Figure 1. Clamping Voltage vs. Peak Pulse Current

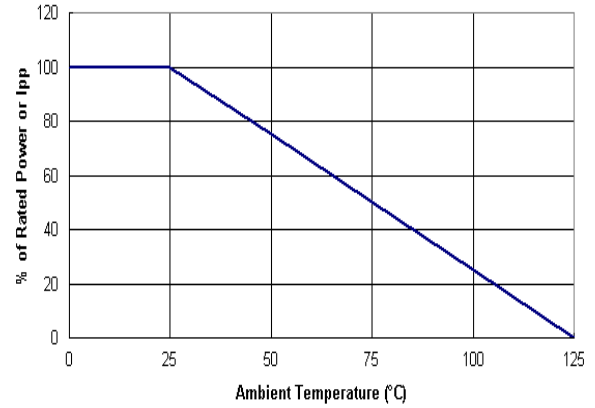


Figure 2. Power Derating Curve

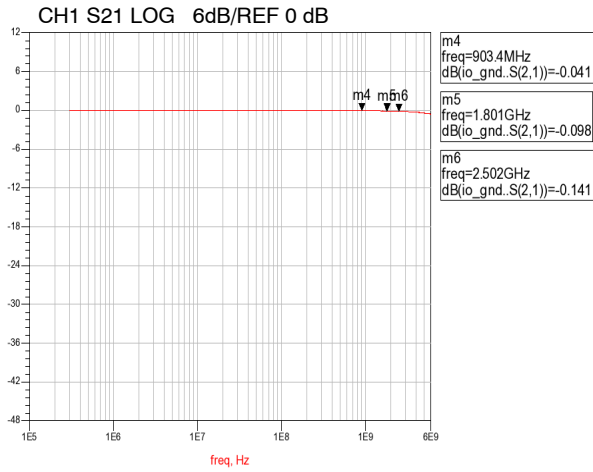


Figure 3. Insertion Loss S21 - I/O to GND

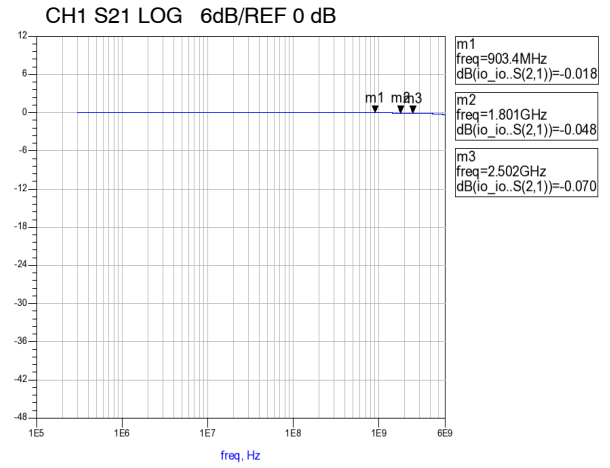


Figure 4. Insertion Loss S21 - I/O to I/O

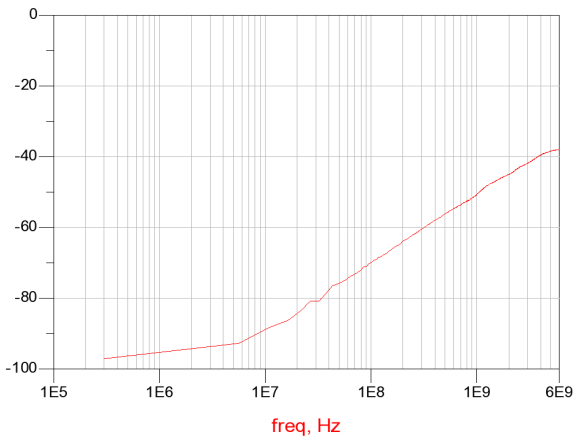


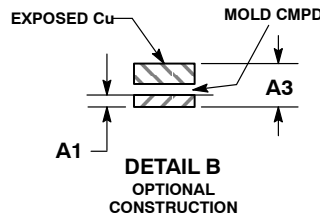
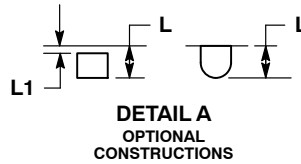
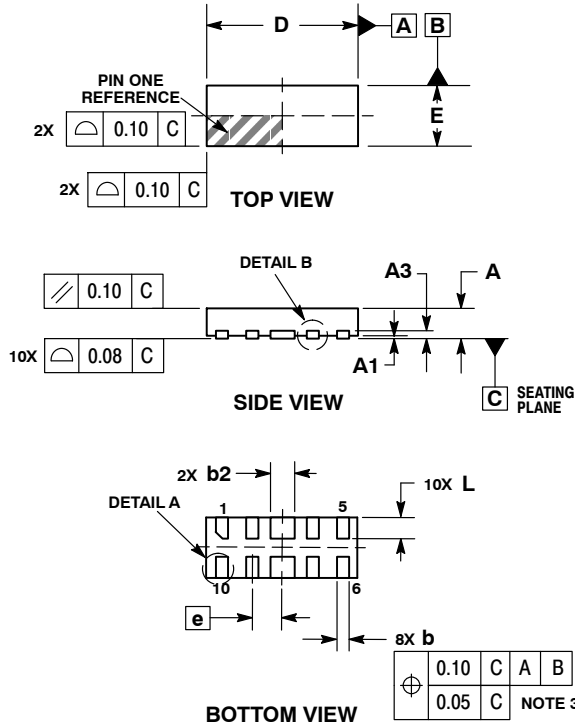
Figure 5. Analog Crosstalk - I/O to I/O



UDFN10 2.5x1, 0.5P  
CASE 517BB  
ISSUE O

DATE 17 NOV 2009

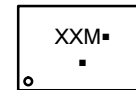
SCALE 4:1



- 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.

DIM	MILLIMETERS	
	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\*

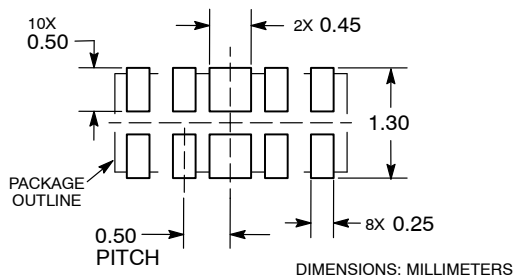


- XX = Specific Device Code
- M = Date Code
- = Pb-Free Package

(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. Some products may not follow the Generic Marking.

RECOMMENDED  
SOLDERING FOOTPRINT\*



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

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DESCRIPTION:	UDFN10 2.5X1, 0.5P	PAGE 1 OF 1

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