

Features

- RoHS compliant*
- Low capacitance - 0.04 pF (I/O to I/O)
- ESD protection to IEC 61000-4-2 (Level 4)

Applications

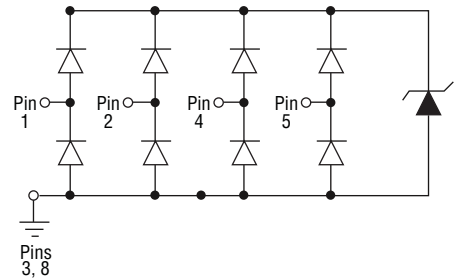
- HDMI 1.3, 1.4 and 2.0
- DisplayPort
- Digital Visual Interface (DVI)
- SATA and eSATA
- USB 3.0
- Memory protection
- SIM card ports

CDDFN10-3324P - Surface Mount TVS Diode Array

General Information

The Model CDDFN10-3324P device provides ESD, CDE and EFT protection for high-speed data ports, meeting IEC 61000-4-2 (ESD) requirements. The Transient Voltage Suppressor array, protecting up to four data lines, offers a Working Peak Reverse Voltage of 3.3 V and a Minimum Breakdown Voltage of 4.5 V.

The DFN10 packaged device has an ultra-low typical capacitance of only 0.04 pF between I/O lines. This allows it to be used for protecting sensitive components used on high-speed interfaces. The small footprint of the device allows for flow-through routing on the PCB, helping to maintain matched impedances of the high-speed data lines.



Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	CDDFN10-3324P	Unit
Peak Pulse Power ($t_p = 8/20 \mu\text{s}$)	P_{pp}	30	W
Peak Pulse Current ($t_p = 8/20 \mu\text{s}$)	I_{pp}	4	A
Operating Temperature	T_J	-55 to +85	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Working Peak Reverse Voltage	V_{WM}			3.3	V
Breakdown Voltage @ 1 mA	V_{BR}	4.5			V
Leakage Current @ V_{WM}	I_R		0.1	0.5	μA
Capacitance @ 1.65 V, $f = 1 \text{ MHz}$ (I/O to GND)	C_{IN}		0.45	0.65	pF
Capacitance @ 1.65 V, $f = 1 \text{ MHz}$ (I/O to I/O)	C_{CROSS}		0.04	0.08	pF
Clamping Voltage @ $8/20 \mu\text{s}$ @ I_{pp}	V_C			7.5	V
ESD Protection per IEC 6-1000-4-2					
Contact Discharge				12	kV
Air Discharge				15	kV

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

Specifications are subject to change without notice.

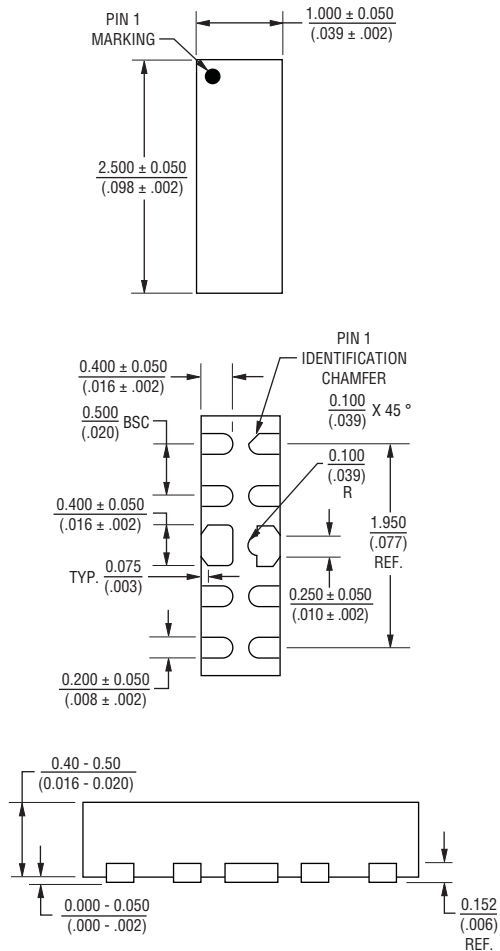
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CDDFN10-3324P - Surface Mount TVS Diode Array



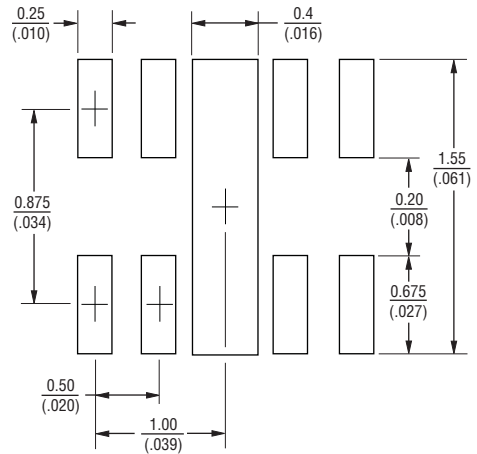
Product Dimensions

This is a molded DFN10 package with lead free 100 % Matte Sn on the lead frame. It weighs approximately 7 mg and has a flammability rating of UL 94V-0.



DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Recommended Footprint



Typical Part Marking

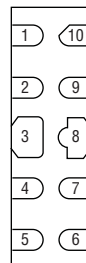
CDDFN10-3324P324

How to Order

CD DFN10 - 33 24 P

Common Code _____
 Chip Diode _____
 Package _____
 DFN10 = DFN-10 Package
 Working Peak Reverse Voltage _____
 33 = 3.3 V_{RWM} (Volts)
 Number of Lines _____
 24 = 2 Ground / 4 Data Lines
 Suffix _____
 P = Ultra-low Capacitance

Device Pinout



TOP VIEW

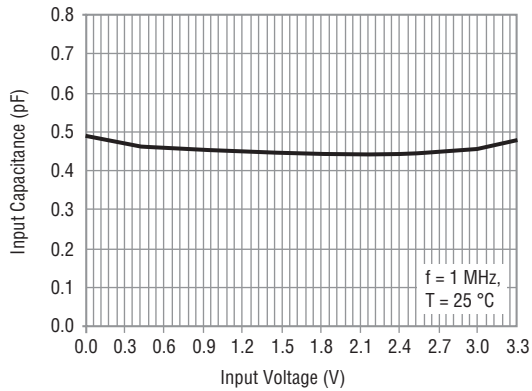
Pin	Function
1,2,4,5	Input Lines
6,7,9,10	Output Lines (No Internal Connection)
3,8	GND

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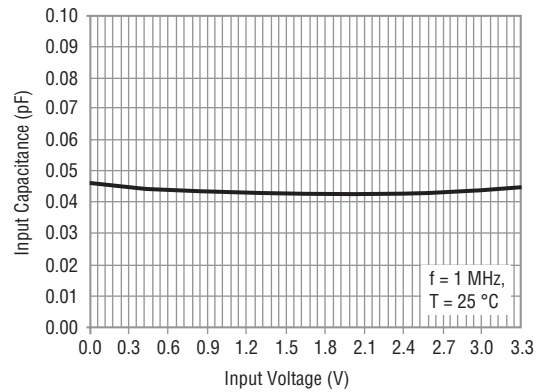
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Rating & Characteristic Curves

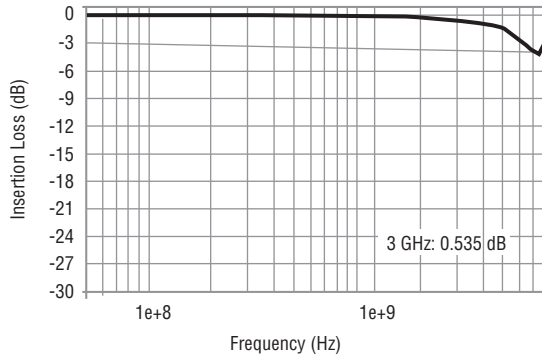
Typical Voltage vs. Capacitance C_{IN}



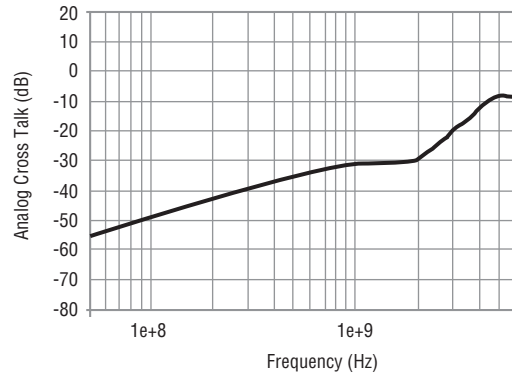
Typical Voltage vs. Capacitance C_{CROSS}



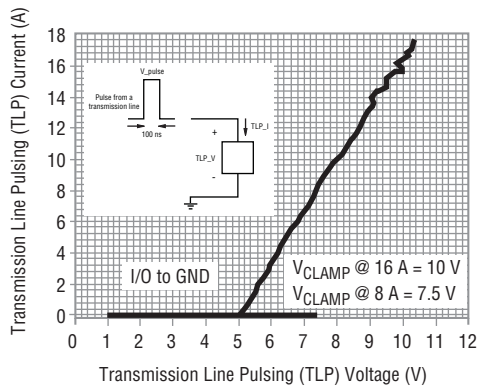
Typical Insertion Loss S21



Typical Analog Cross Talk



Typical Transmission Line Pulsing (TLP)



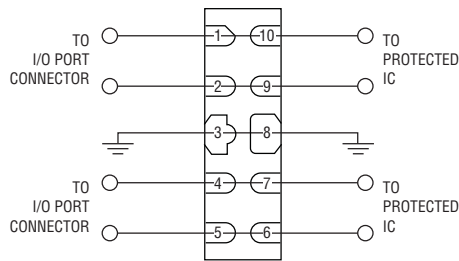
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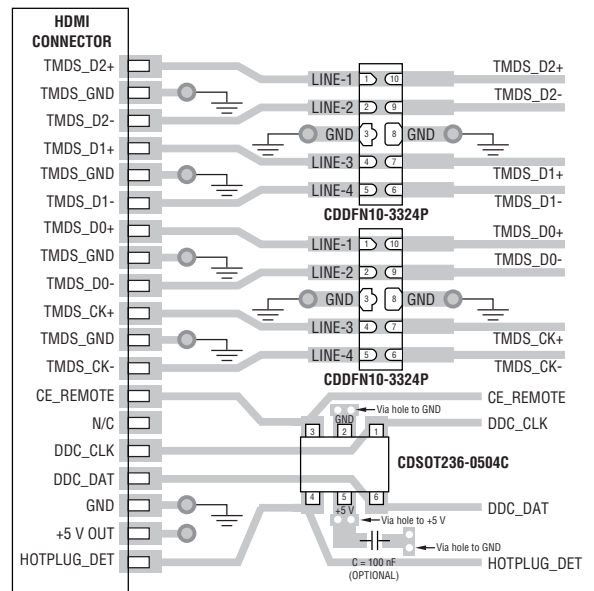


Reference Application

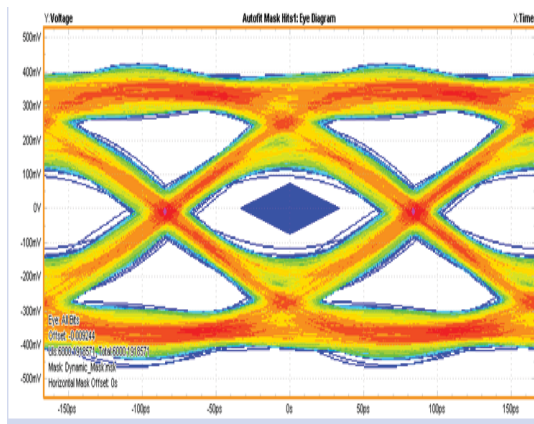
The Bourns® Model CDDFN10-3324P is designed to protect high-speed data ports from ESD transients. For high-speed ports above 5 Gbps such as HDMI 2.0 and USB 3.0, maintaining signal line impedance is a critical requirement. The use of a DFN10 package using a “feed-through” layout provides minimal impedance change on the high-speed data line, while the ultra-low capacitance performance of the device limits signal degradation on each channel.



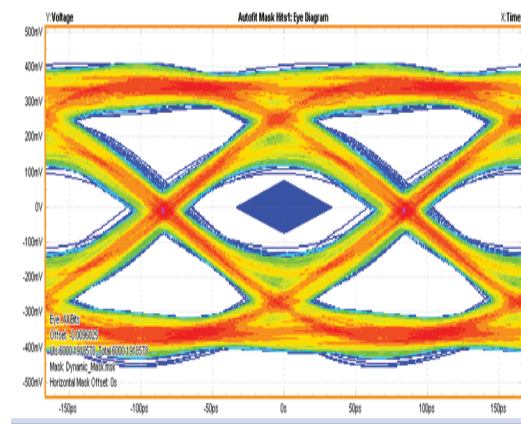
Model CDDFN10-3324P Layout on HDMI Port



Feed-Through Layout - Model CDDFN10-3324P in HDMI Application



HDMI 2.0 Eye Diagram Test Without Model CDDFN10-3324P (PCB Only)



HDMI 2.0 Eye Diagram Test With Model CDDFN10-3324P

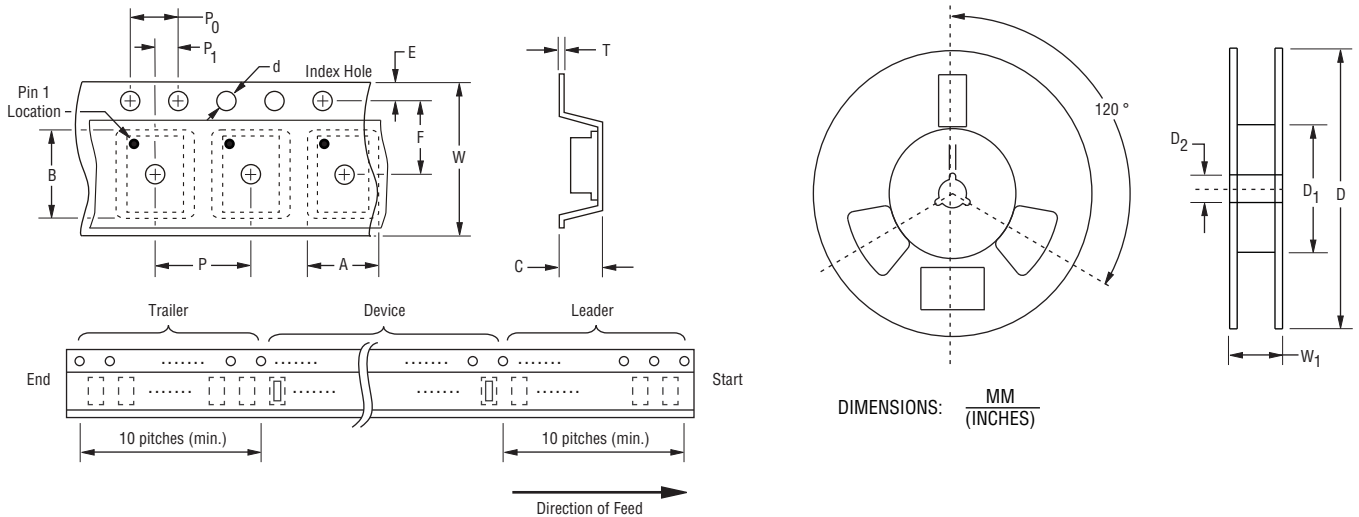
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Packaging Information

The product is packaged in an 8 mm x 4 mm tape and reel format per EIA-481-D standard.



Item	Symbol	DFN-10
Carrier Width	A	$\frac{1.70 \pm 0.08}{(0.067 \pm 0.003)}$
Carrier Length	B	$\frac{2.30 \pm 0.08}{(0.091 \pm 0.003)}$
Carrier Depth	C	$\frac{0.75 \pm 0.05}{(0.030 \pm 0.002)}$
Sprocket Hole	d	$\frac{1.15 \pm 0.10}{(0.045 \pm 0.004)}$
Reel Outside Diameter	D	$\frac{178}{(7.008)}$
Reel Inner Diameter	D ₁	$\frac{54.40 \pm 0.40}{(2.142 \pm 0.016)}$
Feed Hole Diameter	D ₂	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
Punch Hole Position	F	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$
Punch Hole Pitch	P	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Sprocket Hole Pitch	P ₀	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Embossment Center	P ₁	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$
Overall Tape Thickness	T	$\frac{0.20 \pm 0.30}{(0.008 \pm 0.012)}$
Tape Width	W	$\frac{8.00 +0.30/-0.10}{(0.315 +0.012/- 0.004)}$
Reel Width	W ₁	$\frac{12.30 \pm 1.00}{(0.484 \pm 0.039)}$
Quantity per Reel	--	3000

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Customers should verify actual device performance in their specific applications

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