

Features

- Low capacitance - 0.3 pF
- ESD protection
- Vcc + six I/O data lines
- RoHS compliant*

Applications

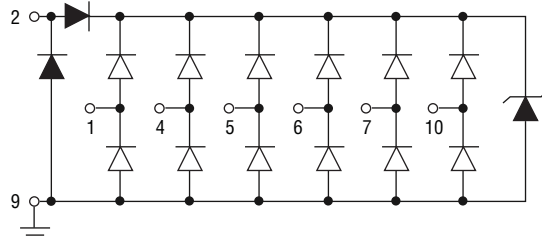
- USB 3.0
- HDMI 1.4
- High speed port protection
- Portable electronics

CDDFN10-0506N - TVS/Steering Diode Array

General Information

The Bourns® Model CDDFN10-0506N device provides ESD and EFT protection for high speed data ports meeting IEC 61000-4-2 (ESD) and IEC 61000-4-4 (EFT) requirements. The Transient Voltage Suppressor array, protecting up to six data lines, offers a Working Peak Voltage of 5.0 V.

The DFN-10 package is easy to handle with standard pick and place equipment and their flat configuration minimizes roll away.



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

Parameter	Symbol	Rating	Unit
Peak Pulse Current ($t_p = 8/20\ \mu\text{s}$)	I_{pp}	3.5	A
Peak Pulse Power ($t_p = 8/20\ \mu\text{s}$)	P_{pk}	40	W
Operating Supply Voltage ($V_{dd} - \text{Gnd}$)	V_{DC}	6	V
DC Voltage on any I/O Pad	V_{IO}	(Gnd -0.5) to ($V_{dd} + 0.5$)	V
Storage Temperature	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Temperature	T_{OPR}	-40 to +85	$^\circ\text{C}$
ESD Protection per IEC 61000-4-2			
Contact Discharge		± 8	kV
Air Discharge		± 15	kV
EFT Protection per IEC 61000-4-4 @ 5/50 ns		40	A

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
Working Peak Voltage ¹	V_{WM}			5.0	V
Breakdown Voltage @ 1 mA ¹	V_{BR}	6.0			V
Forward Voltage @ 15 mA ²	V_F		0.8	1.2	V
Leakage Current @ V_{WM} ¹	I_L			2.5	μA
Leakage Current @ V_{WM} ³	I_{IO}			1	μA
Channel Capacitance ³ @ 2.5 V, 1 MHz	C_{IO}		0.25	0.35	pF
Channel to Channel Capacitance ⁴ @ 2.5 V, 1 MHz	C_{CROSS}		0.05	0.07	pF
ESD Dynamic Turn-on Resistance ⁵	$R_{dynamic_I/O}$		0.35		Ω
ESD Dynamic Turn-on Resistance ⁶	$R_{dynamic_VDD}$		0.2		Ω

Note 1: Pin 2 to Pin 9

Note 2: Pin 9 to Pin 2.

Note 3: Pin 1, 4, 5, 6, 7 or 10 to Ground.

Note 4: Between I/O 1, 4, 5, 6, 7 or 10.

Note 5: Any I/O Pin to Ground.

Note 6: V_{DD} Pin to Ground.

*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.

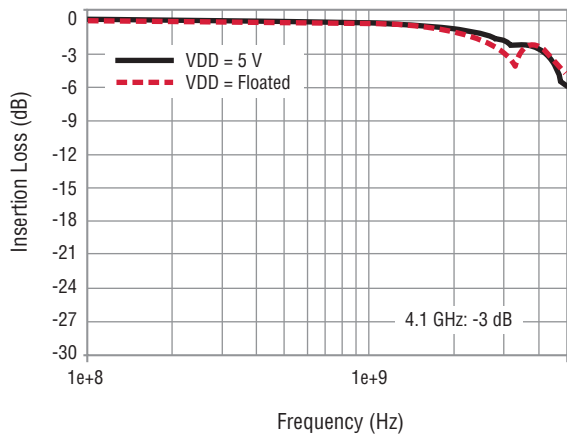
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

CDDFN10-0506N - TVS/Steering Diode Array

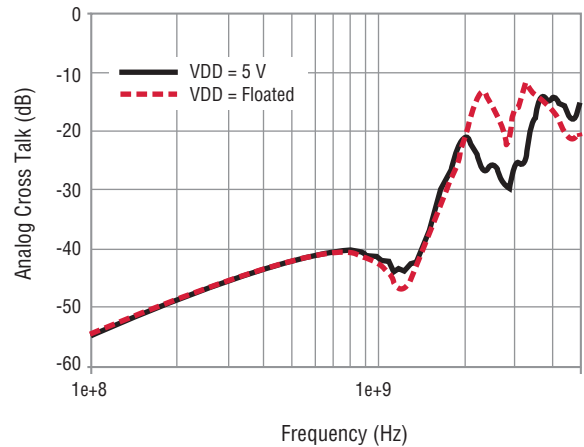
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Performance Curves

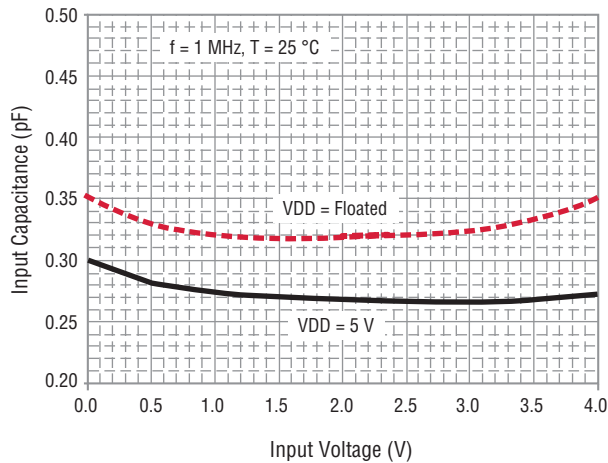
Insertion Loss S21



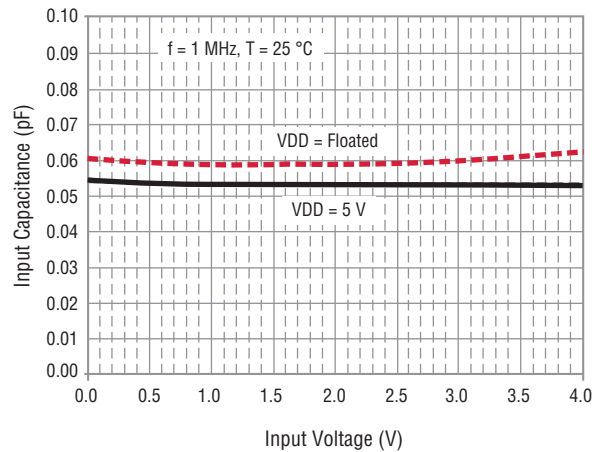
Crosstalk Between I/Os



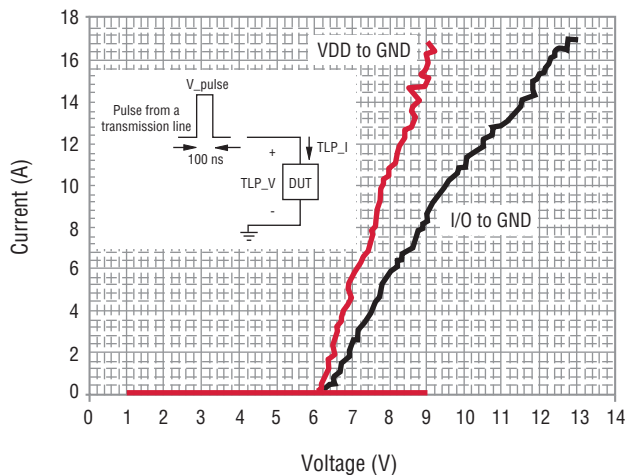
Channel Capacitance versus Voltage



Channel to Channel Capacitance versus Voltage



Typical V/I Characteristic



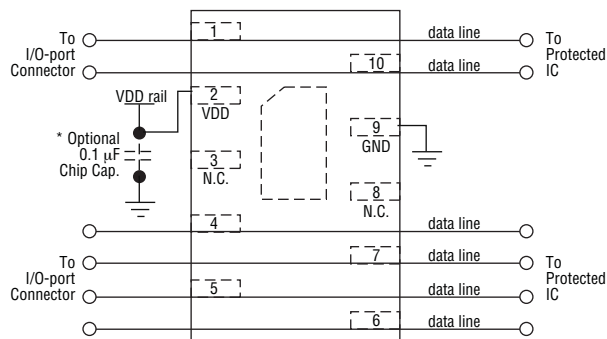
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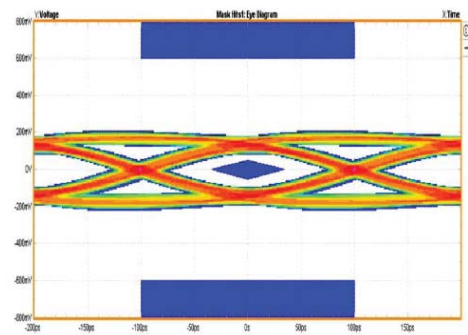
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Reference Application

Bourns® Model CDDFN10-0506N is designed to protect high speed data ports from ESD transients. For high speed ports above 5 Gb/s such as USB 3.0, differential signalling is used where the need to keep impedance constant is a critical requirement. The use of a DFN-10 package using a “feed through” layout provides a minimum impedance change on the high speed data line while the ultra-low capacitance performance of the device limits the signal loss degradation of each channel.



CDDFN10-0506N Layout on USB 3.0 Port



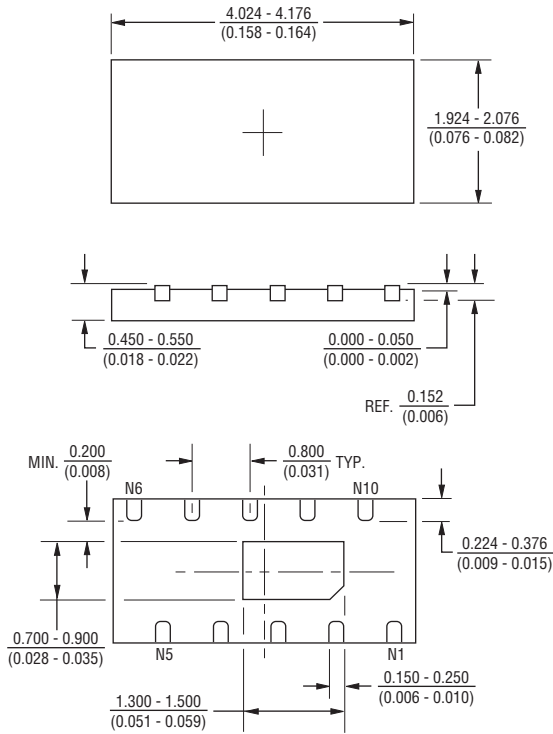
CDDFN10-0506N Using 5 GHz Eye Diagram

CDDFN10-0506N - TVS/Steering Diode Array



Product Dimensions

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

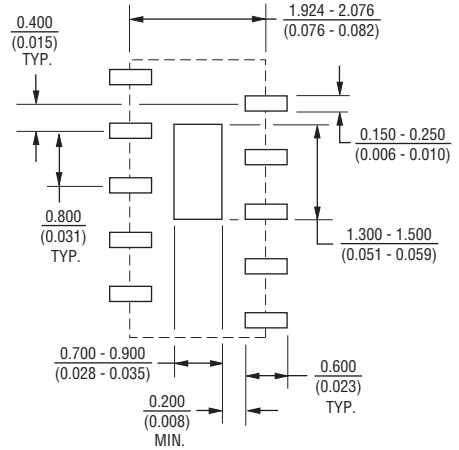


DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

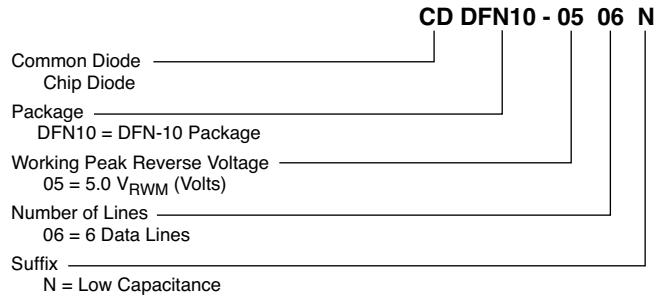
Typical Part Marking

CDDFN10-0506N506

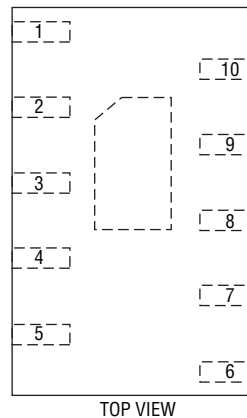
Recommended Footprint



How to Order



Pin Out



Pin	Function
1	I/O LINE
2	V _{CC} LINE
3	N.C.
4	I/O LINE
5	I/O LINE
6	I/O LINE
7	I/O LINE
8	N.C.
9	Ground
10	I/O LINE
Center Pad	Ground

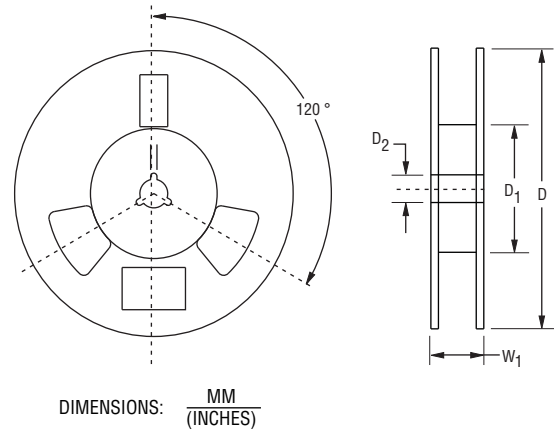
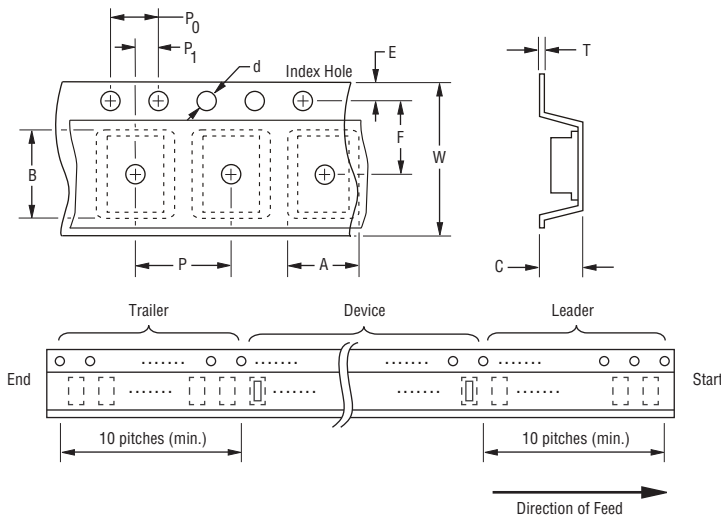
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Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Devices are packed in accordance with EIA standard RS-481-A.

Item	Symbol	DFN-10
Carrier Width	A	$\frac{2.21 \pm 0.05}{(0.087 \pm 0.002)}$
Carrier Length	B	$\frac{4.22 +0.05/-0.04}{(0.166 +0.002/-0.002)}$
Carrier Depth	C	$\frac{0.81 \pm 0.05}{(0.032 \pm 0.002)}$
Sprocket Hole	d	$\frac{1.50 +0.1/-0}{(0.059 +0.004/-0)}$
Reel Outside Diameter	D	$\frac{180 \pm 3}{(7.087 \pm .118)}$
Reel Inner Diameter	D ₁	$\frac{50.0}{(1.969)}$ MIN.
Feed Hole Diameter	D ₂	$\frac{13.0 +0.5/-0.2}{(0.512 +0.020/-0.008)}$
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
Punch Hole Position	F	$\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$
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	$\frac{0.6}{(0.024)}$ MAX.
Tape Width	W	$\frac{12.3}{(0.484)}$ MAX.
Reel Width	W ₁	$\frac{18.4}{(0.724)}$ MAX.
Quantity per Reel	--	3000

REV. 09/15

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