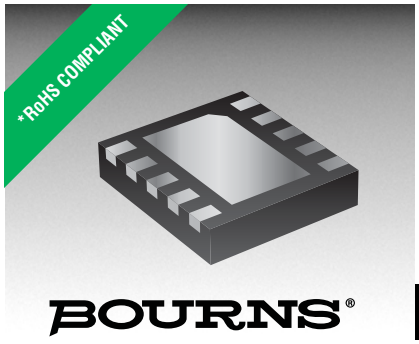


BOURNS®

Features

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

Applications

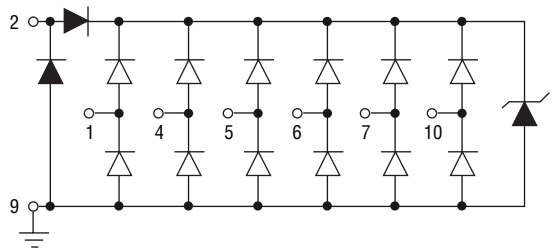
- USB 3.0
- HDMI 1.4
- High speed port protection
- Portable electronics

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 °C (Unless Otherwise Noted)

Parameter	Symbol	Rating	Unit
Peak Pulse Current (t_p = 8/20 µS)	I_{pp}	3.5	A
Peak Pulse Current (t_p = 8/20 µS)	P_{pk}	40	W
Operating Supply Votage (V_{dd} - 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	ºC
Operating Temperature	T_{OPR}	-40 to +85	ºC

Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

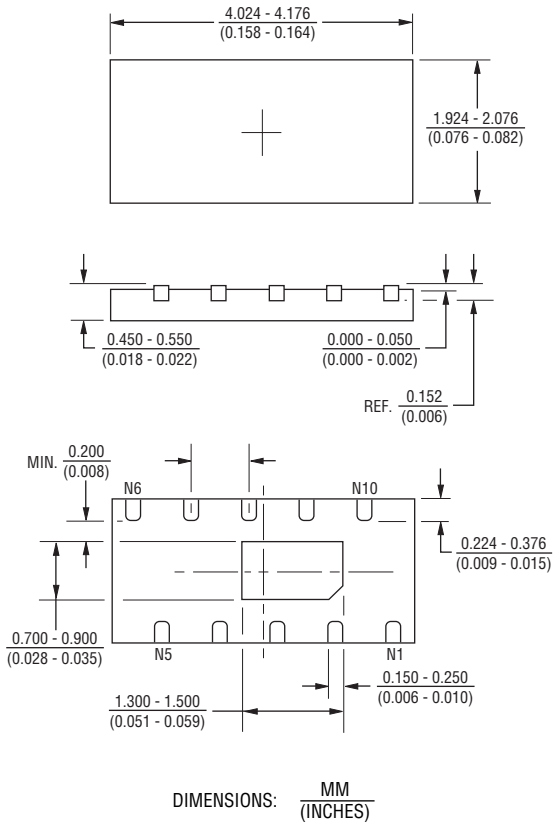
Parameter	Symbol	Min.	Typ.	Max.	Unit
Working Peak Voltage [1]	V_{WM}			5.0	V
Breakdown Voltage @ 1 mA [1]	V_{BR}	6.0			V
Forward Voltage @ 15 mA [2]	V_F		0.8	1.2	V
Leakage Current @ V_{WM} [1]	I_L			2.5	µA
Leakage Current @ V_{WM} [3]	I_{IO}			1	µA
Channel Capacitance [3] @ 2.5 V, 1 MHz	C_{IO}		0.25	0.35	pF
Channel to Channel Capacitance [4] @ 2.5 V, 1 MHz	C_{CROSS}		0.05	0.07	pF
ESD Protection per IEC 61000-4-2 Contact Discharge Air Discharge		 ±8 ±15			 kV kV
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
EFT Protection per IEC 61000-4-4 @ 5/50 ns		40			A

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.
Customers should verify actual device performance in their specific applications.

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.

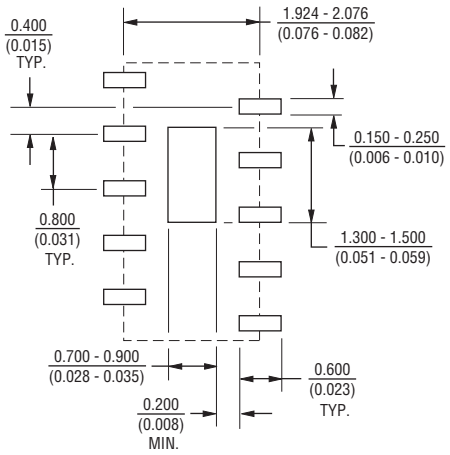


DIMENSIONS: MM / (INCHES)

Typical Part Marking

CDDFN10-0506N 506

Recommended Footprint

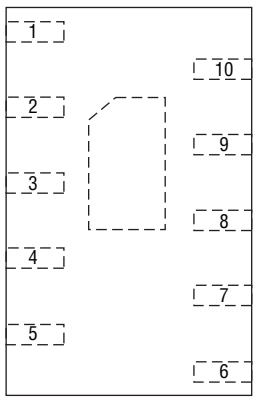


How to Order

CD DFN10 - 05 06 N

- Common Diode / Chip Diode
- Package: DFN10 = DFN-10 Package
- Working Peak Reverse Voltage: 05 = 5.0 V_{RWM} (Volts)
- Number of Lines: 06 = 6 Data Lines
- Suffix: N = Low Capacitance

Pin Out

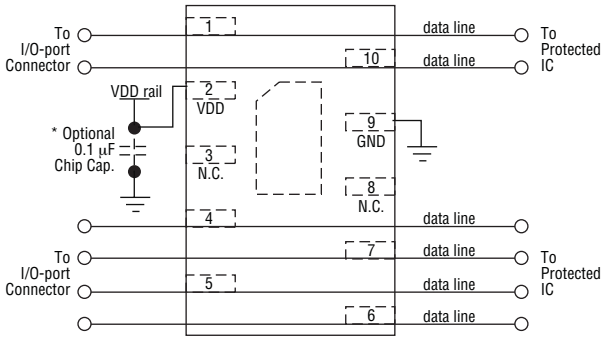


TOP VIEW

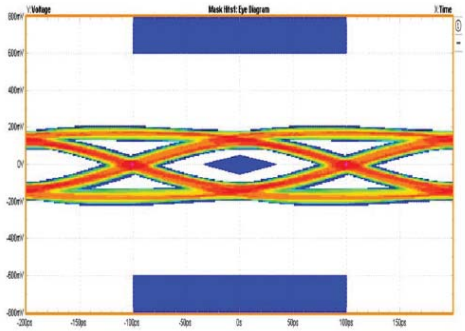
Pin	Function
1	I/O LINE
2	V_{CC} LINE
3	N.C.
4	I/O LINE
5	I/O LINE
6	I/O LINE
7	I/O LINE
8	N.C.
9	Ground
10	I/O LINE

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.



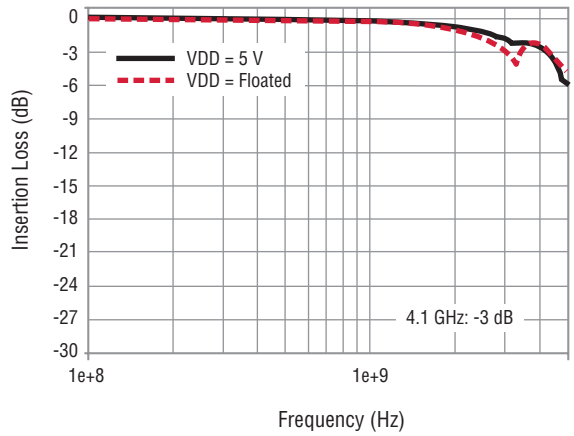
CDDFN10-0506N Layout on USB 3.0 Port



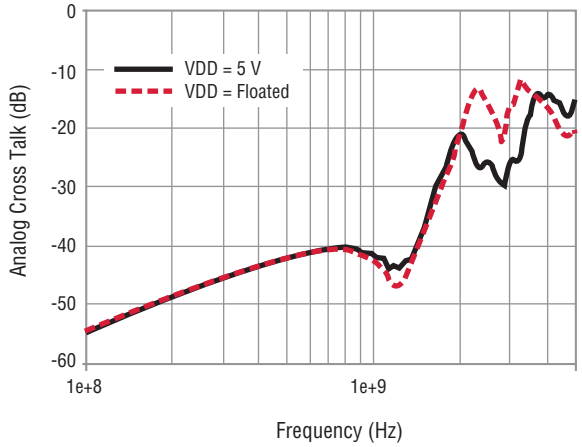
CDDFN10-0506N Using 5 GHz Eye Diagram

Performance Curves

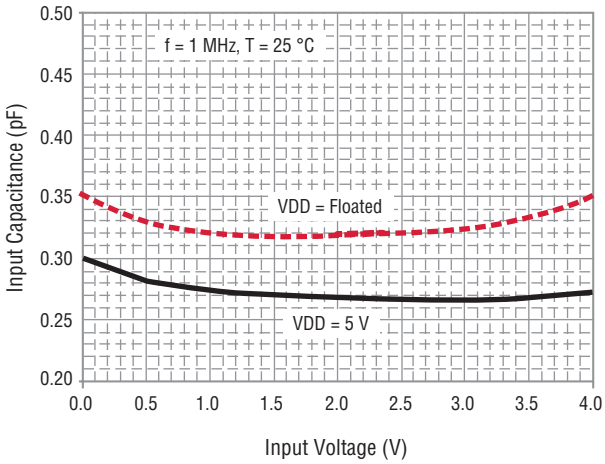
Insertion Loss S21



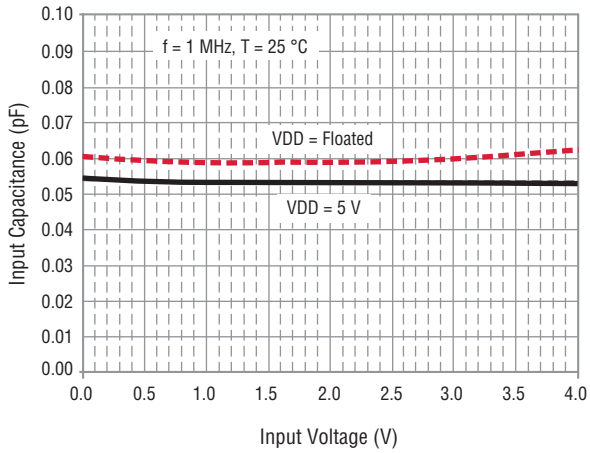
Crosstalk Between I/Os



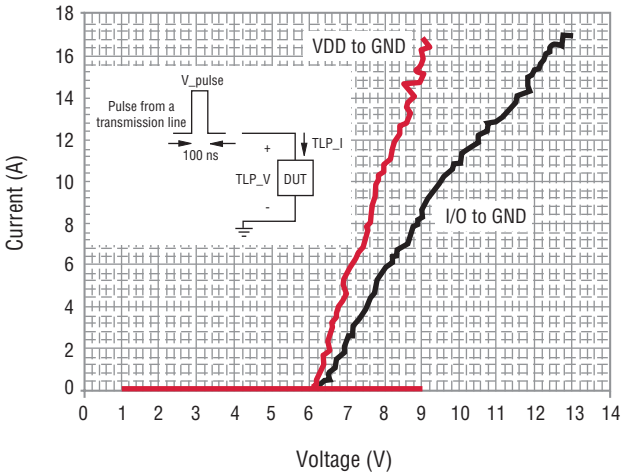
Channel Capacitance versus Voltage



Channel to Channel Capacitance versus Voltage

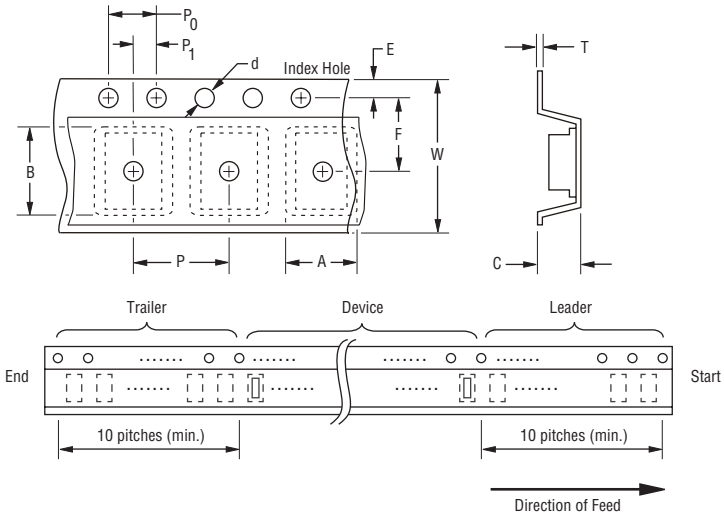


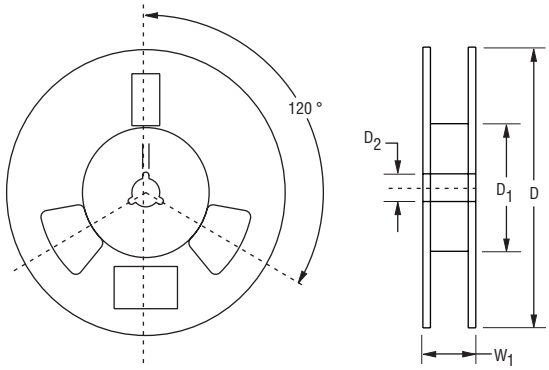
Typical V/I Characteristic



Packaging Information

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





DIMENSIONS: MM / (INCHES)

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

Item	Symbol	DFN-10
Carrier Width	A	2.90 ± 0.10 (0.114 ± 0.004)
Carrier Length	B	2.90 ± 0.10 (0.114 ± 0.004)
Carrier Depth	C	0.90 ± 0.10 (0.035 ± 0.004)
Sprocket Hole	d	1.55 ± 0.05 (0.061 ± 0.002)
Reel Outside Diameter	D	178 (7.008)
Reel Inner Diameter	D_1	50.0 (1.969) MIN.
Feed Hole Diameter	D_2	13.0 ± 0.20 (0.512 ± 0.008)
Sprocket Hole Position	E	1.75 ± 0.10 (0.069 ± 0.004)
Punch Hole Position	F	3.50 ± 0.05 (0.138 ± 0.002)
Punch Hole Pitch	P	4.00 ± 0.10 (0.157 ± 0.004)
Sprocket Hole Pitch	P_0	4.00 ± 0.10 (0.157 ± 0.004)
Embossment Center	P_1	2.00 ± 0.05 (0.079 ± 0.002)
Overall Tape Thickness	T	0.20 ± 0.10 (0.008 ± 0.004)
Tape Width	W	8.00 ± 0.20 (0.315 ± 0.008)
Reel Width	W_1	14.4 (0.567) MAX.
Quantity per Reel	--	3000