### 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

### 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)

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

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Peak Voltage</td>
<td>$V_{WM}$</td>
<td>5.0</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakdown Voltage @ 1 mA</td>
<td>$V_{BR}$</td>
<td>6.0</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward Voltage @ 15 mA</td>
<td>$V_F$</td>
<td>0.8</td>
<td>1.2</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Leakage Current @ $V_{WM}$</td>
<td>$I_L$</td>
<td>2.5</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage Current @ $V_{WM}$</td>
<td>$I_{IO}$</td>
<td>1</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel Capacitance</td>
<td>$C_{IO}$</td>
<td>0.25</td>
<td>0.35</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Channel to Channel Capacitance @ 2.5 V, 1 MHz</td>
<td>$C_{CROSS}$</td>
<td>0.05</td>
<td>0.07</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>ESD Dynamic Turn-on Resistance</td>
<td>$R_{dynamic, I/O}$</td>
<td>0.35</td>
<td>Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESD Dynamic Turn-on Resistance</td>
<td>$R_{dynamic, VDD}$</td>
<td>0.2</td>
<td>Ω</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov
Performance Curves

### Insertion Loss S21

![Insertion Loss S21 Graph]

- **Frequency (Hz)**
- **Insertion loss (dB)**
- **VDD = 5 V**
- **VDD = Floated**

**4.1 GHz: -3 dB**

### Crosstalk Between I/Os

![Crosstalk Between I/Os Graph]

- **Frequency (Hz)**
- **Analog Cross Talk (dB)**
- **VDD = 5 V**
- **VDD = Floated**

### Channel Capacitance versus Voltage

![Channel Capacitance versus Voltage Graph]

- **Input Voltage (V)**
- **Input Capacitance (pF)**
- **f = 1 MHz, T = 25 °C**
- **VDD = Floated**
- **VDD = 5 V**

### Channel to Channel Capacitance versus Voltage

![Channel to Channel Capacitance versus Voltage Graph]

- **Input Voltage (V)**
- **Input Capacitance (pF)**
- **f = 1 MHz, T = 25 °C**
- **VDD = Floated**
- **VDD = 5 V**

### Typical V/I Characteristic

![Typical V/I Characteristic Graph]

- **Voltage (V)**
- **Current (A)**
- **VDD to GND**
- **I/O to GND**
- **Pulse from a transmission line**

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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.

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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.

Recommended Footprint

How to Order

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

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Packaging Information

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

![Diagram showing tape and reel format with dimensions and symbols for various parts such as Carrier Width, Carrier Length, Carrier Depth, Sprocket Hole, Reel Outside Diameter, Reel Inner Diameter, Feed Hole Diameter, Sprocket Hole Position, Punch Hole Position, Punch Hole Pitch, Sprocket Hole Pitch, Embossment Center, Overall Tape Thickness, Tape Width, Reel Width, and Quantity per Reel.]

**DIMENSIONS: MM (INCHES)**

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>DFN-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrier Width</td>
<td>A</td>
<td>2.21 ± 0.05 (0.087 ± 0.002)</td>
</tr>
<tr>
<td>Carrier Length</td>
<td>B</td>
<td>4.22 ± 0.05 (0.166 ± 0.002)</td>
</tr>
<tr>
<td>Carrier Depth</td>
<td>C</td>
<td>0.81 ± 0.05 (0.032 ± 0.002)</td>
</tr>
<tr>
<td>Sprocket Hole</td>
<td>d</td>
<td>1.50 ± 0.1 (0.059 ± 0.004)</td>
</tr>
<tr>
<td>Reel Outside Diameter</td>
<td>D</td>
<td>180 ± 3 (7.087 ± 0.118)</td>
</tr>
<tr>
<td>Reel Inner Diameter</td>
<td>D₁</td>
<td>50.0 MIN. (1.969)</td>
</tr>
<tr>
<td>Feed Hole Diameter</td>
<td>D₂</td>
<td>13.0 ± 0.2 (0.512 ± 0.008)</td>
</tr>
<tr>
<td>Sprocket Hole Position</td>
<td>E</td>
<td>1.75 ± 0.1 (0.069 ± 0.004)</td>
</tr>
<tr>
<td>Punch Hole Position</td>
<td>F</td>
<td>5.50 ± 0.05 (0.217 ± 0.002)</td>
</tr>
<tr>
<td>Punch Hole Pitch</td>
<td>P</td>
<td>4.00 ± 0.1 (0.157 ± 0.004)</td>
</tr>
<tr>
<td>Sprocket Hole Pitch</td>
<td>P₀</td>
<td>4.00 ± 0.1 (0.157 ± 0.004)</td>
</tr>
<tr>
<td>Embossment Center</td>
<td>P₁</td>
<td>2.00 ± 0.05 (0.079 ± 0.002)</td>
</tr>
<tr>
<td>Overall Tape Thickness</td>
<td>T</td>
<td>0.6 (0.024) MAX.</td>
</tr>
<tr>
<td>Tape Width</td>
<td>W</td>
<td>12.3 (0.484) MAX.</td>
</tr>
<tr>
<td>Reel Width</td>
<td>W₁</td>
<td>18.4 (0.725) MAX.</td>
</tr>
<tr>
<td>Quantity per Reel</td>
<td></td>
<td>3000</td>
</tr>
</tbody>
</table>

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