Features
- RoHS compliant*
- Low capacitance - 0.5 pF
- ESD protection >15 kV

Applications
- HDMI 1.4
- Digital Visual Interface (DVI)
- USB 3.0 / USB OTG
- Memory protection
- SIM card ports

General Information
The CDDFN10-0524P device provides ESD, EFT and Surge protection for high-speed data ports meeting IEC 61000-4-2 (ESD) requirements. The Transient Voltage Suppressor array, protecting up to 4 data lines, offers a Working Peak Reverse Voltage of 5 V and Minimum Breakdown Voltage of 6 V.

The DFN10 packaged device will mount directly onto the industry standard DFN10 footprint. Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and their flat configuration minimizes roll away.

Absolute Maximum Ratings (@ TA = 25 °C Unless Otherwise Noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>CDDFN10-0524P</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Pulse Power (tP = 8/20 μS)</td>
<td>Ppp</td>
<td>30</td>
<td>W</td>
</tr>
<tr>
<td>Peak Pulse Current (Ipp = 8/20 uS)</td>
<td>Ipp</td>
<td>3.8</td>
<td>A</td>
</tr>
<tr>
<td>Operating Voltage (I/O pin - GND)</td>
<td>VDC</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>TSTG</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>TOPR</td>
<td>-55 to +85</td>
<td>°C</td>
</tr>
</tbody>
</table>

Electrical Characteristics (@ TA = 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>Breakdown Voltage @ 1 mA</td>
<td>VBR</td>
<td>6</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Reverse Standoff Voltage</td>
<td>VFR</td>
<td>5</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Forward Voltage If =15 mA</td>
<td>VF</td>
<td>0.9</td>
<td>1.1</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Channel Leakage Current</td>
<td>ID</td>
<td>1.5</td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td>Channel Input Capacitance</td>
<td>CIN</td>
<td>0.5</td>
<td>0.65</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Channel to Channel Input Capacitance</td>
<td>CCROSS</td>
<td>0.04</td>
<td>0.08</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>ESD Protection per IEC 6-1000-4-2</td>
<td></td>
<td>8</td>
<td>10</td>
<td></td>
<td>kV</td>
</tr>
<tr>
<td>Contact Discharge</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESD Dynamic Turn-on Resistance</td>
<td>Rdyn</td>
<td>0.3</td>
<td></td>
<td></td>
<td>Ω</td>
</tr>
<tr>
<td>(any I/O Pin to Gnd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFT Protection per IEC 61000-4-4</td>
<td></td>
<td>40</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>@ 5/50 ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge Protection per IEC 61000-4-5</td>
<td></td>
<td></td>
<td>3.8</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>@ 8/20 μs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.
CDDFN10-0524P - Surface Mount TVS Diode Array

Product Dimensions

Recommended Footprint

Typical Part Marking

CDDFN10-0524P ..........................................................524

Environmental Specifications

Moisture Sensitivity Level ...........................................3
ESD Classification (HBM) ............................................3B

How to Order

CD DFN10 - 05 24 P

Common Diode
Chip Diode

Package
DFN10 = DFN-10 Package

Working Peak Reverse Voltage
05 = 5 $V_{RWM}$ (Volts)

Number of Lines
24 = 2 Ground / 4 Data Lines

Suffix
P = Ultra-low Capacitance

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CDDFN10-0524P - Surface Mount TVS Diode Array

Rating & Characteristic Curves

Typical Variation $C_{IN}$ vs $V_{IN}$

```
Input Capacitance (pF)

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Input Voltage (V)

f = 1 MHz, T = 25 °C
```

Typical Variation of $C_{IO}$-to-$IO$ vs $V_{IN}$

```
Input Capacitance (pF)

0.0 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 1.0
Input Voltage (V)

f = 1 MHz, T = 25 °C
```

Insertion Loss S21 (I/O-to-GND)

```
Insertion Loss (dB)

-30 -27 -24 -21 -18 -15 -12 -9 -6 -3 0
Frequency (Hz) 1e+8 1e+9

3 GHz: -0.92 dB
4.3 GHz: -3 dB
```

Analog Cross Talk

```
Analog Cross Talk (dB)

-80 -70 -60 -50 -40 -30 -20 -10 0 10 20
Frequency (Hz) 1e+8 1e+9
```

Transmission Line Pulsing (TLP)

```
Transmission Line Pulsing (TLP) Current (A)

0 2 4 6 8 10 12 14 16 18
Transmission Line Pulsing (TLP) Voltage (V)
```

Data Lines Connection

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The Bourns® Model CDDFN10-0524P is designed to protect high-speed data ports from ESD transients. For high-speed ports such as HDMI 1.4 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.

Feed-Through Layout -
Model CDDFN10-0524P in HDMI Application
### Packaging Information

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

#### Dimensions:

<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>1.45 ± 0.05 (0.057 ± 0.002)</td>
</tr>
<tr>
<td>Carrier Length</td>
<td>B</td>
<td>2.95 ± 0.05 (0.116 ± 0.002)</td>
</tr>
<tr>
<td>Carrier Depth</td>
<td>C</td>
<td>0.90 ± 0.05 (0.035 ± 0.002)</td>
</tr>
<tr>
<td>Sprocket Hole</td>
<td>d</td>
<td>1.55 ± 0.05 (0.061 ± 0.002)</td>
</tr>
<tr>
<td>Reel Outside Diameter</td>
<td>D</td>
<td>178 (7.008)</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 ± 0.20 (0.512 ± 0.008)</td>
</tr>
<tr>
<td>Sprocket Hole Position</td>
<td>E</td>
<td>1.75 ± 0.10 (0.069 ± 0.004)</td>
</tr>
<tr>
<td>Punch Hole Position</td>
<td>F</td>
<td>3.50 ± 0.05 (0.138 ± 0.002)</td>
</tr>
<tr>
<td>Punch Hole Pitch</td>
<td>P</td>
<td>4.00 ± 0.10 (0.157 ± 0.004)</td>
</tr>
<tr>
<td>Sprocket Hole Pitch</td>
<td>P₀</td>
<td>4.00 ± 0.10 (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>0.20 ± 0.10 (0.008 ± 0.004)</td>
</tr>
<tr>
<td>Tape Width</td>
<td>W</td>
<td>8.00 ± 0.20 (0.315 ± 0.008)</td>
</tr>
<tr>
<td>Reel Width</td>
<td>W₁</td>
<td>14.4 MAX. (0.567)</td>
</tr>
<tr>
<td>Quantity per Reel</td>
<td></td>
<td>3000</td>
</tr>
</tbody>
</table>
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