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# USB 3.1

## ESD & Overcurrent Protection

### Solution Products



MF-NSMF200-2



CDDFN10-0516P

### Objective

Universal Serial Bus (USB) 3.1 ports at 10 Gbps are twice as fast as USB 3.0 ports, enhancing consumer applications requiring low latency high bandwidth. The USB 3.1 standard section 6.1 recommends that power and signal lines receive ESD protection, while section 11.4.1.1 also requires that hosts and self-powered hubs have time delayed overcurrent protection such as Polymer PTC devices.

### Solution

1 Multifuse® PPTC Resetttable Fuse: MF-NSMF200-2  
1 TVS Diode Array: CDDFN10-0516P

### Compliance\*

IEC 61000-4-2 Level 4  
USB 3.1  
UL 60950-1

### Alternate Recommendations

1 TVS Diode: CDSOD323-T05  
2 4-Channel 3.3V TVS Diode Arrays:  
CDDFN10-3324P  
1 PPTC Resetttable Fuse: MF-MSMF110-2

### Benefit

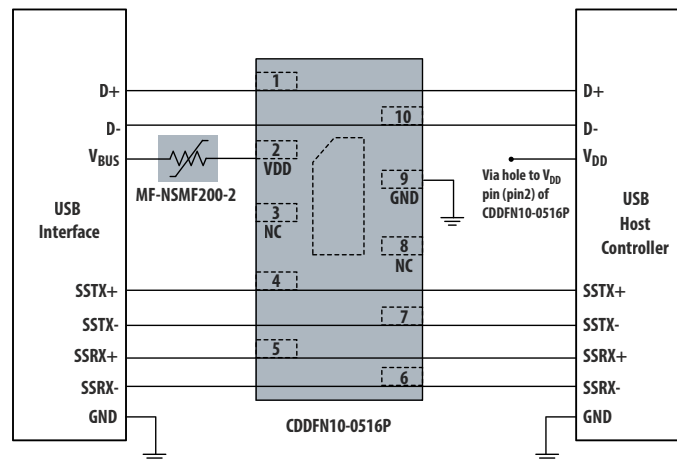
Model CDDFN10-0516P ultra-low capacitance diodes with ultra-low inter-channel capacitance minimize crosstalk with up to 10 kV contact ESD protection per IEC 61000-4-2 in one package for a single solution.

The ultra-compact Model MF-NSMF200 package with low resistance minimizes voltage drop at maximum current, and trip current of 4 A ensures no inrush tripping.

### Design Kit



PN-DESIGNKIT-56



\*1. The Bourns® Model CDDFN10-0516P has been tested according to the IEC 61000-4-2 standard using the IEC 61000-4-2 ESD pulse waveform. The device withstands up to 10 kV contact and 15 kV air discharge which meets and exceeds Level 4 requirements (8 kV contact, 15 kV air).

2. The Multifuse® device (MF-NSMF200-2) helps to ensure the application's compliance to  
A. USB 3.1 (section 11.4.1.1.1) in that a Polymer PTC device may be used for overcurrent protection of the DC bus; and  
B. UL 60950-1 Section 2.5 (Limited Power Source Table 2B) in that any short circuit current shall be limited to less than 8 A within 5 seconds.

The TVS diode array (CDDFN10-0516P) provides ESD and surge protection to the port. Customers should evaluate the effects of the capacitance of the TVS diode arrays on the quality of USB 3.1 data flow in their specific circuits and applications.

The schematic shown here illustrates the application protection and does not constitute the complete circuit design. Customers should verify actual device performance in their specific applications.