

TPD6S300 USB Type-C™ Port Protector: Short-to- V_{BUS} Overvoltage and IEC ESD Protection

1 Features

- 4-Channels of Short-to- V_{BUS} Overvoltage Protection (CC1, CC2, SBU1, SBU2): 24- V_{DC} Tolerant
- 6-Channels of IEC 61000-4-2 ESD Protection (CC1, CC2, SBU1, SBU2, DP, DM)
- CC1, CC2 Overvoltage Protection FETs 600 mA Capable for passing V_{CONN} power
- CC Dead Battery Resistors Integrated for handling dead battery use case in mobile devices

2 Applications

- Laptop PC
- Tablets
- Smartphones
- Monitors and TVs
- Docking Stations

3 Description

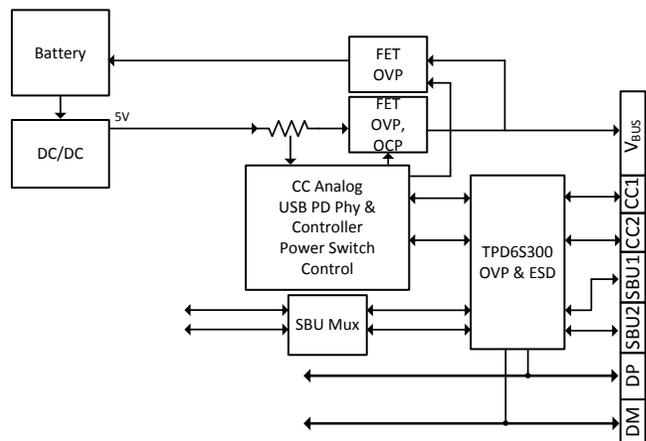
The TPD6S300 is a single chip USB Type-C port protection solution that provides 20-V Short-to- V_{BUS} overvoltage and IEC ESD protection.

Since the release of the USB Type-C connector, many products and accessories for USB Type-C have been released which do not meet the USB Type-C specification. One example of this is USB Type-C Power Delivery adaptors that only place 20 V on the V_{BUS} line. Another concern for USB Type-C is the mechanical sliding of the connector shorting pins, due to the close proximity they have in this small connector. This can cause 20-V V_{BUS} to be shorted to the CC and SBU pins. Also, due to the close proximity of the pins in the Type-C connector, there is a heightened concern that debris and moisture will cause the 20-V V_{BUS} pin to be shorted to the CC and SBU pins.

These non-ideal equipments and mechanical events make it necessary for the CC and SBU pins to be 20-V tolerant, even though they only operate at 5 V or lower. The TPD6S300 enables the CC and SBU pins to be 20-V tolerant without interfering with normal operation by providing overvoltage protection on the CC and SBU pins. The device places high voltage FETs in series on the SBU and CC lines. When a voltage above the OVP threshold is detected on these lines, the high voltage switches are opened up, isolating the rest of the system from the high voltage condition present on the connector.

Finally, most systems require IEC 61000-4-2 system level ESD protection for their external pins. The TPD6S300 integrates IEC 61000-4-2 ESD protection for the CC1, CC2, SBU1, SBU2, DP, DM pins, removing the need to place high voltage TVS diodes externally on the connector.

Application Diagram



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4 Device and Documentation Support

4.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

4.2 Community Resources

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4.3 Trademarks

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4.4 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

4.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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