32V Type-C CC and SBU Over-Voltage and IEC ESD Protection Switch

DESCRIPTION

MT7931 is an integrated protection device for CC and SBU path in USB Type-C port. It provides 32V Short-to-V_{BUS} overvoltage and IEC ESD protection.

For many Type-C Controllers, low voltage silicon process is used for high density digital circuits. It will be very costly to achieve the high voltage capability on those pins. MT7931 can protect downstream low voltage devices with up to 32V input over voltage. During normal operation, the device is transparent to the operation of the Type-C controller.

When high voltage is applied to CC/SBU pins, MT7931 blocks the high voltage to provide a safe operating condition for Type-C controller.

MT7931 also integrates C_CC pin pull down resistor so that mobile devices can be powered up and charged in dead battery situations. When system power is up, the MT7931 can automatically cut out C_CC pin pull down resistor so that Type-C controller CC pin pulls down resistor can take over without confusing the power source.

MT7931 also integrates a high voltage LDO which can generate 3.3V output from VBUS directly and a power path control circuit.

In dead battery situation when system power is down, MT7931 integrated C_CC pin pull down resistor to establish handshake with PD power source and enable VBUS voltage. Once VBUS voltage is enabled, MT7931 can provide 3.3V power to PD controller with integrated high voltage LDO to ensure a reliable startup from dead battery condition.

MT7931 is available in a tiny 20 lead QFN 3.0mmx3.0mm package.

FEATURES

- 4-channels over voltage protection (C_CC1, C_CC2, C_SBU1, C_SBU2) with 32V tolerance
- 5 Channels (VBUS, C_CC1/2, C_SBU1/2) IEC 61000-4-2 ESD protection switches
- High current capability (600mA) for CC1/CC2 over voltage protection FETs to pass V_{CONN} power
- Integrated C_CC1/2 pull down resistors for handling dead battery condition
- Automatic and transparent operation without interfere or burden Type-C controller
- Compact package size to minimize external components and solution size: QFN3X3_20L

APPLICATIONS

- USB Type-C devices
- Notebook and mobile devices
- Smart mobile phone and TVs
- Monitors
- Desktop PC/motherboard
- Docking station
- Port/cable adapters and dongle

TYPICAL APPLICATIONS