





USB332x USB Transceiver Family

Industry's Smallest, Hi-Speed USB 2.0 ULPI Transceiver Family for Portable Consumer Electronics Applications

The USB332x family of Hi-Speed USB 2.0 transceivers sets a new standard for integration by combining six functions into one extremely small size to help meet the tight board space and cost requirements of today's portable consumer electronics products. The highly-integrated USB332x transceivers are designed in a wafer-level chip scale package (WLCSP) measuring 1.95mm x 1.95mm. One of the key features of the USB332x family is the ability to protect portable products from extreme over-voltage conditions of up to +30V on VBus. The need for external VBus over-voltage protection ICs, USB switches, electrostatic discharge (ESD) protection devices, and reference oscillators is eliminated, thereby minimizing eBOM part count and conserving valuable board space. The flexible and easy-to-use USB332x family also allows the USB connector to act as a single port of connection for Hi-Speed data transfer, battery charging and stereo/mono audio accessories.

Highlights

- Highly-integrated, Hi-Speed USB 2.0 transceivers
 - Integrated VBus over-voltage protection (up to +30V)
 - Integrated USB switch
 - Internal ESD protection circuits
 - Integrated 3.3V LDO regulator
 - External passive components minimized
 Industry's best ESD performance in a Hi-
 - Speed USB transceiver = ±8kV HBM
 - ±8kV/±15kV IEC (contact/air)
 - No external ESD protection circuits required
- Supports a wide variety of common reference clock frequencies

Target Applications

- Cell Phones
- Smart Phones
- PDAs
- GPS Personal Navigation Devices

Features and Benefits

FEATURES BENEFITS Integrated VBus over-voltage protection Eliminates need for costly external over-voltage protection (OVP) IC Integrated USB switch and ESD protection Provides lower eBOM part count and smaller PCB footprint area USB utilized as a single port of connection Reduction of end product size and cost flexPWR technology Longer battery life Flexible and easy-to-use solution Faster time-to-market and lower product development cost Multiple clock input frequencies supported Allows USB PHY to operate from the system clock, eliminating the need for any external crystal oscillator for the USB PHY Ability to tolerate "noisy" clocks and power supplies Does not require costly filtering or clock generator circuits to preserve Hi-Speed eye diagram integrity Extremely small package footprint Efficient PCB board space utilization

- Ability to use the USB connector as a single
 - Ability to use the USB connector as a single port of connection
 - Switch Hi-Speed data, battery charging and stereo/mono audio accessories
 UART mode
 - UART MODE flov DW/DTM toobp
 - flexPWR[™] technology
 - Variable I/O voltage capability
 Low power and standby modes of
 - operation to minimize power consumption
 - "Wrapper-less" architecture for optimized timing performance
 - Low jitter PLL makes it possible to accept "noisy" clock sources
 - Hi-Speed USB On-The-Go (OTG) host and device capable
 - Supports commercial (0° to 70°C) and industrial (-40° to 85°C) temperature ranges
 - Extremely small package size and low eBOM part count

Digital TVs

Gaming Consoles

Industrial Systems

Set-top Boxes/DVRs/PVRs

Printers

- MP3 and Personal Media
 Players (PMPs)
- Digital Still and Video Cameras
- External Hard Disk Drives



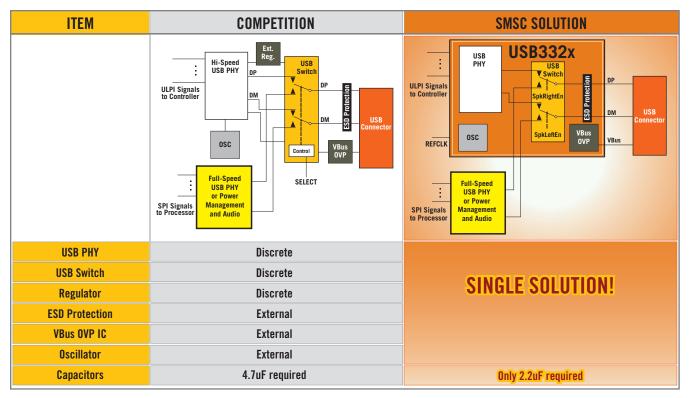
What is flexPWR[™]Technology?



flexPWR Technology provides:

- Low current design well-suited for battery powered applications
- Integrated battery to 3.3V linear regulator
- Variable I/O voltage to support a wide variety of processors
- Low current sleep mode tri-states all ULPI pins
- Allows OTG host to turn VBus off to conserve battery

USB332x Integrates Six Functions into One Solution!



USB332x Family Selector Guide

Part Number	Reference Clock Frequency
USB3321	26MHz
USB3322	12MHz
USB3326	19.2MHz
USB3327	27MHz
USB3329	13MHz

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