

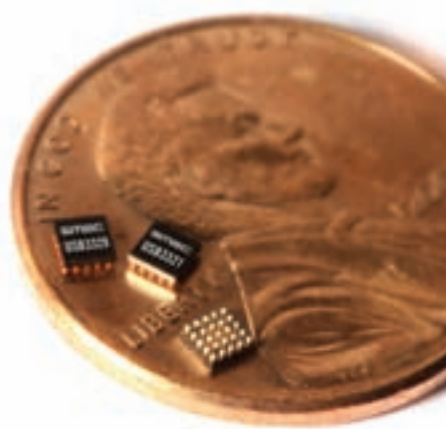


# USB332x USB Transceiver Family



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 (WLCSPP) 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
- 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
- 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



## Target Applications

- Cell Phones
- Smart Phones
- PDAs
- GPS Personal Navigation Devices
- MP3 and Personal Media Players (PMPs)
- Digital Still and Video Cameras
- External Hard Disk Drives
- Printers
- Set-top Boxes/DVRs/PVRs
- Digital TVs
- Gaming Consoles
- Industrial Systems

## 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



# 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!

ITEM	COMPETITION	SMSC SOLUTION
USB PHY	Discrete	<p><b>SINGLE SOLUTION!</b></p> <p>Only 2.2uF required</p>
USB Switch	Discrete	
Regulator	Discrete	
ESD Protection	External	
VBus OVP IC	External	
Oscillator	External	
Capacitors	4.7uF required	

## USB332x Family Selector Guide

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

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