



## Hi-Speed USB Transceiver with 1.8V-3.3V ULPI Interface - 24MHz Reference Clock

### PRODUCT FEATURES

Data Brief

- USB-IF “Hi-Speed” compliant to the Universal Serial Bus Specification Rev 2.0
- Interface compliant with the ULPI Specification revision 1.1 as a Single Data Rate (SDR) PHY
- 1.8V to 3.3V IO Voltage ( $\pm 10\%$ )
- flexPWR<sup>®</sup> Technology
  - Low current design ideal for battery powered applications
  - “Sleep” mode tri-states all ULPI pins and places the part in a low current state
- Supports FS pre-amble for FS hubs with a LS device attached (UTMI+ Level 3)
- Supports HS SOF and LS keep-alive pulse
- Includes full support for the optional On-The-Go (OTG) protocol detailed in the On-The-Go Supplement Revision 1.0a specification
- Supports the OTG Host Negotiation Protocol (HNP) and Session Request Protocol (SRP)
- Allows host to turn VBUS off to conserve battery power in OTG applications
- Support OTG monitoring of VBUS levels with internal comparators
- “Wrapper-less” design for optimal timing performance and design ease
  - Low Latency Hi-Speed Receiver (43 Hi-Speed clocks Max) allows use of legacy UTMI Links with a ULPI bridge
- Internal 5V cable short-circuit protection of ID, DP and DM lines to VBUS or ground
- 24MHz Reference Clock Operation
  - 0 to 3.6V input drive tolerant
  - Able to accept “noisy” clock sources
- Internal low jitter PLL for 480MHz Hi-Speed USB operation
- Internal detection of the value of resistance to ground on the ID pin
- Integrated battery to 3.3V LDO regulator
  - 2.2uF bypass capacitor
  - 100mV dropout voltage
- Integrated ESD protection circuits
  - Up to  $\pm 15\text{kV}$  without any external devices

- CarKit UART mode for non-USB serial data transfers
- Industrial Operating Temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Packaging Options
  - 24 pin QFN lead-free RoHS compliant package (4 x 4 x 0.90 mm height)

### Applications

The USB3315 is targeted for any application where a Hi-Speed USB connection is desired and when board space, power, and interface pins must be minimized.

The USB3315 is well suited for:

- Cell Phones
- PDAs
- MP3 Players
- GPS Personal Navigation
- Scanners
- External Hard Drives
- Digital Still and Video Cameras
- Portable Media Players
- Entertainment Devices
- Printers
- Set Top Boxes
- Video Record/Playback Systems
- IP and Video Phones
- Gaming Consoles
- POS Terminals

**Order Number(s):****USB3315C-CP-TR FOR 24 PIN, QFN LEAD-FREE ROHS COMPLIANT PACKAGE (TAPE AND REEL)****REEL SIZE IS 4000 PIECES.****This product meets the halogen maximum concentration values per IEC61249-2-21****For RoHS compliance and environmental information, please visit [www.smSC.com/rohs](http://www.smSC.com/rohs)**

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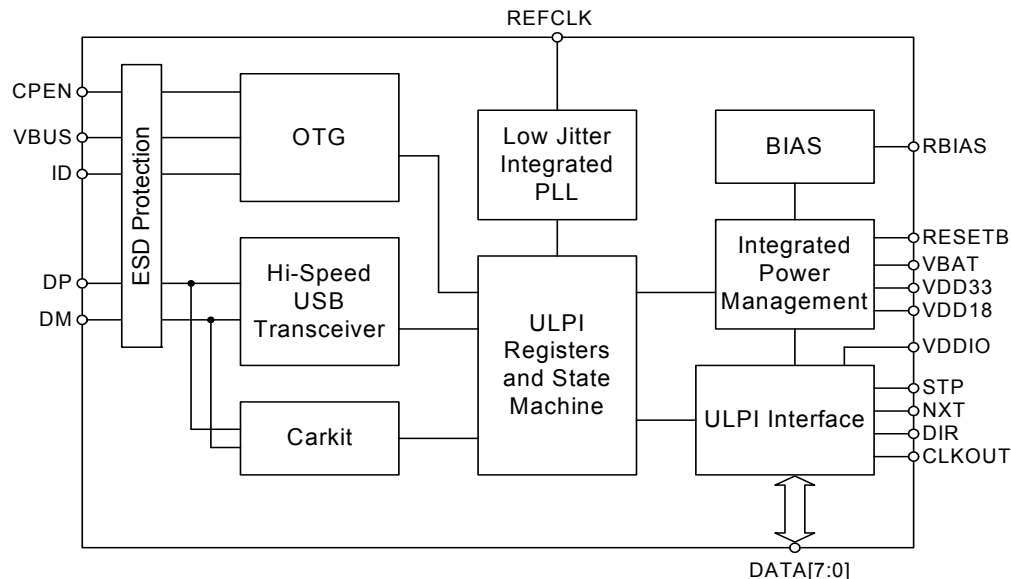
## General Description

The USB3315 is a highly integrated Hi-Speed USB 2.0 Transceiver (PHY) that supports systems architectures based on a 24MHz reference clock. It is designed to be used in both commercial and industrial temperature applications.

The USB3315 meets all of the electrical requirements to be used as a Hi-Speed USB Host, Device, or an On-the-Go (OTG) device. In addition to the supporting USB signaling the USB3315 also provides USB UART mode.

USB3315 uses the industry standard UTMI+ Low Pin Interface (ULPI) to connect the USB PHY to the Link. The industry standard ULPI interface uses a method of in-band signaling and status byte transfers between the Link and PHY, to facilitate a USB session. By using in-band signaling and status byte transfers the ULPI interface requires only 12 pins.

The USB3315 uses SMSC's "wrapper-less" technology to implement the ULPI interface. This "wrapper-less" technology allows the PHY to achieve a low latency transmit and receive time. SMSC's low latency transceiver allows an existing UTMI Link to be reused by adding a UTMI to ULPI bridge. By adding a bridge to the ASIC the existing and proven UTMI Link IP can be reused.



**Figure 1 USB3315 Block Diagram**

The USB3315 is designed to run with a 24MHz reference clock. By using a reference clock from the Link the USB3315 is able to remove the cost of a crystal reference from the design.

The USB3315 includes an integrated 3.3V LDO regulator to generate its own supply from power applied at the **VBAT** pin. The voltage on the **VBAT** pin can range from 3.1 to 5.5V. The regulator dropout voltage is less than 100mV which allows the PHY to continue USB signaling when the voltage on **VBAT** drops to 3.1V. The USB transceiver will continue to operate at lower voltages, although some parameters may be outside the limits of the USB specifications. If the user would like to provide a 3.3V supply to the USB3315, the **VBAT** and **VDD33** pins should be connected together.

The USB3315 also includes integrated pull-up resistors that can be used for detecting the attachment of a USB Charger. By sensing the attachment to a USB Charger, a product using the USB3315 can charge its battery at more than the 500mA allowed when charging from a USB Host.

# Package Outline

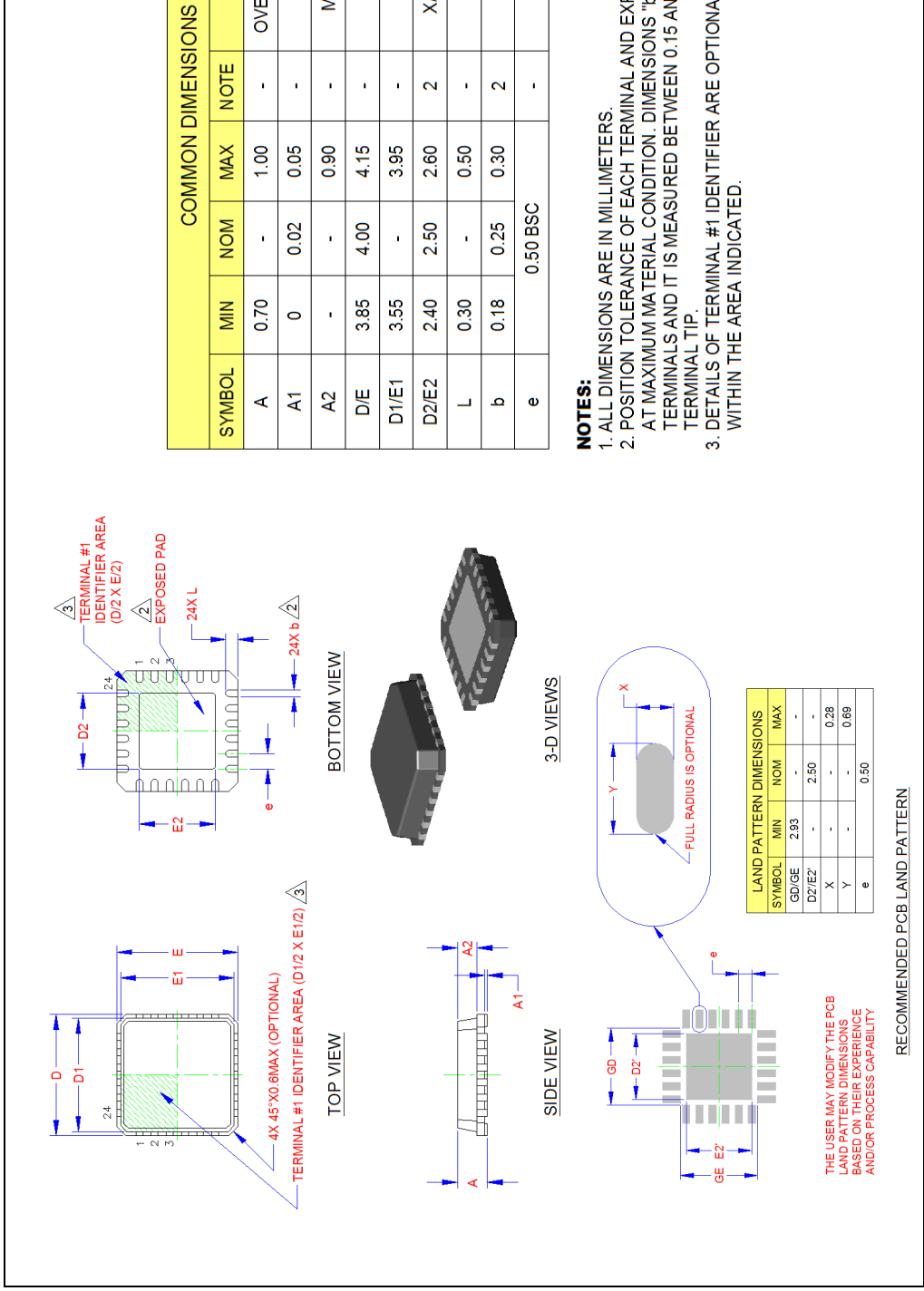


Figure 2 24-Pin QFN, 4x4mm Body, 0.5mm Pitch

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