

## Hi-Speed USB Transceiver with 1.8V-3.3V ULPI Interface - 26MHz 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
- 26MHz 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)
  - 25 ball VFBGA lead-free RoHS compliant package also available; (3 x 3 x 0.88mm height)

### Applications

The USB3317 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 USB3317 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):**

**USB3317C-CP-TR FOR 24 PIN, QFN LEAD-FREE ROHS COMPLIANT PACKAGE (TAPE AND REEL)  
USB3317C-GJ-TR FOR 25 PIN, VFBGA 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)**



80 ARKAY DRIVE, HAUPPAUGE, NY 11788 (631) 435-6000, FAX (631) 273-3123

Copyright © 2010 SMSC or its subsidiaries. All rights reserved.

Circuit diagrams and other information relating to SMSC products are included as a means of illustrating typical applications. Consequently, complete information sufficient for construction purposes is not necessarily given. Although the information has been checked and is believed to be accurate, no responsibility is assumed for inaccuracies. SMSC reserves the right to make changes to specifications and product descriptions at any time without notice. Contact your local SMSC sales office to obtain the latest specifications before placing your product order. The provision of this information does not convey to the purchaser of the described semiconductor devices any licenses under any patent rights or other intellectual property rights of SMSC or others. All sales are expressly conditional on your agreement to the terms and conditions of the most recently dated version of SMSC's standard Terms of Sale Agreement dated before the date of your order (the "Terms of Sale Agreement"). The product may contain design defects or errors known as anomalies which may cause the product's functions to deviate from published specifications. Anomaly sheets are available upon request. SMSC products are not designed, intended, authorized or warranted for use in any life support or other application where product failure could cause or contribute to personal injury or severe property damage. Any and all such uses without prior written approval of an Officer of SMSC and further testing and/or modification will be fully at the risk of the customer. Copies of this document or other SMSC literature, as well as the Terms of Sale Agreement, may be obtained by visiting SMSC's website at <http://www.smSC.com>. SMSC is a registered trademark of Standard Microsystems Corporation ("SMSC"). Product names and company names are the trademarks of their respective holders.

**SMSC DISCLAIMS AND EXCLUDES ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND AGAINST INFRINGEMENT AND THE LIKE, AND ANY AND ALL WARRANTIES ARISING FROM ANY COURSE OF DEALING OR USAGE OF TRADE. IN NO EVENT SHALL SMSC BE LIABLE FOR ANY DIRECT, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES; OR FOR LOST DATA, PROFITS, SAVINGS OR REVENUES OF ANY KIND; REGARDLESS OF THE FORM OF ACTION, WHETHER BASED ON CONTRACT; TORT; NEGLIGENCE OF SMSC OR OTHERS; STRICT LIABILITY; BREACH OF WARRANTY; OR OTHERWISE; WHETHER OR NOT ANY REMEDY OF BUYER IS HELD TO HAVE FAILED OF ITS ESSENTIAL PURPOSE, AND WHETHER OR NOT SMSC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.**

## General Description

The USB3317 is a highly integrated Hi-Speed USB 2.0 Transceiver (PHY) that supports systems architectures based on a 26MHz reference clock. It is designed to be used in both commercial and industrial temperature applications.

The USB3317 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 USB3317 also provides USB UART mode.

USB3317 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 USB3317 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.

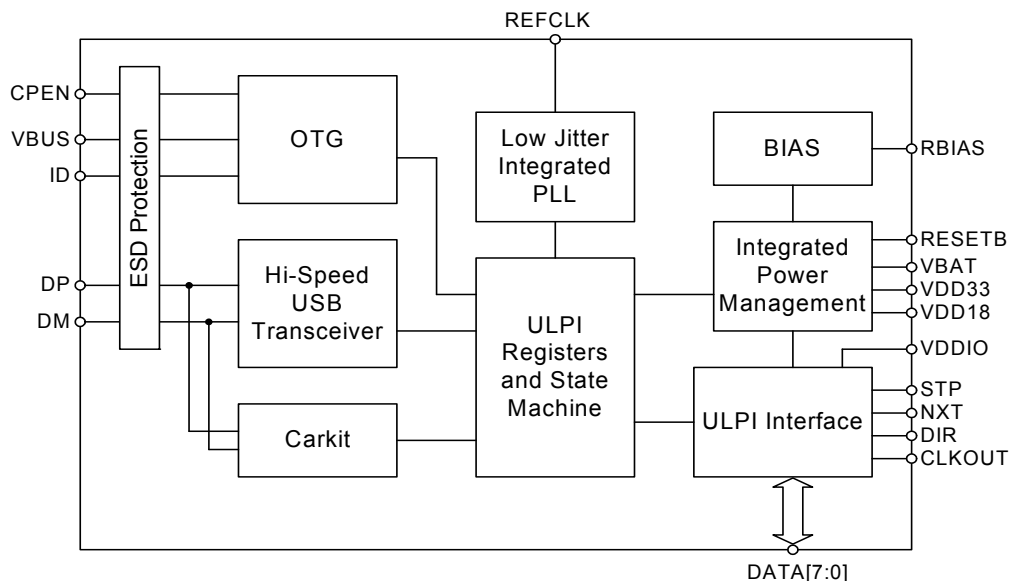


Figure 1 USB3317 Block Diagram

The USB3317 is designed to run with a 26MHz reference clock. By using a reference clock from the Link the USB3317 is able to remove the cost of a crystal reference from the design.

The USB3317 includes a 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 USB3317, the **VBAT** and **VDD33** pins should be connected together.

The USB3317 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 USB3317 can charge its battery at more than the 500mA allowed when charging from a USB Host.

# Package Outlines

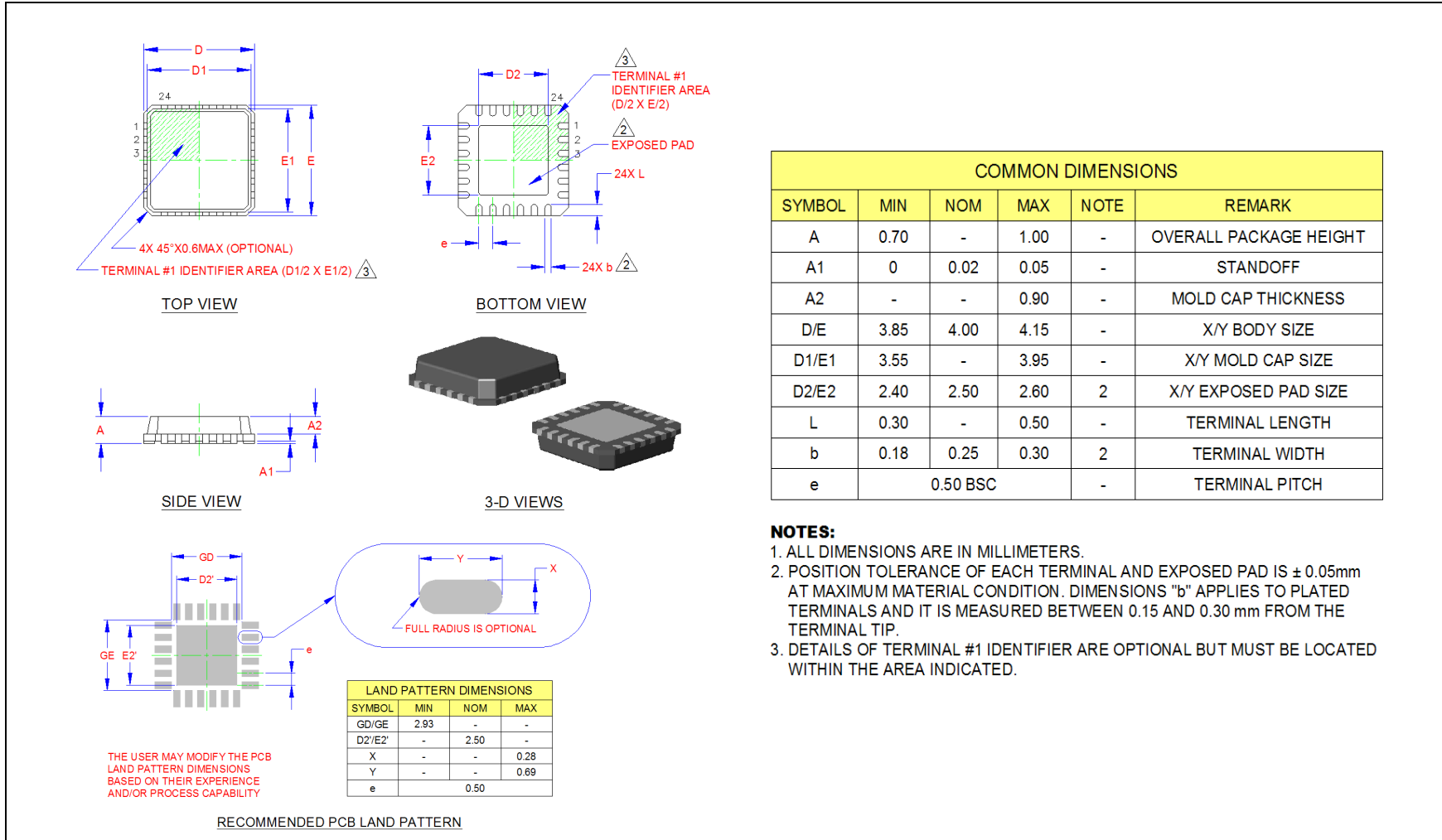
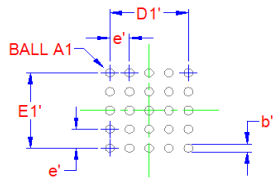
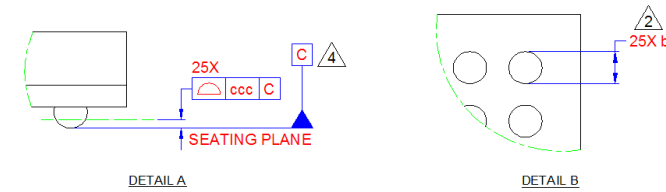
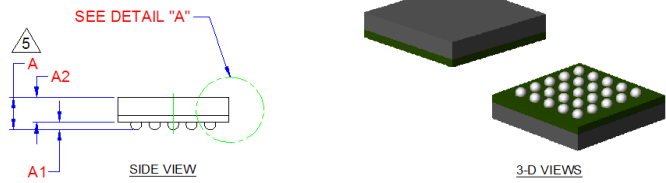
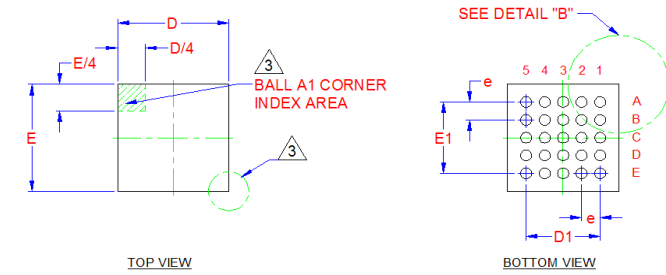


Figure 2 24-Pin QFN, 4x4mm Body, 0.5mm Pitch



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	2.00	-
b'	0.20	-	0.25
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.00	5	OVERALL PACKAGE HEIGHT
A1	0.15	-	-	-	STANDOFF
A2	0.65	-	-	-	PKG BODY THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D1/E1	2.00 BSC		-	-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC		-	-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS  $\pm 0.075\text{mm}$  AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

Figure 3 25-pin VFBGA, 3x3mm Body, 0.5mm Pitch

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[USB3317-GJ-TR](#) [USB3317C-GJ-TR](#) [USB3317C-CP-TR](#)