



## USB334x

# Enhanced Single Supply Hi-Speed USB ULPI Transceiver



## PRODUCT FEATURES

Data Brief

- USB-IF Battery Charging 1.2 Specification Compliant
- Link Power Management (LPM) Specification Compliant
- Integrated ESD protection circuits
  - Up to  $\pm 25$ kV IEC Air Discharge without external devices
- Over-Voltage Protection circuit (OVP) protects the VBUS pin from continuous DC voltages up to 30V
- Integrated USB Switch (USB3341, USB3346, and USB3347)
  - Allows single USB port of connection by providing switching function for:
    - Battery charging
    - Stereo and mono/mic audio
    - USB Full-Speed/Low-Speed data
- SMSC RapidCharge Anywhere™ Provides:
  - 3-times the charging current through a USB port over traditional solutions
  - USB-IF Battery Charging 1.2 compliance to any portable device
  - Charging current up to 1.5Amps via compatible USB host or dedicated charger
  - Dedicated Charging Port (DCP), Charging (CDP) & Standard (SDP) Downstream Port support
- flexPWR® Technology
  - Extremely low current design ideal for battery powered applications
  - “Sleep” mode tri-states all ULPI pins and places the part in a low current state
  - 1.8V to 3.3V IO Voltage (USB3343)
- Single Power Supply Operation
  - Integrated 1.8V regulator
  - Integrated 3.3V regulator
    - 100mV dropout voltage
- PHYBoost
  - Programmable USB transceiver drive strength for recovering signal integrity
- VariSense™
  - Programmable USB receiver sensitivity
- “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
- External Reference Clock operation available
  - ULPI Clock Input Mode (60MHz sourced by Link)
    - 0 to 3.6V input drive tolerant
    - Able to accept “noisy” clock sources as reference to internal, low-jitter PLL
    - Crystal support available (USB3343)
- Smart detection circuits allow identification of USB charger, headset, or data cable insertion
- Includes full support for the optional On-The-Go (OTG) protocol detailed in the On-The-Go Supplement Revision 2.0 specification
- Supports the OTG Host Negotiation Protocol (HNP) and Session Request Protocol (SRP)
- UART mode for non-USB serial data transfers
- Internal 5V cable short-circuit protection of ID, DP and DM lines to VBUS or ground
- Industrial Operating Temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- 24 pin, QFN lead-free RoHS Compliant package (4 x 4 x 0.90 mm height)

### Applications

The USB334x is the solution of choice for any application where a Hi-Speed USB connection is desired and when board space, power, and interface pins must be minimized.

- 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

## Order Number(s):

| ORDER NUMBER  | REFCLK<br>FREQUENCY<br>(Note 0.1)   | PACKAGE TYPE  | REEL SIZE    |
|---------------|-------------------------------------|---|--------------|
| USB3341-CP-TR | 26MHz<br>(oscillator only)          | 24 Pin, QFN Lead-Free RoHS<br>Compliant Package (tape and reel) | 4,000 pieces |
| USB3343-CP-TR | 26MHz<br>(oscillator or<br>crystal) |   |              |
| USB3346-CP-TR | 19.2MHz<br>(oscillator only)        |   |              |
| USB3347-CP-TR | 27MHz<br>(oscillator only)          |   |              |

**Note 0.1** All versions support ULPI Clock In Mode (60MHz input at REFCLK)

**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

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SMSC's USB334x is a family of Hi-Speed USB 2.0 Transceivers that provide a physical layer (PHY) solution well-suited for portable electronic devices. Both commercial and industrial temperature applications are supported.

Each model in the USB334x family may use a 60MHz reference clock or the model-number specific reference clock shown on page 2.

Several advanced features make the USB334x the transceiver of choice by reducing both eBOM part count and printed circuit board (PCB) area. Outstanding ESD robustness eliminates the need for external ESD protection devices in typical applications. The internal Over-Voltage Protection circuit (OVP) protects the USB334x from voltages up to 30V on the **VBUS** pin. By using a reference clock from the Link, the USB334x removes the cost of a dedicated crystal reference from the design. The USB334x includes integrated 3.3V and 1.8V regulators, making it possible to operate the device from a single power supply.

The USB334x is optimized for use in portable applications where a low operating current and standby currents are essential. The USB334x operates from a single supply and includes integrated regulators for its supplies. The USB334x also supports the USB Link Power Management protocol (LPM) to further reduce USB operating currents.

The USB334x family is enabled with SMSC's RapidCharge Anywhere™ which supports USB-IF Battery Charging 1.2 for any portable device. RapidCharge Anywhere™ provides three times the charging current through a USB port over traditional solutions which translate up to 1.5Amps via compatible USB host or dedicated charger. In addition, this provides a complete USB charging ecosystem between device and host ports such as Dedicated Charging Port (DCP), Charging (CDP) and Standard (SDP) Downstream Ports.

The USB334x meets all of the electrical requirements for a Hi-Speed USB Host, Device, or an On-the-Go (OTG) transceiver. In addition to the supporting USB signaling, the USB334x also provides USB UART mode and, in versions with the integrated USB switch, USB Audio mode.

USB334x uses the industry standard UTMI+ Low Pin Interface (ULPI) to connect the USB transceiver to the Link. ULPI uses a method of in-band signaling and status byte transfers between the Link and PHY to facilitate a USB session with only twelve pins.

The USB334x 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.

Versions of the USB334x with the integrated USB switch enable a single USB port of connection.

## Block Diagrams

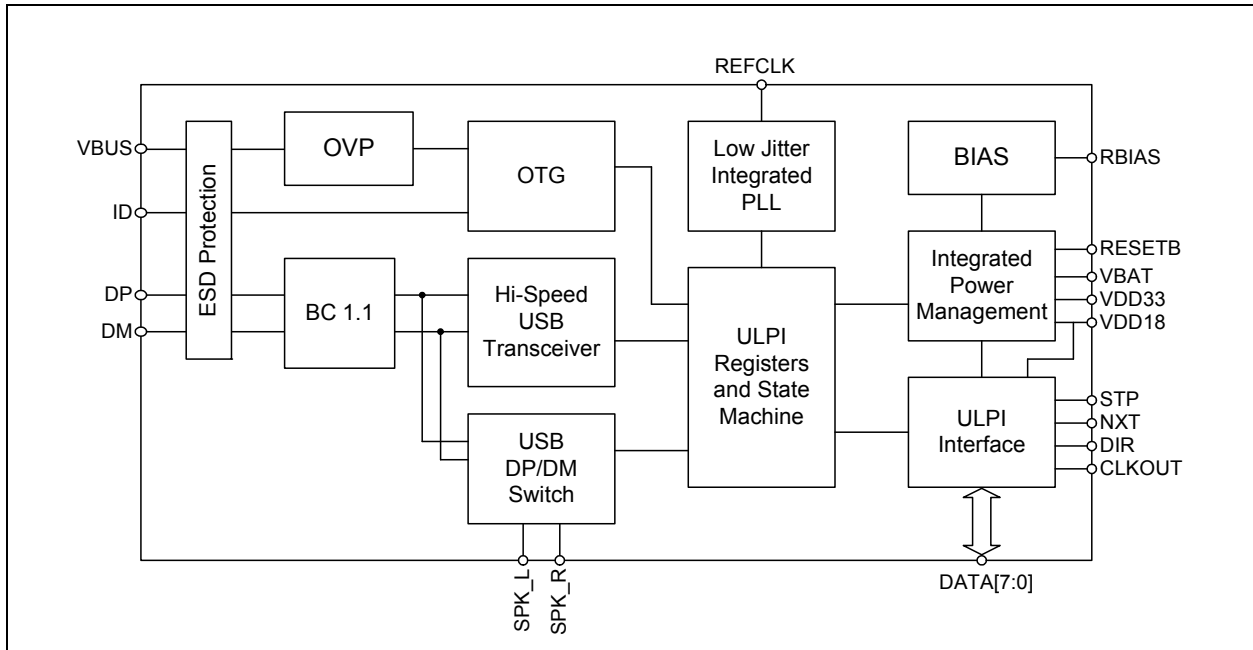


Figure 1 Block Diagram (USB3341, USB3346, and USB3347)

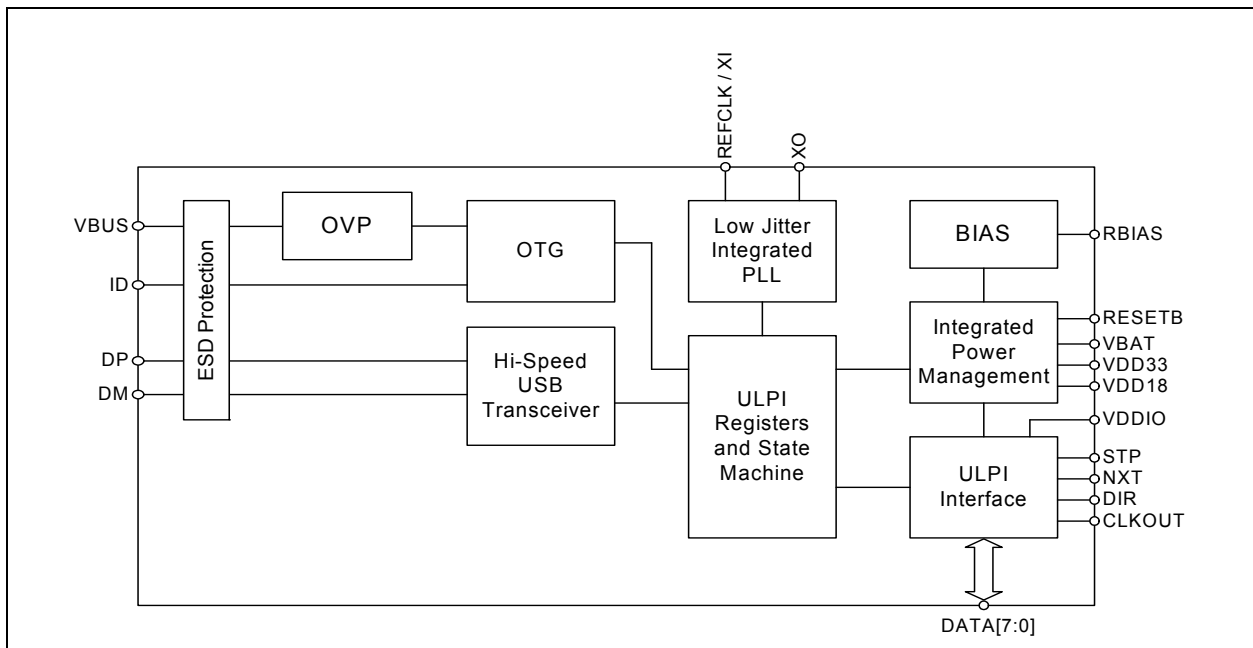


Figure 2 Block Diagram (USB3343)

# Package Outline

Revision 1.2 (02-08-13)

PRODUCT PREVIEW

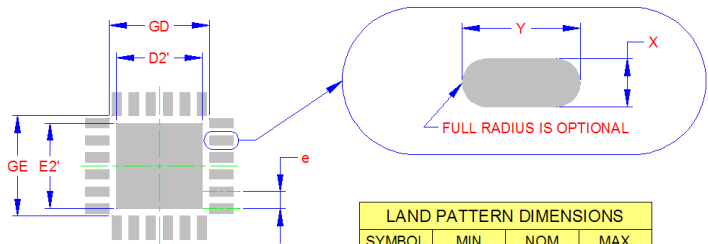
5

SMSC USB334x

| COMMON DIMENSIONS |          |      |      |      |                        |
|-------------------|----------|------|------|------|------------------------|
| SYMBOL            | MIN      | NOM  | MAX  | NOTE | REMARK                 |
| A                 | 0.70     | -    | 1.00 | -    | OVERALL PACKAGE HEIGHT |
| A1                | 0        | 0.02 | 0.05 | -    | STANDOFF               |
| A2                | -        | -    | 0.90 | -    | MOLD CAP THICKNESS     |
| D/E               | 3.85     | 4.00 | 4.15 | -    | X/Y BODY SIZE          |
| D1/E1             | 3.55     | -    | 3.95 | -    | X/Y MOLD CAP SIZE      |
| D2/E2             | 2.40     | 2.50 | 2.60 | 2    | X/Y EXPOSED PAD SIZE   |
| L                 | 0.30     | -    | 0.50 | -    | TERMINAL LENGTH        |
| b                 | 0.18     | 0.25 | 0.30 | 2    | TERMINAL WIDTH         |
| e                 | 0.50 BSC |      | -    | -    | TERMINAL PITCH         |

**NOTES:**

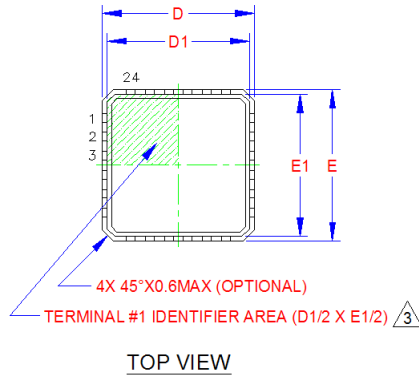
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS  $\pm 0.05\text{mm}$  AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.



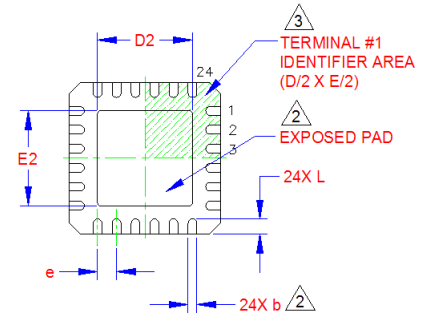
| LAND PATTERN DIMENSIONS |      |      |      |
|-------------------------|------|------|------|
| SYMBOL                  | MIN  | NOM  | MAX  |
| GD/GE                   | 2.93 | -    | -    |
| D2'/E2'                 | -    | 2.50 | -    |
| X                       | -    | -    | 0.28 |
| Y                       | -    | -    | 0.69 |
| e                       | 0.50 |      |      |

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

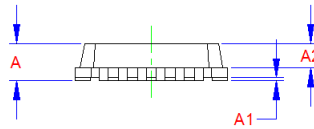
RECOMMENDED PCB LAND PATTERN



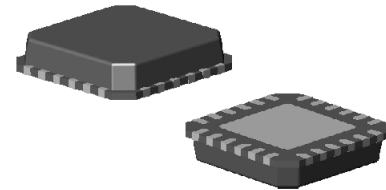
TOP VIEW



BOTTOM VIEW



SIDE VIEW



3-D VIEWS

Figure 2.1 24-pin QFN, 4 x4 mm Body, 0.5mm Pitch

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