

# USB 2.0 High-Speed 3-Port Hub Controller

## PRODUCT FEATURES

## Data Brief

### General Description

The SMSC 3-Port Hub is low power, OEM configurable, MTT (multi transaction translator) hub controller IC with 3 downstream ports for embedded USB solutions. The 3-port hub is fully compliant with the USB 2.0 Specification and will attach to an upstream port as a Full-Speed Hub or as a Full-/High-Speed Hub. The 3-Port Hub supports Low-Speed, Full-Speed, and High-Speed (if operating as a High-Speed Hub) downstream devices on all of the enabled downstream ports.

### General Features

- Hub Controller IC with 3 downstream ports
- High-performance multiple transaction translator. MultiTRAK™ Technology Provides one transaction translator per port
- Enhanced OEM configuration options available through either a single serial i2C EEPROM, or SMBus Slave Port
- 36-pin (6x6mm) and 48-Pin (7x7mm) QFN lead-free, RoHS compliant packages
- Footprint compatible with USB2514 and USB2512 (36-pin QFN) to provide designers with flexibility regarding the quantity of USB expansion ports utilized without redesign

### Hardware Features

- Low power operation
- Full Power Management with individual or ganged power control of each downstream port
- On-chip Power On Reset (POR)
- Internal 1.8V Voltage Regulator
- Fully integrated USB termination and Pull-up/Pull-down resistors
- On Board 24MHz Crystal Driver, Resonator or External 24/48MHz clock input
- USB host/device speed indicator. Per-port 3-color LED drivers that indicate the speed of USB host and device connection - hi-speed (480 Mbps), full-speed (12 Mbps), low-speed (1.5 Mbps) (48-pin QFN)
- Enhanced EMI rejection and ESD protection performance

### OEM Selectable Features

- Customize Vendor ID, Product ID, and Device ID
- Select whether the hub is part of a compound device (When any downstream port is permanently hardwired to a USB peripheral device, the hub is part of a compound device)

- Flexible port mapping and disable sequence. Ports can be disabled/reordered in any order to support multiple product SKUs. Hub will automatically reorder the remaining ports to match the Host controller's numbering scheme
- Programmable USB differential-pair pin location
- Ease PCB layout by aligning USB signal lines directly to connectors
- Programmable USB signal drive strength. Recover USB signal integrity due to compromised system environment using 3-level driving strength resolution
- Select the presence of a permanently hardwired USB peripheral device on a port by port basis
- Configure the delay time for filtering the over-current sense inputs
- Configure the delay time for turning on downstream port power
- Configure the polarity of downstream port power control signals
- Indicate the maximum current that the 3-port hub consumes from the USB upstream port
- Indicate the maximum current required for the hub controller
- Supports Custom String Descriptor up to 31 characters in length for:
  - Product String
  - Manufacturer String
  - Serial Number String
- Pin Selectable Options for Default Configuration
  - Select Downstream Ports as Non-Removable Ports
  - Select Downstream Ports as Disabled Ports
  - Select Downstream Port Power Control and Over-Current Detection on a Ganged or Individual Basis
  - Select Downstream Port Power Control Polarity
  - Select USB Signal Drive Strength
  - Select USB Differential Pair Pin location
  - Select on-chip or off-chip voltage regulator mode

### Applications

- LCD monitors and TVs
- Multi-function USB peripherals
- PC mother boards
- Set-top boxes, DVD players, DVR/PVR
- Printers and scanners
- PC media drive bay
- Portable hub boxes
- Mobile PC docking
- Embedded systems

**ORDER NUMBERS:****USB2513-AEZG FOR 36 PIN, QFN LEAD-FREE ROHS COMPLIANT PACKAGE****USB2513-HZH FOR 48 PIN, QFN LEAD-FREE ROHS COMPLIANT PACKAGE**

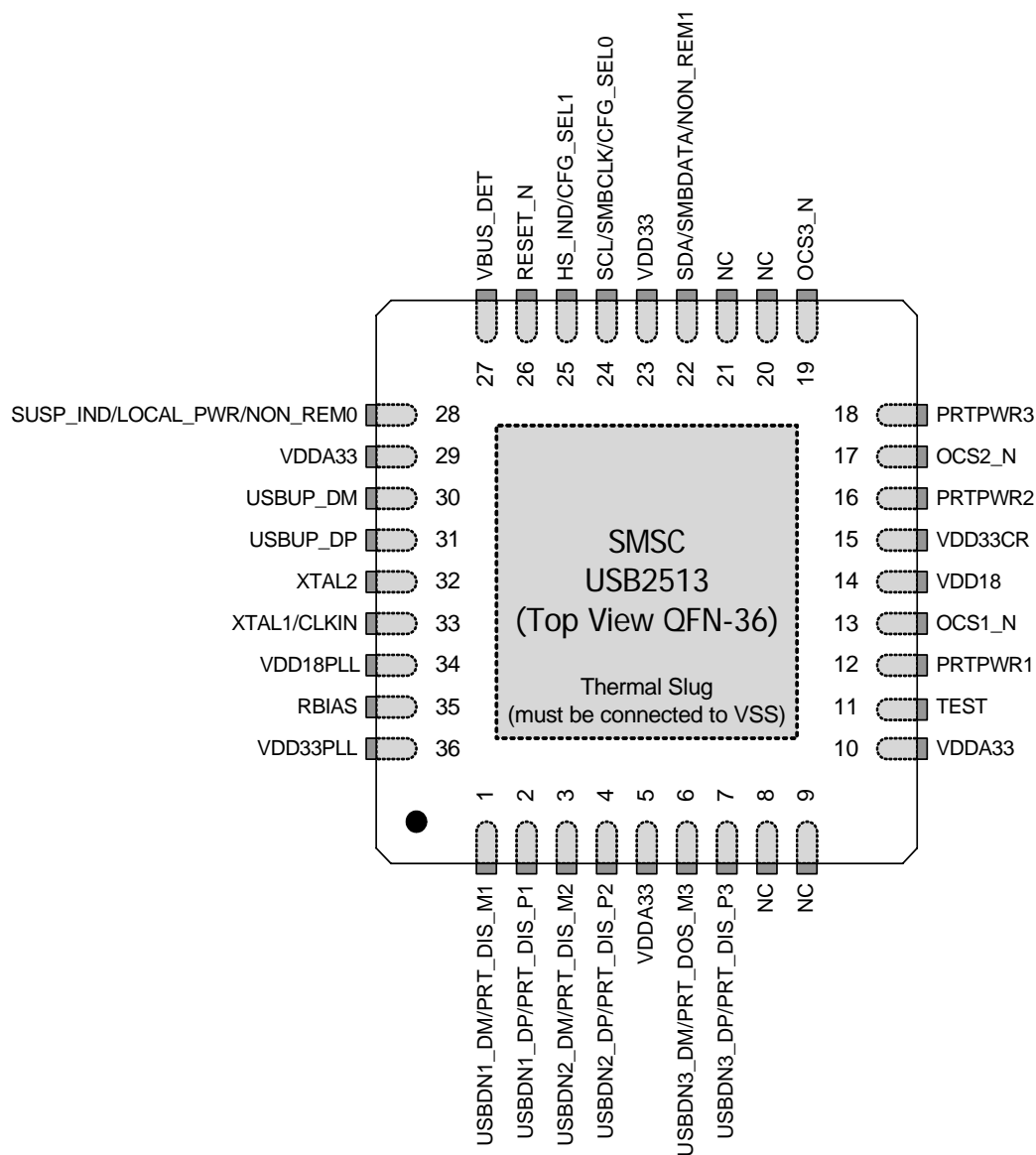
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## Pin Configuration




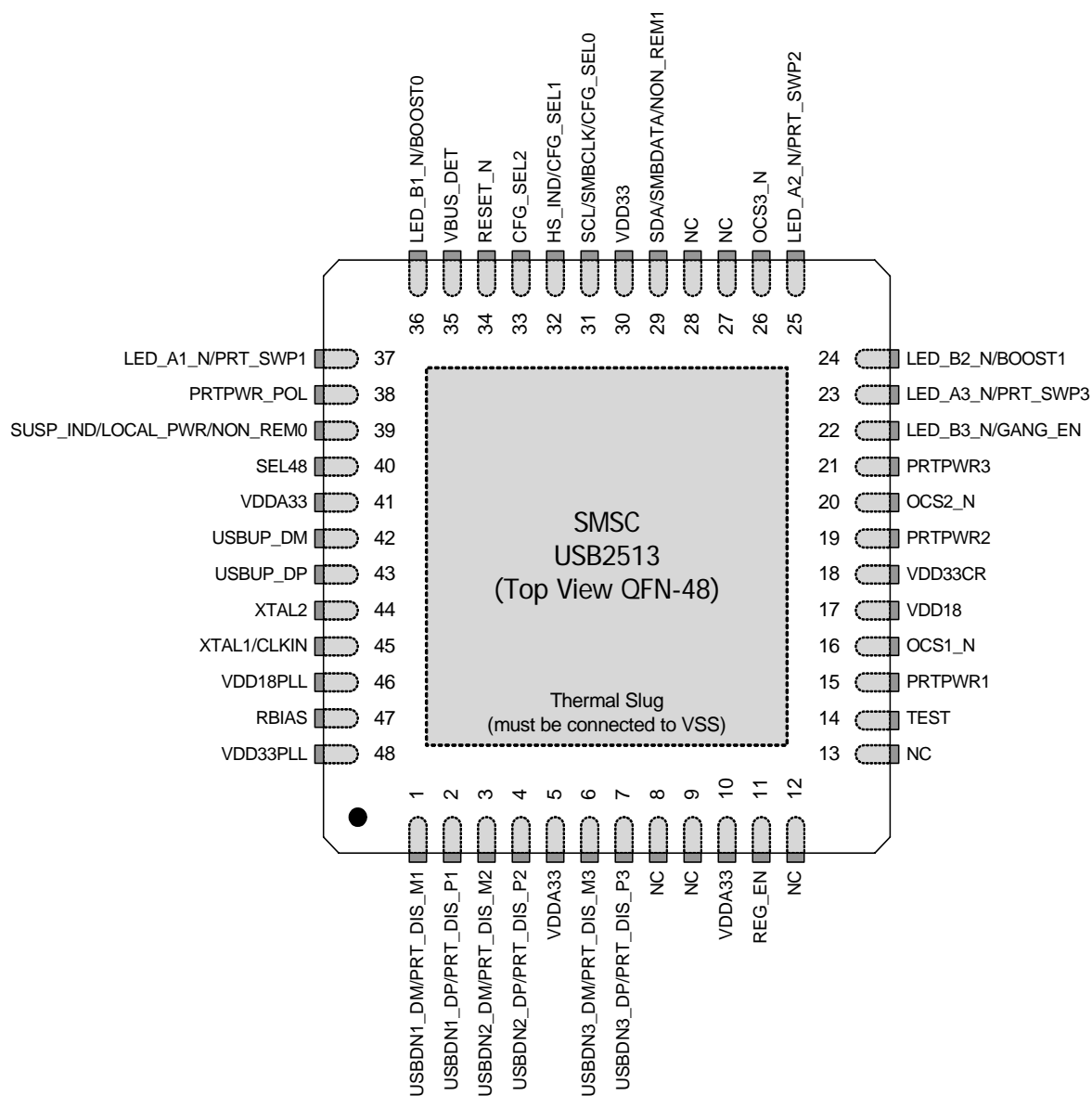
 Indicates pins on the bottom of the device.

Figure 1 USB2513 36-Pin QFN



Indicates pins on the bottom of the device.

Figure 2 USB2513 48-Pin QFN

## Block Diagram

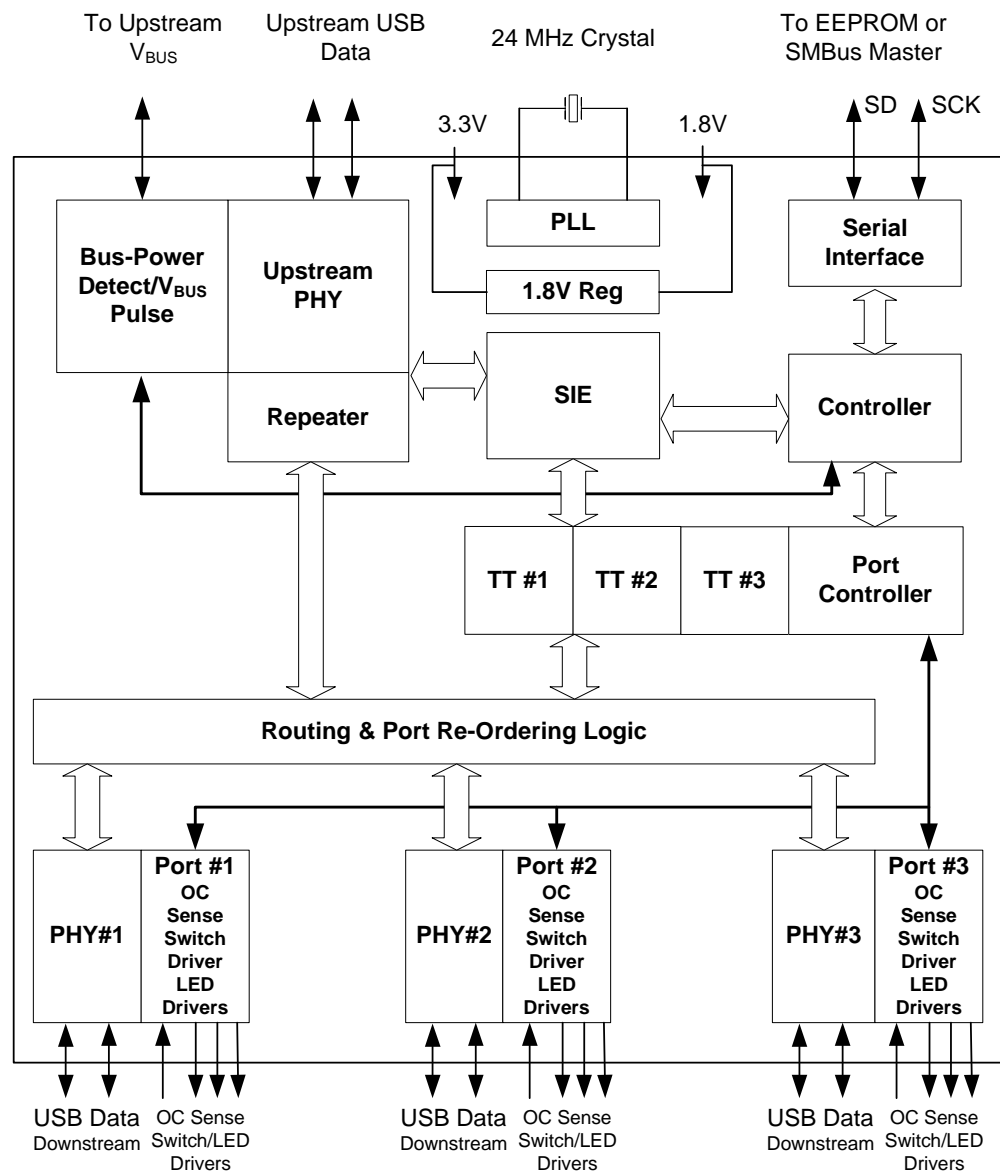


Figure 3 USB2513 Block Diagram

# Package Outlines

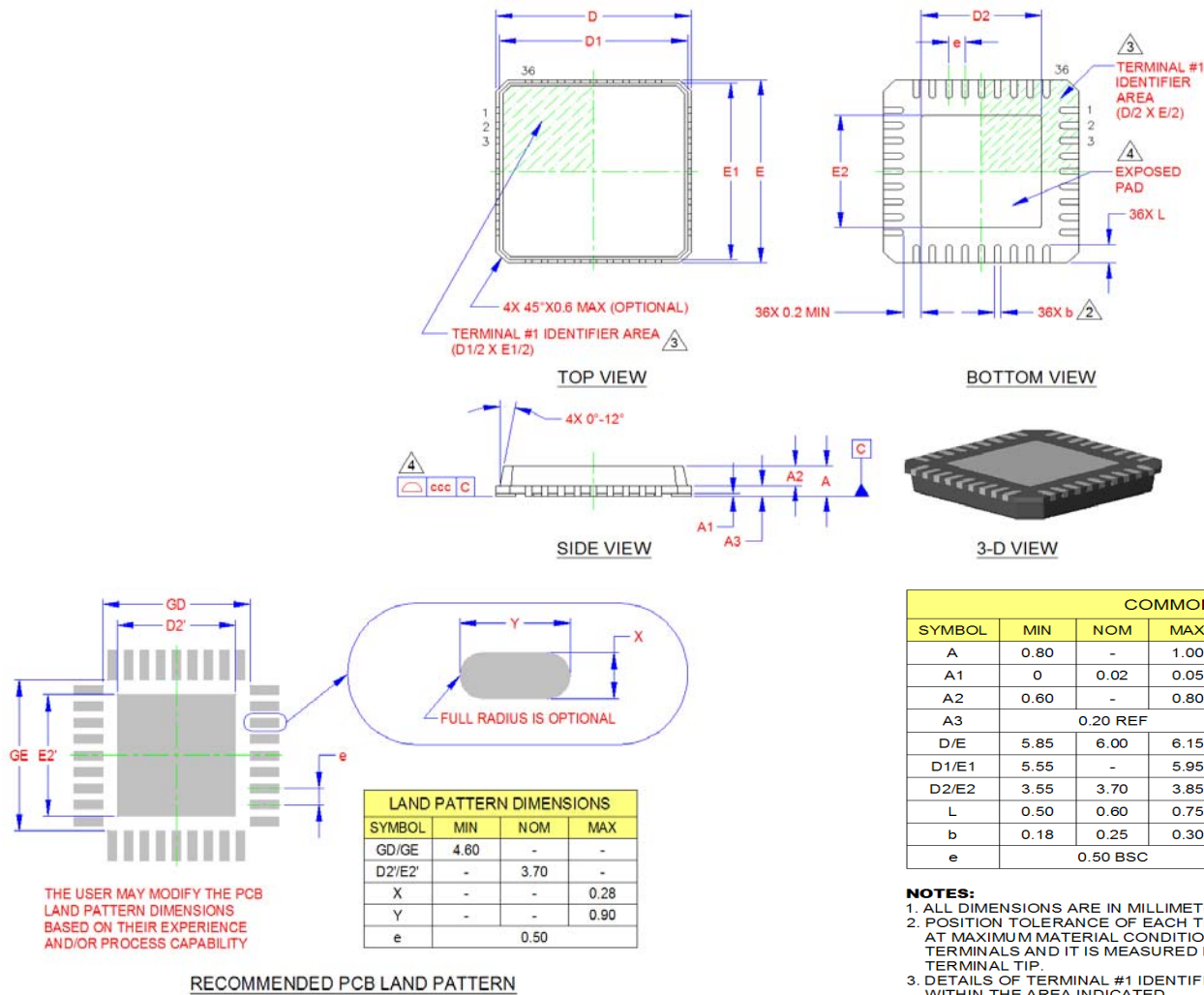
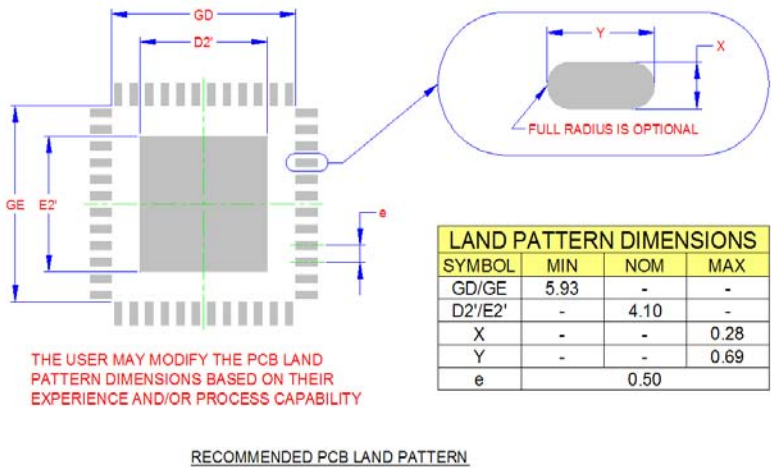
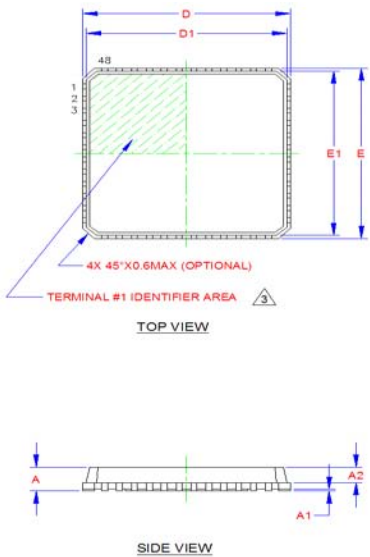
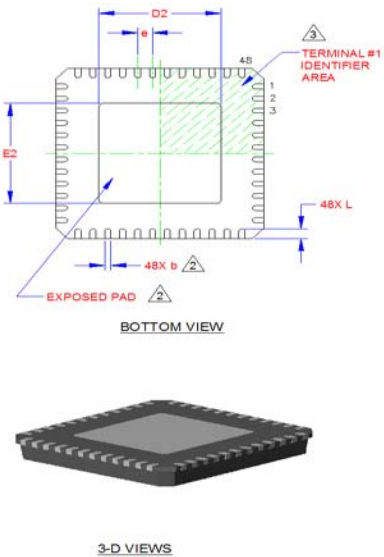


Figure 4 36-Pin QFN, 6x6mm Body, 0.5mm Pitch



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	6.85	7.00	7.15	-	X/Y BODY SIZE
D1/E1	6.55	-	6.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	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:**

- ALL DIMENSIONS ARE IN MILLIMETER.
- 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.
- DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

Figure 5 48-Pin QFN, 7x7mm Body, 0.5mm Pitch

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