



**USB2502**



## 2-Port USB 2.0 Hub Controller

### PRODUCT FEATURES

Data Brief

- Integrated USB 2.0 Compatible 2-Port Hub
  - High-Speed (480Mbps/s), Full-Speed (12Mbps/s) and Low-Speed (1.5Mbps/s) compatible
  - Full power management with ganged power control
  - Detects Bus-Power/Self-Power source and changes mode automatically
- Complete USB Specification 2.0 Compatibility
  - Includes USB 2.0 Transceivers
- VID/PID/DID, and Port Configuration for Hub via:
  - Single Serial I<sup>2</sup>C EEPROM
  - SMBus Slave Port
- Default VID/PID/DID, allows functionality when configuration EEPROM is absent
- Hardware Strapping options allow for configuration without an external EEPROM or SMBus Host
- On-Board 24MHz Crystal Driver Circuit or 24 MHz external clock driver
- Internal PLL for 480MHz USB 2.0 Sampling
- Internal 1.8V Linear Voltage Regulator
- Integrated USB termination and Pull-up/Pull-down resistors
- Internal Short Circuit protection of USB differential signal pins
- Basic single-color LED support
- 1.8 Volt Low Power Core Operation
- 3.3 Volt I/O with 5V Input Tolerance
- 36 Pin QFN or 48 Pin TQFP lead-free RoHS compliant package

**ORDER NUMBERS:****USB2502-AEZG FOR 36 PIN LEAD-FREE ROHS COMPLIANT QFN PACKAGE; USB2502-HT FOR 48 PIN LEAD-FREE ROHS COMPLIANT TQFP PACKAGE**

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## General Description

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The SMSC 2-Port Hub is fully compliant with the USB 2.0 Specification and will attach to a USB host as a Full-Speed Hub or as a Full-/High-Speed Hub. The 2-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.

The Hub works with an external USB power distribution switch device to control  $V_{BUS}$  switching to downstream ports, and to limit current and sense over-current conditions.

All required resistors on the USB ports are integrated into the Hub. This includes all series termination resistors on D+ and D- pins and all required pull-down and pull-up resistors on D+ and D- pins. The over-current sense inputs for the downstream facing ports have internal pull-up resistors.

Throughout this document the upstream facing port of the hub will be referred to as the upstream port, and the downstream facing ports will be called the downstream ports.

## OEM Selectable Features

A default configuration is available in the USB2502 following a reset. This configuration may be sufficient for some applications. Strapping option pins make it possible to modify a limited sub-set of the configuration options.

The USB2502 may also be configured by an external EEPROM or a microcontroller. When using the microcontroller interface, the Hub appears as an SMBus slave device. If the Hub is pin-strapped for external EEPROM configuration but no external EEPROM is present, then a value of '0' will be written to all configuration data bit fields (the hub will attach to the host with all '0' values).

The 2-Port Hub supports several OEM selectable features:

- Operation as a Self-Powered USB Hub or as a Bus-Powered USB Hub.
- Operation as a Dynamic-Powered Hub (Hub operates as a Bus-Powered device if a local power source is not available and switches to Self-Powered operation when a local power source is available).
- Optional OEM configuration via I2C EEPROM or via the industry standard SMBus interface from an external SMBus Host.
- Compound device support (port is permanently hardwired to a downstream USB peripheral device).
- Hardware strapping options enable configuration of the following features.
  - Non-Removable Ports
  - Port Power Polarity (active high or active low logic)

# Block Diagram

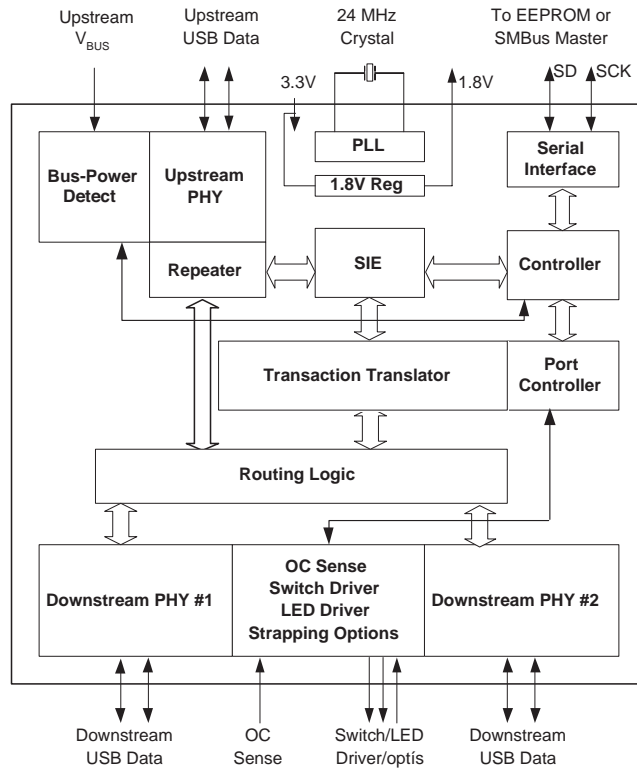


Figure 1 2-Port Block Diagram

# Package Outlines

Revision 2.3 (08-27-07)

PRODUCT PREVIEW

SMSC USB2502

2-Port USB 2.0 Hub Controller

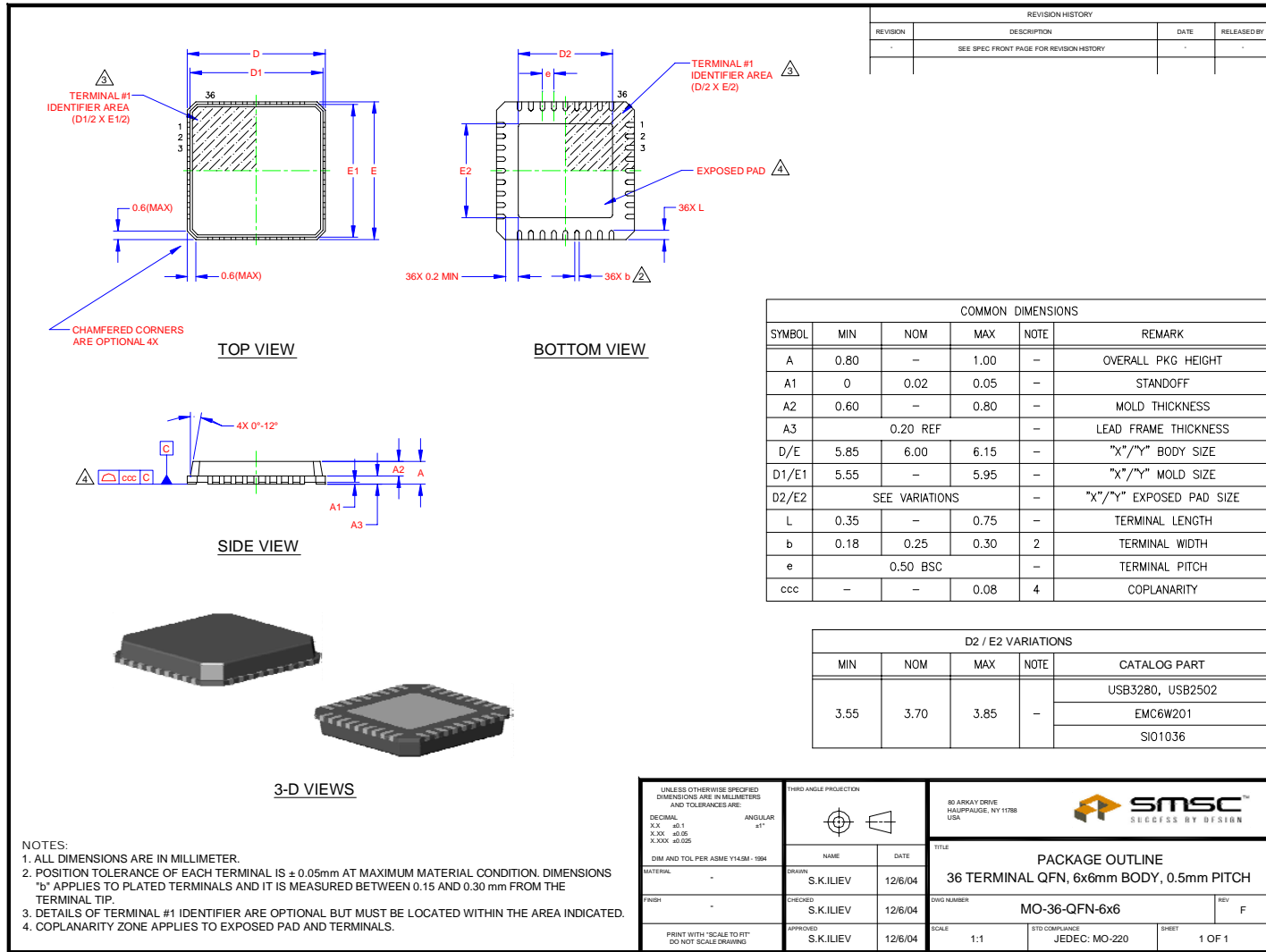
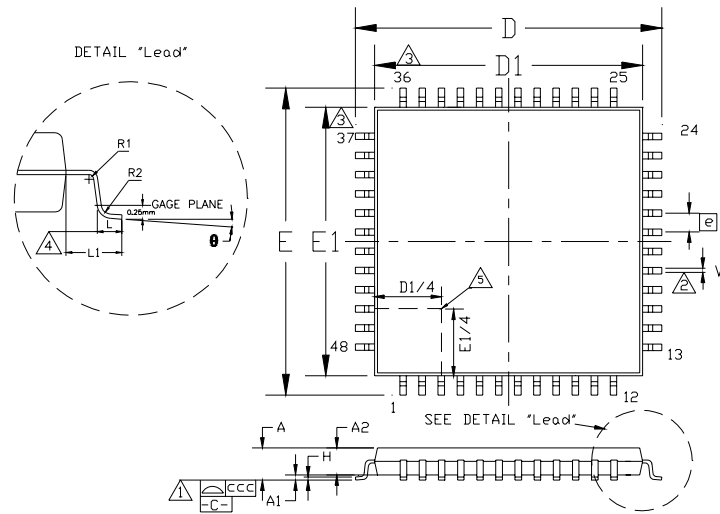


Figure 2 36 Pin QFN Package


**Figure 3 48 Pin TQFP Package Outline (7x7x1.4 mm body, 2mm Footprint)**
**Table 1 48 Pin TQFP Package**

	MIN	NOMINAL	MAX	REMARKS
A	~	~	1.60	Overall Package Height
A1	0.05	~	0.15	Standoff
A2	1.35	~	1.45	Body Thickness
D	8.80	~	9.20	X Span
D1	6.90	~	7.10	X body Size
E	8.80	~	9.20	Y Span
E1	6.90	~	7.10	Y body Size
H	0.09	~	0.20	Lead Frame Thickness
L	0.45	0.60	0.75	Lead Foot Length
L1	~	1.00	~	Lead Length
e	0.50 Basic			Lead Pitch
θ	0°	~	7°	Lead Foot Angle
W	0.17	0.22	0.27	Lead Width
R1	0.08	~	~	Lead Shoulder Radius
R2	0.08	~	0.20	Lead Foot Radius
ccc	~	~	0.08	Coplanarity

**Notes:**

1. Controlling Unit: millimeter.
2. Tolerance on the true position of the leads is  $\pm 0.04$  mm maximum.
3. Package body dimensions D1 and E1 do not include the mold protrusion. Maximum mold protrusion is 0.25 mm.
4. Dimension for foot length L measured at the gauge plane 0.25 mm above the seating plane.
5. Details of pin 1 identifier are optional but must be located within the zone indicated.