

## USB4640/USB4640i

# High-Speed Inter-Chip (HSIC) USB 2.0 Hub and Flash Media Controller

## PRODUCT FEATURES

Data Brief

### General Description

The SMSC USB4640/USB4640i is a Hi-Speed HSIC USB hub and card reader combo solution with an upstream port that is compliant to HSIC 1.0 (supplement to the *USB 2.0 Specification*). The two downstream ports are compliant with the *USB 2.0 Specification*.

High-Speed Inter-Chip (HSIC) is a digital interconnect bus that enables the use of USB technology as a low-power chip-to-chip interconnect at speeds up to 480 Mb/s. The HSIC interface is an industry standard 2-pin digital interface which uses standard USB software. The USB4640/USB4640i provides an ultra fast interface between an HSIC enabled host and several popular flash media formats. The controller allows read/write capability to flash media from the following families:

- Secure Digital™ (SD)
- MultiMediaCard™ (MMC)
- Memory Stick® (MS)
- xD-Picture Card™ (xD)<sup>1</sup>

The USB4640/USB4640i combo solution leverages SMSC's innovative technology that delivers industry-leading data throughput in mixed-speed USB environments. Average sustained transfer rates exceeding 35 MB/s are possible<sup>2</sup>.

### Highlights

- Upstream HSIC port and 2 exposed Hi-Speed USB 2.0 downstream ports for external peripheral expansion
- Dedicated flash media reader internally attached to a 3rd downstream port of the hub as a USB compound device
  - single or multiplexed flash media reader interface
- **PortMap**
  - Flexible port mapping and disable sequencing
- **PortSwap**
  - Programmable USB differential-pair pin locations ease PCB design by aligning USB signal lines directly to connectors
- **PHYBoost**
  - Programmable USB signal drive strength for recovering signal integrity using 4-level driving strength resolution

### Features

- Compliance with the following flash media card specifications SD 2.0; MMC 4.2; MS 1.43; MS-Pro 1.02; MS-Pro-HG 1.01; MS-Duo 1.10; and xD 1.2
- Low-power digital HSIC interface offers a replacement for onboard host and device connection for analog USB bus cable
- HSIC interface enables printers, mobile PCs, ultra-mobile PCs, and cell phone products to reduce the total power budget
- HSIC interface provides use of USB connectivity and compatibility with existing USB drivers and software
- External 1.2 V reference allows upstream/downstream HSIC links to use the same voltage reference
- Supports a single external 3.3 V supply source; internal regulators provide 1.8 V internal core voltage for additional bill of materials and power savings
- The hub transaction translator (TT) supports Full-Speed and Low-Speed peripheral operation
- 9 KB RAM | 64 KB on-chip ROM
- Enhanced EMI rejection and ESD protection performance
- Hub and flash media reader/writer configuration from a single source:
  - Configures internal code using an external I<sup>2</sup>C EEPROM
  - Supports external code using an SPI Flash EEPROM
  - Customizable vendor ID, product ID, and language ID if using an external EEPROM
- Up to 9 configurable GPIOs for special functions
- The USB4640 supports the commercial temperature range of 0°C to +70°C
- The USB4640i supports the industrial temperature range of -40°C to +85°C
- 48-pin QFN (7 x 7 mm) lead-free, RoHS compliant package

### Applications

- 3G/4G handsets, smartphones, cell phones, and other mobile devices
- Desktop and mobile PCs
- Printers
- GPS navigation systems
- Media players/viewers
- Consumer A/V
- Set-top boxes
- Industrial products

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1. Obtain user license from the xD-Picture Card License Office.  
 2. Host and media dependent.

**Order Numbers:**

**USB4640/USB4640i-HZH-xx for 48-pin, QFN lead-free RoHS compliant package**

**USB4640/USB4640i-HZH-TR-xx for 48-pin, QFN lead-free RoHS compliant tape and reel package**

“XX” in the order number indicates the internal ROM firmware revision level. Please contact SMSC for more information.

**This product meets the halogen maximum concentration values per IEC61249-2-21**

**For RoHS compliance and environmental information, please visit [www.smssc.com/rohs](http://www.smssc.com/rohs)**

*Please contact your SMSC sales representative for additional documentation related to this product such as application notes, anomaly sheets, and design guidelines.*

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# Block Diagram

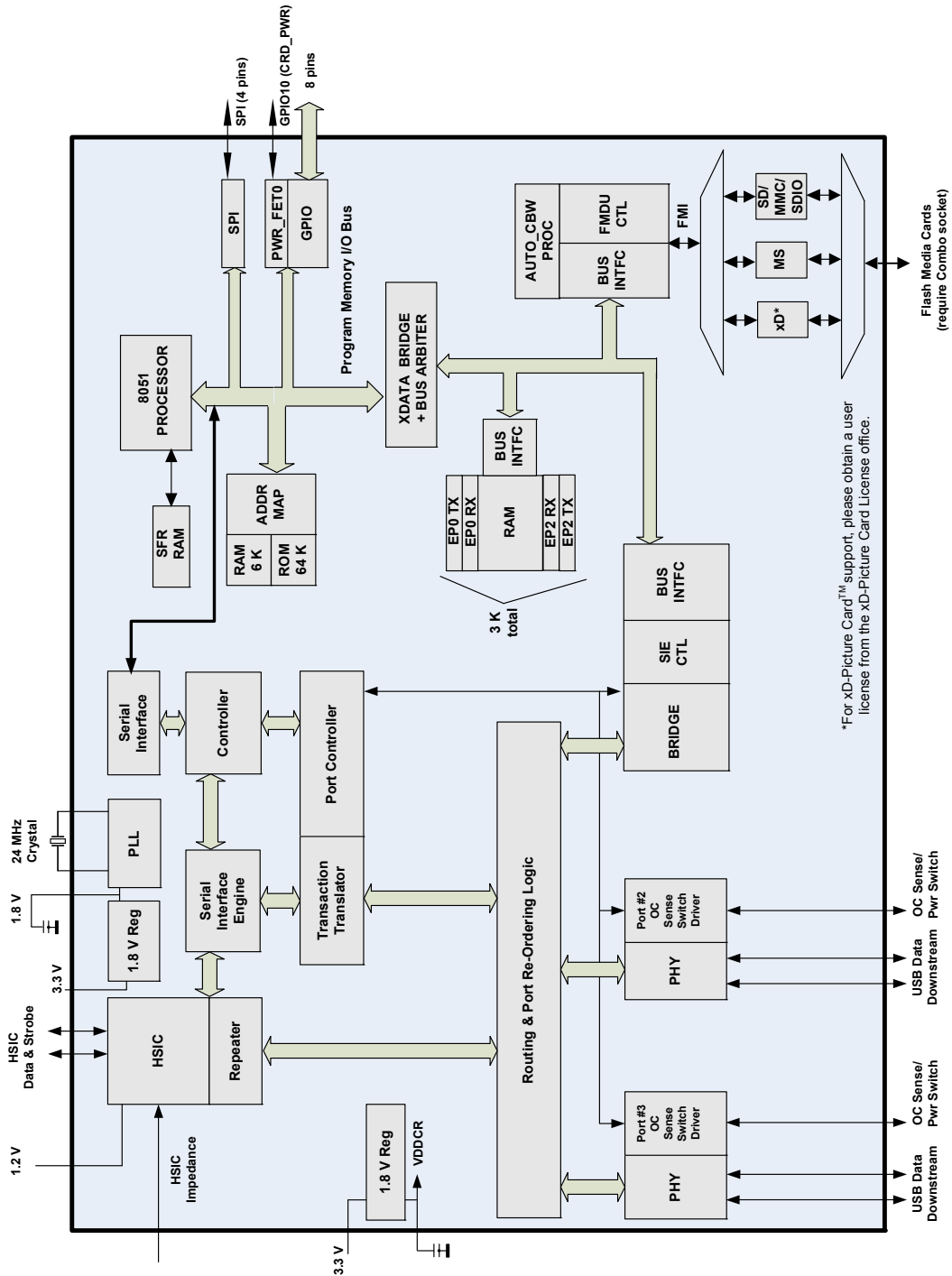
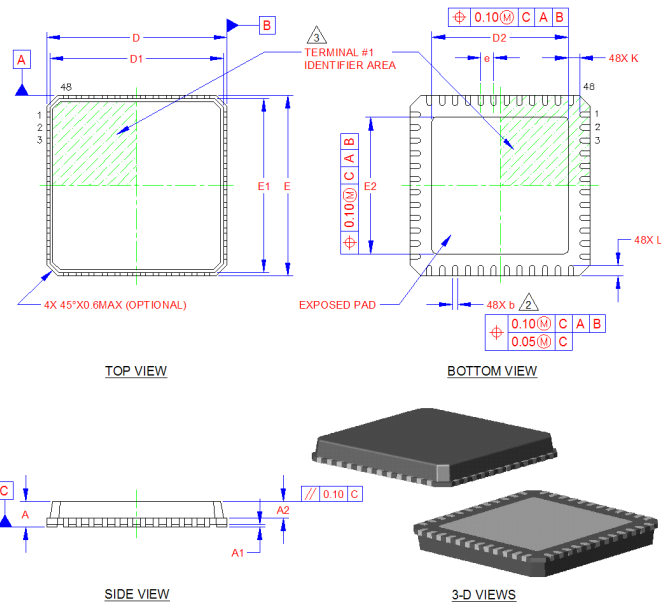


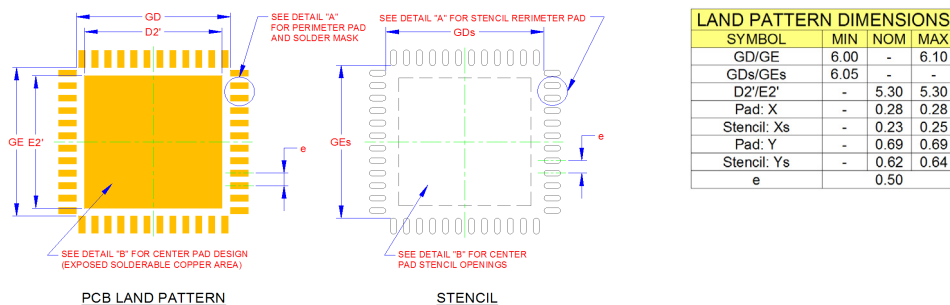
Figure 1 USB4640/USB4640i Block Diagram

# Package Outline



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	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	6.75	6.95	-	X/Y MOLD CAP SIZE
D2/E2	5.20	5.30	5.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

**NOTES:**  
 1. ALL DIMENSIONS ARE IN MILLIMETER.  
 2. 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	6.00	-	6.10
GDs/GEs	6.05	-	-
D2'/E2'	-	5.30	5.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		-

Figure 2 USB4640/USB4640i 48-Pin QFN