

## USB375x

# USB 2.0 Protection IC with Battery Charger Detection

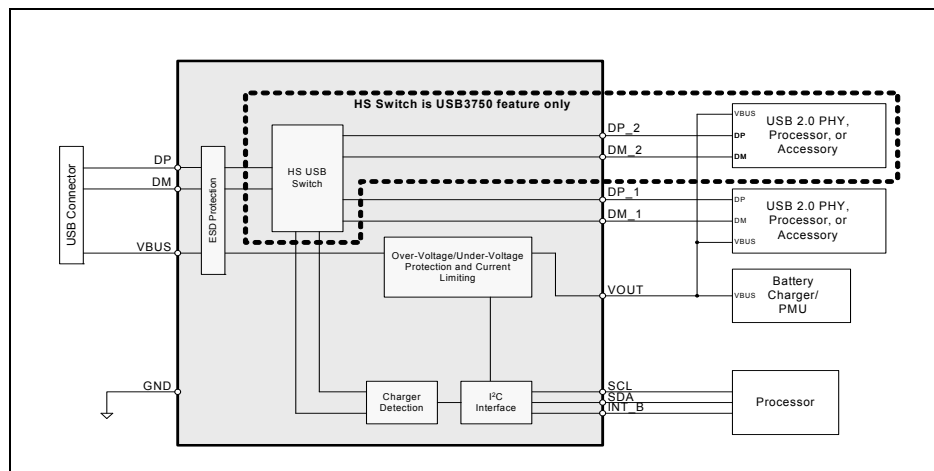



### PRODUCT FEATURES

Data Brief

- **VBUS Over-Voltage Protection**
  - Protects internal circuits from VBUS up to 9V
  - Over-Voltage/Under-Voltage Lockout opens VBUS switch
  - Interrupt to indicate Over-Voltage/Under-Voltage Lockout
  - Integrated Low  $R_{DS(ON)}$  FET
- **USB Port ESD Protection (DP/DM/VBUS)**
  - $\pm 15kV$  (air discharge)
  - $\pm 15kV$  (contact discharge)
  - IEC 61000-4-2 level 4 ESD protection without external devices
- **High Speed USB Mux for multiplexing the USB lanes between different functions (USB3750 only)**
  - Switch the USB connector between two different functions
  - High bandwidth USB switch passes HS USB signals
- **Provides USB Battery Charger Detection for:**
  - USB-IF Battery Charging compliant Dedicated Charging Ports (DCP)
  - USB-IF Battery Charging compliant Charging Downstream Port (CDP)
- Standard Downstream Port (SDP); i.e. USB host or downstream hub port
- Dedicated SE1 type chargers
- **Dead Battery Provision Support (USB375x-1 only)**
  - Allows 100mA trickle charging from VBUS when attached to a Standard Downstream Port (SDP) while not enumerated
  - Built-in 100mA current limiting option
- **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
  - Maximizes power delivered to the system
- **Industrial Operating Temperature -40°C to +85°C**

### USB375x Block Diagram



**Order Numbers:**

ORDER NUMBER	PACKAGE TYPE	PACKAGE SIZE
USB3750A-1-A4-TR (see <a href="#">Note 1</a> )	16 pin, QFN lead-free RoHS compliant package	3.0mm x 3.0mm
USB3751A-1-A4-TR (see <a href="#">Note 2</a> )		
USB3751A-2-A4-TR (see <a href="#">Note 3</a> )		

**Note 1** Provides HS mux and support for 100mA dead battery current limiting.

**Note 2** Provides support for 100mA dead battery current limiting.

**Note 3** Does not provide support for 100mA dead battery current limiting.

**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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The USB375x integrates many features that have historically been discrete devices in a mobile product. This device provides significant VBUS protection for the entire system, robust USB interface ESD protection, a USB 2.0 compliant High Speed switch, and USB-IF Battery Charger Detection (revision 1.1) capabilities that are essential to the latest mobile products.

Several advanced features allow the USB375x to be optimized for portable applications and to reduce both eBOM part count and printed circuit board (PCB) area. Outstanding ESD robustness eliminates the need for external ESD protection devices.

In addition to the integrated ESD protection on the USB interface, the USB375x provides VBUS Over-Voltage Protection (OVP).

The USB375x integrated battery charger detection circuitry supports USB-IF Battery Charger Detection. Battery charger detection will begin automatically whenever VBUS rises above the UVLO threshold, and can also be completed manually through the I<sup>2</sup>C interface. The USB375x can detect a range of USB battery chargers including a Standard Downstream Port (SDP), a Charging Downstream Port (CDP), and a Dedicated Charging Port (DCP). For more information on USB battery charger detection, please see the USB Battery Charging Specification, Revision 1.1.

The I<sup>2</sup>C interface gives processor control over the USB Switch, charger detection, OVLO settings, and status of the USB375x. In addition, custom charger detection can be implemented through the I<sup>2</sup>C interface.

The USB375x family is enabled with SMSC's RapidCharge Anywhere™ which supports USB-IF Battery Charging 1.1 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.

# Package Outline

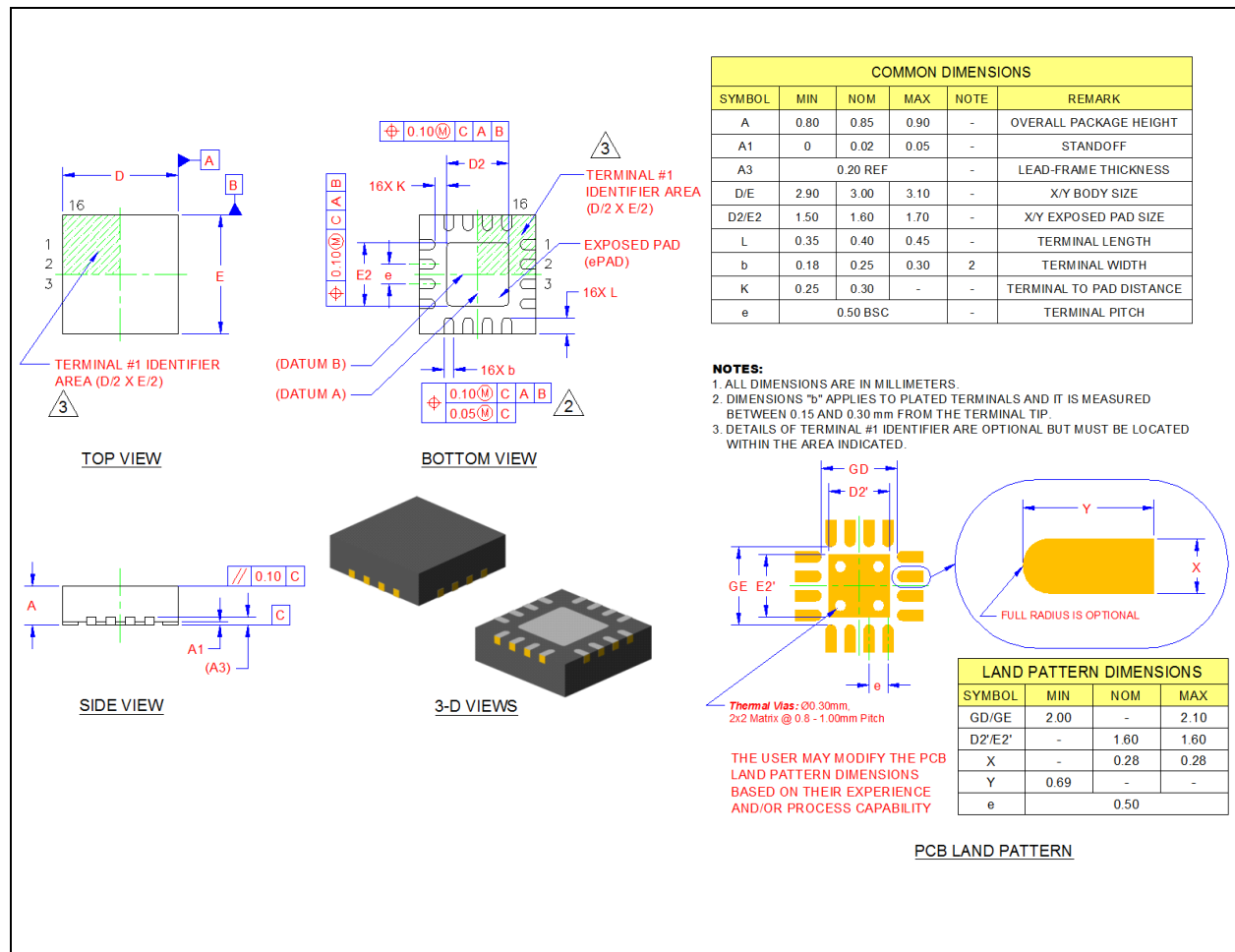


Figure 1 16-Pin, 3.0mm x 3.0mm QFN Package Outline