



# Programmable USB Port Power Controller with Charger Emulation

## PRODUCT FEATURES

Data Brief

### General Description

The UCS1002 provides a USB port power switch for precise control of up to 2.5 amperes continuous current with over-current limit (OCL), dynamic thermal management, latch or auto-recovery (low test current) fault handling, selectable active low or high enable, under- and over-voltage lockout, back-drive protection, and back-voltage protection.

Split supply support for VS and VDD is an option for low power in system standby states. This gives battery operated applications, like notebook PCs, the ability to detect attachments from a sleep or off state. After the Attach Detection is flagged, the system can decide to wake up and/or provide charging.

In addition to power switching and current limiting modes, the UCS1002 will automatically charge a wide variety of portable devices, including USB-IF BC1.2, YD/T-1591 (2009), most Apple<sup>®</sup> and RIM<sup>®</sup>, and many others. Nine preloaded charger emulation profiles maximize compatibility coverage of peripheral devices. As well, a customizable charger emulation profile is available to accommodate unique existing and future portable device handshaking / signature requirements.

The UCS1002 also provides current monitoring to allow intelligent management of system power and charge rationing for controlled delivery of current regardless of the host power state. This is especially important for battery operated applications that want to provide power in a standby and/or off state but do not want to drain the battery excessively.

The UCS1002 is available in a 20-pin QFN 4 mm x 4 mm package.

### Applications

- Notebook and Netbook Computers
- Tablets and E-book readers
- Desktops and Monitors
- Docking Stations and Printers
- AC-DC wall adapters

### Features

- Port power switch with two current limit behaviors
  - 2.9 V to 5.5 V source voltage range
  - Up to 2.5 A current with 55 mΩ On Resistance
  - Over-current trip or constant current limiting
  - Soft turn-on circuitry
  - Programmable current limit
  - Dynamic thermal management
  - Under- and over-voltage lockout
  - Back-drive, back-voltage protection
  - Latch or auto-recovery (low test current) fault handling
  - Selectable active high or low power switch enable
  - BC1.2 VBUS discharge port renegotiation function
- Selectable / automatic cycling of USB data line charger emulation profiles
  - USB-IF BC1.2 charging downstream port (CDP) & dedicated charging port (DCP) modes, YD/T-1591, and most Apple and RIM protocols standard; others as defined via the SMBus 2.0 / I<sup>2</sup>C<sup>®</sup>
  - USB 2.0 compliant high-speed data switch (in Pass-through and CDP modes)
  - Nine preloaded charger emulation profiles for maximum compatibility coverage of peripheral devices
  - One custom programmable charger emulation profile for portable device support for fully host controlled charger emulation
- Self-contained current monitoring and charge rationing for power allocation applications
- Automatic shutdown when Battery Full option
- Low power Attach Detection and open-drain A\_DET# pin
- Ultra low power Sleep state
- Optional split supply support for VBUS and VDD for low power in system standby states
- Wake on Attach USB
- SMBus 2.0 / I<sup>2</sup>C communications
  - Supports Block Write and Read
  - Multiple SMBus addresses
- Wide operating temperature range: -40 °C to +85 °C
- IEC61000-4-2 8 / 15 kV ESD immunity
- UL recognized and EN/IEC 60950-1 (CB) certified

**Ordering Information**

<b>ORDERING NUMBER</b>	<b>PACKAGE</b>	<b>FEATURES</b>
UCS1002-1-BP-TR	20 pin QFN 4 mm x 4 mm (Lead Free RoHS compliant)	USB Port Power Controller with Charger Emulation, Attachment Detection, Current Monitoring, Current Rationing, Programmable SMBus address

**REEL SIZE IS 4,000 PIECES**

**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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## Block Diagram

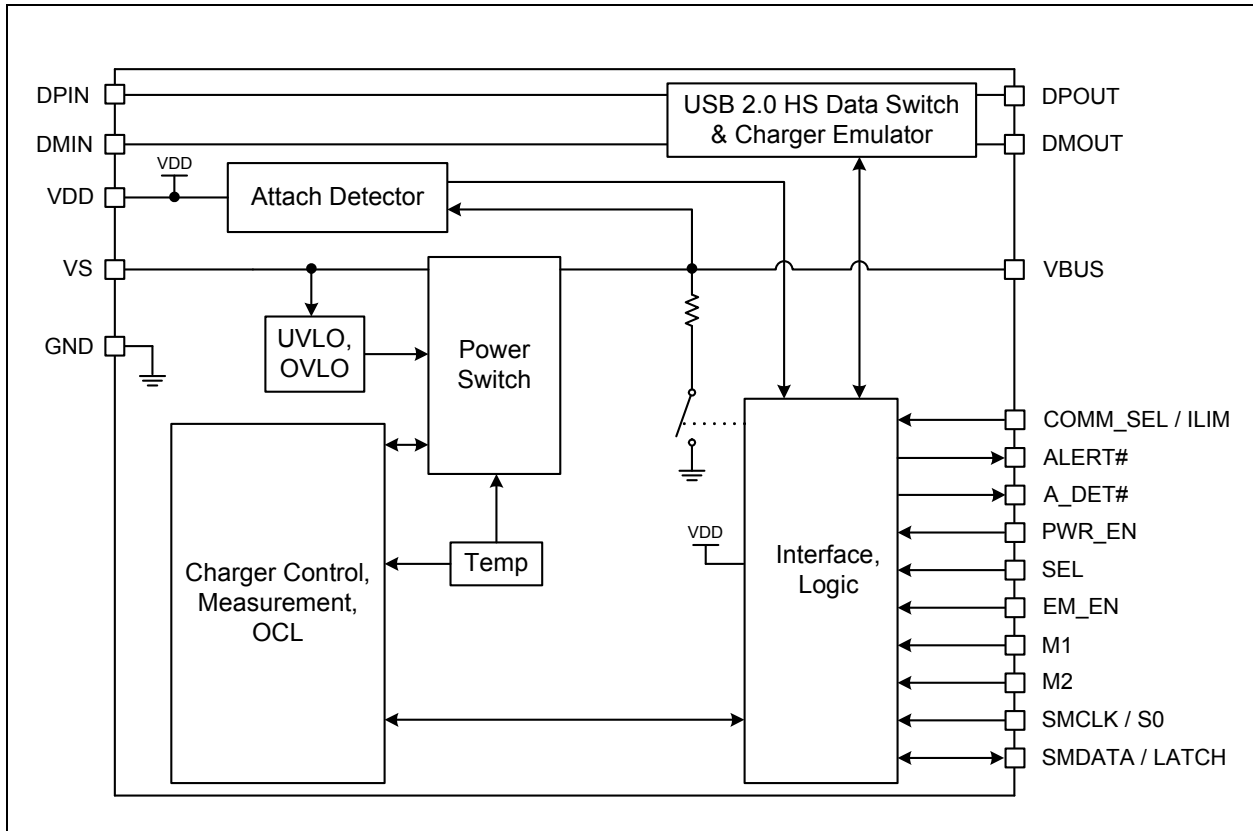


Figure 1 UCS1002 Block Diagram

## Package Outline

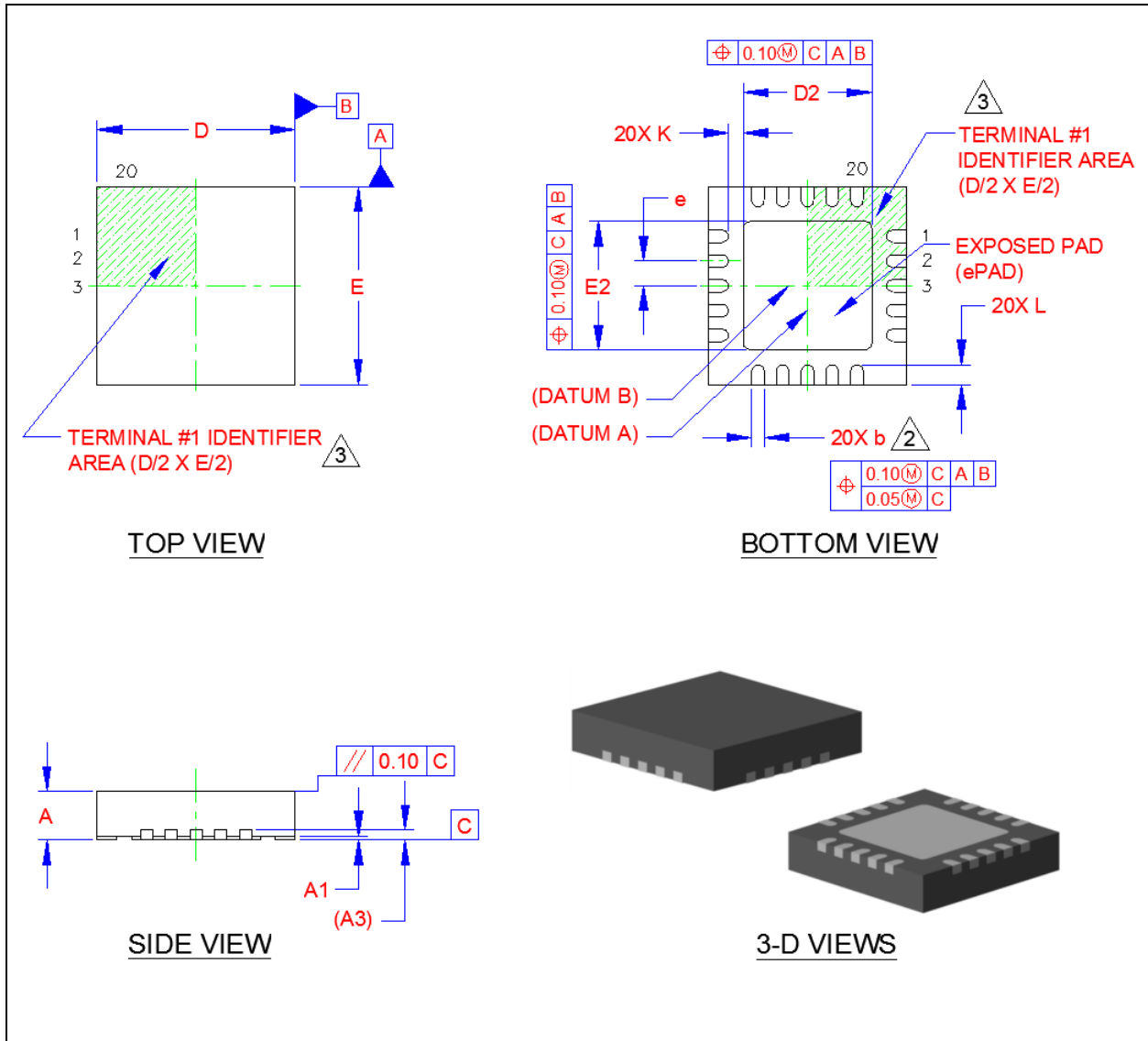


Figure 2 UCS1002 20-pin QFN Package Outline, 4 mm x 4 mm

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.50	2.60	2.70	-	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	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
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.

Figure 3 UCS1002 Package Parameters