

Description

The PSC5425E combines a highly integrated switch-mode charger, to minimize single-cell Lithium-ion (Li-ion) charging time from a USB power source, and a boost regulator to power a USB peripheral from the battery.

The charging parameters and operating modes are programmable through an I²C interface. The charger and boost regulator circuits switch at select-able frequency to lower the EMI and minimize the size of external passive components.

The PSC5425E provides battery charging in three phases: conditioning, constant current, and constant voltage.

To ensure USB compliance and minimize charging time, the input current is limited to the value set through the I²C host. Charge termination current is programmable through the I²C host.

The integrated circuit (IC) automatically restarts the charge cycle when the battery falls below an internal threshold. If the input source is removed, the IC enters a high-impedance mode with leakage from the battery to the input prevented. Charge status is reported back to the host through the I²C port.

The PSC5425E can operate as a boost regulator on command from the system. The boost regulator includes a soft-start that limits inrush current from the battery.

The PSC5425E is available in a 20-bump, 0.4mm pitch WLCSP package.

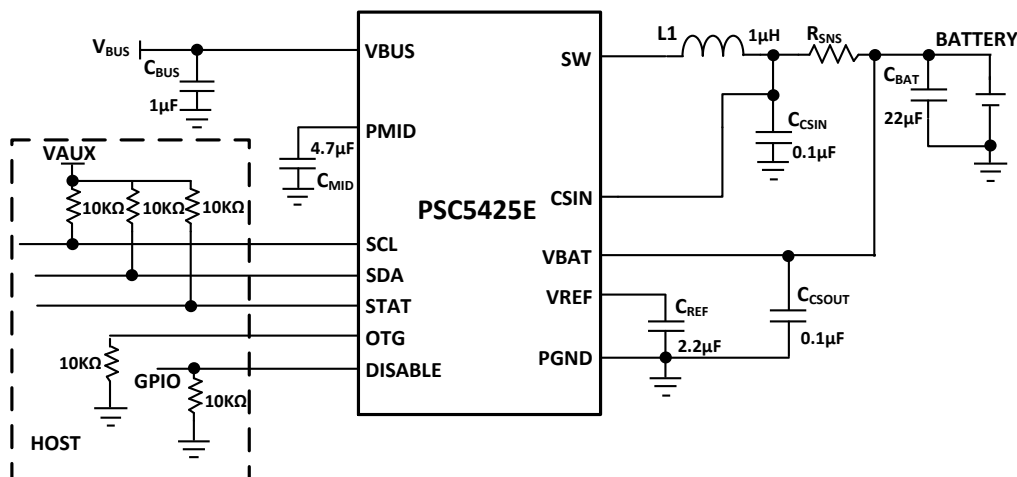


Figure 1: Typical Application

Feature

- Fully Integrated, High-Efficiency Charger for Single-Cell Li-Ion and Li-Polymer Battery Packs
- Faster Charging than Linear
- Charge Voltage Accuracy: ±0.5% 25°C
- ±5% Charge Current Regulation Accuracy
- 29V Absolute Maximum Input Voltage
- 6V Maximum Input Operating Voltage
- 2.25A Maximum Charge Rate

Application

- Cellular Phones, Smart Phones, PDAs
- Tablet, Portable Media Players
- Gaming Device, Digital Cameras

USB-Compliant Single-Cell Li-Ion Switching Charger with USB-OTG Boost Regulator

- Programmable through I²C Interface:
 - Input Current
 - Fast-Charge/Termination Current
 - Charger Voltage
 - Termination Enable
- Synchronous Buck PWM Controller with Wide Duty Cycle Range
- Small Footprint 1μH External Inductor
- Weak Input Sources Accommodated by Reducing Charging Current to Maintain Minimum VBUS Voltage
- Low Reverse Leakage to Prevent Battery Drain to VBUS
- 5V, 700mA Boost Mode for USB OTG for 3.3 to 4.5V Battery Input

Recommended External Components

Key Components	Recommended specification
L1	Inductor, 1.0-2.2uH, +-20%, Isat>3A
C _{MID}	Capacitor, 4.7μF, +-10%, >6V
C _{REF}	Capacitor, 2.2-4.7μF, +-10%, >6V
C _{BUS}	Capacitor, 1μF, +-10%, >30V

Block Diagram

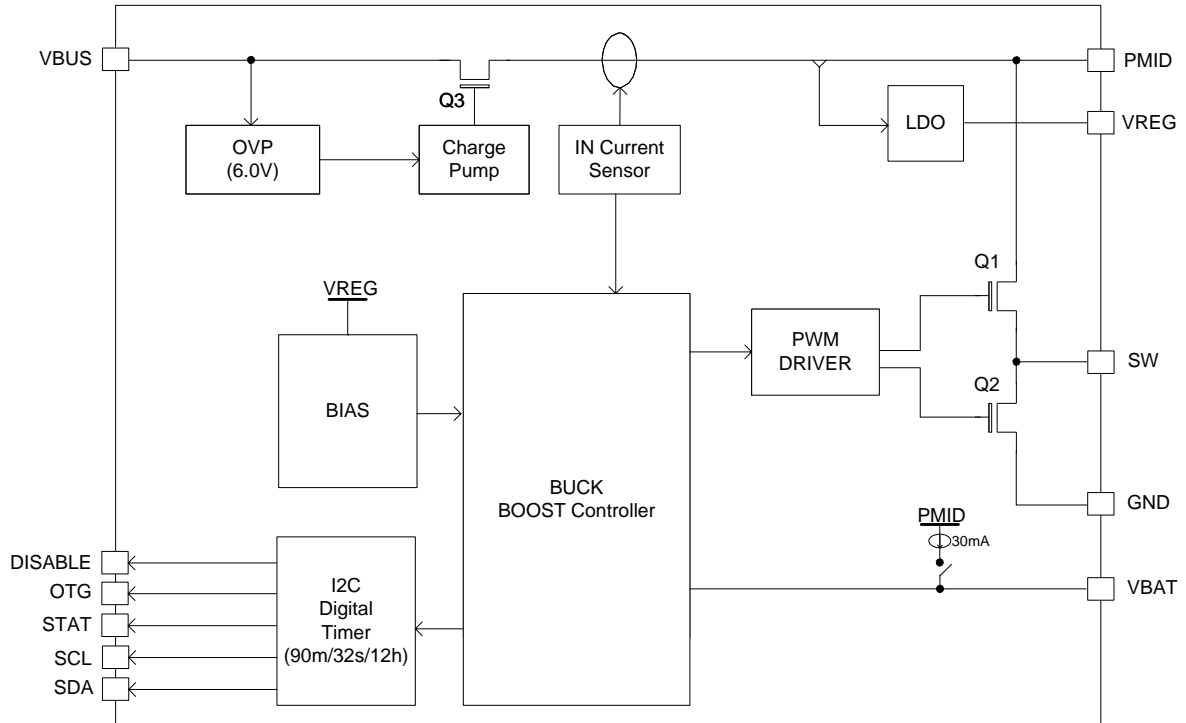


Figure 2: IC and System Block Diagram

Pin Configuration

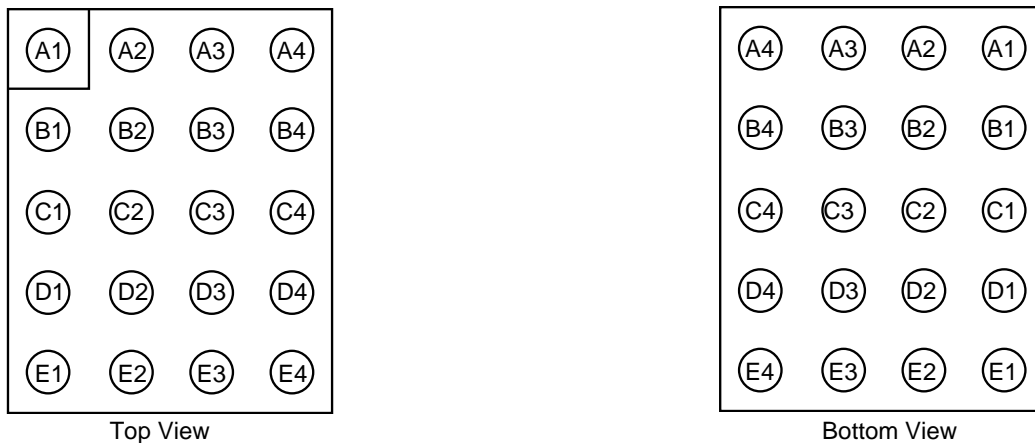



Figure 3: WLCSP-20 Pin Assignments


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