Type-C Multi-cell NVDC Buck-Boost Charger

Features

- NVDC multi-cell battery charger
  - High efficiency buck-boost architecture integrates four power FETs (two half bridges)
  - Charges 1S to 4S battery systems
  - >95% efficiency @ 5A (VBUS 15V, VBAT 8V)
  - 4V to 21.5V VBUS input (sink mode) compliant, up to 6A output current
  - Max output power delivered (sink mode) is 6A x V_{SYS}
  - Typical power handling range: 15W to 22.5W per cell
  - Gate driver for an external P-channel FET switch allows instant power up in fully depleted battery scenario as well as battery supplement function (ideal diode operation)
  - Automatic trickle and pre-charge algorithm
  - External 10mohm battery current sensing resistor
  - Supports parallel multi-port charging
- Extensive set of safety features
  - Battery cell remote sensing
  - Battery Over-voltage, over-current protection
  - Battery thermal protection (JEITA compliant)
  - Battery swelling protection algorithm
  - 24V Abs Max on VBUS
  - VBUS over/under voltage protection
  - External FET gate driver for output (source mode) power path management with output over current protection and CLS mode
- High accuracy regulation and monitoring
  - +/- 0.5% Charging voltage accuracy
  - +/- 5% Charging current accuracy
  - +/- 1.5% Fuel gauging accuracy
  - +/- 5% accuracy for all current limiting and voltage monitoring functions
  - USB Type-C & OTG compliant power source
  - 3V to 20V VBUS output (source mode), up to 5A
- IMVP8 support though PSYS and PROCHOT#
- Type-C-PD compliant power source and sink
  - Peak current overload support/current foldback support
  - PPS profile support as per USB PD latest spec
  - Direct charging ready, source (up to 5A) and sink
  - Slave I2C interface operating in FAST, FAST+ and HS modes, reconfigurable as SMBus
  - Provides a complete Type-C PD solution when paired with SM5517 Type-C PD controller
  - Fast Role Swap dedicated pin for immediate reaction to fast role swap commands
- MISC
  - 10-bit ADC for system measurements
  - Fuel gauging
  - 3.3V 100mA LDO supply
  - PCB type-3 compliant package
- Certifications
  - UL62368-1 n. E60693-A6001-UL
  - IEC62368-1: 2018 n. DK-104760-UL

Applications

- Laptops, Ultra-books, Tablets
- Any 1S to 4S battery powered system

Device Information

Part Number	Package	Body Size
SM5803A	75 pin WLCSP	4.4870mm x 3.3870mm

Description

The SM5803A is a high efficiency Narrow VDC buck boost 6A battery charger for power bank, laptop and mobile applications. It integrates most features required to handle the power needs a USB type-C PD 3.0 capable port, plus a comprehensive battery management solution that minimizes external components.

The SM5803A supports 1, to 4 cell Li-Ion batteries. The charger section can manage 4V to 21.5V input voltages working either in step-down buck mode, step-up boost mode as well as buck-boost mode when configured as power sink, with charging/system currents up to 6A at battery/system level.

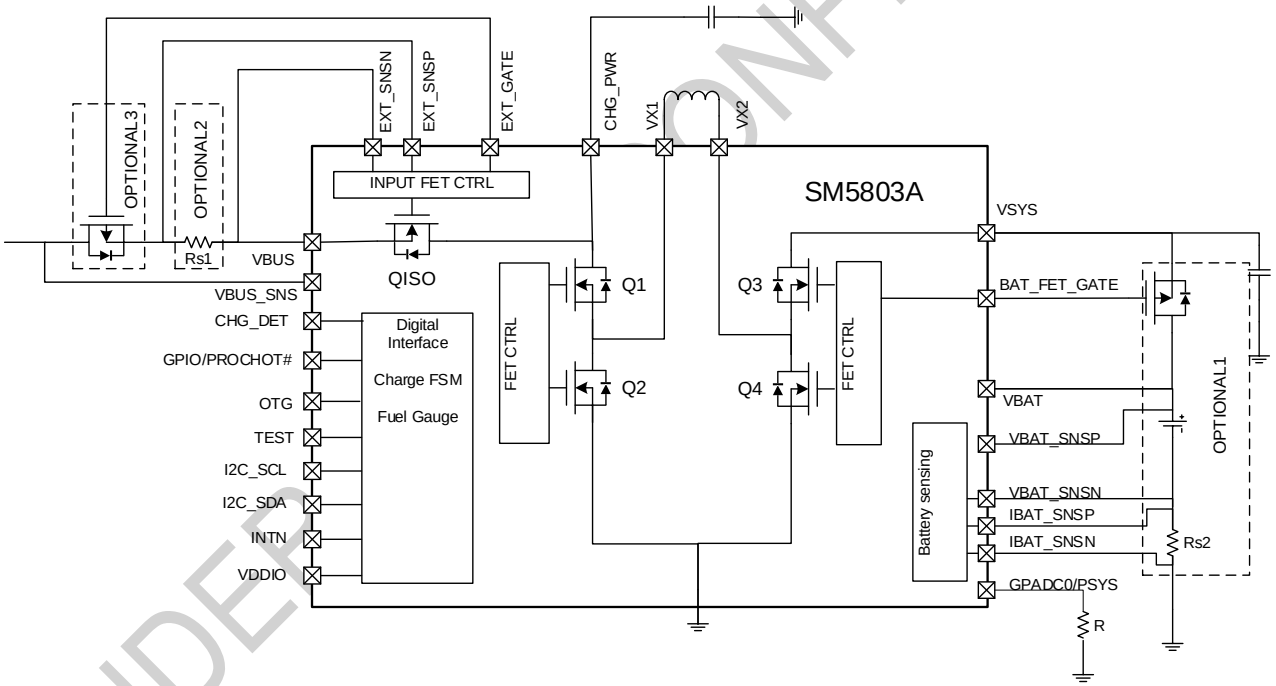
The SM5803A supports either reverse step-down buck, reverse step-up boost or reverse buck-boost modes, providing 3V to 20V as a power source and up to 5A current output. The output voltage can be set with 10mV resolution, ensuring compliance with the latest USB PD 3.0 spec PPS profile.

The SM5803A includes measurement functions, low power fuel gauge mode, external FET gate controllers input/battery/capacity tank power-paths, USB OTG regulator, anti-swelling protection.

It is also direct charging ready through dedicated multiple battery protection mechanisms supporting direct charging techniques both as source and sink.

The SM5803A offers full IMVP8 support through PSYS, PROCHOT and OTG pins. OTG pin can be configured to act as a fast role swap input pin to enable quick 5V sourcing in type-C PD FRS time sensitive applications.

Figure 1: SM5803A block diagram



OPTIONAL1 = Required when connecting to a battery else not needed
OPTIONAL2 = Required for PSYS/PROCHOT current sensing and/or sourcing on VBUS with CLS function in buck mode, else not needed
OPTIONAL3 = Required for VBUS sourcing in boost mode with CLS function