



# Synchronous, Bi-directional Buck Charger Controller with Hybrid Power Boost Mode and Processor Hot Monitor

## 1 Descriptions

SC89781 is a synchronous buck charger, which supports buck mode and boost mode during forward charging or reverse discharging operations. SC89781 manages 1S to 4S battery charging from a wide input range from 4.5V to 24V and supports automatic system power selection with NMOS drivers on the battery side and adapter side.

The device adopts hybrid power boost architecture which allows the battery to work with the adapter to supply the system load when it exceeds the adapter capability in turbo mode. The adapter supplies the system power directly and charges the battery pack with dynamic power management to avoid over-loading. As the system power increases, the charging current will reduce to maintain the adapter current in regulation. If the system power continuously increases and hybrid power boost mode will be triggered to supplement system power.

Through the SMBUS interface, the user can set the charging current, charging voltage, input current limit, current limits, switching frequency, and other parameters flexibly. Besides, charging and discharging current also can be set in real-time via the external ILIM pin.

SC89781 is compliant with Intel IMVP8/IMVP9 specifications including system power, input current, charging or discharging current monitoring, and processor hot indication.

SC89781 can operate in learn mode and ship mode to meet the user's demands. Full protection is supported including over-temperature protection, adapter, and battery over-voltage protection, input MOSFETs over-current protection, battery, inductor, and MOSFET short circuit protection.

SC89781 is available in a 4mm x 4mm QFN-28 Package.

## 3 Applications

- Ultra-Books, Notebooks, Tablet PCs
- Industrial Equipment
- Equipment with Rechargeable Batteries

## 2 Features

- Wide Input Range: 4.5V to 24V, 30V sustainable
- Buck Battery Charger for 1 to 4 Cell Batteries
- Hybrid Power Boost Operation for Turbo Mode
- Ultra-Fast Transient Response Time of 150us to Enter Hybrid Boost Mode
- Automatic Power Source selection from Adapter or Battery with integrated NMOS Driver
- $\pm 0.4\%$  Charge Voltage Accuracy for 2-4cells with 16mV/step
- $\pm 2\%$  Input Current Accuracy with 64mA/step (10m $\Omega$ )
- $\pm 2\%$  Charge Current Accuracy with 64mA/step(10m $\Omega$ )
- $\pm 2\%$  Discharge Current Accuracy with 512mA/step 10m $\Omega$ )
- Dynamic Power Path Management
- SMBUS Interface
- Charge Current And Discharge Current Can be Limited by An External Resistor in Real-Time
- Input Current Regulation to Avoid Overload
- Switching Frequency: 300/400/600/800Khz
- PROCHOT Profile for Intel IMVP8/IMVP9
- Current Monitor & System Power Monitor
- Low Adapter Standby Current for Energy Star
- Automatic End of Charge
- Learn Mode for Battery Gauge
- Ship Mode
- Protection including UVP, OVP, OCP, SCP, OTP
- QFN-28Package

## 4 Device Information

ORDER NUMBER	PACKAGE	BODY SIZE
SC89781QDER	28 Pin QFN	4mm x 4mm x 0.75mm