Lithium-Ion Battery Monitor

FEATURES

- Measures Individual Cell Voltage for Three or Four Lithium-Ion Cells
- Measures Battery Pack Current and Temperature
- 10 Bit A/D with Microprocessor Interface
- Hardware Overcharge, Over-Discharge, and Overcurrent Protection
- Communications Interface for Optional External EEPROM
- Two Year Real Time Clock
- Regulated 5V Microprocessor Supply

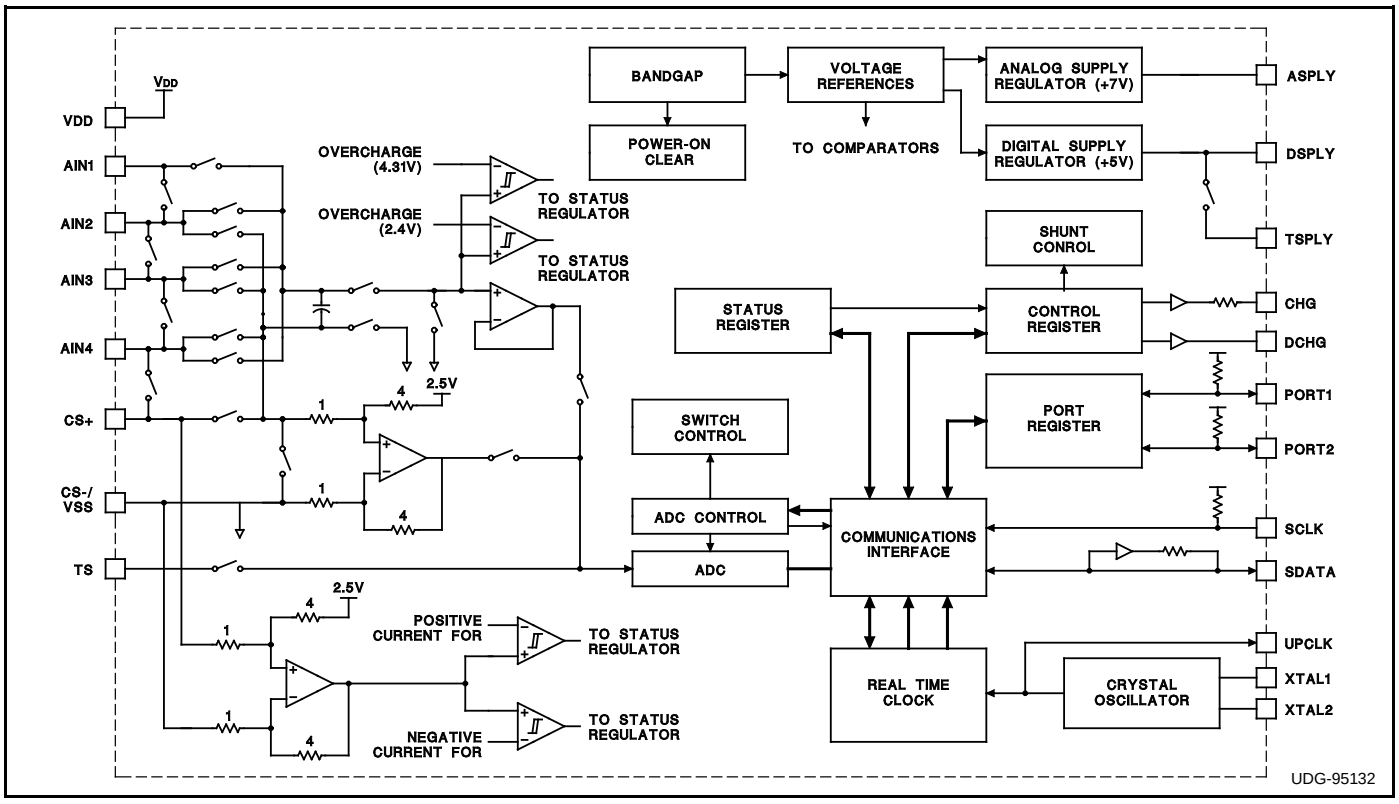
DESCRIPTION

The UCC3950 is a monolithic BiCDMOS integrated circuit designed to reside inside a battery pack and measures under host microprocessor control any combination of battery parameters, such as cell voltage, pack current, and pack temperature. The UCC3950 is designed for the unique charging and safety concerns associated with lithium-ion cells, and includes protection features such as programmable current shunts for individual cell charge equalization, hardware monitoring of individual cell voltage and pack current, and isolation of the cells from charge and/or discharge currents.

The UCC3950 is intended to be paired with a simple, low-cost host microprocessor such as an 80C51, that resides either inside or outside the battery pack. If the microprocessor is external to the pack, an optional serial EEPROM can be used inside the pack to retain battery information, such as number of cycles, pack serial numbers, or system calibration constants. The UCC3950 provides the clock to the host microprocessor and a regulated power source to the host, EEPROM and the thermistor. Operation of the 32kHz crystal during sleep mode consumes only 25µA. A real-time clock is provided to log elapsed time, which along with a recorded temperature profile, can be used to calculate battery self-discharge.

The UCC3950 monitors the individual cell voltage of three or four series-connected lithium-ion cells and provides individual cell shunt capability under microprocessor control to maintain balanced charge between cells. The UCC3950 can also drive two external high-side P-channel power MOSFETs to disconnect the cells from either the charging supply, the load, or both. For accurate cell voltage readings near full charge, a factory trimmed bandgap voltage reference in conjunction with software calibration constants stored in external memory limits overall system measurement error to 1% at 4.2V.

BLOCK DIAGRAM



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