ABRIDGED DATA SHEET

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MAX17853 14-Channel High-Voltage Data-Acquisition System

General Description

The MAX17853 is a flexible data-acquisition system for the management of high-voltage and low-voltage battery modules. The system can measure 14 cell voltages and a combination of six temperatures or system voltage measurements with fully redundant measurement engines in 263µs, or perform all inputs solely with the ADC measurement engine in 156µs. There are 14 internal balancing switches rated for > 300mA for cell-balancing current, each supporting extensive built-in diagnostics. Up to 32 devices can be daisy-chained to manage 448 cells and monitor 192 temperatures.

Cell and bus-bar voltages ranging from -2.5V to +5V are measured differentially over a 65V common-mode range, with a typical accuracy of 1mV (3.6V cell, 25°C). If oversampling is enabled, up to 128 measurements per channel can be averaged internally with 14-bit resolution and combined with digital post-processing IIR filtering for increased noise immunity. The system can shut itself down in the event of a thermal overload by measuring its own die temperature.

For robust communications, the system uses a Maxim battery-management UART or SPI protocol, and is optimized to support a reduced feature set of internal diagnostics and rapid-alert communication through both embedded communication and hardware-alert interfaces to support ASIL D and FMEA requirements.

Applications

- High-Voltage Battery Stacks
- Electric Vehicles (EVs)
- Hybrid Electric Vehicles (HEVs)
- Electric Bikes
- Battery-Backup Systems (UPS)
- Super-Cap Systems
- Battery-Powered Tools

***Ordering Information* appears at end of data sheet.**

Benefits and Features

- 65V Operating Voltage
- Ultra-Low-Power Operation
  - Standby Mode: 2mA
  - Shutdown Mode: 2µA
- Redundant ADC and Comparator (COMP) Acquisitions
- Simultaneous Cell and Bus-Bar Voltage Acquisitions
- 14 Cell-Voltage Measurement Channels
  - 1mV Accuracy (3.6V, 25°C)
  - 2mV Accuracy (5°C to 40°C)
  - 4.5mV Accuracy (-40°C to +125°C)
- 14 Cell-Balancing Switches
  - > 300mA Software-Programmable Balancing Current
  - Optimized Driving and Parking Balancing Modes
  - Automated Balancing with Individual Cell Timers
  - Automated Balancing by Cell Voltage
  - Emergency Discharge Mode
- Six Configurable Auxiliary Inputs for Temperature, Voltage, or GPIO
- Integrated Die-Temperature Measurement
- Automatic Thermal Protection
- Individually Configurable Safety Alert
  - Overvoltage, Undertemperature Faults
  - Undervoltage, Overtemperature Faults
  - One Cell-Mismatch Alert
- Support ASIL D Requirements for Cell Voltage, Temperature, Communication
- Selectable UART, Dual UART, or SPI Interface
- Battery-Management UART Protocol
  - Daisy-Chain Up to 32 Devices
  - Capacitive Communication-Port Isolation
  - Up to 2Mps Baud Rate (auto-detect)
  - 1.5µs Propagation Delay (per device)
  - Packet-Error Checking (PEC)
- Configurable Hardware-Alert Interfaces
- Factory-Trimmed Oscillator
  - No External Crystals Required
- 32-Bit Unique Device ID
- 64-Pin (10mm x 10mm) LQFP Package

19-100355; Rev 2; 3/19

maxim integrated™

MAX17853 Simplified Application Diagrams

UART Interface with Single-Ended Alert