

FEATURES

Simultaneous and continuous measurement of cell voltages

24 channel (ADBMS6840)

18 channel (ADBMS6842)

16 channel (ADBMS6843)

Electrochemical impedance spectroscopy

Passive cell balancing with programmable pulse-width modulation control per channel

Configurable digital low-pass filters per channel

Bidirectional isoSPI interface

2 Mbps isolated serial communication

Uses a single twisted pair cable

Low EMI susceptibility and emissions

Capacitive or transformer-coupled

Integrated step-down DC/DC regulator with internal low-resistance power MOSFET

Low-power cell monitoring mode

Bus bar bypass and measurement support

14 pins configurable as analog input or digital I/O

Configurable as an I²C or SPI port

2 additional pins dedicated as analog inputs

Maximum lifetime TME < 3 mV (over full temperature and voltage range)

Sleep-state supply current of 7 μ A

Measure-state power reduction of up to 1W

72/88-lead side-solderable package with exposed pad

AEC-Q100 Qualified

ISO 26262 life cycle, automotive safety integrity level capability (ASIL D)

APPLICATIONS

Electric and hybrid electric vehicles

Backup battery systems

Grid energy storage

GENERAL DESCRIPTION

The ADBMS6840/ADBMS6842/ADBMS6843 (ADBMS Cell Monitor) is a family of multicell battery monitors that measure 16, 18, or 24 series-connected battery cells (Table 1).

All cell voltages are measured simultaneously using a set of analog-to-digital converters (ADCs), one for each cell. Each channel includes a programmable digital low-pass filter. A second set of similar ADCs provides closely correlated measurements to ensure redundant measurement capability required to meet safety standards. The ADBMS Cell Monitor allows bus bars to be bypassed using dedicated pins. Direct measurement of negative bus bar voltages are supported when across each channel.

The device has a bidirectional isolated serial-port interface (isoSPI) for high-speed, RF-immune communication over simple twisted pair cables. Using the isoSPI interface, multiple ADBMS Cell Monitors may be connected in a daisy-chain configuration to a BMS Controller enabling simultaneous monitoring of long, high-voltage strings of battery cells. Using the bidirectional feature, the daisy-chain may also be configured to provide communication redundancy to protect against a cable break along the chain.

The device supports internal and external passive cell balancing with individually programmable pulse-width modulation (PWM) control. The ADBMS Cell Monitor is powered directly from the battery to be measured, by either the step-down DC/DC or linear regulator. Using the integrated DC/DC regulator significantly reduces the power consumption by up to 1W while in the MEASURE state. When in SLEEP state, the device draws 7 μ A, which minimizes the discharge of the battery stack. The lifetime total measurement error (TME) of the device is less than 3 mV over the full-operating temperature and voltage range.

Table 1. Derivative Overview

Feature	ADBMS6840	ADBMS6842	ADBMS6843
isoSPI Ports	0/1/2 MODE Pin Configurable		
SPI Ports	0/1 MODE Pin Configurable		
Voltage Channels	24	18	16
EIS	Yes		
GPIOs	14		
GPIAs	2		
Pins	88 (84 used pins + 1 exposed pad)	72 (70 used pins + 1 exposed pad)	
Pitch	0.4 mm		0.5 mm
Package	LFCSP-SS 10 mm x 10 mm		

Rev. SpC

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