

## 1. General Description

EMBMS1820 is a multicell battery monitor that measures up to 18 series connected battery cells with a total measurement error (TME) of less than 3.0 mV. The wide cell measurement range is from 0V to 5.5V that makes the device suitable for most battery chemistries, such NCM, LFP, Sodium-ion and Lead-acid batteries etc. All 18 cells can be measured in 329  $\mu$ s, and lower data acquisition rates can be selected for higher noise reduction.

Multiple EMBMS1820 devices can be connected in series, permitting simultaneous cell monitoring of stacked high voltage battery strings. Each EMBMS1820 has an isolated daisy chain communication interface for high speed (EMiso), RF immune, long distance communications. Multiple devices are connected in a daisy chain with one host processor connection for all devices. This daisy chain can be operated bi-directionally, ensuring communication integrity, even in the event of a fault along the communication path.

The device can be powered directly from the battery stack or from an isolated power supply. It integrates passive balancing up to 350mA for each cell, with individual pulse-width modulation (PWM) duty cycle control for each cell. The other features include an integrated 5 V regulator, 9 general-purpose I/O, and a sleep mode, where current consumption is reduced to 8  $\mu$ A.

## 2. Features and Benefits

- Measures up to 18 battery cells in series
- Maximum lifetime TME:  $\pm 3$ mV at 3.3V per cell (-40°C - 125°C)
- Stackable architecture for high voltage battery system
- Built-in isolated daisy chain communication interface
  - 2.5Mbps isolated serial communications
  - Uses a single twisted pair, up to 100 meters
  - Low EMI susceptibility and emissions
  - Bi-directional for broken wire protection
- 329  $\mu$ s to measure all cells in a system
- Synchronized voltage and current measurement
- 16-bit  $\Delta$ - $\Sigma$  ADC with configurable third-order noise filter
- Passive cell balancing up to 350 mA (maximum) with Programmable PWM

- Hot plug tolerant without external protections:  $\pm 12\text{V}$  tolerant for S0 – S18, IPA, IPB, IMA, IMB pins;  $-6\text{V}$  -  $+12\text{V}$  tolerant for C0 – C18 pins
- 9 general-purpose digital I/O or analog inputs
  - Temperature or other sensor inputs
  - Configurable as an I<sup>2</sup>C or SPI master
- 8  $\mu\text{A}$  sleep mode supply current
- Bus bar provisions
- 64-lead LQFP\_EP package

### 3.Applications

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- Electric and Hybrid Electric vehicles
- Backup battery systems
- Grid energy storage
- Residential energy storage
- High power portable equipment

# EMBMS1820

## 18-Cell Battery Monitor with Isolated Daisy Chain Communication Interface

### 4. Ordering information

Table 1 Ordering information

Type number	Package		Quantity
	Name	Description	
EMBMS1820PJP	64-Lead LQFP_EP	LQFP_EP package, 64 pins 12mm x 12mm; 1.6 mm (Max) height	1500

### 5. Function diagram

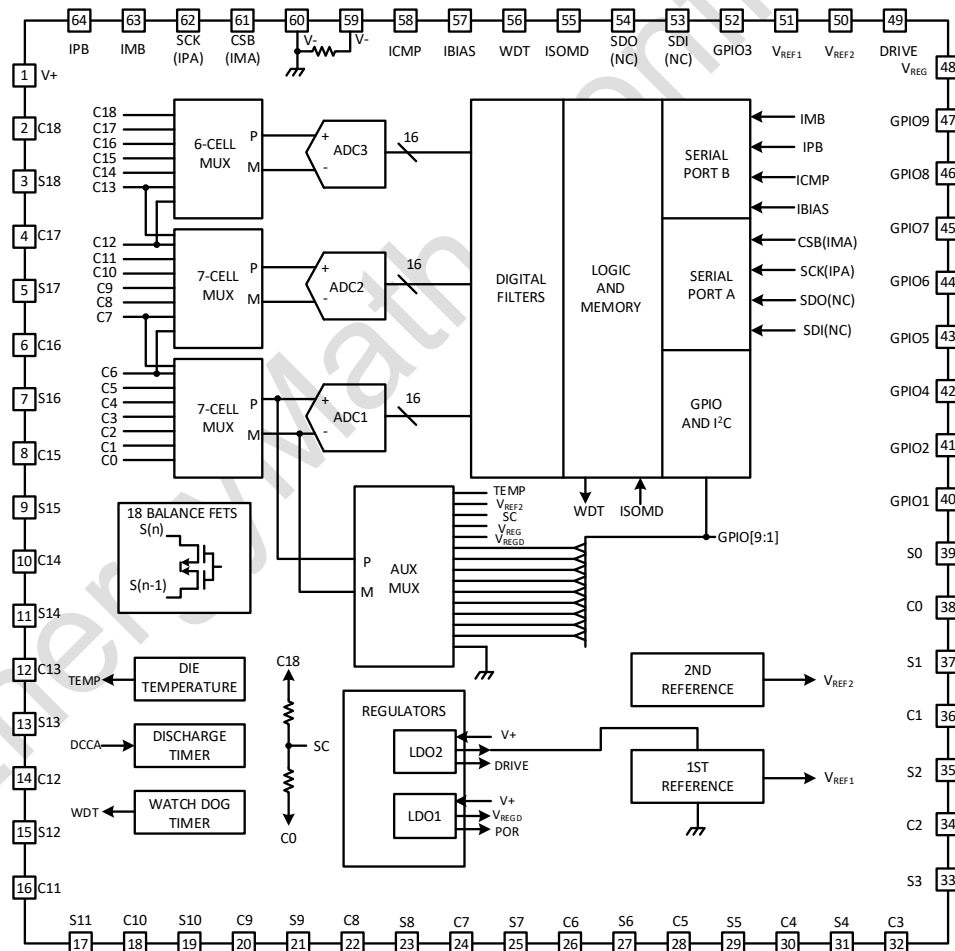


Fig 1. EMBMS1820 block diagram