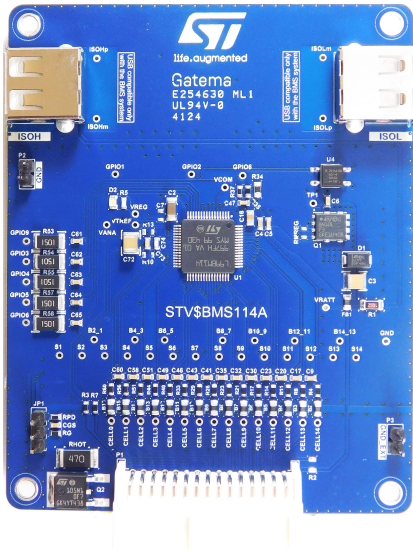


Battery management system module based on L99BM114



Features

- Hosts the L99BM114 multicell battery monitoring and balancing IC
- Voltage monitoring of every single cell and of the entire battery node
- Voltage, current, and temperature sensing of each cell
- 5 GPIOs to connect temperature sensors as NTCs
- An NTC hosted on the L99BM114 to sense the chip temperature
- Passive balancing
- Compact size: 100 mm x 76 mm

Description

The **STEVAL-BMS114** is a battery management system (BMS) evaluation board that can handle from 1 to 31 Li-ion battery nodes. Each battery node manages from 4 to 14 battery cells, for a voltage range between 48 V and 800 V.

The board is based on the **L99BM114**, a multicell battery monitoring and balancing IC, used in transportation and industrial application.

The main activity of the **L99BM114** is monitoring cells and battery node status through stack voltage measurement, cell voltage measurement, temperature measurement, and coulomb counting. Measurement and diagnostic tasks can be executed either on demand or periodically, with a programmable cycle interval. Measurement data are available for an external microcontroller to perform charge balancing and to compute the state of charge (SOC) and the state of health (SOH).

The main functions of a standard BMS are monitoring and protecting the battery pack.

The monitoring function is related to the measurement of the battery current, voltage, and temperature. The protection function brings the system to a safety state in case of under or overvoltage and overheating.

The **STEVAL-BMS114** provides an elaborate monitoring network to sense the voltage, current, and temperature of each cell.

The **STEVAL-BMS114** can work in two different daisy chain topologies: single access and dual access ring.

In a single access daisy chain configuration, a series of AFE is connected to an MCU board through a single transceiver connected to the **STEVAL-BMS114** isolated ISOLport. The AFE are connected to each other through the isolated ISOH port.

The MCU communicates with the **STEVAL-BMS114** hosted **L99BM114** transceiver through the SPI protocol. The transceiver converts these signals into ISO SPI signals to communicate with the BMS.

The **STEVAL-BMS114** allows converting SPI signals into isolated SPI signals, thus reducing the number of necessary wires from 4 to 2 and implementing differential communication for higher noise immunity.

| Product summary | |
|--|--|
| Battery management system module based on L99BM114 | STEVAL-BMS114 |
| Multicell battery monitoring and balancing IC | L99BM114-TR |
| Applications | Battery Management Systems |

1 Block diagram

Figure 1. Block diagram

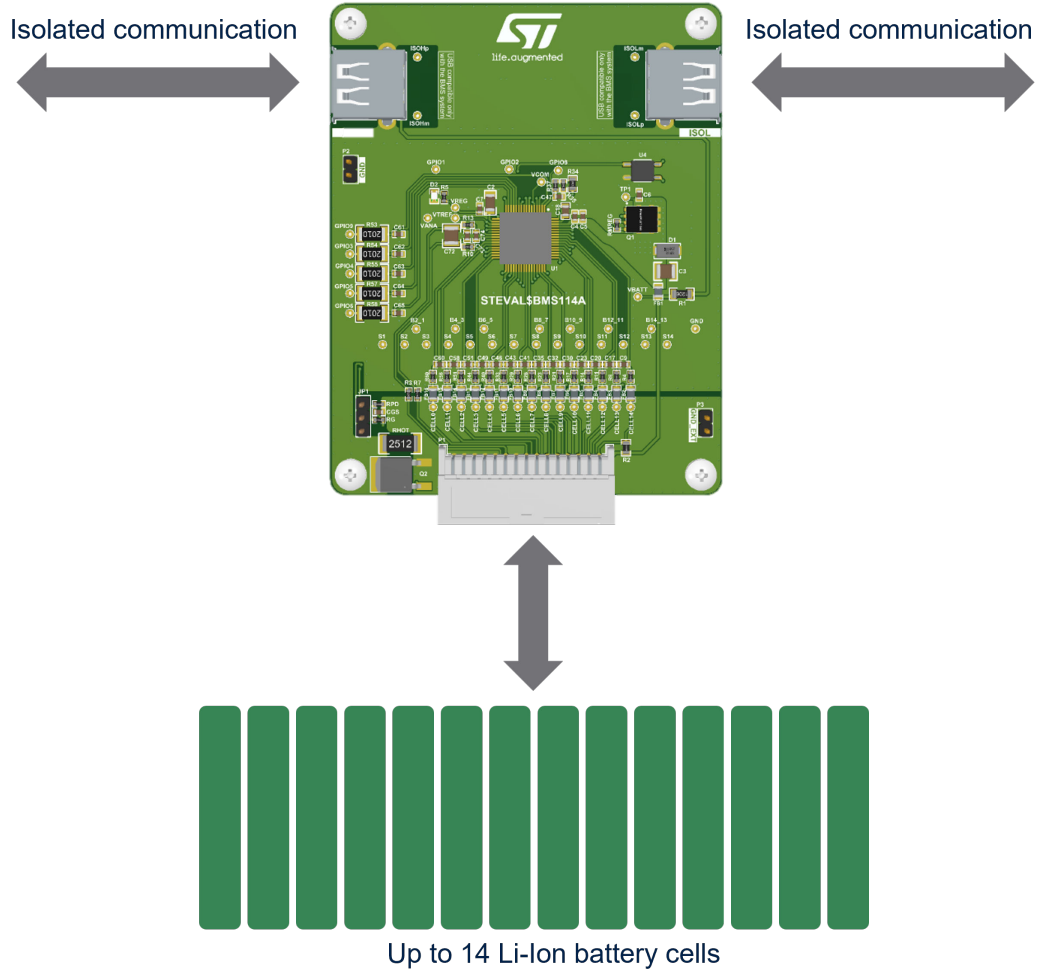


Figure 2. Single access configuration without node-to-node isolation

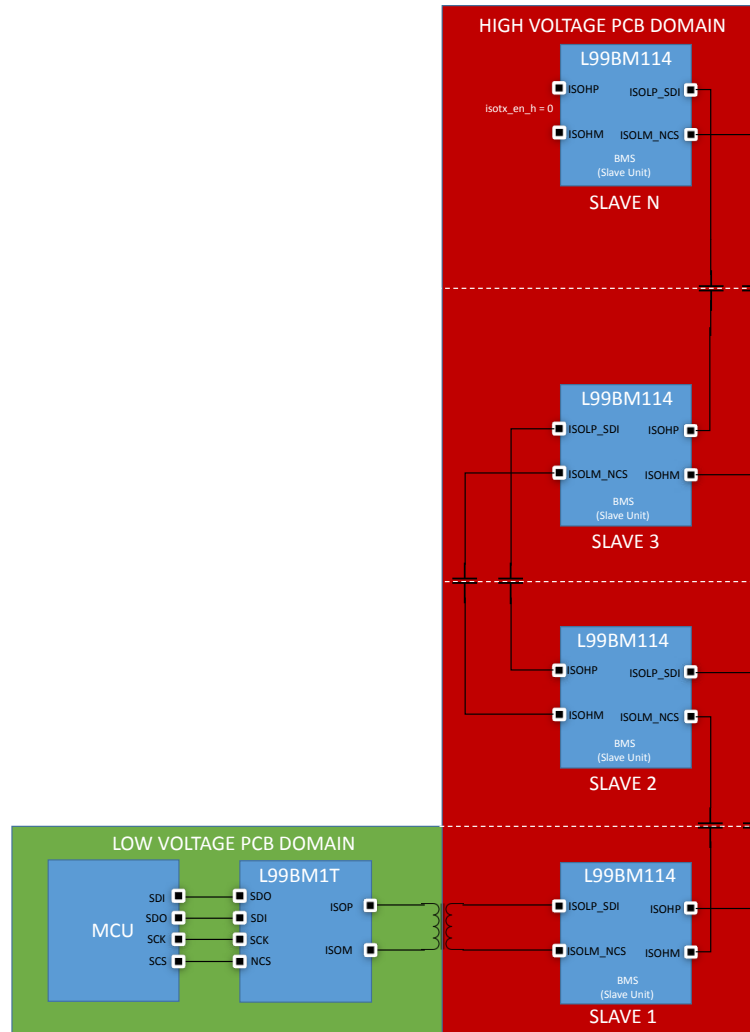
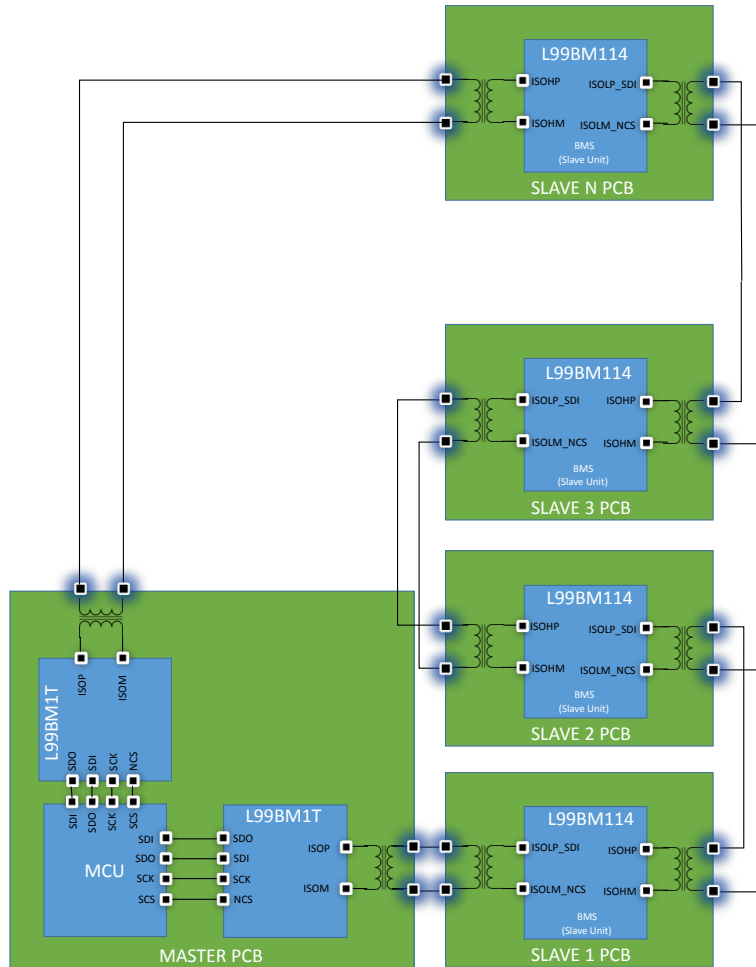
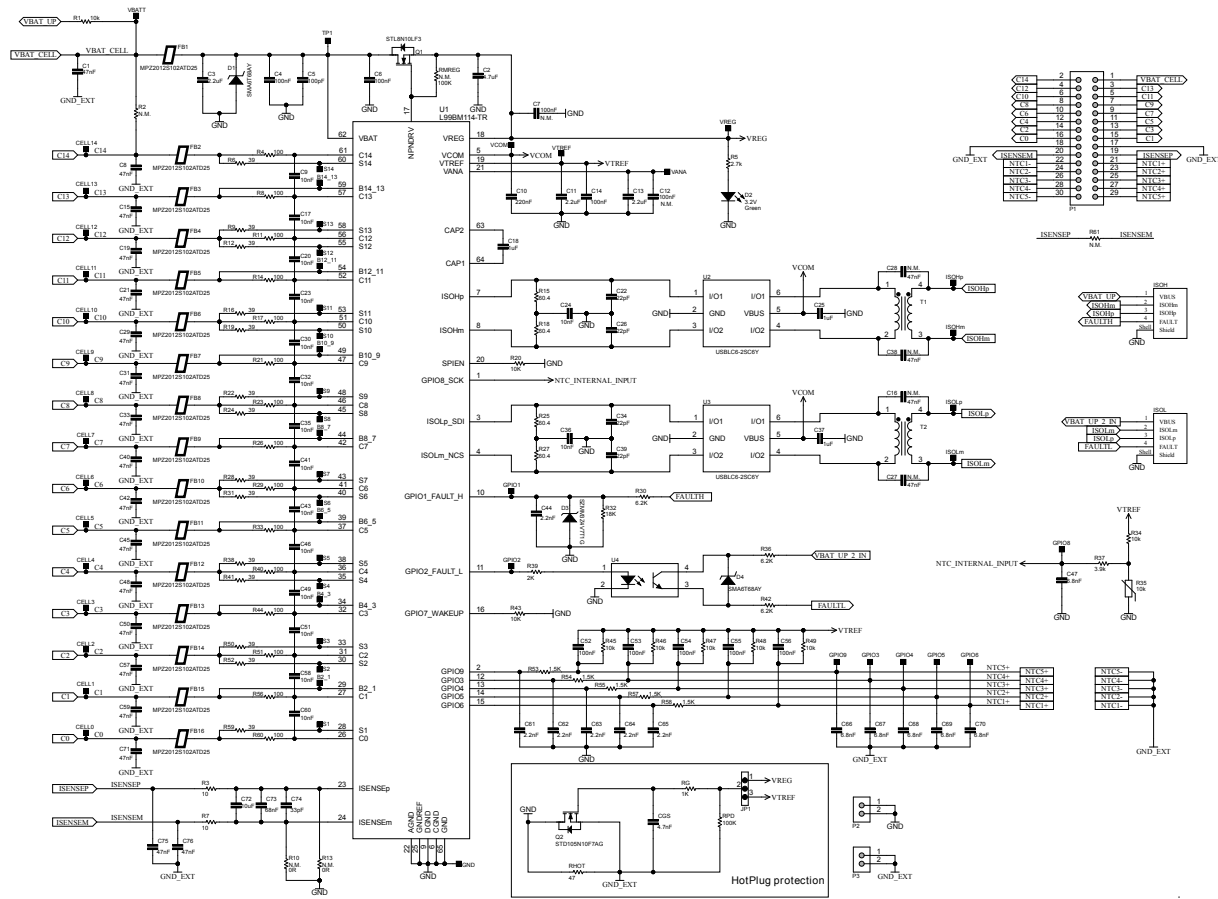


Figure 3. Dual access ring configuration with isolated nodes



2 Schematic diagram

Figure 4. STEVAL-BMS114 circuit schematic



3 Board versions

Table 1. STEVAL-BMS114 versions

| Finished good | Schematic diagrams | Bill of materials |
|-----------------------------|---------------------------------|--------------------------------|
| STV\$BMS114A ⁽¹⁾ | STV\$BMS114A schematic diagrams | STV\$BMS114A bill of materials |

1. This code identifies the STEVAL-BMS114 evaluation board first version.

Revision history

Table 2. Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 16-Jan-2025 | 1 | Initial release. |

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