LION Smart

LLVS-0.1

Datasheet

Low Voltage
Battery Management System

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LLVS

Overview

System Description and Structure

The battery management system LLVS of LION Smart is a universal measuring, monitoring and control system for low voltage systems, with up to 18 lithium-ion battery cells. As a result of its single board hardware and software structure, the system can be easily configured to various kinds and sizes of low voltage battery packs of up to 18 cells.

The system features a very fast and precise measurement of cell voltages and cell temperatures.

Due to the large number of available measurement channels and interfaces for communication with external devices, the LLVS is an ideal platform for experimental and development projects.

Sophisticated security concepts and high-quality electronic components guarantee highest reliability, precision, performance, and efficiency.

The software includes advanced energy saving functions, such as auto-off. The BMS is powered by the battery stack.

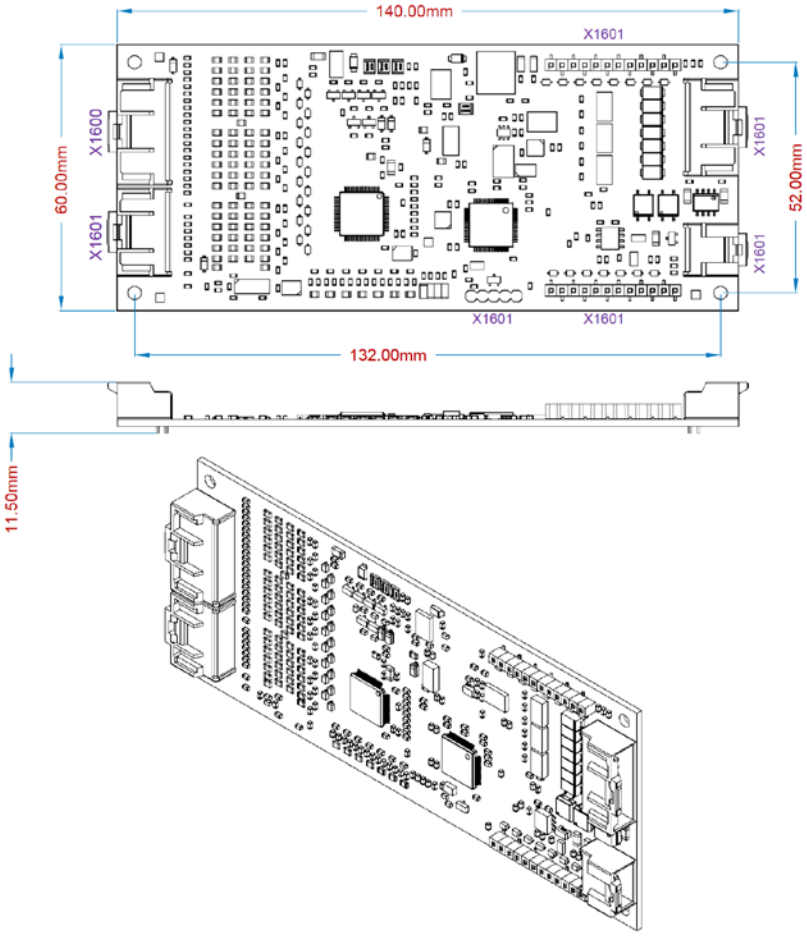

Figure 1: Dimensions of LLVS 0.1

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Functions

Cell Data Measurement

- Cell voltages: 6 to 18 channels with a measuring range from 0.7 V to 5.0 V, 90 V total
- Cell temperatures: 5 channels, with 2 additional onboard temperature sensors

Cell Monitoring and Balancing

- Customizable voltage and temperature limits
- Battery power forecast for additional control devices
- Passive balancing with currents up to 62 mA @ 4.0 V U_{CELL}

Utilization of Additional Analog Sensors

- Current measurement: e.g. Hall and Shunt sensors

Circuit Breaker Control

- Control of the contactors with three low side PWM outputs

Communication

- CAN
- UART
- Digital and analog I/Os for status and diagnostics

Software Architecture

- Real-Time-Operating system
- Adaptable

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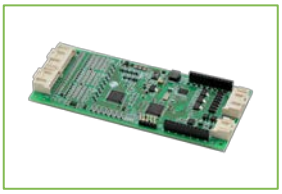
System Module

LION Low Voltage System (LLVS)

- Precise voltage and temperature measurements
- Compact and cost effective single board solution
- Highly customizable battery management systems



Technical Specifications

	LLVS 0.1
General	
LxWxH	140 x 60 x 11,5 mm
Weight	46 g
Environment	
Operating temperature	- 20°C…+ 85°C
Storage temperature	- 40°C…+105°C
Power supply	
Operating voltage from cell stack	12 V ... 90 V industrial, 12 V … 60 V DC consumer
Current consumption	
Off Mode	15 µA
On Mode	7 mA
Breaker outputs	
Number of low side switching outputs	3
Maximum switching current separately	1 A
Maximum switching current total	2 A
Communication interfaces	
CAN	1x
UART	1x
Bluetooth	1x optional
Cell balancing	
Passive balancing	typically, 62 mA @ 4.0 V U_{CELL}
Voltage measurement	
Number of measuring channels	6 … 18
Measuring range	0,7 … 5,0 V
Voltage absolute accuracy	±1,5 mV
Temperature measurement	
Number of measuring channels	2 on board + max. 5 for the battery NTC 10 kΩ @ 25 °C, β Value: 3977
Measuring range	- 40 °C…+ 125 °C
Temperature absolute accuracy	±1,5 °C
Current sensor via Shut	
2 mΩ Shunt	- 25 A … + 75 A
1 mΩ Shunt	- 50 A … + 150 A
0.5 mΩ Shunt	- 100 A … + 300 A
ADC resolution	16 bits
Current sensor via Hall Sensor	
ADC input	0 … 5 V
Resolution	16 bits

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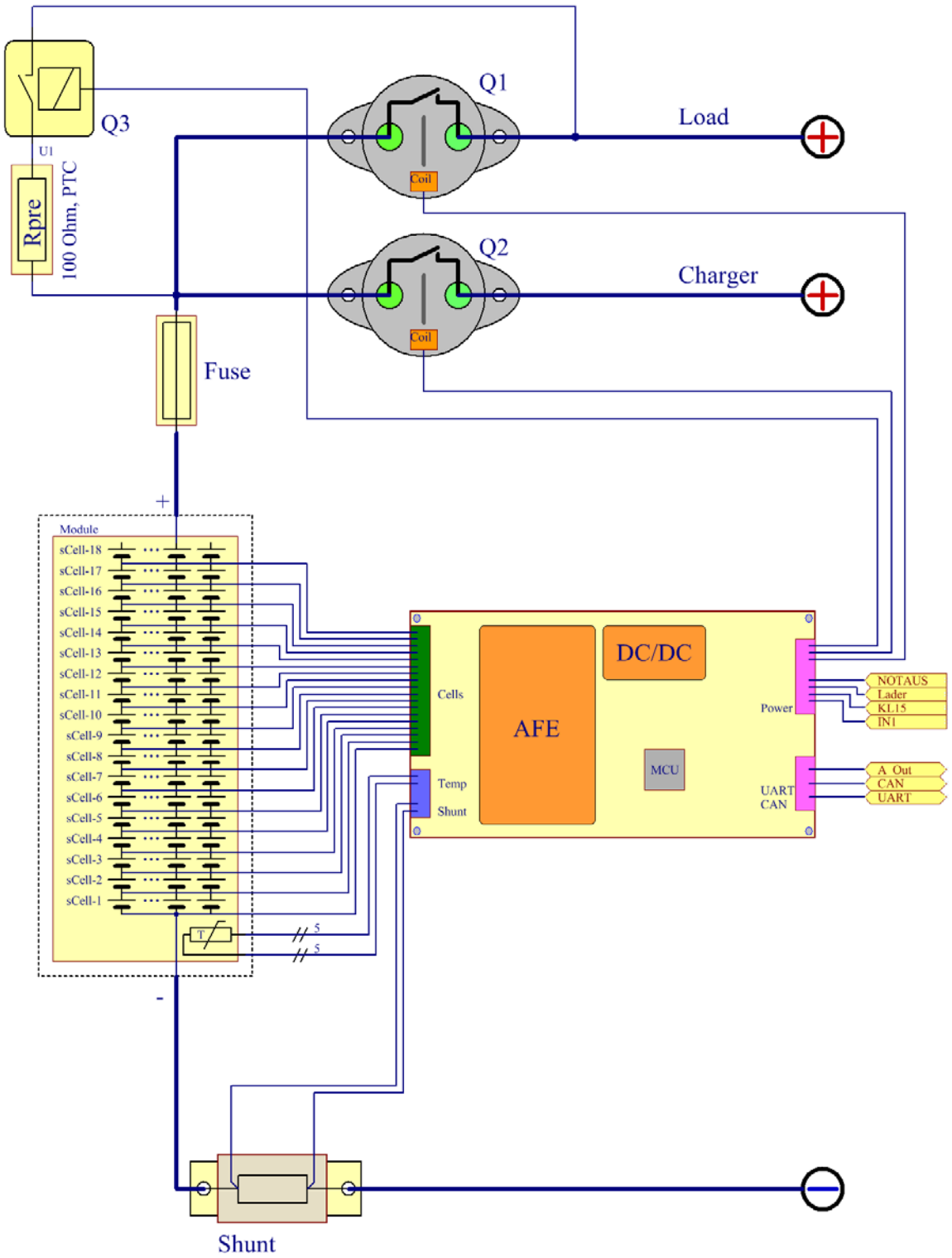
Typical Application



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