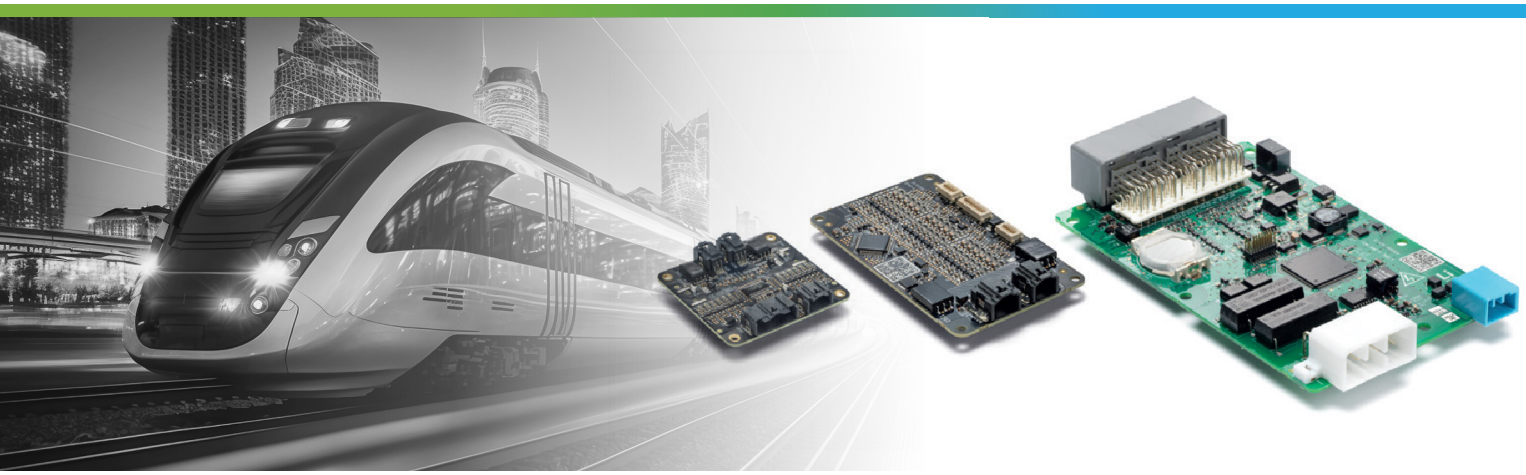
Sensata EL

Battery Management System



n-BMS™

Next Generation Battery Management System

The n-BMS is developed to meet all relevant automotive requirements. Featuring functionally safe design with key components such as Processor, ASIC and PSU carefully selected to meet functional safety at ASIL C level.

With several off-the-shelf CMU variants suited for diverse application and end-user needs, the n-BMS has a high degree of flexibility and supports various battery design choices.

The 12 voltage channel “100809” cell monitoring unit is compatible with both the n-BMS and the fully ISO26262 certified n3-BMS, providing a convenient upgrade path for n-BMS users for an safety rated key components certified system.

Both CMU boards are extremely compact, measuring only 65 x 75 mm for the 12 channel and 55 x 89 mm for the 15 channel CMU.

The n-BMS uses the Creator™ software, which enables the battery designer to create a unique, application specific battery characteristics and safety strategies, while ensuring optimal peformance, charge time, and overall battery life.

Highlights

Safety

- Self-test and redundancy in safety critical measurement circuits
- Open circuit detection

Usability

- RTC + logging of events, errors and warnings
- BMS Creator PC tool for easy configuration
- Optional current sensing (Hall effect or Shunt)
- CAN UDS tool

Battery Life

- High frequency sampling of current (100 mS) allows optimal detection of pulses
- Powerful and intelligent dissipative balancing at 170 mA per cell
- -40° to +85°C operational range

Performance

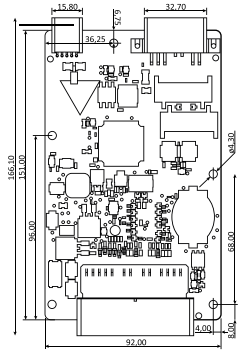
- ±1,6 mV at 25°C at individual cell level
- Optimized low power consumption mode
- ±1°C accuracy in temperature measurement
- Advanced SOC algorithm with OCV compensation
- Advanced SOH, SOP algorithm

Features

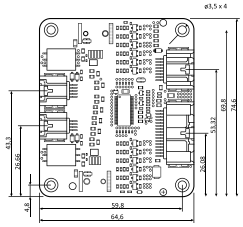
- For applications up to 1000 V and 1000 A
- Safety rated key components
- ISO26262 certification capable monitoring unit (CMU12)
- 12 and 15 voltage channel CMU options

Applications

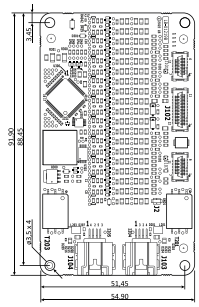
Next Generation Battery Management System



n-BMS MCU



n-BMS CMU12 100809



n-BMS CMU15 100820

Parameters	Specifications
Master Control Unit (MCU)	
Power supply	6-35 V
Range of high voltage measurement	0 - 1000 VDC
Accuracy of high voltage measurement	±1 VDC
Range of current measurement input Shunt	±150 mV
Accuracy of current measurement input Shunt	±1.0 mV -40 – 85 °C
Range of current measurement input (Hall effect sensor)	0.0 – 5.0 V, 0.0 -2.5 V current in, 2.5 V – 5.0 V current out
Accuracy of current measurement input (Hall effect sensor)	±1.5 mV -40 – 85 °C
Accuracy of temperature (NTC)	±1 °C -40 – 85 °C
Ground fault detection (leakage) levels	250/500/1000 Ω/V Between GND and HV+/-
Standby Consumption	<8,5 mW at 12V supply
Active Consumption	<3,5 W at 12 V supply
Communication interface, master-slave	isoSPI
Supported CAN communication type	CAN 2.0A/B 11 bit and 29 bit IDs
Supported CAN speeds	125, 250, 500, 1000 kbit/sec
Number of CAN ports	2, one isolated CAN, one non-isolated CAN.
External GPIOs	16 (Active Low)
Charger control interfaces	CAN

Parameters — Specifications

Cell Monitoring Unit (CMU)	CMU 12	CMU 15
Number of CMU's supported	1 - 32	
Number of cells in series for total system	384	390
Number of cells per unit	4 – 12 (minimum 12 V to power the CMU)	6 – 15 (minimum 17 V to power the CMU)
Detectable cell voltage	0 - 5 VDC	
Number of temperature sensors per unit	4 (NTC based)	8 (NTC based)
Cell balancing topology	Dissipative	
Cell balancing current	200 mA, at cell voltage 4.2 V	170 mA at cell Voltage 4.2 V
Cell voltage typical sampling time	100 ms	
Accuracy of single cell voltage	±1,6 mV at 25 °C	
Communication interface	isoSPI (Max. 5 m shielded cable between boards)	
Accuracy of cell temperature (NTC)	± 2 °C -40 - 0 °C | ± 1 °C 0 - 40 °C | ± 2 °C 40 - 85 °C	
Standby Consumption	~460 µW (12 µA) - with 12 cells @ 3,2 V	~528 µW (12 µA) - with 12 cells @ 3,2 V
Active Consumption	~690 mW (18 mA) - with 12 cells @ 3,2 V	~960 mW (18 mA) - with 12 cells @ 3,2 V
Patents	ZT 200780048774, EP 0781788.6, US 8.350.529	

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