LiBAL c-BMS24X™
Compact Battery Management System

Sensata Technologies | **LiTHIUM BALANCE** BATTERY MANAGEMENT SYSTEMS | **Li** BALANCE

c-BMS with extended software functionality:
- Parallel pack capable up to 10 packs in parallel
- Hot swappable
- Heater control
- Hybrid SOC algorithm
- Advanced balancing, SOH, SOP, SOE algorithms

INTRODUCTION

The c-BMS24X combines the compact hardware and all the functionality of a traditional c-BMS with the latest features, software capability, and advanced Sensata Techologies | Lithium Balance proprietary algorithms developed for low Voltage BMS.

The c-BMS24X supports connecting up to 10 battery packs in parallel, providing flexibility in battery design along with improved safety and serviceability. The battery packs connected in parallel are hot swappable, eliminating downtime and range concerns normally associated with EVs due to the need of charging.

Hybrid SOC, along with advanced SOH, SOP, and SOE algorithms ensure that the c-BMS can maintain high measurement accuracy even with cell chemistries such as LFP, without the need of a full charge-discharge cycle or long rest time, essentially increasing overall system uptime.

Using the c-BMS24X Creator™ software, an advanced version of the traditional c-BMS' configuration software, the battery designer can define unique, application-specific battery settings, safety strategy, optimized battery performance and battery life. The c-BMS24X is cell agnostic both in terms of form factor and chemistry.

SAFETY
ISO 26262 rated key components

Self-test and redundancy in safety critical measurement circuits

Open circuit detection

BATTERY LIFE
High frequency sampling of current at 10 mS allows optimal detection of pulses

Powerful and intelligent dissipative balancing at 200 mA per cell

Heater control

PERFORMANCE
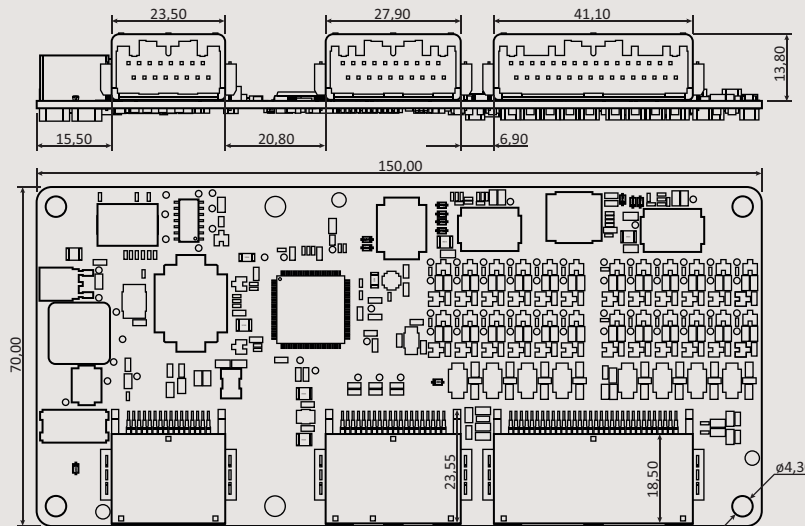Individual cell voltage measurement accuracy to within ±1.6 mV at 25 °C

Optimized low power consumption mode

±1 °C accuracy in temperature measurement

Hybrid SOC algorithm & OCV compensation with SOC accuracy reaching +/- 0,5%

Advanced SOH algorithm based on capacity fading and internal resistance estimation

Advanced SOP and SOE algorithms

Parallel pack support (up to 10 packs)

Hot swap capability

Advanced balancing algorithm allowing cells balancing at any time during the charge-discharge cycle

USABILITY
RTC + logging of events, errors and warnings

BMS Creator PC tool for easy configuration

Applications

LiBAL c-BMS24X™
Compact Battery Management System

Sensata
Technologies

LiTHIUM BALANCE Li
BATTERY MANAGEMENT SYSTEMS

c-BMS Compact Battery Management System for 24 cells

Dimensions in MM

PARAMETERS	SPECIFICATIONS
Power supply	6-35 V
Range of high voltage measurement	0 - 120 VDC
Accuracy of high voltage measurement	±1 VDC
Range of current measurement input Shunt	±200 mV
Accuracy of current measurement input Shunt	±0.5 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)	±1.25 mV -40 – 85 °C
Standby consumption (sleep mode)	<2,5 mW
Active consumption	<2.7 W
Supported CAN communication type	CAN 2.0A/B 11 bit and 29 bit IDs
Supported CAN speeds	125, 250, 500, 1k kbit/sec
CAN ports	1
External General Purpose I/O's	4 GP I/O (Active Low) and 4 inputs
Charger control interfaces	CAN
Number of cells	Up to 24 Cells. Minimum 11 V
Minimum detectable cell voltage	0 VDC
Maximum detectable cell voltage	5 VDC
Cell balancing topology	Dissipative
Cell balancing current	200 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
Range of Temperature measurements	-40 to +85 °C
Accuracy of cell temperature (NTC)	±1 °C -40 – 85 °C
Patents	Granted: ZT 200780048774, EP 0781788.6, US 8.350.529
Temperature sensor channels	Up to 6
Dimension	170 mm x 70 mm x 15 mm, 67 g
Parallel pack support	Yes
Hot swap capability	Yes
Hybrid SOC algorithm	Yes