



BMU-LC-C52T60-15

Datasheet

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Declaration

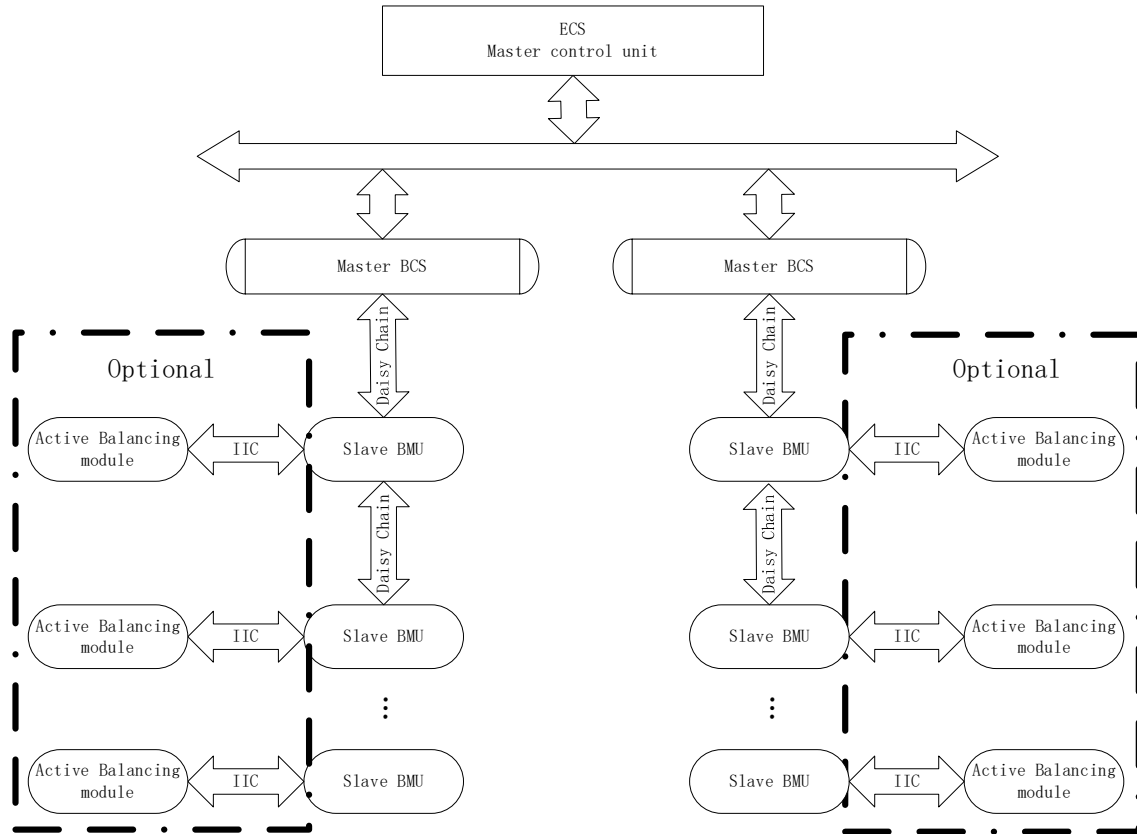
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1 System Overview

1.1 System Architecture



1.2 System Functions and Features

1. The system operates at a rated voltage of 24V, with a working voltage range of 18V to 36V, meeting the requirements of various energy storage applications.
2. The system supports both individual cell voltage and battery pack terminal voltage acquisition, featuring high accuracy and speed. Reliability is ensured through comparison between cumulative cell voltages and pack terminal measurements.
3. The system provides temperature and current acquisition capabilities, allowing flexible configuration of temperature sensor quantities and current measurement methods (shunt or Hall sensor). All acquisitions are characterized by high precision and reliability.
4. The system includes accurate insulation detection to ensure the safety and reliability of the battery system.

5. Using proprietary integrated algorithms based on collected battery data, the system calculates State of Charge (SOC) and State of Health (SOH) in real-time, delivering high accuracy under both dynamic and static conditions.
6. The active balancing system employs a self-developed balancing algorithm capable of high-current balancing. It offers high efficiency, high reliability, ultra-low standby power consumption, and supports cascading and easy expansion.
7. Based on collected and computed battery data, the system monitors the operating status and fault levels of the battery pack in real-time, enabling alarm and protection functions.
8. The system features a wide range of interfaces to support various application scenarios, facilitating charge/discharge control and thermal management of the battery pack.
9. The system is equipped with multiple CAN and RS485 communication interfaces for data exchange and control with devices such as PCS and ECS, as well as communication with display modules. It also supports 4G, GPS, Bluetooth, and Wi-Fi for remote monitoring, control, and system upgrades.
10. The system uses high-reliability components and incorporates multiple redundant protection measures. It is designed to withstand harsh electromagnetic environments, high temperatures, and vibrations, ensuring high reliability, stability, and strong anti-interference performance.
11. The system is suitable for various energy storage applications, including power plant storage, residential energy storage, and echelon utilization, offering excellent scalability and adaptability.

2 Slave Control Unit (BMU)

2.1 Product Description of Slave Control Unit (BMU)

The Slave Control Unit (BMU) is a critical component of the Energy Storage Battery Management System (BMS). It plays a decisive role in ensuring the safe application and extended service life of energy storage battery packs in grouped configurations. By accurately collecting the voltage and temperature of individual cells, the Slave Control Unit enables real-time monitoring of battery status.

The design incorporates high-reliability automotive-grade control chips and utilizes advanced acquisition technology to achieve high-precision data collection, providing a solid foundation for State of Charge (SOC) estimation. It supports passive balancing for up to 52 cells within a PACK, with a maximum continuous passive balancing current of

80mA.

2.2 Functions and Features of Slave Control Unit (BMU)

The unit includes, but is not limited to, the following functions:

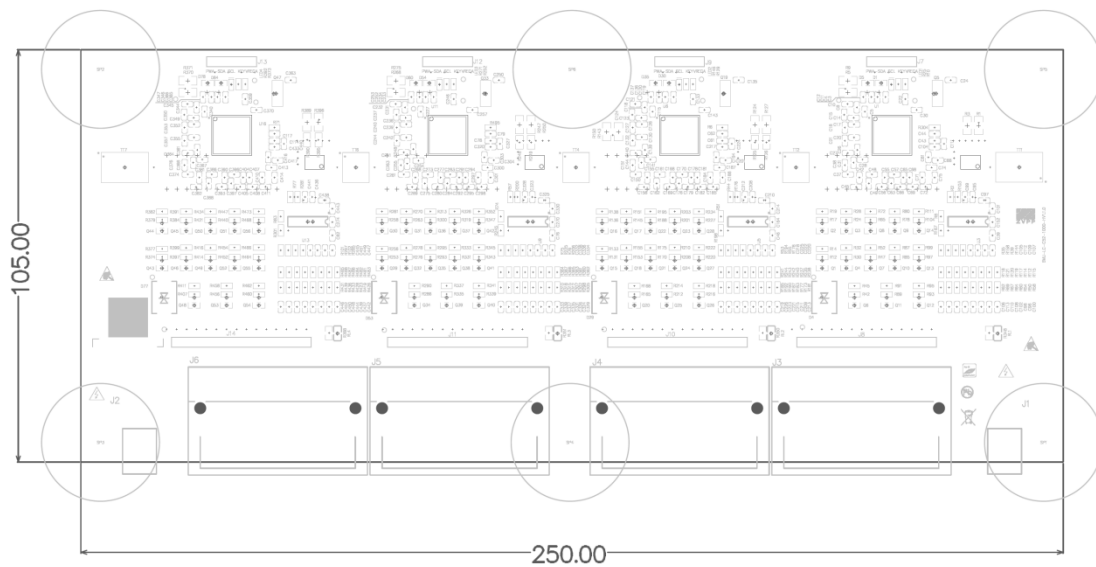
1. Cell Voltage Sampling: Compatible with various battery types, including Lithium Iron Phosphate (LFP), Lithium Manganese Oxide (LMO), Lithium Titanate (LTO), and NMC batteries. Supports voltage acquisition for 52 series-connected cells.
2. Temperature Sampling: Capable of sampling up to 60 external temperature points.
3. Stacked-Board Design: Allows optional installation of an active balancing board.
4. Passive Balancing: Provides a maximum passive balancing current of 80mA.
5. EEPROM: Stores the corresponding board SN code during production for traceability.
6. Daisy-Chain Communication: Uploads cell voltages, temperatures, and EEPROM data, and receives balancing commands and data to be written into the EEPROM.
7. Comprehensive Self-Diagnostic Functions: Supports functional safety certification requirements.
8. Material Safety: All materials comply with the UL-94V0 flame retardant rating.
9. Safety Compliance: Meets 1500V safety requirements and supports UL certification for 1500V systems.

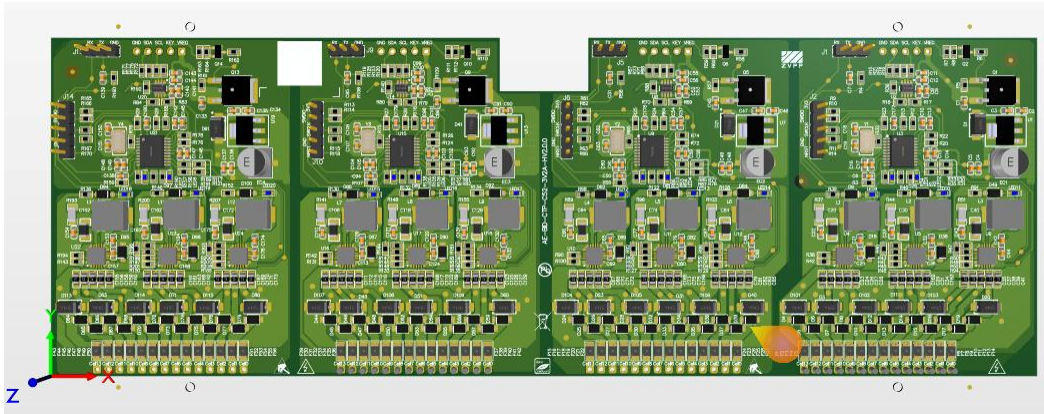
2.3 Electrical Characteristics

Parameters		Min	Typ	Max	Unit	Comments
Cell Voltage	Voltage range	0	-	5	V	-
	Accuracy	-	-	±0.1	mV	2.5V~4.5V, -30°C~85°C
Temperature Sampling	Temperature range	-40	-	85	°C	Storage temperature
	Sampling points	-	-	60	PCS	-
	Accuracy	-	1	±2	°C	-30°C~85°C
Passive Balancing	Balancing Current	-	-	80	mA	-

Operating Power	AFE	-	480	-	mW	Single AFE chip
Standby Power Consumption	AFE	-	6.0	-	μ A	Single AFE chip
Insulation and voltage	Insulation resistance	100	-	-	M Ω	Voltage sampling terminal, casing, and digital interface terminal
	Rated operational voltage	-	-	1500	V	-

2.4 Dimensional Drawing

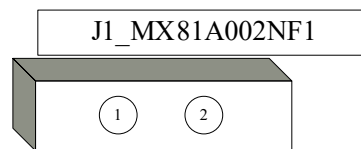




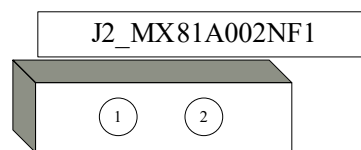
Note: The socket numbers correspond to the following pin definitions

2.5 Terminal Interface Definition

• J1_MX81A002NF3-T1

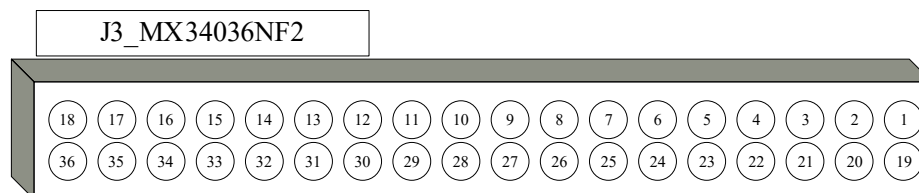


Pin	Definition	Description
J1-1	A_C_IN_N	Daisy-Chain Input N
J1-2	A_C_IN_P	Daisy-Chain Input P



Pin	Definition	Description
J2-1	D_C_IN_N	Daisy-Chain Output N
J2-2	D_C_IN_P	Daisy-Chain Output P

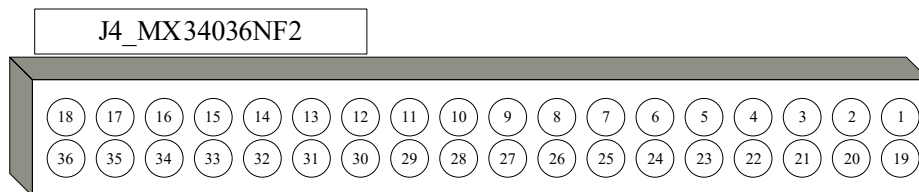
• J3_MX34032NF2



Pin	Definition	Description
J3-1	A_RT_N	NTC-
J3-2	A_RT_N	NTC-
J3-3	A_PWA-	Battery sampling power supply negative
J3-4	A_BAT_0	Battery sampling cell 1 negative
J3-5	A_BAT_1	Battery sampling cell 1 positive
J3-6	A_BAT_2	Battery sampling cell 2 positive
J3-7	A_BAT_3	Battery sampling cell 3 positive
J3-8	A_BAT_4	Battery sampling cell 4 positive
J3-9	A_BAT_5	Battery sampling cell 5 positive
J3-10	A_BAT_6	Battery sampling cell 6 positive
J3-11	A_BAT_7	Battery sampling cell 7 positive
J3-12	A_BAT_8	Battery sampling cell 8 positive
J3-13	A_BAT_9	Battery sampling cell 9 positive
J3-14	A_BAT_10	Battery sampling cell 10 positive
J3-15	A_BAT_11	Battery sampling cell 11 positive
J3-16	A_BAT_12	Battery sampling cell 12 positive
J3-17	A_BAT_13	Battery sampling cell 13 positive
J3-18	A_PWA+	Battery sampling power supply positive
J3-19	A_RT_N	NTC- GND
J3-20	A_RT_N	NTC- GND
J3-21	A_RT_N	NTC- GND
J3-22	A_ETA_A13	NTC13+
J3-23	A_ETA_A15	NTC15+
J3-24	A_ETA_A14	NTC14+
J3-25	A_ETA_A12	NTC12+
J3-26	A_ETA_A9	NTC9+

J3-27	A_ETA_A10	NTC10+
J3-28	A_ETA_A11	NTC11+
J3-29	A_ETA_A6	NTC6+
J3-30	A_ETA_A8	NTC8+
J3-31	A_ETA_A7	NTC7+
J3-32	A_ETA_A5	NTC5+
J3-33	A_ETA_A3	NTC3+
J3-34	A_ETA_A2	NTC2+
J3-35	A_ETA_A1	NTC1+
J3-36	A_ETA_A4	NTC4+

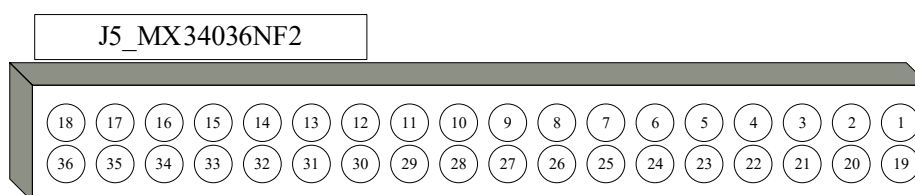
• **J4_MX34032NF2**



Pin	Definition	Description
J4-1	B_RT_N	NTC-
J4-2	B_RT_N	NTC-
J4-3	B_PWA-	Battery sampling power supply negative
J4-4	B_BAT_0	Battery sampling cell 14 negative
J4-5	B_BAT_1	Battery sampling cell 14 positive
J4-6	B_BAT_2	Battery sampling cell 15 positive
J4-7	B_BAT_3	Battery sampling cell 16 positive
J4-8	B_BAT_4	Battery sampling cell 17 positive
J4-9	B_BAT_5	Battery sampling cell 18 positive
J4-10	B_BAT_6	Battery sampling cell 19 positive
J4-11	B_BAT_7	Battery sampling cell 20 positive
J4-12	B_BAT_8	Battery sampling cell 21 positive
J4-13	B_BAT_9	Battery sampling cell 22 positive
J4-14	B_BAT_10	Battery sampling cell 23 positive
J4-15	B_BAT_11	Battery sampling cell 24 positive
J4-16	B_BAT_12	Battery sampling cell 25 positive

J4-17	B_BAT_13	Battery sampling cell 26 positive
J4-18	B_PWA+	Battery sampling power supply postive
J4-19	B_RT_N	NTC-
J4-20	B_RT_N	NTC-
J4-21	B_RT_N	NTC-
J4-22	B_ETB_A13	NTC28+
J4-23	B_ETB_A15	NTC30+
J4-24	B_ETB_A14	NTC29+
J4-25	B_ETB_A12	NTC27+
J4-26	B_ETB_A9	NTC24+
J4-27	B_ETB_A10	NTC25+
J4-28	B_ETB_A11	NTC26+
J4-29	B_ETB_A6	NTC21+
J4-30	B_ETB_A8	NTC23+
J4-31	B_ETB_A7	NTC22+
J4-32	B_ETB_A5	NTC20+
J4-33	B_ETB_A3	NTC18+
J4-34	B_ETB_A2	NTC17+
J4-35	B_ETB_A1	NTC16+
J4-36	B_ETB_A4	NTC19+

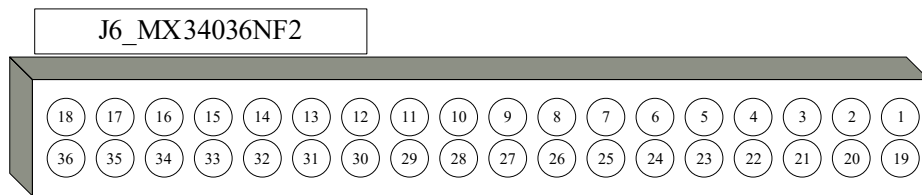
• J5_MX34032NF2



Pin	Definition	Description
J5-1	C_RT_N	NTC-
J5-2	C_RT_N	NTC-
J5-3	C_PWA-	Battery sampling power supply negative
J5-4	C_BAT_0	Battery sampling cell 27 negative
J5-5	C_BAT_1	Battery sampling cell 27 positive
J5-6	C_BAT_2	Battery sampling cell 28 positive

J5-7	C_BAT_3	Battery sampling cell 28 positive
J5-8	C_BAT_4	Battery sampling cell 30 positive
J5-9	C_BAT_5	Battery sampling cell 31 positive
J5-10	C_BAT_6	Battery sampling cell 32 positive
J5-11	C_BAT_7	Battery sampling cell 33 positive
J5-12	C_BAT_8	Battery sampling cell 34 positive
J5-13	C_BAT_9	Battery sampling cell 35 positive
J5-14	C_BAT_10	Battery sampling cell 36 positive
J5-15	C_BAT_11	Battery sampling cell 37 positive
J5-16	C_BAT_12	Battery sampling cell 38 positive
J5-17	C_BAT_13	Battery sampling cell 39 positive
J5-18	C_PWA+	Battery sampling power supply postive
J5-19	C_RT_N	NTC-
J5-20	C_RT_N	NTC-
J5-21	C_RT_N	NTC-
J5-22	C_ETC_A13	NTC43+
J5-23	C_ETC_A15	NTC45+
J5-24	C_ETC_A14	NTC44+
J5-25	C_ETC_A12	NTC42+
J5-26	C_ETC_A9	NTC39+
J5-27	C_ETC_A10	NTC40+
J5-28	C_ETC_A11	NTC41+
J5-29	C_ETC_A6	NTC36+
J5-30	C_ETC_A8	NTC38+
J5-31	C_ETC_A7	NTC37+
J5-32	C_ETC_A5	NTC35+
J5-33	C_ETC_A3	NTC33+
J5-34	C_ETC_A2	NTC32+
J5-35	C_ETC_A1	NTC31+
J5-36	C_ETC_A4	NTC34+

• **J6_MX34032NF2**



Pin	Definition	Description
J6-1	D_RT_N	NTC-
J6-2	D_RT_N	NTC-
J6-3	D_PWA-	Battery sampling power supply negative
J6-4	D_BAT_0	Battery sampling cell 40 negative
J6-5	D_BAT_1	Battery sampling cell 40 positive
J6-6	D_BAT_2	Battery sampling cell 41 positive
J6-7	D_BAT_3	Battery sampling cell 42 positive
J6-8	D_BAT_4	Battery sampling cell 43 positive
J6-9	D_BAT_5	Battery sampling cell 44 positive
J6-10	D_BAT_6	Battery sampling cell 45 positive
J6-11	D_BAT_7	Battery sampling cell 46 positive
J6-12	D_BAT_8	Battery sampling cell 47 positive
J6-13	D_BAT_9	Battery sampling cell 48 positive
J6-14	D_BAT_10	Battery sampling cell 49 positive
J6-15	D_BAT_11	Battery sampling cell 50 positive
J6-16	D_BAT_12	Battery sampling cell 51 positive
J6-17	D_BAT_13	Battery sampling cell 52 positive
J6-18	D_PWA+	Battery sampling power supply postive
J6-19	D_RT_N	NTC-
J6-20	D_RT_N	NTC-
J6-21	D_RT_N	NTC-
J6-22	D_ETD_A13	NTC58+
J6-23	D_ETD_A15	NTC60+
J6-24	D_ETD_A14	NTC59+
J6-25	D_ETD_A12	NTC57+
J6-26	D_ETD_A9	NTC54+
J6-27	D_ETD_A10	NTC55+

J6-28	D_ETD_A11	NTC56+
J6-29	D_ETD_A6	NTC51+
J6-30	D_ETD_A8	NTC53+
J6-31	D_ETD_A7	NTC52+
J6-32	D_ETD_A5	NTC50+
J6-33	D_ETD_A3	NTC48+
J6-34	D_ETD_A2	NTC47+
J6-35	D_ETD_A1	NTC46+
J6-36	D_ETD_A4	NTC49+