Date 日期:

20250626

Project Name 项目名:

HS-039 BMS-13S100A-V2

Manufacturer

生产制造商

CM Batteries Co.,Ltd

page：1

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1. Feature Description 产品功能描述

This BMS adopts a high-performance MCU to achieve fully digital control through modular development. Key features included:

本产品采用高性能 MCU，实现全数字化控制；通过模块化开发。本产品具有以下特点：

(1) Series: 13 Series 支持串数

(2) Power Interface：功率接口 Unified Port：同口

(3) Continuous Charge/Discharge Peak Current：100A 持续充/放电最大电流

(4) Battery Level Estimation: SOC 电量估算

(≤10%)SOC estimation function (accuracy ≤10%)估算功能

(5) Communication: CAN 通讯方式

(6) 1.Battery Temperature Detection 电池温度检测

2.NTC 温度采样点

(7) Voltage & Current Accuracy 电压电流精度

High Voltage Accuracy (≤30mV)高电压精度

High Current Accuracy(≤2%)高电流精度

(8) Battery Parameter Setup 电池参数设置

Flexible Parameter Settings Via PC Software 参数通过上位机灵活设置

(9) Supports Log Saving Function 支持日志保存功能

(10) Active Balance Control 智能均衡

Adopts static balancing technology to optimize battery management and enhance battery lifespan.采用静态均衡方式，更好管理电池，增强电池使用寿命。

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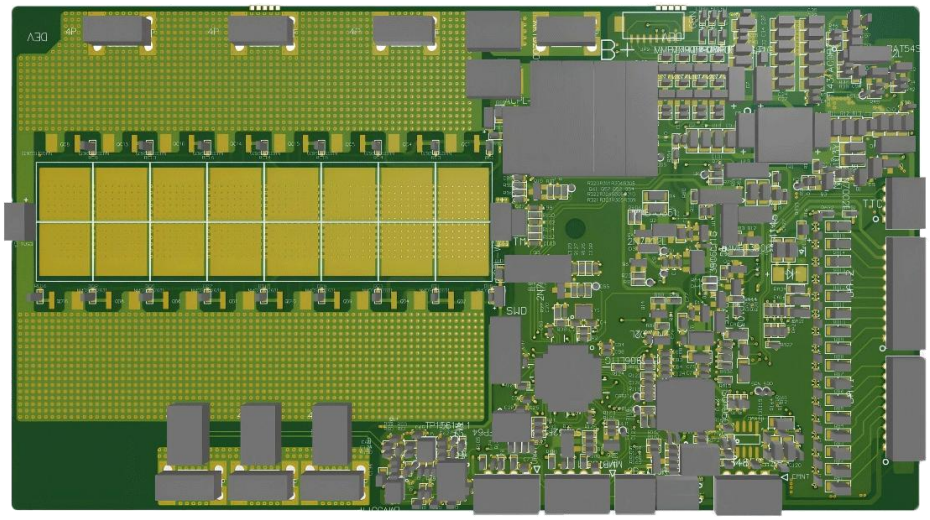
2. Specification 技术规格

2 .1. Dimension: 180MM*100MM*20MM 外形尺寸



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2 .2. Specification Parameters 系统规格参数

Item 项目	Description 说明	Note 备注
Configuration 组合方式	13 Series	
Working Voltage Range 电池组工作电压范围	36.4V~55.25V	（2.8V~4.25V）Per Cell
Consumption 工作功耗	＜2W	
Single Cell Detection Voltage 单体电池检测电压	2.8~4.25V	
Individual cell voltage sampling accuracy 单个电池电压采样精度	±30mV	AC 1KHZ
Total Voltage Sampling Accuracy 总电压采样精度	<1% or <2V <1% or <2V	
Temperature Detection Range 温度检测范围	-20 ℃~ 85℃	
Temperature Detection Accuracy 温度检测精度	±2 ℃	
Current Detection Range 电流检测范围	100A	Maximum Continuous Current 最大持续电流
Current Detection Accuracy 电流检测精度	＜1%	
Sampling Period 采样周期	400ms	
SOC Estimation Accuracy 估算精度	----	
Equilibrium Mode 均衡模式	Passive Equilibrium 被动均衡	
Equilibrium Current 均衡电流	30mA	
Communication Mode 通讯方式	CAN	Separate 隔离
	UART	Non-separate 非隔离

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2.3. Parameter Settings 基本参数设置

All parameters support software settings and can be set flexibly according to customer requirements. for the convenience of users, the software comes with internal expert library settings. The following is an example of lithium iron phosphate system.

所有参数都支持软件设置，可根据客户要求灵活设置。为了方便用户使用，软件内部自带专家库设置。以下以磷酸铁锂系统为例说明。

Table 3-2 表 3-2

（Note: The following parameters are applicable to lithium iron phosphate systems tested at 25℃ ambient temperature, unless otherwise specified.）

(注：以下参数除特殊注明外，以下参数适用于磷酸铁锂系统 25℃环温下测试)

No. 序号	Indicator item 指标项目	Ex-factory Default Parameter 出厂默认参数		Yes or No 是否可设	Note 备注
1	Cell overcharge protection 单体过充保护	Cell overcharge alarm voltage 单体过充报警电压	4200mV	Y	
		Cell overcharge protection voltage 单体过充保护电压	4250mV	Y	
		Overcharge protection delay time 单体过充保护延时	1.0S	Y	
	Cell over-voltage protection release 单体过压保护解除	Overcharge protection release voltage 单体过充保护解除电压	4150mV	N	
		Discharge release 放电解除	>2A	Y	
		Cell overcharge protection release delay time 单体过充保护解除延时	1.0S	Y	

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2	Cell unit over-discharge protection disengaged 单体过放保护解除	Cell over-discharge protection release voltage 单体过放保护解除电压	2900mV	Y	
		Release when there is charging 有充电时解除	Charging Current>2A 充电电流>2A	N	
		Cell unit over-discharge protection release delay time 单体过放保护解除延时	1.0S	Y	
3	Charging over current protection 充电过流保护	Charge over current alarm current 充电过流报警电流	100A	Y	If it occurs three times in a row, the state will be locked and will no longer be automatically released. It is necessary to restart the system or insert the electric gun. 连续出现 3 次将锁定该状态不再自动解除，需要重启系统或电枪插入
		Charge over current protection current 充电过流保护电流	105A	Y	
		Charge over current software protection delay time 充电过流软件保护延时	1.0S	Y	
	Charging Over-current protection released 充电过流保护解除	Automatic remove 自动解除	60S 后自动解除	Y	
4	Disengage charging over current protection 放电过流保护	Discharge over current alarm current 放电过流报警电流	100A	Y	If it occurs three times in a row, the state will be locked and will no longer be automatically released. It is necessary to restart the system or insert the electric gun. 连续出现 3 次将锁定该状态不再自动解除，需要重启系统或电枪插入
		Discharge over current protection current 放电过流保护电流	105A	Y	
		Discharge over current protection delay 放电过流保护延时	1.0S	Y	
	Discharge over current 放电过流保护解除	Automatic remove 自动解除	60S 后自动解除	Y	

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5	Short circuit protection 短路保护	Short circuit protection current 短路保护电流	499A	Y	If it occurs three times in a row, the state will be locked and will no longer be automatically released. It is necessary to restart the system or insert the electric gun. 连续出现 3 次将锁定该状态不再自动解除，需要重启系统或电枪插入
		Short-circuit protection delay time 短路保护延时	100US	Y	
		Short-circuit protection release 短路保护解除	充电解除	Y	
			系统重启		
	MOS over temperature protection 过温保护	Over-temperature protection temperature 过温保护温度	85℃	Y	
		Charging low temperature alarm temperature 过温解除温度	85℃	Y	
6	Cell temperature protection 电芯温度保护	Charging low temperature alarm temperature 充电低温报警温度	3℃	Y	
		Charging low temperature protection temperature 充电低温保护温度	0℃	Y	
		Charging low temperature protection release temperature 充电低温保护解除温度	3℃	Y	
		Charging high temperature alarm signal 充电高温报警信号	50℃	Y	
		Charging high temperature protection 充电高温保护温度	65℃	Y	

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6		Charging high temperature protection release temperature 充电高温保护解除温度	50℃	Y	
		Discharge low-temperature warning 放电低温报警温度	-10℃	Y	
		Discharge Low Temperature Protection Temperature 放电低温保护温度	-28℃	Y	
		Discharge low temperature protection release temperature 放电低温保护解除温度	-10℃	Y	
		Discharge high temperature alarm signal 放电高温报警信号	50℃	Y	
		Discharge High Temperature Protection 放电高温保护温度	60℃	Y	
		Discharge high temperature protection release temperature 放电高温保护解除温度	55℃	Y	
7	Current consumption 消耗电流	Current consumption in active mode 激活模式消耗电流	< 2W	N	
		Standby mode current consumption 待机模式消耗电流	150UA	N	

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8	Equilibrium function 均衡功能	Equilibrium start-up voltage 均衡启动电压	3300mV	Y	
		Open differential pressure 开启压差	30mV	Y	
		Differential voltage off 关闭压差	20mV	Y	
9	Default capacity setting 默认容量设置	Low voltage alarm threshold 电压低告警门槛	SOC<3%	Y	
		Full capacity setting 满容量设置	?AH	Y	

2.4. System Framework 系统框图

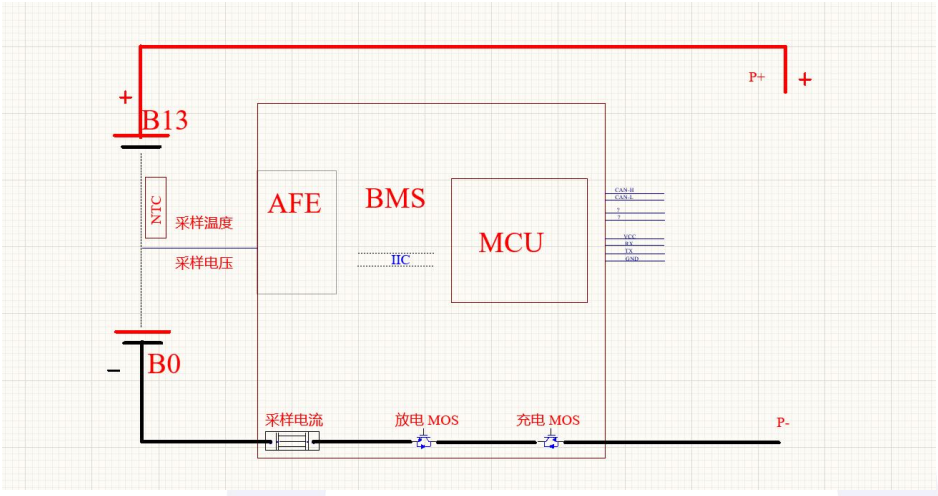

Table 3-2 BMS System Framework 图 3-2 BMS 系统框图

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2 .5. Port Definition 端口定义

Name 名称	No. 序号	Connector 端子	Mean 定义	Description 说明	Structural form 结构形式
BAT1	1	B-	Battery negative 电池负极		
	2	B0	The first section of cell - end 第一节电芯-端		
	3	B1	The first section of the cell + end 第一节电芯+端		
	4	B2	The second section of the cell + end 第二节电芯+端		
	5	B3	The third section of the cell + end 第三节电芯+端		
	6	B4	The fourth section of the cell + end 第四节电芯+端		
	7	B5	The fifth section of the cell + end 第五节电芯+端		
	8	B6	The sixth section of the cell + end 第六节电芯+端		
	9	B7	The seventh section of the cell + end 第七节电芯+端		
BAT2	1	B8	Section 8 cell+ End 第八节电芯+端		
	2	B9	Section 9 cell+ End 第九节电芯+端		
	3	B10	Section 10 cell+ End 第十节电芯+端		
	4	B11	Section 11 cell+ End 第十一节电芯+端		
	5	B12	Section 12 cell+ End 第十二节电芯+端		
	6	B13	Section 13 cell+ End 第十三节电芯+端		

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	7	B14	Section 14 cell+ End 第十四节电芯+端		
	8	B15	Section 15 cell+ End 第十五节电芯+端		
	9	B16	Section 16 cell+ End 第十六节电芯+端		
	10	B+	Battery Positive 电池正极		
TTC	1	AFE1-TS1	NTC1		
	2	AFE1-GND			
	3	AFE1-TS2	NTC2		
	4	AFE1-GND			
DI	1	BAT-	Universal input 通用输入口	Power switch 开关	
	2	DI1			
UART2	1	3.3V	Power supply 电源	Upper computer 上位机	
	2	RX1	One-chip computer receiver 单片机接收端		
	3	TX1	One-chip computer transmitter 单片机发送端		
	4	BAT-	Reference ground 参考地		
CMNT	1	485A			
	2	485B			
	3	CANH		CAN	
	4	CANL			
LED	1	NC			
	2	5V			
	3	NC			
	4	NC			
	5	NC			
	6	NC			
	7	NC			
	8	GND			

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B-	Battery Negative电池负极				
P-	Load Negative负载负极				
B+	Battery Positive电池正极				
SWD	1	3.3V	Software Burn Port 软件烧写口		
	2	DIO			
	3	CLK			
	4	B-			

2.6. Protection Logic 保护逻辑

Over-discharge protection: When the battery reaches the preset value of protection, the discharge MOS will be turned off 过放保护：电池达到保护预设值时，放电 MOS 关闭
Discharge conditions: 解除条件:
Charging current is more than 2A 充电电流大于 2A
MOS Voltage reaches the preset value of recovery, re-open the discharge MOS 电压达到恢复预设值，重新打开放电
Over-charging protection: when the battery reaches the preset value, the charging MOS will be turned off. 过充保护：电池达到保护预设值时，充电 MOS 关闭
Discharge conditions: 解除条件:
Discharge current greater than 2A 放电电流大于 2A
MOS Voltage reaches the preset value, re-open the charging MOS 电压达到恢复预设值，重新打开充电
Battery charging over current protection, turn off the charging MOS, automatically recover once within 60s, and lock up three times in a row within two minutes. 电池充电过流保护时，关闭充电 MOS，60s 内自动恢复一次，两分钟内连续三次锁死。 Release condition: automatic recovery within 60s 解除条件：60s 内自动恢复
Battery discharge over current protection, close the discharge MOS, within 60s automatically recover once, within two minutes three consecutive lockout. 电池放电过流保护时，关闭放电 MOS，60s 内自动恢复一次，两分钟内连续三次锁死。 Release conditions: automatic recovery within 60s 解除条件：60s 内自动恢复
Protection, the charging and discharging MOS will be closed, and the temperature will reach the preset value of recovery, and the charging and discharging MOS will be re-opened. 充电过温：达到保护预设值时，充放电 MOS 关闭，温度达到恢复预设值，重新打开充放电 MOS

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Charging low temperature: when the protection preset value is reached, the charging and discharging MOS will be turned off, the temperature will reach the recovery preset value, and the charging and discharging MOS will be turned on again. 充电低温：达到保护预设值时，充放电 MOS 关闭，温度达到恢复预设值，重新打开充放电 MOS
Discharge over-temperature: when the protection preset value is reached, the charging and discharging MOS will be turned off, and the temperature will reach the recovery preset value, and the charging and discharging MOS will be turned on again. 放电过温：达到保护预设值时，充放电 MOS 关闭，温度达到恢复预设值，重新打开充放电 MOS
Discharge low temperature: when the protection preset value is reached, the charging and discharging MOS will be turned off, the temperature will reach the recovery preset value, and the charging and discharging MOS will be turned on again. 放电低温：达到保护预设值时，充放电 MOS 关闭，温度达到恢复预设值，重新打开充放电 MOS
MOS over-temperature: when the protection preset value is reached, the charging and discharging MOS will be turned off, and the temperature will reach the recovery preset value, and the charging and discharging MOS will be turned on again. MOS 过温：达到保护预设值时，充放电 MOS 关闭，温度达到恢复预设值，重新打开充放电 MOS
Differential Pressure Excessive Protection: When the protection preset value is reached, the charging and discharging MOS will be locked, the core differential pressure will reach the recovery preset value and the electric gun will be inserted and lifted. 压差过大保护：达到保护预设值时，充放电 MOS 锁死，电芯压差达到恢复预设值且电枪插入解除。

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2 .7. Operating Environment 使用环境

Ambient Temperature 环境温度	-20℃ to +60℃ degrees Celsius, with an air temperature change of less than 0.5 degrees/minute. -20℃~ + 60℃，空气温度变化小于 0.5℃/分。
Relative Humidity 相对湿度	The maximum relative humidity is 90 per cent, while the monthly minimum temperature of the month is not higher than 25 degrees Celsius. 最高相对湿度为 90%，同时该月月最低温度不高于 25℃。
Other climatic conditions 其它气候条件其它气候条件	No condensation, icing, rain, snow, hail, etc., solar radiation is less than 700W/m2, air pressure 70~106kPa. 无凝露、结冰、雨、雪、雹等，太阳辐射低于 700W/m^2，气压 70~106kPa。
Dust and solid particle content 灰尘和固体颗粒含量	The ambient airshould not contain corrosive gases and conductive dust present. 环境空气中不应含有腐蚀性气体及导电尘埃存在。
Altitude 海拔高度	Below 1,000 meters, derated for use above 1,000 meters, and derated by 6% for each 1,000 meters of elevation (current). 低于 1000 米，1000 米以上降额使用，每升高 1000 米降额 6%（电流）。
Vibration and shock 震动和冲击	5.9m/s2 (0.6g) at sinusoidal vibration 9~200Hz. 正弦振动 9~200Hz 时，5.9m/s2(0.6g)。

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Date 日期:

20250626

Project Name 项目名:

HS-039 BMS-13S100A-V2

Manufacturer

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2.8. Test Items 项目测试

No. 序号	Test Items 试验项目	Test Conditions 实验条件	Judgement Criteria 判断标准
1	High temperature test 高温试验	Temperature 60℃, humidity 90% 温度 60℃，湿度 90%	Normal operation without fault according to HMS-TA6 standard. 按 HMS - TA6 标准，正常运行无故障
2	Low temperature test 低温试验	Temperature -10℃, humidity 90% 温度-10℃，湿度 90%	Normal operation without fault according to HMS-TA6 standard. 按 HMS - TA6 标准，正常运行无故障
3	Hot and cold cycle test 冷热循环试验	High temperature 60℃ for 45 minutes, room temperature for 15 minutes, low temperature -10℃ for 45 minutes, room temperature for 15 minutes for 1 cycle, perform 5 cycle cycles 高温 60℃45 分钟，常温 15 分钟，低温-10℃45 分钟，常温 15 分钟为 1 个循环周期，执行 5 个循环周期	Normal operation without fault according to HMS-TA6 standard. 按 HMS - TA6 标准，正常运行无故障
4	Voltage limit test 电压界限试验	Voltage 0.7E be connected to an electricity grid for 0.5 hours, voltage 1.2E be connected to an electricity grid for 2 hours 电压 0.7E 通电 0.5 小时，电压 1.2E 通电 2 小时	According to HMS-TA6 standard, normal function after resuming normal operation. 按 HMS - TA6 标准，恢复常态后功能正常
5	Resonance test 共振试验	Amplitude 5mm (1 to 10Hz); Amplitude 0.5mm (10 to 45Hz) 振幅 5mm（1～10Hz）；振幅 0.5mm（10～45Hz）	According to HMS-TA6 standard 按 HMS - TA6 标准
6	Vibration endurance test 振动耐久试验	30minAt resonant frequency (no resonant frequency, vibration frequency of 30Hz) amplitude 1.0mm, acceleration 35.3 m/s*s, test time 30min 在共振频率下（无共振频率，振动频率为 30Hz）振幅 1.0mm，加速度 35.3 m/s*s，试验时间	According to HMS-TA6 standard 按 HMS - TA6 标准