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Product confirmation

Customer Name		Customer Model	JBD-HP16SA-L11S-20A-20A-B
Our Material Number		Customer Material Number	
Sample Submission Date	2023-08-28	Company Model	JBD-HP16SA V2.0
Edition	A01	Number of pages	8
Approved by	Reviewed by		Prepared by
	Qiaoqiao zhang		Houwei Liu
Material Number	JBD-SP16SA-L11S-20A-20A-B		
Customer Confirmation Column			
Confirmation Comments:			
Signature:			
Date:			

Special Instruction:

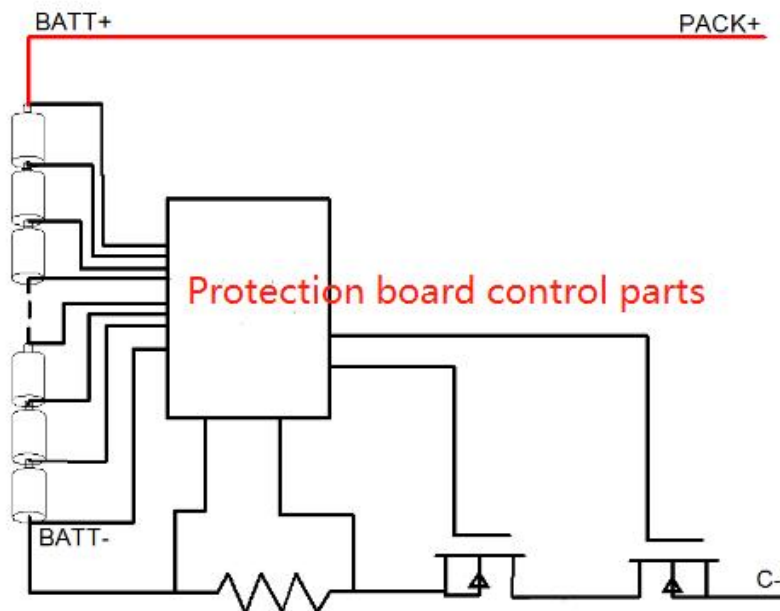
1. Please organize the test in time and give the test feedback to our company, so as to facilitate our company to arrange the follow-up work of this project after the customer receives the sample. If no reply is received within 5 days, our company will assume that the test passed by the customer and the project will be completed normally.
2. If the customer passes the test, please mark the product name and product code in the customer comment column, and stamp the sign for confirmation. Otherwise, please point out the problem in the test unqualified column and put forward improvement suggestions.
3. Our company can receive orders only after receiving the original signed and sealed by the customer and attaching the detailed description of the product.

I. Introduction and Features

JBD-HP16SA is a protection board solution specially designed by Dongguan Jiabaida Electronic Technology Co., Ltd. for 16S battery packs of electric bicycles, electric motorcycles and other products; it can be applied to lithium batteries with different chemical properties, such as lithium ion and lithium polymer. , Lithium iron phosphate, etc. The protection board has strong loading capacity, and the maximum continuous discharge current can reach 30A.

- 4~16 cell series protection
- Various protection functions for charging and discharging
- Hardware discharge overcurrent and short circuit protection function processing
- Reserved discharge temperature protection
- Very low static current consumption

II. Principle diagram



III. Basic parameters

3.1 Scope of use

Battery pack structure 11S

Charging mode: CC-CV (constant current constant voltage)

Charging mode: constant current constant voltage

Output terminal: C-

Input terminal: B-, BC0-BC11

3.2 Electrical Characteristics (The test needs to be carried out in a room with a temperature of $25 \pm 2^{\circ}\text{C}$ and a relative humidity of $65 \pm 20\%$)

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Functions	Test items	specification			Unit
		Min.	Type	Max.	
Operating Voltage	voltage range	23.1		41.25	V
Operating current	recharging current(continunous)	--	--	20	A
	Discharging current (continunous)	--	--	20	A
Charging protection	Charger voltage (CC -CV)	39.6			V
	Over-charge protection voltage	3.700	3.750	3.800	V
	Over-charge protection delay time	500	1000	1500	M S
	Over-charge protection recovery voltage	3.550	3.600	3.650	V
Discharge protection	Over-discharge protection voltage	2.000	2.100	2.200	V
	Over-discharge protection delay time	200	350	500	M S
	Over-discharge protection recovery voltage	2.200	2.300	2.400	V
	Over-discharge protection recovery condition	Disconnect load or charging			
Equalization function	Balanced turn-on voltage	3.55	3.60	3.65	V
	Balanced current	15	25	25	mA
	Balance Type	Pulsed model			
Over-current Protection	Charging over current delay		/	/	mS
	Charging over-current protection value		/		A
	charge release adjustable	/			
	Discharge over current 1 protection current value	80		140	A
	Discharge over current 1 protection delay	50	150	250	S
	Discharge over current protection recovery condition	Disconnect load or charging			
Short circuit protection	Short circuit protection delay time	200		500	uS
	Short circuit protection recovery	Disconnect load or charging			
Temperature Protection	Temperature protection of discharge value		/		℃

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	Temperature protection release of discharge value		/		°C
Internal resistance	Discharge loop internal resistance	/	10	20	M R
Self-consuming	Operating mode	/	25	50	M A
Operating temperature	Normal working range	-20		70	°C
storage temperature	Humidity is lower than 90%,	-40		85	°C
Protection board size	length*Width*Height	MAX: 69±2*56.5±2*10±2			mm

3.3 Protection function description:

Overcharge protection: When the battery is in the charging state, the voltage continues to rise. When the protection board detects that the voltage of any cell is higher than the overcharge protection value, the protection board immediately starts timing. When the time reaches the overcharge protection delay, the protection The board turns off the charging MOS tube, the charging is stopped, and it cannot be charged at this time.

Overcharge protection recovery: After the protection board has over-voltage protection, the battery voltage drops when the battery is standing or discharged. When the protection board detects that the voltage of each cell is lower than the overcharge protection recovery voltage, the protection board outputs a signal and turns on The charging MOS tube can be charged at this time.

Over-discharge protection: When the battery is discharged, the voltage continuously decreases. When the protection board detects that the voltage of any cell is lower than the over-discharge protection value, the protection board immediately starts timing. When the time reaches the over-discharge protection delay, the protection board The output signal turns off the discharge MOS tube, the discharge is cut off, and the load lock circuit works, and it cannot discharge at this time.

Over-discharge protection recovery: After the protection board has over-discharge protection, the battery voltage will continue to rise when the battery is standing or discharged. When the protection board detects that the voltage of each cell is higher than the over-discharge protection recovery voltage, it will be disconnected at this time When the load is charging, the protection board outputs a signal, and the discharge MOS tube is turned on, and it can be discharged at this time.

Over-current protection: The current suddenly increases when the battery is in a static or discharged state. When the protection board detects that the current reaches the over-current protection value, the protection board starts timing. When the current in the loop reaches the over-current protection delay time , The output signal of the protection board turns off the discharge MOS tube, the load lock circuit works, and it cannot discharge at this time. Overcurrent protection recovery: After the discharge overcurrent protection of the protection board appears, the discharge MOS tube is turned off, and the current in the loop becomes 0. At this time, the load is disconnected or charging, the protection board outputs a signal, and the discharge MOS tube is turned on. At this time can be discharged

Note: If the parameters of the protection board are adjusted, please read the internal parameters of the protection board before making changes. After the modification is completed, click Write. If the nominal capacity of the battery pack has not been notified to our company, please make changes after communication

IV. Detailed Notes to the number:

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(1) (2) (3) (4) (5)

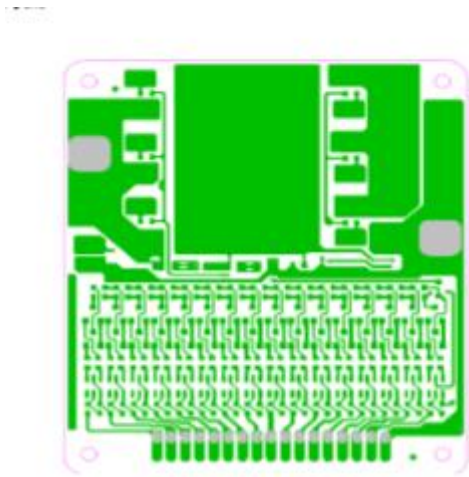
- (1) Jia Bai Da Electronic Technology Co., Ltd: JBD, for short
- (2) Our protection board model:HP16SA, the maximum support 16 strings
- (3) L11S, namely, the sample of this time is a protective board for lifepo4 battery.
- (4)Maximum charge and discharge current, if this current is exceeded, it may cause permanent damage to the protection board.
- (5) With balance function

After your company receives the specification and sample, the verification test is completed, if you company need subsequent batches, please sign this specification and send it back to our company. Our company will provide your company with batches according to the parameters in this specification

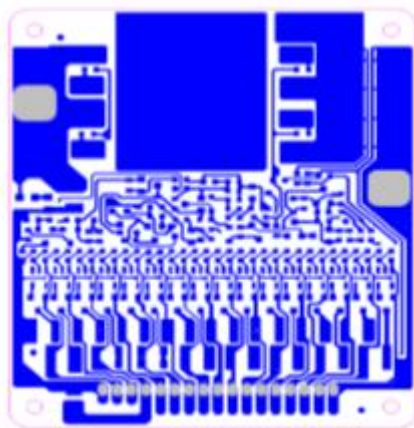
This specification defines the functions, electrical parameters, mechanical parameters and package and transportation, installation and use of the lithium battery pack management system designed and manufactured by Dongguan City Jia Bai Da Electronic Technology Co., Ltd (hereinafter referred to as “our company” later) according to the design requirements provided by your company. Upon confirmation by your company, this specification is only for our company and your company's internal use, and shall not be given to a third party without our company's permission, and our company has the right of final interpretation with regard to this specification.

V. PCB routing and dimension structure drawing

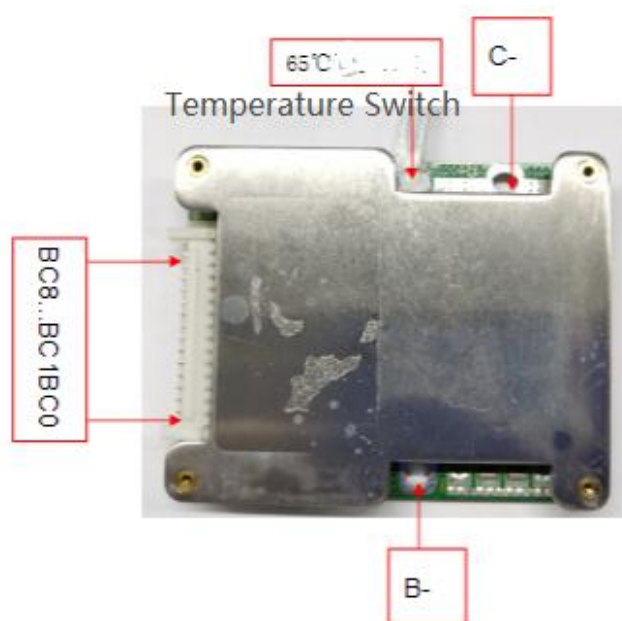
Top layer routing drawing



Bottom layer routing drawing



Wiring Diagram

**Port Description:**

port	Description
C-	Charge and discharge negative poles
B-	Connect the first string of negative pole of the battery pack, that is, the total negative pole of the battery pack
BC0	Connect the first string of negative pole of the battery pack
BC1	Connect the first string of positive pole of the battery pack
BC2	Connect the second string of positive pole of the battery pack
BC7	Connect the 10th string of positive pole of the battery pack
BC8	Connect the 11th string of positive pole of the battery pack that is, the total positive pole of the battery pack

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Main Raw Material

S.N	Material name	Manufacturer	Qty(pcs)
1	Protection IC\HY2112-CB\SOT23-6	Hongkang	8pcs
2	Balance IC\HY2212-BB3A\SOT23-6	Hongkang	8pcs
3	MOS fet\CRSS 052N08 or WMM053NV8HGS\TO-263	CR	6 pcs

VII. Order of connection

When assembling the wiring, weld the cable and the cell correctly, connect the B- of the PCM with the total negative pole of the cell, and then insert the cable into the needle base on the PCM. (Note: different connection modes for different strings, and different connection modes for the same port)

VIII. Precautions for use

1. The design parameters and conditions of use must be followed during use, and the parameters of this specification must not be violated, otherwise the protection board will be easily damaged and the battery pack will be damaged.
2. Prevent static electricity during use, and take corresponding measures to discharge static electricity when testing, installing, and touching the protective board.
3. The charging port can withstand up to the specified DC voltage. Chargers above this voltage cannot guarantee that the protection board will not be damaged. Please use the charger within this specification. The charger should preferably have the function of trickle off at the end of the charging current. Yes, to achieve double insurance. Chargers that do not have the trickle shutdown function are designed for lead-acid batteries and are not compatible with lithium batteries.
4. Be careful not to touch the components on the circuit board with the lead wire, electric soldering iron, tin slag, etc. during use, otherwise the protection board may be damaged.
5. The maximum discharge current is the maximum current that lasts for a few seconds. During the test, the unsustainable time is too long to avoid overheating and damage to the power MOS.
6. When assembling the protection board and the battery pack, do not put the heat sink aluminum plate close to the surface of the battery cell, otherwise, heat will be transferred to the battery cell and affect the safety of the battery pack.
7. If there is any abnormality during use, please stop using it immediately and return it to the original factory or ask professional maintenance personnel for repair.
8. If it is a split port protection board, it is forbidden to use P- as a charging port, because when P- is used as a charging port, the battery pack has no overcharge protection. It is forbidden to use C- as a discharge port when splitting ports.
9. It is forbidden to use two or more protection boards in series or in parallel.
10. This protection board has undergone a lot of reliability tests, and its reliability is much higher than that of the general protection boards on the market. The process of the battery cell should also be guaranteed at the same time to reduce the occurrence of combustion as much as possible.
11. This protection board is not equipped with a 0V battery charging function. Once the battery is 0V, the battery performance will be severely degraded and may even be damaged.
12. In order not to damage the battery, the user needs to charge it regularly to replenish the power when it is not used for a long time (the capacity of the battery pack is more than 2AH, and the storage is longer than 3 months); and in use, it must be charged in time within 12 hours after it is discharged. , To prevent the battery from discharging to 0V due to self-consumption. The customer is required to have an obvious mark on the battery shell for regular maintenance of the battery.
13. This protection board does not have a reverse charging protection function. If the charger's polarity is

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reversed, the protection board may be damaged.

Safety precautions: The company is committed to improving quality and reliability, but generally speaking, electrical parts will have a certain probability of failure. The use environment and conditions are different, and the durability will be different. The use of lengthy design, Avoid abnormal heat, smoke, personal accidents, fire accidents, social damages, etc. caused by overload use