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1) Detailed Notes to the number:

JBD – SP04S005 – L4S – 150A – B – U – H

(1) (2) (3) (4) (5) (6) (7)

(1) Jia Bai Da Electronic Technology Co., Ltd: JBD, for short

(2) Our protection board model: SP04S005, the maximum support 4strings.

(3) L4S, namely, the sample of this time is a 4string protective board for lithium iron phosphate battery.

(4) Maximum charge and discharge current, if this current is exceeded, it may cause permanent damage to the protection board.

(5) means balanced function.

(6) means UART function

(7) It has heating function when charging, and the heating module should be bought separately

2) Introduction and Features:

SP04S005 is an intelligent protection board scheme specially designed for battery packs of Power tools and solar inverters by Dongguan City Jia Bai Da Electronic Technology Co., Ltd. It can be applied to lithium batteries with different chemical properties, such as lithium ion, Li-polymer. Lithium iron phosphate, etc. The protection board has strong loading capacity and the maximum continuous discharge current can reach 150A.

- 3s-4cell series protection
- Various protection functions for charging and discharging
- Discharge overcurrent, short circuit protection functional processes of hardware
- Overvoltage, undervoltage, temperature, overload protection functional processes of software
- Precise SOC calculation with SOC function of automatic learning
- Discharge overcurrent, short circuit protection functional processes of hardware
- Equipped with Bluetooth module with isolated UART communication

notice: Due to the BMS has discharge isolation function, the communication can't be implemented after discharge protection. It can only communicate after either charging for activating the communication or removing the discharge protection

3) Basic parameters

Scope of use:

Battery pack structure: 4S

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

Discharge: constant-current discharge

Output terminal: C-; B+

Input terminal: B-, BC0-BC4 B+

4) Maximum rating: (in addition to the special mark, Ta = 25 °C)

NO	Items	Min.	Type	Max.	Unit	Description
1	voltage range	10		14.6	V	circuit normal working range
2	quiescent current			150	uA	Single battery voltage 3.2V
3	Working humidity	-20		+70	°C	Normal working temperature range
4	Max. working humidity			90%		No condensation
5	Storage temperature	-40		+85	°C	Humidity < 90%, No condensation
6	Working altitude			4000	M	
7	Charging voltage			14.6	V	CC-CV

5) Structure parameter

NO	Items	standard	Unit
Protection board size	L*W*H	215*114*10(±2)	mm
Ribbon cable size	AWG24 ribbon cable\2.54 space \16PIN	500	mm

Electrical Characteristics (The test needs to be carried out in a room with a temperature of 25 ± 2 °C and a relative humidity of 65 ± 20 %)

4.2Function parameter

Functions	Test items	Test condition	specification			Unit
			Min.	Type	Max.	
Charging protection	Over-charge protection voltage	At charge off	3.600	3.650	3.700	V
	Over-charge protection delay time	/	1000	2000	3000	mS
	Over-charge protection recovery voltage	/	3.400	3.450	3.650	V
Balanced function	Balanced turn-on voltage	/	3.350	3.400	3.450	V
	Voltage difference achieves the starting condition	/		30		mV
	Balanced current	/	20		60	mA
Operating current	normal charge current	/			150	A
Charging overcurrent protection value	Charging overcurrent protection value	/	155		165	A
	Charging overcurrent delay	/	7	10	113	S
	Charging release adjustment	/		32		S
Temperature protection	high temperature protection	/	60	65	70	°C
	high temperature recovery	/	50	55	60	°C
	low temperature protection	/	-8	-5	-2	°C
	low temperature recovery	/	-2	0	2	°C
Discharge protection	Over-discharge protection voltage	At discharge off	2.450	2.500	2.550	V
	Over-discharge protection delay time	/	1000	2000	3000	mS
	Over-discharge protection recovery voltage	/	2.900	3.000	3.100	V
Discharging current	Max. continuous current	/			150	A
Overcurrent	Discharge	/	155		165	A

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protection	overcurrent protection current value	1					
	Discharge overcurrent protection delay	1	/	7	10	13	S
overcurrent recovery	Discharge overcurrent protection recovery condition		/	32			S
Overcurrent protection	Discharge overcurrent protection current value	2	/	330	380	430	A
	Discharge overcurrent protection delay	2	/	200		1000	mS
	Discharge overcurrent protection recovery condition		/	32			S
Short circuit protection	Short circuit protection delay time		/	300	400	500	uS
	Short circuit protection		/	Disconnect the load and delay 60S			
Internal resistance	Discharge loop internal resistance		/	/	5	10	mR
Self-consuming	Operating mode			20	50		uA
It has heating function when charging, and the heating module should be bought separately	The heating on condition:	The heating on condition: If charging low temperature protecting (configurable) when charging,					
	Heating loop limit current,	The maximum current limit of a port is < 2A					
	Heating off condition:	charging low temperature protection recovery (configurable)					

Notice:

The above parameters are recommended values. After customers get the protection board, they can change it according to their needs.

Software interface (customer can read the battery data from Computer communication directly, they can observe the charge & discharge state and they can change the protection parameters of battery pack, etc...)

The screenshot shows the 'Parameter' tab of the JBDTools software. On the left, there is a table for 'PackInfo' with columns for NO., Voltage, Balance, and Temp(C). The main area displays various parameters: Voltage (0.0 V), Current (0.0 A), Avg Cell (0.0 V), Max Cell (0.0 V), Min Cell (0.0 V), Diff Voltage (0 mV), CycleCount (0), FCC (0 mAh), RemainCap (0 mAh), Version (Hex), and Date (2016-01-01). There are also two circuit diagrams labeled CHG_FET and DSG_FET. A large green bar indicates a 100% charge level. On the right, there is a list of protection settings such as CELL OVP, CELL UVP, PACK OVP, PACK UVP, CHG OTP, CHG UTP, DSG OTP, DSG UVP, CHG OCP, DSG OCP, SHORT Circuit, AFE ERROR, SOFT LOCK, CHGOVERTIME, and DSGOVERTIME. The status bar at the bottom indicates 'Not connected!', 'ComPort:COM3,Baudrate:9600,data length:8', and the time '2019-04-03 17:17:30'.

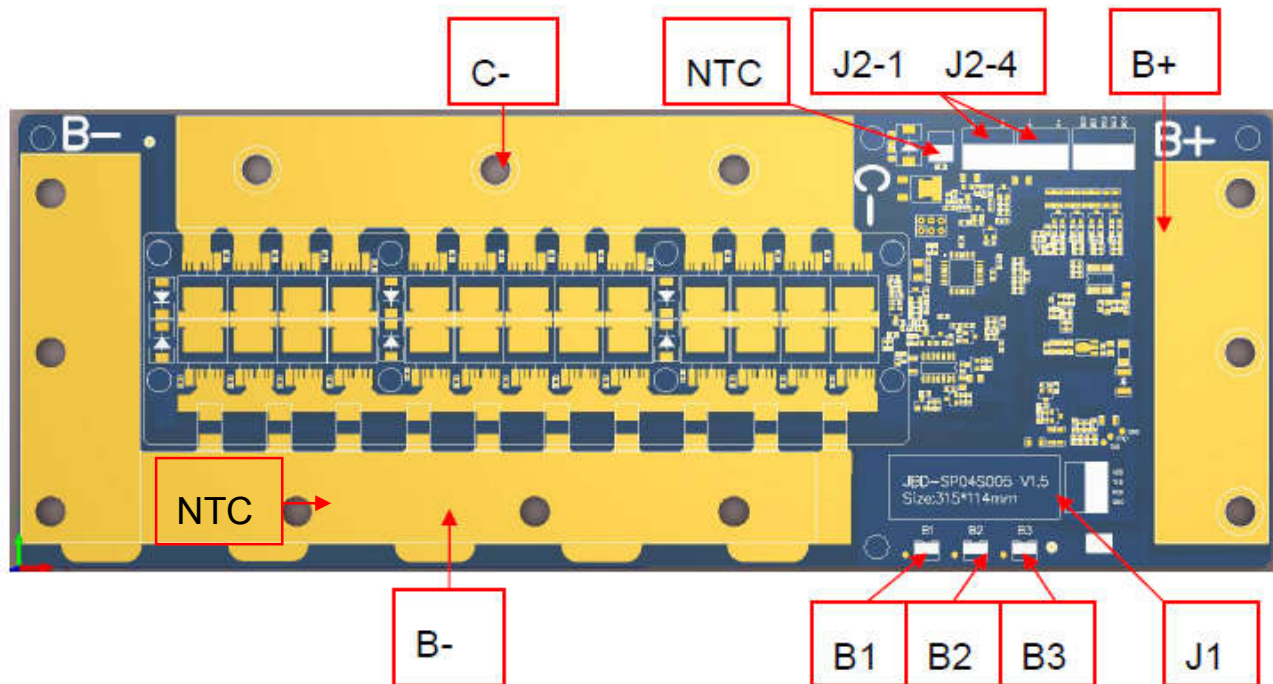
Software parameter

The screenshot shows the 'Parameter' tab of the JBDTools software with detailed configuration options. On the left, there are buttons for 'Read', 'Write', 'SaveFile', and 'OpenFile'. The main area is divided into several sections:

- Basic protected parameter configuration:** Includes settings for CellOvp (4250 mV), CellUvp (2500 mV), PackOvp (58000 mV), PackUvp (43000 mV), CHGOTP (-65 C), CHGUTP (-1 C), DSGOTP (70 C), DSGUTP (-10 C), CHGOCP (5000 mA), and DSGOCP (10000 mA).
- Function configuration:** Includes checkboxes for '开关功能', '负载检测', '均衡功能', '充电均衡', 'LED_EN', 'LED_NUM', 'RTC', 'NO_LIMIT', and 'CHG_EN'.
- NTC configuration:** Includes checkboxes for NTC1 through NTC8.
- Balanced allocation:** Includes 'StartVoltage' (3600 mV) and 'Accuracy' (50 mV).
- Capacity configuration:** Includes 'Nominal' (10000 mAh), 'Cyclic capacity' (8000 mAh), 'Full voltage' (4150 mV), 'End of voltage' (3000 mV), 'DischargeRate' (0.1 %), and various capacity levels (80%, 60%, 40%, 20%).
- Advanced protection:** Includes '过流及短路保护值翻倍' checkbox, DSGOCP2 (31 mV), OCP2Delay (640 mS), Short-circuit (78 mV), SctDelay (400 uS), HardwareOVP (4300 mV), OVPdelay (8 S), HardwareUVP (2500 mV), UVP delay (8 S), and SC release (5 S).
- Other information configuration:** Includes 'Current' (2.5 mR), 'PackNumber' (15), 'Cycles' (0), 'Serial number' (0), 'Manufacturer' (ABCDEF), 'Device model', 'Production' (2019-4-3), and 'Bar code'.
- Protection Count:** A table for tracking counts for SC Count, CHGOCP, DSGOCP, CellOVP, CellUVP, CHGOTP, CHGUTP, DSGOTP, DSGUTP, PACKOVP, and PACKUVP.

 The status bar at the bottom indicates 'Not connected!', 'ComPort:COM3,Baudrate:9600,data length:8', and the time '2019-04-03 17:17:49'.

五、 Wiring diagram



Port Description:

port	Description	
B-	Connect the first string of negative pole of the battery pack, that is, the total negative pole of the battery pack	
C-	Charge and discharge negative poles	
B1	Connect the first string of negative pole of the battery pack, that is the total negative pole of the battery pack	
B2	Connect the first string of positive pole of the battery pack	
B3	Connect the second string of positive pole of the battery pack	
B4	Connect the 3rd string of positive pole of the battery pack	
B+	Connect the 4th string of positive pole of the battery pack	
J1	Bluetooth interface	
J2	1	Positive polar of heating plate
	2	Negative polar of heating plate
	3	Temperature switch
	4	Temperature switch

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)

Precautions for use

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1. When in use, design parameters and work conditions must be followed, and the parameters in this specification must not be violated, otherwise it is easy to damage the protection plate, and then damage the battery pack.
2. When in use, there should be corresponding electro static-free measures for testing, installation and contacting with the protection board.
3. The charging port can withstand the specified DC voltage. If the charger is higher than this voltage, it cannot guarantee that the protection board will not be damaged. Please use the charger according to this specification. It is better to choose the charger with the function of closing the trickle current at the end of charging current, so as to achieve double security. Chargers without trickle current closed are designed for lead-acid batteries and do not work with lithium.
4. When in use, Pay attention to the electric lead, electric soldering iron and solder splash. Do not enable them to touch the components and parts on the circuit board; 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, it cannot last too long to avoid overheating damage of power MOS.
6. When assembling the protection board and the battery pack, do not place the heat dissipating aluminum plate close to the surface of the cell. Otherwise, the heat will be transferred to the cell, affecting the safety of the battery pack.
7. If abnormal conditions occur during use, please stop using it immediately, return it to the original factory or ask professional maintenance personnel for maintenance.
8. If it is a split protection board, it is forbidden to use P- as a charging port. Because P- is used as a charging port, the battery pack has no overcharge protection. It is forbidden to use C- as a discharge port at the time of splitting
9. It is forbidden to use two or more protection boards in series and in parallel.
10. The protection board has already done a lot of reliability tests, the reliability is far higher than the general protection board on the market, and the process of the cell must be ensured at the same time, so as to reduce the occurrence of combustion as much as possible.

Safety Precautions:

Our company is committed to improvement of quality and reliability, but in general, there will be a certain probability of failure in electrical components and parts, with different environment and conditions, the durability will be different. When in use, the lengthy design is adopted to avoid overload abnormal fever, smoking, and even casualty, fire accidents, social damage, etc.