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Version No.： V1.0

Lithium battery protection board
（EK-B3S25A）
Product Datasheet

Shenzhen Enerkey BMS Power Technology Co., LTD

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Product Name	Lithium battery protection board
Product Model	EK- B3S25A
Version	V1.0
Adapt Battery String	3S
Adapt Battery Type	NCM
Function	Overcharge protection, over-discharge protection, over-current protection, short-circuit protection
Effective date	26th.Dec.2023

Product change history			
Version	Date	Change point description	Approve
V1.0	2023-12-26	Initial version	

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Contents

1. Overview

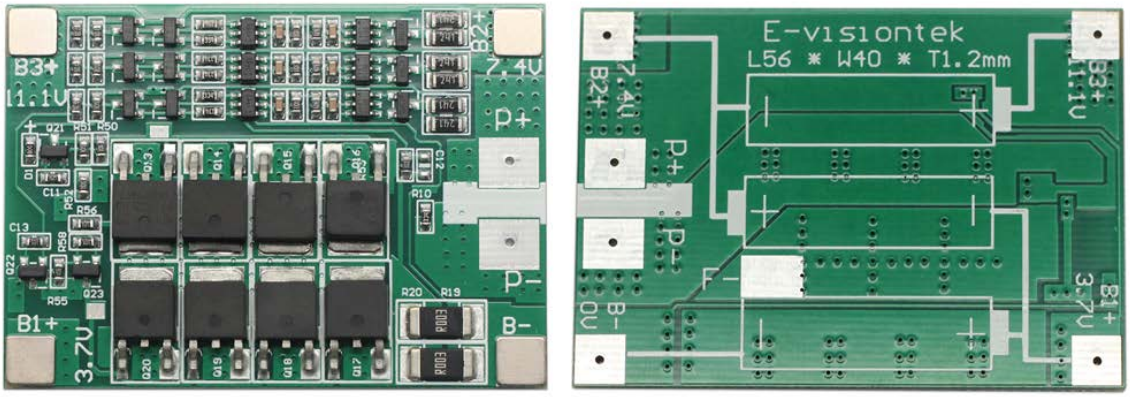
①.This series of lithium battery protection boards is a power management system (BMS) tailored for ternary lithium batteries.
②.This series of lithium battery protection boards uses automotive-grade MOS, 2oz thickened copper foil and copper strips for current sharing, making the protection board highly precise, with ultra-low internal resistance and ultra-low heat generation.
③.On the basis of basic protection board functions such as overcharge protection, over-discharge protection, over-current protection, over-temperature protection, short-circuit protection, etc., a balancing function, reset function, electrostatic protection, dust-proof protection and moisture protection are added.
④. This protection board (EK-B3S25A) is specially developed for users who modify electric drills.
⑤.It has the functions of "overcharge protection, over-discharge protection, over-current protection, and short-circuit protection".
⑥.It is mostly used in the battery packs of portable electric screwdrivers, electric drills, electric saws, power tools, portable vacuum cleaners, small household appliances and other products. Mainly plays the role of protecting the battery pack.

2. Technical Parameters

No.	Item.		Min value	Typical value	Max value	Unit
1	Parameter overview	Rated working voltage B+B-			12.6	V
		Rated discharge current		25		A
		Peak starting current		40		A
2	Overcharge protection	P+P- input withstand voltage			25	V
		Charge detection voltage	4.25	4.30	4.35	V
		Charge detection delay time		110	200	S
		Overcharge release voltage	4.05	4.1	4.15	V
3	Over discharge protection	Discharge detection voltage	2.4	2.5	2.6	V
		Discharge detection delay		100		ms
		Discharge release voltage	2.80	2.90	3.00	V
		Conditions for lifting	Disconnect external load or charge self-recovery			
4	Overcurrent protection	Overcurrent detection voltage		0.1		V
		Over current protection		40		A
		Overcurrent detection delay time		7	20	ms
		Conditions for lifting	Disconnect external load or charge self-recovery			
5	Short circuit protection	Short circuit protection		0.3		A
		Detection delay time	150	250	400	μS
		Conditions for lifting	Disconnect external load or charge self-recovery			

6	Internal resistance	Main circuit on-state resistance		3	4	mΩ
7	Current consumption	Normal working current consumption		3	6	μA
8	Quiescent Current	Current consumption during sleep			4	μA
9	Operating temperature	-	-40	25	85	℃

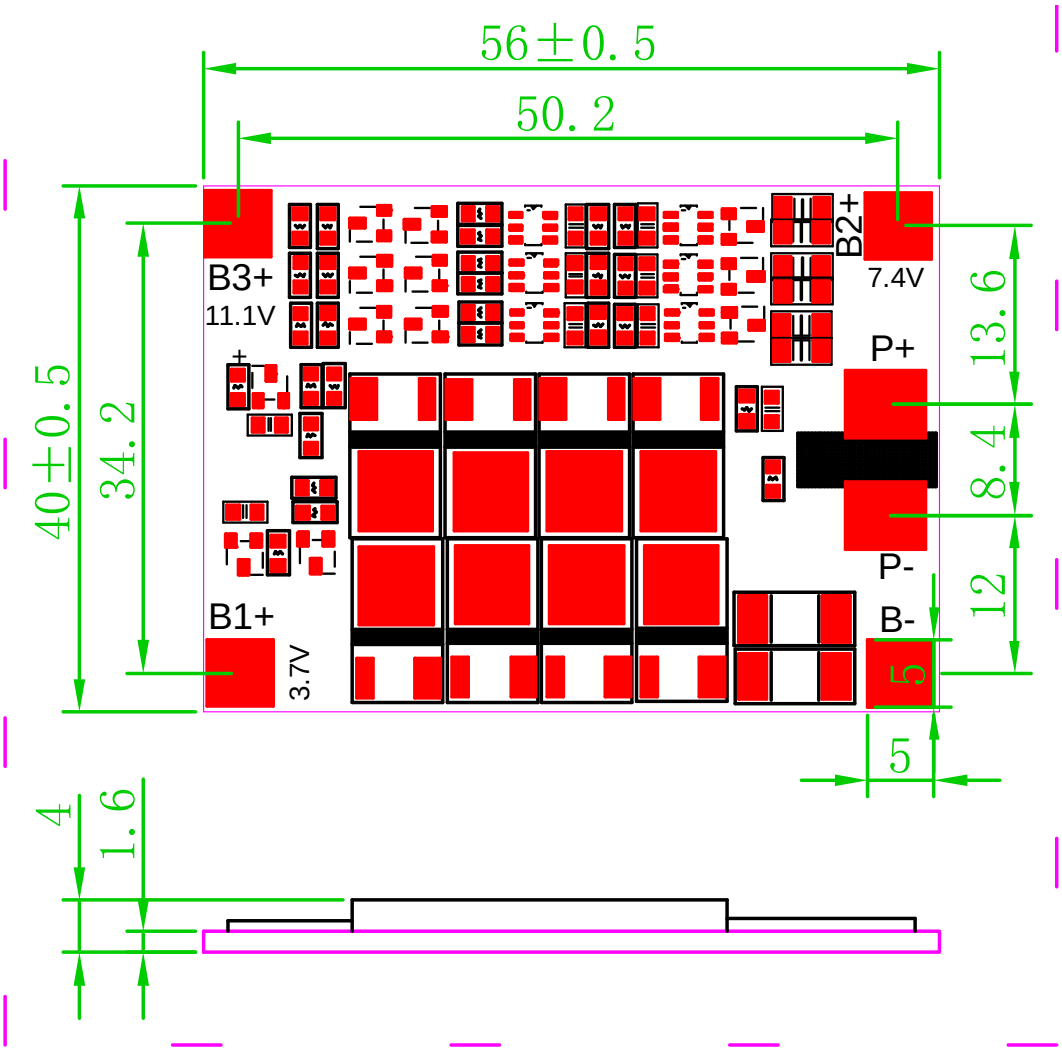
3. Product Photo



4. Product Drawing

1) 2D dimension drawing

(No tolerance noted：±0.15，Unit: mm)



2) PCB specifications

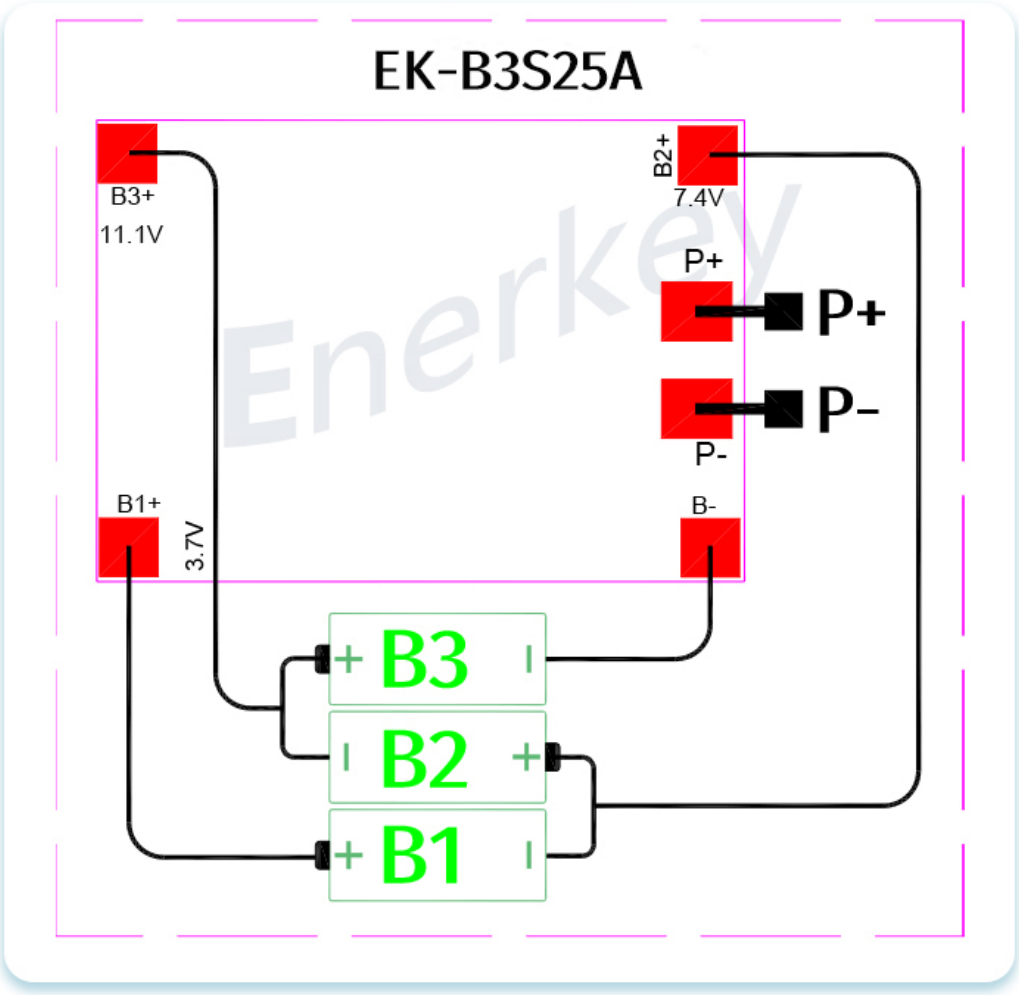
PCB Specifications			
Material	FR-4	Layer	2 layer
PCB thickness	1.6±0.10	Copper(CU) thickness	2.0 oz
Pads plating	Lead-free spray tin	Plate thickness	
Solder	Green	Silkscreen	White

5. Product wiring diagram

1) 3S wiring diagram illustration

EK-B3S25A supports 3 string battery packs. The wiring method is shown in "Figure 5.1.1".

Wiring diagram



2) Wiring precautions

①. Installing the protective board requires a certain amount of technical electronic knowledge.
②. Please solder the battery voltage collection line to the protective plate first, and then install it on the battery pack to fix it.
Follow the order of welding from low to high, from B-..B1..B2.
③. The connection between the battery terminal B- and the protection board terminal B- should be short and thick, otherwise it will cause the protection board to charge and discharge in advance and malfunction.
You need to use thick wires when wiring P+/P-. Wires that are too thin and too long will burn the board!
④. After connecting the battery, please pay attention to the insulation protection of the product to avoid short circuit when the power is on.

5. Frequently Asked Questions

Phenomenon	Solution
After the protective board is installed, No output or wrong output voltage	① Activate the protection board: Connect the charger to power on or short-circuit P- and B- for 2-3 seconds. ② Then measure whether the output voltage is normal; The wiring order is wrong: measure whether the voltage of each battery string is normal.

7. Environmental substance requirements

Each battery corresponds to an LED indicator, and you can clearly observe whether each cell is balanced.

Harmful Substance	Limit standard (mg/kg)
Lead (Pb)	1000
Cadmium (Cd)	100
Mercury (Hg)	1000
Hexavalent chromium (Cr6+)	1000
Polybrominated biphenyls (PBB)	1000
Polybrominated diphenyl ethers	1000

8. Safety protection measures, transportation and storage

1) Safety protection measures

①. There is no high voltage in the balancing board itself, and it will not cause electric shock damage to the body.
②. Do not repair the balancing board while the power is on. All repairs should be performed by qualified service personnel.
If the working voltage set by the factory is changed, the safety certificate no longer applies.
③. When using, please pay attention to the insulation treatment of the product to avoid short circuit.
④. Pay attention to ESD protection when using this product.
⑤. This product complies with the company's thrust standards: 0402 components ≥1.0KgF; 0603 components ≥1.5KgF; IC and MOS tubes ≥2.0KgF.

2) Packaging and shipping

①. Separate and package PCBA with anti-static bubble bags.
②. The packed products can be transported by ordinary means of transportation when they are not directly affected by rain, snow or violent collisions and bumps.
It is not allowed to be placed together with corrosive substances such as acids and alkalis during transportation.

3) Storage

Packaged products should be stored in a permanent warehouse with a temperature of 0℃~35℃ and a relative humidity of no more than 80%.

The warehouse should be free of acid, alkali and corrosive gases, strong mechanical vibration and impact, and no strong magnetic field.