



4 cell 16.8V 40A 18650 lithium battery protection board (with recovery function - AUTO Recovery)

Model: BMS-40A-4S-E / B / S

Integrated with 10 low internal resistance MOSFETS, continuous discharge 40A, 100mA equalizing current, suitable for electric drills, sprayers, LED lights, low power inverters (400W).

BMS-40A-4S-S Standard BMS 4 cell 16.8V 40A lithium battery protection board (with recovery function - AUTO Recovery)
Starting motor less than 60A / power less than 100W.

BMS-40A-4S-E Same as above with the difference of Starting motor less than 80A / power less than 135W.

BMS-40A-4S-B Battery balance version, Starting motor less than 80A / power less than 135W.

Application range: Suitable for lithium batteries with a normal voltage of 3.7V and fully charged 4.2V.
including 1860 to 26650, Polymer lithium batteries.

PCB Size: -Std & Enh. 55 x 45 x 3.4mm

"PCB Size: -Balance 60 x 46 x 3.4mm

Weight: 9.3g and 10.3g

Charging Voltage: 16.8 ~ 18.1V

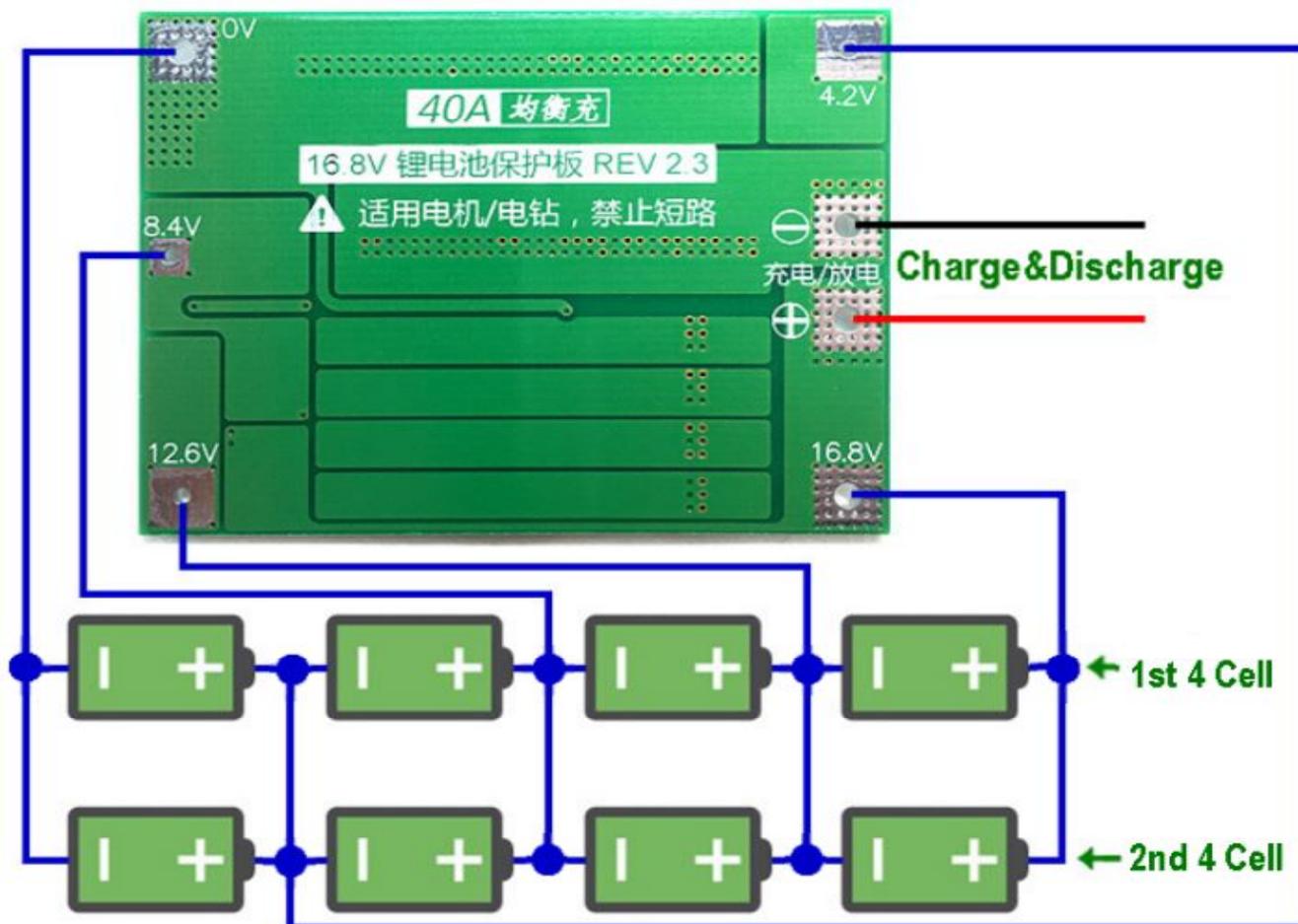
Continues discharge max: 40A

If heat dissipation environment is not adequate please reduce load

Continues discharge normal: 40A

Standard version (-S): Applicable to start electric motor with current below 60A and power up to 100W.

Enhanced version (-E): Applicable to start electric motor with current below 80A and power up to 135W, with interference function.

Recommended conditions:



4S40A : Electric parameter	Min	Nor	Max	Unit	Notes
Self consuming current	12	18	24	uA	
Overcharge protection voltage	4.2	4.25	4.3	V	
Balance charging start voltage	4.17	4.12	4.23	V	Balanced Version
Balance current	95	100	105	mA	Balanced Version
Balance charging Power	1.56	1.72	1.91	W	Balanced Version
Over-charge recovery voltage	4.1	4.15	4.2	V	
Over-discharge protection voltage A	2.4	2.5	2.6	V	
Voltage after over discharge protection	2.8	3	3.2	V	1C Discharge
Voltage after over discharge protection	3.2	3.5	3.8	V	2C Discharge
Over-discharge recovery voltage	2.9	3.2	3.3	V	
Rds (on)	2.5	3	3.5	mΩ	
Over-current protection current (-S)	54	60	66	A	Standard version
Over-current protection current (-B & -E)	70	80	90	A	Balance & Enhanced Version
Over-current delay time	100	150	200	ms	
Continue work current	0	40	40	A	Resistive load
Continue output power	0	672	672	W	Resistive load
Environment temperature	-40	25	85	°C	

Trouble shooting:

Fault phenomenon	Fault Checking and Causes	Action
Unable to charge	Measure the voltage of 4 batteries. If the voltage of one group of batteries is exceeds about 4.25V, the protection board will start overcharge protection.	Match the batteries well, and don't mix the good batteries with the bad ones (normal function, no warranty)
Unable to discharge	Measure the voltage of 4 groups of batteries. If the voltage of one group of batteries is less than 2.7V, the protection board will start overcharge protection.	Match the batteries well, and don't mix the good batteries with the bad ones (normal function, no warranty)
Charge / discharge failure	0V, 4.2V, 8.4V, 12.6V, 16.8V wrong connection	Rewire or renew the board (Human fault, no warranty)
Overcharge/over-discharge failure	0V, 4.2V, 8.4V, 12.6V, 16.8V wrong connection	Rewire or renew the board (Human fault, no warranty)
Discharge protection	Check the battery pack whether has sufficient discharge capacity and the starting current of the load whether exceeds the over-current protection current of the protective board.	Replacement of batteries with stronger discharge or protective board with larger current (beyond working range, no warranty by return)
Element virtual welding	There is no connection between one pin of the component and PCB welding.	
Element continuous welding	There is a short circuit between two or more pins of a component.	Remove components and re-weld (Maintainable by return)
Electrostatic breakdown A	In the absence of electricity, measure the G, D and S pins of MOS transistors. If the forward and reverse resistances of any two pins are 0Ω, it has been damaged.	Removal and replacement MOSFETs transistors
Electrostatic breakdown B	Remove the MOSFET's transistors and measure the resistance values of G and D poles, G and S pins. If there is breakdown, the resistance should be infinite under normal conditions.	Removal and replacement MOSFETs transistors

Note 1: The successful start of the drill requires three 15C-20C power battery, or six 10C-15C power battery (ordinary 18650 cannot start the drill!!).

Note 2: Strictly according to map wiring 0V, 4.2V, 8.4V, 12.6V, 16.8V, do not deliberately short circuit.

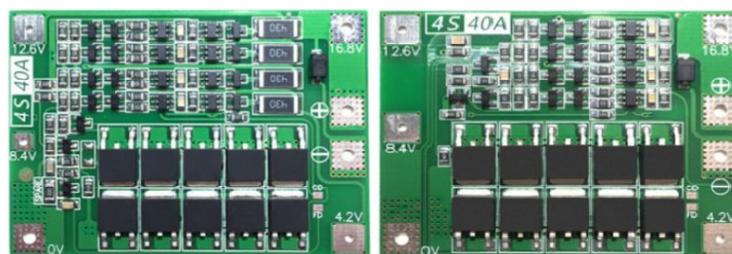
Note 3: When the load of the brush motor is used, try to connect a non-polar capacitor (withstand voltage above 25V, capacity 10uF-100uF) to the motor's positive and negative terminals to prevent the reverse spike from the motor. Break the MOSFET's.

Note 4: 4 groups of batteries in series, please ensure that the voltage of each group of batteries, if not the same, please fill each battery separately and then use in series.

For battery test, discharge and the voltage that drop faster in a particular battery group there are poor batteries in this group.

For some of the poor basis of electronic customers to explain:

Balanced charge is only auxiliary functions, try not to put a good battery and poor battery mixed together! 4 sets of battery capacity / resistance closer to the better! (3 good battery +1 Poor battery use effect = 4 poor battery use effect).



BALANCE VERSION

ENHANCED VERSION