

BMS 4S 20A LITHIUM BATTERY PROTECTION BOARD

DESCRIPTION

[BMS 4S 20A lithium battery protection board](#)

is a Battery Management System (BMS) designed to protect and manage a battery pack composed of **four lithium cells connected in series (4S)**. It is rated to handle a maximum **continuous discharge current of 20 amps**. These boards are typically used for 18650 lithium-ion cells in DIY battery pack projects for applications like e-bikes, power tools, and solar storage systems.

There are also variations for LiFePO4 (LFP) batteries, which have different voltage specifications

Specifications

While specifications can vary slightly between manufacturers and models, here are some typical technical details for a generic 4S 20A lithium-ion BMS.

Number of cells	4 (connected in series)
Compatible battery chemistry	3.7V lithium-ion (Li-ion), including 18650 cells
Charging voltage	16.8V DC
Nominal voltage	14.8V (for standard Li-ion)
Max continuous current	10A to 15A
Max peak (instantaneous) current	20A
Overcharge detection voltage	4.25V to 4.35V $\pm$ 0.05V
Over-discharge detection voltage	2.5V to 3.0V $\pm$ 0.05V
Over-discharge recovery voltage	2.5V $\pm$ 0.05V
Working temperature	-40°C to +50°C
Quiescent current	Less than 30 μ A

Features

The main purpose of the BMS is to ensure the safety and longevity of the battery pack by protecting it from dangerous conditions.

- **Overcharge protection:** Prevents the individual battery cells from being charged to an excessively high voltage, which can cause them to overheat and degrade. The board will cut off the charging process when a cell reaches its overcharge detection voltage, which is typically between 4.25V and 4.35V for a standard lithium-ion cell.
- **Over-discharge protection:** Stops the battery pack from being discharged below a safe voltage level. Discharging too far can cause irreversible damage to the cells. The board will cut off the load when a cell reaches its over-discharge detection voltage, typically between 2.3V and 3.0V.
- **Overcurrent protection:** Shuts off the power if the current draw from the battery pack exceeds a safe level. A 20A board can handle a maximum working or peak current of up to 20A, though the continuous working current may be lower, around 10A to 15A.

- **Short-circuit protection:** Provides immediate protection by cutting the circuit in the event of a short, which can cause a rapid and dangerous surge of current.
- **Cell balancing:** Some advanced 4S BMS boards include a passive or active cell balancing feature. This helps ensure all four cells in the series have a similar voltage and State of Charge (SoC) by bleeding off excess energy from the higher-voltage cells.
- **Low standby current:** The board draws a very low amount of current (often less than $30\mu\text{A}$) when the battery pack is not in use, which helps prevent the battery from slowly draining over time.