

Use case
Circuit protection for BMS



Eaton fuses provide circuit protection for automotive battery management systems

With the automotive industry shifting from overreliance on fossil fuels to more sustainable energy sources offering lower emissions, modern vehicles have become more electrified. In many electric and hybrid cars, erstwhile mechanical and hydraulic functions now consist of electronic systems offering smaller carbon footprints and greater efficiency. Given the host of infotainment, connectivity, and driver assistance features integrated into these modern vehicles, they require more powerful batteries under the hood to cater to the increasing number of electronics.

Lithium-ion batteries, conventionally used in electric vehicles, suffer from several

problems, including varying voltage levels, excessive current flow, overheating, and overcharging. These problems necessitate the use of an external control system to optimize power storage and supply. Battery management systems (BMS) help monitor, balance, and regulate battery cells to ensure reliable, high-power delivery to electronics throughout the vehicle.

Automotive BMS handles voltages up to 48 V and higher. These higher voltages present fresh challenges for automakers to find the optimal solution for circuit protection in BMS. The safety implications of having a failed EV battery would be dire. Eaton's Bussmann® series

CC06FA fast-acting fuses are surface mount components that provide reliable overcurrent protection in battery management systems for electric and hybrid vehicles. They are AEC-Q200 Grade 1 compliant, ensuring high safety and reliability under a wide range of operating temperatures and high mechanical stress.

The CC06FA fuses are lightweight components available in the 0603 (1608 metric) compact package, making them suitable for space-constrained applications such as BMS at the cell level. They can withstand operating temperatures ranging from -55 °C to +125 °C with a high breaking capacity up to 63 Vdc.

Additionally, the solder-free design allows for excellent on-off and temperature cycling characteristics during use.

Eaton's CC06FA fuses ensure protection at the BMS cell level by 'gracefully' shutting down localized sections to isolate faults, rather than tripping the larger fuse upstream that protects the overall system. This intelligent solution provides cost savings on fuse replacements while ensuring the safety and reliability of BMS.

CC06FA Bussmann® series fast-acting fuses are manufactured with the highest-grade eco-friendly materials to reduce carbon waste. They are lead-free, halogen-free, and RoHS compliant.

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