



Eaton ECSTA for automotive onboard chargers

According to the IEA, global demand for EVs could grow 36% to reach up to 245 million vehicles by 2030¹. Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Hybrid Electric Vehicles (HEVs) utilize batteries with built-in charging capability to lower annual emissions and save costs on mobility.

The need for increased mileage allowing EVs to keep up with conventional combustion engine vehicles presents fresh challenges for designers: notably, faster charging for maximum mileage on a single charge. Hybrid vehicles utilize fossil fuel-powered drivetrains as well as batteries, while BEVs and PHEVs incorporate solid-state batteries to power the drivetrains. Each of these

vehicles utilizes onboard chargers (OBCs).

Onboard and wireless chargers are designed to convert single or multiphase AC power supplied via cables that plug into charging station outlets into DC to charge EV battery packs. Thus, the primary function of the charger is to maintain the flow of electricity from the grid to the battery. In power supply circuits, it is essential to know the state of charge of batteries by monitoring charge and discharge currents.

Current sense transformers (CSTs) are electronic components used to sense and measure current flow in power supply circuits and have increasing prominence in automotive applications. Their mode of operation is shunting

a small sample current and measuring it while dissipating minimal energy. CSTs produce an alternating current in the secondary winding that is proportional to the current being measured in the primary winding. The sensed current is then used to prevent overcurrent and monitor or control circuits in power supplies and other powered applications.

Eaton automotive current sense transformers (ECSTA) are suitable for high-reliability commercial and automotive applications. ECSTA provides accurate sensing and measurement of current levels in power circuits and incorporates a low DC resistance coil that can sense current levels and current direction changes with minimal

energy dissipation. The ECSTA is AEC-Q200 tested and ideal for high-reliability automotive and commercial applications (e.g., industrial, computing, medical, and energy products).

Eaton's current sense transformers help prevent overcurrent conditions and other current fault conditions in powered circuits. They feature a rugged bobbin construction ideal for use in harsh operating conditions. Applications of Eaton's ECSTA include improving the efficiency of high-frequency switched-mode power supplies (SMPS), AC detection, load drop, and shutdown detection, system tampering detection, load measuring, and high-frequency current sensing.

¹[Global EV Outlook 2020](#)

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