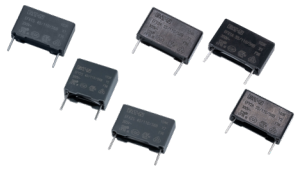
Use case
Eaton film capacitors for onboard chargers



Eaton's film capacitors provide reliable EMI filtering in onboard chargers for electric vehicles

As plug-in electric vehicles and pure EV production ramp up globally, automakers are faced with technological challenges, including a greater likelihood of electromagnetic interference (EMI). Considering the stringent safety and efficiency requirements of EVs, high levels of noise can be hazardous. As such, EMI filtering is critical in today's component-dense automotive PCBs.

Modern automobiles utilize high-power electronics under the hood to convert and control power in the system. The onboard charger (OBC) is an integral device mounted within the vehicle that is responsible for converting AC from the grid into DC to supply the battery management system (BMS), which manages the supply of power to the batteries. OBCs also perform other functions, such as current protection and monitoring the charging rate.

EMI filtering components such as capacitors help protect sensitive electronics from damage by suppressing undesirable current conduction through internal circuitry that can potentially interfere with the power and signal lines. In onboard chargers, common-mode and differential-mode EMI filtering via capacitors provides high impedance to mitigate noise signals with minimal power dissipation.

Eaton offers a broad range of film capacitors (safety, DC-link, pulse, and AC filtering) in common industry footprints for high-reliability capacitance and EMI/ripple current filtering in EV onboard chargers. Film safety capacitors use metallized polypropylene film, encapsulated in a UL94V-0 compliant resin. The class X1 and X2 families offer various sizes and configurations for differential and common-mode filtering across power lines, with versions also meeting the THB Grade IIIB and AEC-Q200 standards for automotive use.

Film DC-Link capacitors, suitable for DC filtering, have a metallized polypropylene film encased in in epoxy resin in a plastic case with 2 or 4 pin tinned copper wire terminals, with an automotive-qualified variant available.

The Eaton's film pulse capacitors (EFPLS/EFPLA) combine metallized films and are encased in plastic with epoxy seal. The EFPLS handles high dV/dt and ripple currents, while the EFPLA, compliant with THB Grade IIIB and AEC-Q200, is suitable for demanding environments, such as automotive onboard chargers. Lastly, Eaton's film AC filtering capacitors use metallized polypropylene, encased in epoxy in a plastic case with 2 or 4 pin tinned copper wire terminals to enhance AC/DC and DC/AC conversions and meet THB Grade IIIB and AEC-Q200 standards.

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