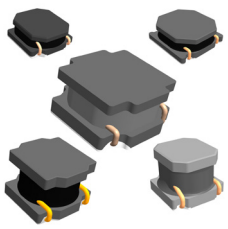
Use case
Eaton SDCxA (semi-shielded drum core) automotive power inductors



Eaton inductors provide high-performance filtering in automotive applications

Leading automakers are pushing the envelope regarding the functionality, drivability, safety, and comfort of the latest cars, trucks, vans, etc. Automobiles have evolved from being just vehicles for movement from one point to another to highly complex "computers on wheels" with a host of new features for enhanced functionality and driving experience. Today, in-vehicle infotainment (IVI) systems allow drivers to stay "connected" during transit. Wireless networking technologies, such as Bluetooth, Wi-Fi, Flexray, Zigbee, and controller area networks (CAN) provide seamless connectivity between various units, modules, and components within vehicles. Advanced driver assistance systems (ADAS) offer several features for improving driver and pedestrian safety such as lane departure warning (LDW), collision avoidance, and adaptive cruise control (ACC).

The need for magnetic filtering in automotive applications

Advanced functionalities in modern vehicles are increasing the current and power requirements, and consequently, the amount of electrical noise (EMI) produced in automotive systems. EMI is of two main forms; conducted or radiated. Conducted EMI refers to electrical disturbances due to inadvertent physical contact of conductors, while radiated EMI is generated by inductive coupling between circuit elements in close proximity. Whatever the form, electrical noise interferes with the operation of components, often resulting in malfunction and latent or catastrophic failures.

Sources of EMI in automotive systems include wiring harnesses, common-mode noise in vehicle power cables, conducted EMI in automotive buck converters, and wideband EMI in powertrains.

Modern vehicles including electric or hybrid-electric cars and trucks can benefit from integrating magnetic filtering components (e.g., common-mode chokes and inductors). For example, inductors can be placed at the input of a buck converter to minimize EMI in automotive circuits. Essential considerations for selecting EMI filtering elements include automotive-grade qualification (e.g., AEC-Q200), small footprints, lightweight, higher current ratings, wide inductance values, as well as suitability for use in wide operating temperatures.

Eaton EMI filtering solutions for automotive applications

Eaton's SDCxA is a line of automotive-grade semi-shielded power inductors providing excellent EMI filtering throughout the vehicle. SDCxA is available in four high-power-density sizes (4 mm, 5 mm, 6 mm, and 8 mm).

The SDCxA consists of two families; SDCLA and SDCHA. SDCLA offers inductances from 1.0 uH to 22 uH, while SDCHA offers inductances from 1.0 uH to 100 uH. Eaton SDCxA provides a wide range of current ratings, while delivering high power density and low core losses. These products utilize high precision embedded semi-shielded construction for excellent EMI immunity in automotive applications. Each inductor is rated from -55 °C to +125 °C operating temperatures.

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