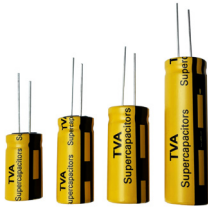


Use Case Automotive



Eaton's supercapacitors help make vehicles safe in emergency situations

As modern vehicles such as automobiles, rail cars, and commercial trucks become more technologically complex and electrified, so do their safety, tracking needs, and capabilities. Safety features are essential in vehicles at all times, especially during accidents or during a mechanical failure and energy storage devices are required to keep these features functional.

The need for safety features in modern vehicles

Automakers are integrating a host of features into vehicles to enhance the safety and security. For example, Global Positioning System (GPS) has become prevalent in all types of transport vehicles. GPS not only guides drivers to their destinations in the shortest possible time but also helps to locate a vehicle in an emergency. Electronic door latches (e-latches) utilize electric actuating systems to make it almost effortless for owners to open their car doors while

preventing access from burglars. In Europe, e-Call systems bring swift assistance to drivers that have been involved in a collision anywhere within the European Union (EU).

Standard lithium-ion and lead-acid batteries utilized in vehicles are prone to a range of failure modes, e.g., battery leaks, thermal runaway (due to temperature rise), cold starting issues, depleted voltage levels, and more. These issues could compromise the safety and security features of vehicles, preventing drivers from accessing them when they need them the most. On the other hand, supercapacitors provide reliable high-density power with excellent temperature stability and durable operation over millions of charge-discharge cycles.

Supercapacitors can be utilized as sole energy storage or combined with batteries for maximum uptime of vehicle

safety features. For example, supercapacitors can activate door locks or enable GPS location to be transmitted if an accident occurs or the car's battery is depleted or disconnected. This could be the difference between getting the help drivers desperately need or being able to exit an unsafe vehicle.

Eaton supercapacitors enhance vehicle safety

Eaton's TVA supercapacitors are reliable, high-power, ultra-high capacitance energy storage devices. The TVA supercapacitors are automotive-grade products with AEC-Q200 certification, uniquely suited for enhancing the security and safety of vehicles. Applications include active safety systems, e.g., door locks, airbag clusters, active suspension systems, adaptive cruise control, as well as passive safety systems for collision avoidance. Eaton's 3.0 V TVA supercapacitors offer

reliable high-density power for activating vehicle safety and security features in the event that the vehicle's battery is dead or disconnected during an accident (a critical requirement in electric vehicles).

Utilizing an electric double-layer capacitor (EDLC) construction combined with proprietary materials and processes, Eaton offers a wide variety of capacitor solutions tailored to specific applications. TVA supercapacitors can be applied as the sole energy storage or in combination with batteries to optimize cost, lifetime, and runtime. System requirements range from a few microwatts to kilowatts. All products offer ultra-low ESR for high power density and utilize eco-friendly materials. Eaton supercapacitors are maintenance-free with long lifetimes (up to 20 years*) and can operate in temperatures from -40 °C to +85 °C.

*Supercapacitor lifetimes vary based on charge voltage and temperature. See Eaton's application guidelines or contact your local Eaton sales representative for more information on lifetime estimates

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