

Use Case Active Suspension Systems



Eaton supercapacitors provide superior active suspension for automotive engineers

Suspension control is a fundamental concern in automobile drivability. Anti-roll bar or stabilizer bar systems help stabilize a vehicle when navigating sharp turns or irregular road conditions by adjusting the suspension automatically and immediately. As a result, the car has better traction and improved steering ability under all conditions.

Recently, an automobile powered by Eaton supercapacitors passed the 60,000-mile road test for an OEM. Eaton's XT and XV supercapacitors provide low resistance and high-density power to next-generation active suspension systems for enhanced drivability, even in extreme weather conditions and over tens of thousands of miles.

Eaton XT and XV supercapacitors offer reliable performance throughout a car's useful life. They instantaneously transmit pulse power to and from the car's active suspension systems while on the move.

Eaton XT supercapacitors are snap-in, cylindrical-shaped cells with an Electric Double-Layer Capacitors construction (EDLC) for ultra-high capacitance, very low Equivalent Series Resistance (ESR), and high-power density. The XT cells have a maximum operating voltage of 3 V. The XV supercapacitors are similar to the XT model, rated at 2.7 V, but provide about 10 percent higher capacitance. These cells also feature an EDLC construction with high-durability materials for high capacitance and ultra-low ESR.

Supercapacitors offer significant durability and longer life over battery systems. Unlike batteries (lead-acid or lithium-ion) which experience a steep drop in capacity over a few years of regular use, Eaton supercapacitors keep delivering power over millions of charge/discharge cycles with minimal decline in capacity.

The average lifespan of XT and XV supercapacitors is up

to 10 years or the life of the vehicle. Whereas a battery only lasts a few years, under the constant high-power charge and discharges required by the anti-roll bar system.

Space is another critical concern for automobile designers. The higher power required for the application results in bulky batteries. However, the Eaton high-power density supercapacitors are lightweight and compact systems which easily fit into a variety of locations in the vehicle.

Due to the high power required, energy storage is best placed near the stabilizers and may commonly be placed in the trunk, under floorboards or in fender locations. Supercapacitors' maintenance-free, long lifespan allows them to be designed into locations that would be otherwise inaccessible for regular replacement.

The XT and XV cells also have a wide operating temperature range (-40 °C to +65 °C)

giving them reliable operation with minimal power loss in all climates. Manufactured with the highest-grade eco-friendly materials, these supercapacitors are RoHS-compliant and UL-certified.

Typical 48V anti-roll applications require 18 to 20 series-connected XT cells at 370 farad (F) each or XV supercapacitors in series at 400 F per unit.

Eaton supercapacitor cells offer significant advantages over batteries for active suspension systems. They deliver reliable and near instantaneous power to active suspension systems for improved drivability, and offer a much longer lifespan. The low profile of Eaton's XT and XV supercapacitors makes them excellent choices for leading automobile manufacturers.

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Printed in USA
Publication No. 10916 BU-MC19051
April 2019

www.eaton.com/supercapacitors

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