



DID YOU KNOW?

PRINCIPLES OF EDLC ENYCAP™ CAPACITORS

General EDLC Technology Overview

Vishay electrical double-layer capacitors (EDLC) are pure supercapacitors made in the technology of standard radial capacitor designs.

An EDLC is a very high capacitance product going up to high farad values. This technology fills the gap between aluminum electrolytic capacitors and rechargeable batteries.

Much more energy can be stored in a supercapacitor than in standard aluminum capacitors. High discharge currents are a further benefit over rechargeable batteries, and EDLCs tolerate many more charge and discharge cycles (> 1 mil).

Typical applications for EDLCs include backup power, burst power support, storage device for energy harvesting, micro UPS, and energy recovery systems.

Specific Characteristics

The principle construction of an EDLC is composed of two active carbon electrodes, separated by a paper and an electrolyte that connects the two electrodes.

EDLC capacitors use the so-called double-layer effect to store electrical energy. A double-layer capacitor has no solid dielectric to separate the different potentials.

The electrodes are polarized by an applied voltage. This causes the ions in the electrolyte to create electrical double layers on each electrode. This physical impact leads to the high energy density of this capacitor technology. Nevertheless, the self-discharge of EDLC products is limited to a maximum of only a couple of weeks.

The useful lifetime of an EDLC is temperature- and voltage-dependent. 10 K (Kelvin) lower temperature will double the lifetime, and a 200 mV lower applied voltage will double the lifetime as well. This principle is derived from the well-known law of Arrhenius about acceleration of reaction processes.

Products utilizing this technology experience aging issues caused by environmental humidity. To provide high performance under high humidity conditions, Vishay has designed ruggedized EDLC versions like the 225 EDLC-R and 235 EDLC-HVR.

If more than two capacitors are in a series connection, don't forget to balance the products. Otherwise a voltage mismatch could occur.

Available Products

Vishay EDLCs include different versions:

- [220 EDLC](#) standard, 2.7 V, 1000 h at 85 °C
- [225 EDLC-R](#) ruggedized, 85 / 85, 2.7 V, 2000 h at 85 °C
- [230 EDLC-HV](#) high voltage, 3.0 V, 2000 h at 85 °C
- [235 EDLC-HVR](#) high voltage ruggedized, 85 / 85, 3.0 V, 2000 h at 85 °C

