Double Layer Capacitors with Capacitances in the Farad Range

WIMA SuperCap NEW

Introduction

The Double Layer Capacitors developed by WIMA are storage capacitors with highest capacitance values in the Farad range. They are among others suited to serve as batteries, can deliver considerably higher currents for a short time, however, and are maintenance free.

Features of the Double Layer Capacitors

Capacitance range:	100 F to 2500 F
Internal resistance:	⩽ 0.7 mΩ (2500 F)
Efficiency:	Discharge current up to 450 A (2500 F)
Temperature range:	-30 °C … +65 °C
Environmental friendly design:	Pb-free and Cd-free
Prismatic housing:	Minimum volume when series connected or in parallel
Leakage current:	< 10 mA

Fields of Application

Automotive:
- Recuperation of brake energy
- Stability control
- Support of car supply systems
- Brake by wire
- Steer by wire
- Lifetime extension of batteries in hybrid cars
- Load levelling for fuel cell drives

Railway:
- Support of starter batteries of diesel-electric drives
- Energy regeneration and network support in local traffic

Wind power:
- Pitch control

UPS:
- Short term storage

Battery support:
- Combination with battery to extend lifetime

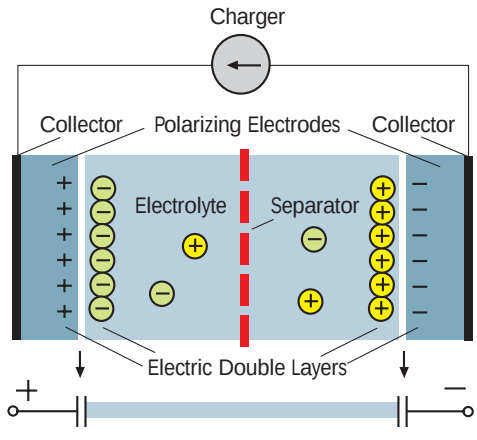
General Information

Availability:	Samples of the values of the data sheet are available as of now.
Price indication:	Prices will be fixed with reference to the market level and will anyway be on a "high end" level.
Module construction:	Custom made module systems increasing the voltage to e.g. 12 V and 42 V on request.
Design in:	Custom made capacitance values and sizes on request.

The construction of a Double Layer Capacitor can be described as a plate capacitor where the most important topic is to obtain electrodes with an extremely large surface. For this purpose activated carbon is ideally suited, as it allows to obtain capacitance values of up to 100F/g of the active mass of the electrode.

The electrolyte, the conductive liquid between the electrodes, is a conducting salt dissolved in an aqueous or organic solvent which permits to apply voltages of 2 to 3 V. Beyond this voltage chemical reactions start to create gas which leads to the destruction of the capacitor.

The actual double layer consists from ions which attach to the electrodes - negative ions to the positive electrode and positive ions to the negative electrode - as soon as a voltage is applied to the cell and thus create a dielectric of a few Angström only. According to the formula for the capacitor from the dielectric constant of the double layer (approx. 10) and the extremely thin dielectric you get an very high capacitance value.



Picture: Principle of a Double Layer Capacitor