Glossary and Definitions

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Here is a glossary and definitions of related terms:

Aerogel Capacitor - these capacitors use carbon aerogel to attain immense electrode surface area, can attain huge values, up to thousands of farads. EDLCs can be used as replacements for batteries in applications where a high discharge current is required, e.g. in electric vehicles. They can also be recharged hundreds of thousands of times, unlike conventional batteries which last for only a few hundred or thousand recharge cycles. However, capacitor voltage drops faster than battery voltage during discharge, so a DC to DC converter may be used to maintain voltage and to make more of the energy stored in the capacitor usable.

Aluminum Electrolytic Capacitor - are compact but "lossy". They are available in the range of <1 µF to 1,000,000 µF with working voltages up to several hundred volts DC. The dielectric is a thin layer of aluminum oxide. They contain corrosive liquid and can burst if the device is connected backwards. The electrolyte will tend to dry out in the absence of a sufficient rejuvenating voltage, and eventually the capacitor will fail. Bipolar electrolytics contain two capacitors connected in series opposition and are used for coupling AC signals. Bad frequency and temperature characteristics make them unsuited for high-frequency applications

Ceramic Capacitor - This capacitor is so named because it contains a ceramic dielectric. One type of ceramic capacitor uses a hollow ceramic cylinder as both the form on which to construct the capacitor and as the dielectric material. The plates consist of thin films of metal deposited on the ceramic cylinder. The other type of ceramic capacitor is manufactured in the shape of a disk. After leads are attached to each side of the capacitor, the capacitor is completely covered with an insulating moisture-proof coating. Ceramic capacitors usually range in value from 1 picofarad to 0.01 microfarad and may be used with voltages as high as 30,000 volts.

Couloumb - A coulomb is the unit of electric charge. It is named after Charles-Augustin de Coulomb.1 coulomb is the amount of electric charge transported by a current of 1 ampere in 1 second. It can also be defined in terms of capacitance and voltage, where one coulomb is defined as one farad of capacitance times one volt of electric potential difference.

EDLC - Electric Double Layer Capacitor - is a next-generation energy storage device that will be used as an auxiliary power supply and the combined use with photovoltaics equipment and hybrid electric cars.also known as supercapacitors or ultracapacitors, have very high capacitance values but low voltage ratings. They use a molecule-thin layer of electrolyte, rather than a manufactured sheet of material, as the dielectric. As the energy stored is inversely proportional to the thickness of the dielectric, these capacitors have an extremely high energy density. The electrodes are made of activated carbon, which has a high surface area per unit volume, further increasing the capacitor's energy density.

Electrolytic Capacitor - is used where a large amount of capacitance is required. As the name implies, an electrolytic capacitor contains an electrolyte. This electrolyte can be in the form of a liquid (wet electrolytic capacitor). The wet electrolytic capacitor is no longer in popular use due to the care needed to prevent spilling of the electrolyte. A dry electrolytic capacitor consists essentially of two metal plates separated by the electrolyte. In most cases the capacitor is housed in a cylindrical aluminum container which acts as the negative terminal of the capacitor. The positive terminal (or terminals if the capacitor is of the multisection type) is a lug (or lugs) on the bottom end of the container. The capacitance value(s) and the voltage rating of the capacitor are generally printed on the side of the aluminum case.

Farad - A farad is defined as the amount of capacitance for which a potential difference of one volt results in a static charge of one coulomb. It has the base SI representation of s4 · A2 · m-2 · kg-1. Since an ampere is the rate of electrical flow (current) of one coulomb per second, an alternate definition is that a farad is the amount of capacitance that requires one second for a one ampere flow of charge to change the voltage by one volt.Film Capacitor - Made from high quality polymer film (usually polycarbonate, polystyrene, polypropylene, polyester (Mylar), and for high quality capacitors polysulfone), and metal foil or a layer of metal deposited on surface. They have good quality and stability, and are suitable for timer circuits and for high frequencies. Fixed Capacitor - is constructed in such manner that it possesses a fixed value of capacitance which cannot be adjusted. A fixed capacitor is classified according to the type of material used as its dielectric, such as paper, oil, mica, or electrolyte.

Flywheel Energy Storage - A flywheel is a rotating disk used as a storage device for kinetic energy. Flywheels resist changes in their rotational speed, which helps steady the rotation of the shaft when a fluctuating torque is exerted on it by its power source such as a piston-based engine, or when the load placed on it is intermittent. Flywheels can be used to produce very high power pulses as needed for some experiments, where drawing the power from the public network would produce unacceptable spikes. A small motor can accelerate the flywheel between the pulses. Recently, flywheels have become the subject of extensive research as power storage devices for uses in vehicles; Flywheel drive is common in low-cost toys.

Flux Capacitor - the flux capacitor is the core component of the move Back to the Future. Doctor Emmett Brown's fictional time traveling De Lorean DMC-12 used a "flux capacitor" and is what make time travel possible. To time travel is sort of like constructing a nuclear bomb - but instead of needing critical mass, one needs critical energy to "break the time barrier". That energy is 1215.9 microfarads.

(ha... I had to put the "flux capacitor" on this list)

Mica Capacitor - this is made of metal foil plates that are separated by sheets of mica (the dielectric). The whole assembly is encased in molded plastic. Since the capacitor parts are molded into a plastic case, corrosion and damage to the plates and dielectric are prevented. Also the molded plastic case makes the capacitor mechanically stronger. Various types of terminals are used on mica capacitors to connect them into circuits. These terminals are also molded into the plastic case.

Oil Capacitors (Self Healing) - these are often used in high-power electronic equipment. An oil-filled capacitor is nothing more than a paper capacitor that is immersed in oil. Since oil impregnated paper has a high dielectric constant, it can be used in the production of capacitors having a high capacitance value. Many capacitors will use oil with another dielectric material to prevent arcing between the plates. If arcing should occur between the plates of an oil-filled capacitor, the oil will tend to reseal the hole caused by the arcing. These are refered to as a self healing capacitor.

Regenerative Braking System - A regenerative brake is a mechanism that reduces vehicle speed by converting some of its kinetic energy into electrical energy. This electrical energy is then stored for future use or fed back into a power system for use by other vehicles. Regenerative brakes in electric railway vehicles feed the generated electricity back into the supply system. In battery electric and hybrid electric vehicles, the energy is stored in a battery or bank of capacitors for later use.

SuperCap - another word for SuperCapacitors or Ultracapacitors

SuperCapacitors - another word for Ultracapacitors - Made from carbon aerogel, carbon nanotubes, or highly porous electrode materials. Extremely high capacity. Can be used in some applications instead of rechargeable batteries.

Tantalum Capacitor - compact, low-voltage devices up to several hundred µF, these have a lower energy density and are more accurate than aluminum electrolytics. These capacitors are comprised of a permeable tantalum cneter section surrounded by tantalum pentoxide. A tantalum wire is inserted into the center section and then extends axially from teh component. There are many advantages of using tantalum capacitors over other types: They have higher volumetric efficiency (CV/cc); They have superior frequency characteristics; They are highly reliable and do not degrade over time. Tantalum capacitors do not lose capacitance like electrolytic capacitors. Unlimted shelf life.

Ultra Broadband Capacitor (UBC) - a component that provides ultra-low insertion loss, flat frequency response and an excellent match over multiple octaves of frequency spectrum in a one piece configuration. They look like a tiny little box.

Ultracapacitors - also known as Supercapacitor, or Electrochemical Capacitor, or Electric Double Layer Capacitor (EDLC). Made from carbon aerogel, carbon nanotubes, or highly porous electrode materials. Extremely high capacity. Can be used in some applications instead of rechargeable batteries.