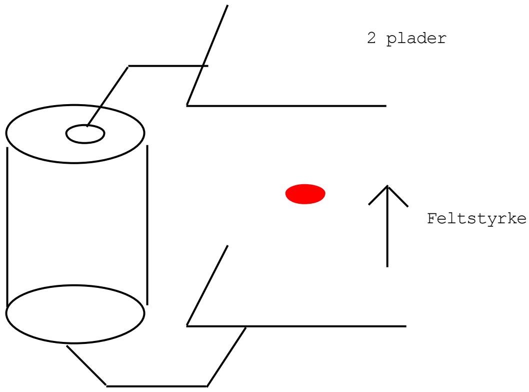
Kondensatorer:

Placeres en ladning, fx på en lille aluminiumskugle, mellem de to plader, påvirkes den af en kraft.



Kraften kan sammenlignes med den tyngdekraft, vi kender. Den vil påvirke kuglen enten opad eller nedad, afhængig af ladningen.

Feltstyrken E måles i Volt / Meter. Kraften F på kuglen måles i Newton / Coulomb.

$$E = ?\left[\frac{N}{Q}\right] = \left[\frac{V}{m}\right]$$

$$F = Q \cdot E \left[N = C \cdot \frac{V}{m} \right]$$

$$\left[N \cdot m = C \cdot V \right]$$

$$\left[J = C \cdot V \right]$$

$$\left[\frac{J}{C} = V \right]$$

Flyttes kuglen, må den tilføres energi (Arbejde). Dvs. den får større potentiale, ~ beliggenhedsenergi.

Oplades en kondensator, fås en samlet ladning på $Q = C \cdot U$

Hvis der sker en ændring af kondensatorens ladning, må der gå en strøm på $i = \frac{dQ}{dt}$

Indsættes $Q = C \cdot U$, fås først $i = \frac{dQ}{dt} = \frac{d(C \cdot U)}{dt}$

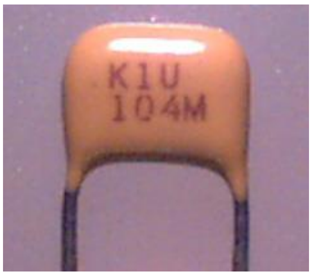
Er kondensatoren konstant, kan den sættes udenfor, og der findes: $i = C \cdot \frac{dU}{dt}$

E kondensators størrelse måles i Farad. 1 Farad er en ret stor størrelse, derfor regnes normalt i microfarad, uF.

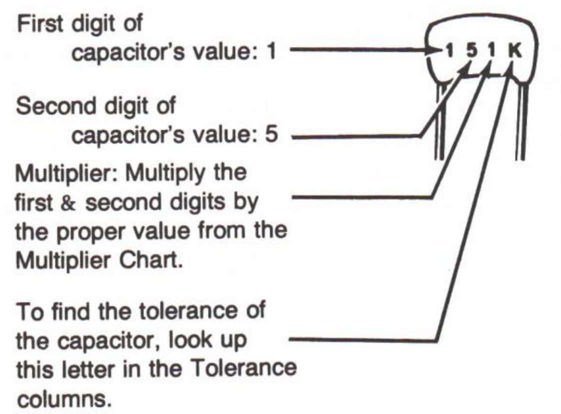
Hvis en kondensator på 1 [F] tilføres en strøm på 1 [Ampere] i 1 [Sekund], vil dens spænding stige 1 [Volt].

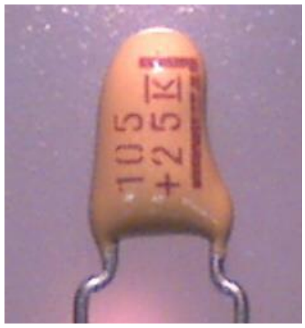
1 [A] i 1 [Sek] er også 1 [Coulomb] som er lig 6.24×10^{18} elektroner.

Eksempler på kondensator-huse, og størrelsesmærkning:



Kemet Ceramic Coated Radial Capacitor 0.1uF



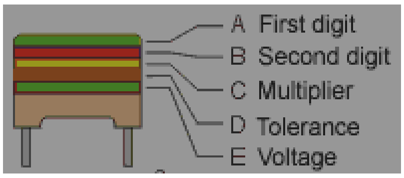


Kemet Tantalum Dipped Radial Capacitor 1.0uF 25 Volts

3. ciffer	Gange med, Antal nuller	Tolerance 10 pF eller mindre	Bogstav	Tolerance over 10 pF
0	1	+/- 0.1 pF	B	
1	10	+/- 0.25 pF	C	
2	100	+/- 0.5 pF	D	
3	1000	+/- 1.0 pF	F	+/- 1 %
4	10.000	+/- 1.0 pF	G	+/- 2 %
5	100.000		H	+/- 3 %
			J	+/- 5 %
8	0.01		K	+/- 10 %
9	0.1		M	+/- 20 %

Eksempel: 151K = 15 X 10 = 150pF   +/- 10%

Se kondensator-calculator: http://www.electronics2000.co.uk/calc/



Eksempel på ældre mærkning.

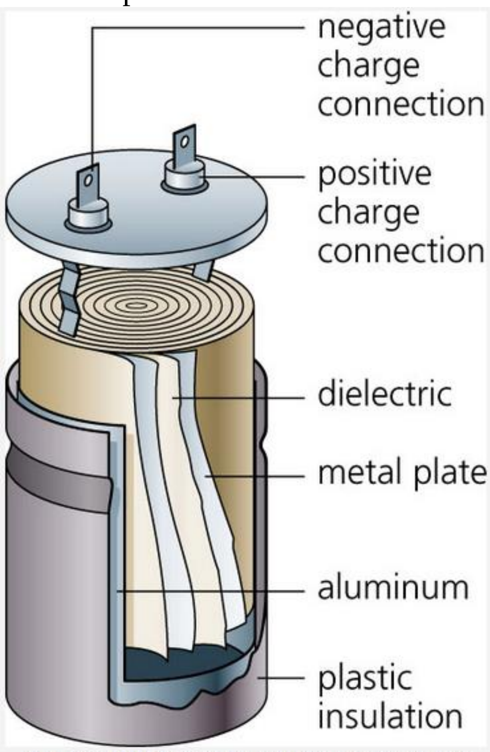
COLOR	DIGIT	MULTIPLIER	TOLERANCE	VOLTAGE
Black	0	x 1 pF	±20%	
Brown	1	x 10 pF	±1%	
Red	2	x 100 pF	±2%	250V
Orange	3	x 1 nF	±2.5%	
Yellow	4	x 10 nF		400V
Green	5	x 100 nF	±5%	
Blue	6	x 1 µF		
Violet	7	x 10 µF		
Grey	8	x 100 µF		
White	9	x 1000 µF	±10%	

http://www.geocities.com/nozomsite/capacitor.htm

Elektrolyt kondensatorer

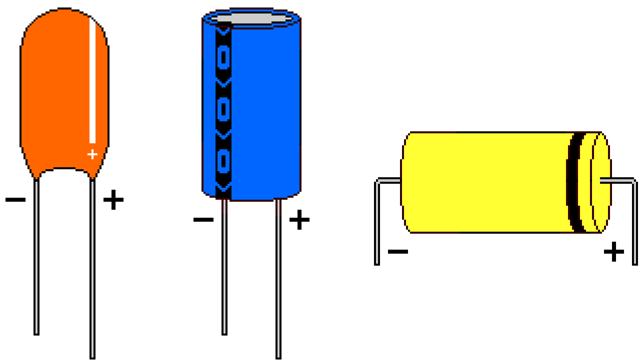
I nogle – større kondensatorer, anvendes der en ”væske”. En elektrolyt. Herved opnås, at man kan stoppe en større ladning ind i kondensatoren, - eller at en kondensator på en given fysisk størrelse kan opnå en større kapacitet.

Men elektrolyt-kondensatorer skal altid poles korrekt, dvs. at den ene af terminalerne altid skal være den mest positive.



En papirkondensator dog adskilt af et dielektrikum i stedet for papir

http://www.elsiden.dk/2010/03/kondensatorer-elektronik/



http://www.uoguelph.ca/~antoon/gadgets/caps/caps.html

Billedet til venstre viser hvordan 2 strimler stanniol er rullet sammen og derved udgør en kondensator.

Se også side: http://www.kpsec.freeuk.com/components/capac.htm

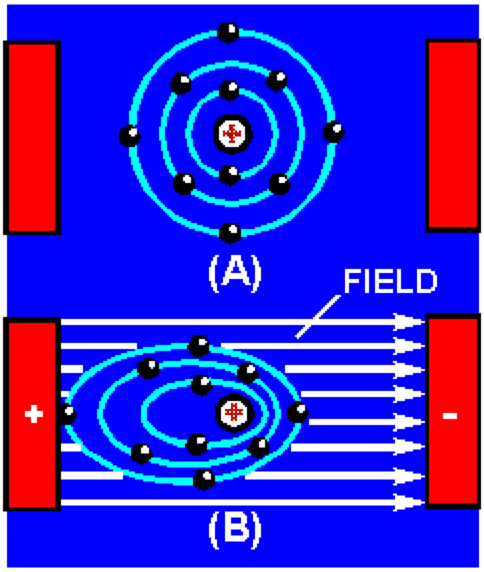
Elektrolyt-kondensator-

Elektrolytkondensatorer er mærket med den maksimale spænding, de må lades op til, før der er fare for, at der sker gnist-gennemslag mellem elektroderne. Sker det, er kondensatoren ødelagt, - " Stået af ".

Yderligere materiale:

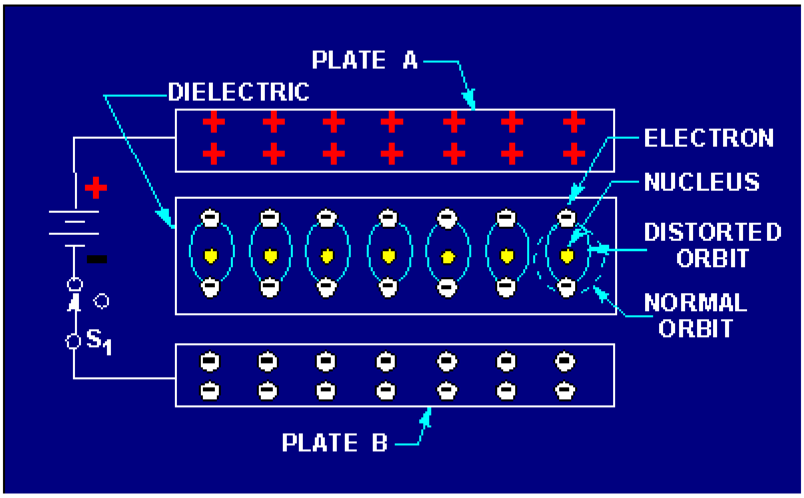
If two unlike charges are placed on opposite sides of an atom whose outermost electrons cannot escape their orbits, the orbits of the electrons are distorted as shown in figure 3-3. Figure 3-3(A) shows the normal orbit. Part (B) of the figure shows the same orbit in the presence of charged particles. Since the electron is a negative charge, the positive charge attracts the electrons, pulling the electrons closer to the positive charge. The negative charge repels the electrons, pushing them further from the negative charge. It is this ability of an electrostatic field to attract and to repel charges that allows the capacitor to store energy.

Figure shows Distortion of electron orbital paths due to electrostatic force.



THE SIMPLE CAPACITOR

A simple capacitor consists of two metal plates separated by an insulating material called a dielectric, as illustrated in figure 3-4. Note that one plate is connected to the positive terminal of a battery; the other plate is connected through a closed switch (S1) to the negative terminal of the battery. Remember, an insulator is a material whose electrons cannot easily escape their orbits. Due to the battery voltage, plate A is charged positively and plate B is charged negatively. (How this happens is explained later in this chapter.) Thus an electrostatic field is set up between the positive and negative plates. The electrons on the negative plate (plate B) are attracted to the positive charges on the positive plate (plate A).

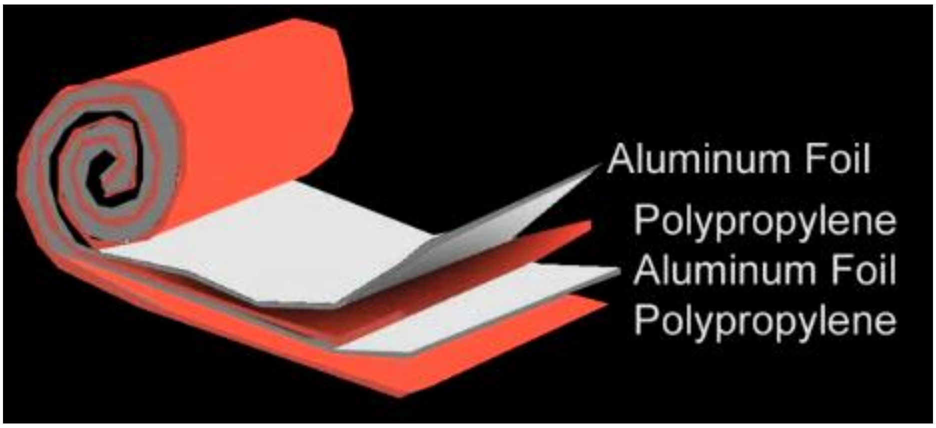


Distortion of electron orbits in a dielectric.

Notice that the orbits of the electrons in the dielectric material are distorted by the electrostatic field. The distortion occurs because the electrons in the dielectric are attracted to the top plate while being repelled from the bottom plate. When switch S1 is opened, the battery is removed from the circuit and the charge is retained by the capacitor. This occurs because the dielectric material is an insulator, and the electrons in the bottom plate (negative charge) have no path to reach the top plate (positive charge). The distorted orbits of the atoms of the dielectric plus the electrostatic force of attraction between the two plates hold the positive and negative charges in their original position. Thus, the energy which came from the battery is now stored in the electrostatic field of the capacitor. Two slightly different symbols for representing a capacitor are shown in figure 3-5.Notice that each symbol is composed of two plates separated by a space that represents the dielectric. The curved plate in (B) of the figure indicates the plate should be connected to a negative polarity.

Kilde: http://www.tpub.com/neets/book2/3.htm

Ekstra:


Aluminum Foil
Polypropylene
Aluminum Foil
Polypropylene