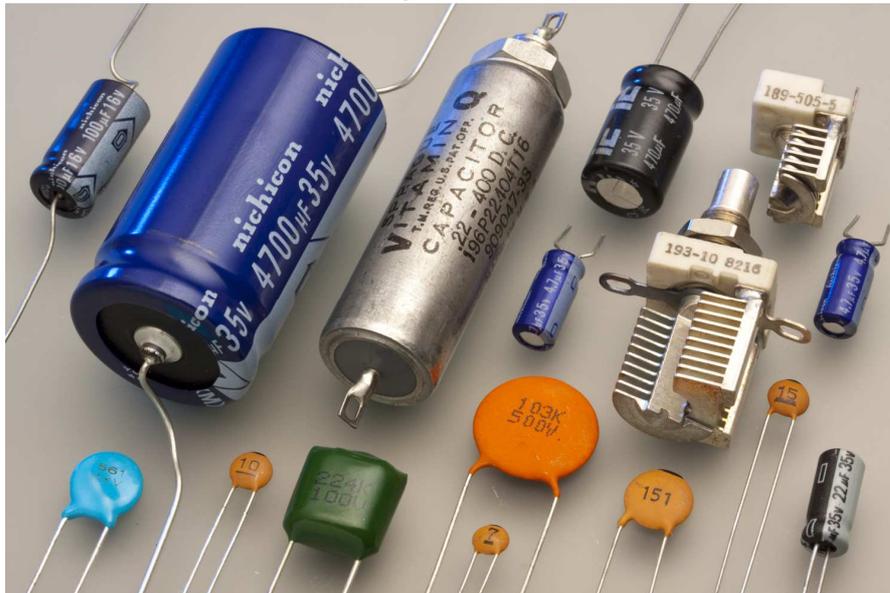


Capacitors

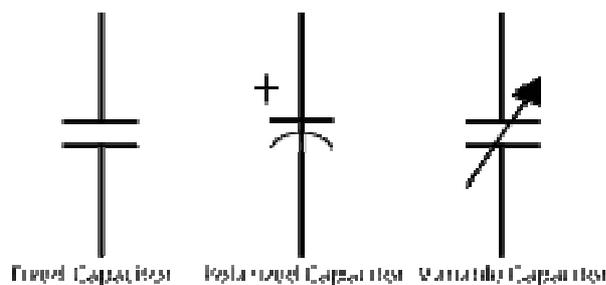


A **capacitor** (originally known as a **condenser**) is a passive two-terminal electrical component used to store electrical energy temporarily in an electric field. The conductors can be thin films, foils or sintered beads of metal or conductive electrolyte, etc. The non-conducting dielectric acts to increase the capacitor's charge capacity. Materials commonly used as dielectrics include glass, ceramic, plastic film, air, vacuum, paper, mica, and oxide layers. Capacitors are widely used as parts of electrical circuits in many common electrical devices. Unlike a resistor, an ideal capacitor does not dissipate energy. Instead, a capacitor stores energy in the form of an electrostatic field between its plates.

The SI unit of capacitance is the farad (F), which is equal to one coulomb per volt (1 C/V). Typical capacitance values range from about 1 pF (10^{-12} F) to about 1 mF (10^{-3} F).

- **Ceramic capacitors** have a ceramic dielectric.
- **Film and paper capacitors** are named for their dielectrics.
- **Aluminium, tantalum and niobium electrolytic capacitors** are named after the material used as the anode and the construction of the cathode (electrolyte)
- **Polymer capacitors** are aluminium, tantalum or niobium electrolytic capacitors with conductive polymer as electrolyte
- **Supercapacitor** is the family name for:
 - **Double-layer capacitors** were named for the physical phenomenon of the Helmholtz double-layer
 - **Pseudocapacitors** were named for their ability to store electric energy electro-chemically with reversible faradaic charge-transfer
 - **Hybrid capacitors** combine double-layer and pseudocapacitors to increase power density
- **Silver mica, glass, silicon, air-gap and vacuum capacitors** are named for their dielectric.

Typical Capacitor Symbols.



Capacitors are expressed in terms of farads. Common abbreviations are **uF (microfarads)**, **nF (nanofarads)**, and **pF (picofarads or micromicrofarads)**

uF / MFD	nF	pF / MMFD		uF / MFD	nF	pF / MMFD
1000 uF / MFD	1000000 nF	1000000000 pF / MMFD		6.8 uF / MFD	6800 nF	6800000 pF / MMFD
680 uF / MFD	680000 nF	680000000 pF / MMFD		5.6 uF / MFD	5600 nF	5600000 pF / MMFD
470 uF / MFD	470000 nF	470000000 pF / MMFD		5.0 uF / MFD	5000 nF	5000000 pF / MMFD
240 uF / MFD	240000 nF	240000000 pF / MMFD		4.7 uF / MFD	4700 nF	4700000 pF / MMFD
220 uF / MFD	220000 nF	220000000 pF / MMFD		4.0 uF / MFD	4000 nF	4000000 pF / MMFD
150 uF / MFD	150000 nF	150000000 pF / MMFD		3.9 uF / MFD	3900 nF	3900000 pF / MMFD
100 uF / MFD	100000 nF	100000000 pF / MMFD		3.3 uF / MFD	3300 nF	3300000 pF / MMFD
88 uF / MFD	88000 nF	88000000 pF / MMFD		3 uF / MFD	3000 nF	3000000 pF / MMFD
85 uF / MFD	85000 nF	85000000 pF / MMFD		2.7 uF / MFD	2700 nF	2700000 pF / MMFD
82 uF / MFD	82000 nF	82000000 pF / MMFD		2.2 uF / MFD	2200 nF	2200000 pF / MMFD
80 uF / MFD	80000 nF	80000000 pF / MMFD		2 uF / MFD	2000 nF	2000000 pF / MMFD
75 uF / MFD	75000 nF	75000000 pF / MMFD		1.8 uF / MFD	1800 nF	1800000 pF / MMFD
72 uF / MFD	72000 nF	72000000 pF / MMFD		1.2 uF / MFD	1200 nF	1200000 pF / MMFD
70 uF / MFD	70000 nF	70000000 pF / MMFD		1.0 uF / MFD	1000 nF	1000000 pF / MMFD
68 uF / MFD	68000 nF	68000000 pF / MMFD		0.82 uF / MFD	820 nF	820000 pF / MMFD
65 uF / MFD	65000 nF	65000000 pF / MMFD		0.68 uF / MFD	680 nF	680000 pF / MMFD
64 uF / MFD	64000 nF	64000000 pF / MMFD		0.47 uF / MFD	470 nF	470000 pF / MMFD
60 uF / MFD	60000 nF	60000000 pF / MMFD		0.33 uF / MFD	330 nF	330000 pF / MMFD
56 uF / MFD	56000 nF	56000000 pF / MMFD		0.22 uF / MFD	220 nF	220000 pF / MMFD
53 uF / MFD	53000 nF	53000000 pF / MMFD		0.20 uF / MFD	200 nF	200000 pF / MMFD
50 uF / MFD	50000 nF	50000000 pF / MMFD		0.10 uF / MFD	100 nF	100000 pF / MMFD
47 uF / MFD	47000 nF	47000000 pF / MMFD		0.01 uF / MFD	10 nF	10000 pF / MMFD
45 uF / MFD	45000 nF	45000000 pF / MMFD		0.0068 uF / MFD	6.8 nF	6800 pF / MMFD
43 uF / MFD	43000 nF	43000000 pF / MMFD		0.0047 uF / MFD	4.7 nF	4700 pF / MMFD
40 uF / MFD	40000 nF	40000000 pF / MMFD		0.0033 uF / MFD	3.3 nF	3300 pF / MMFD
39 uF / MFD	39000 nF	39000000 pF / MMFD		0.0022 uF / MFD	2.2 nF	2200 pF / MMFD
36 uF / MFD	36000 nF	36000000 pF / MMFD		0.0015 uF / MFD	1.5 nF	1500 pF / MMFD
35 uF / MFD	35000 nF	35000000 pF / MMFD		0.001 uF / MFD	1 nF	1000 pF / MMFD
33 uF / MFD	33000 nF	33000000 pF / MMFD		0.00068 uF / MFD	0.68 nF	680 pF / MMFD
30 uF / MFD	30000 nF	30000000 pF / MMFD		0.00047 uF / MFD	0.47 nF	470 pF / MMFD
27.5 uF / MFD	27500 nF	27500000 pF / MMFD		0.00033 uF / MFD	0.33 nF	330 pF / MMFD
27 uF / MFD	27000 nF	27000000 pF / MMFD		0.00022 uF / MFD	0.22 nF	220 pF / MMFD
25 uF / MFD	25000 nF	25000000 pF / MMFD		0.00015 uF / MFD	0.15 nF	150 pF / MMFD
24 uF / MFD	24000 nF	24000000 pF / MMFD		0.0001 uF / MFD	0.1 nF	100 pF / MMFD
22 uF / MFD	22000 nF	22000000 pF / MMFD		0.000068 uF / MFD	0.068 nF	68 pF / MMFD
21 uF / MFD	21000 nF	21000000 pF / MMFD		0.000047 uF / MFD	0.047 nF	47 pF / MMFD
20 uF / MFD	20000 nF	20000000 pF / MMFD		0.000033 uF / MFD	0.033 nF	33 pF / MMFD
19 uF / MFD	19000 nF	19000000 pF / MMFD		0.000022 uF / MFD	0.022 nF	22 pF / MMFD
18 uF / MFD	18000 nF	18000000 pF / MMFD		0.000015 uF / MFD	0.015 nF	15 pF / MMFD
16 uF / MFD	16000 nF	16000000 pF / MMFD		0.00001 uF / MFD	0.01 nF	10 pF / MMFD
15 uF / MFD	15000 nF	15000000 pF / MMFD		0.0000068 uF / MFD	0.0068 nF	6.8 pF / MMFD
12 uF / MFD	12000 nF	12000000 pF / MMFD		0.0000047 uF / MFD	0.0047 nF	4.7 pF / MMFD
10 uF / MFD	10000 nF	10000000 pF / MMFD		0.0000033 uF / MFD	0.0033 nF	3.3 pF / MMFD
8.2 uF / MFD	8200 nF	8200000 pF / MMFD		0.0000022 uF / MFD	0.0022 nF	2.2 pF / MMFD
8.0 uF / MFD	8000 nF	8000000 pF / MMFD		0.0000015 uF / MFD	0.0015 nF	1.5 pF / MMFD
7.5 uF / MFD	7500 nF	7500000 pF / MMFD		0.000001 uF / MFD	0.001 nF	1 pF / MMFD