



Capacitor Formulas

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Examples!

Conversions!

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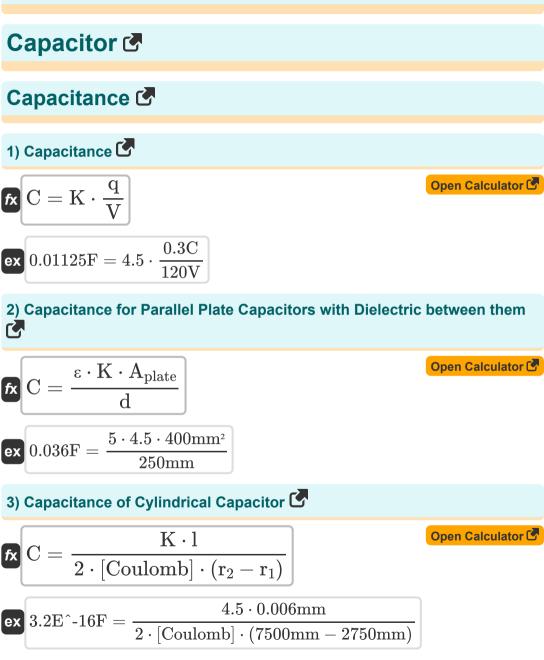
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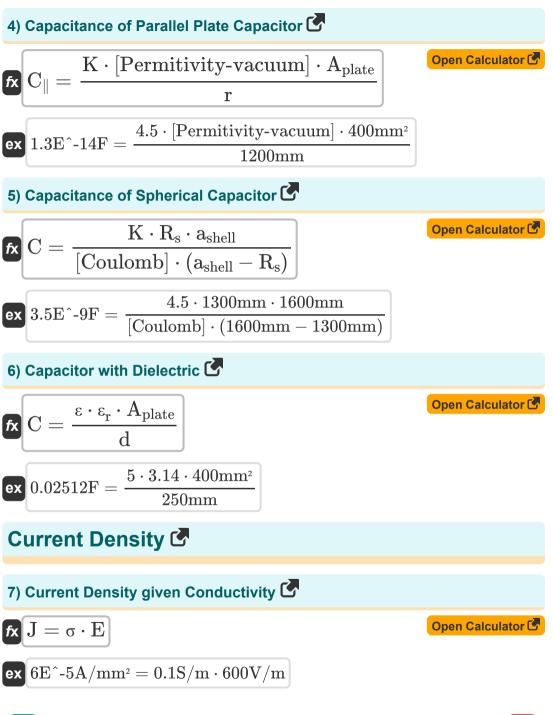
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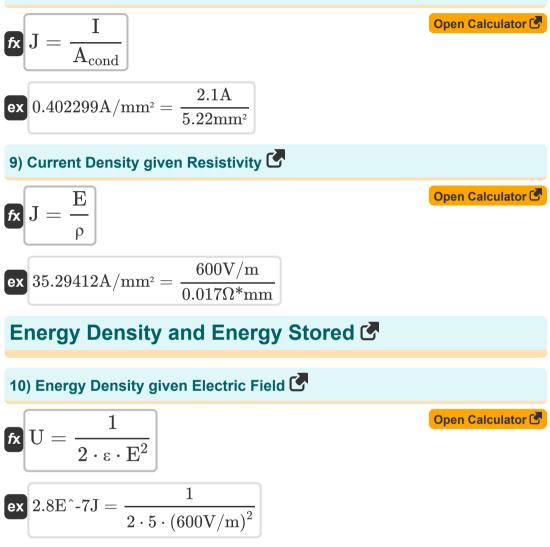


List of 19 Capacitor Formulas





8) Current Density given Electric Current and Area 🕑





11) Energy Density in Electric Field

fx
$$\mathbf{U} = rac{1}{2} \cdot [ext{Permitivity-vacuum}] \cdot \mathrm{E}^2$$

$$\overbrace{\mathbf{ex}}{1.6\mathrm{E}^{\text{-}}\mathrm{-}6\mathrm{J}} = \frac{1}{2} \cdot \left[\mathrm{Permitivity}\text{-}\mathrm{vacuum}\right] \cdot \left(600\mathrm{V/m}\right)^2$$

12) Energy Density in Electric Field given Free Space Permittivity 🕑

$$\mathbf{\tilde{K}} \mathbf{U} = \frac{1}{2 \cdot \epsilon \cdot \mathbf{E}^2}$$

$$\mathbf{ex} 2.8 \mathbf{E}^{-7} \mathbf{J} = \frac{1}{2 \cdot 5 \cdot (600 \mathrm{V/m})^2}$$

13) Energy Stored in Capacitor given Capacitance and Voltage 🕑

fx
$$U_e = rac{1}{2} \cdot C \cdot V^2$$

ex $28800J = rac{1}{2} \cdot 4F \cdot (120V)^2$

14) Energy Stored in Capacitor given Charge and Capacitance

fx
$$U_e = \frac{q^2}{2 \cdot C}$$

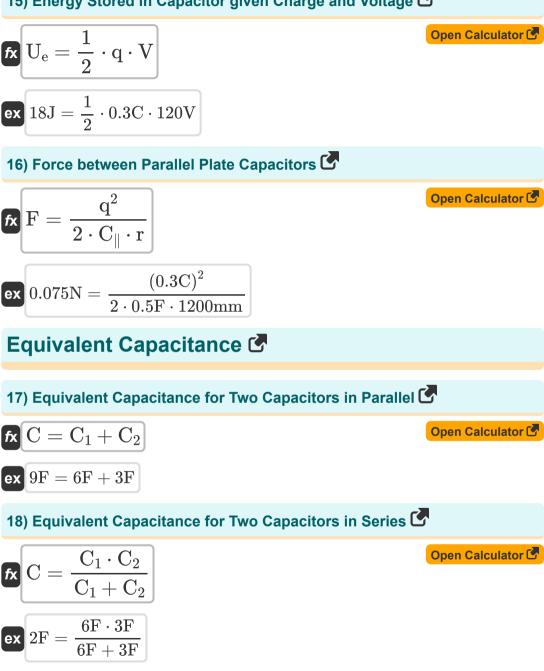
ex $0.01125J = \frac{(0.3C)^2}{2 \cdot 4F}$



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15) Energy Stored in Capacitor given Charge and Voltage 🕑





19) Equivalent Resistance in Series 子

fx
$$\mathrm{R_{eq}} = \mathrm{R} + \Omega$$

ex $65\Omega = 15\Omega + 50\Omega$



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Variables Used

- **A**cond Area of Conductor (Square Millimeter)
- Aplate Area of Plates (Square Millimeter)
- **a_{shell}** Radius of Shell (Millimeter)
- C Capacitance (Farad)
- C_{II} Parallel Plate Capacitance (Farad)
- C₁ Capacitance of Capacitor 1 (Farad)
- C₂ Capacitance of Capacitor 2 (Farad)
- d Distance between Deflecting Plates (Millimeter)
- E Electric Field (Volt per Meter)
- E Electric Field (Volt per Meter)
- F Force (Newton)
- I Electric Current (Ampere)
- J Electric Current Density (Ampere per Square Millimeter)
- K Dielectric Constant
- I Length of Cylinder (Millimeter)
- **q** Charge (Coulomb)
- r Distance between Two Masses (Millimeter)
- R Resistance (Ohm)
- **r**₁ Inner Radius of Cylinder (*Millimeter*)
- r2 Outer Radius of Cylinder (Millimeter)
- Reg Equivalent Resistance (Ohm)
- R_s Radius of Sphere (Millimeter)

- U Energy Density (Joule)
- Ue Electrostatic Potential Energy (Joule)
- V Voltage (Volt)
- E Permittivity
- ε_r Relative Permittivity
- p Resistivity (Ohm Millimeter)
- **o** Conductivity (Siemens per Meter)
- Ω Final Resistance (Ohm)





Constants, Functions, Measurements used

- Constant: [Coulomb], 8.9875E+9 Coulomb constant
- Constant: [Permitivity-vacuum], 8.85E-12 Permittivity of vacuum
- Measurement: Length in Millimeter (mm) Length Unit Conversion
- Measurement: Electric Current in Ampere (A) Electric Current Unit Conversion
- Measurement: Area in Square Millimeter (mm²) Area Unit Conversion
- Measurement: Energy in Joule (J)
 Energy Unit Conversion
- Measurement: Electric Charge in Coulomb (C) Electric Charge Unit Conversion
- Measurement: Force in Newton (N) Force Unit Conversion
- Measurement: Capacitance in Farad (F) Capacitance Unit Conversion
- Measurement: Electric Resistance in Ohm (Ω)
 Electric Resistance Unit Conversion
- Measurement: Surface Current Density in Ampere per Square Millimeter (A/mm²)
 Surface Current Density Unit Conversion
- Measurement: Electric Field Strength in Volt per Meter (V/m) Electric Field Strength Unit Conversion





- Measurement: Electric Potential in Volt (V) Electric Potential Unit Conversion
- Measurement: Electric Resistivity in Ohm Millimeter (Ω*mm)
 Electric Resistivity Unit Conversion
- Measurement: Electric Conductivity in Siemens per Meter (S/m) Electric Conductivity Unit Conversion



- Capacitor Formulas
- Electromagnetic Induction
 Formulas
- Electrostatics Formulas
- Magnetic Field due to Current
 Formulas

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