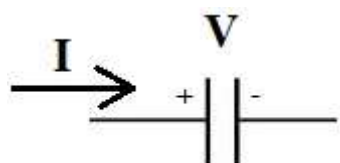


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-
- [Home](#)
 - [Articles](#)
 - [Projects](#)
 - [Programming](#) [coding](#)
 - [Calculators](#)
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How to Calculate the Current Through a Capacitor



To calculate current going through a capacitor, the formula is:

$$I = C \frac{dV}{dt}$$

All you have to know to calculate the current is **C**, the capacitance of the capacitor which is in unit, Farads, and the derivative of the voltage across the capacitor. The product of the two yields the current going through the capacitor.

Example

If the voltage of a capacitor is $3\sin(1000t)$ volts and its capacitance is $20\mu\text{F}$, then what is the current going through the capacitor?

$$\begin{aligned} I &= C \frac{dV}{dt} = (20\mu\text{F}) \frac{d(3 \sin(1000t))}{dt} \\ &= (20\mu\text{F}) (3)(1000) \cos(1000t) = 60 \cos(1000t) \text{ mA} \end{aligned}$$

To calculate the current through a capacitor with our online calculator, see our [Capacitor Current Calculator](#).

Comments



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Steve · June 9, 2020

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If the voltage is constant then it is DC and the current will be 0 once it charges (2-3 seconds depending on the Resistance and Capacitance)

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nikhil wani · Feb 10, 2020

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if the voltage across capacitor is constant i.e +20V or -20V, then how can we calculate current through capacitor

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Harbinder singh Thind · Nov 4, 2019

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How about this formula

$C = I / 6.28 \times U \times F$ or $I = 6.28 \times C \times U \times F$

Where C = Capacitance in farads

I = Current in Amp.

U = Applied Voltage in Volts

F = Frequency of applied voltage in Hz

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How does this work if I am trying to use it alongside Kirchhoff's laws and I am not given an equation rather just a number?

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Anonymous · Apr 10, 2019

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if suppose instead of sin we can use a number what is the answer

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dlhylton (mod) · Jan 31, 2018

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BabCollo, the derivative of sin is cos

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Where is the cos coming from

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dt stands for the derivative with respect to time

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