

# How to Calculate Inductance?

An inductor is a common electronic component that plays crucial roles such as filtering and energy storage in circuits. This article briefly introduces the calculation of inductance and relevant formulas.

## Unit of Inductance

The unit of inductance is Henry - H.

$$1\text{H} = 1000\text{mH} = 10^6\mu\text{H} = 10^9\text{nH}$$

## Calculation of Inductance

### Inductance of a Single - Turn Coil (AL)

For an iron - core coil, the inductance L can be calculated using the formula:  $L = N^2 \cdot AL$ , where N is the number of turns.

## Relationship between Voltage and Inductance in an AC Circuit

When an alternating current is passing through, the relationship between voltage and inductance is as follows:

$$U = I \cdot X_L$$

$$X_L = 2\pi fL$$

Where:

1. U represents voltage.
2. I represents current.
3.  $X_L$  represents impedance.
4. f represents frequency.
5. L represents the inductance value.

## Applications of Inductors

Inductors are widely used in various fields. In power supply circuits, they are used for filtering to smooth out voltage fluctuations. For example, in a computer power supply, inductors help remove high - frequency noise from the direct current output, ensuring stable power supply for the computer components.

In signal processing circuits, inductors can be used to separate different frequency signals. In a radio receiver, inductors are part of the tuning circuit, allowing the receiver to select a specific radio frequency signal from a wide range of electromagnetic waves.