

1. Overview of inductance

An inductor is a coil that stores energy in the form of a magnetic field. Inductance consists of wires, loops, or coils. Inductance hinders current changes in a circuit

The ability of a coil to resist changes in current is a characteristic of the coil, called inductance. There are many inductors used in electronic circuits, including

Hollow core, with iron core, with magnetic particle core, useful in power supply, useful in RF, and so on. The following image shows several common differences

The type of inductance.

2. Hollow inductor

Air core inductors are often used in school laboratories, and they are convenient to make. Enamelled wires can be wound on the pen holder of Rollerball pen

Inductors are called hollow inductors because there is only air inside the coil. Of course, manufacturers cannot use pen holders when producing inductors. Generally

I will use circular plastic or ceramic molds to process inductors. Due to the use of non-magnetic materials inside the hollow inductor, it has a very low temperature

Degree coefficient, the inductance value is very stable within the operating temperature range. However, due to the use of non magnetic materials as the medium, the inductance is very low and does not exist

Magnetic core loss, in RF applications that require very low inductance, hollow inductors are used.

Hollow inductors have obvious advantages, as they do not require a magnetic core and can be wound as long as there is a coil. Therefore, when debugging a single board or participating in electronic design competitions

At that time, the hollow inductor is actually a widely used type of inductor.

3. Iron core inductance

Iron core inductance, hence its name, refers to the use of solid or stacked iron cores inside the coil. Placing the iron core into the coil can significantly increase the inductance. because

In situations where high inductance is required, such as in the filtering circuit of power supplies, iron core inductors are often used. Using iron core inductance to increase inductance

At high frequencies, magnetic core loss can also occur. In order to avoid hysteresis and eddy current losses, a whole magnet is generally not used, but rather the same thickness of

The thin iron core is laminated, and each thin piece is insulated from each other to reduce core loss. It is commonly used in transformers.

4. Ferrite inductance

A ferrite inductor is a coil wound around a magnetic core of a strong ferromagnetic material such as ferrite. Ferrite is a hard substance composed of embedded insulating adhesives

The fine particle composition of iron powder. Ferrite is a crystalline structure synthesized from multiple substances. The common inductance values of ferrite inductors range from a few micro to a few milliohms

The range is commonly used in high-frequency circuits. The ferrite iron core used in general high-frequency

inductors contains nickel zinc (NiZn) or manganese zinc (MnZn)

Ferrite compounds belong to soft magnetic ferromagnetic materials with low coercivity. Low Coercivity means low resistance to demagnetization

This means that the hysteresis loss is relatively small. Therefore, Ferrite core is widely used in RF circuit, power circuit and filter circuit.