

Secondary power supply

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Introduction.

In the era of modern technologies, people can't live without electronic devices, even a few days. At the moment, phones are commonplace, something we are used to. Every morning we get up and look at the charging rate of our smartphone. So let's analyze the simplest secondary power source - a phone charger.

What is a secondary power supply?

All electronic products require primary power supplies that convert AC power from the grid to dc power used in electronic circuitry. Some products require secondary power supplies that convert dc electricity from one voltage to another. For example, secondary power supplies inside computers convert dc power from the primary power supply from 12 Vdc to lower voltage dc power used by components on the motherboard, such as the CPU and memory.

What does a secondary power supply consist of?

SPS consists of a transformer, a rectifier, a filter and a stabilizer.

Transformer

The transformer is designed to change the input voltage level, it can increase and reduce the input voltage. The operation of the transformer is characterized by the transformation coefficient. If $C_{tr} > 1$ then the transformer is increasing. If $C_{tr} < 1$ then the transformer is reducing.

Rectifier

The rectifier converts AC voltage to unipolar. The voltage after the rectifier has a pulsating nature and contains a constant component and a variable component. The magnitude of the pulsation is estimated by the ripple factor. The pulsation negatively affects the operation of equipment and machinery.

Filter

The filter is used to smooth the pulsation. It consists of two capacitors and a choke or resistor. The choke can reduce the pulsation better but it's larger and costs much more than a resistor.

Stabilizer

The stabilizer is designed to maintain a constant voltage level at the output of the source in case of changing both the voltage of the primary network and the load. It also functions as a secondary filter.

Conclusion

In this work, we studied secondary power supplies and the functions of their main components. We found out that secondary power supplies protect electric devices during power surges converting the high voltage into smaller one and vice versa.

Reference

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