

Linear Power Supply vs Switched Mode Power Supply

When it comes to electrical and electronic circuits, it is important to have a power supply as it delivers the right amount of voltage and current to make the circuit run without exceeding the correct limits and burning or blowing it up. In this regard, there are two very common types of power supply, the linear and the switched mode. The main difference between the two is the way they operate. Linear power supplies provide a constant voltage at all times while the power provided by a switched mode power supply constantly varies. A switching power supply operates by constantly switching the source on and off; the rate of which is dictated by the needed voltage at the output.

A linear power supply is often used because of its simplicity. Linear regulators exist in packaged ICs that only need a rectified voltage source to operate. In comparison, a switched mode power supply is very complex and requires a handful of ICs as well as inductors.

The main advantage of a switched mode power supply over a linear power supply is efficiency. A linear power supply operates pretty much like a voltage divider that constantly changes resistance to regulate the output voltage. The current that goes into it is the same as the current that goes out of it and the difference between the input and output is wasted. A switched mode power supply doesn't have much when it comes to resistive elements and the electricity is mainly stored in capacitors. The voltage of a switched mode power supply constantly oscillates at a very minute amount and the circuitry uses this oscillation to gauge when to connect and disconnect from the source.

The main disadvantage of a switched mode power supply compared to a linear power supply is noise. The voltage oscillations and the constant connecting and disconnecting from the source create too much electrical noise that can interfere with other nearby electronics. To combat this noise, adequate shielding is often needed. Linear power supplies also create some amount of noise but nowhere near as much as that produced by switched mode power supplies.

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