**12V 1A SMPS Power Supply**

**What is 12V 1A SMPS Power Supply?**

A 12V 1A SMPS (Switched Mode Power Supply) is an electronic device that provides a stable and regulated direct current (DC) output voltage of 12 volts with a maximum output current of 1 ampere. These power supplies are commonly used to deliver power to various electronic devices, such as routers, modems, LED lighting systems, and low-power electronics. The term "switched mode" in SMPS refers to the efficient switching technology it employs to regulate voltage and current, making it more energy-efficient and compact compared to traditional linear power supplies. The 12V 1A rating means it can deliver up to 12 watts of power, which is suitable for devices with relatively low power demands. These power supplies are known for their reliability and versatility, making them a popular choice for a wide range of applications in electronics and telecommunications. They ensure a steady and precisely regulated power source, which is essential for the reliable operation of electronic equipment.

A 12V 1A SMPS power supply is designed to offer a consistent and reliable source of 12 volts at a current rating of 1 ampere, ensuring that the connected devices receive the appropriate voltage and current levels they require for optimal performance. These power supplies are commonly used in scenarios where low to moderate power is needed, such as powering surveillance cameras, small appliances, IoT devices, and various types of embedded systems.

The switched-mode design of these power supplies makes them highly efficient, producing less heat and consuming less energy compared to traditional linear power supplies. This efficiency is particularly valuable in applications where minimizing power waste and reducing heat generation are crucial.

These power supplies typically feature a compact and lightweight design, making them ideal for situations where space and portability are key considerations. They often come with safety features, including overcurrent protection and short-circuit protection, to safeguard both the connected devices and the power supply itself.

A 12V 1A SMPS power supply is a versatile and efficient solution for delivering regulated power to a wide range of electronics, combining reliability, energy efficiency, and compact design to meet the diverse power needs of many different devices and applications**.**

Certainly! A 12V 1A SMPS (Switched Mode Power Supply) is a versatile and widely used electronic component that converts alternating current (AC) from an electrical outlet into a stable 12-volt direct current (DC) output. The "1A" designation indicates that it can provide up to 1 ampere of current, which amounts to a maximum power delivery of 12 watts. These power supplies are popular for various applications, including powering LED lighting systems, small appliances, and low-power electronic devices like routers and microcontrollers. The switched-mode design ensures efficient energy conversion and regulation, leading to less power wastage and heat generation compared to older linear power supplies.

These power supplies are known for their reliability, compact size, and lightweight build. They often incorporate safety features such as short-circuit protection and overcurrent protection to prevent damage to connected devices or the power supply itself. With their ability to deliver a precise voltage and current output, 12V 1A SMPS power supplies are essential in ensuring that electronic devices operate consistently and safely, making them a vital component in the world of modern electronics and technology.



**Working:**

The operation of a 12V 1A SMPS (Switched Mode Power Supply) involves several key steps to convert alternating current (AC) from a power source into a stable and regulated 12-volt direct current (DC) output. These power supplies employ high-frequency switching technology for efficiency and precise voltage control.

Initially, the AC input is passed through a rectifier circuit, which converts it into unregulated DC voltage. This unregulated voltage then enters a high-frequency switching stage, typically through a power semiconductor like a MOSFET. The switching operation rapidly turns the DC voltage on and off. This generates a high-frequency AC waveform, which is then fed into a compact transformer. The transformer steps down or steps up the voltage, depending on the specific design, while also providing electrical isolation for safety.

After transforming the voltage, the output is rectified once again to ensure a stable DC voltage. This output is typically higher than the desired 12V, so it goes through a voltage regulation stage, using feedback control to precisely adjust the output voltage. The power supply monitors the output voltage and adjusts the switching operation to maintain the desired 12V, even when input voltage or load conditions change.

The result is a regulated and efficient 12V output, suitable for powering various electronic devices and applications. These power supplies are known for their energy efficiency, compact design, and reliability, making them essential components in the world of electronics and power distribution.

The key working principle of a 12V 1A SMPS power supply involves three primary stages: rectification, voltage transformation, and regulation. In the rectification stage, the AC input voltage from the power source is converted into an unregulated DC voltage. This unregulated DC voltage is then fed into the switching stage, where high-frequency switching components like MOSFETs are employed. The switching operation rapidly turns the voltage on and off, resulting in a high-frequency AC waveform.

Following this, the high-frequency AC waveform is passed through a compact transformer, which serves to either step up or step down the voltage, depending on the design requirements. The transformer also provides electrical isolation for safety.

Once the voltage has been transformed, it is rectified once again to ensure a stable DC voltage. However, at this stage, the voltage is typically higher than the desired 12V output. Therefore, a voltage regulation stage, equipped with feedback control, is employed to precisely adjust the output voltage to the specified 12V. The power supply continuously monitors the output voltage and dynamically adjusts the switching operation to maintain the desired voltage, even when input voltage or load conditions fluctuate.

The result is a precisely regulated and efficient 12V output, which is suitable for powering a wide range of electronic devices and applications. These power supplies are celebrated for their energy efficiency, compact design, and reliability, making them essential components in the realm of modern electronics and power distribution.

**Features:**

* Protection: over-voltage over current circuit protection
* AC input: AC 100-265 V (Global common)
* AC frequency: 50 HZ/60 HZ
* Output voltage: DC 12 V
* Output Current: 1A
* Modulation: Pulse width modulation

[**Specification**](https://robu.in/product/ac-dc-power-supply-module-12v-1a-switching-power-supply-board/#tab-specification)

Model : WX-DC1205

Input Voltage : 100-265VAC

Output Voltage : 12VDC

Output Current : 1A

Frequency : 50HZ/60HZ

Overvoltage Protection: Yes

Over Current Protection: Yes

Length (mm): 63

Width (mm): 30

Height (mm): 20

Weight (gm): 27

Shipment Weight: 0.03 kg

Shipment Dimensions: 8 × 10 × 3 cm

**SMPS using VIPer22A:**

Looking at the figure we can easily see that the configuration does not involve too many stages or parts.

The input mains AC, as usual is first rectified using ordinary 1N4007 diodes which is fixed in the bridge network mode.

The rectified high voltage DC is filtered using the high voltage capacitor.

The next stage is the crucial one which incorporates the outstanding chip VIPer22A manufactured by ST Microelectronics.

The IC alone functions as the oscillator and induces a frequency of around 100 KHz into the primary winding of the ferrite E core transformer.

The IC is absolutely rugged and is internally protected from sudden voltage in rush and other voltage related component hazards.

The IC also incorporates built in over heat protection which makes the IC virtually indestructible.

The voltage induced at the input is effectively stepped down at the output winding, due to low eddy current losses, about 1 amp current becomes available from a relatively tiny ferrite transformer.

With the coil specs shown the voltage is around 12 and the current is around 1amp.

A special feedback circuitry is also included in the circuit for maintaining high degree of protection and power saving features.

The feedback loop is implemented via an opto-coupler which becomes active during abnormal circuit conditions.

When the output voltage tends to rise beyond the set threshold the feed back loop becomes operative and feeds an error signal to the IC FB input.

The IC instantly comes into an corrective mode and switches off the input to the primary winding until the output returns to the normal range.

You may also want to read this: 24watt, 12V, 2 amp SMPS using a single IC Most recommended for you.

**Circuit Diagram:**

