

Simple 5V power supply for digital circuits

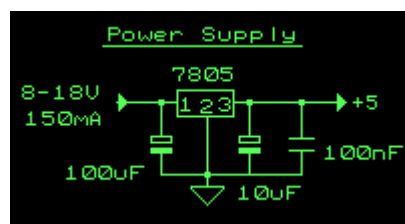
Summary of circuit features

- Brief description of operation: Gives out well regulated +5V output, output current capability of 100 mA
- Circuit protection: Built-in overheating protection shuts down output when regulator IC gets too hot
- Circuit complexity: Very simple and easy to build
- Circuit performance: Very stable +5V output voltage, reliable operation
- Availability of components: Easy to get, uses only very common basic components
- Design testing: Based on datasheet example circuit, I have used this circuit successfully as part of many electronics projects
- Applications: Part of electronics devices, small laboratory power supply
- Power supply voltage: Unregulated DC 8-18V power supply
- Power supply current: Needed output current + 5 mA
- Component costs: Few dollars for the electronics components + the input transformer cost

Circuit description

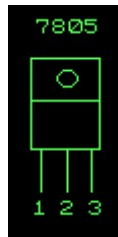
This circuit is a small +5V power supply, which is useful when experimenting with digital electronics. Small inexpensive wall transformers with variable output voltage are available from any electronics shop and supermarket. Those transformers are easily available, but usually their voltage regulation is very poor, which makes them not very usable for digital circuit experimenter unless a better regulation can be achieved in some way. The following circuit is the answer to the problem.

This circuit can give +5V output at about 150 mA current, but it can be increased to 1 A when good cooling is added to 7805 regulator chip. The circuit has over overload and thermal protection.



Circuit diagram of the power supply.

The capacitors must have enough high voltage rating to safely handle the input voltage feed to circuit. The circuit is very easy to build for example into a piece of veroboard.



Pinout of the 7805 regulator IC.

- 1. Unregulated voltage in
- 2. Ground
- 3. Regulated voltage out

Component list

7805 regulator IC

100 uF electrolytic capacitor, at least 25V voltage rating

10 uF electrolytic capacitor, at least 6V voltage rating

100 nF ceramic or polyester capacitor

Modification ideas

More output current

If you need more than 150 mA of output current, you can update the output current up to 1A doing the following modifications:

- Change the transformer from where you take the power to the circuit to a model which can give as much current as you need from output
- Put a heatsink to the 7805 regulator (so big that it does not overheat because of the extra losses in the regulator)

Other output voltages

If you need other voltages than +5V, you can modify the circuit by replacing the 7805 chips with another regulator with different output voltage from regulator 78xx chip family. The last numbers in the the chip code tells the output voltage. Remember that the input voltage muts be at least 3V greater than regulator output voltage ot otherwise the regulator does not work well.