

## Abstract

Efficient conversion of electrical power is becoming a primary concern to companies and society as a whole. As a result of the same power supply is an essential part of almost all electrical or electronics applications. The choice of whether to use a switching or linear power supply in a particular design is significantly based on the needs of the application itself. However switching power supplies offer not only higher efficiencies but also offer greater flexibility to the designer. Recent advances in semiconductor, magnetic and passive technologies make the switching power supply an ever more popular choice in the power conversion arena today.

Switching regulators are preferred over linear regulators because of following major advantages:

- Much higher efficiencies: 68 to 90%
- Compact size
- Reduced cost at higher o/p power levels
- Versatility - Multiple output

Various converter topologies for switched mode power supplies are:

Buck, boost, buck-boost, fly back, half bridge, full bridge, push pull. Each topology has its own merits within certain applications. But in general the Flyback is the most versatile of all the topologies, allowing the designer to create one or more output voltages, some of which may be opposite in polarity. Flyback converters have gained popularity in battery-powered systems, where a single voltage must be converted into the required system voltages with very high power conversion efficiency. The most important advantages of Flyback are transformer phasing & its capability of providing multiple outputs.

Designing an offline switching power supply involves many aspects of electrical engineering, analog & digital circuits, bipolar & MOS power device characteristics, magnetics, thermal considerations, safety requirements, control loop stability etc. This presents an enormous challenge involving complex trade-offs with a large number of design variables. This design task can be simplified using TOP-switches' high level of integration. Because of the significantly reduced number of design variables & built-in loop stability, a step-by-step design method can be developed to obtain satisfactory result.

The project is aimed to the design & development of a multiple output flyback regulator using TOP switch. Of course compared to single output supplies, multiple output applications demand further design considerations to optimize the performance. The design of multiple o/p power supplies always requires some bread boarding to verify transformer designs, feedback techniques and system behavior. TOP switch is a monolithic device combining a high voltage power MOSFET switch with all the analog & digital control circuitry required to implement isolated, regulated & protected switching power supplies.

This project offers complete design of a FIVE output switch mode power supply using flyback converter topology. The supply is rated for 43 W continuous output power, with 57 W of peak power capability. The specifications of the power supply are:

Input :	185 V to 265 V AC
Outputs:	(1) 3.3 V, 3.0 A
	(2) 5.0 V, 3.2 A
	(3) 12.0 V, 0.6 A
	(4) 18.0 V, 0.5 A
	(5) 30.0 V, 0.03 A
Output Power	:43W(continuous)                      57 W (peak)

Further, it is also planned to use one of the five outputs for driving the fluorescent lamp. For this purpose, the high frequency dc is to be used for switching of MOSFET in the driver circuit. Major application areas of the designed flyback supply are set top box applications, VCRs, DVD players, cable modems & direct satellite receivers.