

# **CONSTRUCT A SWITCHING MODE POWER SUPPLY USING DIGITAL PULSE WIDTH MODULATION (PWM) TECHNIQUE**

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## **ABSTRACT**

This report involves the constructing a Switching Mode Power Supply (SMPS) with the output is 5VDC, using Digital Pulse Width Modulation (PWM) technique. The Xilinx Complex Programmable Logic Devices (CPLD) is to generate the control signal for required Pulse Width Modulation (PWM) switching pattern. In the laboratory testing, the circuit designed work successfully for different input supply voltages. So, Digital Pulse Width Modulation (PWM) pattern is good to use for switching mode power supply.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

The switching regulator circumvents all of the linear regulator's short-comings. First, the switching supply exhibits efficiencies of 68 to 90 percent regardless of the input voltage, thus drastically reducing the size requirement of the heatsink and hence its cost. [10].

The power transistors within the switching supply operate at their most efficient points of operation saturation and cutoff. This means that the power transistors can deliver many times their power rating to the load and the less expensive, lower power packages can be used. Since the input voltage is chopped into an AC waveform and placed into a magnetic element, additional windings can be added to provide for more than one output voltage. The incremental additional cost of each added output is very small compared to the entire supply cost-and in the case of transformer isolated switching supplies; the output voltages are independent of the input voltage. This means that the input voltage can vary above and below the level of the output voltages without affecting the operation of the supply. The last major advantages are its size and cost at the higher output power levels. Since their frequency of operation is very much greater than the 50-60 Hz line frequency, the magnetic and capacitive elements used for energy storage are much smaller and the cost to build the switching supply becomes less than the linear supply at the higher power levels[1].

The disadvantages of the switching supply are minor. First the switching supply is more complicated than the comparable linear supply. Second, considerable noise from the switching supply is generated on its outputs and input and radiated into the environment. This can be difficult to control and certainly cannot be ignored during the design phase. Third, since the switching supply chops the input voltage into time limited pulses of energy, the time it takes the supply to respond to changes in the load