

Design and Implentation of Buck-Boost converter with PWM Generator

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Abstract—This paper focuses on designing a high efficient buck-boost converter which steps up and steps down the voltage using PWM generator as a gate driver circuit. This model will be simulated using esim and skywater 130 nm PDK

Buck-boost converter which is the analog block will be simulated using esim and the PWM generator will act as gate driver is the digital block which will be simulated using Verilog HDL

Keywords—buck-boost converter , PWM generator

I. INTRODUCTION

There are many electrical devices and circuits across a variety of applications that require a lower or higher voltage than provided by the power source. In such cases, we require a circuit to transforming or change the level of the electrical voltage input received.

Before the invention of DC to DC converters, the use of vibrators, rectifiers, and transformers- step up or step down- had become common. And while they worked, they were highly inefficient and wasted a lot of energy in the form of excess heat. So in order to have a highly efficient model , DC-DC converter was introduced

II. REFERENCE CIRCUIT DETAILS

The Buck Boost converter has two modes of operation.

Mode 1: Switch is ON, Diode is OFF

The Switch is ON and therefore represents a short circuit ideally offering zero resistance to the flow of current so when the switch is ON all the current will flow through the switch and the inductor and back to the DC input source

Mode 2: Switch is OFF, Diode is ON

In this mode the polarity of the inductor is reversed and the energy stored in the inductor is released and is ultimately dissipated in the load resistance and this helps to maintain the flow of current in the same direction through the load and also step-up the output voltage

III. REFERENCE CIRCUIT DIAGRAM

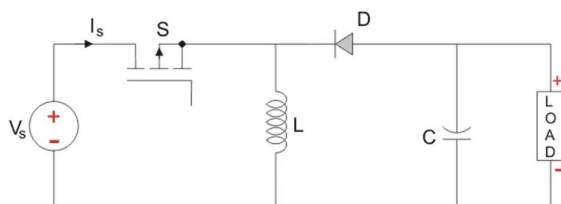


Fig1: Circuit Diagram of buck-boost converter.

IV. REFERENCE WAVEFORMS

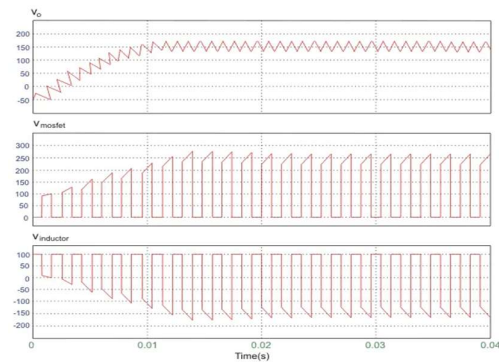


Fig2 :Voltage Waveforms

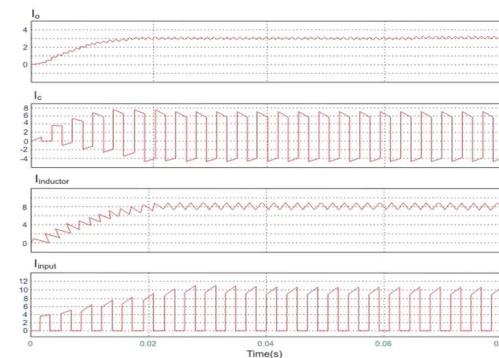


Fig3 :Current Waveforms

VI. REFERENCES

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