

MIDDLE EAST TECHNICAL UNIVERSITY

Electrical & Electronics Engineering

Hardware Project

EE 464 – Static Power Conversion - II

Instructor:

Assist. Prof. Dr. Ozan KEYSAN

Students:

Huzeyfe Hintoglu - 2093920

Enes Ayaz - 2093318

Ali Aydın - 2093326

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# Introduction

In our hardware project of the EE464 course, we are asked to design an Isolated Power Supply. In this project, the design, simulations and hardware implementations are to be performed for hardware project. As Anka Inc. group, we have chosen the project designing an Isolated Flyback Converter. The specifications are as follows;

|  |  |
| --- | --- |
| Minimum Input Voltage (V) | 210 Vac |
| Maximum Input Voltage (V) | 230 Vac |
| Output Voltage (V) | 15 |
| Output Power (W) | 15 |
| Output Volt. Peak-to-Peak Ripple (%) | 5 |
| Line Regulation (%) | 3 |
| Load Regulation (%) | 3 |

Table 1: Flyback Converter Specifications

The main motivation selecting this topology is to overcome efficiency problems as our output current value is smaller, which results in less power loss in overall system. Also, there is no 3rd winding in transformer designed for Flyback Converter as well as output inductance for filtering purposes as in Forward Converter topology.

# 1. Flyback Converter Design

## 1.1. Steady State Operation

## 1.2. Transformer Design

## 1.3. Discontinuous Mode Calculations

## 1.4. Non-Ideal Simulation

## 1.5. Efficiency

## 1.6. Component Selection

### 1.6.1. Transformer

### 1.6.2. Capacitor

### 1.6.3. Diode

### 1.6.4. MOSFET

### 1.6.5. Rectifier Bridge

# 2. Test Results

## 2.1. Overall Design

## 2.2. Transformer Results

## 2.3. RLC Measurement

## 2.4. Output Voltage and Current

## 2.5. Input Voltage

## 2.6. Switching Performance

# Conclusion

# Appendix