

**Middle East Technical University**

**Faculty of Engineering**

**Department of Electrical and Electronics Engineering**

**EE464 Hardware Project Simulation Report**

**Kutay Delibaş**

**Mehmet Gürtekin 2166593**

**Ogün Altun**

**Introduction**

This report presents the preliminary simulations, their results and our inferences from those results to construct our hardware project for EE464 course. In this hardware project, we are required to design an isolated DC-DC converter that includes magnetic design. We selected our topology from the given list in the hardware project page which is FOR#2. The features of this converter are given below:

* Minimum Input Voltage = 24 V
* Maximum Input Voltage = 48 V
* Output Voltage = 10 V
* Output Power = 48 W
* Output Volt. Peak-to-Peak Ripple = 2%
* Line Regulation = 2%
* Load Regulation = 2%

The reason behind this selection lies under the advantages of Forward converter over Flyback converter which is the other option for this project. The transformer in the Forward converter transfers energy instantly unlike Flyback converter which stores energy in the transformer’s air gaps. The instant energy transfer allows us to construct a more ideal transformer with high magnetizing inductance and without an air gap. This transformer type provides much lower peak currents in both sides which lowers the copper losses. Another advantage of Forward converter is having the output inductor and freewheeling diode. These two components stabilize the output current, so the ripple of the secondary side current is smaller in Forward converter. Furthermore, since the output inductor is also the main energy storage element, output capacitor can be selected smaller and with a lower ESR value which results in lower output voltage ripples. In order to benefit from these advantages in our design, we chose to make a Forward converter in our hardware project.