EE3007D Power Electronics

Course Project Report

Buck Boost Converter

Aim

To develop a Buck Boost Converter that can convert a 15V dc input to 10V and 25V dc outputs at 25W

Apparatus Used

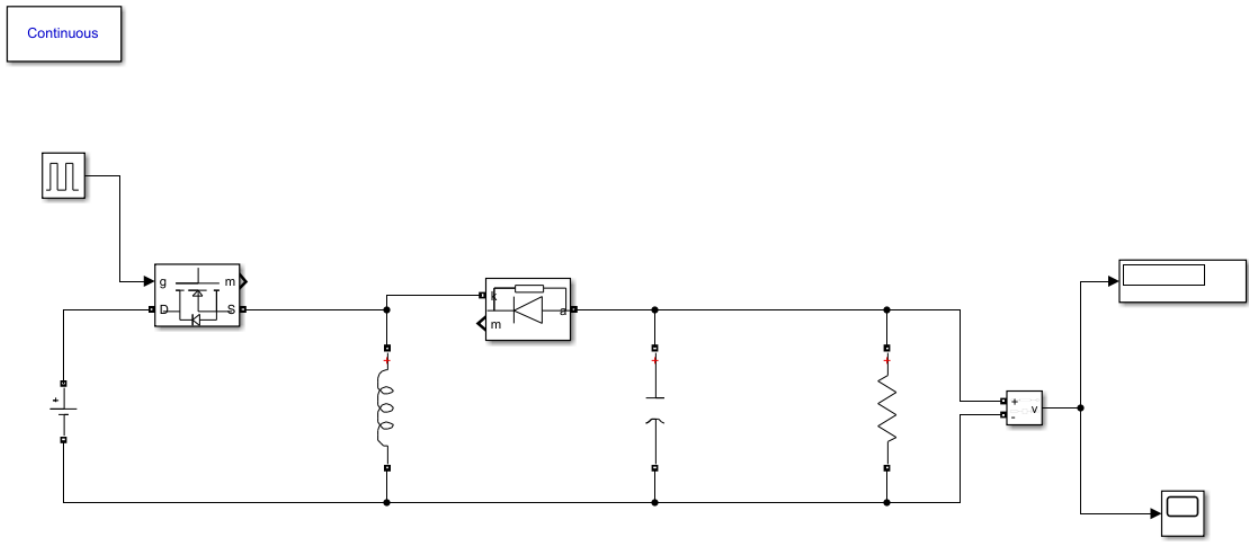
1. **TLP250 Optocoupler - 1 Nos**
2. **1000uF, 63V Electrolytic Capacitor - 1 Nos**
3. **Inductor wound for 8.34mH - 1 Nos**
4. **10W, 100E Resistor Bank - 4 Nos**
5. **IRF540 Power MOSFET - 1 Nos**
6. **1N5048 Power Diode - 1 Nos**

Design

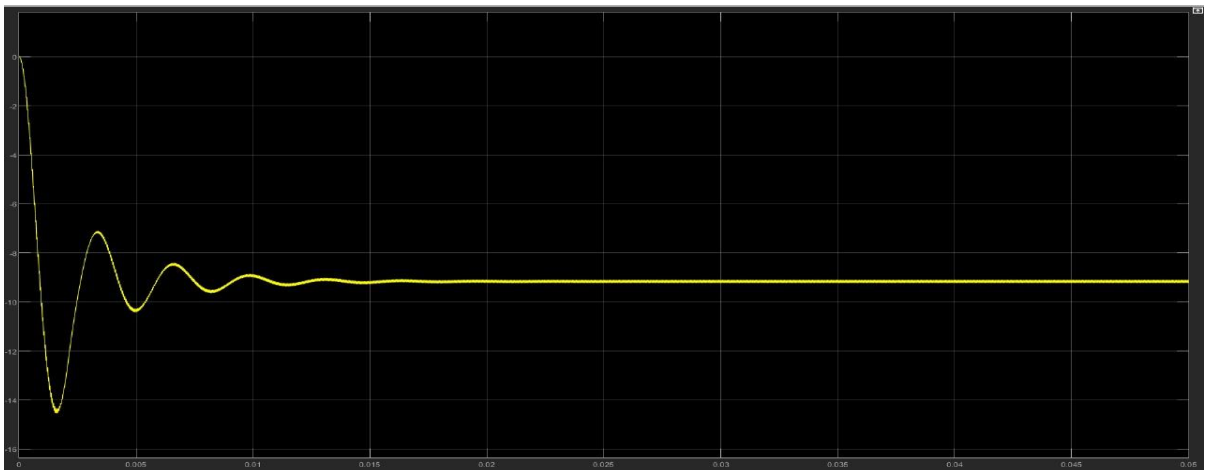
- Theoretical Duty Cycles for 10V and 25V dc outputs are 0.4 and 0.625 respectively
- The minimum inductance so that the circuit does not enter discontinuous conduction mode(considering the worst case) was found to be 3.125mH. Accordingly, an inductor of inductance 8.34mH was wound.

- The minimum value of capacitor was designed to be 250 microF. .Accordingly a 1000microF ,63V capacitor was used.
- Four resistor banks of rating 100 ohm 10W were connected parallel inorder to obtain a total resistance of 25 ohm 50W.

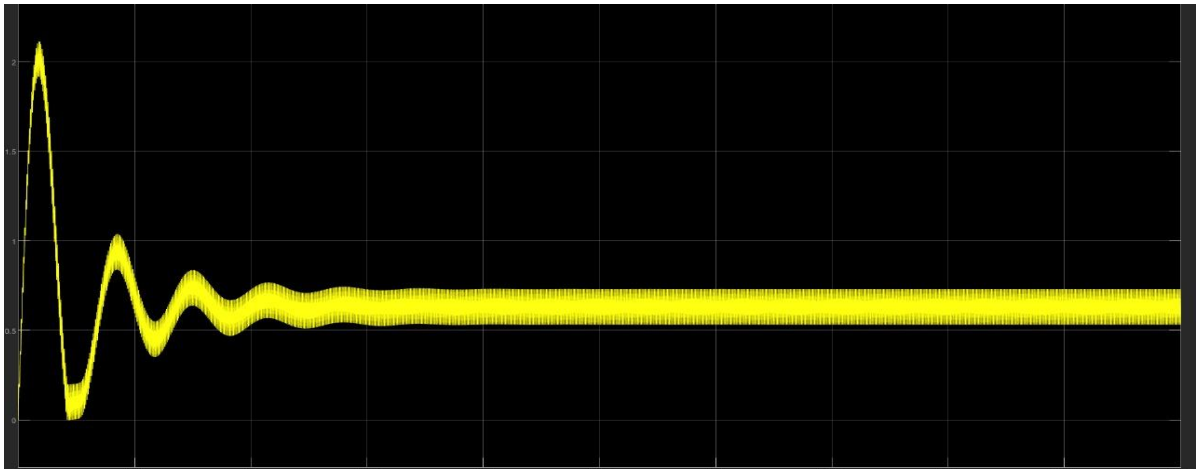
Simulation:



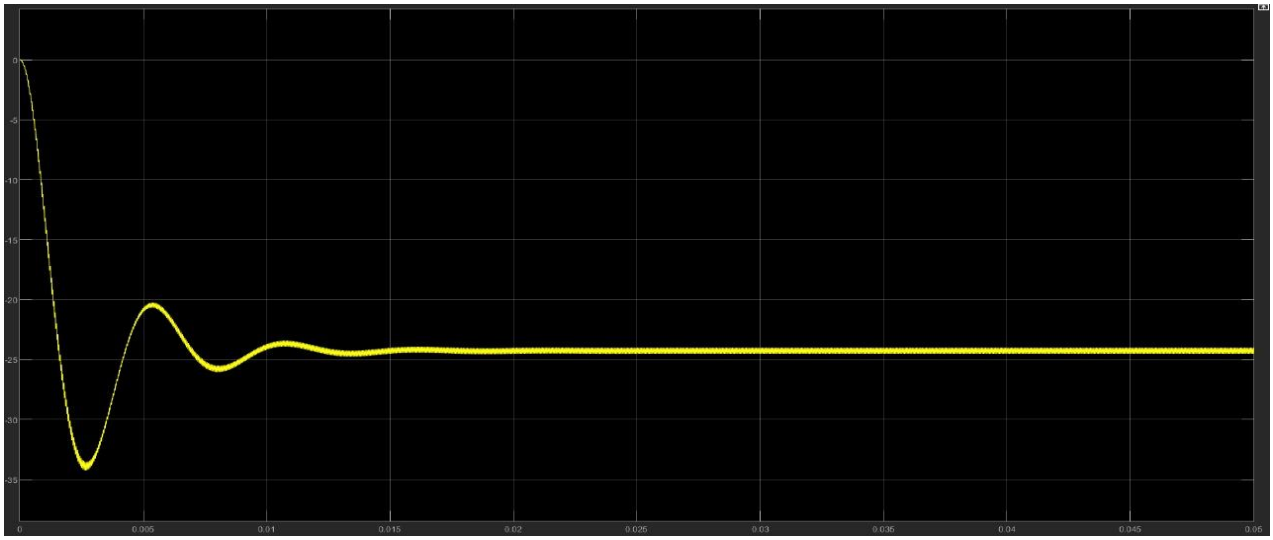
BUCK OUTPUT VOLTAGE:



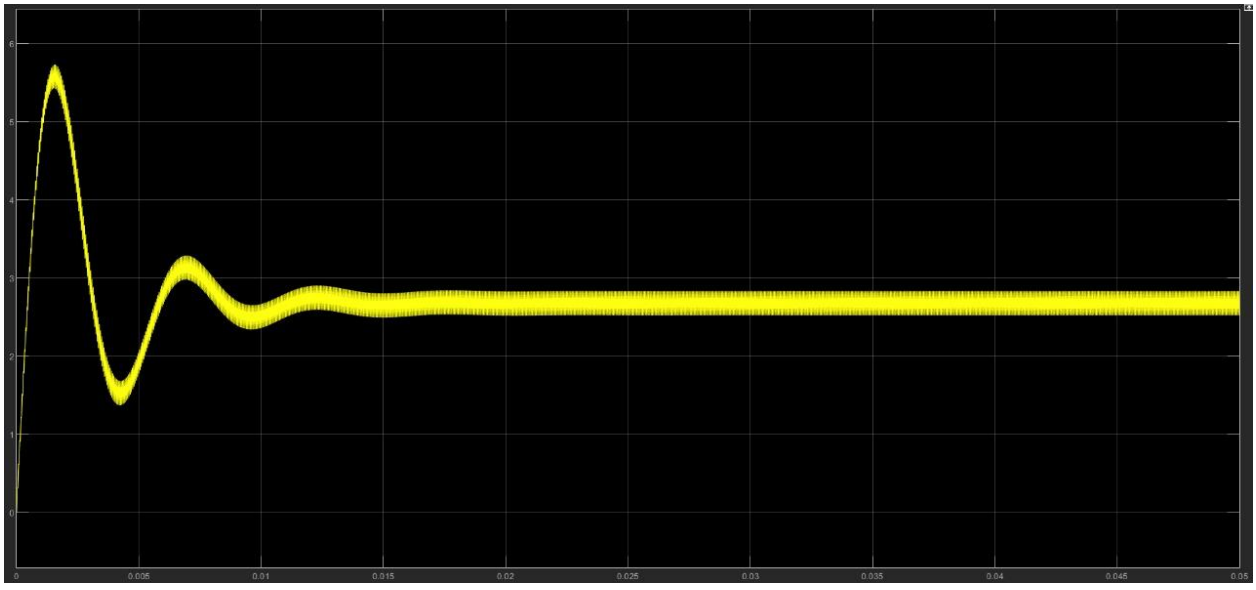
BUCK INDUCTOR CURRENT:



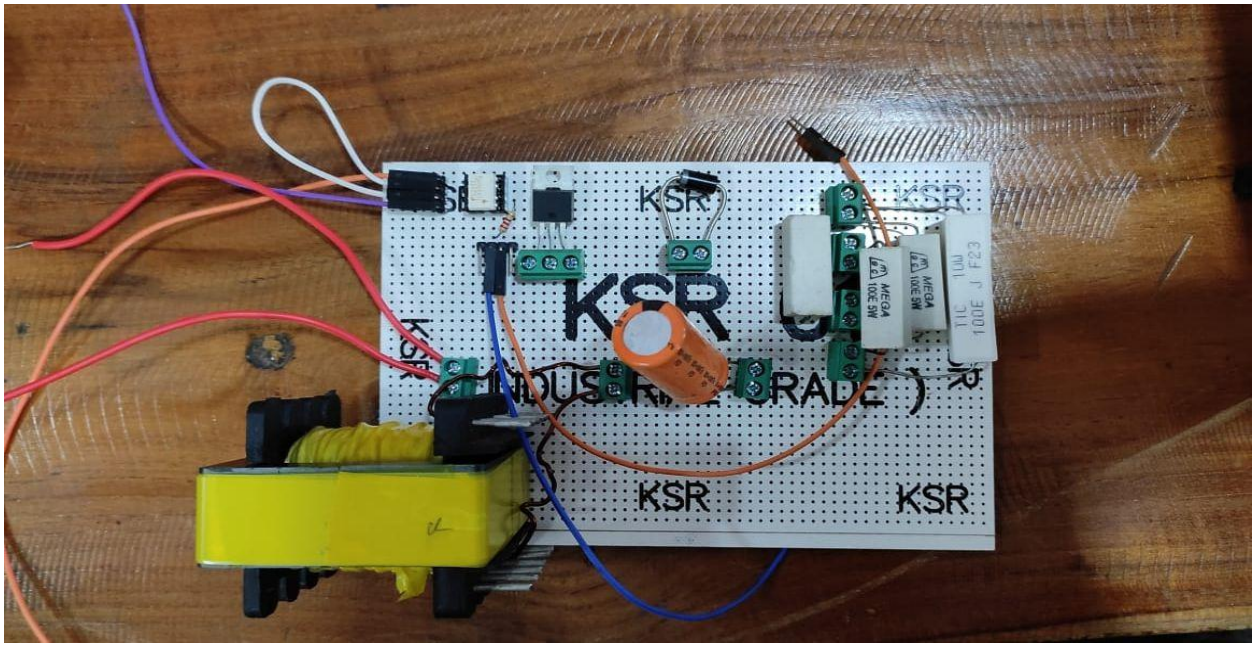
BOOST OUTPUT VOLTAGE:

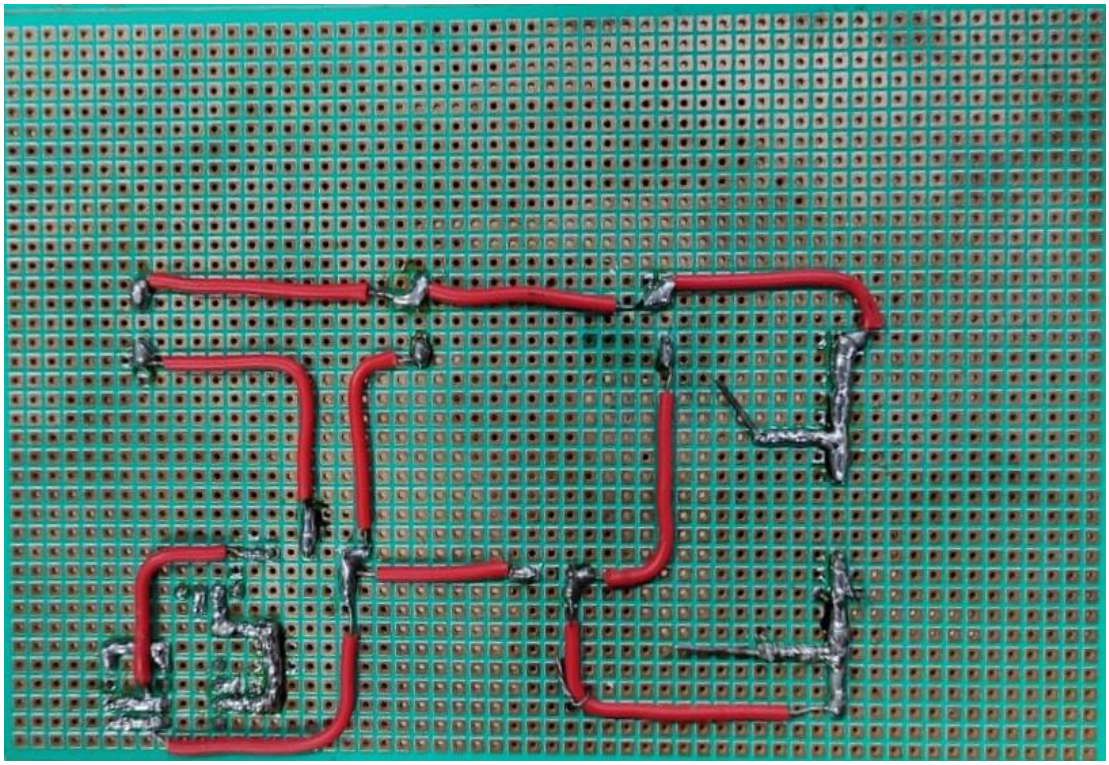


BOOST INDUCTOR CURRENT:



Hardware:





Result:

The buck-boost converter design met the specified requirements, providing a stable 10V output over the input voltage of 15 V (Buck converter)and a stable 24V output over the input of 15 V(Boost converter)

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