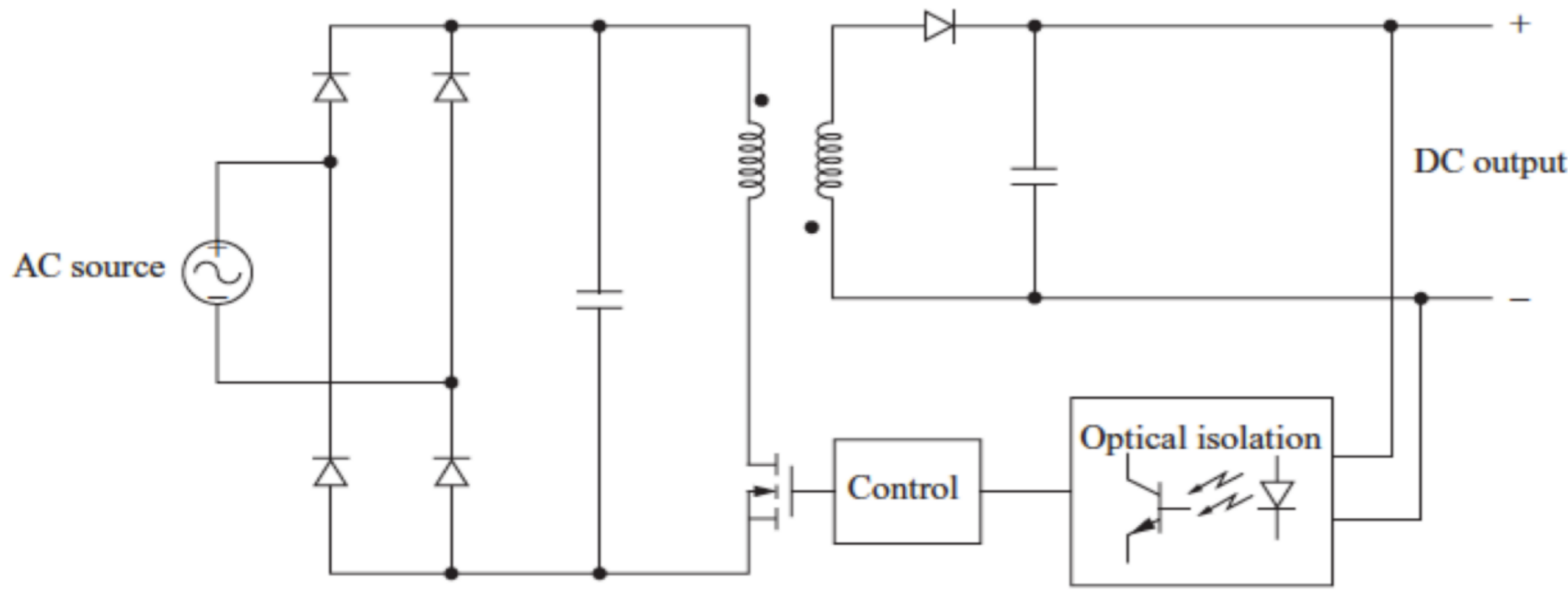
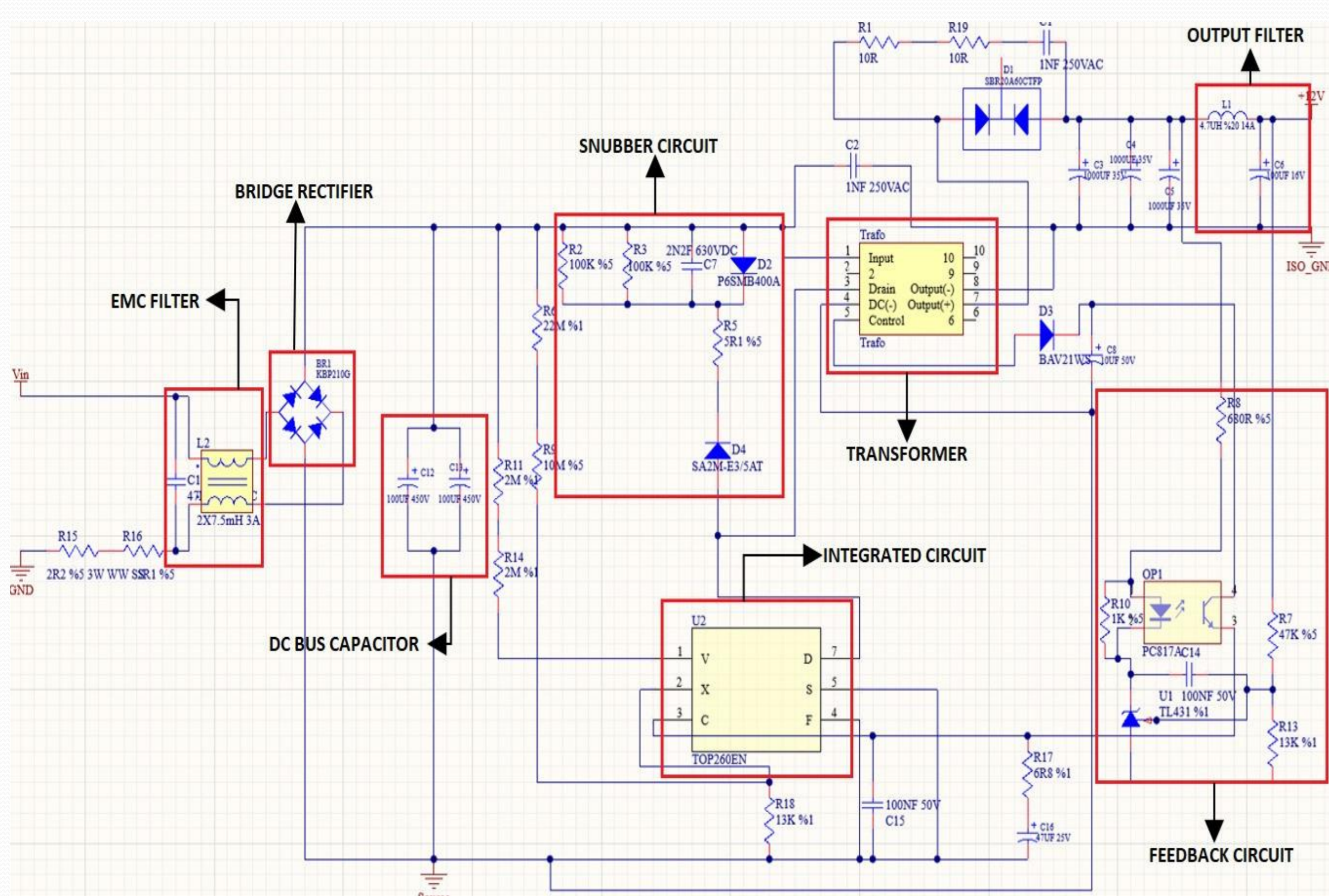


## 1 INTRODUCTION



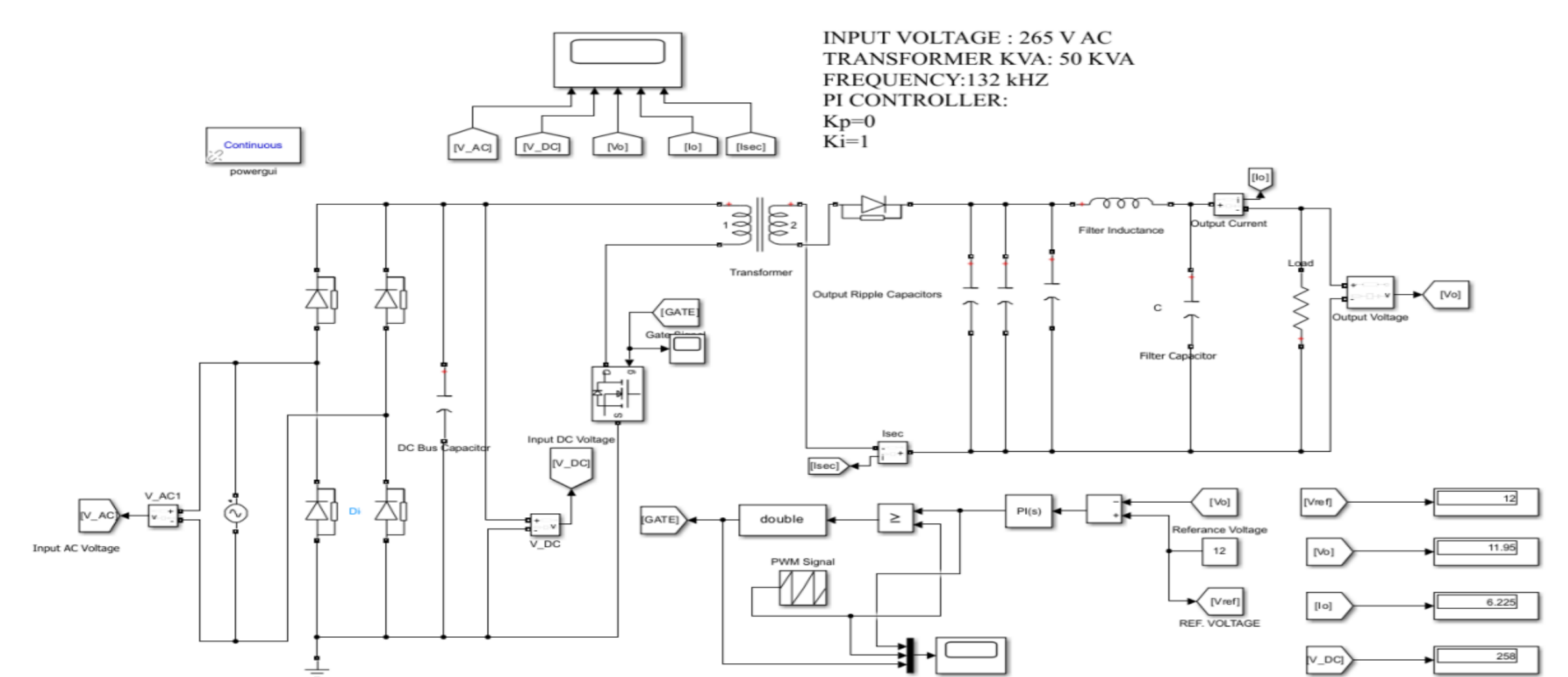
Closed Loop Flyback Circuit in Basic Structure

## 2 METHOD

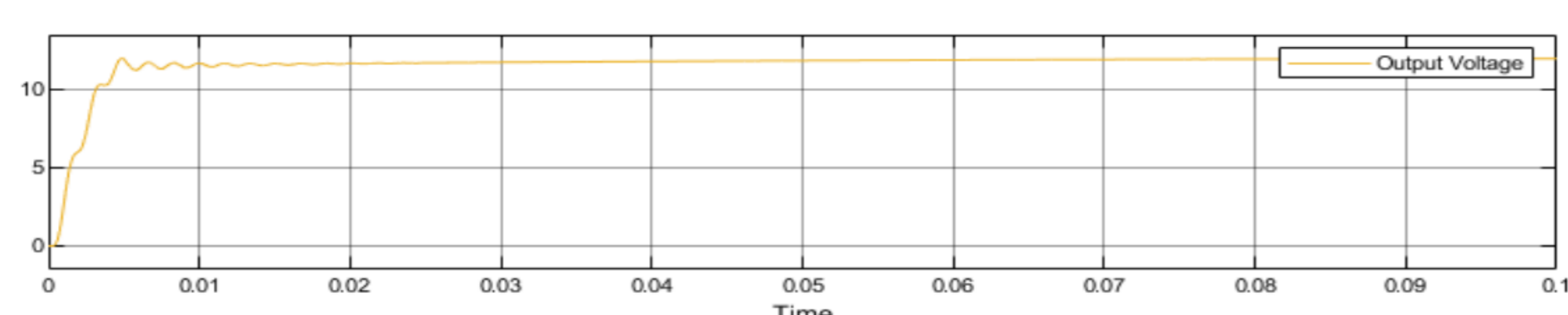


Designed flyback converter schematic

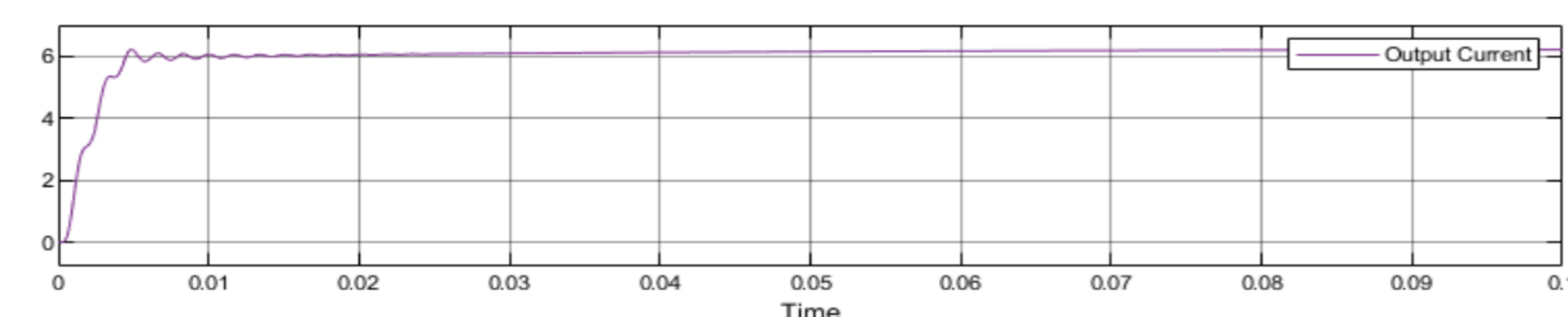
## 3 EXPERIMENT / SIMULATION



Simulated flyback circuit with feedback mechanism



Output voltage graph for simulation



Output current graph for simulation

## 4 RESULTS



Voltage and current graph under full-load condition



Voltage and current graph under half-load condition



Voltage graph under no-load condition



Realized version of the designed flyback converter

## 5 COST ANALYSIS

MATERIAL	MANUFACTURER	ABOUT	PRICE
2KB10M-E4-51	VISHAY	2 A, 1000 V	18 TL
1x Bridge Rectifier	VISHAY	2 A, 1000 V	18 TL
1x Capacitor	KEMET	47 nF, 275 V	14.70 TL
1x Capacitor	Chemi-Con	220 µF, 450 V	226.34 TL
1x Capacitor	KEMET	2.2 nF, 450 V	8.45 TL
2x Capacitor	KYOCERA	100 nF, 50 V	0.76 TL
1x Capacitor	SAMWHA	47 µF, 25 V	7 TL
2x Capacitor	VISHAY	1 nF, 250 V	69.56 TL
1x Capacitor	Optoelectronic Technology	10 µF, 50 V	4.5 TL
3x Capacitor	Panasonic	1000 µF, 35 V	211.89 TL
1x Capacitor	SAMWHA	100 µF, 16 V	10 TL
2x Resistance	VISHAY	100 kΩ, 2 W	59.84 TL
1x Resistance	Firstohm	4.7 Ω, 5 W	19.32 TL
1x Resistance	ELECTRONICS BD	22 MΩ, 0.25 W	0.494 TL
1x Resistance	YAGEO	10 MΩ, 0.25 W	3.22 TL
1x Resistance	Royalohm	13 kΩ, 0.25 W	5.411 TL
2x Resistance	VISHAY	2 MΩ, 0.25 W	11.28 TL
1x Resistance	MULTICOMP PRO	6.8 Ω, 0.25 W	16.42 TL
1x Resistance	Royalohm	22 Ω, 0.5 W	0.61 TL
1x Resistance	Royalohm	680 Ω, 0.5 W	2.62 TL
1x Resistance	Royalohm	1 kΩ, 0.5 W	0.32 TL

1x Resistance	Royalohm	47 kΩ, 0.25 W	0.32 TL
1x Resistance	Royalohm	13 kΩ, 0.25 W	0.41 TL
1x NTC Thermistor	Thinking	5 Ω, 5A	40.59 TL
1x Diode	Panjit	1000 V, 2A	11.90 TL
1x Zener Diode	Diodes Incorporated	60 V, 10 A	33.17 TL
1x Inductance	TDK Corporation	4.7 µH, 14 A	145.87 TL
1x Line Filter	TDK Corporation	10 mH, 2A	179.11 TL
1x Optocoupler	VISHAY	4N25	24.83 TL
1x TOPSwitch	Power Integrations	TOP260EN	95.54 TL
1x Adjustable Precision Shunt regulators	Diodes Incorporated	2.5V 36 VV	11.27 TL
1x TVS Diode	Littelfuse	400 V, 100 A	19.94 TL
1x Diode	VISHAY	200 V, 250 mA	9.34 TL
1x E42 Transformer	Ulus Elektronik	E42/15.7	482.85 TL
<b>TOTAL PRICE</b>			<b>1745.9 TL</b>

At this point, it should be emphasized that all the elements whose prices are determined in the table are calculated from unit prices. In the case of mass production, a reduction in cost can be expected.

## 6 CONCLUSION

In collaboration with Arçelik Inc., this thesis focuses on the topology, design, and realization of a converter for washing machines, specifically using the flyback topology after extensive literature review and analysis of various topologies. The flyback topology was chosen for its electrical isolation between input and output and its suitability for continuous current mode to enhance efficiency. Detailed research on the working principles and operating modes of the flyback topology informed the design, which incorporated structures like EMC filters, snubber circuits, and feedback systems to increase efficiency and reduce noise. Simulations confirmed that the circuit achieved the desired 12V output and 75W power, operating in continuous current mode. Following successful simulations, the production phase commenced with transformer design and PCB layout, despite challenges in procuring some circuit elements. This research underscores the flyback topology's suitability for the specified voltage and power levels, marking a significant step in ongoing research and development.

