Dr. MAHALINGAM
COLLEGE OF ENGINEERING AND TECHNOLOGY
Enlightening Technical Minds

Dr. MAHALINGAM
COLLEGE OF ENGINEERING AND TECHNOLOGY
An Autonomous Institution
Affiliated to Anna University, Chennai. Approved by AICTE.
Accredited by NBA and NAAC with Grade A
Udumalai Road, Pollachi - 642 003. Tamilnadu.

Battery Charger (5V) without Transformer

Objective:

To design a **Transformerless Battery charger** converting 220V (AC) to 5V (DC) using MULTISIM simulation software.

Simulation Environment:

- ✓ **Tool used** – Multisim
- ✓ **Supply Voltage** – 220 V (AC)

Theory:

This is a low cost and simple circuit that can be used to charge the battery (5V). The power is directly tapped from the mains of 220V via resistors (R1 and R2) .Diodes (D1,D2,D3 and D4) which acts as Rectifier rectifies the voltage and X rated Capacitor (C1 and C2) are used to filter the output. The Zener diode D5 keeps the voltage at steady 5V.

Schematic Diagram:

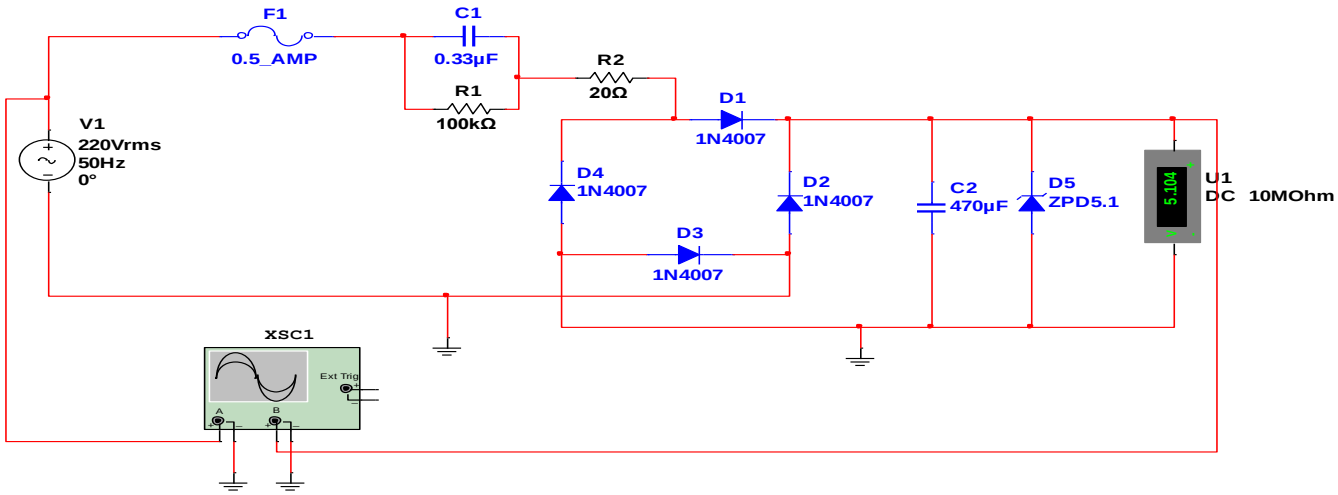

Figure 1: The circuit schematic of the Battery Charger in Multisim

Simulation Results :

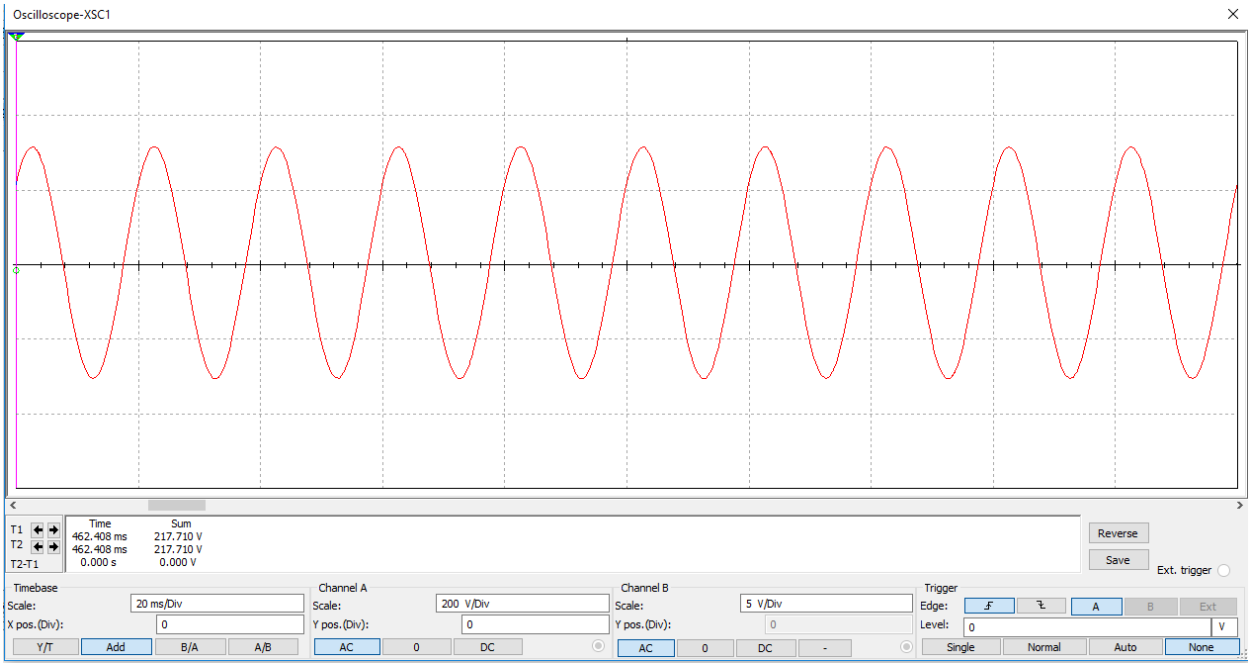

Figure 2: Oscilloscope Input Plot (AC 220V)

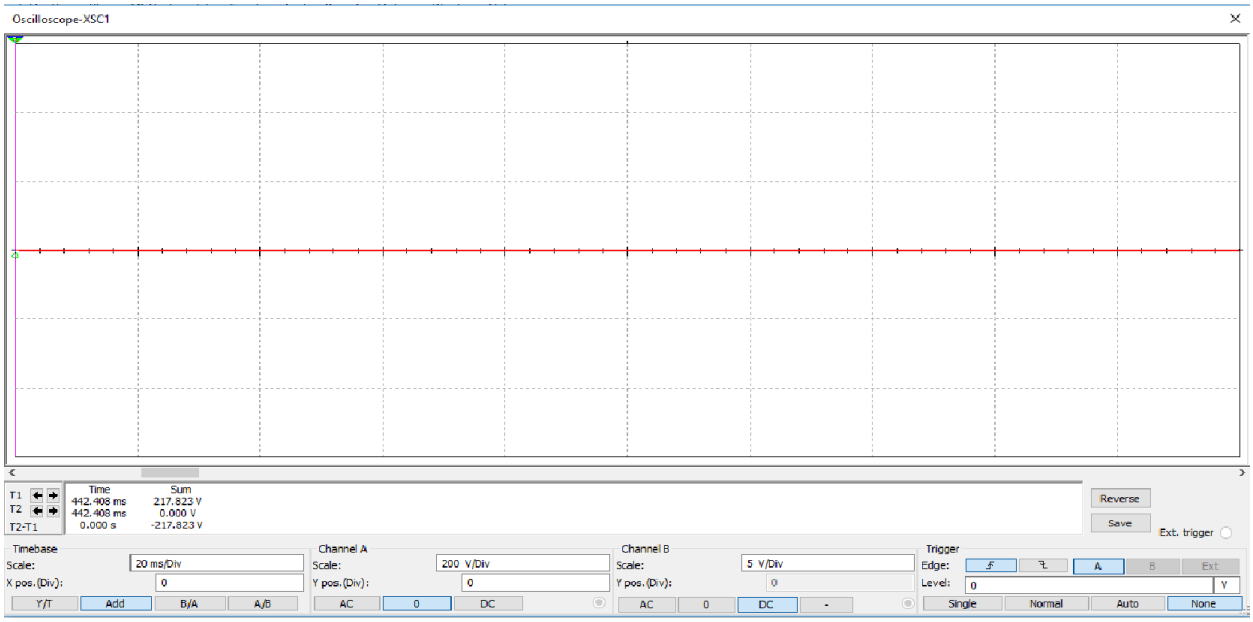

Figure 3: Oscilloscope Output Plot (DC 5V)

Advantages:

It is cheap, smaller size and lighter weight. The power loss in this device is negligible because of low current flow through the device. No Noise is produced and Lower harmonics distortion

Conclusion:

Thus, we have designed the Battery charger which converts 220 V to 5 V without using Transformer and simulated using MULTISIM . Input waveforms and Output waveforms are plotted.

References:

[1] Saisundar. S., I Made Darmayuda, Zhou Jun, Krishna Mainali, Simon Ng Sheung Yan, Eran Ofek ***," Transformerless AC-DC Converter"*** World Academy of Science, Engineering and Technology, International Journal of Electronics and Communication Engineering, Vol:6, No:9, 2012.

[2] L. Shiguo, W. Huai, Z. Guangyong, and I. Batarseh, "***Several schemes of alleviating bus voltage stress in single stage power factor correction converters***," in *Power Electronics and Drive Systems*, Vol:2, pg.921- 926, Jul. 1999.

[3]] Theraja, B.L. and Theraja, A.K. (2002): "***A Textbook of Electrical Technology***" 23rd ed. S. Chand: New Delhi, India.

Websites:

- http://www.circuitstoday.com
- http://www.circuitsgallery.com
- http://www.brighthubengineering.com