iJRASET

International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** III **Month of publication:** March 2017

DOI: http://doi.org/10.22214/ijraset.2017.3154

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Design of Novel Bridgeless AC-DC-AC Fly Back Convertor using Matlab

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Abstract:-The aim of the project is to design and analyse of an AC-DC-AC fly back convertor without the usage of bridge circuit. Comparison of basic bridge diode circuit, which the flyback rectifier with a bridgeless topology can solve the problems and is related to continuous conduction losses display in the primary side and also increase the efficiency of bridge diode circuits. The proposed flyback inverter is operated in continuous conduction Modes with less peak current and better efficiencies. The comparative study of the proposed circuit with conventional circuit having AC-DC-AC converter is presented the simulation of proposed converter is implemented using MATLAB Simulink.
Keywords: Bridgeless circuit, fly back converter, continuous conduction mode, sine PWM.

I. INTRODUCTION

The fly back converter is an important which it compared with other converter which generates controlled adjustable DC Voltage levels .In addition to have more advantages like low cast, better efficiency Galvanic Isolation.etc. It also regulated the power factor correction and the converter line current harmonics.

In an converter which has to improve the efficiency of flyback topology is active clamping the capacitor and main switch on primary side, which it performs as snubber. It also to reduce the peak over shoot of the system. So the efficiency gets improved. Here the snubber LC is used, which it reduces the value of snubber and performs its maximum efficiency.

In another method of efficiency improvement to use of soft switching which it reduce the switching loss. When compared with conventional method a bridgeless concept can be more efficient AC-DC-AC conversion. The boost and flyback converter based bridge circuit leads to conduction losses, and harmonics. In bridge less concept removes the bridge diodes on input side to neglect the conduction losses. This paper presents AC-AC converter, which the flyback rectifier and flyback Inverter without usage of bridge circuit for the economic and efficiency.

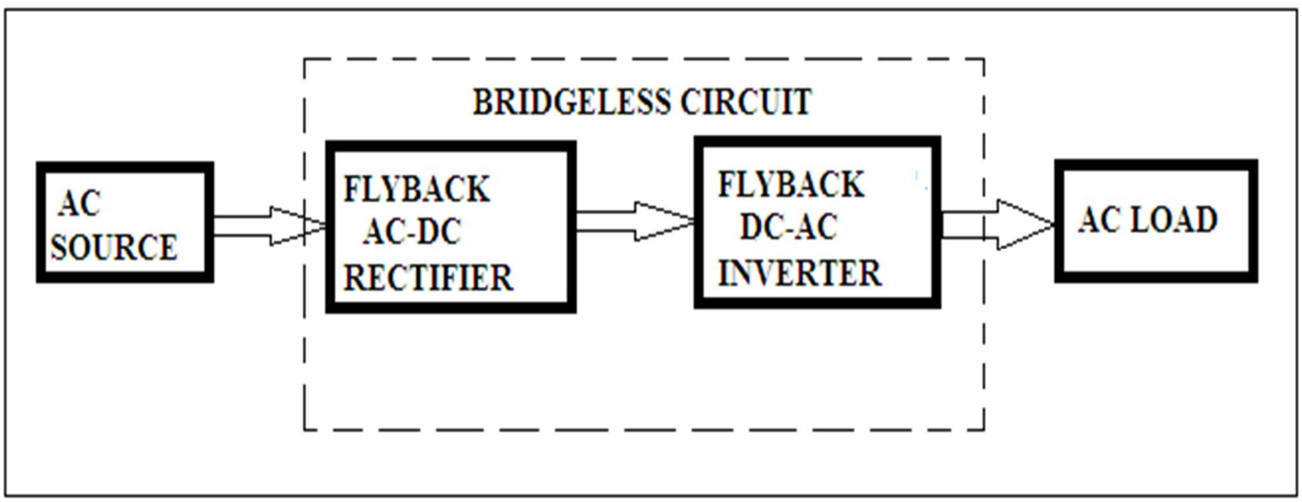

Fig.1 Block Diagram of Bridgeless AC-DC-AC Flyback Converter.

II. BRIDGELESS FLYBACK RECTIFIER

Fig.2 shows the circuit design for bridgeless flyback rectifier. The bridgeless rectifier derived from DC-DC converter as isolated type, which it eliminates the diode bridge at the input side. Also it replaces bidirectional and dual output windings. The dual winding carrier current alternatively based on polarity of input line voltages.

Volume 5 Issue III, March 2017
ISSN: 2321-9653

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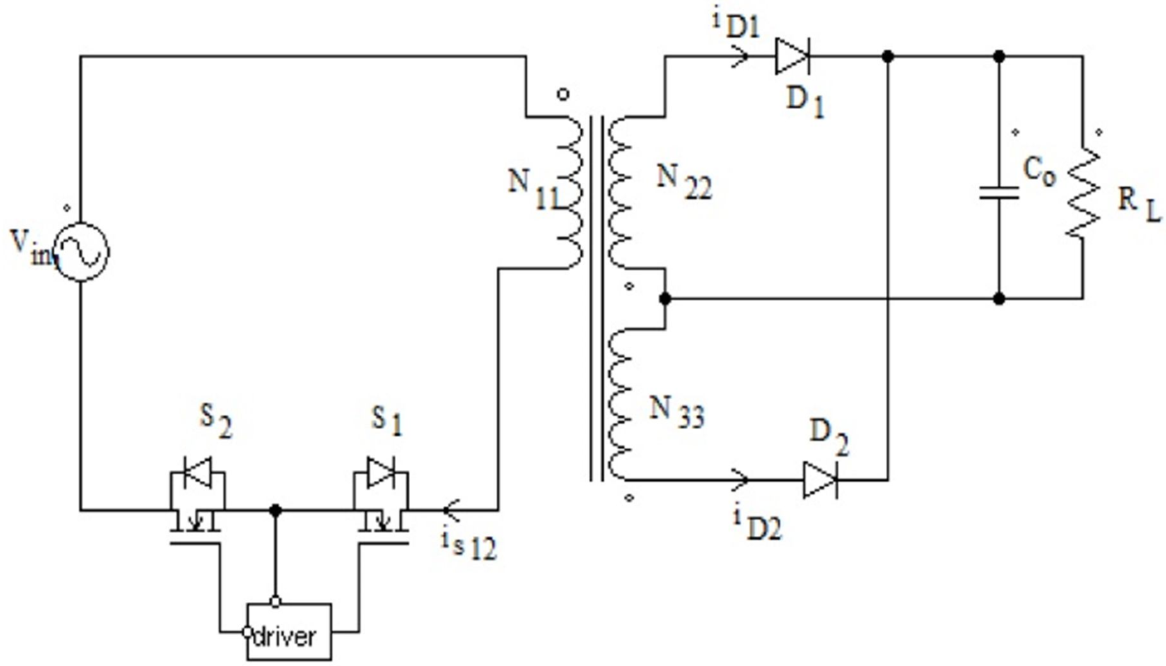

Fig.2 Circuit Diagram of Bridgeless Fly back Rectifier.

When the input voltage Vi is positive, Secondary winding and output diode operates while tertiary winding and diode D2 conducts when Vin is negative.A controller gives same gate pulse for the switches S1 and S2 on primary side.

III. BRIDGELESS FLYBACK INVERTER

The bridgeless Fly back Inverter which obtained from DC to AC with 230 Vims, 50Hz.The method based on continuous conduction mode. During positive half cycle switches S1 is turned ON and the negative half cycle switches S2 is turned OFF to generate the AC output. The inverter the function DC to DC flyback converter in each half cycle. The PWM pulse generated by sine PWM.An LC filter is used to reduce the ripple and improves the efficiency of the system.

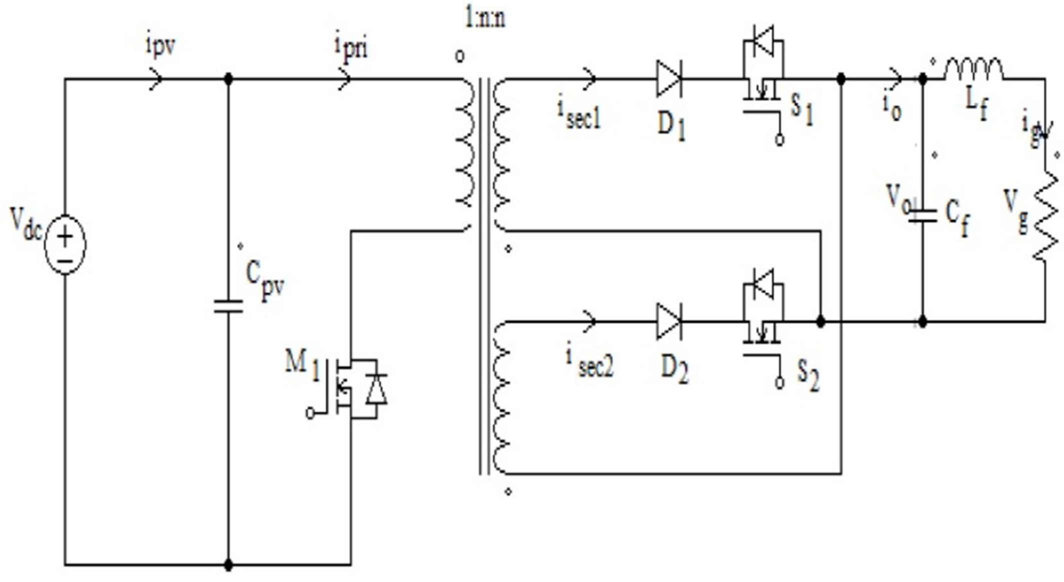

Fig.3 Circuit Diagram Of Bridgeless Flyback Inverter.

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Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

IV. SYSTEM DESCRIPTION

The combination of bridgeless flyback rectifier and the flyback inverter to perform an operation at two modes. In between the flyback converter is used to boost the maximum voltage such as low DC to high DC. EWhere the two modes are described below,

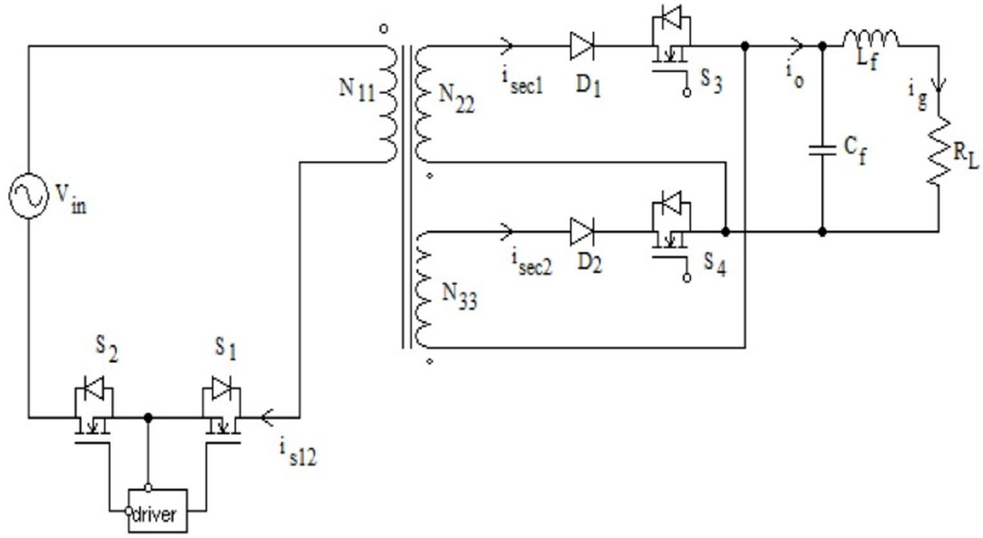

Fig.4 Circuit Diagram Of Proposed AC-DC-AC Converter.

A. *Mode 1:* During positive half cycle switch S1 is turned ON and the primary current linearly increase4s and the energy stored in primary side winding of flyback transformer. At that time output capacitor supplies the power to load. When S1 is turned OFF. The stored energy in primary winding of flyback transformer is supplied to the load through D3 and S3.

B. *Mode 2:* The primary switch S2, diode of S1 conducts so that energy to the load supplied through D2 and S4.The operation same as first mode except primary current. Both magnetization and switching current flows opposite direction.

V. SIMULATION RESUTS

The proposed circuit is designed for 250W, 220V, 50HZ load and simulated using MATLAB Simulink.

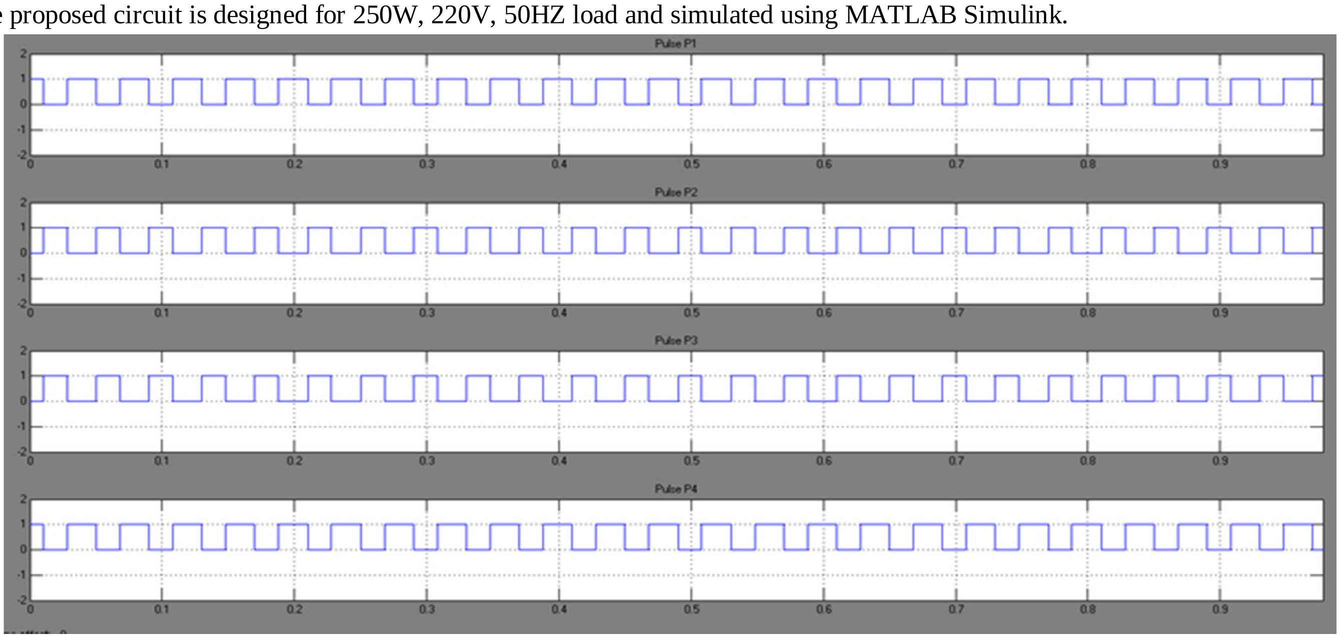

Fig.5 Gate pulse waveform

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ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

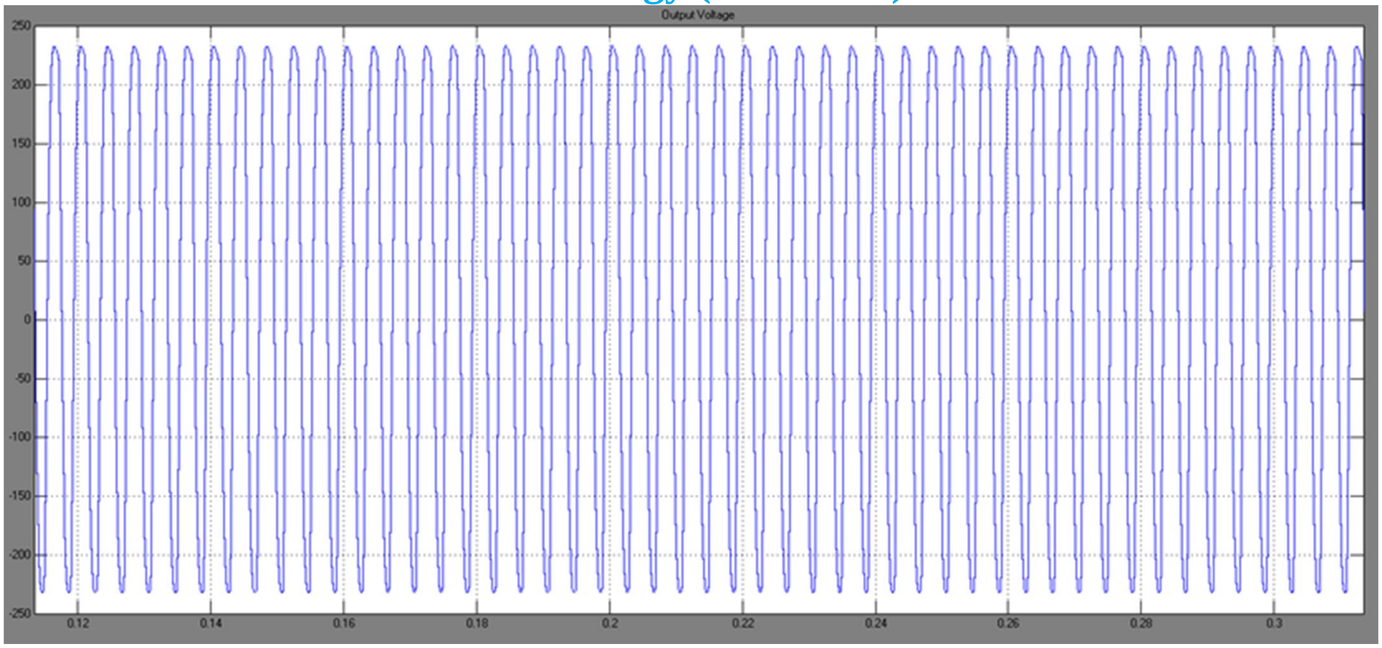


Fig.6 Output voltage waveform.

The output voltage and current and the input voltage with the gate pulses are shown in Figure. The flyback converter which is a most attractive solution the isolation gets safe to input side.

VI. CONCLUSION

The proposed circuit design which performs as AC-DC conversion as Bridge less Flyback rectifier, DC-AC conversion as bridgeless flyback CCM Inverter, the above two combines AC-DC-DC-AC converter which it boost the maximum power and get better efficiency of the system. The proposed bridgeless fly back conversion is designed and the output gets verified by using MATLAB Simulink.

REFERENCES

[1] S. H. Kang, D. Maksimovi´c, and I. Cohen, "Efficiency optimization in digitally controlled fly back DC–DC converters over wide ranges of operating conditions," IEEE Trans. Power Electron., vol. 27, no. 8, pp. 3734–3748, Aug. 201

[2] S. Zinging, F. Device, and M. Bootee, "Decoupling capacitor selection in DCM fly back PV microinverters considering harmonic distortion," IEEE Trans. Power Electron., vol. 28, no. 2, pp. 816–825, Feb. 20

[3] M.T. Zhang, M.M. Jovanovic and F.C.Y. Lee, "Design considerations and performance evaluations of synchronous rectification in fly back converters," IEEE Trans. on Power electron., vol.13, no.3, pp.538-546, May, 199

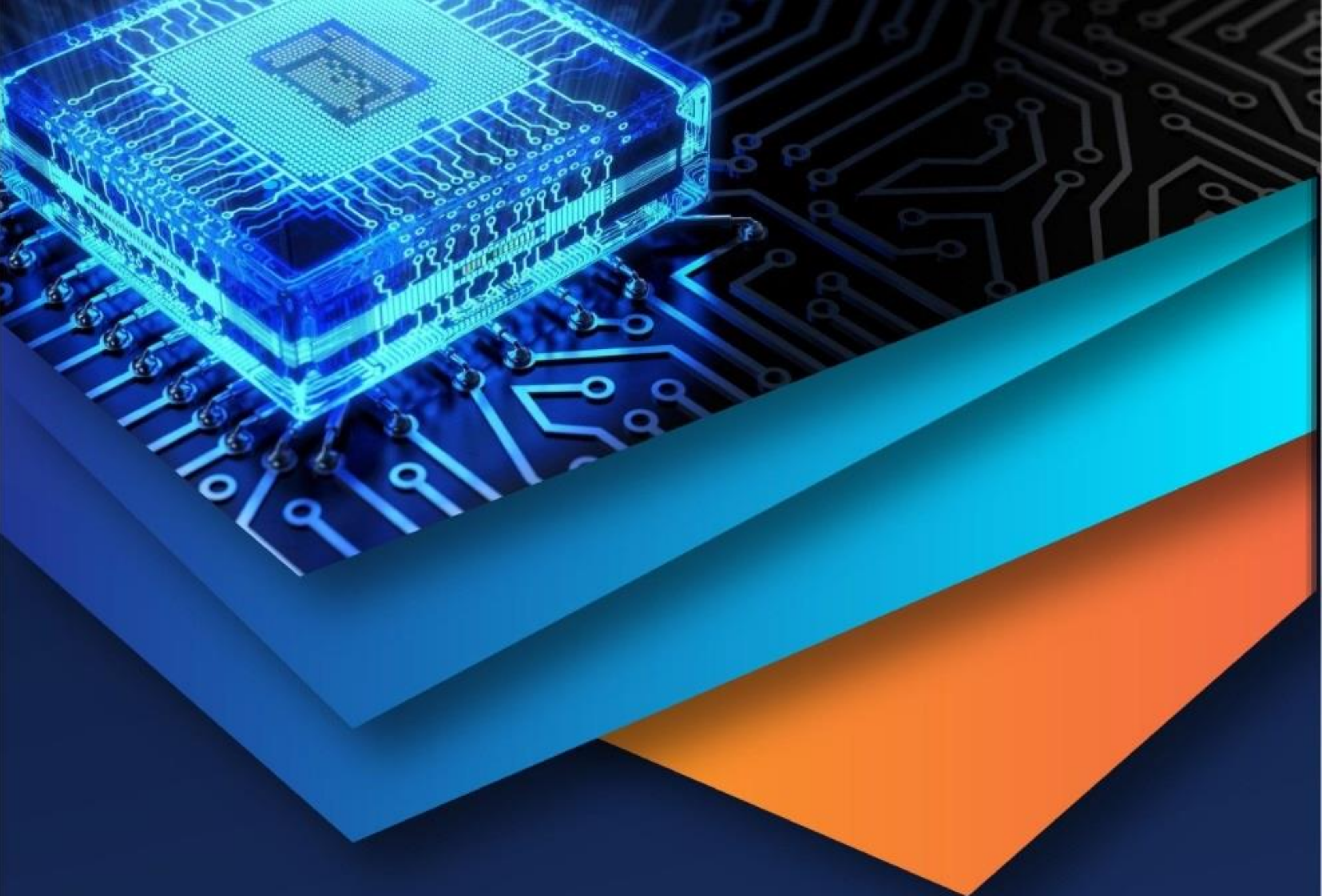
[4] G. Friar, B. Asabi, and M. A. Reseal, "A novel analytical solution for the PV-arrays maximum power point tracking problem" in Proc. IEEE Int. Conf. Power Energy, Nov. 29, 2010–Dec. 1, 2010, pp. 917–922.

[5] G.C. Huang, T.J. Liang and K.H. Chen, "Losses analysis and low standby losses quasi-resonant fly back converter design," in Proc. IEEE ISCAS, 2012, pp.217-220.

[6] A. C. Kyritsis, E. C. Tatamis, and N. P. Papa Nikolaou, "Optimum design of the current-source fly back inverter for decentralized grid-connected photovoltaic systems," IEEE Trans. Energy Convers., vol. 23, no. 1, pp. 281–293, Mar. 2008.

[7] N. D. Benavides and P. L. Chapman, "Modelling the effect of voltage ripple on the power output of photovoltaic modules," IEEE Trans. Ind. Electron., vol. 55, no. 7, pp. 2638–2643, Jul. 2008.

[8] N. Mohan, T. M. Undemand, and W. P. Robbins, Power Electronics: Converters, Applications, and Design. New York, NY, USA: Wiley, 2002.



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