Voltage Multiplier Module for a Photovoltaic System with a high step up converters

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Abstract- In this paper For the Photovoltaic system we are use a proposed High Step-up Converter. This converter is operating at the high level duty ratio.We use the module of a boost converter and the coupled Inductors.To achieved high voltage we use the extra conventional boost converter, this two phase configuration reduces the current stress from the switch and constrain the current losses which minimize the conduction ripple of the switches. In the proposed converter the active circuit gives us large voltage across the Mosfet's. Hence low voltage switch will be use for the reduction of conduction loss as well as cost.Inductors are the Energy storing devices because of these Efficiency will get increased.our prototype circuit is gets 40 V input voltage and 380 output voltage and power is 1000 W. And the maximum Efficiency is the 96.8%.

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I. INTRODUCTION

We know that Now a days the Natural resources are Increasing, therefore it's value automatically we have certain shortage of the renewable energy sources.Low voltage is getting from the natural energy sourcesso that's why we are use High step up Converters in Solar panal or any renewable energy sources.such as wind power and photovoltaic system; such systems played a very Important to produces the energy .Example we take In photovoltaic system we are convert the Light energy into the electrical power ,and we also convert the low voltage into the high Voltage by using converter.By using the Battery we are going to store the energy into Batteries also which are energy storing devices.In Fig 1.we showed fully developed Photovoltaic system in which we are showing converter,battery,inverter partuse for the high step up conversion. Most of the times the converter will not achive the high step up conversion

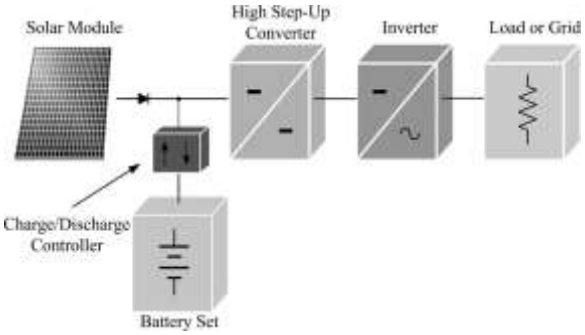

Fig.1 Photovoltaic system

The reason is the leakage of the Resistance and Inductor.

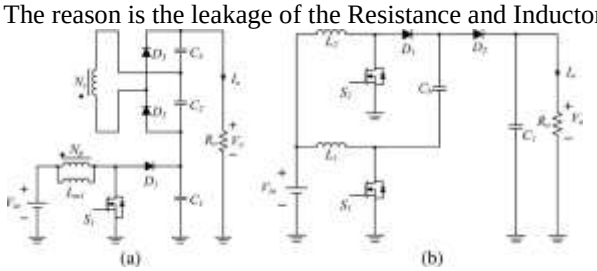

Fig.2 Modified Boost flyback Converter

For that we have to use a modified converter which is shown in figure 2. But in some conditions it will not use such as at the one switch operation is not suitable for high power operations which give large current ripple,which increases conduction losses.

A modified converter is a use as high step up gain achiever this gain is produce through a coupled inductor. This converter performance is similar to the active clamped flyback converter hence leakage current is gets minimize at the output terminal. In Fig. 3(b) shown that the interleaved boost converter with voltage lift capacitor which is similar to the proposed converter.

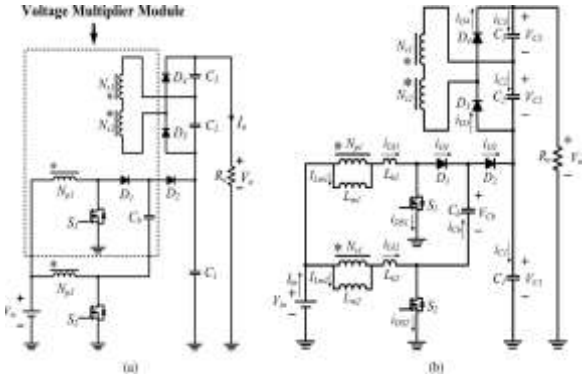

Fig.3(a)Converter with voltage multiplier module. Fig.3(b) Proposed Converter

It Obtains extra voltage gain through the voltage-lift capacitor which minimizes the current ripple which is used in power factor correction and higher power methods.

Here we discuss the advantages of the proposed converter

1) The Characteristics of the converter are ripple of the current at low input and conduction losses are low
2) In high Power applications this converter is use.
3) Natural energy required a high voltage gain so this converter is suitable for that.
4) The main switch stress of voltage is lower than the output voltage.
5) The cost is very less.

6) It gets high efficiency.

II. STEADY-STATE ANALYSIS

All component in the proposed converter are ideal .Vcb,Vc1and Vc3 are considered to be constant.

A. Voltage gain

$$V_{Cb} = \frac{1}{1-D} V_{in}. \quad (1)$$

*VC*1 can be derived from

$$V_{C1} = \frac{1}{1-D} V_{in} + V_{Cb} = \frac{2}{1-D} V_{in}. \quad (2)$$

*Vc*3 can be derived from

$$V_{C2} = V_{C3} = n \cdot V_{in} \left(1 + \frac{D}{1-D}\right) = \frac{n}{1-D} V_{in}. \quad (3)$$

The output voltage can be derived from

$$V_o = V_{C1} + V_{C2} + V_{C3} = \frac{2n+2}{1-D} V_{in}. \quad (4)$$

The voltage gain of the proposed converter is

$$\frac{V_o}{V_{in}} = \frac{2n+2}{1-D}. \quad (5)$$

B. Voltage Stresses on Semiconductor ComponentsS1 and S2 are getting from

$$V_{S1} = V_{S2} = \frac{1}{1-D} V_{in}. \quad (6)$$

Above switches are related to V0

$$V_{S1} = V_{S2} = V_o - \frac{2n+1}{1-D} V_{in}. \quad (7)$$

Voltage stress

$$V_{D1} = V_{C1} = \frac{2}{1-D} V_{in} \quad (8)$$

III. CONVERTER COMPONENTS AND PARAMETERS

Components	Symbols	Parameters
Magnetizing inductances	L_{m1}, L_{m2}	133 µH
Leakage inductances	L_{k1}, L_{k2}	1.6 µH
Turns ratio	n (N_s/N_p)	1
Power switches	S_1, S_2	IRFP4227
Diodes	D_1, D_3, D_4	FCF06A-40
	D_2	BYQ28E-200
Capacitors	C_b, C_2, C_3	220 µF
	C_1	470 µF

IV. MATLAB MODEL.

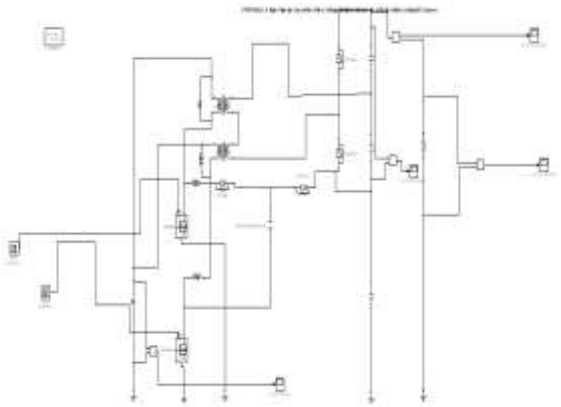

Fig.4. Matlab Simulation

Our simulation model is done in the matlab 2010 software.From using library we are start the simulation. Maximum electrical components are found in the Sim power system of the matlab.for the converter part we are used the Mosfet. We use Mosfets rather than the IGBT because It's Switching period is very low.To make this converter we take all component ten we are connect them as per the given converter in our paper as shown in the above model pulse generator block is use and it is connected to pulse generator to generate the pulseas well as we have to show the results for showing results Scope is use. We can see the results as the form of waveform. Power gui Block is use to provide the equivalent circuits to the proposed converter.

V. RESULTS

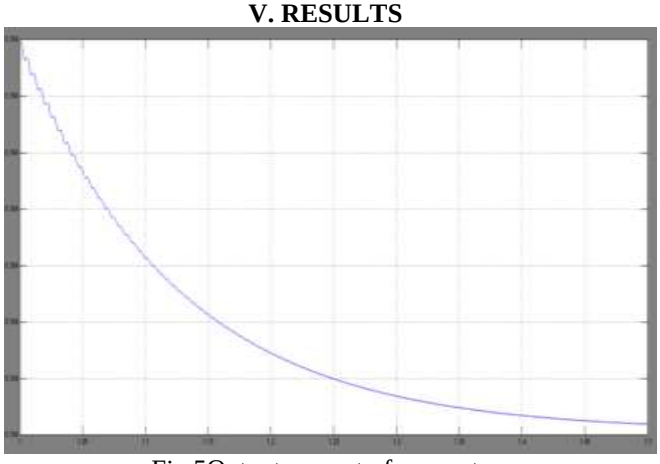

Fig.5Output current of converter

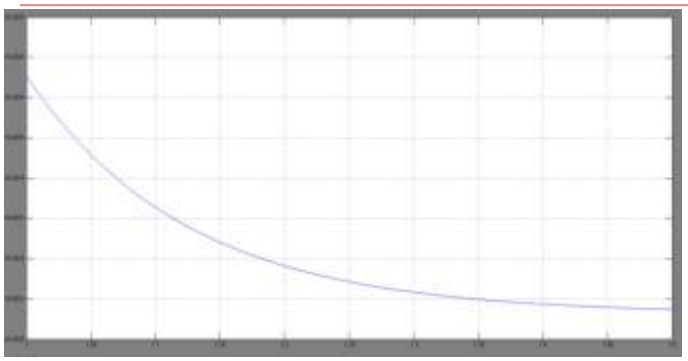

Fig.6Output Voltage of the converter

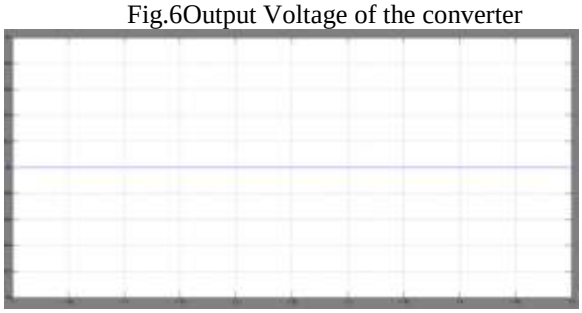

Fig.7 Input Dc Voltage

By using another IEEE paper parameters we can Compare the Standard Results.

VI. CONCLUSION

In our Paper proposed converter is implemented in the software from the output voltage and current we canshow the high step up conversion.our proposed converter is use in high output voltage and it can be use for the PV panel and any renewable energy sources.We use the PWM scheme reduces the currents.

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