

## A High Gain Input-Parallel Output-Series Dc/Dc Converter with Dual Coupled Inductors

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### Abstract

This project, along with the voltage multiplier chain with dual coil output to the boost converter provides a novel parallel input. On the one hand, and to take part in the input current and to reduce input current ripple in the two coils in parallel with the primary windings connected. On the other hand, it is proposed to change, and a series of interleaved output capacitors profit profitable high-voltage, low output voltage ripple, low pressure switch is connected with trying gets. In addition, the two sides increase connected to the secondary coil of the two primary currents parallel to increase the voltage balance between the productive diode and capacitor is coupled in series. In addition, activation key to the current zero level are being driven and connected inductors reasonable inductance leakage diodes to reduce the problem of reverse recovery.

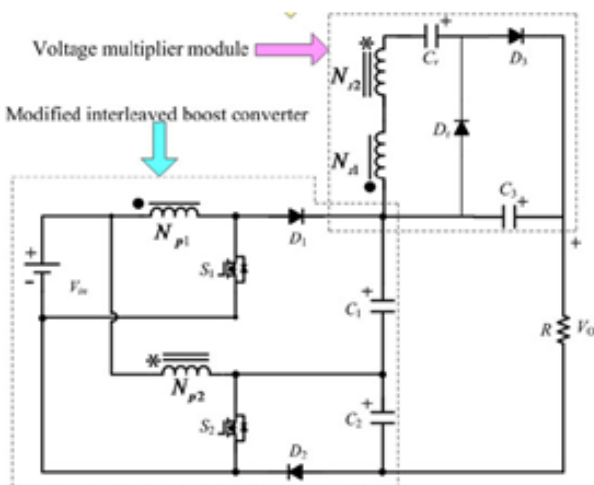


Fig: Circuit Diagram

### 1. INTRODUCTION:

Basic sense voltage can be changed to provide increased, with a very high duty ratio is not final. In practice, power, inductor and capacitor component of parasitic elements is more limited effort. In addition, very high cycle duties of running the opposite direction to recover increases conduction losses, dual LED rectifier current and big waves that can induce serious problem. On the other hand, usually in a high output voltage and high energy conversion large current input, low voltage master key after the stress voltage can not resist a little special with device power rating and diode, respectively output In switching voltage is equal to traditional push. Many topology to increase high-voltage step-up boost Traditional alternatives offered on the basis of a visit. The paper output batch of high steps and a series of high-energy processes with double coil side is proposing to change the input parallel. This configuration will benefit from high-voltage, low output voltage ripple, and stress the key advantages of low voltage across the power gets. In addition, Converter Integrated inductors reasonable inductance leakage diodes key problem of reverse recovery current of the current active zero level and have been able to overcome.

### Topology And Operation Principle Of The presented Converter:

Etymologically topology proposed in image processing. 1. This circuit can be divided into two parts as is. This area batch interleaved name changes and modifications are A capacitor and diode technology side inductor using a voltage multiplier. Batch convert, the basic topology is shown in FIG. 1

(a) and (b) binary output of the rail link is put on negative capital performance in the same direction, which is another batch version. Tin. So-called modified interleaved boost 1C) changes, taken from two basic feeling invest in series and in parallel outputs of a composition. Therefore, interleaved control based on several key part: 1) Traditional efforts to boost interleaved dual function can gain access to. 2) because the series connected interleaved low ripple output voltage capacitors. And 3) low voltage switching confirmation. However, the primary inductors windings as well as energy storage and filter job, as that shown in the image separately as a separate amendment interleaved boost converter has been replaced with double coil . (1) d. Coil attached to the two secondary windings are all trying to increase output of modified to achieve changes that are stacked on unity effort multiplier is coupled in series. Fortunately, this connection is useful for the balance of the primary side currents. Tip "\*" and "•" signs of coupling coils. It's displayed in the equivalent transformer circuit is transformer circuit is reflected Fig.2,where:

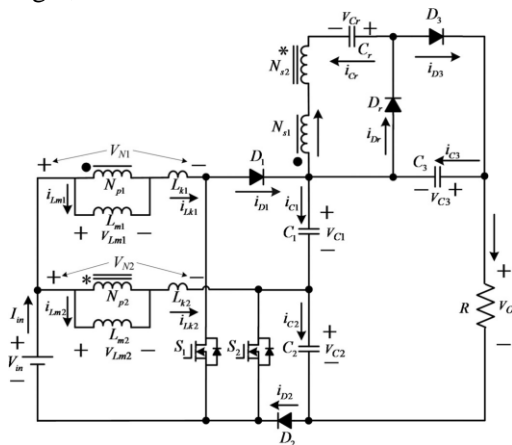


FIG 2:

- 1)  $L_{m1}, L_{m2}$ : magnetizing inductances;
- 2)  $L_{k1}, L_{k2}$ : leakage inductances;
- 3)  $C_1, C_2, C_3$ : output and clamp capacitors;
- 4)  $S_1, S_2$ : main switches;

- 5)  $D_1, D_2$ : clamp diodes;
- 6)  $D_r, C_r$ : regenerative diode and capacitor;
- 7)  $D_3$ : output diode;
- 8)  $N$ : turns ratio of  $N_s/N_p$ ;
- 9)  $V_{N1}, V_{N2}$ : the voltage on the primary sides of coupled inductors.

Fig. 3 shows the theoretical waveforms when the converter is operated in continuous conduction mode (CCM). The duty cycles of the power switches are interleaved with  $180^\circ$  phase shift, and the duty cycles are greater than 0.5. That is to say, the two switches can only be in one of three states ( $S_1$ : ON,  $S_2$ : ON;  $S_1$ : ON,  $S_2$ : OFF;  $S_1$ : OFF,  $S_2$ : ON), which ensures the normal transmission of energy from the coupled inductor's primary side to the secondary one. The operating stages can be found in

**1) First stage:  $[t_0-t_1]$ :** At  $t = t_0$ , Power switch while still turn  $S_2$ , because of leakage inductance  $L_1$  zero current switching (ZCS) is started with  $S_1$  diodes  $D_1, D_2$ , and  $D_r$  is running off, and output only led bilateral  $D_3$ . The problem of reverse recovery diodes alleviates, which include  $L_{k1}$  leak and  $L_{k2}$ , diode  $D_3$  is output in the current falling rate control. The current through the diode  $D_3$  drops to zero when the phase ends.

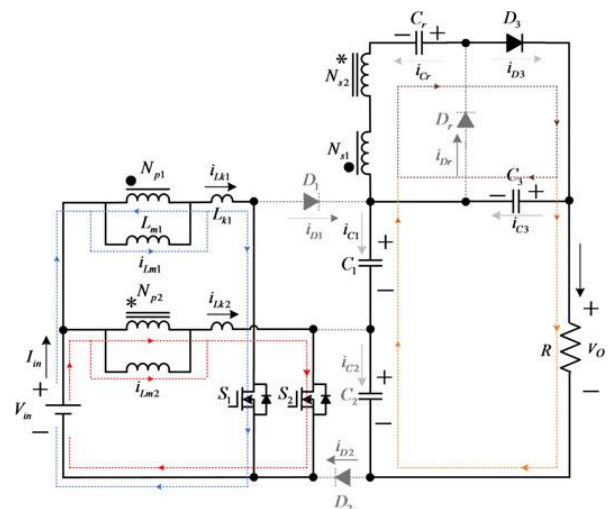


FIG : FIRST STAGE

2) **Second stage:**  $[t_1-t_2]$ : As shown in the image during this period, both the power switch,  $S_1$  and  $S_2$  is enabled. 5, all of the diodes are reverse-biased. The magnetic  $LM_1$  and  $LM_2$  and is charged with writing and  $L_{k2}$   $L_{k1}$  source leaked to the input voltage  $V_{in}$ . They are running off key  $S_2$ , this term,  $T_2$  ends at the moment.

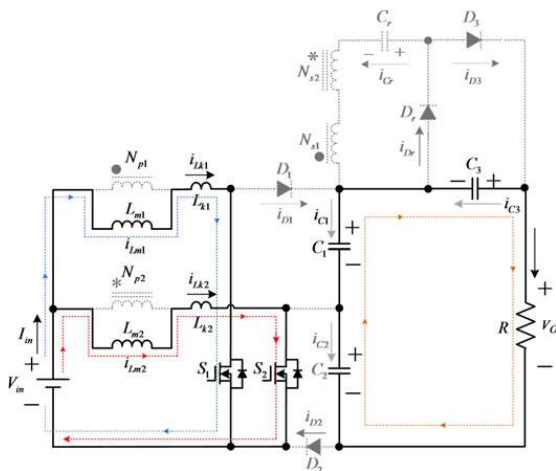


FIG : SECOND STAGE

3) **Third stage:**  $[t_2-t_3]$ : At  $t = t_2$  Diode  $D_2$  and  $r$  is running off the  $S_2$ . This image has been introduced in the current flow path. 6. storing energy, magnetization  $LM_2$  and charging capacitor chrome  $D_r$  diode transfer of the secondary side, and  $L_{k1}$  and  $L_{k2}$  capacitor leakage and by  $D_r$  chrome diode current. Input voltage source, and by bilateral  $D_2$  LED capacitor  $C_2$  includes magnetization  $LM_2$  and leak inductance energy release  $L_{k2}$ .

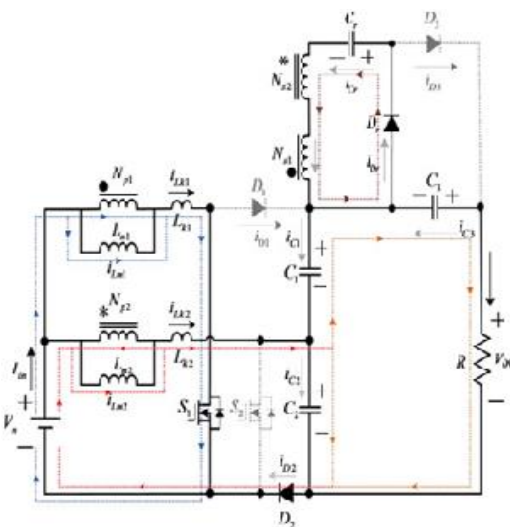


FIG : THIRD STAGE

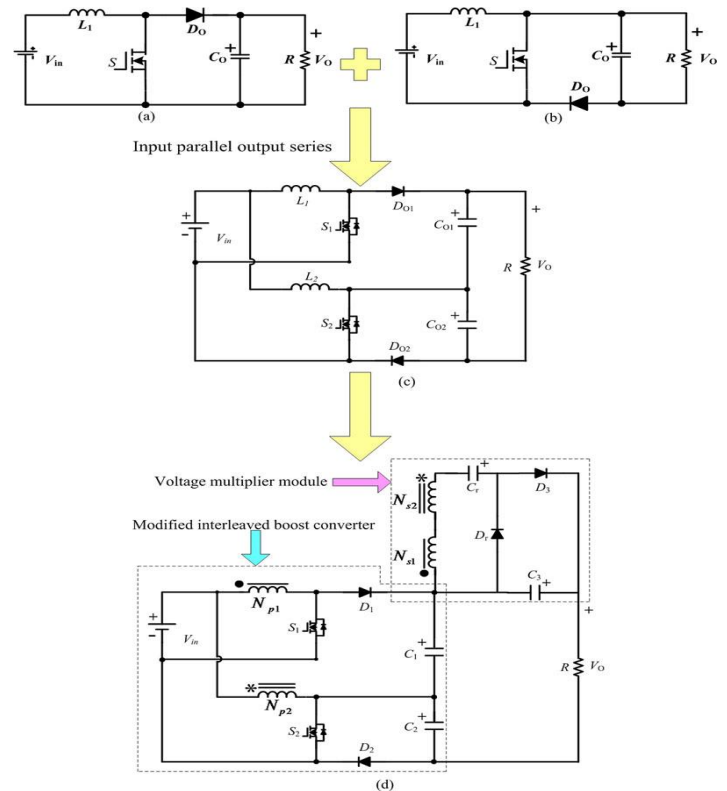


FIG 3: Design

### RELATED WORK:

#### A. Voltage and Current Stress Analysis

Part attempt to simplify the analysis of stress, leak inductance inductor and capacitors and voltage ripples ignored. Pressure-voltage power key  $S_1$  and  $S_2$  from  $V_{S1}$  - stress =  $V_{S2}$  - stress =  $V_{in}$

$$1 - D = \frac{V_{O2}}{V_{O1}}(1 + N)$$

In the equation above with at least RDS- low-voltage semiconductor field effect transistors oxide- metal Classified plug and costs of the proposal to limit the damage that can be adopted for converting confirm that. The relationship between stress and the common voltage switch turns ratio of the coil are plotted.

#### B. Current Sharing Performance

Analysis of the performance of current sharing to ease, all phases II, III has been considered the sixth and seventh. The switch  $S_1$ , the average current diode  $D_1$

is equal to zero. However, D1, which passes the current average, S1 key stop running as a power is equal to the average LK1 stream.

### C. Key Performance Comparison

The proposed changes Tool Show, the first table is an increase in the voltage, and reveals a number of essential elements, and semiconductor stress transfer proposal and other similar converters common voltages. This communication is a high-step process of change and high energy will be a candidate. One is forced to change, to see all that, and they are effective transition feet, lower key than the voltage of the voltage can increase. The proposed change in the amount of diodes used and is lower than on the secondary windings

### CONCLUSION

Low input voltage and high energy step changes, this paper successfully developed and series' inductor production volumes and parallel input techniques as high-voltage disidisi Converter has been achieved. And to explore the benefits of the proposed changes is the main theory, a stable condition of the operating principles, and the performance of the main circuit wave is described. The following are some important aspects of the changes proposed: 1) it is receiving excessive voltage increase, and in turn ratio of working in harsh and duty cycle can be avoided; 2) The main key pressure voltage output voltage, which is a quarter of that, are very low, 3) automatically input current can be shared with each stage and low ripple investment currents are obtained; Under  $N = 1$  4) ZCS damage major change has been so reduced that can be turned into the main switch. And 5) leakage inductance diodes current is controlled in the fall, so that recovery diode solve the opposite problem everyday. At the same time, a major weakness of each switch duty cycle  $180^\circ$  phase shift control of interleaved with at least 50%.

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