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Utilizing a three.winding transformer and soft switching, a high step-up DC-DC converter for photovoltaic systems

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Abstract

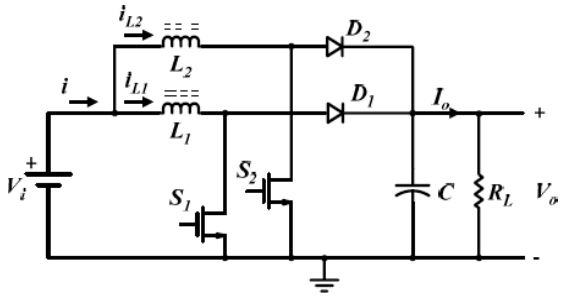
. The recommended architecture includes a lift converter with properly connected inductors to improve voltage gain advantage. It has advantages such as continuous input current, high levels of efficiency, three-winding coupled inductors typically used to increase the amount of voltage gain, and a technique known as soft switching is being used for the purpose of reducing losses in the diode and lowering the voltage stress at the switch. It also aids in the absence of the problem of reverse recovery diodes. These coupled-inductor boost converters have already received a great deal of consideration and are widely recognized as the finest solution in the situation of

Introduction

Spinning electrical motors that can operate at a variety of speeds[1] and resist dynamic load fluctuations are needed for the great majority of industrial applications today [2]. Due to their robust design, high durability, and ease of maintenance, induction motors (IMs) are the preferred option for industrial applications [3].

INTERLEAVED BOOST DC-DC CONVERTER

Two face interleaved boost converter



Two face interleaved boost converter

Ideal waveform of the current in the inductor L1 and L2 for interleaved boost converter operating at CCM

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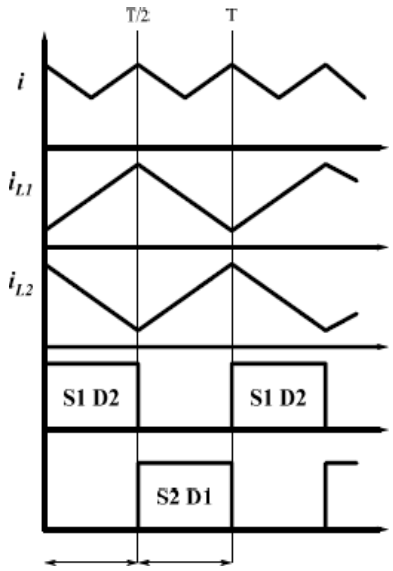

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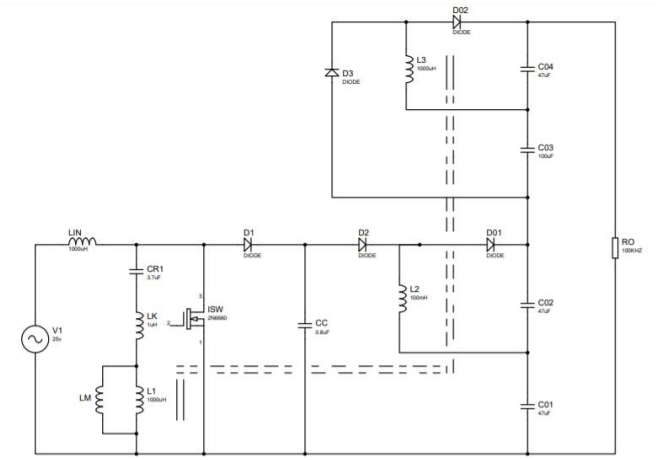
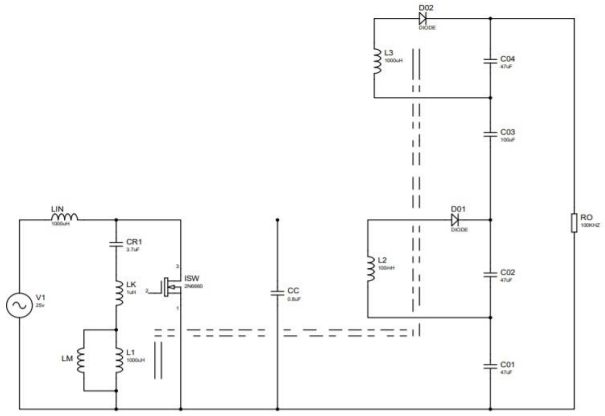
. Proposed DC-DC converter with three winding



Modes of operation



SECOND PERIOD (T1 ≤ T<T2)

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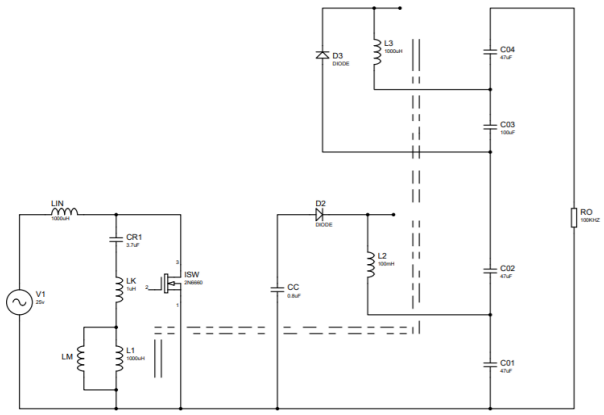
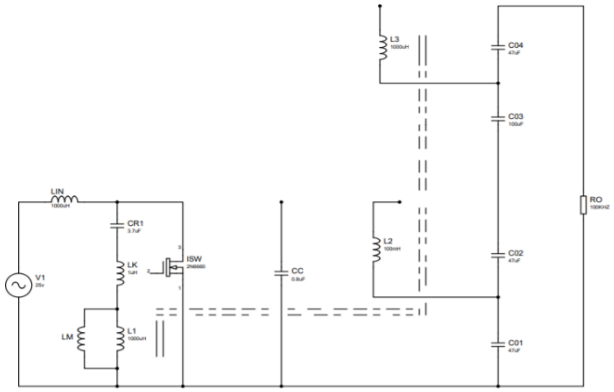
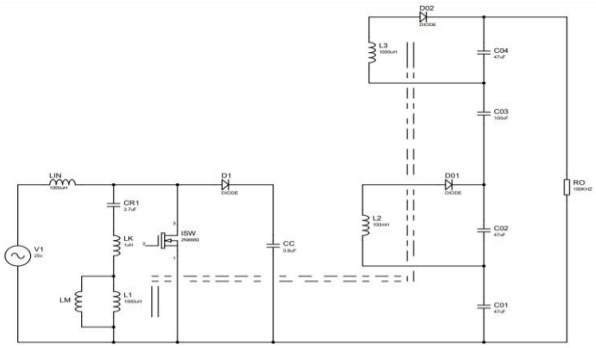


Third period of operation



Fourth period of operation



Fifth period of operation

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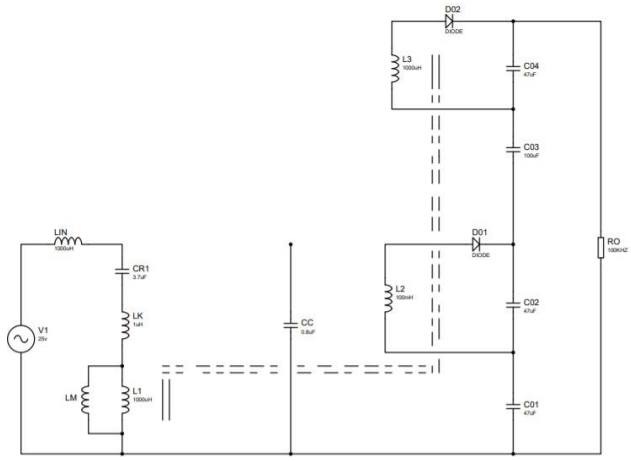
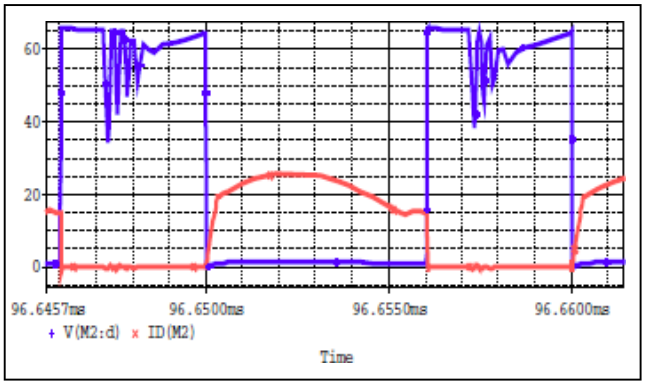
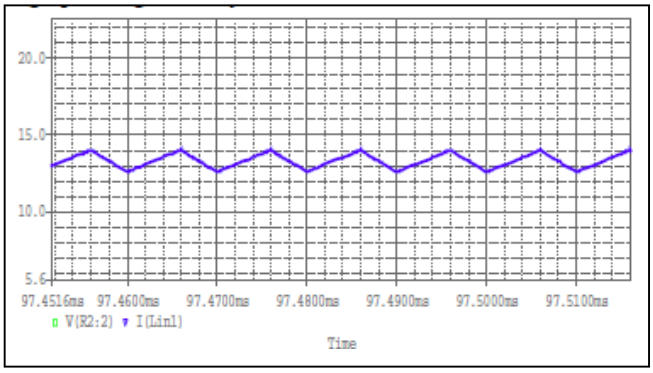


I. RESULTS AND DISCUSSION



Waveforms for converter Input Current and The Output Voltage



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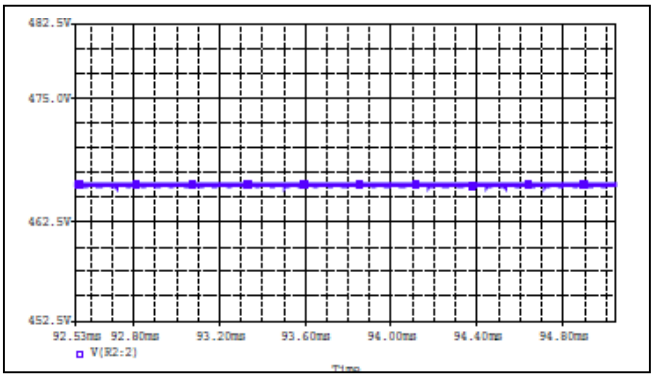
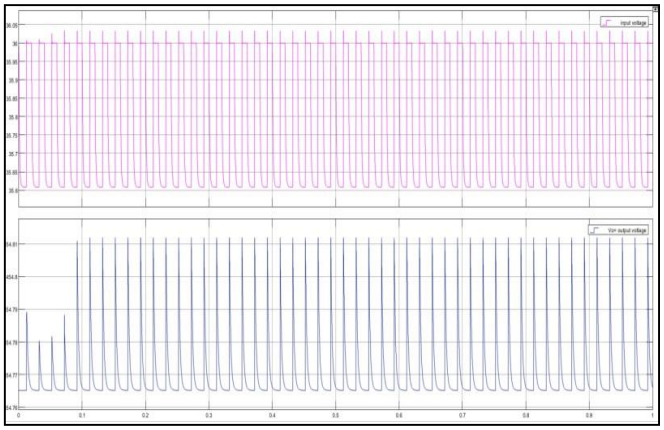


5 Waveforms for converter Input Current and The Output Voltage

Simulation result for proposed Interleaved Boost Converter



Conclusion

Additionally, our converter has a large voltage gain due to the use of linked inductors, making it appropriate for use with high voltage systems like grid-connected photovoltaic systems. There will be constant input current and less strain on the switch and diodes because only one switch is employed. Consequently, the circuit's final cost will be lower

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