

IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS . i L1 V gs2 V gs1, V gs3 V gs5, V gs6 V gs4, V gs7 i L2 V cr2 V cr1 i cr1 i s1 T s DT s DT s 180 0 V c1 t 0 t 1 t 2 t 3 t 4 t 5 t 6 t 7 t 8 t 9 t 11 i ...

In this study, a coupled-inductor-based SIMO step-down converter utilizes two power switches with the properties of voltage clamping for the middle-voltage switch, and soft switching for all power switches due to the appropriate choice of the corresponding device specifications. This study mainly investigates a high-efficiency single-input multiple-output (SIMO) step-down ...

Coupled inductor is employed which eliminates current ripples in input/output of converter. So Cuk converters are interfaced with energy storage system [7] in Fig. 3(c) boost and buck configuration that are in series with energy storage capacitor which allows for both higher and lower output voltages [14].

using coupled inductor, which can effectively decrease the output voltage and the inductor current ripples [19]. An ultrahigh step-down converter can be realised by combining a coupled inductor and an energy transferring storage capacitor, which can effectively lower the output voltage by an appropriate control duty cycle [20].

This review further detailed that a coupled inductor, with each winding under active control, is able to distribute or channelize the energy stored in the common magnetic ...

Although the transformer typically consists of two coupled inductors--see Fig. 12.1--its function is principally different from that of the familiar inductance. While the inductance is an energy-storage (and energy-release) circuit element, the ideal transformer, as a new circuit element, never stores any instantaneous energy. It does not ...

Mode 1 ($t_0 \leq t < t_1$): In this initial mode, the power switch S is turned on, allowing the inductor L_{in} to store energy from the input voltage source V_{in} . During this phase, diodes D_1 , D_2 , and ...

technology for renewable energy systems including the battery storage system, PV farm and electrical vehicle charge station. This thesis is focused on the study of three-level DC/DC converter ... coupling inductors, both inductor current ripple and output current ripple are largely reduced by interleaving with inverse-coupled inductors.

In this study, a coupled inductor (CI)-based high step-up DC-DC converter is presented. The proposed topology is developed from a primitive quadratic boost converter (QBC) structure. A two-phase interleaved QBC ...

Coupled inductor energy storage push down

Adoption of coupled inductors enables the presented converter not only to provide a high conversion ratio, but also to suppress the transient surge voltage via the release of the energy stored in ...

Soft switching methods increase efficiency in DC-DC converters and increase the reliability and lifespan of devices by relieving stress on components. This paper proposes a method for soft ...

Coupled inductors and flyback transformers both use cores to store energy received from a winding and then transfer that energy to the other winding. For both transformers and coupled inductors, the efficacy of the winding coupling, expressed as coupling coefficient k , depends on the core material properties as well as the physical arrangement ...

A high conversion gain, isolated bidirectional converter for energy storage system is presented. Two coupled inductors stored energy and reduced the current ripple in low ...

battery to the coupled inductor. Energy is stored in the magnetizing inductance of the coupled inductor and the capacitor C_2 through the secondary winding of the coupled inductor and the capacitor C_1 . The body diode D_3 is forward biased due to the induced voltage in the coupled inductor. In Interval II, current through D

The leakage energies of the prime and the coupled-inductors can be recycled using the new passive clamped circuit and the captured energy can be then transferred to the load side alongside with ...

the flux in the core of the coupled-inductor increases as does the energy stored. Unlike the flyback converter [4], the coupled-inductor circuit's energy is provided to the load R_1 during the on-time of Q_1 . The energy stored is the combined energy storage of ...

In this paper, an isolated high efficiency, high step-down DC-DC converter for ultracapacitor charger applications is presented. In the proposed converter, by utilizing the structure of asymmetrical half-bridge that combined the current-doubler synchronous rectifier and the technique of coupled inductors to achieve high step-down. The step-down conversion ratio ...

Heat pumps (HPs) have become pivotal for heating and cooling applications, serving as sustainable energy solutions. Coupled with renewable energy sources (RES) to run the compressor, which is the major energy-consuming component, they contribute to eco-conscious practices. Notably, their adaptability to be supplied by either alternating (AC) or direct (DC) ...

a compact lateral coupled inductor is designed and used for a two-phase interleaved buck module in [17]. To achieve high power density and high step-down conversion ratio an IBC is designed by a three winding coupled inductor in [18]. A four-phase inverse coupled-inductor is ...

pling inductors between phases. The coupling fundamentally al-ters the trade-offs between ripple current, loss,

energy storage, and transient response, enabling improvements in one or more ...

A soft-switching bidirectional dc-dc converter (BDC) with a coupled-inductor and a voltage doubler cell is proposed for high step-up/step-down voltage conversion applications. A dual-active half-bridge (DAHB) converter is integrated into a conventional buck-boost BDC to extend the voltage gain dramatically and decrease switch voltage stresses ...

A high conversion gain, isolated bidirectional converter for energy storage system is presented. Two coupled inductors stored energy and reduced the current ripple in low-voltage side. Two coupled inductors are combined with the transformer can increase the voltage conversion ratio and achieve galvanic isolation.

In this paper, a novel high-efficiency bidirectional isolated DC-DC converter that can be applied to an energy storage system for battery charging and discharging is proposed. By integrating a coupled inductor and switched-capacitor voltage doubler, the proposed converter can achieve isolation and bidirectional power flow. The proposed topology comprises five ...

In this paper, a novel bidirectional boost/buck converter with coupled inductor is designed and implemented and the switching loss and reverse recovery problems are reduced, thereby improving converter efficiency. In this paper, a novel bidirectional boost/buck converter with coupled inductor is designed and implemented. When batteries release energy to a DC ...

Corpus ID: 17235220; A push-pull converter based bidirectional DC-DC interface for energy storage systems @article{Hiraki2009APC, title={A push-pull converter based bidirectional DC-DC interface for energy storage systems}, author={Eiji Hiraki and Kazumasa Hirao and Toshihiko Tanaka and Tomokazu Mishima}, journal={2009 13th European Conference on Power ...

This paper presents a novel bidirectional DC-DC converter, equipped with a three-winding coupled inductor, that can be applied to high-voltage, bidirectional DC-DC energy conversion and meet battery charging and discharging requirements. The architecture consists of a semi-Z-source converter and a forward-flyback converter featuring a three-winding coupled ...

proach employed switched capacitors and coupled inductors for high voltage conversion ratios and reduced voltage stress [17], [18]. In a recent work [19], a dual coupled inductor-based flyback energy conversion circuit achieved high voltage step-up/down ratios and efficiency. An active switch-based ca-

M. Muthukumaran, M. Pandiselvi, M. Jansirani, K. Alagumeena, 2019, High Step-Up/Step-Down Soft-Switching Bidirectional DC-DC Converter with Coupled-Inductor and Voltage Matching Control for Energy Storage Systems, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) ICONEEEE - 2k19 (Volume 7 - Issue ...

Coupled inductor energy storage push down

Mutually coupled inductors. Coupling coefficient. Power and energy of mutually coupled inductors. Analysis of circuits with mutually coupled inductor. 6.1. Equivalent circuits of mutually coupled inductors As was already mentioned in the second topic, when the magnetic field of one coil reaches a second one the two inductors are mutually ...

In this study, a coupled inductor (CI)-based high step-up DC-DC converter is presented. The proposed topology is developed from a primitive quadratic boost converter (QBC) structure. A two-phase interleaved QBC structure is obtained by employing multi-winding CIs instead of discrete inductors as the energy storage magnetic element.

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