

Abstract: The abstract of this paper to design and implementation of bi-directional dc-dc converter for energy storage system. In upcoming generation, the global energy level may increase 2% per year. The conventional electrical power generation ...

This paper presents a novel 400 to 12 V isolated bidirectional dc-dc converter based on a phase-shift-controlled-modified dual-active-bridge power stage, which has promising performance for low-voltage high-current applications. This paper presents a novel 400 to 12 V isolated bidirectional dc-dc converter based on a phase-shift-controlled-modified dual-active ...

The main technical features that distinguish the next generation of medium voltage dc integrated power systems (MVDC-IPS) from the current ones are the 10 kV voltage level and the bi-directional energy storage system. The bi-directional energy storage converter is faced with the problems of voltage mismatch due to the wide range of voltage variations of the energy ...

The bi-directional energy storage converter is faced with the problems of voltage mismatch due to the wide range of voltage variations of the energy storage device and the exhaustive use of energy from the low voltage storage device.

In order to reduce the current ripple and improve the power density of the system, the multiple structure design is generally adopted by the traditional bidirectional DC/DC converter. However, the fixed multiplicity design can't make the DC/DC power converter always output the smallest current ripple under different duty ratios. Through this research, it is found ...

Bidirectional DC/DC converters are widely adopted in new energy power generation systems. Because of the low conversion efficiency and non-isolation for conventional, bidirectional DC/DC converters in the photovoltaic energy storage complementary system, this paper proposes a bidirectional isolation LLC converter topology, with compensating ...

A bidirectional inverter is an electrical device that can convert direct current (DC) to alternating current (AC) and vice versa. This dual functionality allows it to facilitate energy flow in both directions, making it a vital component in energy storage systems like flywheel energy storage, where it enables efficient charging and discharging of the storage medium.

This paper presents a new control method for a bidirectional DC-DC LLC resonant topology converter. The proposed converter can be applied to power the conversion between an energy storage system and a DC bus in a DC microgrid or bidirectional power flow conversion between vehicle-to-grid (V2G) behavior and

grid-to-vehicle (G2V) behavior. ...

1 INTRODUCTION. Energy is recognised as the essence of humanity as it directly affects the economy, wealth and prosperity of a society. Fossil fuels, coal, oil and natural gas can be considered as the major energy sources since almost 85% of the energy in use is supplied by these sources [] crease in the energy demand due to industrial development and ...

braking, battery charging, energy storage and driving performance when several sources are employed. Redundancy is avoided in Fig. 1d, since only two power converters are required in a system composed of batteries and SCs to drive one IM. This configuration is adopted in this work, which is focused on the use of a dc-dc bidirectional two ...

Aiming at the energy inconsistency of each battery during the use of lithium-ion batteries (LIBs), a bidirectional active equalization topology of lithium battery packs based on energy transfer was constructed, and a bivariate equalization control strategy of adjacent SOC difference and voltage is proposed according to the corresponding relationship between open ...

The energy storage system allows bidirectional power transfer between three-phase AC voltage side and energy storage device through the bidirectional AC-DC converter. Hence, the bidirectional AC-DC converter needs to be operated in two modes, which are specified as rectifier mode and inverter mode.

Renewable energy-based direct current microgrids are becoming popular due to their higher energy efficiency than AC microgrids. Energy storage system (ESS) helps to stabilise the system against the instability caused by stochastic nature of the renewable sources as well as demand variation within a microgrid.

Abstract--In high-voltage bus-based energy storage systems, an isolated bidirectional dc/dc converter is required to link the low voltage energy storage unit and the high-voltage bus. This paper proposes a series resonant dc/dc converter for this specific application. In the proposed converter, the step-up ratio is

Active clamp current fed full-bridge 2.1.2. DAB 2.1.3. Fixed frequency LLC 2.1.4. Phase shift LLC 2.2. AC/DC topologies ... (PCS) in energy storage Bi-Directional Dual Active Bridge (DAB) DC:DC Design 20 o Single phase shift modulation provides easy control loop implementation. Can be extended to dual phase shift

A novel topology of the bidirectional energy storage photovoltaic grid-connected inverter was proposed to reduce the negative impact of the photovoltaic grid-connected system on the grid caused by environmental instability. Using the proposed Inverter as a UPS power supply in case of a grid failure, storage electrical energy and regulating the energy delivered to the ...

Abstract: This article presents a 10-kW novel gallium-nitride (GaN)-based three-phase grid to 48-V battery energy storage system (BESS). The BESS utilizes a single-stage ac-dc dual-active-bridge (DAB) converter

with dual-phase-shift (DPS) and variable-frequency (VF) control. 600- and 80-V GaN power transistors, as well as planar magnetics, are used to ...

Hence, an energy storage system is necessary to use in renewable energy sources to provide a reliable power supply and make it dispatch-able on demand [2-4]. Fig. 1 shows an energy storage system which composes of a Li-ion battery bank, a bidirectional isolated DC-DC converter and a three-phase bidirectional AC-DC converter [5].

Low-temperature preheating, fast charging, and vehicle-to-grid (V2G) capabilities are important factors for the further development of electric vehicles (EVs). However, for conventional two-stage chargers, the EV charging/discharging instructions and grid instructions cannot be addressed simultaneously for specific requirements, pulse heating and ...

The dual active bridge (DAB) DC-DC converter has broad prospects for use, for example, energy-storage systems, electric vehicles, and DC distribution network. To improve the quality of bus current, researchers often cascade filter inductors to the DC port of DAB converter. If so, the system may be instable and oscillate because the converter is turned into a ...

In this paper, a GaN-based bidirectional three-level dc-dc converter is designed for high power energy storage application, the voltage stress of switches at battery side is reduced to half of the input voltage without additional capacitor, PCS of battery unit is utilized to keep the stabilization of positive bus and negative bus.

inverter with bidirectional power conversion system for Battery Energy Storage Systems (BESS). The design consists of two string inputs, each able to handle up to 10 photovoltaic (PV) panels in series and one energy storage system port that can handle battery stacks ranging from 50V to 500V. The nominal rated

The bidirectional buck-boost converter is the main part to control the energy flow of the battery and other storage components. This proposed energy storage model offers good dynamic performance and well-regulated output voltage. Commonly, for energy storage systems Li-ion batteries are used due to their high cycle time and power density.

This article presents a 10-kW novel gallium-nitride (GaN)-based three-phase grid to 48-V battery energy storage system (BESS). The BESS utilizes a single-stage ac-dc dual-active-bridge (DAB) converter with dual-phase-shift (DPS) and variable-frequency (VF) control. 600- and 80-V GaN power transistors, as well as planar magnetics, are used to achieve 96.6% ...

8 Bidirectional DC-DC Converters for Energy Storage Systems Hamid R. Karshenas 1,2, Hamid Daneshpajoo 2, Alireza Safaei 2, Praveen Jain 2 and Alireza Bakhshai 2 1Department of Elec. & Computer Eng., Queen's University, Kingston, 2Isfahan University of Tech., Isfahan, 1Canada 2Iran 1. Introduction Bidirectional dc-dc converters (BDC) have recently received a lot of ...

4 · A bidirectional DC-DC converter is presented as a means of achieving extremely high voltage energy storage systems (ESSs) for a DC bus or supply of electricity in power applications. This paper presents a novel dual-active-bridge (DAB) bidirectional DC-DC converter power management system for hybrid electric vehicles (HEVs).

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