

What is SS-DAB based bidirectional on-board charger?

This highlights the relevance of the SS-DAB-based Bidirectional On-Board Charger in promoting the integration of electric vehicles in a manner that is both effective and friendly to the grid. The proposed SS-DAB bidirectional charger topology enhances efficiency, reducing power losses during bidirectional energy transfer.

What is a bi-directional on-board charger (OBC) based on SiC-MOSFET?

Motivated by these trends in EV technology, this paper presents an 11 kW bi-directional on-board charger (OBC) based on SiC-MOSFETs with a high efficiency of over 96% and a power density of over 1.0 kW/liter for electric vehicles.

How efficient is an 11 kW bi-directional on-board charger for electric vehicles?

This paper presents an 11 kW bi-directional on-board charger (OBC) for electric vehicles with 96% efficiency. The OBC consists of a three-phase two-level AC/DC converter and a CLLC resonant DC/DC converter with bi-directional power transfer.

What are bidirectional on-board chargers for electric vehicles?

This paper reviews about the bidirectional on-board chargers for electric vehicles. The chargers are of two types: on-board chargers and off-board chargers. The overall size, weight and cost of the onboard chargers can be reduced using integrated on-board chargers where the drive train components are used for propulsion as well as for charging.

Is a single-stage bidirectional AC-DC converter feasible for onboard battery chargers?

A single-stage bidirectional ac-dc converter feasible for onboard battery chargers IEEE J. Emerg. Sel. Top. Power. Electron., 10(3)(2021), pp. 3024-3032 Google Scholar S.Wang, H.Li, Z.Zhang, M.Li, J.Zhang, X.Ren, Q.Chen Multifunction capability of sic bidirectional portable chargers for electric vehicles IEEE J. Emerg. Sel. Top. Power.

Can a bidirectional converter be used as a battery charger?

Bidirectional converter as a battery charger . A low-cost digital controlled charger is proposed for plug-in EVs, which utilizes the available main traction and auxiliary motors and associated power electronic drive of HEV to form the charger circuit.

In the present scenario of the fossil fuel crisis, a shift from conventional transportation to electric vehicles (EVs) is the goal, and it is necessary to make it economically feasible. Developing an efficient charger with mid-range power level may successfully resolve this problem. In this direction, an EV charging infrastructure has been proposed to achieve grid-to ...

# Bidirectional on-board power storage

Bi-directional charging system and control method thereof Citations (15) \* Cited by examiner, + Cited by third party ... on-board power supply device, and electric automobile ... Multiple bidirectional converters for charging and discharging of energy storage units US20180134175A1 (en) \* 2016-11-16: 2018-05-17: Hyundai Autron Co., Ltd. ...

block diagram for bidirectional on-board charger topology, which facilitates the bidirectional flow of power from utility to energy storage and back to utility in grid-connected system. Different topologies of bidirectional AC/DC converters have been reviewed and the circuit complexity and the performance of these converters are compared in ...

This paper proposed a SiC bidirectional LLC on-board charger architecture to achieve high efficiency and high power density. The first stage is an interleaved bridgeless totem pole PFC to achieve unity power factor. ... The LLC converter is a key component of the bidirectional power converter for mobile energy storage vehicles (MESV), it is ...

In the present scenario of the fossil fuel crisis, a shift from conventional transportation to electric vehicles (EVs) is the goal, and it is necessary to make it economically feasible. Developing an efficient charger ...

To solve the problems of large switching losses and the need for large-capacity electrolytic capacitances in three-phase DC/AC on-board chargers for vehicle-to-grid (V2G) ...

Abstract: This paper presents a new single-stage isolated bidirectional stacked switches-based CLLC resonant converter with reduced storage capacitances for High Voltage (HV) Electric Vehicle (EV) systems. In the proposed converter, two closed-loop ripple reduction control units implemented on both rectifier and inverter modes of the converter to minimize the output and ...

An innovative single-stage integrated on-board charger is proposed for on-board chargers, which reduces size, weight and number of components of power electronics circuits ...

During need situations, there is a bidirectional current flow between the battery and the charging point inlet, and between the motor and battery. Bidirectional power flow is necessary for electric vehicles to maintain grid stability during times of peak demand where ...

A 10 kW rated single-stage bi-directional series-resonant DAB AC/DC converter based on GaN transistors, as depicted in Figure 15 b, has been proposed for low voltage, i.e., ...

The wide-scale adoption and accelerated growth of electric vehicle (EV) use and increasing demand for faster charging necessitate the research and development of power electronic converters to achieve high-power, compact, and reliable EV charging solutions. Although the fast charging concept is often associated with off-board DC chargers, the ...

# Bidirectional on-board power storage

This type of charger is capable to charge the battery at anywhere in wide voltage range [9,10]. Presently, bidirectional integrated on-board battery chargers [11] are now developed, wherein ...

Bidirectional charging and energy storage device (1) of a vehicle (2), preferably an electric vehicle, with a vehicle battery (3) connected to it and a preferably central control unit (4), the charging and energy storage device (1) being designed and provided for this purpose in order to store energy from an external energy source (6) by means of a pole plug (5) and to provide an energy ...

In recent years, the trend in power electronics has been toward high-efficiency and high-power-density converters. Additionally, this trend has allowed electric vehicles to ...

The bidirectional charging technology has attracted much attention, and Dilong will launch a 22kW high-power bidirectional charger that is compatible with national, European, and American standards! New energy vehicles have become one of the current trends in social development, and as an important technology in the ch

This paper deals with developing and implementing a bidirectional galvanically isolated on-board charger of a high-power density. The power density of the new charger was 4 kW/kg and 2.46 kW/dm<sup>3</sup>, and the maximum efficiency was 96.4% at 3.4 kW. Due to the requirement to achieve a high-power density, a single-stage inverter topology was used. ...

DOI: 10.1016/j.prime.2024.100613 Corpus ID: 269959577; Performance of Bidirectional ON-Board Charger in Electric Vehicle: A Review @article{Sethuraman2024PerformanceOB, title={Performance of Bidirectional ON-Board Charger in Electric Vehicle: A Review}, author={Rajesh Sethuraman and Mageshvaran Rudhramoorthy}, journal={e-Prime - Advances ...

The design and development of a 550 W non-isolated single-phase two-stage level-1 bidirectional on-board battery charger (OBC) for electric vehicles (EVs) have been ...

The DC-link voltage is then lower than the peak grid voltage so that the buck type DC-AC converters cannot be grid-tied directly, which causes the LLC reverse operation difficult in bidirectional charging applications. This paper proposed a SiC bidirectional LLC on-board charger architecture to achieve high efficiency and high power density.

The design and development of a 550 W non-isolated single-phase two-stage level-1 bidirectional on-board battery charger (OBC) for electric vehicles (EVs) have been discussed in this ...

This article proposed an off-board bidirectional battery charger for electric vehicles (EVs) that have been designed to perform various modes of operation of EVs like grid-to-vehicle (G2V) and vehicle-to-grid (V2G) while improving the grid power quality (PQ). During the charging process, the charger operates in the G2V mode. In this mode, power flows from the ...

The battery charging power electronics interface of an electric vehicle (EV) must be capable of bidirectional power flow to enable both grid-to-vehicle (G2V) and vehicle-to-grid (V2G) operations.

The DC-DC converter will step up or step down the power from the storage system as required by the motor. During charging mode the vehicle battery, which forms a part of the energy storage system, will be charged from the utility through a rectifier and a DC-DC converter. ... 4.2 Control methods of bidirectional on-board chargers The power ...

This charger is capable of providing reactive power both in the vehicle to grid (V2G) and grid to vehicle (G2V) mode with some limitation on the amount of reactive power generated for operation in the linear modulation region of the converter. This paper presents the design, control and simulation of a bidirectional on-board charger for battery electric vehicles ...

An isolated bidirectional resonant converter with digital control for the energy transferring between the DC bus and the EV battery can be reduced and achieve soft switching to improve the efficiency. An isolated bidirectional resonant converter with digital control is presented in this paper for the energy transferring between the DC bus and the EV battery. The main ...

board chargers o Power conversion ... (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 modulation for better range of ZVS and efficiency. o SiC devices offer best in class power density and efficiency

Usage of traditional combustion engines and their emissions possesses a great influence on global warming and opens the way for rapid manufacturing of battery-powered electric vehicles. This article lightens a unidirectional on-board single-stage charger that transfers the power from AC mains to the battery. A single-phase non-isolated modified bridgeless ...

EVs could serve as mobile storage and provide grid support during peak hours. In this application, a bi-directional on-board battery charger (OBC) would provide the battery to the grid interface. The choice of the OBC's power topology and control scheme will be crucial for successful EV to grid integration [2, 3].

INDEX TERMS Bidirectional On-board Charger, DC/DC Converter, Electric Vehicle, Power Factor Correction Converter, Single-stage Topology, Wide Bandgap Devices. I. INTRODUCTION

To achieve this, on-board power systems are designed for higher-frequency switching to reduce energy losses. Bidirectional charging and increased auxiliary power capability: Bidirectional charging allows EVs to not only charge the on-board battery from the grid but to serve as an energy source capable of powering various electrical loads.



## Bidirectional on-board power storage

This paper presents a SiC MOSFET-based 6.6 kW bi-directional Electric Vehicle (EV) on-board charger (OBC), with high efficiency and high power density. A digital controlled prototype with a switching frequency of 67kHz for CCM totem pole PFC, and 150kHz-300kHz for a CLLC resonant converter is demonstrated with 54W/in<sup>3</sup> power density exceeding 96.5% in ...

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