

New Series Input Parallel Output LLC DC/DC Converter with the Input Voltage Balancing Capacitor for the Electric System of Electric Vehicles

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Abstract : This paper presents a new parallel output LLC DC/DC converter for electric vehicle. The electric vehicle has two batteries. One is a high voltage battery for the powertrain of the vehicle and the other is a low voltage battery for the vehicle electric system. The low voltage is charged from the high voltage battery and the high voltage input and the high current output DC/DC converter is needed. Therefore, the new LLC converter with the input voltage compensation is proposed for the high voltage input and the low voltage output DC/DC converter. The proposed circuit has two LLC converters with the series input voltage from the battery for the powertrain and the parallel output low battery voltage for the vehicle electric system because the battery voltage for the powertrain and the electric power for the vehicle become high. Also, the input series voltage compensation capacitor is used for balancing the input current in the two LLC converters. The proposed converter has an equal electric stress of the semiconductor parts and the reactive components, high efficiency and good heat dissipation.

Keywords : electric vehicle, LLC DC/DC converter, input voltage balancing, parallel output

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