

Integrated Power Supply Resonant Transformer



AI Overview

An integrated resonant transformer combines the functions of a transformer and resonant inductor to achieve high efficiency, compact size, and soft-switching in modern power supplies. Overview Integrated resonant transformers are widely used in LLC and series-parallel resonant converters to improve efficiency and reduce the size of power supplies. By combining the transformer and resonant inductor into a single magnetic component, designers can minimize the number of discrete components, reduce parasitic losses, and achieve soft-switching conditions such as zero-voltage switching (ZVS) or zero-current switching (ZCS) across a wide load range (). Design Principles Resonant Tank Integration: In an LLC converter, the resonant tank consists of a series inductor (LS), a series capacitor (CS), and the transformer. The leakage inductance of the transformer is often used as the resonant inductor, reducing the need for a separate inductor and enabling a smaller overall converter footprint (). Magnetic Shunt and Planar Windings: To increase resonant inductance and maintain a wide input voltage range, a magnetic shunt can be integrated into planar transformer windings. This allows precise control of leakage inductance while keeping the transformer compact and efficient (). Soft-Switching Optimization: Integrated transformers are designed to support ZVS or ZCS, which reduces switching losses in power transistors. The transformer design must consider winding layout, core material, and leakage paths to ensure sinusoidal resonant currents and minimal harmonic distortion (). High-Frequency Operation: Operating at high frequencies (e.g., 1 MHz) allows the transformer and passive components to be smaller, increasing power density. High-frequency operation requires careful attention to winding losses, skin effect, and litz wire usage to minimize copper losses (). Advant...

Article Content

Power Supply Basics – Part 2: Ferroresonant and

Ferroresonant power supply systems are transformer-based power supplies that use a resonant circuit and nonlinear magnetic properties to provide

Analysis and Design of LLC Resonant High-Voltage

In the lab, a high-frequency high-voltage transformer's impedance and frequency characteristics are measured using an impedance analyzer. the

8 Best Integrated Amplifiers – Ranking at the End of 2025

We are publishing our final ranking of integrated amplifiers, compiled from models released in 2025. As usual, this selection is sorted by increasing

Analysis and Design of Novel High-Frequency Integrated Transformer

Adjusting the leakage inductance to approximate the initial design value is important for obtaining the desired output voltage range for an LLC resonant converter with an integrated

Lecture 35: Resonant Power Conversion, Part 1

1 Resonant Power Conversion In many power converter applications, one converts between dc and high-frequency sinusoidal ac (either as an intermediate or final waveform).

Design and Optimization of an Integrated Resonant Inductor With High ...

In a typical two-stage AC-DC power supply, the DC-DC stage is often constructed using a resonant converter with galvanic isolation provided by a high-frequency transformer. In such

Analysis and Design of Novel High-Frequency Integrated Transformer

This study presents a new integrated transformer structure based on a winding-type transformer that allows to adjust the leakage inductance without additional devices through segments where primary

LLC and LCC Integrated Resonant transformers Archives

LLC and LCC Integrated Resonant Transformers designed for the best performance on high efficiency resonant power supplies.

Integrated Transformer for High Power Resonant Converters with SiC

B. Li, Q. Li and F. C. Lee, "High-Frequency PCB Winding Transformer With Integrated Inductors for a Bi-Directional Resonant Converter," in IEEE Transactions on Power Electronics, vol. 34, no. 7, pp. 6123

Institution of Engineering and Technology

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

Partial power LLC resonant converter with integrated transformer for ...

A partial power LLC resonant converter for a wide input range is presented in this article. The two LLC converters are both designed at the open-loop state, performing as a DC transformer (DCX) to

Three-Phase AC/DC Quasi-Single-Stage Isolated Resonant PFC

Three-Phase AC/DC Quasi-Single-Stage Isolated Resonant PFC Converter With Integrated Transformer Abstract: Converters that produce an isolated dc output from a three-phase

Design and Optimization of an Integrated Resonant

In a typical two-stage AC-DC power supply, the DC-DC stage is often constructed using a resonant converter with galvanic isolation provided by a high

Designing 2 kW LLC Transformer with Integrated

The article outlines the process of designing an LLC transformer with integrated resonant inductance for high-density power supplies. It highlights

Resonant power supply

With an effectively contained degree of circuit complexity, they allow the realisation of power supplies with 90-96% efficiency, (which can be improved further using synchronous rectifiers instead of output

Double B-type magnetic integrated transformer based

Magnetic integration technology is an effective way to reduce the volume of converters. Currently, the magnetic integrated transformer based on

Understanding LLC Operation (Part I): Power Switches

LLC resonant converters are ideal for power supply applications with delicate systems (i.e. high-end consumer electronics), or power-demanding operations

High Frequency High Power Integrated Transformer Design for

In this paper, a new current sharing method for paralleled Litz wire transformers is introduced. Using this method, the transformer can stand much higher current without increasing the cost or volume. And

High Performance Isolated Gate-Driver Power Supply

The proposed resonant converter structure features an integrated planar transformer designed with a specific layer disposition to ensure low inter

The Structure and Modelling Method of Integrated LLC Transformer

The integrated magnetics technology is famous both in academic and industry applications to achieve low profile and high power density of the power supply. The integrated transformer is widely used in

High Power Density, High-Voltage Parallel Resonant

This configuration of the resonant capacitor bank is a major cause of the deterioration of the power density of the resonant converter in a high-voltage

Combined Inductor and Transformer Design for Resonant Converters

G. E. Gamache and C. R. Sullivan, "Resonant converter transformer design and optimization," in Energy Conversion Congress and Exposition (ECCE), 2011 IEEE, 2011, pp. 590-597.

Analytic Design Method for (Integrated-) Transformers of Resonant ...

Abstract- The series-parallel resonant converter and its magnetic components are analysed by fundamental frequency techniques. The proposed method allows an easy design of the integrated

High Frequency LLC Resonant Converter with Magnetic Shunt

LLC resonant converter has been proved as an excellent candidate to achieve this goal. To achieve smaller size of passive components, the resonant inductor in the LLC converter is usually integrated

Design of a PQ Core Magnetic Integrated Transformer for a 15-kW

In data center power systems, three-phase LLC resonant converters are widely adopted due to their advantages of electrical isolation and high power density. However, the conventional use of multiple

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