



Resonant capacitor in high frequency power supply

A novel constant power charging strategy is proposed for LCC resonant capacitor charging power supply (CCPS) in this paper, which combines the advantages of discontinuous current mode (DCM) and ...

o When output power increases, classical and simpler structures become too inefficient. o Hard switching of power switches o Reverse recovery time of diodes o Energy stored in transformers. Why Resonant Converters? When the switch is turned on while the parasitic capacitor is charged, losses can be high (scale up with switching frequency) ->

A novel high-frequency half-bridge resonant converter is proposed which is suitable for application as a capacitor charging-power supply (CCPS). The proposed LCL-T resonant converter with clamp diodes is shown to have in-built constant current (CC) - constant voltage (CV) characteristics. Therefore, the need to sense output current and voltage, and their ...

In this paper, the working characteristics of the LC series resonant converter are studied. Based on a CCPS with charging voltage of 10kV and charging capacity of 25kVA, a constant current ...

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Due to the integration and utilization of the parasitic capacitance of the transformer, the LCC resonant converters with a capacitive output filter are widely used in high-voltage power ...

R 1 was chosen to an optimum of 470 Ω to charge the gates fast enough and to keep the power losses at a minimum. R 2 is only required to always discharge the gates to a defined state and therefore have a value of 10 k Ω . The inductance L 1 = 100 μ H is used to block the high frequency oscillations from the DC power supply. The ratio of the DC input to the AC output ...

Here, a minimum resonant capacitor design approach is proposed for the insulated-gate bipolar transistor (IGBT)-based high-power LLC resonant converter to improve its comprehensive efficiency in the electric vehicle (EV) battery charging application.

A rapid, high voltage capacitor charging power supply (CCPS) based on a third order resonant converter topology has been proposed, analyzed, and simulated using the PSpice software, and as a proof of concept, a prototype of the 6.0 kV, 6.0 A ...

Abstract: For the pulse power system using capacitor as energy storage unit, the performance of capacitor charging power supply (CCPS) determines the stability of output voltage. With the rapid progress of high-frequency and high-power devices, high-frequency converter charging power has become the



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mainstream. Among them, the LC series resonant converter is an ...

When multiple numbers of same value capacitors are used there are high chances of Anti resonance with power planes, same way when multiple numbers of different values capacitors are used there are high chances of anti resonance b/w different capacitor values. Bottom point we need is simulate complete system with whatever tools we have(can be ...

The ferrite bead is connected in series with the power supply rail and is often combined with capacitors to ground on either side of the bead. This forms a low-pass filter network, further reducing high-frequency power ...

Novel high frequency converter cum Inverter analyzed mathematically and simulated with less number of controlled switches in the converter stage of a capacitor charging power supply.

This topic provides detailed information on designing a resonant half-bridge converter that uses two inductors (LL) and a capacitor (C), known as an LLC configuration. This topic also ...

In switching power supplies, the energy stored in capacitors and inductors is managed by a high frequency power switch. Switching power supplies operate at high frequency and the capacitors and inductors are therefore small. Capacitors in resonant supplies can also large voltage swings as they resonantly transfer energy packets from the ...

these and other capacitors for high frequency applications, a useful value can be ensured by selecting a capacitor which has a self-resonant frequency above the highest frequency of interest. In general, film type capacitors are not useful in power supply decoupling applications because DECOUPLING DECOUPLING

By making the power capacitors small, the resonant frequency is increased above the audio range, however there is bad distortion at the output. The capacitors can also be made really big to push this frequency below the audible range, however this requires a massive 100F capacitor for a resonant frequency of 15.9Hz. I don't believe audio ...

In this paper, high voltage and high frequency Capacitor Charging Power Supply based on serial resonant topology is analyzed. Considering the nonlinear and parasitic parameters, the charging ...

The role of the resonant capacitor charger is to accumulate the energy needed to generate a single voltage pulse in the electric field of a capacitor bank. The charging process must have acceptable accuracy and has to be fast enough to finish in the available time (pause) between output pulses. A simple, resonant construction with two power switches was chosen ...

A Switched Capacitor Based AC/DC Resonant Converter for High Frequency AC Power Generation Cuidong



Resonant capacitor in high frequency power supply

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3.1 Modeling Based on MATLAB-Simulink. As shown in Fig. 2, the structure of the main circuit consists of 220 V AC power supply, 220 V/110 V step-down transformer, rectifier diodes, filter inductor, resonant inductor, resonant capacitor, and SCR that is anti-paralleled with a freewheeling diode and capacitor. The resonant capacitor is in series with the primary ...

A novel high-frequency half-bridge resonant converter is proposed which is suitable for application as a capacitor charging-power supply (CCPS).

A power supply specifically designed for capacitor-charging applications that uses a series-resonant circuit topology, a constant on-time/variable frequency control scheme, and zero-current switching techniques has been developed. The performance of this capacitor-charging power supply (CCPS) has been evaluated in the laboratory by charging ...

input, or from a 220 to 370 V dc bus at high efficiency. Quasi-resonant Circuit Operation The quasi-resonant Buck regulator circuit shown in Fig. 1 is applicable to high frequency power conversion systems and will be described in detail. Initial conditions are given with the switch Q open, and no current flowing from the

LCC resonant converter is widely used in high-voltage capacitor charging power supply (CCPS) due to its high efficiency and utilization of parasitic parameters.

This paper treats a new type of high power switched-capacitor-DC-DC-converter (SCDDC), which is characterized by resonant switching transitions. This drastically reduces switching losses and opens up the possibility to employ thyristors instead of turn-off power semiconductors. At the same time a larger energy can be transferred per switching ...

Fundamental Knowledge of High-Frequency Characteristics in Inductors and Capacitors - Impedance and Resonance (1) 01/24/2023. High frequency; RF Inductor; Inductor for Power Lines; Inductors; Capacitor; Ceramic Capacitor; Resistors ; INDEX. 1. Electrical behavior of a direct current circuit and an alternating current circuit connected to ideal ...

This paper describes the design, implementation and testing of a 2.0-kW high-voltage rep-rate charging power supply based on a LCC-type resonant converter operating ...

The authors propose a capacitor-voltage-clamped series-resonant converter, regulated at constant frequency by pulse-width modulation (PWM), that is suitable for an offline isolated multiple output ...



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Abstract: A novel constant power charging strategy is proposed for LCC resonant capacitor charging power supply (CCPS) in this article, which combines the advantages of discontinuous current mode (DCM) and continuous current mode (CCM) to increase the charging speed of capacitor and the utilization of input grid capacity. In order to implement the multimode ...

The capacitor charging power supply (CCPS) will charge a 100uF energy storage capacitor from 0V to 600V in 35ms exhibiting a charging power of 514.28 J/s at a repetition rate of 25 Hz. Topology selection is based on the fact that the series resonant converter with switching frequency below 50% of the resonant frequency ($f_s \leq 0.5 f_r$) act as a current source. Skip to ...

Application Guide for High Power resonant Capacitors (Conduction Cooled Capacitors) Capacitor selection The following formula is to be used to determine what capacitance value is required: $KVAR = (V^2/X_c) = V^2 \times 2\pi f \times C \times 10^{-6}$ Where KVAR= Kilovolt-ampere reactance V= Applied RMS voltage X_c = Capacitive reactance $= 1/(2\pi fC)$ C= capacitance in mF f= Operating ...

Here, a minimum resonant capacitor design approach is proposed for the insulated-gate bipolar transistor (IGBT)-based high-power LLC resonant converter to improve its comprehensive efficiency in the electric ...

Resonant Power Conversion Bill Andreyck Abstract The technique of zero voltage switching in modern power conversion is explored. Several ZVS topologies and applications, limitations of the ZVS technique, and a generalized design procedure are featured. Two design examples are presented: a 50 Watt DC/DC converter, and an off-line 300 Watt multiple output power ...

Self-resonant Frequency (SRF): A capacitor's SRF results from its resistive, capacitive, and inductive attributes, forming a resonant circuit. At the SRF, the capacitor's impedance ($|Z|$) drops to its lowest value before increasing again (Figure 5). The SRF characteristic is fundamental for higher frequency applications, particularly radio frequencies. ...

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