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Wireless power transfer on power train to charge battery

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----------**Abstract -** Wireless power transfer (WPT), wireless power transmission, wireless energy transmission, or electromagnetic power transfer is the transmission of electrical energy withoutwires. Wireless power transmission technologies use time varying electric, magnetic, orelectromagnetic fields. Wireless transmission is useful to power electrical devices where interconnecting wires are inconvenient, hazardous, or are not possible.

INTRODUCTION:

Wireless power techniques mainly fall into two categories, non-radiative and radiative. In near field or non-radiative, power is transferred by magnetic fields using inductive coupling between coils of wire, or by electric fields using capacitive coupling between metal electrodes. Inductive coupling is the most widely used wireless technology; its applications include charging handheld devices like phones and electric toothbrushes, RFID tags, and chargers for implantable medical devices like artificial cardiac pacemakers, or electric vehicles.

In far-field or radiative techniques, also called power beaming, power is transferredby beams of electromagnetic radiation, like microwaves or laser beams. These techniquescan transport energy longer distances but must be aimed at the receiver. Proposed applications for this type are solar power satellites, and wireless powered drone aircraft.

The ability to influence and motivate others is a skill that is difficult to master. But for project managers, the choice of failing to develop this skill can result in project failureand professional catastrophe. This article examines a survey--involving 115 certified project managers--looking at

how project managers perceive their ability to motivate project stakeholders and team members. In doing so, it overviews the field's literature onthe definitions of project leadership, noting the core elements of project motivation; it

identifies two styles of project leadership and two types of motivation. It looks at researchon four techniques for motivating others, techniques that include optimizing human energy, enabling autonomy, providing feedback, and providing reward and recognition. It also describes the concept of motivation from the organizational perspective and the differences between the factors affecting a project team's motivation and anorganization's motivation.

Project scope

Promotes Durability of Devices and Accessories: Remember that the technology works by powering or charging a device without electrical contact. Hence, it removes theneed for plugging a cable into a charging port. Repeated plugging and unplugging couldwear and tear the charging wires and the charging ports on the devices. This is because ittakes more time to charge a battery wirelessly than using a wired charger. Reports have it that compared to using cables, wireless charging takes 30-80% longer to fully charge adevice. Wireless charging is a very cool technology. In order to make wirelessbattery charging accessible to everyone and everywhere, a network of induction chargingstations needs to be created, with the charging plates being embedded in the road surface.Induction charging while driving is the prime option for e-mobility.

Broadly speaking, there are three types of wireless charging, according to David Green, a research manager with IHS Markit. There are charging pads that use tightly-coupled electromagnetic inductive or non-radiative charging; charging bowls or through-surface type chargers that use loosely-coupled or radiative electromagnetic resonant charging thatcan transmit a charge a few centimetres; and uncoupled radio frequency (RF) wireless charging that allows a trickle charging capability at distances of many feet.

LITERATURE SURVEY

Over 115 years ago Tesla invented the concept of wireless power transfer. Manyindustrial applications based on this technology have been developed ever since. This technology is of interest especially where the interconnecting wires are inconvenient, oreven impossible. This is a survey

that describes the history of wireless power technology.Specifically, two types of wireless power transfer, radiative and non- radiative are studied.

Circuit Rating:

The topology of the circuit is the classic half-bridge. The control circuit could have been realized using an IC (so fixing the operating frequency), but there is a more economical solution which consists of a self-oscillating circuit where the two transistors are drive-in opposing phase by feedback from the output circuit. The line voltage is rectified by the full-bridge rectifier, generating a semi-sinusoidal voltage at double the line frequency.

Current rating:

The nature of the half-bridge topology is such that in normal operation, half the supply voltage is dropped across each device, so from the above figures VCE in the steady state is 310V /2, 155V. Hence the collector current in the steady state can be calculated using: POUT = IC (RMS). VCE (RMS)

VCE (RMS) = 1/2. V mains

IC (RMS) =2. POUT / V mains

IC (RMS) =IC (peak)/ √2

IC (peak) =2. √ 2. POUT / V mains

= 2. √2. 50W /

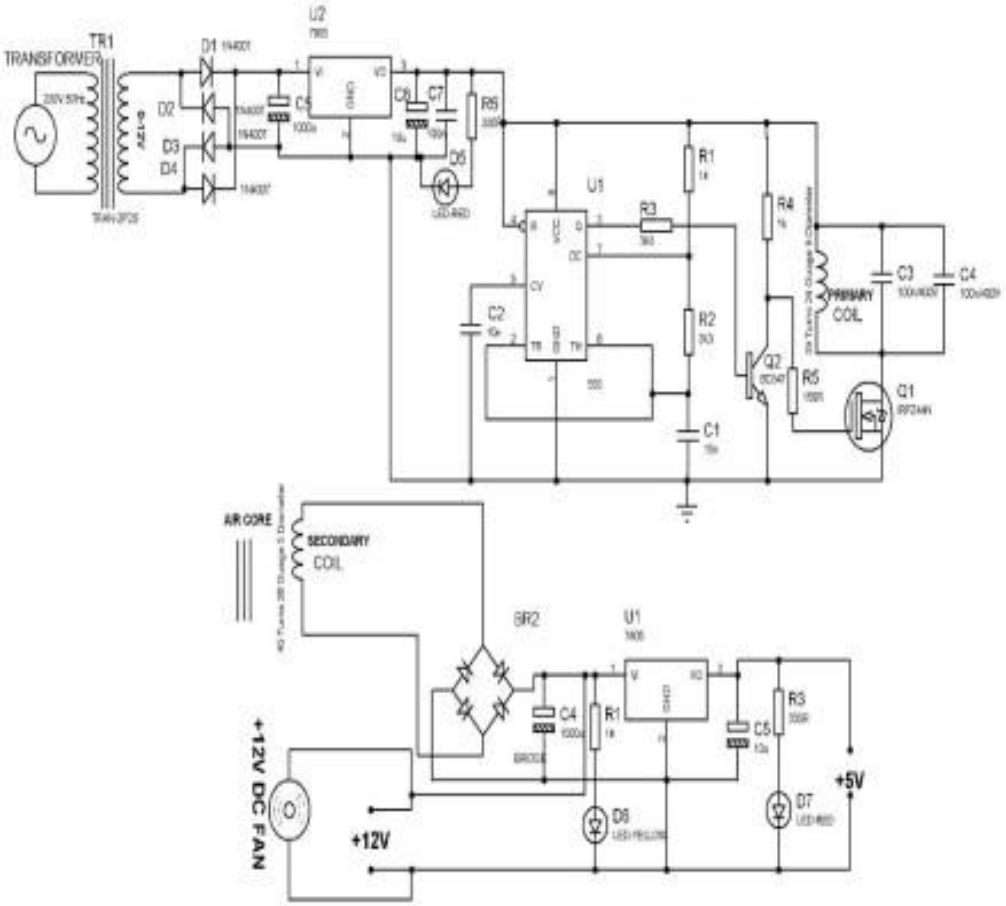
220V IC (peak) =

0.64A

As stated above, when the circuit is first turned on, the low initial resistance the load causes a large current to flow through the transistors. This current can be up to ten times the current in the steady state, and the devices must be selected to withstand this.

In this example then it is recommended that the device used is bipolar transistor, rated at 450V and around 2A I e Q1 and Q2. Storage and fall times are decided by the R 330k and C3, C4 & fall time, t fall, of the transistors influences the losses of the circuit, while the storage time, is important as it affects the switching frequency of the converter. The nature of the processes used to produce bipolar transistors means that the storage time between batches of transistors may vary considerably. The transistors used must be manufactured, tested and selected to have storage times within certain limits. Transistors with too large a storage time may cause the circuit to oscillate below the operating limits of the output transformer, causing saturation of the core towards the end of eachcycleThis will cause a spike in the collector current of the transistors every cycle, which will eventually cause them to overheat and be destroyed.

CIRCITE DIGRAM:



Circuit Description

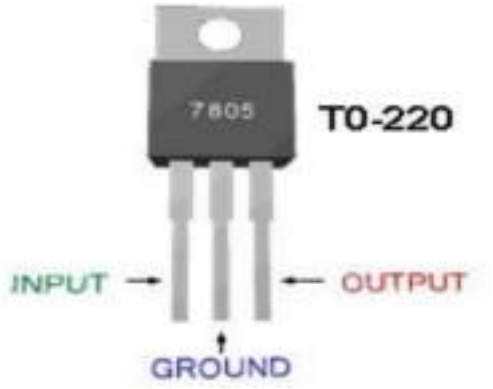
High Frequency Transformer

A transformer is an electrical device that transfers energy from one circuit to another purely by magnetic coupling. Relative motion of the parts of the transformer isnot required for transfer of energy. Transformers are often used to convert between highand low voltages, to change impedance, and to provide electrical isolation between circuits.

High frequency transformers transfer electric power. The physical size is dependent on the power to be transferred as well as the operating frequency. The higherthe frequency the smaller the physical size is. Frequencies are usually between 20 and 100kHz. Ferrite is mainly used as the core material.

Transformers are essential in high voltage power transmission providing an economical means of transmitting power over large distances. Transformers come in arange of sizes from a thumbnail-sized coupling transformer hidden inside a stage microphone to gigawatt units used to interconnect large portions of national power grids, all operating with the same basic principles and with many similarities in their parts.

VOLTAGE REGULAR:



Features

• Output Current up to 1A

• Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V

• Thermal Overload Protection

• Short Circuit Protection

• Output Transistor Safe Operating Area Protection

Description

The LM78XX/LM78XXA series of three-terminal positive regulators are available in the TO-220/D-PAK package and with several fixed output voltages, makingthem useful in a Wide range of applications. Each type employs internal current limiting, thermal shutdown and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver

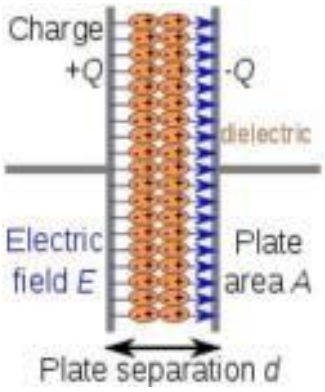
over 1A output Current. Although designed primarily as fixed voltage regulators, these devices can beused with external components to obtain adjustable voltages and currents.

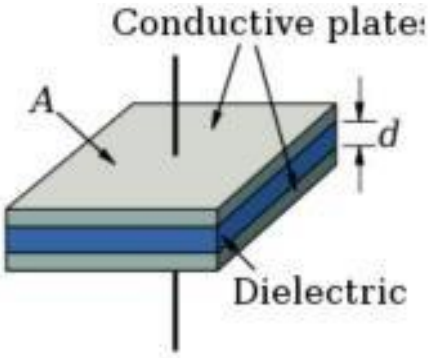
Voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobilealternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be

Current Flow in the N-Type Material

The positive potential of the battery will attract the free electrons in the crystal. These electrons will leave the crystal and flow into the positive terminal of the battery. As a result, an electron from the negative terminal of the battery will enter the crystal, thus completing the current path. So, the majority current majority current material (electrons) are repelled by the negative side of the battery & move through the crystal toward the positive side of the battery.

ELECTROMAGNATIC COIL





$$C = \frac{\varepsilon A}{d}$$

CONCLUSION

Developing a fundamental theoretical model to analyse the resonant Inductively coupledwireless power transfer system for battery charging of Electric vehicle. Intending an experimental setup of resonance based wireless power Transfer system to examine its performance. Elucidating the effect of design and operating parameters to arrive at an optimal solution for designing a suitable and efficient wireless power Transfer system under non-ideal charging scenarios. Examining the effect of proximal metallic objects onthe performance of wireless power transfer system and propose a

solution to maintain theOptimum power transfer efficiency under unusual charging conditions. Designing an adaptive matching circuit with automatic frequency tuned capability to maintain the optimum power transfer efficiency under various usage scenarios. Implementing the proposed solution as a prototype.

FUTURE SCOPE

The electronic revolution of the past century has been a tangled affair. Remember when phones were always wired into the wall? When the internet required one more cord fromthe back of your computer? Wireless is the future, which is all well and good for information transfer. But what about energy itself? We live in a wireless world. Cell phones, Wi-Fi, Bluetooth, 2G, 3G, 4G — the always on, always connected world of digital devices is driven by the magic of wireless. But all our devices from smart phonesto laptops, still rely on cords and plugs for charging. Everyone's had their cell phone become useless for the day when the battery dies and there's nowhere to charge it. Batterylife consistently shows up as a key factor in product ads, feature lists and reviews. As advanced and powerful as phones, tablets and laptops are, when that bar hits 0%, they'reas good as worthless without an outlet (the same outlet everyone else in the cafe or the airport wants to use).