



DESIGN THINKING ON SMART LOW POWER PORTABLE INVERTER USING MOSFET

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Abstract—This paper is due to the shortage and uncarriable inverter in the country, backup power system market is un doubted grow with new technology and begin incorporated and implemented. India inverter market is fatherly growing market with both MNC companies for a major market share. So, This paper is useful for carrying inverter for anywhere we go like a power bank, by this we can uses power as for light, fan, mobile charger etc. for basic uses.

Key words- Design a circuit, low power, portable inverter

INTRODUCTION

Portable inverters are widely used in the domestic as well as industrial environments to serve as second source cause of power cut from the electricity utility grids. The inverter is a device that gives power to the electric appliances in the event of the power failure. Microelectronic circuits with low power dissipations, which can be powered by light weight batteries with sufficient times between recharges, is something that the mobile and battery-operated electronic devices markets demand. The inverter as the implies first converts AC to DC for charging battery's and then inverts DC to AC for powering the electric gadgets and other uses.

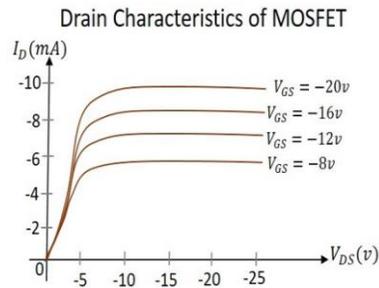
So here is the portable power inverter which is small in size and which can give output voltage of 220v-230/150w. This portable low power inverter can be used to power up devices such as lights, fan, charger etc....

LOW POWER INVERTER USING MOSFET

- The MOSFET is a bit similar to FET. An oxide layer is deposited on the substrate to which the gate terminal is connected.
- This oxide layer acts as an insulator(SiO_2). The N-channel MOSFETs are named as NMOS. When the drain characteristics of a MOSFET are drawn between the drain current I_D and the drain source voltage V_{ds} . Then the characteristic curve is as shown below for different value of inputs as per refer.
- Actually, When V_{ds} is increased the drain current I_d should increase, but due to the applied V_{gs} the drain current is controlled at certain level. Hence the gate current control the output drains current.

Advantage of MOSFET

- Switching speeds is improved.
- It improves the dynamic performance that required even less power from the driver.
- Lower gate to drain feedback capacitor.
- Lower rise and fall times, which has allowed for operation at higher switching frequencies.
- MOSFET is a low cost.

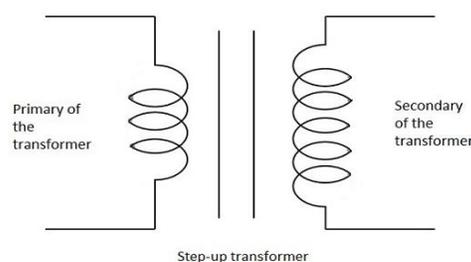


CONCEPT OF TRANSFORMER

- A transformer has a primary coil to which input is given and a secondary coil from which the output is collected. Both of these coils are wound on a core material. Usually, an insulator forms the core of the transformer.
- Depending upon the number of turns in the secondary winding, the transformer can be called as a step up or step-down transformer.
- The main point to be noted here is that, there will not be any difference in the primary and secondary power of the transformer. Accordingly, if the voltage is high at secondary, then low current is drawn to make the power stable. As well, if the voltage in the secondary is low, then high current is drawn so as the power must be same as the primary side.

In this project we are used as step-up transformer. When the secondary winding has more number of turns than the primary winding, then the transformer is said to be a step up transformer. Here the induced EMF is greater than the input signal.

As alternating flux produces current in the secondary coil, and this alternating flux is produced by alternating voltage, so we can say that only an alternating current AC can help a transformer to do work. Hence a transformer doesn't work on DC.



$$E_{rms} = 4.4fN\phi_{max}$$

Were

$f =$ flux frequency in Hertz = $\omega 2\pi$

$N =$ number of coil windings

$\emptyset =$ flux density in Weber

This is known as Transformer EMF Equation

The transformers are mainly classified as single phase and three phase transformers.

i. A normal transformer is a single-phase transformer. It has a primary and a secondary winding and it is operated to either decrease or increase the secondary voltage.

ii. For a three-phase transformer, three primary windings are connected together and three secondary windings are connected together.

- So, for low power portable inverter we use the concept of step up transformer And its produce low power to high power voltage.

PORTABLE INVERTER

- [3] It is the portable inverter and user can use it anywhere at a time.

- The circuit is built in low cost and efficient manner only.

- [4] The user can generate low volt DC to high volt AC of 240v and standard signal PWM used in the devices for activating MOSFET.

- In modern day power supply are more important to power up devices...

- But carrying power source to places you travel is very difficult. So, we came up with a solution

- We inverted a medium power inverter it just needs 9v battery to generate 230v AC voltage anywhere you travel partner.

- The rechargeable battery provides the DC 12v that is going to be converted into amplified 230 voltage by low power inverter MOSFET IRFZ44 and transformer

- The transformer is an inverter. The primary is 12volt then 230 volt is used secondary for output.

- The IC provides pulses with modulation as push or pull configuration at 50Hertz to power MOSFET.

- And read the datasheet of IC for its configuration. The power MOSFET are connected on the pin for the IC output.

- The power MOSFET transfers the power to the transformer that steps up the voltage to 230volts. Capacitor is used to filter out the output response in AC.

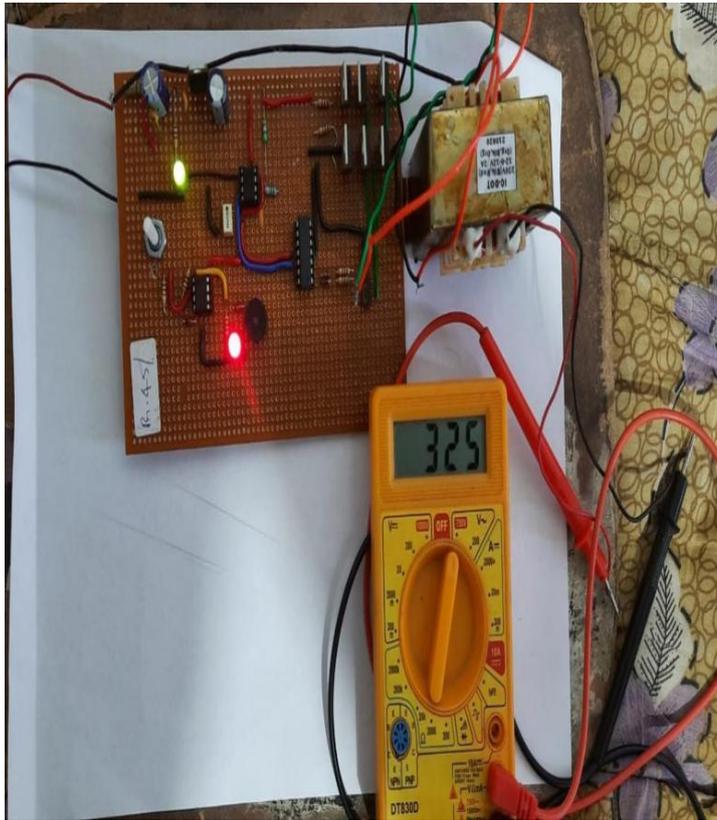
- From this both MOSFET and step-up transformer working together to produce a 230 voltage as a low power portable inverter.

- By this portable inverter as power bank as we can also use as a small home appliance.

Application of portable inverter

There are lot of applications of the DC to AC inverter. Here we discuss only the low power inverter applications.

RESULT



- As per the result the low power inverter works and gives an out put
- The simulations have done, it can be concluded that to get low power dissipation using a square wave (PWM) that is simple and maximized on the user of a suitable fiber, and portable to carry anywhere and you can easily generate 230 voltages on your travel time.

REFERENCES

References are used to point out published paper or concept of the paper

The template will number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]

Samples of the various types of references are given below [1]-[4].

- [1] E. Basic of MOSFET and its working, tutorial point
- [2] Basic and concepts of transformer and its working
- [3] Simple low power inverter design by electronic for u

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