

□Title:

# **POWER EFFICIENT MINI INVERTER**

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# OBJECTIVE

- The main objective of the project is to design a low cost & power efficient mini inverter using MOSFET.

# INTRODUCTION

➤ Inverters are widely used in the domestic as well as industrial environments to serve as second line of source in case of power cut from the electricity utility grids. Inverter is the device that powers the electric appliances in the event of the power failure. So here is the power efficient inverter which is small in size and which can give output voltage of depending on the load used. This power efficient mini inverter can be used to power up devices such as Wifi routers, mobile chargers, Lights etc.

# ABSTRACT

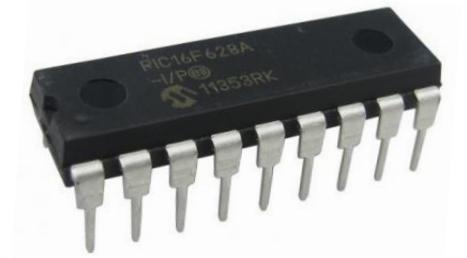
- Inverter as the name implies first converts AC to DC for charging the battery and then inverts DC to AC for powering the electric gadgets. Here, the mini inverter is designed at low cost and power efficient using MOSFET, motivated by the growing demand due to frequent power shortages.
- It is constructed from resistors, capacitors, and N-channel MOSFETs. This is cheap, clean, very conductive, silent in operation and very reliable source of power supply.
- Inverter as the name implies first converts AC to DC for charging the battery and then inverts DC to AC for powering the electronic gadgets.

# COMPONENTS USED

S.NO	COMPONENTS	S.NO	COMPONENTS
1	Battery (12V)	6	Capacitor
2	MOSFET(npn)	7	Diode
3	PIC Microcontroller	8	Comparator
4	High frequency Transformer	9	LED
5	Resistor	10	Load(BULB)

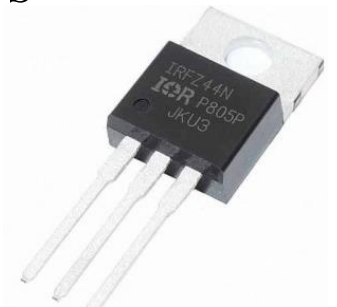
# MICROCONTROLLER

The main component of this inverter is a microcontroller as it is used to generate control signals. This microcontroller is specially developed for the generation of PWM pulse. Here, we have used PIC microcontroller.



# MOSFET

Most commercial Inverters are packed with MOSFETs for driving stage because it is very efficient in switching, less resistance path between source and drain terminal which translates to less heat.



## BATTERY

The batteries in the inverter store energy in the form of direct current . Here, three 4V battery is connected in series.

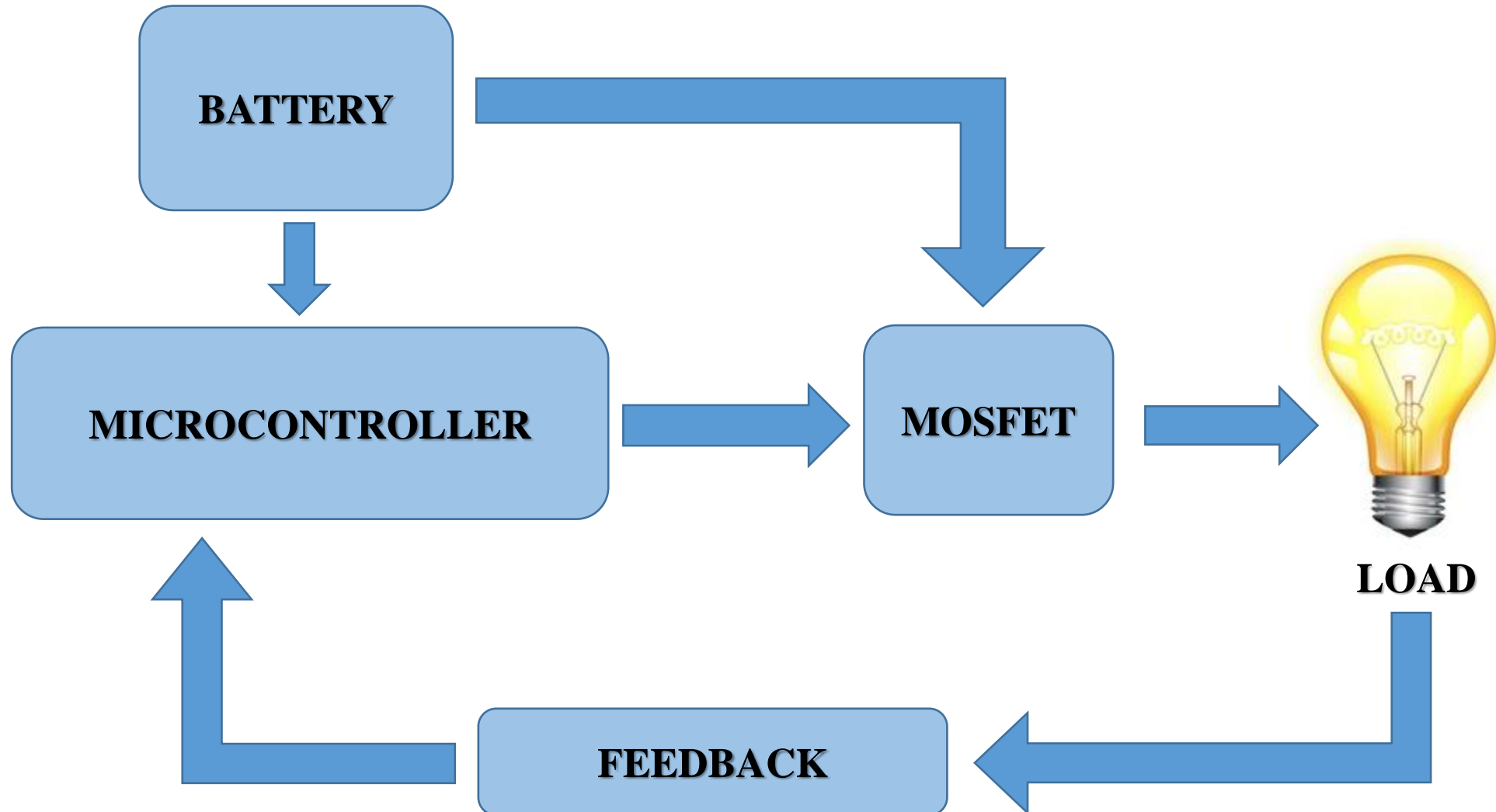


## TRANSFORMER

The transformer is the component which converts Low voltage AC to high voltage AC. Which is connected with drain of MOSFET and to battery. It's output is fed to the load with required amount of power.



# BLOCK DIAGRAM

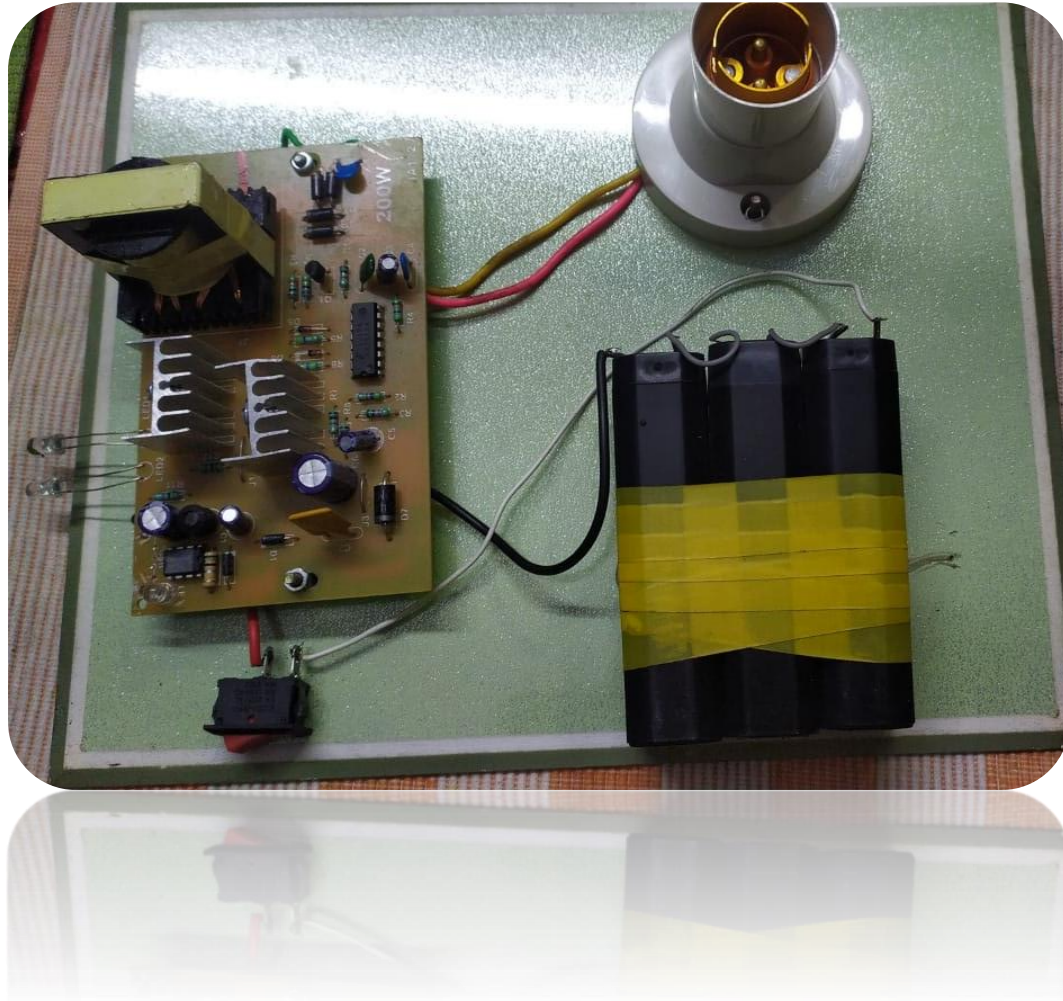




# WORKING

- The microcontroller produces the PWM pulse in accordance with the load that is to be switched on.
- The pulse created will trigger the gate of the MOSFET.
- The MOSFET used here is NPN MOSFET. From the load the output is feedback to the Microcontroller through shunt resistor.
- The source of the MOSFET and the centre of the transformer is connected to battery through which the supply is given.
- Hence through the PIC microcontroller the PWM pulse is created according to the load's(BULB) watts.

# OUTCOME



# ADVANTAGES & APPLICATIONS

- This is cheap, clean, very conductive, salient in operation and very reliable source of power supply.
- It can be an energy-efficient & power is used in optimized way.
- Future generation can use in wide range.
- Powers the electric appliances in the event of power failure.

# REFERENCES

- <https://nevonprojects.com/power-efficient-mini-inverter-project/>
- <https://eie.uonbi.ac.ke/sites/default/files/cae/engineering/eie/MICROCONTROLLER%20BASED%20POWER%20INVERTER.pdf>
- <https://www.scribd.com/document/522649520/Power-Efficient-Mini-Inverter-project>