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Single-phase half-bridge inverter based on mosfet

Overview

This project involves designing and implementing a single-phase half-bridge sinusoidal PWM inverter using MOSFETs to generate a 9V, 50Hz AC output from a DC source.What is a single phase half bridge inverter?

Fig. 1: Single Phase Half Bridge Inverter The above Fig. 1 shows half bridge inverter using two transistors (MOSFET or IGBT). The diodes are used to protect the IGBT from blocking negative voltage. The diodes allow free-wheeling operation in case of inductive load.

How a half bridge inverter works?

When only two switching devices are used for converting DC to AC then the configuration is known as half bridge inverter. The working of the half bridge inverter is as follows : The transistor (MOSFET or IGBT) Q 1 is turned ON for a time T o /2 which makes the V/2 voltage appear across the load, resistance ‘R’.

What is the difference between half bridge and full bridge inverter?

Comparison between half and full bridge inverters have also been detailed. Single Phase Full Bridge Inverter is basically a voltage source inverter. Unlike Single Phase Half Bridge Inverter, this inverter does not require three wire DC input supply. Rather, two wire DC input power source sufices the requirement.

What is a MOSFET in an inverter?

This type of Inverter requires two power electronics switches (MOSFET). The MOSFET or IGBT is used for switching purpose. According to output frequency, ON time and OFF time of MOSFET is decided and gate pulses are generated. We need 50Hz AC power, so the time period of one cycle ($0 < t < 2\pi$) is 20msec.

Why is the output voltage negative in a single-phase half bridge inverter?

The load voltage magnitude is again Vs but with reverse polarity. This is the reason; the output voltage is shown negative in the voltage waveform. For the time $0<t\leq(T/2)$, thyristors T1 & T2 conducts and load voltage Vo = Vs. Vo = -Vs. I think you have understood the working principle of single-phase half bridge inverter.

What is the power circuit of a single-phase full bridge inverter?

The power circuit of a single-phase full bridge inverter comprises of four thyristors T1 to T4, four diodes D1 to D1 and a two wire DC input power source Vs. Each diode is connected in antiparallel to the thyristors. D1 is connected in anti-parallel to T1 and so on.

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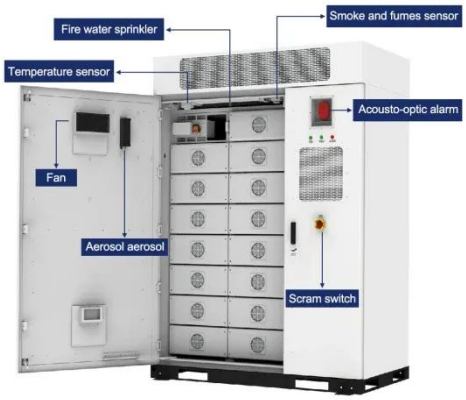

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