Principles of transistor and gto bride inverters

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Among the different existing inverter topologies, the full bridge or the H-bridge inverter topology is considered to be the most efficient and effective. Configuring a full bridge topology could involve too many criticality, however with the advent of full bridge driver ICs these have now become one of the simplest inverters one can build.

A full bridge inverter also called an H-bridge inverter, is the most efficient inverter topology which work two wire transformers for delivering the required push-pull oscillating current into the primary. This avoids the use of a 3-wire center tapped transformer which are not very efficient due to their twice the amount of primary winding than a 2-wire transformer

This feature allows the use of smaller transformers and get more power outputs at the same time.Today due to the easy availability of full bridge driver ICs things have become utterly simple and making a full bridge inverter circuit at home has become a kids play.

The mentioned chip is an outstanding full bridge driver IC as it single handedly takes care of all the major criticality involved with H-bridge topologies through its advanced in-built circuitry.

Pin14 and pin10 are the high side floating supply voltage pinouts of the IC. The 1uF capacitors effectively keep these crucial pinouts a shade higher than the drain voltages of the corresponding mosfets ensuring that the mosfet source potential stays lower than the gate potentialfor the required conduction of the mosfets.

The diodes across the gate resistors are introduced for quick discharging of the internal gate/drain capacitors during their non-conduction periods for ensuring optimal response from the devices.

As can be seen in the given diagram, if an externally accessible 330V DC is applied across the "+/- AC rectified lines", the configuration instantly becomes a transformerless inverter wherein any intended load can be connected directly across the points marked as "load".

Alternatively if an ordinary step-down transformer is used, the primary winding can be connected across the points marked as "load". In this case the "+AC rectified line" can be joined with pin#1 of the IC and terminated commonly to the battery (+) of the inverter.

Although the below shown design looks too easy to construct, the layout requires some strict guidelines to be followed, you may refer to the post for ensuring correct protection measures for proposed simple full bridge inverter circuit.

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The ICs are full fledged half bridge drivers equipped with the required bootstrapping capacitor network for driving the high side mosfets, and a dead-time feature to ensure 100% safety for the mosfet conduction.

These four inputs needs to be triggered to ensure that at any instant HIN1 and LIN2 are switched ON simultaneously while HIN2 and LIN1 are switched OFF, and vice versa. This is done at twice the rate of the inverter output frequency. Meaning if the inverter output is required to be 50Hz, the HIN/LIN inputs should be oscillated at 100Hz rate and so on.