

# SINGLE PHASE BRIDGE INVERTER

A single phase bridge inverter is shown in Fig.8.7. It consists of four transistors. These transistors are turned on and off in pairs of Q1, Q2 and Q3 Q4.

In order to develop a positive voltage  $+V$  across the load, the transistors Q1, and Q2 are turned on simultaneously whereas to have a negative voltage  $-V$  across the load we need to turn on the devices Q3 and Q4.

Diodes D1, D2, D3, and D4 are known as the feedback diodes, because energy feedback takes place through these diodes when the load is inductive.

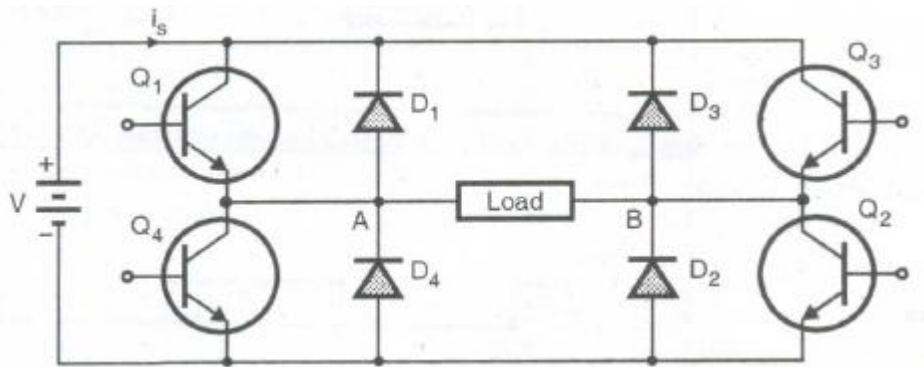


Fig.8.7: single phase full bridge inverter

## Operation with resistive load

With the purely resistive load the bridge inverter operates in two different intervals In one cycle of the output.

### Mode I (0 - $T_0/2$ ):

The transistors Q1 and Q2 conduct simultaneously in this mode. The load voltage is  $+V$  and load current flows from A to B. The equivalent circuit for mode 1 is as shown in Fig. 8.8 (A). At  $t = T_0/2$ , Q1 and Q2 are turned off and Q3 and Q4 are turned on.

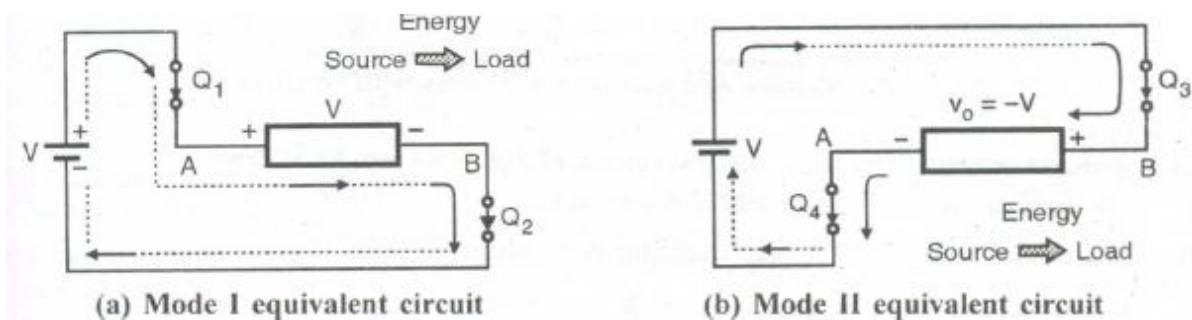


Fig.8.8

### Mode II ( $T_0/2 - T_0$ ):

- At  $t = T_0/2$ , Q3 and Q4 are turned on and Q1 and Q2 are turned off. The load voltage is  $-V$

and load current flows from B to A. The equivalent circuit for mode II is as shown in Fig. 9.5.1(b). At  $t = T_0$ , Q3 and Q4 are turned off and Q1 and Q2 are turned on again.

- As the load is resistive it does not store any energy. Therefore the feedback diodes are not effective here.
- The voltage and current waveforms with resistive load are as shown in Fig. 9.5.2.

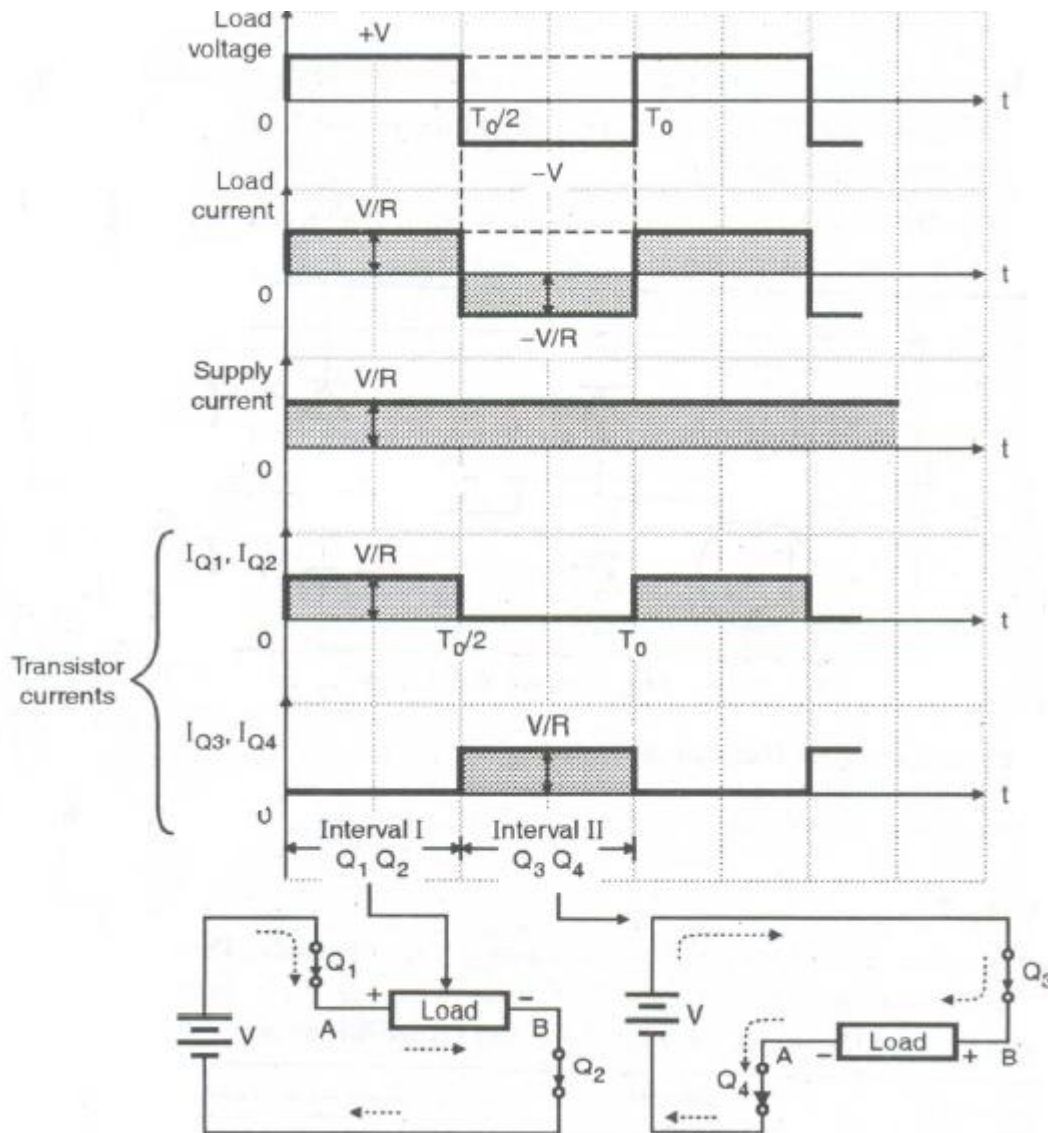


Fig.8.10: Voltage and current waveforms with resistive load.

The important observations from the waveforms of Fig. 8.10 are as follows:

- The load current is in phase with the load voltage
- The conduction period for each transistor is  $1t$  radians or  $180^\circ$
- Peak current through each transistor =  $V/R$ .
- Average current through each transistor =  $V/2R$
- Peak forward voltage across each transistor =  $V$  volts.