

Single phase inverter circuit diagram

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Single Phase Inverter is an electrical circuit, converts a fixed voltage DC to a fixed (or variable) single phase AC voltage with variable frequency. A single Phase Inverter can be used to control the speed of single-phase motors.

Consider Q_1, Q_2, Q_3 and Q_4 as IGBTs. The above Fig. 3.6 (a) shows single phase bridge inverter with RL load. The construct is same as that of single phase bridge inverter with resistive load. And the diodes D_1, D_2, D_3 and D_4 are the feedback elements.

At time t_1 the pair of transistors Q_1 and Q_2 is turned ON. The transistors act as a closed switch and hence A gets connected to positive terminal of the dc source. B gets connected to the negative terminal of the input supply or dc source.

The load current starts increasing exponentially due to the inductive nature of the load. The instantaneous current through Q_1 and Q_2 is equal to the instantaneous load current through RL. The energy is stored into the inductive load during this interval (i.e. t_1 -- t_2).

At time t_2 to t_3 , the transistor Q_3 and Q_4 are turned ON simultaneously. The output load voltage remains negative equal to $(-V)$ volts but the direction of load current will reverse and its magnitude becomes negative. The current increases in the negative direction and energy is stored in the load. This operation is shown in the following (3.6)

The mode IV operation is same as that in mode I. At instant t_4 (to) the transistors Q_3 and Q_4 are turned OFF. The load inductance tries to maintain the load current in the same direction by inducing a positive load voltage. Due to which the diodes D_1 and D_2 are forward biased, and thus the energy stored in the load inductance is returned back to the input dc supply. The value of load voltage $V_o = +V$, but the load current remains negative and decreases to zero. The operation in this interval is shown in Fig. 3.6 (f).

Thus, the square wave output voltage contains odd harmonics. Here, in single pulse modulation (SPM), the output pulse delay in the beginning while it is advanced at the end by equal interval of $(T_t - \theta)/2$ shown in following Fig. 3.8 (b).

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