

STUDY OF BASIC TRANSISTOR CONVERTERS

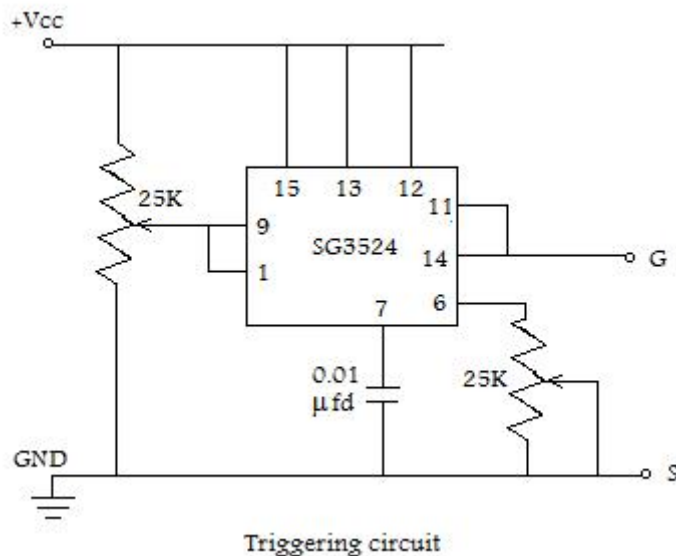
Object:

1. To study a forward converter (Buck).
2. To Study a fly-back converter (Boost).
3. To study a CUK converter (Buck-Boost).

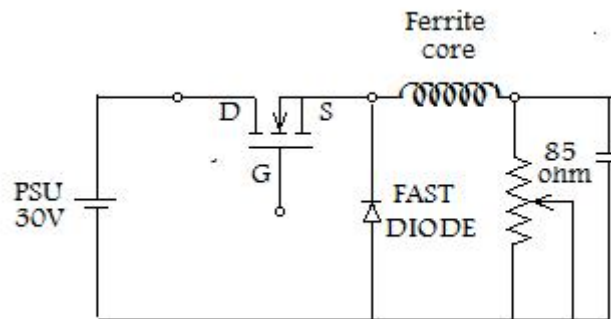
APPARATUS :

1. Experimental Set-up.
2. Rheostat 85Ω .
3. 0 – 30V, 2A Power Supply.
4. Oscilloscope (Double Trace).

PROCEDURE :



A. TO STUDY A FORWARD (BUCK) CONVERTER.



Study the Mosfet used in the circuit. Look up at manual and note the circuit associated with the mosfet. Note all ratings.

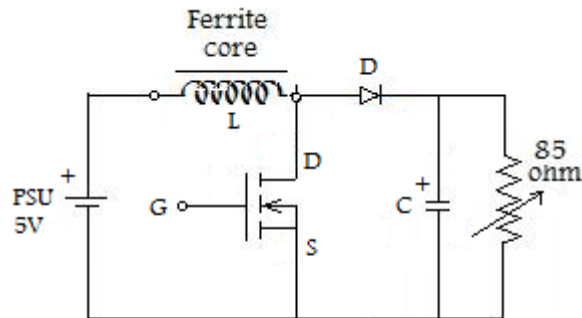
Connect components on the panel as shown in fig. P.E. 14.1. By controlling the potentiometers on the front panel. Set the driving signal at the base of the power Transistor to about 30Khz and a low Duty ratio.

- A. With Duty ratio from 0.1 to 0.9 in nine steps note the output DC voltage. Note for some of these cases voltage across all power components on the panel. The load current should always be continuous. Keep track of it by observing inductor voltage. It should never come to Zero (instantaneously). In case it does come down to zero, adjust load to make current continuous again.

Note the input current waveform for any two values of D.R.

- B. With D. R. held at 0.1, adjust load circuit and Tabulate V_{DCout} and $I_{DC(Load)}$. Repeat with D.R. 2.4, 0.8.

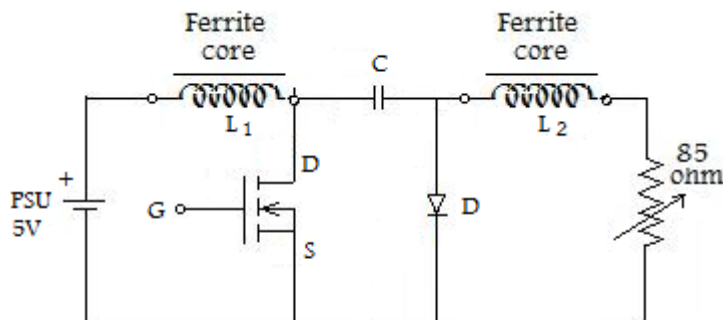
B. FLY – BACK (BOOST) CONVERTER



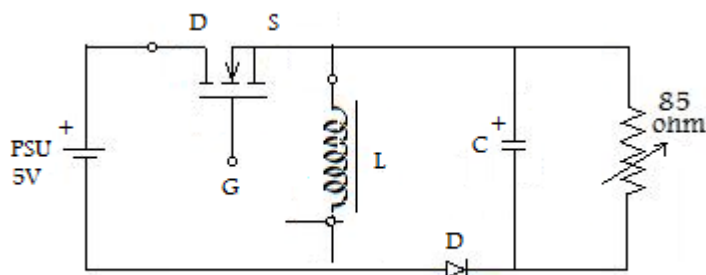
FLY - BACK (BOOST) CONVERTER

Connect up the circuit as in Fig. P. E. 14.2. Repeat the steps in part A. The current should still be continuous. Therefore note the voltage across the inductor and take steps as in 'A'.

C. (a) BUCK – BOOST CONVERTER (b) CUK CONVERTER



BUCK - BOOST CONVERTER



CUK CONVERTER

- (a) Connect up circuit as in Fig. P.E 14.3. Repeat as in A & B, again keeping track of the continuity of the current through L. Note waveforms and observations of D. R. and output DC avg. voltage. Observe input current waveform and mosfet voltage.
- (b) Repeat as above connect and external L_2 . Current in both inductors should be continuous now. C_2 is the Non-polarised one of the panel.

Questions :

- 1. Why are the currents required to remain constant in the experiments?
- 2. Which circuits allow a continuous input current?
- 3. Differentiate between the two types of buck-boost converters.