MONOLITHIC SWITCHING REGULATORS - FEATURES

(i) Step – Down Switching Regulator:

- C_T is the timing capacitor which decides the switching frequency.
- Rsc is the current sensing resistance. Its value is given by

$$Rsc = \frac{330mV}{DesiredPeakCurrent}$$

- The Non-inverting terminal of the internal op-amp(pin9) is connected to the 1.3V reference (pin8).
- Resistances R1 & R2 from a potential divider, across the output voltage Vo. Their value should be such that the potential at the inverting input of the op-amp should be equal to 1.3V ref when Vo is at its desired level.
    - $V_{(-)} = 1.3V = \frac{R2}{R1 + R2}\ Vo$

The output capacitance Co is used fro reducing the ripple contents in the output voltage. It acts as a filter along with the inductor L.

- The inductor L is a part of filter connected on the output side, to reduce the ripple percentage.
- The 0.1μF capacitor connected between pin8 & ground bypasses any noise voltage coupled to the reference (pin8).

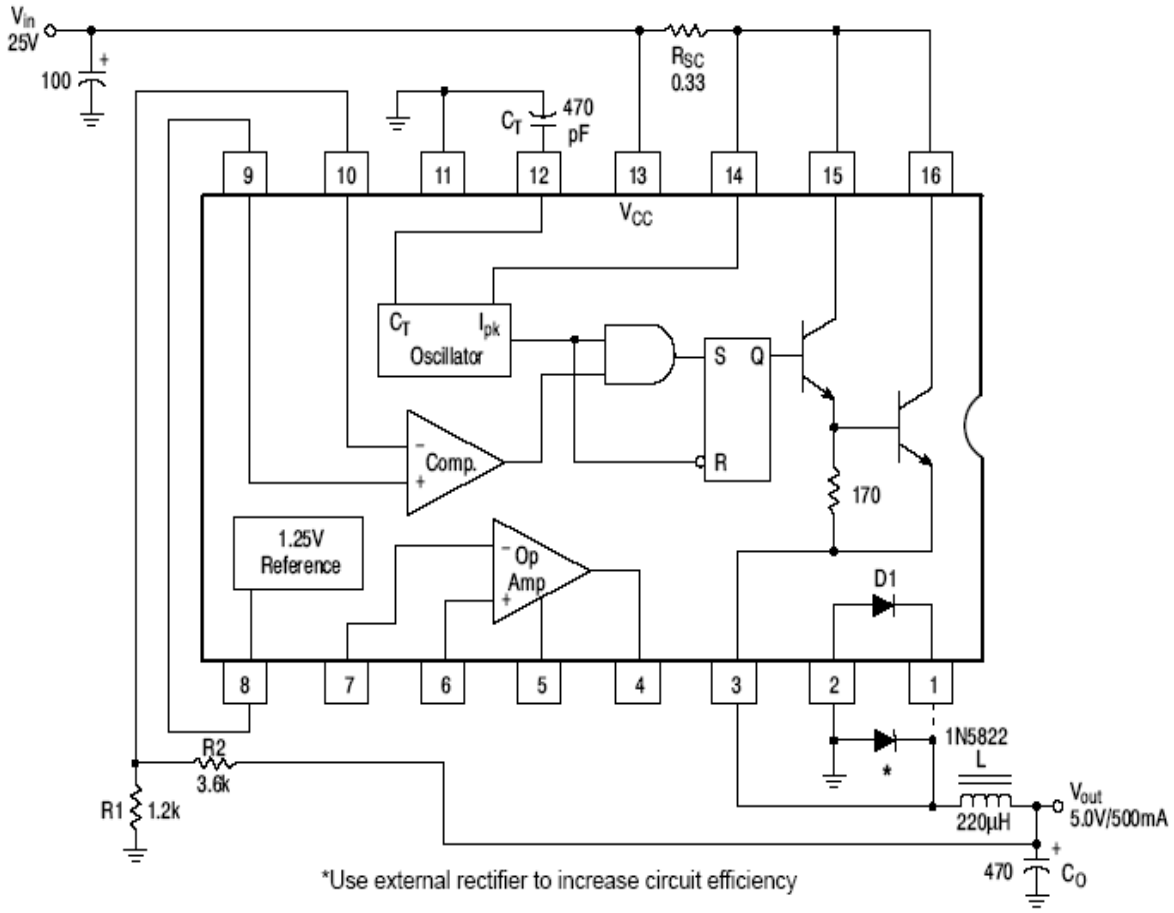


Figure 6. Step–Down Converter

(ii) Step – Up Switching Regulator:

- Note that inductor is connected between the collectors of Q1 & Q2.
- When Q1 is ON, the output is shorted & the collector current of Q1 flows through L.
- The diode D1 is reverse biased & Co supplies the load current.
- The inductor stores the energy. When the Q1 is turned OFF, there is a self induced emf that appears across the inductor with polarities.
- The output voltage is given by,

$$Vo = Vin + V_L$$

- Hence it will be always higher than Vin & step up operation is achieved.

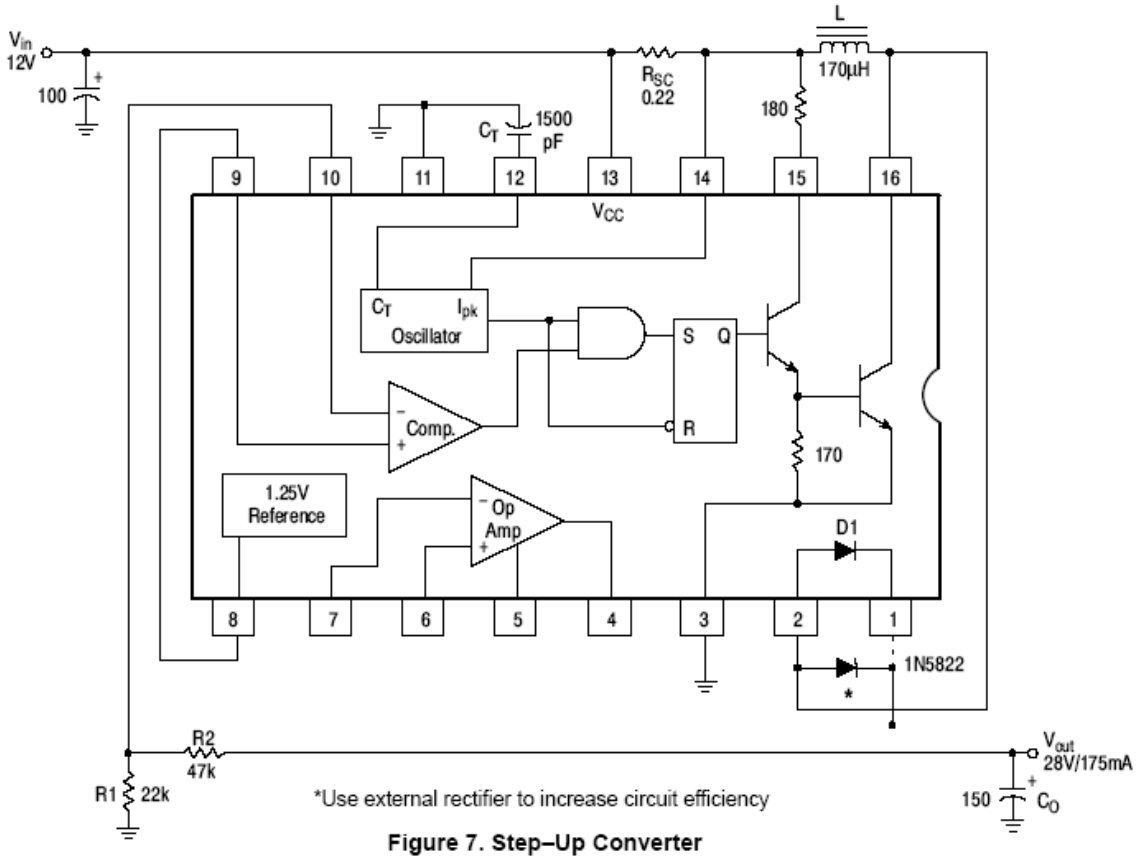
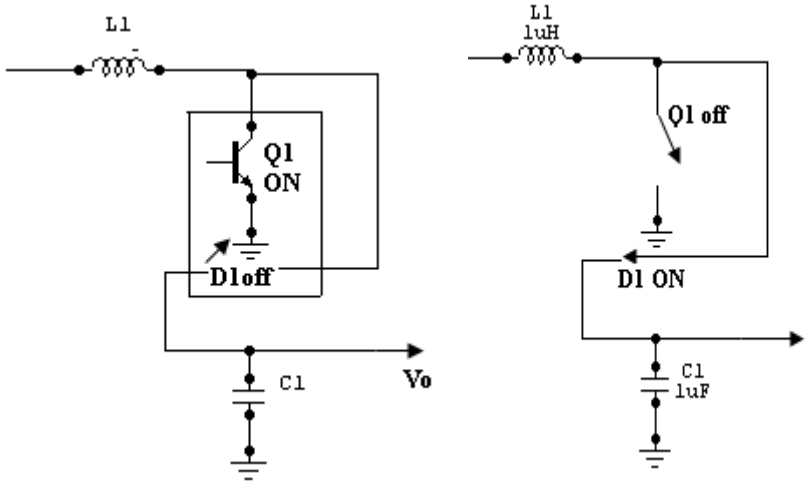


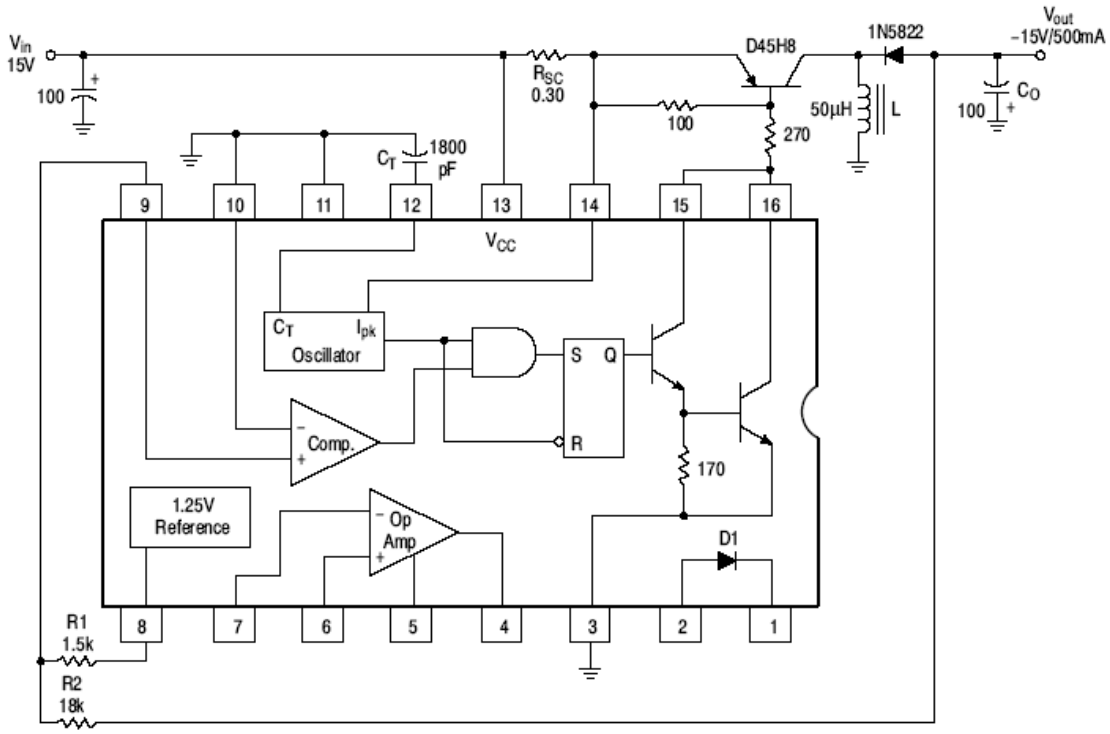
Figure 7. Step–Up Converter



With Q1 ON with Q1 oFF

(iii) Inverting Switching Regulator:

Inverting switching regulator converts a positive input voltage into a negative output voltage which is higher in magnitude.



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