Bipolar dc-dc converter requires no inductor

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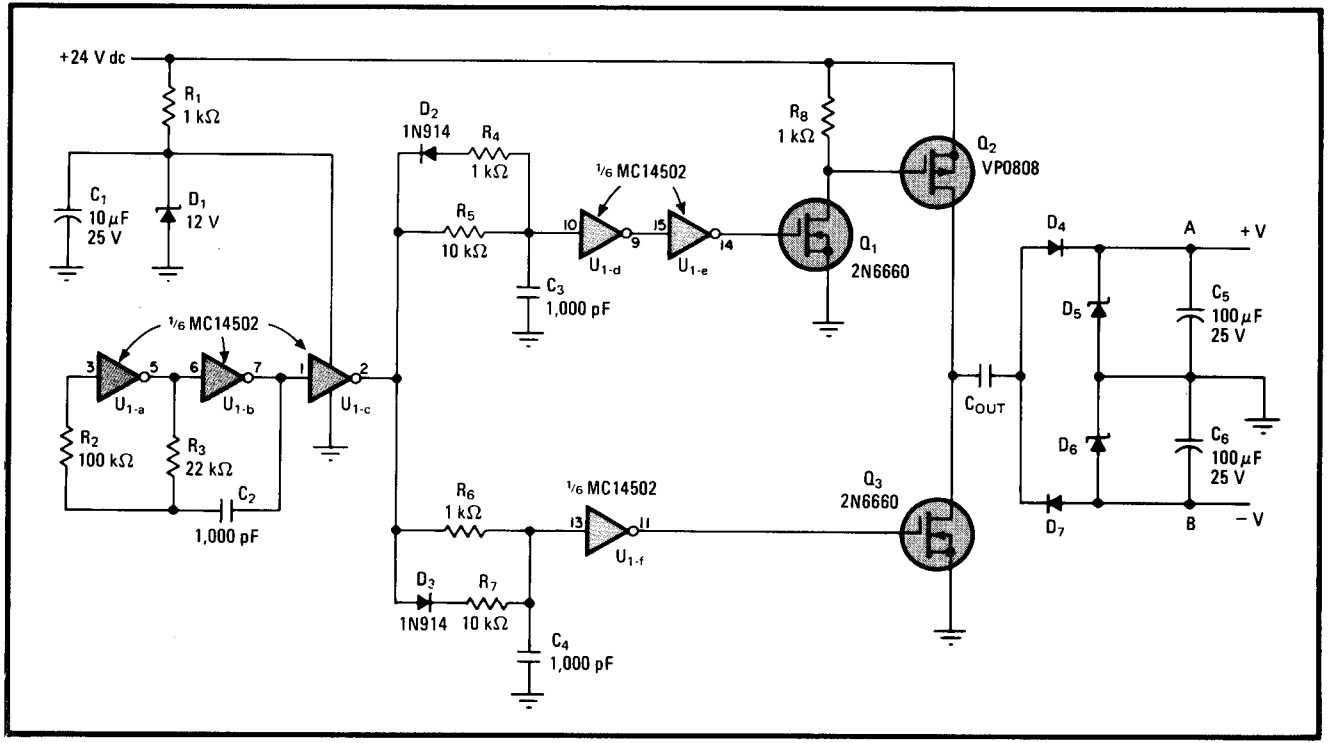
The saturable cores used in dc-dc converters often create radio-frequency interference that must be suppressed with filters. This coreless dc-dc converter circuit helps circumvent these rfi problems and also provides two dc voltages, one of negative and one of positive polarity with reference to ground. And it does so without using expensive and dilatory transformers or inductors.

In the circuit shown, inverters $U_{1\text{-}a}$ and $U_{1\text{-}b}$ form a 20-kilohertz oscillator whose square-wave output—further shaped by D_2, R_4, and R_5 and by D_3, R_6, and R_7—drives power field-effect transistors Q_2 and Q_3. The p-channel and n-channel FETs conduct alternately, in a push-pull configuration. When Q_2 conducts, the positive charge on C_{out} forces diode D_4 to conduct as well, which produces a positive voltage, determined by zener diode D_5, at terminal A.

Similarly, when Q_3 in its turn conducts, the negative charge on C_{out} forces D_7 to do so as well. A negative voltage therefore develops at terminal B, whose level is set by D_6. □



Converter. Unlike standard dc-dc converters, this circuit gives two dc voltages, one of positive, one of negative polarity—without using transformers or inductors. Only one inverter chip, three transistors, and a few discrete components are needed to realize the converter. Diodes D_5 and D_6 determine the level of positive and negative voltages at terminals A and B.