

APPLICATION NOTE 1932

Simple Circuit Generates Multiple Isolated Supply Voltages

Isolated supplies are required in most high-voltage systems that include low-voltage ICs. A simple approach is available for systems in which the potential difference is a fixed DC voltage, but in most cases the design and implementation of an isolated power supply is an involved endeavor.

In **Figure 1**, the digital-oscillator circuit U1 contains a MOSFET driver whose complementary outputs drive a pair of capacitors (C1 and C2). The capacitors are connected to a full-wave rectifier formed by diodes D1-D4, and the rectifier outputs connect to a filter capacitor (C3). Additional diode-capacitor networks can be added as shown to create a multitude of isolated voltages, limited mainly by the maximum total load current of all outputs and the maximum drive available from U1 (over 1A for $V_{CC} = +18V$).

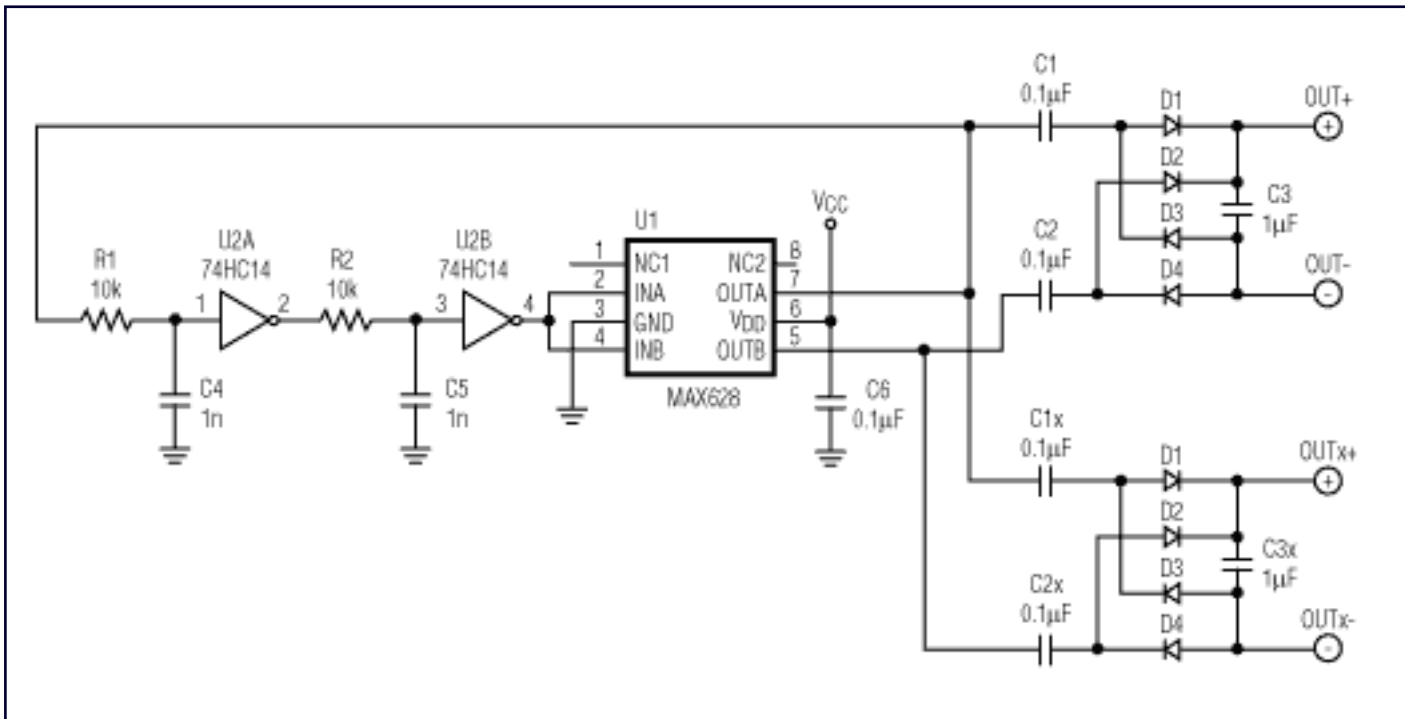


Figure 1. A MOSFET driver (U1) helps to generate multiple isolated voltages.

The output voltages of this circuit are two diode drops below the input supply voltage. If the rectifiers are built with silicon small-signal diodes such as 1N914s, the circuit provides up to 4mA at 3.3V from a +5V input. Higher currents are available with larger diodes, and the substitution of Schottky for silicon diodes allows higher outputs by lowering the burden voltage. This circuit is suitable for systems with fixed DC potentials, but is less suitable for those in which the potential between low- and high-voltage sections is varying.

A similar version of this article appeared in the December 23, 2002 issue of EDN magazine.

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