APPLICATION NOTE 674

Push-Pull Driver Provides Isolated 5V at 1A

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Abstract: In this design idea a simple circuit converts a regulated 5V input to an isolated 5V output at 1A. The efficiency of a transformer H-bridge, push-pull driver, the MAX253, depends directly on the forward drops of the output rectifiers.

The circuit in Figure 1 converts a regulated 5V input to an isolated 5V output with 1A current-output capability. IC1, a push-pull transformer driver, powers a pair of cross-coupled power MOSFETs in a flip-flop-like configuration. In turn, the MOSFETs toggle the primary winding of a forward transformer. The transformer's secondary output, after rectification and filtering, provides the isolated 5V supply. Because the output voltage is unregulated, its voltage tolerance depends on the input-voltage range and the range of load current. With Schottky rectifiers, such as the MBRS130 for D1 and D2, the circuit delivers 5V ±10% at 700 to 1000mA from a 5V ±5% input with 80% efficiency (Figure 2). Using ultrafast-recovery silicon rectifiers, such as the MURS120, the circuit delivers 5V ±10% at 200 to 500 mA from a 5V ±5% input, with 77% efficiency. (DI #2502)
Figure 1. A simple circuit produces a 5V, 1A isolated output from a 5V regulated input.

Figure 2. The efficiency of the circuit in Figure 1 depends directly on the forward drops of the output rectifiers.

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