Keywords: analog switches, phase reversal switches, MAX4526/MAX4527, power switching, digital signal switching, differenential data, full-wave rectifying

APPLICATION NOTE 1863

Transmit Digital Signals and Power Over Same Wires

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Abstract: Analog switches can be used to enable the transmission of digital signals and power over the same two wires. The signal waveform is rectified at the remote location to provide a stable supply voltage and modest load current (about 1mA maximum) for the receiver.

This signaling system enables the transmission of digital signals and power over the same two wires (**Figure 1**). The signal waveform is rectified at the remote location to provide a stable supply voltage and modest load current (about 1mA maximum) for the receiver.
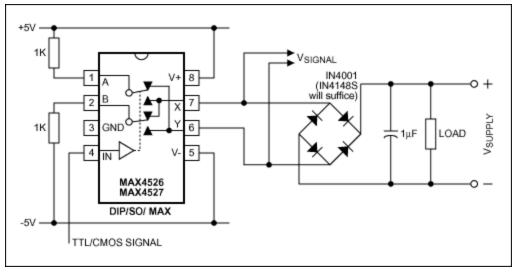

Figure 1. This digital signaling system accepts single-ended data, transmits differential data, and produces a supply voltage for the receiver by full-wave rectifying the remote-end signal.

For conventional single-ended data, a series of "0s" can allow excessive droop in the receiver's supply voltage. To avoid that problem differential data (±5V to ±18V) is transmitted, pseudo RS-485 style, from a single-ended logic-level input. The full-wave rectifier and differential drive ensures that a supply voltage is always present

Current-limiting resistors at the supply inputs prevent damage in the event of a line short. Values of 1kΩ are optimum. Higher values produce excessive switching noise at the chip side of the resistors, caused

by charge injection from the switches. Adequate decoupling of the supply rails also helps to minimize noise.

With +5V and -5V supplies powering the MAX4526/4527 as shown in Figure 1, the measured output for various loads is as follows:

Load (Ω)	V_{SUPPLY}(V)
1M	9.60
47k	9.00
10k	8.60
8.2k	8.40
5k	8.20

Related Parts		
MAX4526	Phase-Reversal Analog Switches	Free Samples
MAX4527	Phase-Reversal Analog Switches	Free Samples

More Information
For Technical Support: http://www.maximintegrated.com/support
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