High Efficiency PolyPhase Converter Combines Power from Multiple Inputs
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Introduction
As more functions are integrated into one IC, the power drawn by a single IC can easily exceed the capability of a single input power source. One solution is to use several available power sources to obtain the required output power, drawing some percentage of the total power from each source. The LTC1929 PolyPhase™ controller provides a simple solution to this problem.

Design Details
The LTC1929 is a PolyPhase dual, current mode controller. It is capable of driving two synchronous buck channels 180 degrees out of phase to reduce output switching ripple current and voltage. One buck stage receives its input power from the 12V input and the other receives its power from the 5V input. In a 2-phase design, as the inductor current in the 5V circuit increases, the inductor current in the 12V circuit decreases. This results in a smaller net ripple current flowing into the output capacitor. Since there are two intervals in one switching period where ripple cancellation takes place, the output ripple voltage of the 2-phase design is much smaller than that of a single-phase design and fewer output capacitors can be used.

A Typical Application
The currents available from a PCI connector are limited to 2A for the 5V supply and 1A for the 12V supply. In the example shown here, the load can be as high as 6A or 16.8W at 2.8V. Neither the 5V nor the 12V source is capable of providing this power. Hence, it is desirable to design a power supply that can draw currents from two power sources and whose maximum input currents from each source will not exceed the corresponding limit. With only one IC, two SO-8 MOSFETs and two small inductors, a high efficiency, low noise power supply can be built.

Figure 1. LTC1929 PCI-bus powered, dual-input PolyPhase power supply

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This is pretty hard to determine (read impossible) if the peak-to-peak output noise is larger than this number. As a practical matter the best laboratory reference available has long-term drift of 1.5μV/mo. This performance is only available from the very best subsurface Zener references using specialized heating techniques.

The LT1461 long-term drift data was taken with parts that were soldered onto PC boards as in a "real world" application. The boards were then placed in a constant-temperature oven with T_A = 30°C and their outputs were scanned regularly and measured with an 8.5 digit DVM.

Figure 4 shows the long-term drift of three typical LT1461S8-2.5s soldered into a PC board. This is the best performance we have measured on an IC voltage reference that is not based on a subsurface Zener.

**Conclusion**

The LT1461 series reference meets the growing need for low power, high accuracy and low temperature coefficient, while simultaneously serving micropower precision regulator applications. This new bandgap reference comes in the 8-lead SO package. It is available in 2.5V and will be available in 4.096V, 5.0V and 10V options.