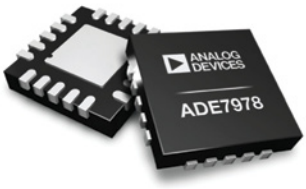
ADE7978 and ADE7932/ADE7933 Isolated Metering Chipset

Overview

The isolated metering chipset includes the ADE7978 3-phase metrology IC combined with up to four ADE7932/ADE7933 fully isolated ADC ICs. The ADCs incorporate Analog Devices' patented *i*Coupler® and *iso*Power® technologies to implement isolated signal transfer and dc-to-dc power conversion across a 5 kV rated insulation barrier.

This integration enables the use of shunt resistor sensing elements instead of current transformers (CTs), thereby providing immunity to magnetic field interference and tampering. The use of shunts instead of CTs also reduces system cost and size.



Features

- Computes active, reactive, and apparent energies for class 0.5 meters
- Provides power quality measurements including THD
- Integrated *iso*Power isolated dc-to-dc converter
- Enables real-time compensation for shunt temperature drift using on-chip temperature sensors
- Flexible SPI, I²C, and HSDC serial interfaces
- Isolation rating: 5000 V rms for 1 minute per UL 1577; 10,000 V surge
- ADE7932/ADE7933: 20-lead wide body SOIC package with increased 8.3 mm clearance and creepage

Applications

- Shunt-based polyphase meters
- Power quality monitoring

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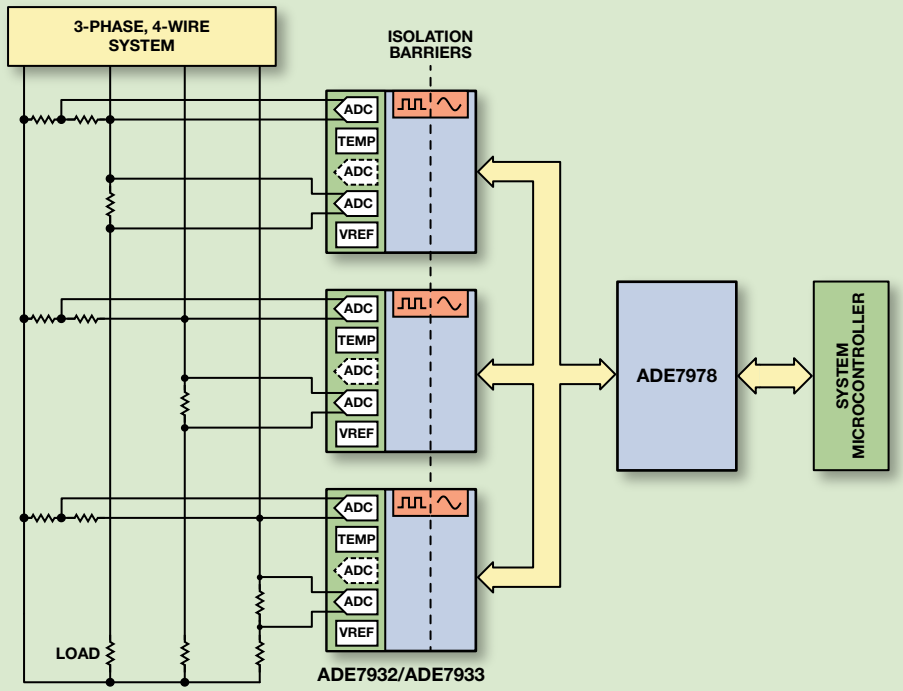
Isolated Metering Chipset Functional Block Diagram



General Description

The ADE7978 and ADE7932/ADE7933 form a chipset dedicated to measuring 3-phase electrical energy using shunts as current sensors. The ADE7932 features two 24-bit ADCs and the ADE7933 features three, one of which provides a signal-to-noise ratio (SNR) of 67 dB over a 3 kHz signal bandwidth while the other provides an SNR of 75 dB over the same bandwidth. One channel is dedicated to measuring the voltage across a shunt when the shunt is used for current sensing. Two additional channels are dedicated to measuring voltages, which are usually sensed using resistor dividers. It also measures the temperature of the IC.

The ADE7932/ADE7933 integrates an isolated dc-to-dc converter. Based on Analog Devices' *iso*Power technology, the dc-to-dc converter provides the regulated power required by the first stage of the ADCs. This device eliminates the need for an external dc-to-dc isolation block.

The *i*Coupler chip scale transformer technology is used to isolate the logic signals between the first and second stages of the ADC. The result is a small form factor, total isolation solution.

The ADE7932/ADE7933 contain a digital interface specially designed to provide the ADE7978 access to its ADC outputs and other configuration settings. The ADE7932/ADE7933 are available in the 20-lead wide body SOIC, Pb-free package with increased creepage.

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