

ADE7912 and ADE7913 Isolated ADC



Overview

The **ADE7912** and **ADE7913** are fully isolated analog-to-digital converters (ADCs) designed for a variety of applications. This solution incorporates Analog Devices' patented *iCoupler*[®] and *isoPower*[®] 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

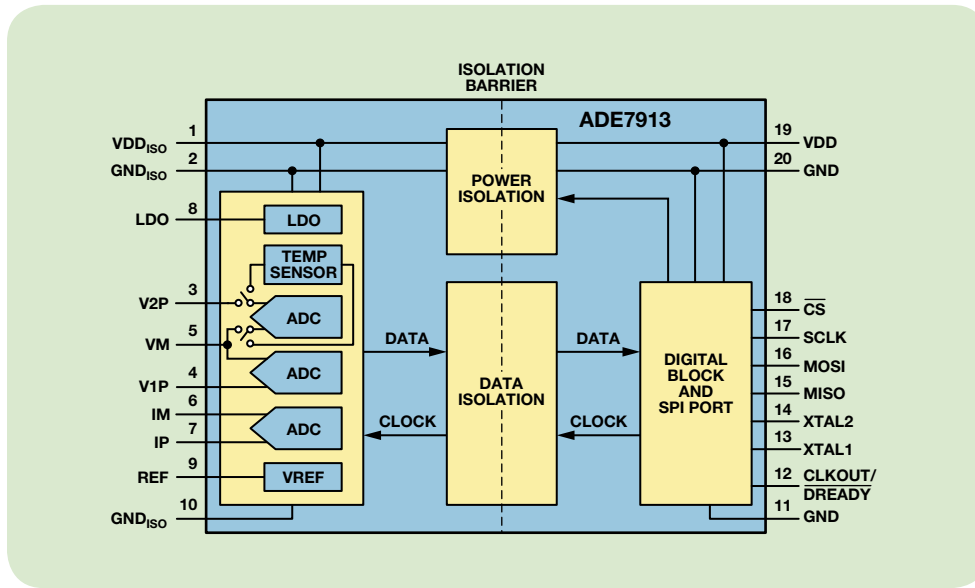
- Three 24-bit isolated ADCs: one current channel and two voltage channels
- Integrated *isoPower*, isolated dc-to-dc converter
- Up to four **ADE791x** ICs clocked from a single crystal or an external clock
- On-chip temperature sensor muxed with second voltage channel
- 4-wire SPI serial interface
- Synchronization between multiple **ADE791x** ICs
- Isolation rating: 5000 V rms for 1 minute per UL1577, 10,000 V surge
- 20-lead wide body SOIC package with increased 8.3 mm clearance and creepage

Applications

- Shunt-based polyphase meters
- Power quality monitoring
- Solar inverters
- Process monitoring
- Protective devices



Functional Block Diagram



General Description

The ADE7912 and ADE7913 feature three 24-bit analog-to-digital converters, each of which provides 70 dB signal-to-noise ratio over a 3 kHz signal 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. One of these channels may be used to measure the temperature measurement of the die, using an internal sensor. The ADE7912 is the same as the ADE7913 but it does not include the second voltage measurement.

The ADE7912 and ADE7913 include *isoPower*, an integrated, isolated dc-to-dc converter. Based on the Analog Devices *iCoupler* technology, the dc-to-dc converter provides the regulated power required by the first stage of the ADCs at 3.3 V input supply. This device eliminates the need for an external dc-to-dc isolation block. The *iCoupler* chip scale transformer technology is also 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 ADE7912/ADE7913 contains a bidirectional SPI serial port interface. It provides access to the ADC outputs, configuration, and status registers for easy interfacing with microcontrollers. The ADE7912/ADE7913 is available in the 20-lead wide body SOIC Pb-free package with increased creepage.

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