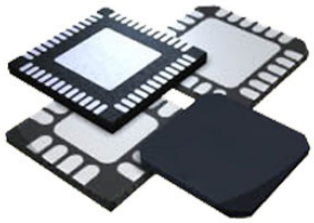
ADE7978ACPZ

Energy Measurement 28-Pin LFCSP EP Tray

Manufacturer:	Analog Devices, Inc
Package/Case:	QFN
Product Type:	Discrete Semiconductor Modules
RoHS:	RoHS Compliant/Lead free
Lifecycle:	Active



Images are for reference only

Inquiry

General Description

The ADE7978, the ADE7933/ADE7932, and ADE7923 form achipset dedicated to measuring 3-phase electrical energy usingshunts as current sensors.The ADE7933/ADE7932 are isolated, 3-channel sigma-deltaanalog-to-digital converters (Σ-Δ ADCs) for polyphase energymetering applications that use shunt current sensors.

TheADE7923 is a nonisolated, 3-channel Σ-Δ ADC for the neutral linethat uses a shunt current sensor. The ADE7932 features two ADCs,and the ADE7933 and ADE7923 feature three ADCs.

One channel is dedicated to measuring the voltage across theshunt when a shunt is used for current sensing. This channelprovides a signal-to-noise ratio (SNR) of 67 dB over a 3.3 kHzsignal bandwidth. Up to two additional channels are dedicatedto measuring voltages, which are usually sensed using resistordividers.

The unused voltage channels on the neutral ADE7923 can beused for auxiliary voltage measurements. These channels providean SNR of 75 dB over a 3.3 kHz signal bandwidth. One voltagechannel can be used to measure the temperature of the die viaan internal sensor.The ADE7933 and ADE7923 include three channels: onecurrent channel and two voltage channels. The ADE7932includes one current channel and one voltage channel, but isotherwise identical to the ADE7933.

The ADE7933/ADE7932 include isoPower®, an integrated,isolated dc-to-dc converter. Based on the Analog Devices, Inc.,iCoupler® technology, the dc-to-dc converter provides theregulated power required by the first stage of the ADCs at a3.3 V input supply. The ADE7933/ADE7932 eliminate the needfor an external dc-to-dc isolation block. The iCoupler chip scaletransformer technology is used to isolate the logic signalsbetween the first and second stages of the ADC. The result is asmall form factor, total isolation solution. The ADE7923 is thenonisolated version of the ADE7933 that can be used forneutral current measurement when isolation from the neutralline is not required.

The ADE7933/ADE7932 and ADE7923 contain a digital interfacethat is specially designed to interface with the ADE7978. Usingthis interface, the ADE7978 accesses the ADC outputs andconfiguration settings of the ADE7933/ADE7932 andADE7923.

The ADE7933/ADE7932 are available in a 20-lead, Pb-free, widebodySOIC package with increased creepage. The ADE7923 isavailable in a similar 20-lead, Pb-free, wide-body SOIC packagewithout the increased creepage.

The ADE7978 is a high accuracy, 3-phase electrical energymeasurement IC with serial interfaces and three flexible pulseoutputs. The ADE7978 can interface with up to four ADE7933/ADE7932 and ADE7923 devices. The ADE7978 incorporates allthe signal processing required to perform total (fundamental andharmonic) active, reactive, and apparent energy measurementand rms calculations, as well as fundamental-only active andreactive energy measurement and rms calculations. A fixedfunction digital signal processor (DSP) executes this signalprocessing.

The ADE7978 measures the active, reactive, and apparent energyin various 3-phase configurations, such as wye or delta services,with both three and four wires. The ADE7978 provides systemcalibration features for each phase, gain calibration, and optionaloffset correction. Phase compensation is also available, but it isnot necessary because the currents are sensed using shunts. TheCF1, CF2, and CF3 logic outputs provide a wide selection ofpower information: total

active, reactive, and apparent powers;the sum of the current rms values; and fundamental active andreactive powers.
The ADE7978 incorporates power quality measurements, suchas short duration low or high voltage detection, short durationhigh current variations, line voltage period measurement, andangles between phase voltages and currents. Two serial interfaces,SPI and I2C, can be used to communicate with the ADE7978.A dedicated high speed interface—the high speed data capture(HSDC) port—can be used in conjunction with I2C to provideaccess to the ADC outputs and real-time power information.The ADE7978 also has two interrupt request pins, IRQ0 andIRQ1, to indicate that an enabled interrupt event has occurred.The ADE7978 is available in a 28-lead, Pb-free LFCSP package.

Key Features

Enables shunt current sensors in polyphase energy meters

Immune to magnetic tampering

Highly accurate; supports EN 50470-1, EN 50470-3, IEC 62053-21, IEC 62053-22, IEC 62053-23, ANSI C12.20, and IEEE 1459 standards

Compatible with 3-phase, 3- or 4-wire (delta or wye) meters and other 3-phase services

Computes active, reactive, and apparent energy on each phase and on the overall system

Less than 0.2% error in active and reactive energy over a dynamic range of 2000 to 1 at>

Less than 0.1% error in voltage rms over a dynamic range of 500 to 1 at>

Less than 0.25% error in current rms over a dynamic range of 500 to 1 at>

Power quality measurements including THD

Single 3.3 V supply

Operating temperature: −40°C to +85°C

Flexible I2C, SPI, and HSDC serial interfaces

Safety and regulatory approvals

UL recognition

5000 V rms for 1 minute per UL 1577

CSA Component Acceptance Notice #5A

IEC 61010-1: 400 V rms

VDE certificate of conformity

DIN V VDE V 0884-10 (VDE V>

Optional isolated (ADE7933/ADE7932) or nonisolated (ADE7923) neutral

Application

Shunt-based polyphase meters

Power quality monitoring

Solar inverters

Process monitoring

Protective devices

Isolated sensor interfaces

Industrial PLCs

Recommended For You

AD7305BRZ

Analog Devices, Inc

SOP20

AD9910BSVZ

Analog Devices, Inc

TQFP100

AD9831ASTZ

Analog Devices, Inc

QFP

AD5447YRUZ

Analog Devices, Inc

TSSOP

AD5302BRMZ

Analog Devices, Inc

MSOP10

AD5531BRUZ

Analog Devices, Inc

TSSOP16

AD537JH

Analog Devices, Inc

CAN10

AD652AQ

Analog Devices, Inc

DIP

AD654JN

Analog Devices, Inc

DIP8

AD7740YRMZ

Analog Devices, Inc

MSOP8

AD9914BCPZ

Analog Devices, Inc

LFCSP

AD73311ARSZ

Analog Devices, Inc

SSOP20

AD7291BCPZ

Analog Devices, Inc

LFCSP20

AD9954YSVZ

Analog Devices, Inc

QFP

AD2S1205YSTZ

Analog Devices, Inc

LQFP44