

# ADE7878, ADE7868, ADE7858, ADE7854

## Polyphase Multifunction Energy Metering ICs



### Features

- Supplies total (fundamental and harmonic) active/reactive/apparent energy and fundamental active/reactive energy on each phase and on the overall system
- Highly accurate; supports EN 50470-1, EN 50470-3, IEC 62053-21, IEC 62053-22, and IEC 62053-23
- Compatible with 3-phase, 3- or 4-wire (delta or wye), and other 3-phase services
- Less than 0.1% error in active and reactive energy over a dynamic range of 1000 to 1 at 25°C
- Less than 0.2% error in active and reactive energy over a dynamic range of 3000 to 1 at 25°C
- Supports current transformer and di/dt current sensors
- Dedicated ADC channel for the neutral current input
- Supplies sampled waveform data on all 3 phases and neutral current
- Single 3.3 V supply
- 40-lead, lead-free, lead frame chip scale package (LFCSPP)
- Operating temperature -40° to +85°C
- Flexible I<sup>2</sup>C®, SPI, HSDC serial interfaces

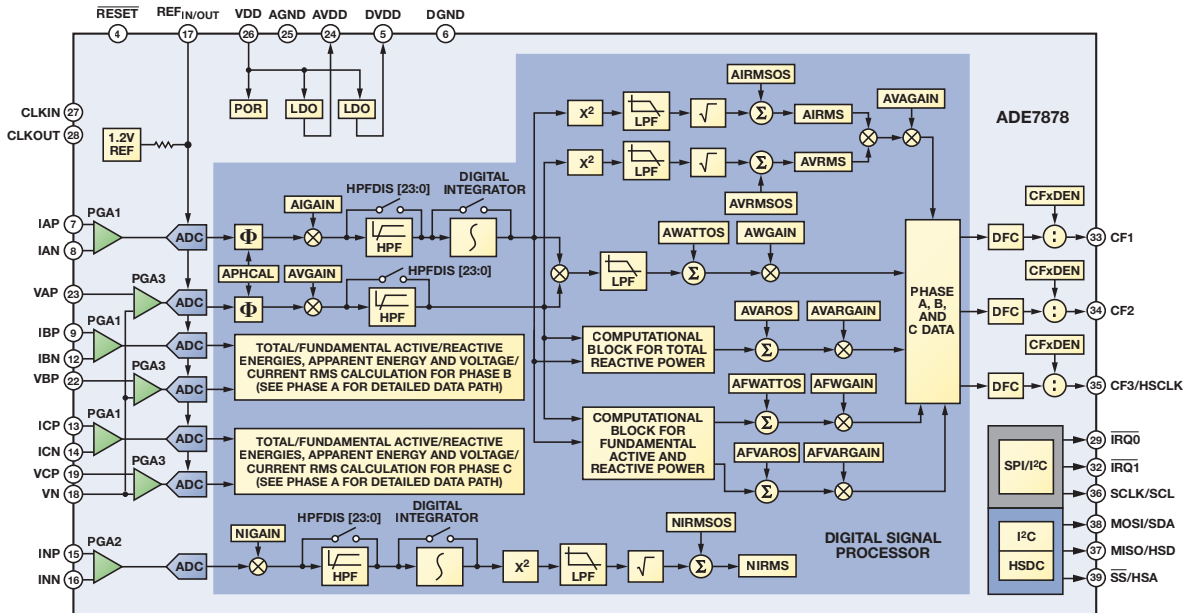
### Overview

The ADE7878, ADE7868, ADE7858, and ADE7854 are high accuracy, 3-phase electrical energy measurement ICs with serial interfaces and three flexible pulse outputs. They incorporate six or seven second-order  $\Sigma$ - $\Delta$  ADCs, a digital integrator, reference circuitry, and all the signal processing required to perform total (fundamental and harmonic) active, reactive, and apparent energy measurement, fundamental only active and reactive energy measurement, and rms calculations.

These metering ICs are suitable to measure active, reactive, and apparent energy in various 3-phase configurations, such as wye or delta services, with both three and four wires. They provide system calibration features for each phase: rms offset correction, phase calibration, and gain calibration.

The CF1, CF2, and CF3 logic outputs provide a wide choice of power information: total/fundamental active/reactive power, total apparent power, or sum of current rms values.

## Functional Block Diagram



## General Description

The ADE7878, ADE7868, ADE7858, and ADE7854 have waveform sample registers that allow access to all ADC outputs. These devices also incorporate power quality measurements such as short duration low or high voltage detections, short duration high current variations, line voltage period measurement, and angles between phase voltages and currents. Two serial interfaces can be used for communication: SPI or I<sup>2</sup>C. A dedicated high speed interface, HSDC (high speed data capture) port, can be used in conjunction with I<sup>2</sup>C to provide access to the ADC outputs and real-time power information. Two interrupt request pins,  $\overline{IRQ0}$  and  $\overline{IRQ1}$ , indicate that an enabled interrupt event has occurred.

The table below indicates feature sets available for each of the products. All products provide the same level of performance and accuracy. The ADE7854 features active energy measurements only. The ADE7858 adds reactive energy measurements. The ADE7868 and ADE7878 include a seventh ADC channel for neutral current measurements. These parts also include advanced antitamper features and power-down modes. The ADE7878 adds fundamental active and reactive power measurements.

Part Number	Watt	VAR	Tamper Detect	Low Power Modes	Fundamental Powers
ADE7878	•	•	•	•	•
ADE7868	•	•	•	•	
ADE7858	•	•			
ADE7854	•				

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