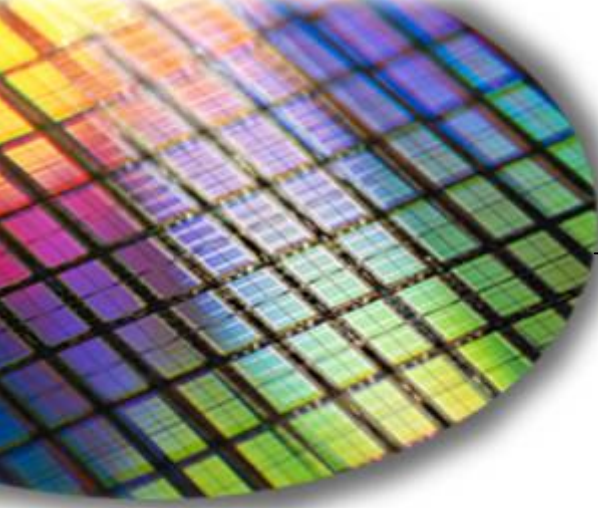




The World Leader in High Performance Signal Processing Solutions



Single-phase Energy Metering IC with Pulse Output

ADE7756

Precision Converters (PRC) Division

**Now available
In Production volumes**

Energy Measurement Data Converter



**Datasheet and Application
Notes available**



<http://www.analog.com/energymeter>

ADE7756: A programmable solution for Energy measurement

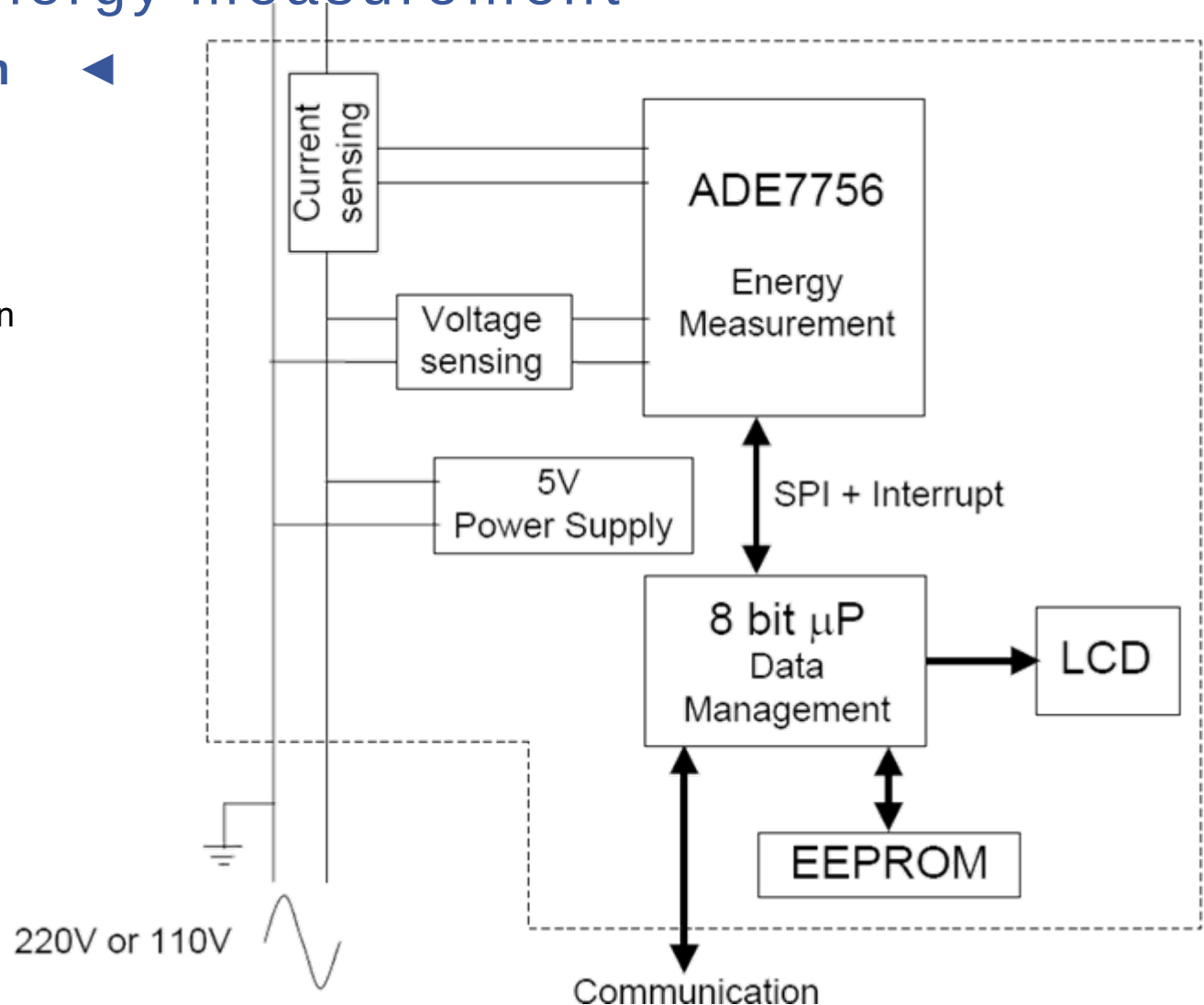
• ADE7756 application ◀

• Block Diagram

• Quality

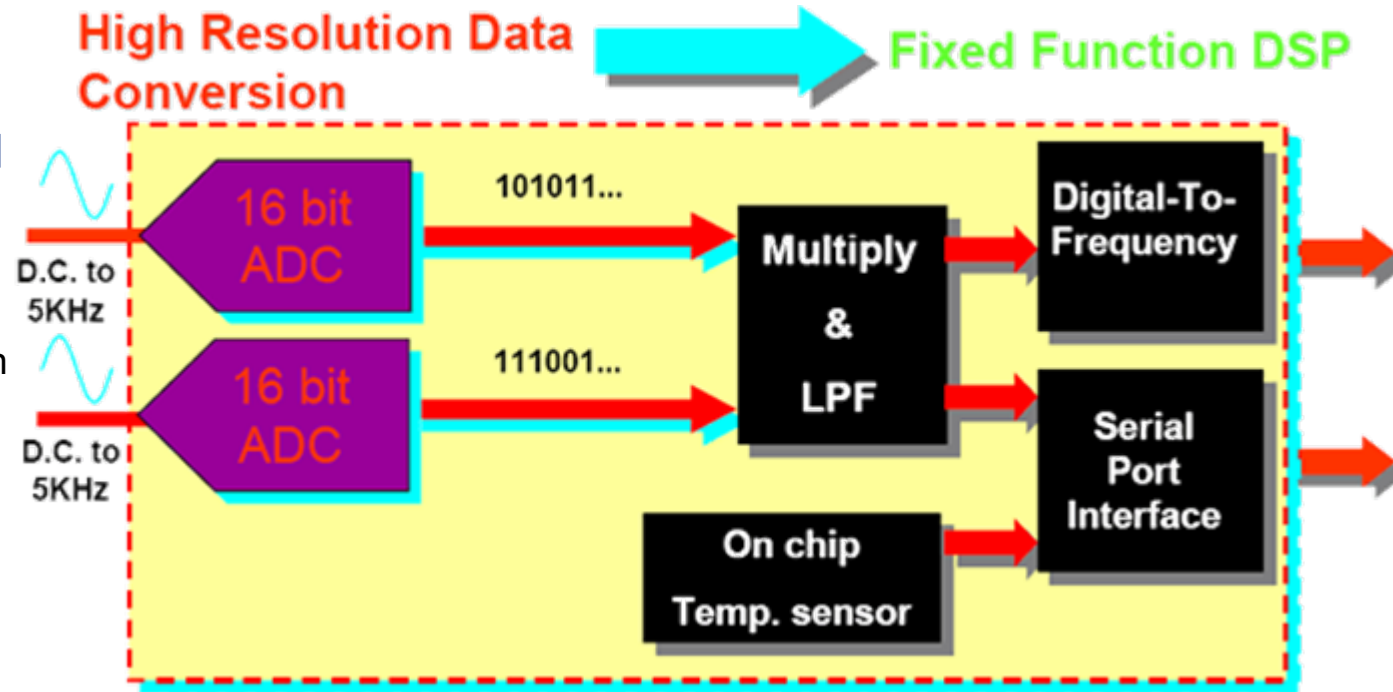
• Features

- Analog Front end
- Current sensor connection
- Digital calibration
- Energy measurement
- Zero crossing
- SAG detection
- Calibration Mode
- Waveform sampling
- Temperature sensor



Technology at a glance

- ADE7756 application
- **Block Diagram**
- Quality
- Features
 - Analog Front end
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 - Digital calibration
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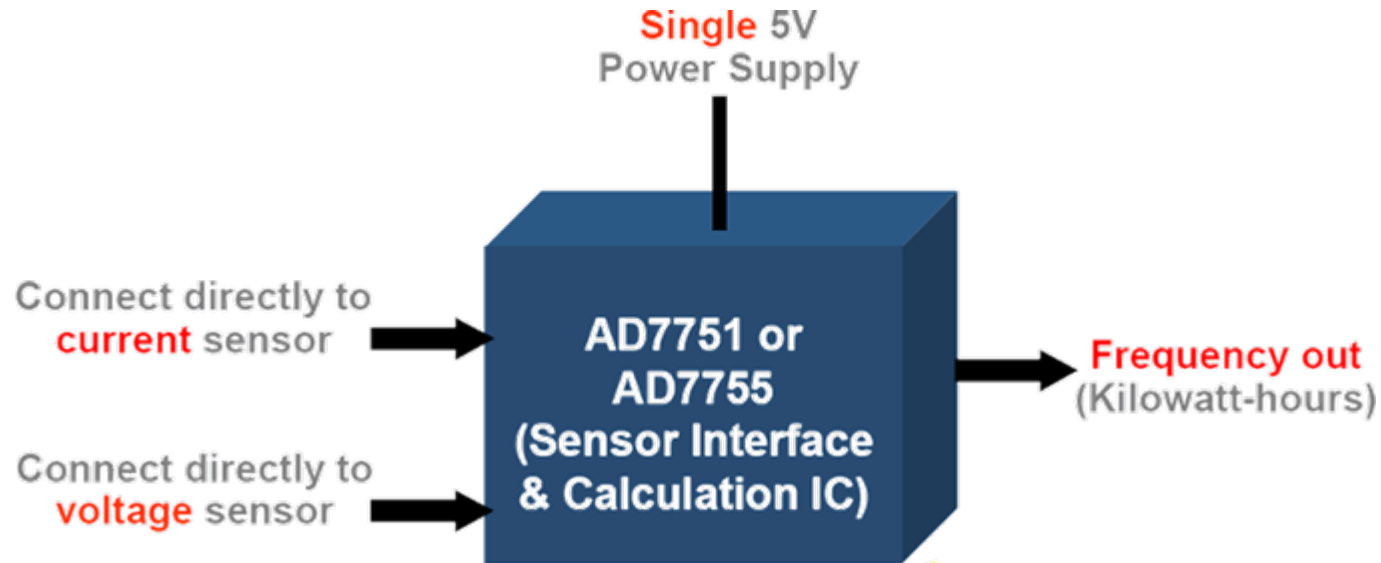
**A proven analog front end
from AD7755**

**Superior DSP
Performance**

Single Chip Energy Meter

Lowest Cost Single Phase Measurement

- ADE7756 application
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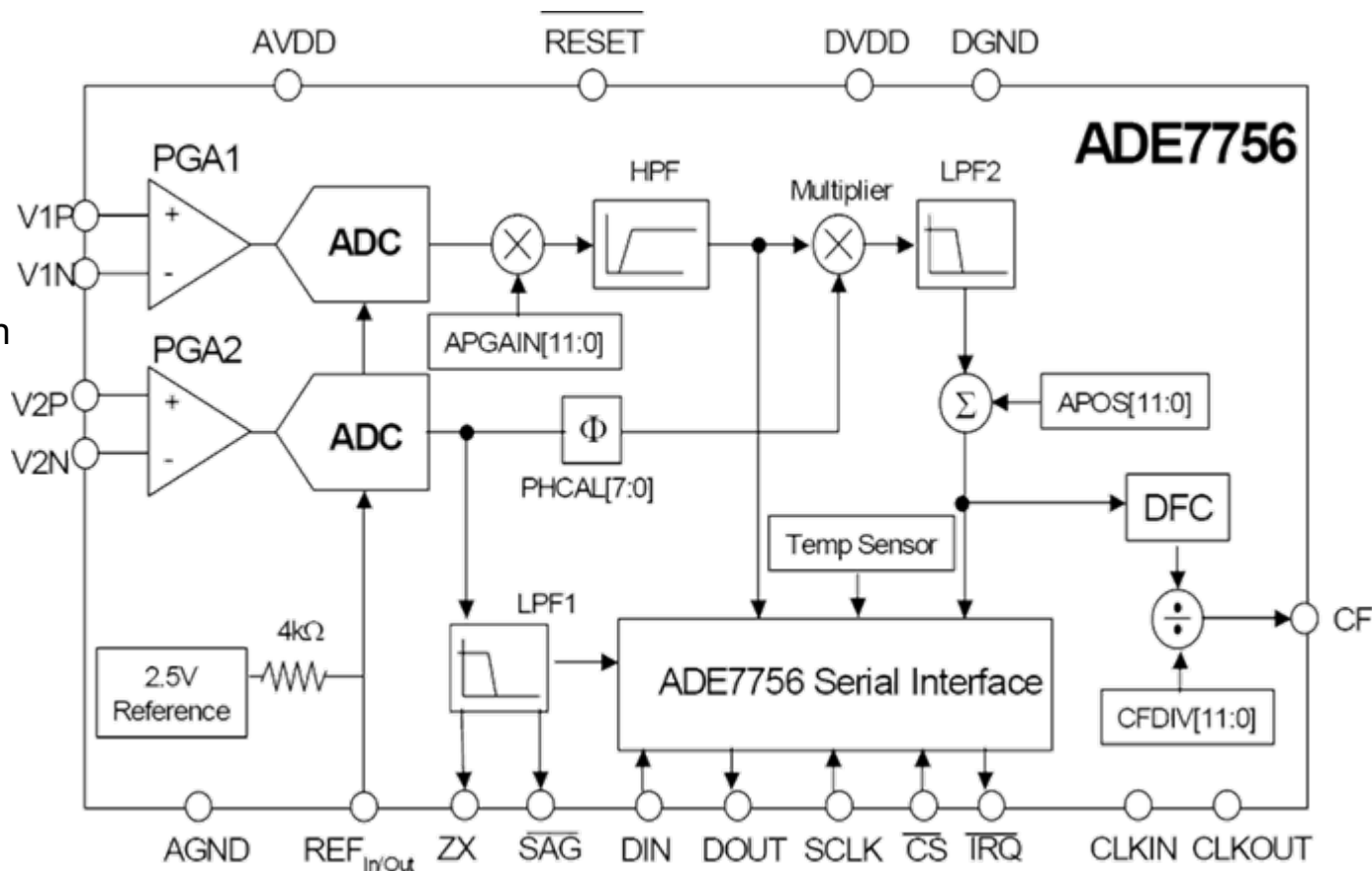


Life Expectancy Exceeds 60 Years !

No Failures after 3,000 hours at 150°C

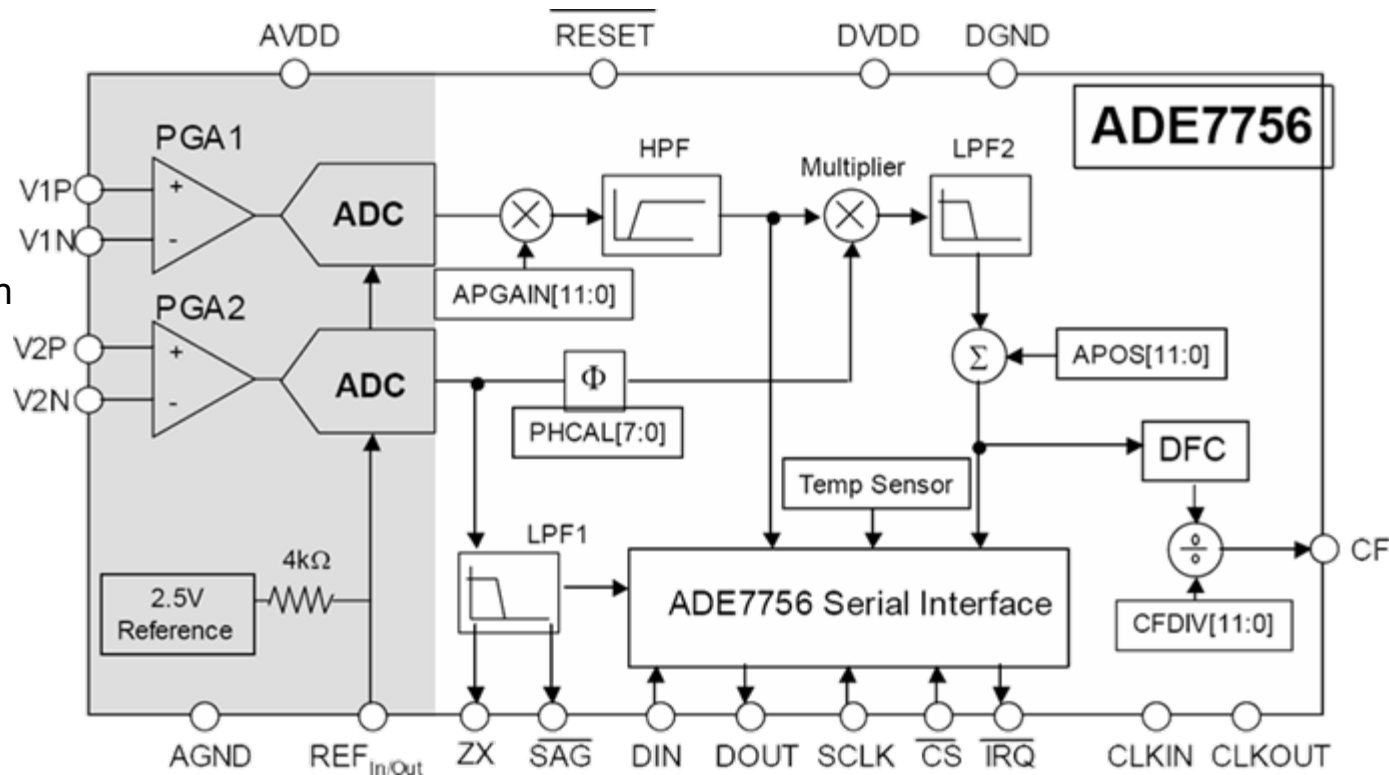
ADE7756: Block Diagram

- ADE7756 application
- Block Diagram
- Quality
- **Features**
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ADE7756: A validated Analog front end

- ADE7756 application
- Block Diagram
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- Features
 - **Analog Front end** ◀
 - Current sensor connection
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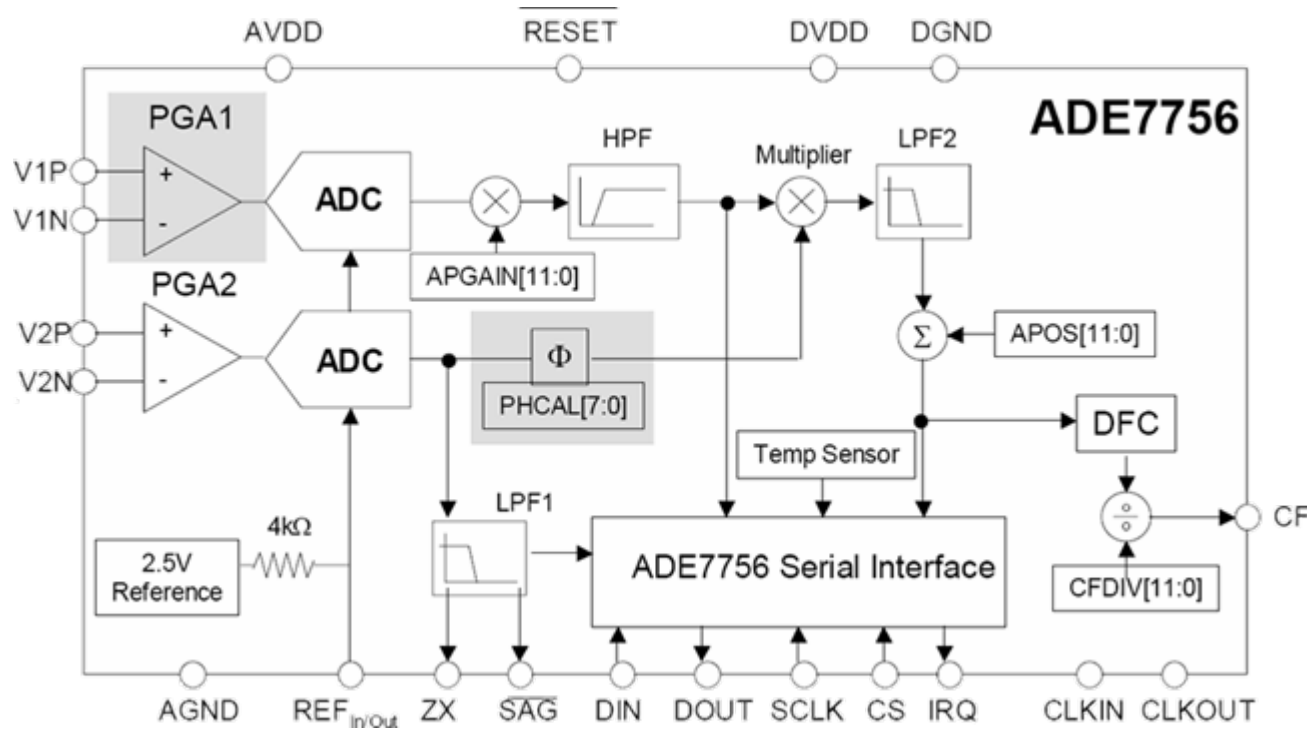


- 16-bit resolution from 2nd order $\Sigma\Delta$ ADC
- Linearity error < 0.3% over 1:1000 dynamic range (int. reference)
- Measurement Bandwidth 14 kHz

ADE7756: Easy use of Current sensors+

- ADE7756 application
- Block Diagram
- Quality
- Features

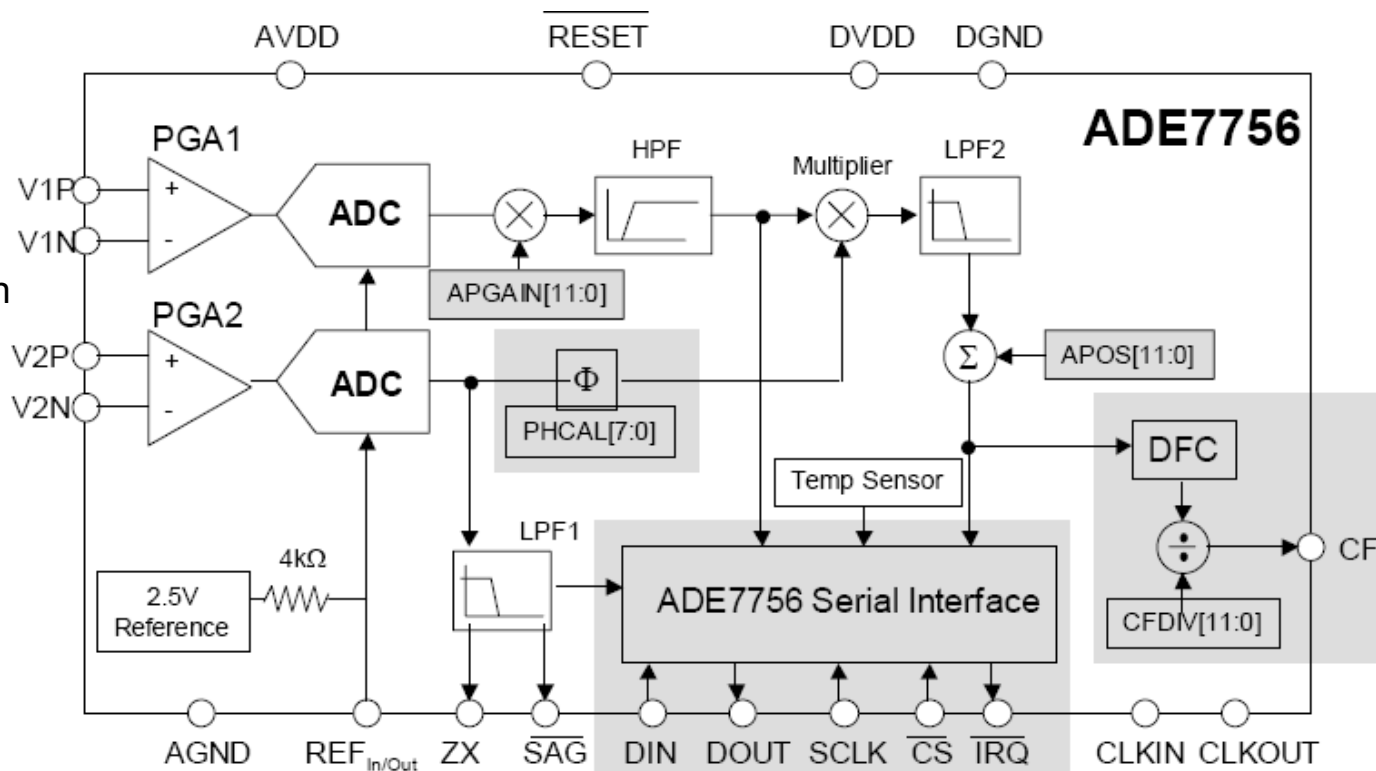
- Analog Front end
- **Current sensor connection** ◀
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- Differential input
- Input Gain up to 64 to interface low shunt resistor
Gain of 16 recommended for 100μΩ
- Phase compensation for CT connection
+/-2.5°max in 0.091°increment @ 50Hz

ADE7756: A Digital solution

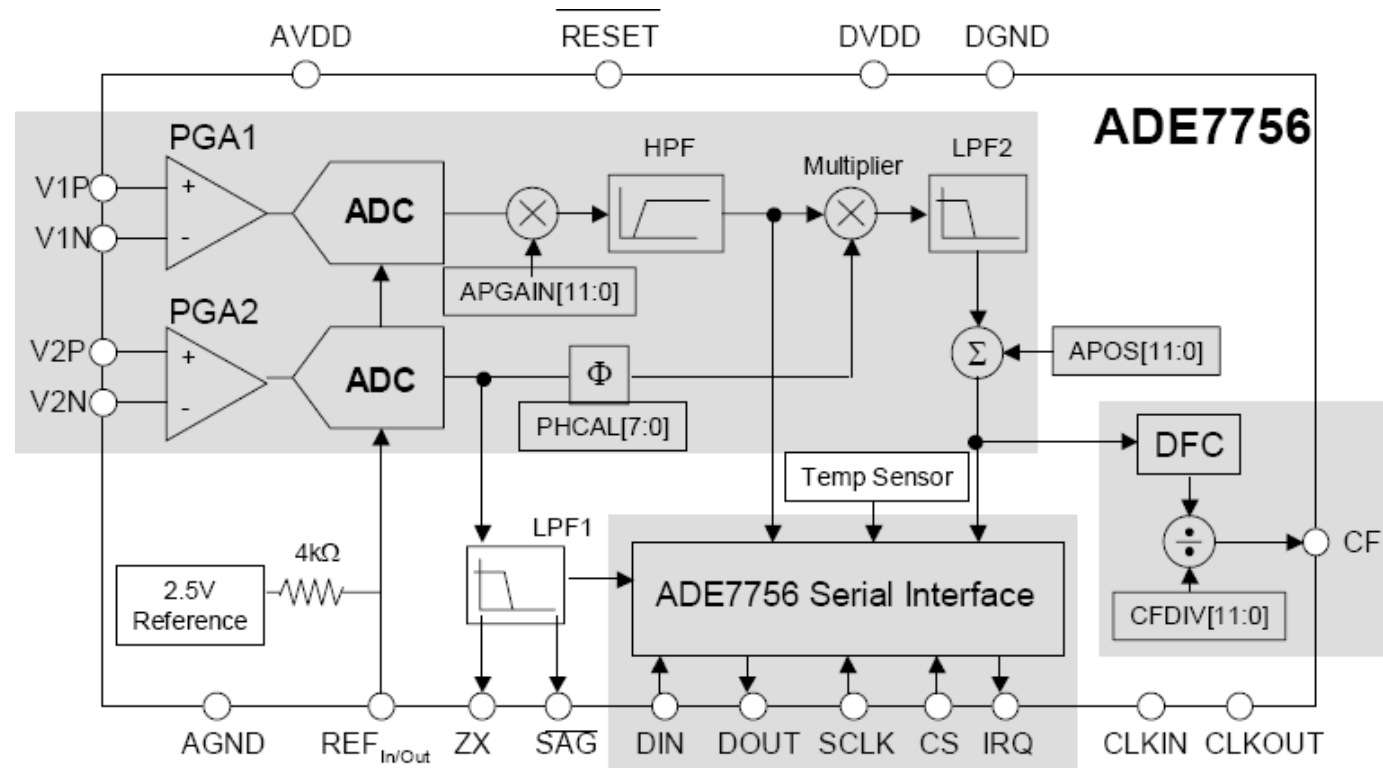
- ADE7756 application
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- No manual calibration
- Configuration done by writing ADE7756 registers at power up
- Only one point calibration to reach 0.3% accuracy
- SPI interface up to 5MHz
- CF output to drive LED

ADE7756: Energy measurement

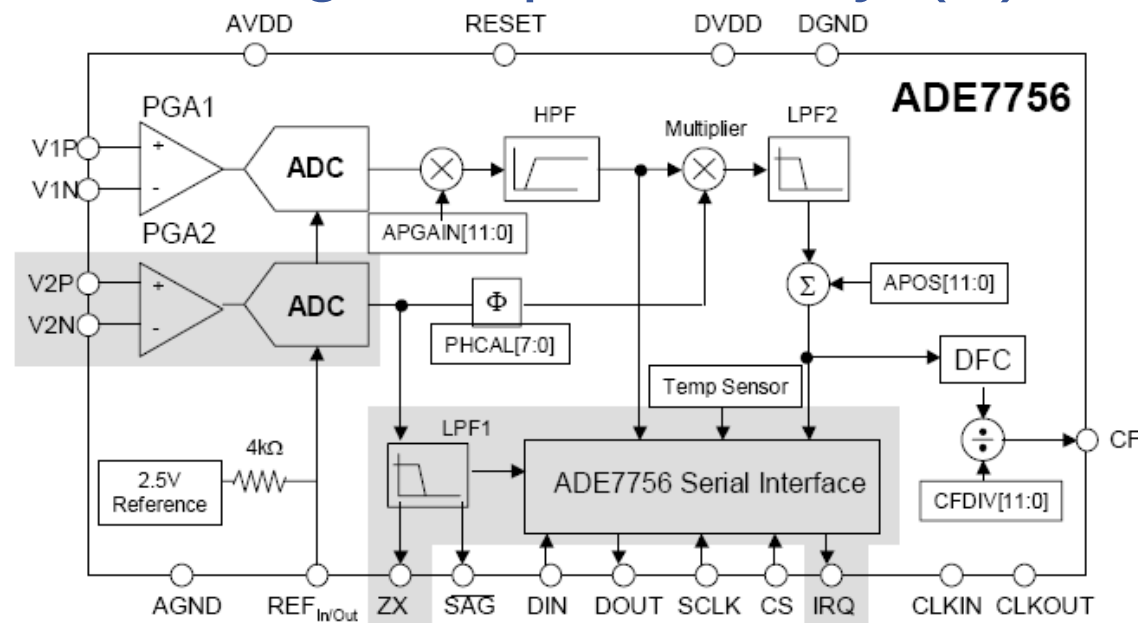
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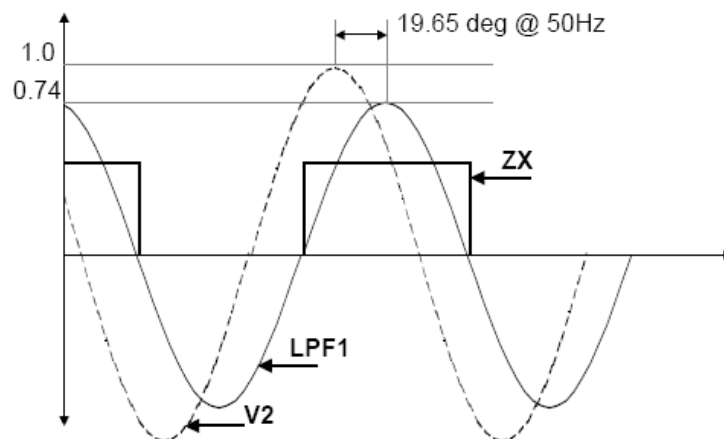
- Accumulation of the Active Energy in a 40-bit register
=> Equivalent to 11.5s of Energy at Full scale
- HPF filter eliminates any DC offset
- Gain for calibration and multi-rate billing
(APGAIN + CFDIV)

ADE7756: Line Voltage supervisory (1)

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Detect Zero-crossing on CH2 => Drive ZX pin and IRQ

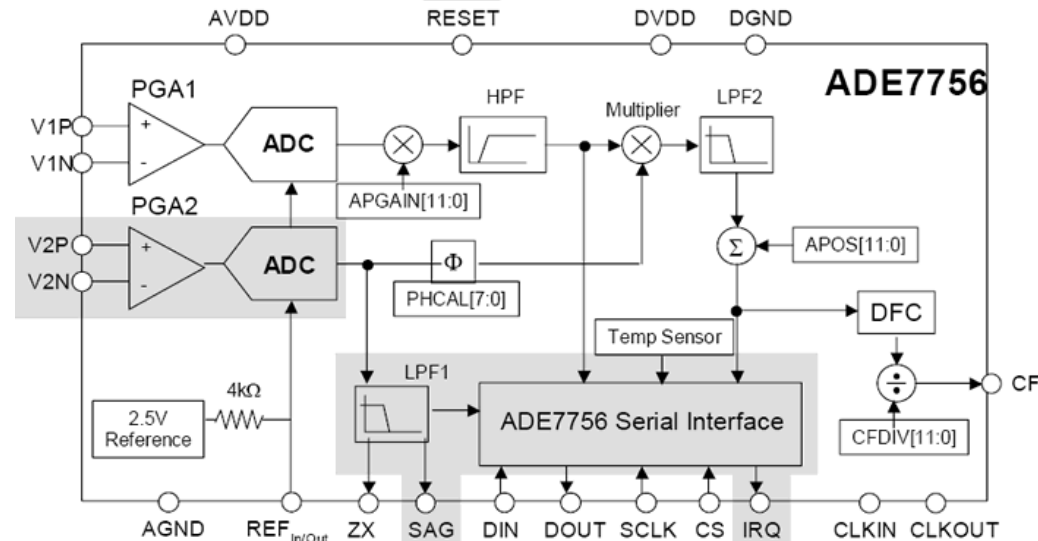


Applications:

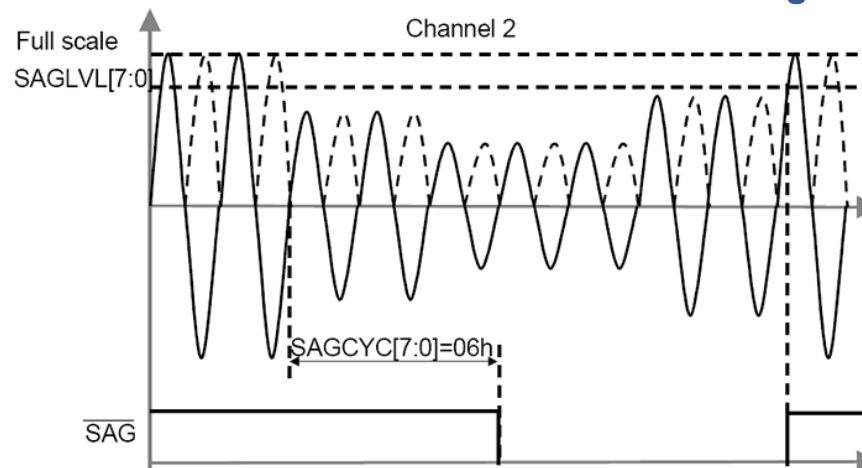
- On-chip Watch Dog timer
- Phase information of the voltage channel
- Interface with a Power switch to cut power at low current

ADE7756: Line Voltage supervisory (2)

- ADE7756 application
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 - Zero crossing
 - **SAG detection** ◀
 - Calibration Mode
 - Waveform sampling
 - Temperature sensor

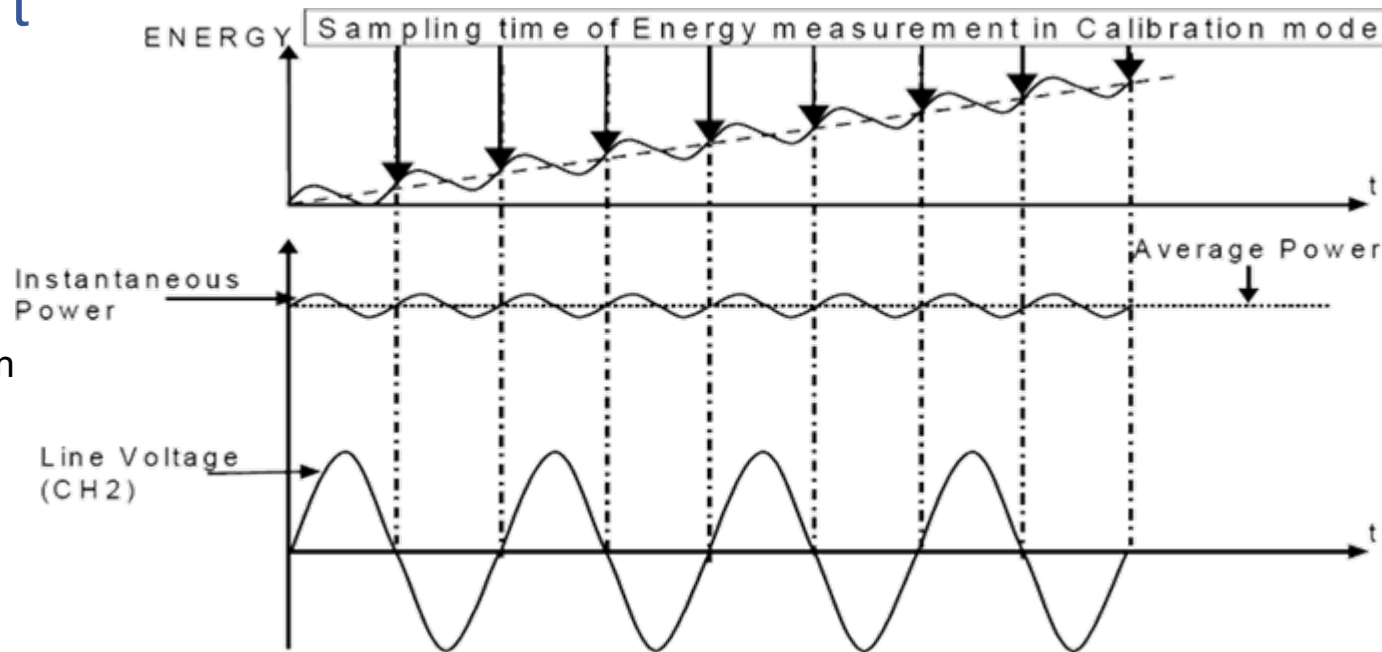


Detect Level variation on CH2 => Drive SAG pin or IRQ
SAG Level and detection time configurable



ADE7756: High Speed and accurate Energy measurement

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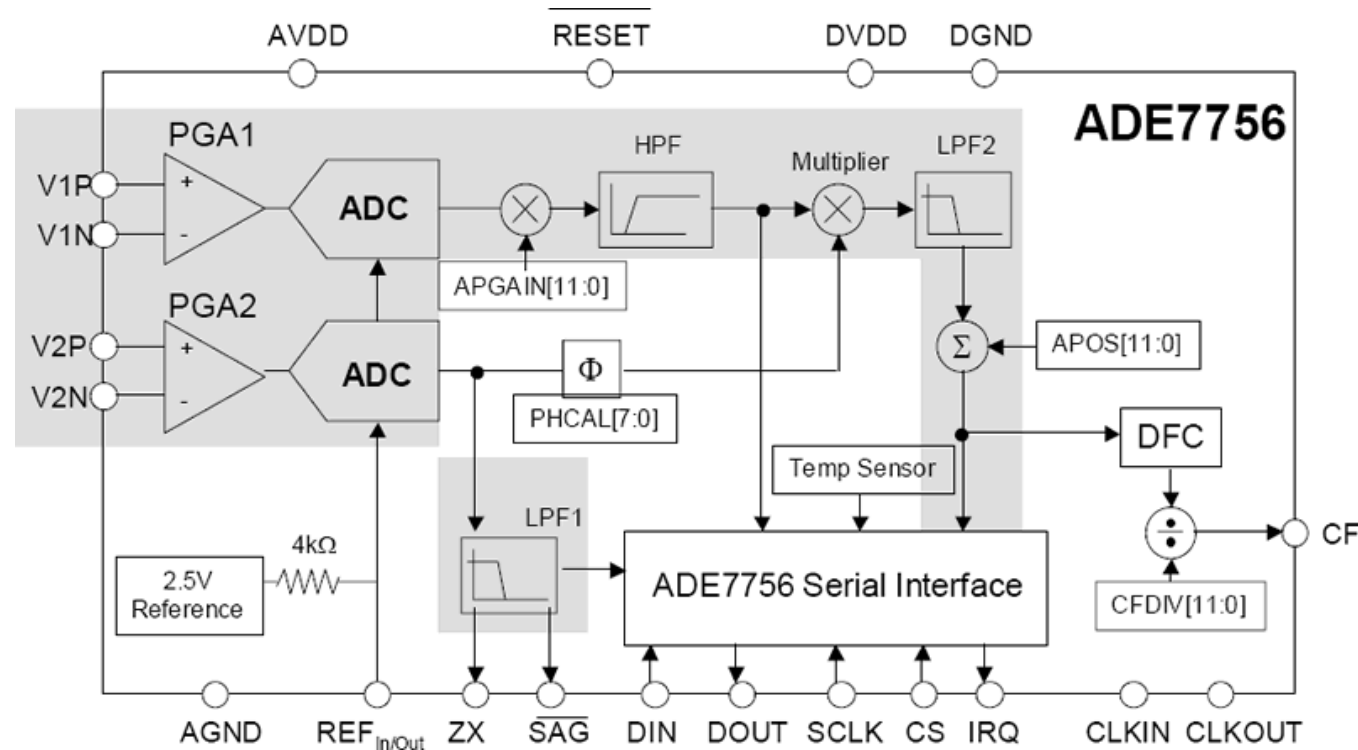
- Principle: Accumulation of the Active Energy over N half line cycles (<255) => Drive IRQ when finished

Benefits:

- Cancel the ripple frequency effect (2 x line freq) in Energy Measurement
- Shorten calibration time-Easy solution to detect Energy placed back on the grid (Sign only)

ADE7756: ADC outputs available through SPI port

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 - Temperature sensor



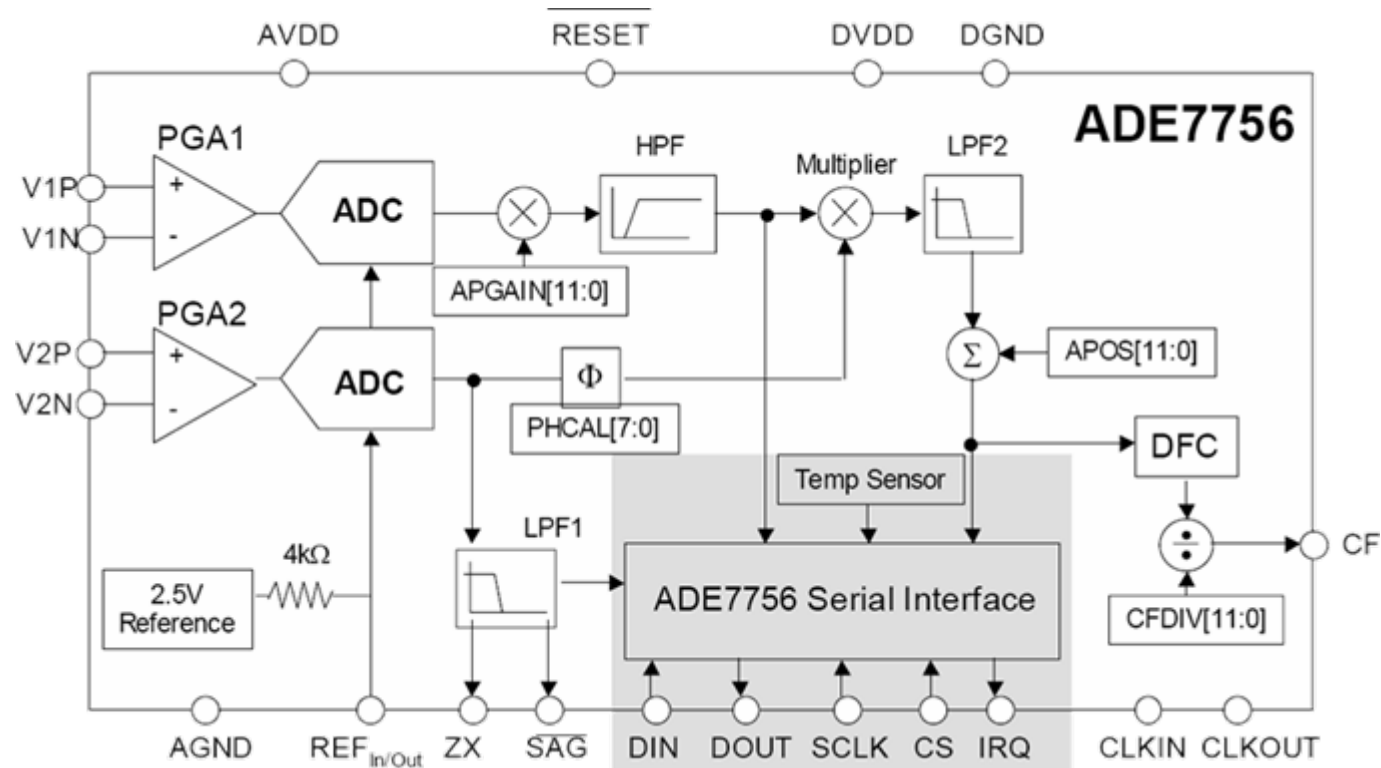
CH1 or CH2 or Multiplication results available through the WAVEFORM register (24-bit)

Equivalent sampling frequency = 28 ksps

- Use the ADE7756 as an ADC in addition to Energy measurement
=> V_{rms} or I_{rms} calculation on a μ P

ADE7756: Embedded Temperature sensor

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 - **Temperature sensor** ◀



8-bit register : 1LSB/°C

- Temperature compensation of external components
- Temperature supervisory of the system