Digital, Polyphase, Metrology IC with ADC Bit Stream Interface

Data Sheet

ADE7979

FEATURES

Digital, metrology IC, shunt-based polyphase meters
Use in the *m*Sure® system with the ADE9322B
High accuracy, supports EN50470-1, EN50470-3, IEC62053-21, IEC62053-22, IEC62053-23, IEC62053-24, ANSIC12.20, and IEEE1459 standards
Compatible with 3-phase, 3-wire or 4-wire (delta or wye) meters, and other 3-phase services
Computes active, reactive, and apparent energy on each phase and for the overall system
Neutral current calculation
Power quality measurements including THD
Single 3.3 V supply
Operating temperature: −40°C to +85°C
Flexible I²C, SPI, and HSDC serial interfaces

APPLICATIONS

Shunt-based, *m*Sure enabled, polyphase meters
Solar inverters
Process monitoring
Smart power distribution units
Polyphase ac chargers

GENERAL DESCRIPTION

The ADE7979 is a high accuracy, 3-phase, digital metrology engine with flexible serial interfaces and three flexible pulse outputs (CF1, CF2, and CF3). The device takes in four sigma-delta (Σ-Δ) analog-to-digital converter (ADC) bit streams and performs all essential energy metering functions including reactive power and rms to create a polyphase energy metering application using shunt current sensors. A complete metrology system requires the ADE7979, up to four ADE9322B Σ-Δ ADC ICs, external isolation, and a power supply of 3.3 V. The power supply required to power the ADE7979 is 3.3 V and must be isolated from the Σ-Δ ADC ICs.

The ADE7979 incorporates all signal processing required to perform total (fundamental and harmonic) active, reactive, and apparent energy measurement and rms calculations, as well as fundamental only active and reactive energy measurement and rms calculations. A fixed function digital signal processor (DSP) executes this signal processing.

The ADE7979 measures the active, reactive, and apparent energy in 3-phase configurations that include delta and wye services that can both be used with either three or four wires. The ADE7979 provides system calibration features for each phase, gain calibration, and optional offset correction. Phase compensation is also available on the device but is not necessary because the currents are sensed using shunts. The CF1, CF2, and CF3 pulse outputs provide a wide selection of power information that includes the sum of the current rms values, fundamental active and reactive powers, and total active, reactive, and apparent powers.

The ADE7979 incorporates power quality measurements that include short duration low or high voltage detection, short duration high current variations, line voltage period measurement, and angles between phase voltages and currents.

Either serial peripheral interface (SPI) or I²C interface can be used to communicate with the ADE7979. The high speed data capture (HSDC) port is a dedicated, high speed interface that can be used in conjunction with the I²C to provide access to the ADC outputs and real-time power information. The ADE7979 also has two interrupt request output pins, $\overline{\text{IRQ0}}$ and $\overline{\text{IRQ1}}$, that indicate when an enabled interrupt event occurs. The ADE7979 is available in a pb-free, 28-lead, lead frame chip scale package (LFCSP).

Note that throughout this data sheet, multifunction pins, such as SCLK/SCL, are referred to by the entire pin name or by a single function of the pin, for example, SCLK, when only that function is relevant.

For more information about the ADE7979, contact your local Analog Devices, Inc., Sales Team, email energy.support@analog.com, or visit www.analog.com/mSure.

[1] Protected by U.S. Patents 5,952,849; 6,873,065; 7,075,329; 6,262,600; 7,489,526; 7,558,080; and 8,892,933. Other patents are pending.

Rev. Sp0 **Document Feedback**

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FUNCTIONAL BLOCK DIAGRAM

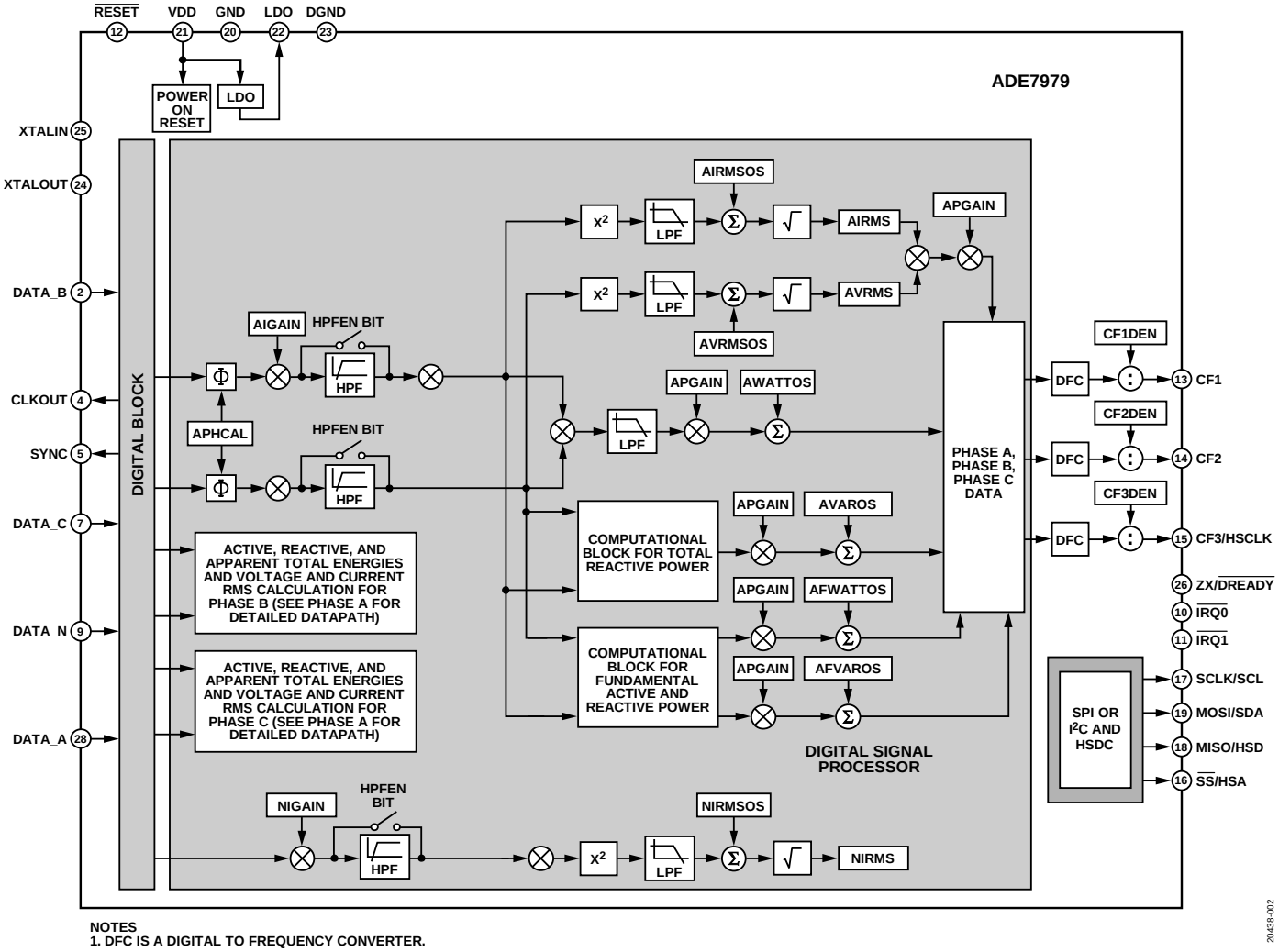

Figure 1.

NOTES

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

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