MSP430F677x

Ultra-Low Power Polyphase Energy Meter System on Chip

TEXAS INSTRUMENTS

Key device features and benefits

Feature	Benefit
Seven 24-bit sigma delta analog-to-digital converters	Class-leading accuracy across a full 2000:1 input current range throughout –40°C to +85°C
Up to 512kB Flash + 32kB SRAM	Dynamic pricing tables for time of use, large buffer for interval data, DLMS/COSEM for meter data formatting, and communication stacks for both wired and wireless protocols
Up to 4 UART, 6 SPI, 2 I2C ports	Interface to communications devices to develop smart meters
Supports multiple LCD format up to 320 segments thanks to eight MUX	Can display Asian and custom characters for global deployment
Energy libraries in software	Performs all of the polyphase meter calculations for energy and power that are required for ANSI/IEC qualified meters and provides an easy starting point for customers developing utility meter products

The Texas Instruments MSP430F6779 is a highly integrated, high accuracy, ultra-low power metrology System on Chip (SoC) designed for smart polyphase electric metering applications.

Optimized for single-phase measurement with anti-tamper, the MSP430F6779 supports up to three independent 24-bit sigma-delta ($\Sigma\Delta$) Analog-to-Digital Converters (ADC) and achieves less than 0.1% error in energy accuracy over a wide dynamic range of 2000:1. In addition, the unique combination of six additional synchronized channels ADC10 give the user the flexibility to develop the lowest cost 2-phase or 3-phase E-meters.

A comprehensive development tool set including hardware reference design and energy libraries in software enables quick development, time to market and certification.
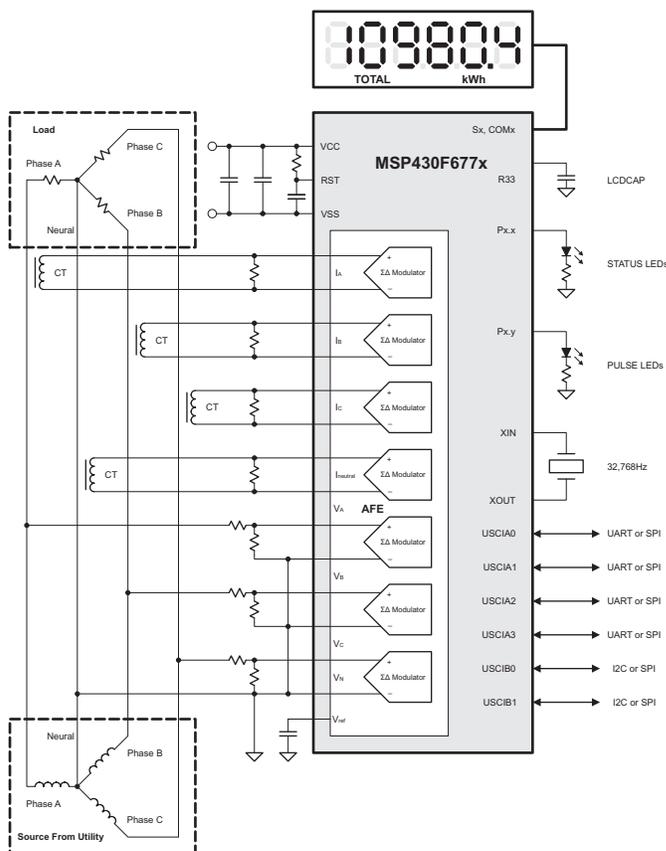
Energy library features

- Polyphase energy measurement with support for anti-tamper
- Class 0.1% accuracy over a 2000:1 dynamic range
- Calibration and key parameters including
  - RMS current and voltage
  - Active, reactive and apparent power
  - Active, reactive and apparent energies
  - Independent pulse output for active and reactive energies
  - Power factor
  - Software phase compensation
  - Frequency
  - Temperature
  - Tamper detection

▲ *F6779 block diagram*
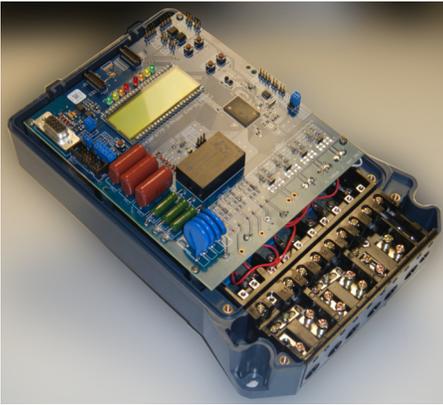
▲ *EVM430-F6779 EVM*

EVM key features

- Supports shunts/current transformers for current sensors

- Less than 0.1% error in accuracy for 2000:1 dynamic range
- Flexible and isolated sources for MSP430F6779
- 320 segment LCD display
- 32kHz RTC support
- Two LEDs and two headers for active energy and reactive energy pulses
- Support for anti-tamper detection
- PC communication to MSP430F6779 via RS-232
- Software installed for measuring metering parameters
- PC-based GUI for calibration/results via MSP430F6779
- JTAG connections for simultaneous debug

Relevant documents

- **MSP430F6779 datasheet**

Find out more about TI's MSP430F677x family by visiting the sites below:

- TI's smart grid solutions:
  www.ti.com/smartgrid
- MSP430 energy library:
  www.ti.com/tool/msp430-energy-library
- Smart Grid E2E™ community:
  www.ti.com/smartgrid-blog

TI Worldwide Technical Support

Internet

TI Semiconductor Product Information Center Home Page
support.ti.com

TI E2E™ Community Home Page
e2e.ti.com

Product Information Centers

Americas	Phone	+1(512) 434-1560
Brazil	Phone	0800-891-2616
Mexico	Phone	0800-670-7544
	Fax	+1(972) 927-6377
	Internet/E-mail	support.ti.com/sc/pic/americas.htm

Europe, Middle East, and Africa
Phone

European Free Call	00800-ASK-TEXAS (00800 275 83927)
International	+49 (0) 8161 80 2121
Russian Support	+7 (4) 95 98 10 701

Note: The European Free Call (Toll Free) number is not active in all countries. If you have technical difficulty calling the free call number, please use the international number above.

Fax	+(49) (0) 8161 80 2045
Internet	www.ti.com/asktexas
Direct E-mail	asktexas@ti.com

Japan

Phone	Domestic	0120-92-3326
Fax	International	+81-3-3344-5317
	Domestic	0120-81-0036
Internet/E-mail	International	support.ti.com/sc/pic/japan.htm
	Domestic	www.tij.co.jp/pic

Asia

Phone

International	+91-80-41381665
Domestic	Toll-Free Number

Note: Toll-free numbers do not support mobile and IP phones.

Australia	1-800-999-084
China	800-820-8682
Hong Kong	800-96-5941
India	1-800-425-7888
Indonesia	001-803-8861-1006
Korea	080-551-2804
Malaysia	1-800-80-3973
New Zealand	0800-446-934
Philippines	1-800-765-7404
Singapore	800-886-1028
Taiwan	0800-006800
Thailand	001-800-886-0010

Fax	+8621-23073686
E-mail	tiasia@ti.com or ti-china@ti.com
Internet	support.ti.com/sc/pic/asia.htm

Important Notice: The products and services of Texas Instruments Incorporated and its subsidiaries described herein are sold subject to TI's standard terms and conditions of sale. Customers are advised to obtain the most current and complete information about TI products and services before placing orders. TI assumes no liability for applications assistance, customer's applications or product designs, software performance, or infringement of patents. The publication of information regarding any other company's products or services does not constitute TI's approval, warranty or endorsement thereof.

B090712

The platform bar, E2E and MSP430 are trademarks of Texas Instruments.
All other trademarks are the property of their respective owners.

TEXAS INSTRUMENTS

IMPORTANT NOTICE

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		