

# MSP430F6736

## Single-phase energy meter IC System on Chip



The Texas Instruments MSP430F6736 is a highly integrated, high accuracy, ultra-low power metrology System on Chip (SoC) designed for system cost optimized, flexible and robust metering implementation such as electricity meters and energy measurement.

Optimized for single-phase measurement with anti-tamper, the MSP430F6736 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 5000:1. 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.

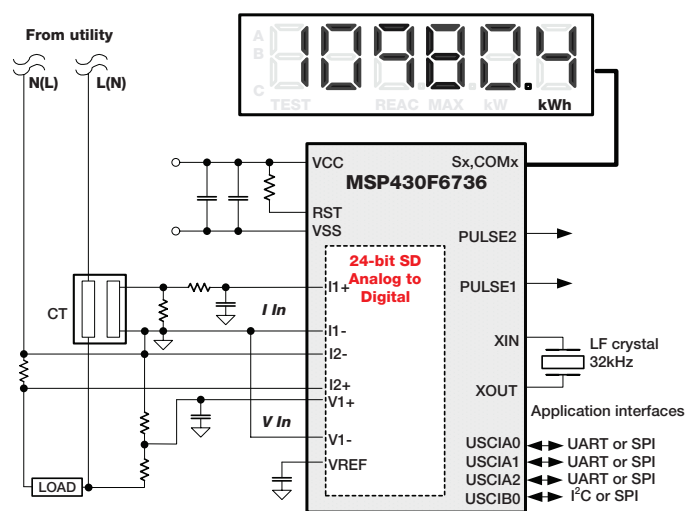
A comprehensive development tool set including hardware reference design and energy libraries in software enables quick development, time to market and certification.

### Energy library features

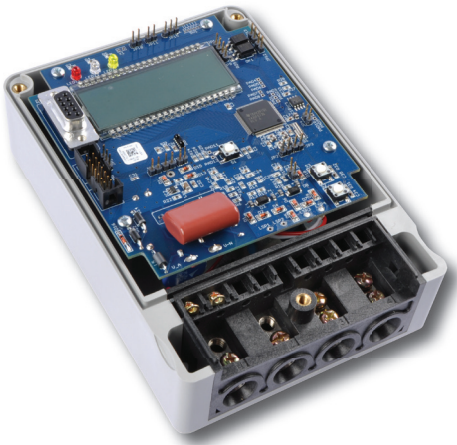
- Single-phase energy measurement with support for anti-tamper
- Class 0.1% accuracy over a 5000:1 dynamic range
- Calibration and key parameters including
  - RMS current and voltage
  - Active, reactive and apparent power
  - Active, reactive and apparent energies
  - Independent pulse output for active and reactive energies
  - Power factor
  - Software phase compensation
  - Frequency
  - Temperature
  - Tamper detection

### Key device features and benefits

Feature	Benefit
Three 24-bit sigma delta analog-to-digital converters	Class 0.1% accuracy 1-phase electricity meters + anti-tamper implementation
Six ADC10 synchronized channels	Low-cost 2-phase and 3-phase energy measurement system implementation
25 MIPS	Enables metrology + application code + communication code (like DLMS) on a single chip
Up to 128 kB Flash + 8kB RAM	Metrology + application + communication stacks implementation
Three UARTs and four timers	Interface to communications devices to develop smart meters
Optimized and robust Real-Time-Clock (RTC) <ul style="list-style-type: none"> <li>• Temperature compensated RTC</li> <li>• Ultra-low-power LPM3.5 RTC down to 1.4<math>\mu</math>A with battery backup auxiliary voltage rail</li> <li>• Accurate time stamping</li> </ul>	<ul style="list-style-type: none"> <li>• Lower system cost with no external compensation needed</li> <li>• Extended life-time for the battery backup in case of power outage</li> <li>• Enables smarter data logging, and flexible tariff implementation with time/day/year tracking</li> </ul>
Six interrupt lines and pre-scalers	Robust design with alarms and anti-tamper mechanism implementation
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	Flexibility for the user to customize energy measurement to application requirement and to develop application code on top of metrology



▲ F6736 block diagram



▲ EVM430-F6736 EVM

## EVM key features

- Supports shunts/current transformers for current sensors
- Less than 0.1% error in accuracy for 5000:1 dynamic range
- Flexible and isolated sources for MSP430F6736
- 160 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 MSP430F6736 via RS-232
- Software installed for measuring metering parameters
- PC-based GUI for calibration/results via MSP430F6736
- JTAG connections for simultaneous debug

## Relevant documents

- [MSP430F6736 datasheet](#)

*Find out more about TI's MSP430F673x family by visiting the sites below:*

- MSP430™ metering:  
[www.ti.com/430metering](http://www.ti.com/430metering)
- MSP430 energy library:  
[www.ti.com/msp430f673x-energylibrary](http://www.ti.com/msp430f673x-energylibrary)
- Smart Grid E2E™ community:  
[www.ti.com/smartgrid-blog](http://www.ti.com/smartgrid-blog)
- TI's smart grid solutions:  
[www.ti.com/smartgrid](http://www.ti.com/smartgrid)

## TI Worldwide Technical Support

### Internet

**TI Semiconductor Product Information Center Home Page**  
[support.ti.com](http://support.ti.com)

**TI E2E™ Community Home Page**  
[e2e.ti.com](http://e2e.ti.com)

### Product Information Centers

<b>Americas</b>	Phone	+1(972) 644-5580
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<b>Mexico</b>	Phone	0800-670-7544
	Fax	+1(972) 927-6377
	Internet/Email	<a href="http://support.ti.com/sc/pic/americas.htm">support.ti.com/sc/pic/americas.htm</a>

### Europe, Middle East, and Africa

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

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Internet	<a href="http://www.ti.com/asktexas">www.ti.com/asktexas</a>
Direct Email	<a href="mailto:asktexas@ti.com">asktexas@ti.com</a>

### Japan

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Internet/Email	International	<a href="http://support.ti.com/sc/pic/japan.htm">support.ti.com/sc/pic/japan.htm</a>
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Domestic	<u>Toll-Free Number</u>
<b>Note:</b> Toll-free numbers do not support mobile and IP phones.	
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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
Email	<a href="mailto:tiasia@ti.com">tiasia@ti.com</a> or <a href="mailto:ti-china@ti.com">ti-china@ti.com</a>
Internet	<a href="http://support.ti.com/sc/pic/asia.htm">support.ti.com/sc/pic/asia.htm</a>

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