# 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 (ΣΔ) 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.

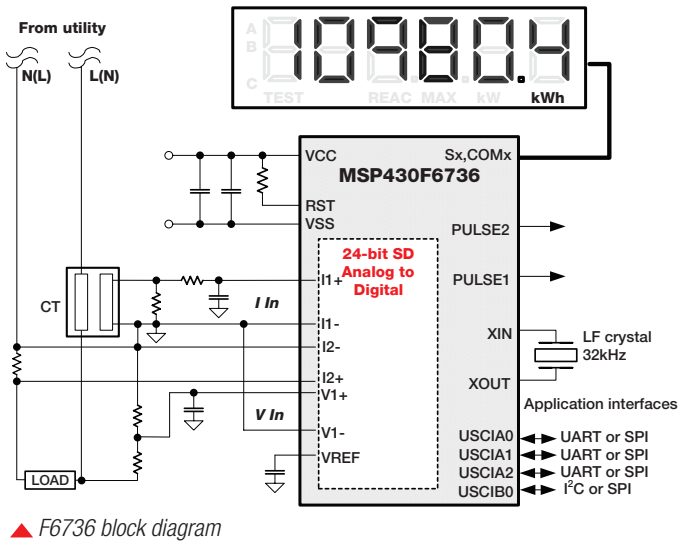
A comprehensive development tool set including hardware reference design and energy libraries in software enables quick development, time to market and certification.

### 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)<br>• Temperature compensated RTC<br>• Ultra-low-power LPM3.5 RTC down to 1.4µA with battery backup auxiliary voltage rail<br>• Accurate time stamping | • Lower system cost with no external compensation needed<br>• Extended life-time for the battery backup in case of power outage<br>• Enables smarter data logging, and flexible tarriff implementation with time/day/year tracking |
| 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**
- MSP430 energy library: **www.ti.com/msp430f673x-energylibrary**
- Smart Grid E2E™ community: **www.ti.com/smartgrid-blog**
- TI's smart grid solutions: **www.ti.com/smartgrid**

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

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