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Worldwide (In English)

Single-Phase Energy Meter with CPU-Independent Metrology Engine and Tamper Detection

(ACTIVE) TIDM-SINGLEPHASEMETER-FE427A

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Description & Features

Technical Documents

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Key Document

Implementing An Electronic Watt-Hour Meter With MSP430FE42x(A)/FE42x2 (Rev. C)

(PDF 658 KB)

24 Apr 2009

1,117 views

Read Abstract

Single Phase Energy Meter w/ CPU-Indep. Metrology & Tamper Detect. Test Data

(PDF 303 KB)

24 Jan 2014

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Description

This single-chip electric meter solution implements a single-phase e-meter utilizing the MSP430FE427A SoC and TPS77033 LDO regulator. It utilizes the CPU-independent ESP430 Metrology Engine to perform all of the required e-meter calculations with no impact on the main MCU core. This allows the developer to add other functions into the SoC, reducing overall e-meter BOM cost. With this tool developers can quickly determine that the FE427A e-meter SoC fits the requirements for their low-cost smart e-meter. In addition, this EVM has tamper detection capabilities which assist the engineer's development of methods to prevent theft of electricity from utilities.

Features

- Single-phase electricity meter design meets the accuracy requirements for ANSI C12.20 and IEC-62053 Class 0.5 meters.
- The ESP430 independently calculates active and reactive power and energy, RMS current and voltage, power factor and line frequency.
- Built-in 128-segment display
- Powered from line voltage from 110V-240V
- Tamper detection algorithms implemented in the ESP430 with user-configurable threshold detection levels.

Schematic/Block Diagram

Quickly understand overall system functionality.

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Test Data

Get results faster with test and simulation data that's been verified.

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Design Files

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Bill of Materials (BOM)

Find the complete list of components in this reference design.

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Part Number	Buy from Texas Instruments or Third Party	Status
EVM430-FE427A: Single-Phase Energy Metering EVM - MSP430FE427A	\$249.00(USD) In Stock Typically Ships in 1 to 3 Business Days Buy from TI	ACTIVE

TI Devices (2)

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Part Number	Name	Product Family	Sample & Buy	Design Kits & Evaluation Modules
MSP430FE427A	16-Bit Ultra-Low-Power Microcontroller for Energy Meters, 32KB Flash, 1024B RAM	Ultra-Low Power	Sample & Buy	View Design Kits & Evaluation Modules
TPS77033	Single Output LDO, 50mA, Fixed(3.3V), Low Quiescent Current	Linear Regulator (LDO)	Sample & Buy	View Design Kits & Evaluation Modules

CAD/CAE symbols

Part #	Package Pins	CAD File (.bxl)	STEP Model (.stp)
MSP430FE427A	LQFP (PM) 64	Download	Download
TPS77033	SOT (DBV) 5	Download	Download

Texas Instruments and Accelerated Designs Inc. have collaborated together to provide TI customers with schematic symbols and PCB layout footprints for TI products.

Step 1: Download and install the Ultra Librarian software [ZIP: 62MB](#)

Step 2: Download the Symbol and Footprint .bxl file.

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Technical Documents

Application Notes (1)

Title	Abstract	Type	Size (KB)	Date	Views	TI Recommends
Implementing An Electronic Watt-Hour Meter With MSP430FE42x(A)/FE42x2 (Rev. C)	Read Abstract	Multiple Files		24 Apr 2009	1,117	✓

User Guides (1)

Title	Abstract	Type	Size (KB)	Date	Views	TI Recommends
Single Phase Energy Meter w/ CPU-Indep. Metrology & Tamper Detect. Test Data		PDF	303	24 Jan 2014	123	✓

Design Files (2)

Title	Abstract	Type	Size (KB)	Date	Views
Single Phase Energy Meter w/ CPU-Indep. Metrology & Tamper Detect. Schematic		PDF	166	24 Jan 2014	117
Single Phase Energy Meter w/ CPU-Indep. Metrology & Tamper Detect. (BOM)		ZIP	41	24 Jan 2014	42

Related Tools & Software

Software (1)

[Single Phase Energy Meter w/ CPU-Indep. Metrology & Tamper Detect. Design Files](#)
(ZIP, 3192 KB) 65 views, 24 Jan 2014

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