Single Phase and DC Embedded Metering (Server Power Monitor)

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Description

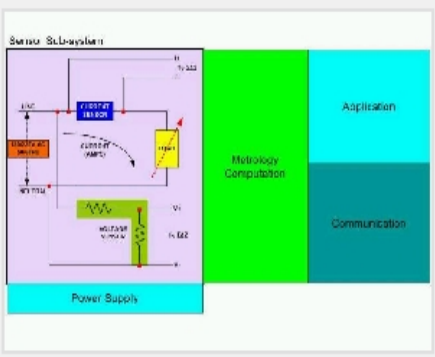
This design implements a high accuracy single phase embedded metering application using an MSP430 MCU. This EVM has built-in support of measuring AC voltage, current, active power, reactive power, apparent power, frequency, power factor, voltage THD, current THD, fundamental voltage, fundamental current, fundamental power and DC voltage, DC current, DC active power. It has the ability to detect the input voltage to work as DC or AC mode. It also is equipped with the capability to compensate the effect of the wire resistance and the EMI filter capacitor so that the reading of voltage and power matches the reading of an external meter when EMI filter is connected to the as input side.

Features

- Measures active, reactive and apparent power and power factor in better than 0.5% accuracy
- Readings update every 4 AC cycles or 80ms
- Automatic reporting measurements to UART
- Capable of AC and DC automatic switching and measurement
- Capable of EMI capacitor and wire resistance compensation
- No separate DC calibration required

Schematic/Block Diagram

Quickly understand overall system functionality.



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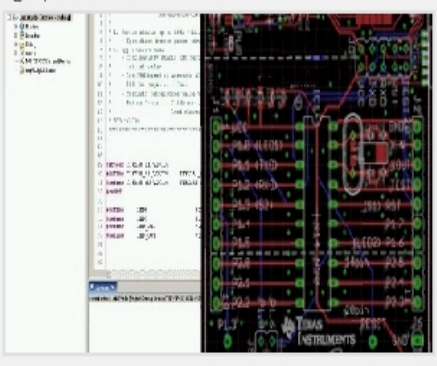

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Bill of Materials (BOM)

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-I2040S: MSP430i2040 Sub metering EVM	$99.00(USD) In Stock Typically Ships in 1 to 3 Business Days Buy from TI	ACTIVE

TI Devices (6)

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Part Number	Name	Product Family	Sample & Buy	Design Kits & Evaluation Modules
MSP430I2020	16-bit Mixed Signal Microcontroller	Ultra-low Power	Sample & Buy	View Design Kits & Evaluation Modules
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Technical Documents

User Guides (1)

Title	Abstract	Type	Size (KB)	Date	Views
Single Phase AC and DC Power Monitor Design Guide (Rev. A)		PDF	6738	18 Aug 2014	268

Design Files (6)

Title	Abstract	Type	Size (KB)	Date	Views
Single Phase and DC Embedded Metering (Server Power Monitor) Layer Plots		ZIP	198	28 Aug 2014	20
Single Phase and DC Embedded Metering (Server Power Monitor) Assembly Drawings		PDF	124	28 Aug 2014	21
Single Phase and DC Embedded Metering (Server Power Monitor) Schematic		PDF	339	28 Aug 2014	109
Single Phase and DC Embedded Metering (Server Power Monitor) CAD Files		ZIP	295	28 Aug 2014	29
Single Phase and DC Embedded Metering (Server Power Monitor) Bill of Materials		PDF	134	28 Aug 2014	46
Single Phase and DC Embedded Metering (Server Power Monitor) Gerber Design Files		ZIP	305	28 Aug 2014	17

Related Tools & Software

Software (1)

Single Phase and DC Embedded Metering (Server Power Monitor) Software
(ZIP, 41661 KB) 28 Aug 2014

Applications

- Smart E-Meter: AMR/AMI

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