

Microchip Smart Metering Platform

Newest Smart Energy Platform Core: SAM4C Series

Summary

To meet the demands of the metering market, the latest energy meter designs require integrated solutions for managing a range of functions that include analog-to-digital conversion, digital signal processing, wireless connectivity to home and neighborhood networks and security. Microchip's smart energy platform provides a unique, multi-level architecture centered around the SAM4C series of microcontrollers.

The ATSAM4C family includes a dual ARM® Cortex®-M4 that enables integration of the application layer, communications layers and metrology functions in a single device. This family of devices has options for integrated software Metrology or an external hardware metrology AFE as well as an integrated or external Power-Line Carrier (PLC) physical layer solution.

Microchip Smart Metering Solution comes along with a comprehensive and flexible Software Metrology Library to support various country-specific requirements to enable the design of residential, commercial and industrial meters up to class 0.2 accuracy with a dynamic range of 3000:1

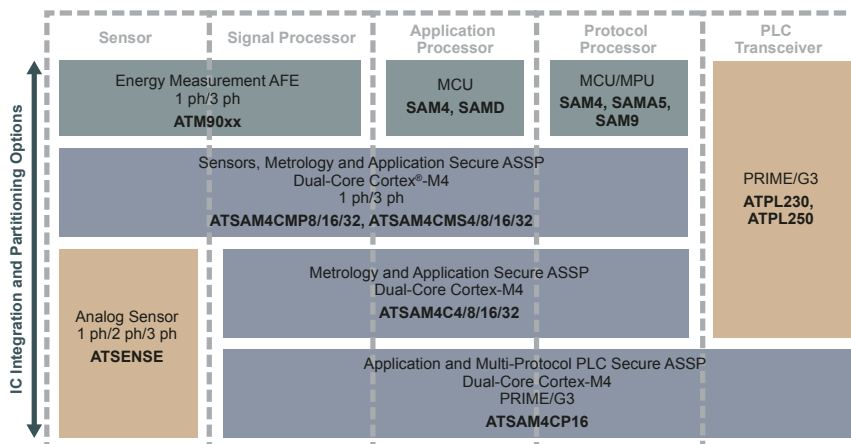
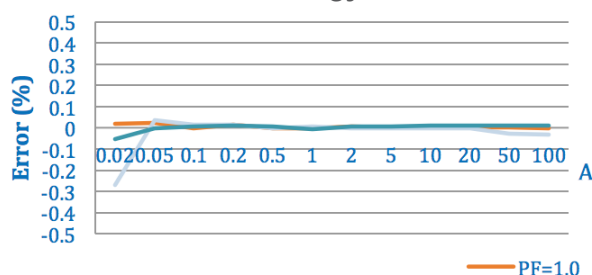
Key Benefits

- Dual-core architecture with separated program memories for main application (legally non-relevant software) and metrology (legally relevant software)
- Single- and poly-phase solutions up to class 0.2 accuracy
- 3000:1 dynamic range improves performance and reduces OEM's overall cost of manufacturing and bill of materials
- Compliant with IEC62052-11, IEC62053-22/23, ANSI C12.1, C12.20
- Advanced cryptographic engine
- Flexible and best-in-class software or hardware metrology
- Standalone sensing AFE and SoC with integrated AFE option
- Power Line Communication option: can embed a PLC modem or be combined with an external PLC AFE

Typical Applications

- Residential and industrial energy meters
- Smart meters
- Data concentrators
- Data acquisition terminals
- Power monitoring instruments that need to measure voltage, current, THD, DFT, mean power, etc.

ATSAM4CM Active Energy Linear Curve



Product Information

Device	SAM4C4	SAM4C8	SAM4C16	SAM4C32C	SAM4C32E	SAM4CMS4	SAM4CMP/S8	SAM4CMP/S16	SAM4CMP/S32	SAM4CP16X
Flash	256 KB	512 KB	1 MB	2 MB		256 KB	512 KB	1 MB	2 MB	1 MB
SRAM (KB)	128 + 16 + 8			256 + 32 + 16		128 + 16 + 8			256 + 32 + 16	128 + 16 + 8
Package	100-pin LQFP				144-pin LQFP	100-pin LQFP				176-pin LQFP
GPIO	74				106	52/57				69
PWM	4					3				4
UART	2× UARTs, 5× USARTs					2× UARTs, 3/4× USARTs				2× UARTs, 5× USARTs
SPI	2× Controllers: 8 C/S + 5 USARTs in SPI Mode					1× Controller: 4 C/S + 3/4 USARTs in SPI Mode				
ADC	10-bit, 6× External + 2× Internal					10-bit, 4× External + 2× Internal				10-bit, 5× External + 2× Internal
Metrology AFE	–	–	–	–	–	7 channels/4 channels				–
Segment LCD	50 × 6					33 × 6/38 × 6				46 × 5
PLC Modem	–					–				PRIME PLC G3-PLC
USB FS	–	–	–	–	Host/Device	–	–	–	–	–
Timer	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.	6 ch.
TWI	2	2	2	2	2	2	2	2	2	2

Development Tools

	Name	Supported Chips	Description
	SAM4CMS32 Demonstration Board (ATSAM4CMS32-DB)	ATSAM4CMS32CB-AU ATSAM4CMS32CB-AUR	These kits use the ATSAM4CMSx to demonstrate high-accuracy, single-phase energy metering functions. The ATSAM4CMSx is an integrated single-phase energy metering SoC with 120 MHz, dual-core ARM® Cortex®-M4 processor cores. The board is ETSI format-compliant and is designed to interface with CT, Rogowski and Shunt current sensors. The kit includes a metering demo application and Microchip's Metrology library for quick out-of-the-box evaluation. You will need to connect your own current sensors to complete the metering demo setup.
	SAM4CMS Demonstration Board (ATSAM4CMS-DB)	ATSAM4CMS16CC-AU ATSAM4CMS16CC-AUR ATSAM4CMS8CC-AU ATSAM4CMS8CC-AUR ATSAM4CMS4CC-AU ATSAM4CMS4CC-AUR	
	SAM4CMP32 Demonstration Board (ATSAM4CMP32-DB)	ATSAM4CMP32CB-AU ATSAM4CMP32CB-AUR	These kits use the ATSAM4CMPx to demonstrate the high-accuracy, poly-phase energy metering functions. The ATSAM4CMPx is an integrated poly-phase energy metering SoC with 120 MHz, dual-core ARM Cortex-M4 processor cores. The board is ETSI format-compliant and is designed to interface with CT, Rogowski and Shunt current sensors. The kit includes a metering demo application and Microchip's Metrology library for quick out-of-the-box evaluation. You will need to connect your own current sensors to complete the metering demo setup.
	SAM4CMP Demonstration Board (ATSAM4CMP-DB)	ATSAM4CMP16CC-AU ATSAM4CMP16CC-AUR ATSAM4CMP8CC-AU ATSAM4CMP8CC-AUR	
	SAM4C32 Evaluation Kit (ATSAM4C32-EK)	ATSAM4C32CA-AU ATSAM4C32CA-AUR	These kits let you quickly evaluate and develop code for smart energy applications built around two high-performance 32-bit ARM Cortex-M4 RISC processors. They are ideal for getting started quickly using the Microchip dual-cortex M4 architecture and evaluating the device performances, low-power mode, anti-tampering and cryptographic functions. The board is equipped with extension connectors such as Microchip RF transceivers.
	SAM4C Evaluation Kit (ATSAM4C-EK)	ATSAM4C16CB-AU ATSAM4C16CB-AUR ATSAM4C8CB-AU ATSAM4C8CB-AUR ATSAM4C4CB-AU ATSAM4C4CB-AUR	
	SAM4CP16B Evaluation Kit (ATSAM4CP16B-EK)	ATSAM4CP16B-AHU-Y	This kit shows the capabilities of the ATSAM4CP16B for smart metering platforms with embedded power line communications. The kit includes a fully operational PRIME communications stack. The ATSAM4CP16B platform supports the PRIME v1.3.6 and PRIME v1.4 specification.
	SAM4CP16C Evaluation Kit (ATSAM4CP16C-EK)	ATSAM4CP16C-AHU-Y	This kit is a hardware platform for evaluating the ATSAM4CP16C System-on-Chip (SoC) for G3 power line communication. The kit provides easy access to the features of the ATSAM4CP16C and explains how to integrate the device into a custom design.

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