

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

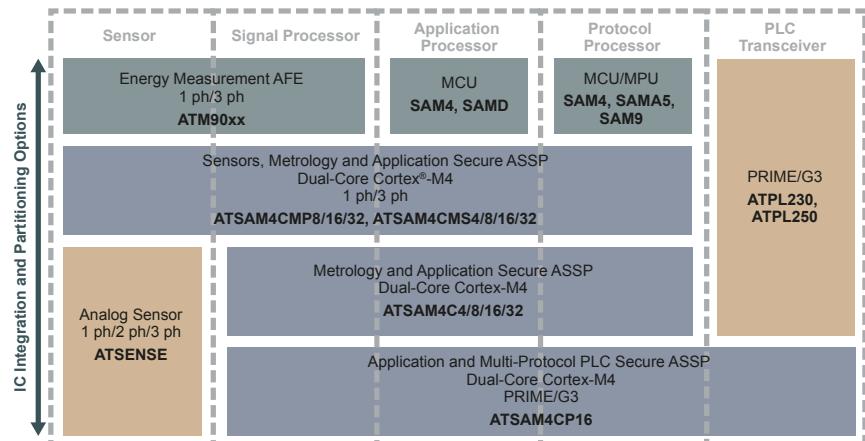
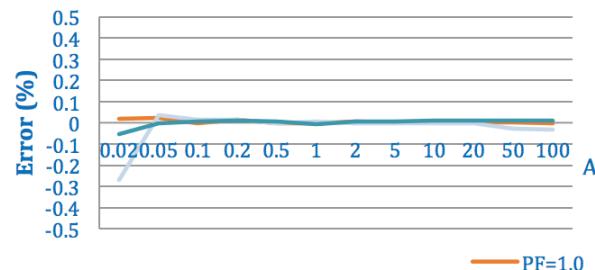
Key Benefits

- 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			
Package	100-pin LQFP			144-pin LQFP	100-pin LQFP					176-pin LQFP			
GPIO	74			106	52/57					69			
PWM	4				3					4			
UART	2x UARTs, 5x USARTs				2x UARTs, 3/4x USARTs					2x UARTs, 5x USARTs			
SPI	2x Controllers: 8 C/S + 5 USARTs in SPI Mode				1x Controller: 4 C/S + 3/4 USARTs in SPI Mode								
ADC	10-bit, 6x External + 2x Internal				10-bit, 4x External + 2x Internal					10-bit, 5x External + 2x Internal			
Metrology AFE	-	-	-	-	-	7 channels/4 channels							
Segment LCD	50 x 6				33 x 6/38 x 6					46 x 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	

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