The newest addition to the SAM D10 and SAM D11 microcontroller (MCU) series, the Atmel® | SMART SAM D09 is the smallest ARM® Cortex®-M0+ based device available from Atmel.

As a lower-cost alternative to the Atmel | SMART SAM D10 MCU, the SAM D09 device is to be offered only where price is the gating factor to securing a design-in. Though pin compatible to the SAM D10 MCU, it is available with a reduced feature set and in two memory and package variants:

Part Number	SAMD09C13A-SSUT	SAMD09D14A-MUT
Flash/SRAM	8KB/4KB	16KB/4KB
Event System	6-ch	6-ch
DMA	6-ch	6-ch
ADC	5-ch (12-bit 350ksps)	10-ch (12-bit 350ksps)
SERCOM	2	2
Timer/Counter	2	2
GPIO	12	22
Supply Voltage	2.4V – 3.63V	2.4V – 3.63V
Package	14-pin SOIC	24-pin QFN

Positioning of the SAM D09 Microcontroller

For new designs—where the choice of the microcontroller architecture has not been clearly determined by the customer—the sales strategy should be as follows:

- If the customer is core agnostic and doesn't need 32-bit performance, lead with an Atmel AVR® device
- When the customer specifies 32-bit and the focus priority is cost, use SAM D09 as a door opener. Then upsell the unique features in the SAM D10 like PTC, 105C availability, Timer/Counter for control and more
- Maximize AS6/ASF environment advantages over competitors' Integrated Development Environments (IDEs) to avoid a fight purely on price

Competition Overview

The table below compares the Atmel | SMART SAM D09, D10 and D11 series to the STM32F030, a product often encountered at customers for cost-driven ARM designs. As the table shows, even the entry-level Atmel | SMART SAM D device, the SAM D09, outperforms the STM32F030. Some highlights to remember in customer meetings:

- STM32F030 needs three more external components than the SAM D09/10/11. This represents an additional 2 - 3 cents in component cost, as well as additional PCB area, assembly time, and assembly cost.
- SAM D09/10/11 devices use only two pins for power, and the RESET line can be configured as GPIO on all packages. This means you can use a smaller, cheaper package from Atmel and still have enough pins.
- All Atmel | SMART devices use the ARM Cortex-M0+ CPU, while the STM32F030 uses the Cortex-M0. The M0+ delivers 9% higher performance than the M0 and uses 30% less power. It also supports single-cycle IO access—a feature vital for reliable bit banging and other timing critical tasks.

	SAMD09C13 SAMD09D14	SAMD10C SAMD11C	SAMD10D SAMD11D	STM32F030F4
CPU	M0+	M0+	M0+	M0
Flash	8-16KB	8-16KB	8-16KB	16KB
SRAM	4KB	4KB	4KB	4KB
EEPROM	Emulated in Flash	Emulated in Flash	Emulated in Flash	N/A
SPI	2 SERCOM	2 SERCOM	3 SERCOM	1
I2C	2 SERCOM(3.4Mbps)	2 SERCOM(3.4Mbps)	3 SERCOM(3.4Mbps)	1(400kbps)
UART	2 SERCOM	2 SERCOM	3 SERCOM	1
FS USB	N/A	FS USB Device (crystal less)	FS USB Device (crystal less)	N/A
Touch	N/A	Up to 12 ch	Up to 42/72 ch	N/A
ADC (12-bit)	5/10-ch 350ksps	5-ch 350ksps	8/10-ch 350ksps	11-ch 1Msps (9 external)
ADC Gain	½-16x	½-16x	½-16x	N/A
DAC	N/A	1-ch 10-bit 350ksps	1-ch 10-bit 350ksps	N/A
AC	N/A	2	2	N/A
DMA	6-ch	6-ch	6-ch	5-ch
Event system	6-ch	6-ch	6-ch	limited
Timer/Counter	1 / 2 x 16 bit	2 x 16 bit	3 x 16-bit	4x 16-bit
Advanced T/C	N/A	1x 16-bit	1 x 16-bit	1x 16-bit
Operating Voltage	2.4-3.63	1.62-3.63	1.62-3.63	2.4-3.6
Package	SOIC14/QFN24	SOIC 14	SOIC20/QFN24	TSSOP20
GPIO	12/22	12	18/22	15
External components	2 caps	2 caps	2 caps	4 caps required 1 Cap for RST recommended