



NEWS RELEASE

# Ambiq's Apollo SoCs Redefine 'low power' with Up to 10x Reduction in Energy Consumption

2015-01-19

Ambiq®, a leader in ultra-low power integrated circuits, today announced the Apollo family of four 32-bit Arm® Cortex®-M4F system on chips (SoCs). In real-world applications, their energy consumption is typically 5 to 10 times lower than that of SoCs of comparable performance, resulting in far longer battery life in wearable electronics and other battery-powered applications. The dramatic reduction in energy consumption is achieved using Ambiq's patented Sub-threshold Power Optimized Technology (SPOT®) platform.

Wearable devices that might otherwise run for days or weeks on a battery can be designed, or redesigned, to function for months or years. Engineers can take advantage of the expanded power budget to add new features and functions that were not previously possible, or opt for smaller batteries, enabling them to create innovative packaging for their products to enhance consumer appeal.

Uniquely, Apollo ultra-low power SoCs optimize both active and sleep mode power. They consume an industry-leading 30µA/MHz when executing instructions from flash and feature average sleep mode currents as low as 100nA. This extremely low energy consumption does not compromise performance. The Arm Cortex-M4F core, with its precision floating point unit, offers the computational horsepower required in an Internet of Things (IoT) world where algorithmic processing requirements are increasing due to the growing use of sensors, audio, and automation sources.

Highly integrated Apollo SoCs operate at up to 24MHz. They are available with up to 512KB of flash and 64KB of RAM to accommodate radio and sensor overhead in addition to application code. Communication with sensors, radios, other peripherals and an optional host processor is implemented via I<sup>2</sup>C/SPI ports and a UART. On-chip



resources include a 10 bit, 13-channel, 1MS/s ADC and a temperature sensor with  $\pm 2^{\circ}\text{C}$  accuracy. Two compact packaging options are available – a 64-pin, 4.5 x 4.5mm BGA package with 50 GPIO and a further size-optimized 2.4 x 2.77mm, 42-pin CSP with 27 GPIO.

Ambiq's SPOT platform operates transistors at sub-threshold voltages (less than 0.5V), rather than using transistors that are turned all the way "on" at 1.8V. It uses the leakage current of "off" transistors to compute in both digital and analog domains. The patented technology, implemented in an industry-standard CMOS process, has overcome the challenges of noise susceptibility, temperature sensitivity and process drift previously associated with sub-threshold voltage switching. The company's AM08x5 and AM18x5 families of ultra low power **real time clocks**, launched in 2013, are based on the same platform.

Ambiq's CEO and President, Mark Foley, said: "The energy efficiency of system of chips has been getting better over the last few years but nobody has delivered the near order-of-magnitude improvement made possible by our **SPOT** platform. The technology, proven in our real-time clocks over the last couple of years and now applied to Apollo SoCs, delivers the breakthrough in battery life that designers of portable devices have been demanding. Looking ahead, we predict that semiconductor energy consumption will be halved every two years. The trend starts here."

**Apollo SoCs** are sampling to selected customers now. Volume production will commence in the spring of 2015 with prices from \$1.50 each in 10K+ volumes.