The EOS™ S3 sensor processing System-on-Chip (SoC) is a multi-core sensor processing system that enables a vast array of sensor applications, from fundamental to computationally intensive, on smartphones, wearables and IoT devices. This ultra-low power, processing-efficient system allows OEMs to extend battery life while designing in sophisticated, always-on sensing capabilities on mobile devices. Advanced sensor algorithms, such as voice recognition, motion compensation heart rate monitoring, and indoor navigation can be implemented at significantly reduced power consumption relative to competing MCU-based solutions.

- Unique multi-core architecture provides world class computational capability at industry-leading power levels.
- Delivers 80% more compute capability than traditional ARM M4F based microcontroller sensor hub solutions at a fraction of the power consumption.
- Dedicated voice processing architecture enables always-on voice applications at less than 350 µAmps.

Capable of running the most fundamental algorithms as well as the most computational-intensive algorithms on the market today, with extra capacity in anticipation of future software requirements.
Applications

**EOS S3 Smartphone Application — Enabling more immersive user experiences**

QuickLogic’s ultra-low power sensor processing solutions deliver a natural always-on voice enabled user experience — a new class of context-driven use cases. Ultra flexible hardware and software programmability allows multiple system level power optimizations possible to further reduce energy consumption.

**EOS S3 Wearable Band Application — 6 months battery life on a coin cell? Imagine the possibilities.**

Complete ultra-low power sensor processing solutions enables new use cases for wearable devices.
## Features

### ARM Cortex-M4 Subsystem
- Cortex-M4 MCU with Floating Point Unit (FPU)
- 512 KB SRAM for code and data memory
- 32 nested vectored interrupt; wake-up interrupt controller
- 2-wire serial debug interface
- 80 μWatts/MHz; ~64 μWatts/DMIPS

### Flexible Fusion Engine
- Ultra-low power μDSP-like engine for always-on, real-time processing
- 58 KB SRAM for code, 16 KB SRAM for data
- 63 μWatts/MHz; as low as 16 μWatts/DMIPS

### Interface Support
- SPI slave interface to applications processor
- SPI master for serial flash memories and external SPI-based peripherals
- I²C master (x2) and SPI master (x1) for external sensors and other components

### Power Management
- Integrated LDO for on-chip voltage regulation
- Low power with fast wake up
- Programmable low power modes (deep sleep, sleep with retention, and active)
- Multiple power domains (MCU, FFE, programmable logic, always-on)
- Firmware initiated sleep entry
- Wakeup from internal or external events

### ADC Support
- Up to two 12-bit sigma delta ADC for battery monitoring or other low speed peripherals

### Audio Support
- As low as 260 μWatts for always-on voice recognition
- I²S Interface or PDM interface support
- PDM to PCM decoder for hardware-based, ultra-low power conversion
- Sensory Low Power Sound Detector for voice recognition applications

### Sensory Audio
- Speaker-independent fixed trigger "OK Google"
- Speaker-dependent fixed trigger with enrollment
- User defined trigger "Open Sesame!", User defined passphrase "What is my step count?"
- Phrase-spotted commands "What is my step count?"
- No slow, cloud processing required, most features run 'deeply embedded'

### Programmable Fabric
- 2,800 effective logic cells of re-programmable logic for hardware customization

### Packages
- 2.7x2.3mm, 0.35mm ball pitch, 42-ball WLCSP
- 3.5x3.5mm, 0.4mm ball pitch, 64-ball BGA

### Process & Voltage Support
- 40nm; 1.1V Vcc
- Independent VCCIO banks (1.71V to 3.6V)
- ADC VCC (1.71V to 3.6V)

### Software Support
- Industry standard, Eclipse IDE plug-in
- Drivers for Android and RTOS

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