

Product Brief

Overview

The ATM5/e Wireless SoC Series is a member of extreme low-power Bluetooth® system-on-chip (SoC) solutions. This Bluetooth Low Energy SoC Series integrates a Bluetooth 6.3/5.4 compliant radio with ARM® Cortex® M33F application processor, 256 KB Random Access Memory (RAM), 512 KB Read Only Memory (ROM), up to 2048KB nonvolatile memory (NVM), with ARM® TrustZone® enabled security features, and state-of-the-art power management to enable maximum lifetime in battery-operated devices.

The ATM5/e Series includes two Families:

- **ATM53/e Family:** Full-featured (Bluetooth 6.3, including Channel Sounding and Inline PCT Transfer)
- **ATM52/e Family:** Bluetooth 5.4 (no Channel Sounding)

The extremely low power ATM5/e Series SoC, with 1.8 mA Active receiving (includes radio and SoC) and 3.1 mA Active transmitting power consumption, is designed to extend battery life for the Internet-of-Things (IoT) applications. Support for low duty cycle operation allows systems to run for significantly longer periods without changing or recharging the battery. In addition, the ATM5305e SoC supports operation from energy harvesting sources such as photovoltaic.

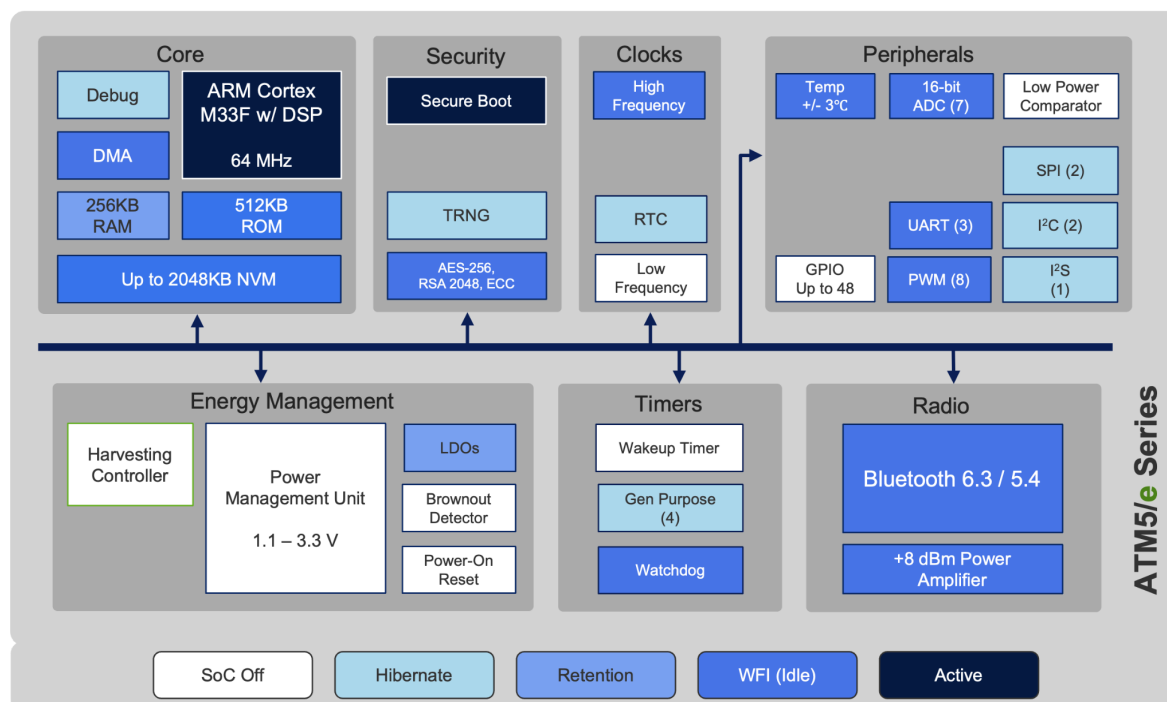
Application

Enterprise Segment

- Asset Tracking
- Logistical Management
- Industrial IoT Sensors
- Remote Monitoring
- Medical Equipment Tracking
- Patient and Staff tracking

Consumer Segment

- Personal Asset Tracker
- Embedded Tag and Tracker
- Environmental Control
- Advanced Home Automation
- Consumer IoT
- Patient Health monitor



Product Brief

Features

Bluetooth 6.3/5.4

- Bluetooth Low Energy
- 2 Mbps, 1 Mbps, 500 kbps, and 125 kbps PHY rates
- Bluetooth 6.3 Channel Sounding, including Inline PCT Transfer (**ATM53/e only**)

MCU and Memory

- 64 MHz ARM® Cortex® M33F MCU
- 512 KB ROM, 256 KB RAM, 1 MB or 2 MB NVM
- Retention RAM configuration: 16 KB to 256 KB in 16 KB step sizes
- 32 MHz / Optional 32.768 kHz Crystal Oscillator

Security

- ARM® TrustZone®, HW Root of Trust, Secure Boot, Secure Execution & Debug
- AES-128/256, SHA-2/HMAC 256 Encryption/Cryptographic Hardware Accelerators
- True random number generator (TRNG)

Energy Harvesting (ATM5305e only)

- Harvesting Controller Supports photovoltaic energy source

RF and Power Management

- Fully integrated RF front-end
- Maximum Tx Output Power: +8 dBm
- 1.1 to 1.6V^{††} or 1.7 to 3.3V battery input voltage with integrated Power Management Unit (PMU)
- Active power consumption with a 3 V battery, includes SoC and Radio power consumption
 - Rx @ -95 dBm: 2.0 mA^{**}
 - Tx @ 0 dBm: 3.1 mA^{**}
- SoC typical power consumption with a 3 V battery, including PMU
 - Retention @ 128 KB RAM: 2.0 µA^{**}
 - Retention @ 256 KB RAM: 2.4 µA^{**}
 - Hibernate: 1.1 µA^{**}
 - SoC Off: 300 nA^{**}

Interfaces

- I²C, I²S, SPI, UART, PWM, GPIO
- 16-bit ADC

Package Options

Product	Package (GPIOs)	Bluetooth Standard	Channel Sounding	Energy Harvesting
ATM5305e	5x5 mm 40-pin QFN (24)	6.3	✓	✓
ATM5305	5x5 mm 40-pin QFN (24) 4x4 mm 93-ball BGA (48)	6.3	✓	N/A
ATM5205	5x5 mm 40-pin QFN (24) 4x4 mm 93-ball BGA (48)	5.4	N/A	N/A

RTOS and Development Tool

- Supports open source Zephyr RTOS, including SDK, Toolchain, as well as Visual Studio Code IDE

Feature Highlights

The ATM5/e Series SoC has designed-in features that make it the best solution for a **low power Bluetooth Low-Energy product**. ATM53e Family SoC has a dedicated harvesting controller to boost and monitor energy from photovoltaic energy source.

The **integrated Power Management Unit (PMU)** is extremely efficient at providing the core and I/O power for the SoC, eliminating the need for an external PMU.

The Bluetooth Core supports advanced applications, including **Bluetooth 6.3 Channel Sounding** applications with Inline PCT Transfer (ATM53/e only).

ATM5/e Series comprehensive set of **Peripherals** includes multiple UARTs, I²C masters, I²S master, general-purpose SPI masters, multiple Pulse Width Modulation (PWM) outputs, Analog Comparators, and a 7-channel 16-bit ADC. The number of peripherals supported is based on pin muxing configuration.

^{††} in validation

^{**} to be finalized after characterization

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