

Nano-Power Arm Cortex-M33 MCU with Bluetooth LE for CGM and Wearable Applications

MAX32657

General Description

The MAX32657 microcontroller (MCU) is an advanced system-on-chip (SoC) featuring an Arm® Cortex®-M33 core with TrustZone®, memory protection unit (MPU), single-precision floating point unit (FPU), digital signal processing (DSP) instructions operating at up to 50MHz, large flash and SRAM memories, and the latest generation ultra-low power radio supporting Bluetooth® Low Energy (LE) 5.4 specification. This device unites processing horsepower with the connectivity required for medical applications such as continuous glucose monitoring (CGM) and other wearables. The nano-power modes increase battery life substantially.

A cryptographic toolbox (CTB) provides an advanced encryption standard (AES) engine, TRNG, and secure boot. The device incorporates the M33 core, which includes the Arm TrustZone security extension for secure yet flexible applications.

Many high-speed interfaces are supported on the device, including SPI, UART, and I²C serial interfaces. All interfaces support efficient direct memory access (DMA)-driven transfers.

The MAX32657 is qualified to operate over a -20°C to +85°C temperature range, which is ideal for medical environments. The device is packaged in a 2.621mm by 2.621mm, 0.4mm pitch WLP to allow 2-layer PCBs.

For more information and sampling availability, contact your ADI sales representative.

Applications

- Continuous Glucose Monitors
- Insulin Pumps
- Portable and Wearable Wireless Medical Devices
- SensorHub
- Fitness/Health Wearables
- Electronic Shelf Labels
- Power Tools
- Bluetooth LE Bridge for IoT at the Edge

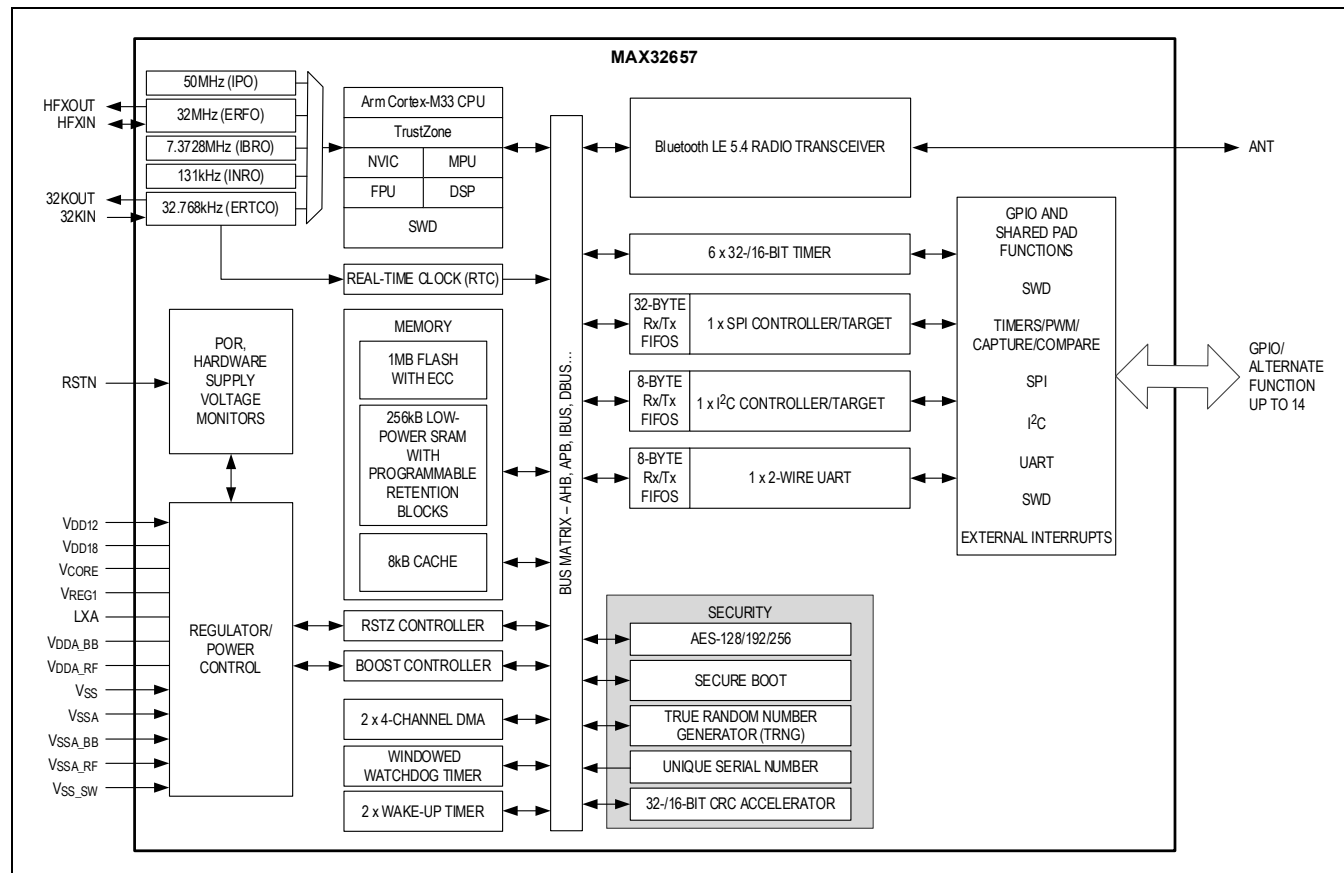
Benefits and Features

- Arm Cortex-M33 Core with TrustZone and FPU
 - Arm Memory Protection Unit (MPU)
 - Secure MPU—Eight Regions
 - Nonsecure MPU—Eight Regions
 - Secure and Nonsecure SysTick Timers
- 1.2V to 1.6V Input Range for Integrated Boost DC-DC Converter
- Internal 50MHz Oscillator
- External MEMS/Crystal Support
 - 32MHz Required for Bluetooth LE
- 1MB Internal Flash with ECC
- 256kB Internal SRAM
- 8kB Cache
- 32.768kHz RTC External Crystal
- ACTIVE Mode: 43µA/MHz Arm Cortex-M33 Running Coremark (50MHz)
- Bluetooth LE 5.4 Radio
 - Rx Sensitivity: -97dBm; Tx Power: +6dBm
 - 15mW Tx Power at 0dBm at $V_{DD12} = 1.5V$
 - 14mW Rx Power at $V_{DD12} = 1.5V$
 - Single-Ended Antenna Connection (50Ω)
 - 1Mbps and 2Mbps Mode
 - Long-Range (125kbps and 500kbps) Modes
- Optimal Peripheral Mix Provides Platform Scalability
 - Two DMA Controllers (Secure and Nonsecure)
 - One SPI Controller/Target
 - One I²C
 - One UART
 - Six 32-Bit Low-Power Timers with PWM
 - 14 Configurable GPIO with Internal Pull-Up/Pull-Down Resistors
- Cryptographic Tool Box (CTB) for IP/Data Security
 - True Random Number Generator (TRNG)
 - AES-128/192/256
 - 104-Bit Unique Serial Number (USN)
 - Secure Boot

Ordering Information appears at end of data sheet.

PRELIMINARY

Simplified Block Diagram



PRELIMINARY

Notes

PRELIMINARY

