

EFR32BG22E Wireless Gecko SoC Family

Data Short



The EFR32BG22E Wireless Gecko family of SoCs is part of the Wireless Gecko portfolio. EFR32BG22E Wireless Gecko SoCs are ideal for enabling energy-friendly Bluetooth 5 networking for IoT devices that require fast startup.

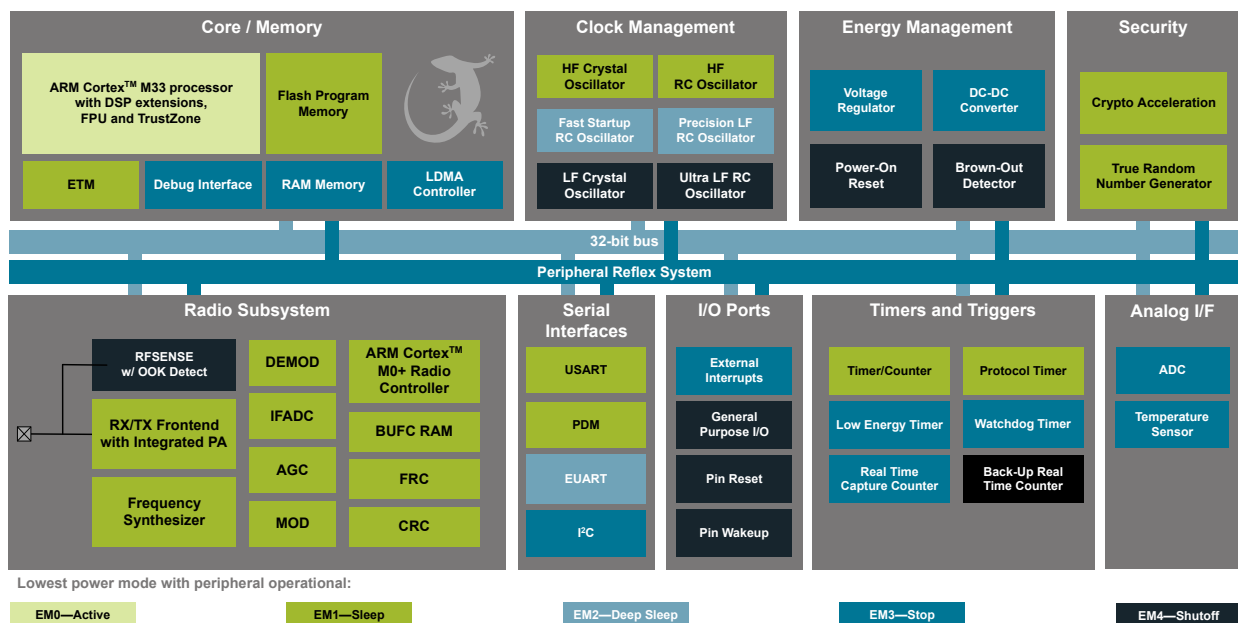
The single-die solution combines a 76.8 MHz Cortex-M33 with a high performance 2.4 GHz radio to provide an industry-leading, energy efficient, wireless SoC for IoT connected energy constrained applications.

Wireless Gecko applications include:

- Asset Tags and Beacons, Ambient IoT
- Consumer Electronics Remote Controls
- Portable Medical, Sports, Fitness, and Wellness devices
- Bluetooth Mesh Low Power Nodes
- Connected Home, Energy Harvest Home Appliances
- Building Automation and Security
- Energy Harvesting Applications
- TPMS / TMS (Tire Pressure Sensors)

KEY FEATURES

- 32-bit ARM® Cortex®-M33 core with 76.8 MHz maximum operating frequency
- Up to 512 kB of flash and 32 kB of RAM
- Energy-efficient radio core with low active and sleep currents
- Bluetooth 5 Direction Finding
- Integrated PA with up to 6 dBm (2.4 GHz) TX power
- Fast cold start boot time and wake-up from EM4



1. Feature List

The EFR32BG22E highlighted features are listed below.

- **Low Power Wireless System-on-Chip**
 - High Performance 32-bit 76.8 MHz ARM Cortex®-M33 with DSP instruction and floating-point unit for efficient signal processing
 - Up to 512 kB flash program memory
 - Up to 32 kB RAM data memory
 - 2.4 GHz radio operation
- **Radio Performance**
 - -106.7 dBm sensitivity @ 125 kbps GFSK
 - -98.9 dBm sensitivity @ 1 Mbit/s GFSK
 - -96.2 dBm sensitivity @ 2 Mbit/s GFSK
 - TX power up to 6 dBm
 - 2.5 mA radio receive current
 - 3.4 mA radio transmit current @ 0 dBm output power
 - 7.5 mA radio transmit current @ 6 dBm output power
- **Low System Energy Consumption**
 - 3.6 mA RX current (1 Mbps GFSK)
 - 4.1 mA TX current @ 0 dBm output power
 - 8.2 mA TX current @ 6 dBm output power
 - 27 μ A/MHz in Active Mode (EM0) at 76.8 MHz
 - 1.40 μ A EM2 DeepSleep current (32 kB RAM retention and RTC running from LFXO)
 - 1.75 μ A EM2 DeepSleep current (32 kB RAM retention and RTC running from Precision LFRCO)
 - 0.17 μ A EM4 current
- **Supported Modulation Format**
 - 2 (G)FSK with fully configurable shaping
 - OQPSK DSSS
 - (G)MSK
- **Protocol Support**
 - Bluetooth Low Energy (Bluetooth 5)
 - Direction finding using Angle-of-Arrival (AoA) and Angle-of-Departure (AoD)
 - Proprietary
- **Quality**
 - AEC-Q100 Qualification including AEC-Q006
- **Fast boot and wake-up**
 - Fast cold start boot time
 - Fast wake-up from EM4
- **Wide selection of MCU peripherals**
 - Analog to Digital Converter (ADC)
 - 12-bit @ 1 Msps
 - 16-bit @ 76.9 kbps
 - Up to 26 General Purpose I/O pins with output state retention and asynchronous interrupts
 - 8 Channel DMA Controller
 - 12 Channel Peripheral Reflex System (PRS)
 - 4 \times 16-bit Timer/Counter with 3 Compare/Capture/PWM channels
 - 1 \times 32-bit Timer/Counter with 3 Compare/Capture/PWM channels
 - 32-bit Real Time Counter
 - 24-bit Low Energy Timer for waveform generation
 - 1 \times Watchdog Timer
 - 2 \times Universal Synchronous/Asynchronous Receiver/Transmitter (UART/SPI/SmartCard (ISO 7816)/IrDA/I²S)
 - 1 \times Enhanced Universal Asynchronous Receiver/Transmitter (EUSART)
 - 2 \times I²C interface with SMBus support
 - Digital microphone interface (PDM)
 - Precision Low-Frequency RC Oscillator to replace 32 kHz sleep crystal
 - RFSENSE with selective OOK mode
 - Die temperature sensor with +/-1.5 degree C accuracy after single-point calibration
- **Wide Operating Range**
 - 1.71 V to 3.8 V single power supply
 - -40 °C to 125 °C
- **Security Features**
 - Hardware Cryptographic Acceleration for AES128/256, SHA-1, SHA-2 (up to 256-bit), ECC (up to 256-bit), ECDSA, and ECDH
 - True Random Number Generator (TRNG) compliant with NIST SP800-90 and AIS-31
 - ARM® TrustZone®
- **Packages**
 - **QFN40** 5 mm \times 5 mm \times 0.85 mm
 - **QFN32** 4 mm \times 4 mm \times 0.85 mm

2. Ordering Information

Table 2.1. Ordering Information

Ordering Code	Protocol Stack	Max TX Power	Max CPU Speed	LFRCO	Flash (kB)	RAM (kB)	GPIO	Package	Temp Range
EFR32BG22E224F512IM40-C	<ul style="list-style-type: none"> Bluetooth 5.x Direction Finding (AoA Transmitter) Proprietary 	6 dBm	76.8 MHz	Precision	512	32	26	QFN40	-40 to 125 °C
EFR32BG22E224F512IM32-C	<ul style="list-style-type: none"> Bluetooth 5.x Direction Finding (AoA Transmitter) Proprietary 	6 dBm	76.8 MHz	Precision	512	32	18	QFN32	-40 to 125 °C

Note:

1. LE Long Range (125 kbps and 500 kbps) PHYs are only supported on part numbers which include AoA/AoD direction-finding capability.
2. Bluetooth 5.x: As the Bluetooth standard evolves, Silicon Labs is regularly adding new features. For more information on supported Bluetooth capabilities, visit <https://www.silabs.com/bluetooth-hardware>.

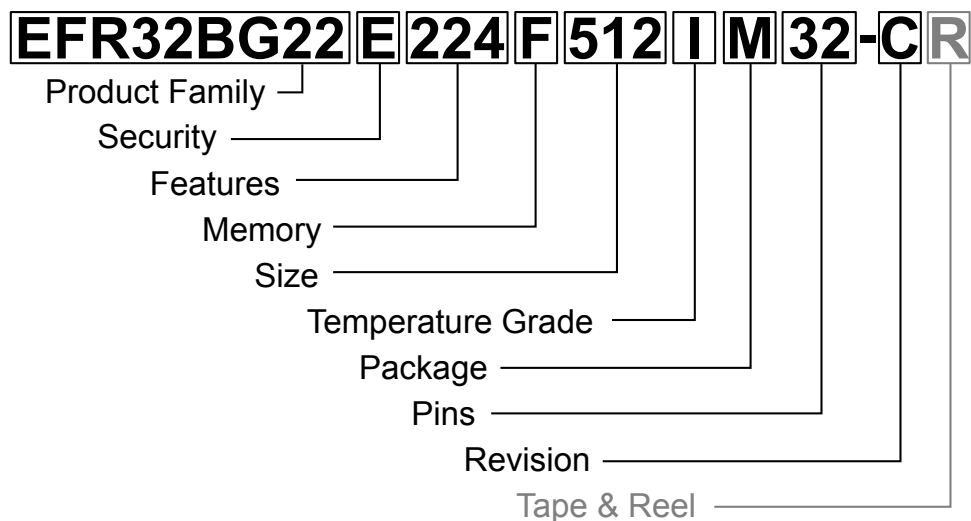


Figure 2.1. Ordering Code Key

Field	Options
Product Family	<ul style="list-style-type: none"> • EFR32BG22: Gecko 22 Family
Security	<ul style="list-style-type: none"> • E: Base Security
Features [f1][f2][f3]	<ul style="list-style-type: none"> • f1 <ul style="list-style-type: none"> • 1: MCU Frequency of 38.4 MHz • 2: MCU Frequency of 76.8 MHz • f2 <ul style="list-style-type: none"> • 1: 0 dBm output power • 2: 6 dBm output power • f3 <ul style="list-style-type: none"> • 1: No Direction finding, without Precision LFRCO • 2: No Direction finding, with Precision LFRCO • 3: Direction finding, without Precision LFRCO • 4: Direction finding, with Precision LFRCO
Memory	<ul style="list-style-type: none"> • F: Flash
Size	<ul style="list-style-type: none"> • Memory Size in kBytes
Temperature Grade	<ul style="list-style-type: none"> • G: -40 to +85 °C • I: -40 to +125 °C
Package	<ul style="list-style-type: none"> • M: QFN
Pins	<ul style="list-style-type: none"> • Number of Package Pins
Revision	<ul style="list-style-type: none"> • C: Revision C
Tape & Reel	<ul style="list-style-type: none"> • R: Tape & Reel (optional)

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