

EFR32FG25 Flex Gecko Wireless SoC

Family Data Short



The EFR32FG25 Flex Gecko SoC is an ideal solution for sub-GHz Wi-SUN applications for metering, lighting, and distribution automation.

The high-performance sub-GHz radio provides long range and is not susceptible to 2.4 GHz interference from technologies like Wi-Fi.

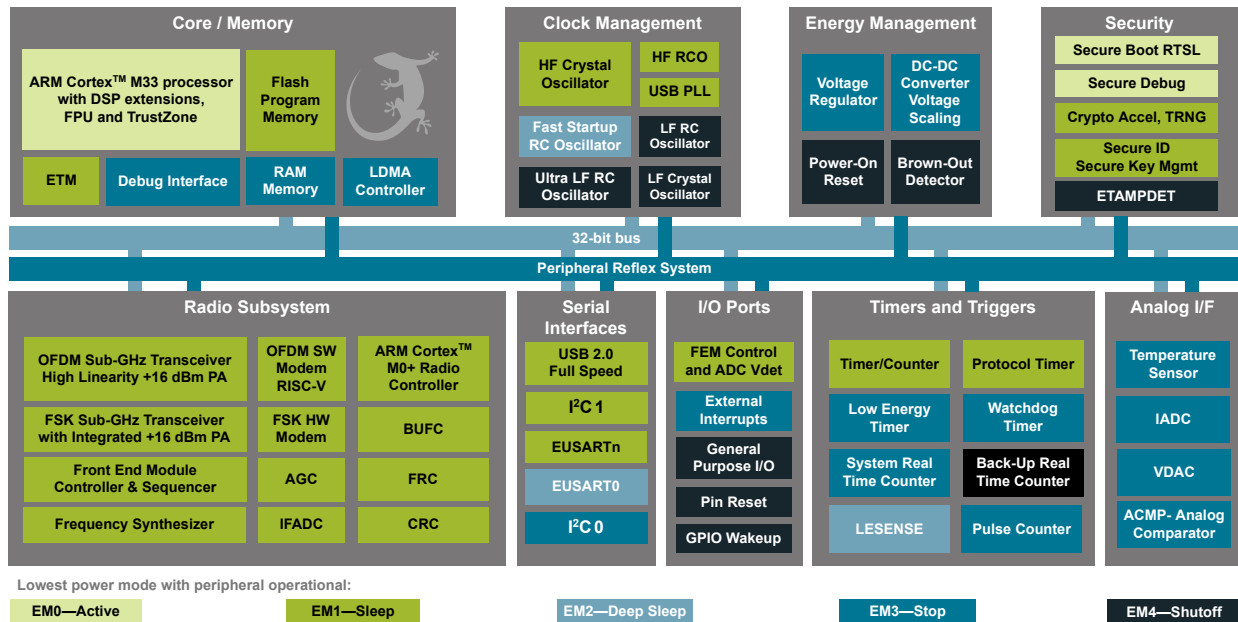
The single die, multi-core solution, provides industry leading security, high throughput, and an integrated power amplifier to enable the next level of secure connectivity for IoT devices.

EFR32FG25 applications include:

- Smart Electric Metering
- Street Lighting
- Distribution automation
- Industrial applications
- Municipal infrastructure

KEY FEATURES

- 32-bit ARM® Cortex®-M33 core with 97.5 MHz maximum operating frequency
- Up to 1920 kB of flash and 512 kB of RAM
- Wi-SUN Multi-rate OFDM, FSK, and O-QPSK modulations
- Integrated PA with up to 16 dBm (Sub-GHz) TX power
- Robust peripheral set and up to 37 GPIO
- Operation up to 125 °C



1. Feature List

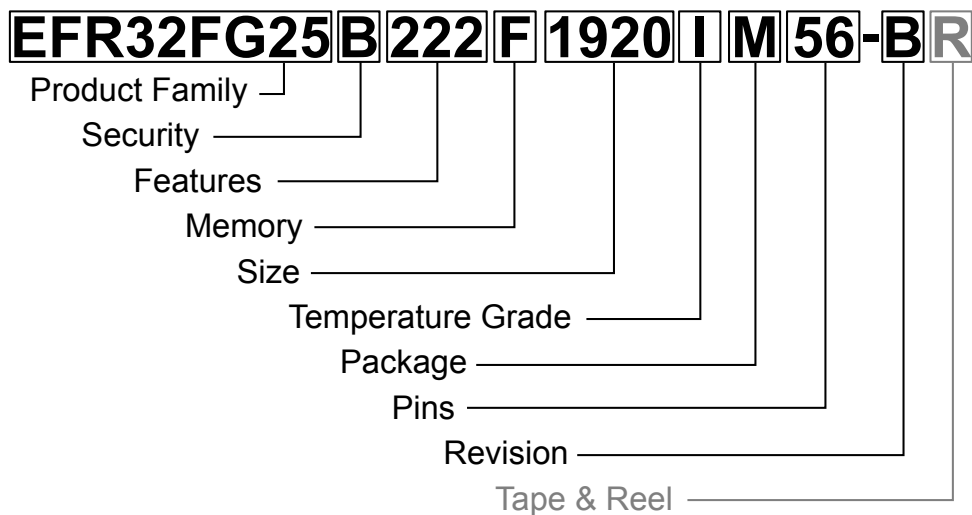
The EFR32FG25 highlighted features are listed below.

- **Low Power Wireless System-on-Chip**
 - High Performance 32-bit 97.5 MHz ARM Cortex[®]-M33 with DSP instruction and floating-point unit for efficient signal processing
 - Up to 1920 kB flash program memory
 - Up to 512 kB RAM data memory
 - Sub-GHz radio operation
 - TX power up to 16 dBm
- **Low Energy Consumption**
 - 6.28 mA RX current at 924 MHz (400 kbps 4-GFSK)
 - 58.6 mA TX current @ 13 dBm output power at 923.6 MHz with CW from FSK PA
 - 76.6 mA TX current @ 16 dBm output power at 915 MHz with CW from FSK PA
 - 186 mA TX current @ 16 dBm output power at 914 MHz (2.4 Mbps Wi-SUN OFDM Option 1, MCS6)
 - 30 μ A/MHz in Active Mode (EM0) at 97.5 MHz
 - 4.6 μ A EM2 DeepSleep current (512 kB RAM retention and RTC running from LFXO)
 - 2.6 μ A EM2 DeepSleep current (32 kB RAM retention and RTC running from LFRCO)
- **High Receiver Performance**
 - -106.3 dBm sensitivity @ 300 kbps 923.7 MHz Wi-SUN OFDM Option 3, MCS4
 - -114.5 dBm sensitivity @ 50 kbps 923.6 MHz Wi-SUN FSK #1b with FEC
 - -126.3 dBm sensitivity @ 4.8 kbps 915 MHz O-QPSK
 - -123.9 dBm sensitivity @ 6.25 kbps 914 MHz SUN O-QPSK
 - -95.3 dBm sensitivity @ 2.4 Mbps 914 MHz Wi-SUN OFDM Option 1, MCS6
 - -114.1 dBm sensitivity @ 50 kbps 866.5 MHz Wi-SUN FSK #1a with FEC
 - -112.7 dBm sensitivity @ 50 kbps 866.5 MHz OFDM Option 4, MCS2
- **Supported Modulation Format**
 - Wi-SUN MR OFDM MCS 0-6 (all 4 Options)
 - 802.15.4 SUN MR O-QPSK with DSSS
 - Wi-SUN FSK
 - 2 (G)FSK with fully configurable shaping
 - (G)MSK
- **Protocol Support**
 - Proprietary
 - Wi-SUN
- **Wide selection of MCU peripherals**
 - Analog to Digital Converter (ADC)
 - 12-bit @ 1 Msps
 - 16-bit @ 76.9 kbps
 - 2 \times Analog Comparator (ACMP)
 - Digital to Analog Converter (VDAC) with two channels
 - Low-Energy Sensor Interface (LESENSE)
 - Up to 37 General Purpose I/O pins with output state retention and asynchronous interrupts
 - 8 Channel DMA Controller
 - 12 Channel Peripheral Reflex System (PRS)
 - 6 \times 16-bit Timer/Counter with 3 Compare/Capture/PWM channels
 - 2 \times 32-bit Timer/Counter with 3 Compare/Capture/PWM channels
 - 32-bit Real Time Counter
 - 24-bit Low Energy Timer for waveform generation
 - 2 \times Watchdog Timer
 - 1 \times USB2.0 Full Speed port, Device only
 - 5 \times EUSART (Enhanced Universal Synchronous/Asynchronous Receiver/Transmitter)
 - EUSART0 operates in EM2
 - SPI and IrDA supported by EUSART
 - 2 \times I²C interface with SMBus support
 - High Frequency Crystal Oscillator clock sharing using buffered sine wave clock output
 - Die temperature sensor with ± 2 $^{\circ}$ C typical accuracy across temperature range
- **Wide Operating Range**
 - 1.71 to 3.8 V VDD power supply
 - 3.45 to 3.8 V PAVDD power supply for OFDM
 - -40 $^{\circ}$ C to +125 $^{\circ}$ C
- **Secure Vault**
 - Secure Boot with Root of Trust and Secure Loader (RTSL)
 - Hardware Cryptographic Acceleration with DPA countermeasures for AES128/256, SHA-1, SHA-2 (up to 256-bit), ECC (up to 256-bit), ECDSA, ECDH and J-Pake
 - True Random Number Generator (TRNG) compliant with NIST SP800-90 and AIS-31
 - ARM[®] TrustZone[®]
 - Secure Debug with lock/unlock
- **Packages**
 - **QFN56** 7 mm \times 7 mm \times 0.85 mm

2. Ordering Information

Table 2.1. Ordering Information

| Ordering Code | Modem Feature | Max TX Power | Flash (kB) | RAM (kB) | Secure Vault | GPIO | Package / Pinout | Temp Range |
|--------------------------|---|--------------|------------|----------|--------------|------|------------------|---------------|
| EFR32FG25B222F1920IM56-B | <ul style="list-style-type: none"> • OFDM • FSK • O-QPSK | 16 dBm | 1920 | 512 | High | 36 | | -40 to 125 °C |
| EFR32FG25B221F1920IM56-B | <ul style="list-style-type: none"> • OFDM • FSK • O-QPSK | 16 dBm | 1920 | 512 | High | 37 | | -40 to 125 °C |
| EFR32FG25B212F1920IM56-B | <ul style="list-style-type: none"> • FSK • O-QPSK | 16 dBm | 1920 | 512 | High | 36 | | -40 to 125 °C |
| EFR32FG25B211F1920IM56-B | <ul style="list-style-type: none"> • FSK • O-QPSK | 16 dBm | 1920 | 512 | High | 37 | | -40 to 125 °C |
| EFR32FG25B121F1152IM56-B | <ul style="list-style-type: none"> • OFDM • FSK • O-QPSK | 16 dBm | 1152 | 256 | High | 37 | | -40 to 125 °C |
| EFR32FG25B111F1152IM56-B | <ul style="list-style-type: none"> • FSK • O-QPSK | 16 dBm | 1152 | 256 | High | 37 | | -40 to 125 °C |
| EFR32FG25A221F1920IM56-B | <ul style="list-style-type: none"> • OFDM • FSK • O-QPSK | 16 dBm | 1920 | 512 | Mid | 37 | | -40 to 125 °C |
| EFR32FG25A211F1920IM56-B | <ul style="list-style-type: none"> • FSK • O-QPSK | 16 dBm | 1920 | 512 | Mid | 37 | | -40 to 125 °C |
| EFR32FG25A121F1152IM56-B | <ul style="list-style-type: none"> • OFDM • FSK • O-QPSK | 16 dBm | 1152 | 256 | Mid | 37 | | -40 to 125 °C |
| EFR32FG25A111F1152IM56-B | <ul style="list-style-type: none"> • FSK • O-QPSK | 16 dBm | 1152 | 256 | Mid | 37 | | -40 to 125 °C |



| Field | Options |
|-----------------------|--|
| Product Family | <ul style="list-style-type: none"> • EFR32FG25: Wireless Gecko Flex 25 Family |
| Security | <ul style="list-style-type: none"> • A: Secure Vault Mid • B: Secure Vault High |
| Features [f1][f2][f3] | <ul style="list-style-type: none"> • f1 <ul style="list-style-type: none"> • 1: 256 kB RAM • 2: 512 kB RAM • f2 <ul style="list-style-type: none"> • 1: FSK / O-QPSK • 2: FSK / O-QPSK / OFDM • f3 <ul style="list-style-type: none"> • 1: No feature enabled • 2: High Quality HFCLKOUT Pin Available |
| 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"> • B: Revision B |
| Tape & Reel | <ul style="list-style-type: none"> • R: Tape & Reel (optional) |

Figure 2.1. Ordering Code Key