BGM121/BGM123 Blue Gecko *Bluetooth* ® SiP Module Data Short

The BGM121/BGM123 Blue Gecko *Bluetooth* ® SiP Module family is targeted for applications where ultra-small size, reliable high performance RF, low-power consumption and easy application development are key requirements.

At 6.5 x 6.5 x 1.4 mm the BGM121/BGM123 module fits applications where size is a constraint. BGM121/BGM123 also integrates a high performance, ultra robust antenna, which requires minimal PCB, plastic and metal clearance. The total PCB area required by BGM121/BGM123 is only 51 mm^2.

The BGM121/BGM123 also integrates a *Bluetooth* 4.2 compliant Bluetooth stack and it can also run end-user applications on-board or alternatively used as a network co-processor over one of the host interfaces.

BGM121/BGM123 SIP modules can be used in a wide variety of applications:

- Wearables
- IoT end devices and gateways
- Health, sports and wellness devices
- Industrial, home and building automation
- Smart phone, tablet and PC accessories
- Beacons

KEY FEATURES

- Bluetooth 4.2 low energy compliant
- Integrated antenna or RF pin
- TX power up to 8 dBm
- RX sensitivity: -90 dBm
- Range: up to 200 meters
- 32-bit ARM® Cortex®-M4 core at 38.4 MHz
- Flash memory: 256 kB
- RAM: 32 kB
- Autonomous Hardware Crypto Accelerator and Random Number Generator
- Integrated DC-DC Converter
- Onboard Bluetooth stack
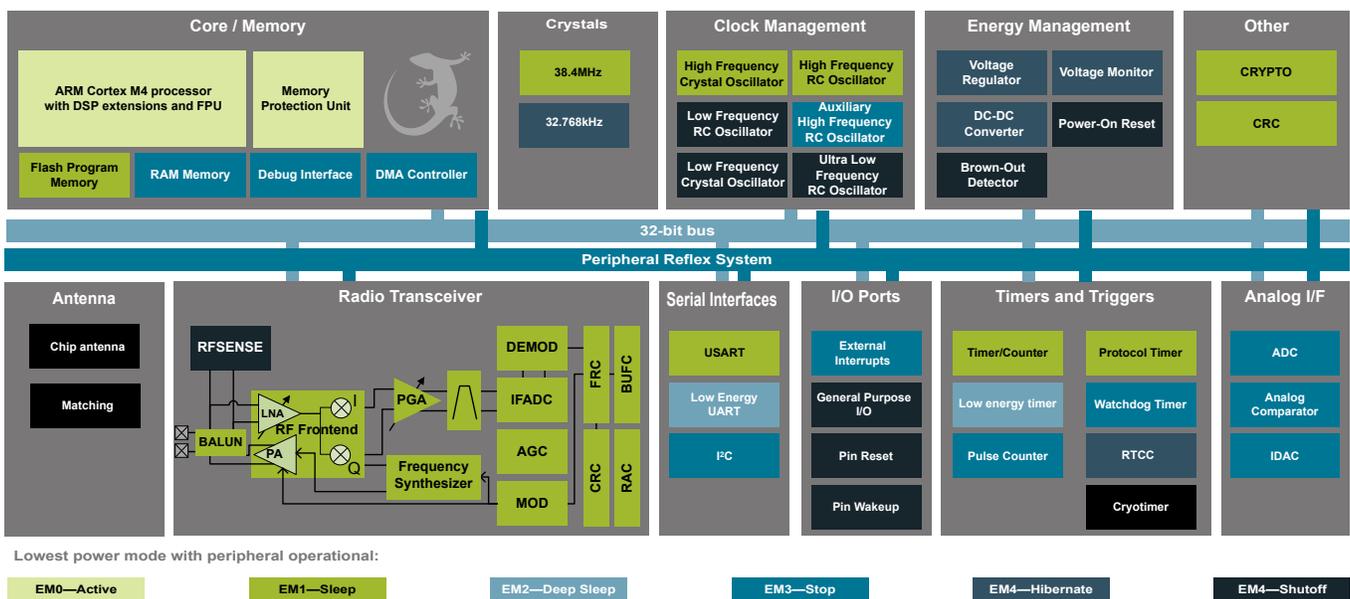
1. Feature List

The BGM121/BGM123 highlighted features are listed below.

- **Low Power Wireless System-on-Chip**.
    - High Performance 32-bit 38.4 MHz ARM Cortex®-M4 with DSP instruction and floating-point unit for efficient signal processing
    - 256 kB flash program memory
    - 32 kB RAM data memory
    - 2.4 GHz radio operation
    - TX power up to 8 dBm
- **Low Energy Consumption**
    - 9.0 mA RX current at 2.4 GHz
    - 8.2 mA TX current @ 0 dBm output power at 2.4 GHz
    - 63 µA/MHz in Active Mode (EM0)
    - 2.5 µA EM2 DeepSleep current (full RAM retention and RTCC running from LFXO)
    - 2.1 µA EM3 Stop current (State/RAM retention)
    - Wake on Radio with signal strength detection, preamble pattern detection, frame detection and timeout
- **High Receiver Performance**
    - -90 dBm sensitivity @ 1 Mbit/s GFSK (2.4 GHz)
- **Supported Protocols**
    - Bluetooth®
- **Support for Internet Security**
    - General Purpose CRC
    - Random Number Generator
    - Hardware Cryptographic Acceleration for AES 128/256, SHA-1, SHA-2 (SHA-224 and SHA-256) and ECC

- **Wide Selection of MCU peripherals**
    - 12-bit 1 Msps SAR Analog to Digital Converter (ADC)
    - 2 × Analog Comparator (ACMP)
    - Digital to Analog Current Converter (IDAC)
    - 32 pins connected to analog channels (APORT) shared between Analog Comparators, ADC, and IDAC
    - 30 General Purpose I/O pins with output state retention and asynchronous interrupts
    - 8 Channel DMA Controller
    - 12 Channel Peripheral Reflex System (PRS)
    - 2×16-bit Timer/Counter
        - 3 + 4 Compare/Capture/PWM channels
    - 32-bit Real Time Counter and Calendar
    - 16-bit Low Energy Timer for waveform generation
    - 32-bit Ultra Low Energy Timer/Counter for periodic wake-up from any Energy Mode
    - 16-bit Pulse Counter with asynchronous operation
    - Watchdog Timer with dedicated RC oscillator @ 50nA
    - 2×Universal Synchronous/Asynchronous Receiver/Transmitter (UART/SPI/SmartCard (ISO 7816)/IrDA/I2S)
    - Low Energy UART (LEUART™)
    - I2C interface with SMBus support and address recognition in EM3 Stop
- **Wide Operating Range**
    - 1.85 V to 3.8 V single power supply
    - 2.4 V to 3.8 V when using DC-DC
    - Integrated DC-DC
    - -40 °C to +85 °C
- **Dimensions**
   - 6.5 x 6.5 x 1.4 mm

2. Ordering Information

Ordering Code	Protocol Stack	Frequency Band	Max TX Power (dBm)	Antenna	Flash (KB)	RAM (KB)	GPIO	Package
BGM123A256V1R[1]	Bluetooth Smart	2.4 GHz	+3	Built-in	256	32	30	1000 pcs reel
BGM123A256V1[1]	Bluetooth Smart	2.4 GHz	+3	Built-in	256	32	30	260 pcs tray
BGM123N256V1R[1]	Bluetooth Smart	2.4 GHz	+3	RF pin	256	32	30	1000 pcs reel
BGM123N256V1[1]	Bluetooth Smart	2.4 GHz	+3	RF pin	256	32	30	260 pcs tray
BGM121A256V1R[1]	Bluetooth Smart	2.4 GHz	+8	Built-in	256	32	30	1000 pcs reel
BGM121A256V1[1]	Bluetooth Smart	2.4 GHz	+8	Built-in	256	32	30	260 pcs tray
BGM121N256V1R[1]	Bluetooth Smart	2.4 GHz	+8	RF pin	256	32	30	1000 pcs reel
BGM121N256V1[1]	Bluetooth Smart	2.4 GHz	+8	RF pin	256	32	30	260 pcs tray
BGM123A256V2R	Bluetooth Smart	2.4 GHz	+3	Built-in	256	32	30	1000 pcs reel
BGM123A256V2	Bluetooth Smart	2.4 GHz	+3	Built-in	256	32	30	260 pcs tray
BGM123N256V2R	Bluetooth Smart	2.4 GHz	+3	RF pin	256	32	30	1000 pcs reel
BGM123N256V2	Bluetooth Smart	2.4 GHz	+3	RF pin	256	32	30	260 pcs tray
BGM121A256V2R	Bluetooth Smart	2.4 GHz	+8	Built-in	256	32	30	1000 pcs reel
BGM121A256V2	Bluetooth Smart	2.4 GHz	+8	Built-in	256	32	30	260 pcs tray
BGM121N256V2R	Bluetooth Smart	2.4 GHz	+8	RF pin	256	32	30	1000 pcs reel
BGM121N256V2	Bluetooth Smart	2.4 GHz	+8	RF pin	256	32	30	260 pcs tray
SLWSTK6101C[2]								
SLWRB4302A[3]								

Note:
1. V1 is the Initial production / engineering sample version and is not certified. V2 is the Full production version and will be certified.
2. Blue Gecko Bluetooth Module Wireless Starter Kit (WSTK) with BGM121A256 radio board (SLWRB4302A) and BGM111A256 radio board (SLWRB4300A), expansion board and accessories.
3. BGM121A256 Radio Board
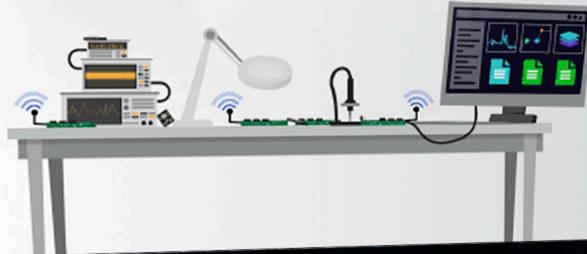
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