

Single-mode, low-power, high-performance Bluetooth 5.3 System-on-Chip (SoC) widely used in mobile devices, wearables, and Internet of Things (IoT) products

Based on Arm® Cortex®-M4F CPU core, the GR5526 series integrates Bluetooth 5.3 Protocol Stack, a 2.4 GHz RF transceiver, on-chip programmable Flash memory, RAM, multiple peripherals, enhanced I2C/UART port number for sensor applications, as well as expanded I/O functionality. GR5526 delivers a feature-rich display and graphics solution by providing the choice of graphics acceleration (GPU + DC) and internal/external SiP PSRAM to accommodate display while still leaving plenty of space for wearable schemes. GR5526 can be configured as a Broadcaster, an Observer, a Central or a Peripheral, and supports the combination of all the above roles, making it an ideal choice for Internet of Things (IoT) and smart wearable devices. In addition, it supports Bluetooth LE direction finding (AoA/AoD) and Isochronous Channels (audio) features.



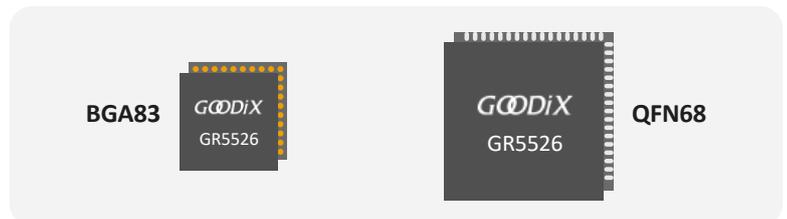
Key Features

- Arm® Cortex®-M4F 32-bit CPU
- Bluetooth LE 5.3 transceiver integrating Controller and Host layers
- Supported data rates: 1 Mbps, 2 Mbps, LR (500 Kbps, 125 Kbps)
- RX Sensitivity: -98 dBm (in 1 Mbps mode), -94 dBm (in 2 Mbps mode) -101 dBm (in LR 500 Kbps mode), -104 dBm (in LR 125 Kbps mode)
- TX power: -20 dBm to +7 dBm
- TX current: 4.0 mA @ 0 dBm, 1 Mbps
- RX current: 3.5 mA @ 1 Mbps
- Memory: 512 KB RAM, 1 MB SiP Flash, 8 MB SiP PSRAM (Optional)
- Supply voltage: 2.4 V to 4.35 V; I/O voltage: 1.8 V to 3.6 V
- AoA/AoD, Ranging, LE Isochronous Channels
- Peripherals: QSPI, SPI, DSPI, OSPI, I2S, I2C, UART, DMA, USB, ADC, PDM, PWM, Timer, GPIO, ISO7816, GPU+DC (Optional)

Packages

GR5526 offers BGA83 and QFN68 packages to support different environmental requirements.

- BGA83: 4.3 x 4.3 x 0.96 (mm), 0.4 mm pitch
- QFN68: 7.0 x 7.0 x 0.85 (mm), 0.35 mm pitch

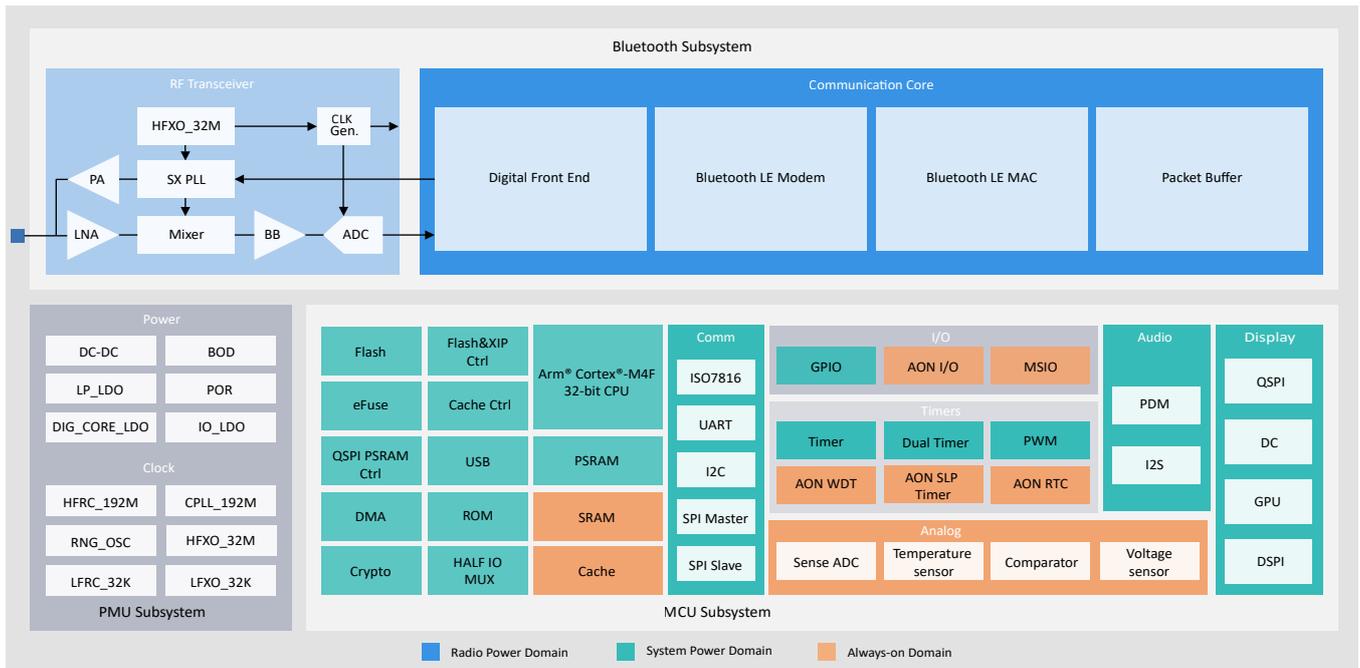


Product Part Number

GR5526 is available in multiple packages and provides the choice of graphics acceleration (GPU + DC) and system-in-package (SiP) PSRAM, meeting your diverse project demands.

Features	CPU	RAM	SiP Flash	SiP PSRAM	GPU+DC	I/O Number	Package (mm)
GR5526VGBIP	Cortex®-M4F	512 KB	1 MB	8 MB	Supported	50	BGA83 (4.3 x 4.3 x 0.96)
GR5526VGBI	Cortex®-M4F	512 KB	1 MB	N/A	N/A	50	BGA83 (4.3 x 4.3 x 0.96)
GR5526RGNIP	Cortex®-M4F	512 KB	1 MB	8 MB	Supported	48	QFN68 (7.0 x 7.0 x 0.85)
GR5526RGNI	Cortex®-M4F	512 KB	1 MB	N/A	N/A	48	QFN68 (7.0 x 7.0 x 0.85)

Block Diagram



Specifications

Bluetooth LE 5.3 Transceiver Integrating Controller and Host Layers

- Data rates: 1 Mbps, 2 Mbps, Long Range (500 kbps, 125 kbps)
- TX power: -20 dBm to +7 dBm
- -98 dBm sensitivity (in 1 Mbps mode)
- -94 dBm sensitivity (in 2 Mbps mode)
- -101 dBm sensitivity (in LR 500 kbps mode)
- -104 dBm sensitivity (in LR 125 kbps mode)
- TX current: 4.0 mA @ 0 dBm, 1 Mbps
- RX current: 3.5 mA @ 1 Mbps
- AoA/AoD, Ranging, LE Isochronous Channels

Arm® Cortex®-M4F 32-bit Micro-processor with Floating Point

- Up to 96 MHz clock frequency
- Built-in Memory Protection Unit (MPU) supporting eight programmable regions
- Hardware Floating Point Unit (FPU)
- Built-in Nested Vectored Interrupt Controller (NVIC)
- Non-maskable Interrupt (NMI) input
- Serial Wire Debug (SWD) with 16 breakpoints, two watchpoints, and a debug timestamp counter
- 51 μ A/MHz execution from Flash @ 3.3 V, 96 MHz

On-chip Memory

- 512 KB data SRAM with retention capabilities
- 8 KB cache SRAM with retention capabilities
- Stack ROM (including boot ROM and Bluetooth LE Stack)
- 1 MB internal QSPI Flash
- 8 MB internal PSRAM (for GR5526VGBIP/GR5526RGNIP only)

Digital Peripherals

- Two general-purpose DMA engines, each with 6 channels and up to 16 programmable request/trigger sources
- USB 2.0 full speed (12 Mbps) controller with on-chip PHY and dedicated DMA controller
- Internal Octal SPI DDR interfaces to support 8 MB internal PSRAM at up to 48 MHz (for GR5526VGBIP and GR5526RGNIP only)

Analog Peripherals

- One 13-bit Sense ADC with a sampling rate of 1 Msps. It supports up to 8 external I/O channels and 3 internal signal channels
- Built-in temperature and voltage sensors
- Low-power comparator, supporting wakeup from deep sleep mode

Power Management

- On-chip DC-DC to provide RF Analog voltage and supply core LDO
- On-chip I/O LDO to provide I/O voltage and supply external components, maximum I/O LDO drive strength: 30 mA
- Programmable thresholds for brownout detection(BOD)
- Supply voltage: 2.4 V to 4.35 V
- I/O voltage: 1.8 V to 3.6V

Low-power Consumption Modes

- Sleep mode: 3.3 μ A (Typical) at 3.3 V VBAT input with 128 KB SRAM retention on and LFXO_32K off; woken up by 8 sources of always-on domain
- Ultra sleep mode: 2.4 μ A (Typical); internal power (all SRAM included) and LFXO_32K removed from entire chip except always-on domain; waken up by Sleep Timer and AON GPIOs
- OFF mode: 200 nA (Typical); nothing on except VBAT, and chip in reset mode

Specifications

Flexible Serial Peripherals

- 6 x UART modules up to 4 Mbps, with all modules supporting flow control and IrDA
- 6 x I2C modules for peripheral communication, up to 3.4 MHz
- 1 x 8-bit/16-bit/32-bit SPI master interface and 1 x SPI slave interface for host communication
- 2 x I2S interfaces (1 I2S master interface and 1 I2S slave interface)
- PDM interface with hardware sampling rate converter
- 1 x ISO7816 interface

Display/Graphics

- 2.5D GPU for graphics acceleration (for GR5526VGBIP and GR5526RGNIP only)
- 1 x Dual-lane SPI (DSPI) interface for display, with MIPI (Mobile Industry Processor Interface) DSI (Display Serial Interface) Type-C support
- 3 x Quad SPI (QSPI) interfaces, up to 48 MHz; supporting direct access via memory mapping when connecting with external NOR Flash
- Display Controller (DC) module with MIPI DSI Type-C support and 2D graphics blending integrated (for GR5526VGBIP and GR5526RGNIP only)

I/O Peripherals

- 50 I/O pins in total
 - 34 general-purpose I/O (GPIO) pins
 - 8 always-on I/O (AON IO) pins, supporting wakeup from deep sleep mode
 - 8 mixed signal I/O (MSIO) pins, configurable to be digital/analog signal interface

Timers

- Two general-purpose, 32-bit timer modules
- A timer module composed of two programmable 32-bit or 16-bit down counters
- An internal sleep timer that can be used to wake the device up from deep sleep mode
- Two PWM modules with edge alignment mode and center alignment mode, each with 3 channels
- 2 x real-time counters (RTC): 1 x Calendar, 1 x RTC

Security

- Complete secure computing engine:
 - AES 128-bit/192-bit/256-bit symmetric encryption (ECB, CBC)
 - Hash-based Message Authentication Code (HMAC-SHA256)
 - Public key cryptography (PKC)
 - True random number generator (TRNG)
- Comprehensive security operation mechanism:
 - Secure boot
 - Encrypted firmware running directly from Flash
 - eFuse for encrypted key storage
 - Differentiate application data key and firmware key, supporting one data key per each device/product

Operating Temperature

- Temperature range: -40°C to +85°C

Applications

GR5526 can be used in rich sets of applications.



Advanced wearables

- Sport bracelet
- Smart watch

Bluetooth HID devices

- Voice remote control
- Keyboard/Mouse
- Gaming controller
- Stylus pen

IoT applications

- Smart Home
- Electronic shelf label (ESL)
- Beacon
- Tire pressure monitoring system (TPMS)
- Mesh applications
- Asset tracking

Support



We offer a wide range of online resources that are accessible anytime, anywhere at [High Performance Bluetooth Products](#).



Get answers from the most popular Community [Q&A](#) and easily learn from others by [Blogs](#).



Email us for any questions or problems you might have while reading docs at docs@reg.goodix.com.