STM32WBA wireless MCU series

Faster time-to-market and higher performance for wireless short-range devices

Product portfolio

Performance

STM32WB05xN
Network co-processor

STM32WB0x
CM0+ 64 MHz
Flash up to 512 KB

STM32WB15
CM4 64 MHz & CM0+ 32 MHz
Flash up to 320 KB

STM32WB55/35
CM4 64 MHz & CM0+ 32 MHz
Flash up to 1 MB

STM32WBA5
CM33 100 MHz
Flash up to 1 MB

NEW
STM32WBA6
CM33 100 MHz
Flash up to 2 MB

Advanced solution

STM32WB05xN	STM32WB0x	STM32WB15	STM32WB55/35	STM32WBA5 / STM32WBA6
Network processor Bluetooth® LE add-on	Space-constrained applications	Dual core Simpler applications	Multiprotocol Dual core Rich feature set	High processing Enhanced security High RF power output

STM32WBA6

STM32WBA6 DNA within portfolio

High-end MCU offering the most advanced features in the series, such as:

- Up to 2 Mbytes of flash memory and 512 Kbytes of RAM
- Up to 86 GPIOs and USB high-speed support for advanced connectivity
- Design flexibility with a wide range of package options
- QFN48 pin-to-pin compatibility for upgrades from STM32WBA55

Built using **40 nm process technology**

psacertified™
level three

Global Platform™ SESIP 3

What makes STM32WBA6 ideal for smart wireless devices

Smart lock

Enhanced user experience
- Easily store keys & data with 2 Mbytes flash for flexible use
- Seamless firmware updates with dual banking

Cost-efficiency: simplification of design thanks to MCU with integrated radio

Smart home – Matter Thread end devices

High performance
- Reliable data transmission with +10 dBm output power
- X-CUBE-MATTER package certifications
- Extensive 2 Mbytes of flash memory and 512 Kbytes of RAM, sufficient for OTA updates

Medical – continuous glucose monitoring devices (CGM)

Better design efficiency
- Tiny packages for flexible integration
- 2 Mbytes flash for data logging
- Lower device cost

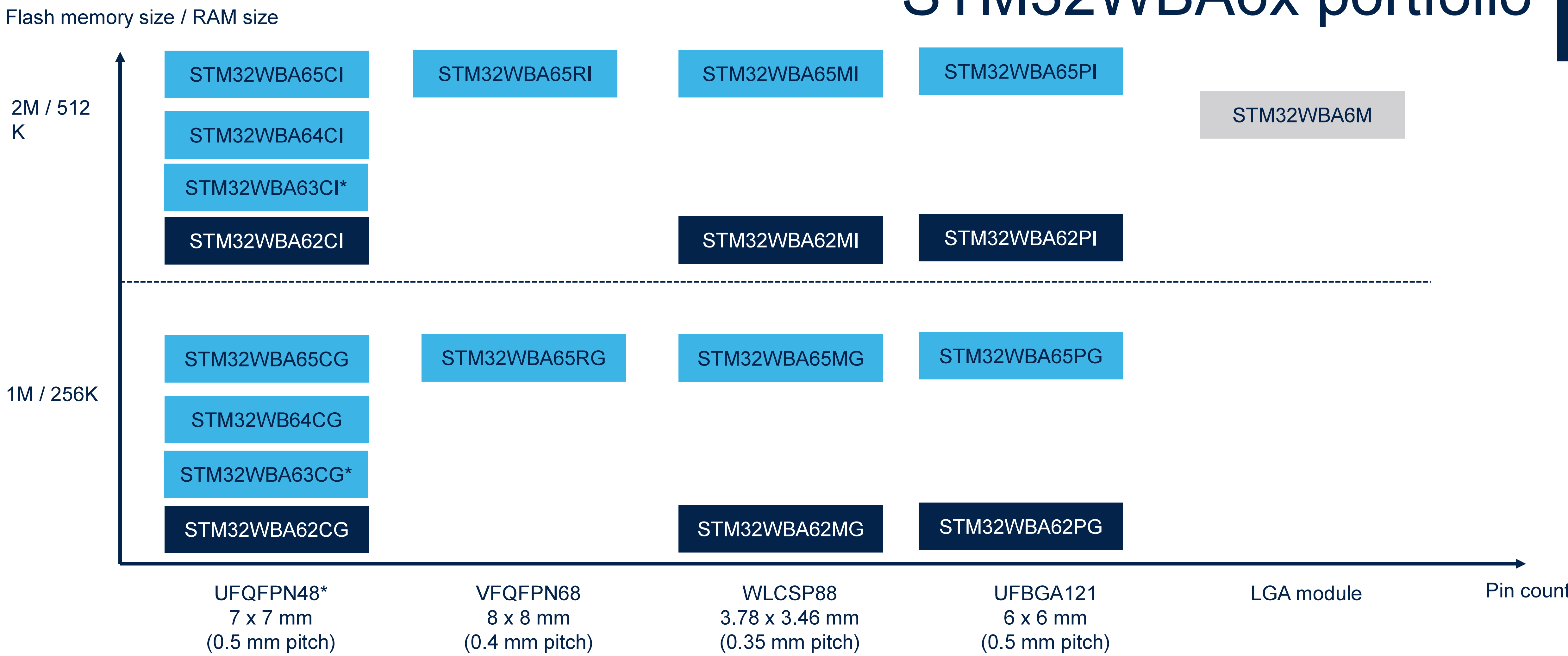
Robust connectivity: reliable data transmission with +10 dBm output power

Ultra-low-power for battery-based devices

Robust security (SESIP L3, RED compliance)

Multiprotocol support (Bluetooth® LE 5.4, Thread, Matter) & flexible packages

STM32WBA6x portfolio



Legend: Multiprotocol (Bluetooth® LE 5.4, IEEE 802.15.4 communication protocols, Zigbee®, Thread, and Matter + Bluetooth® LE audio) | Bluetooth® LE 5.4 | Available Q4 2025

* STM32WBA63 is pin-to-pin compatible with the STM32WBA55 QFN48 package.

STM32WBA6 product lines

- Arm® Cortex®-M33 (DSP + MPU + TZ) at 100 MHz
- ART Accelerator
- Integrated balun + antenna matching
- Max output power: +10 dBm
- 16-bit motor control timer
- 32- bit timer
- 1x ADC 12-bit
- 2x comparators
- Temperature sensor
- Low voltage 1.7 to 3.6V
- Temperature range -40° to 105°C

Product line	Flash (MB)	RAM (KB)	Multi protocols	Other	USB	LDO/SMPS
STM32WBA6						
STM32WBA65	Up to 2 MB	Up to 512 KB	**Yes**	3x USART 3x SPI 4x I2C	USB HS	SMPS + LDO
STM32WBA64			**Yes**	3x USART 3x SPI 4x I2C	USB HS	LDO
STM32WBA63			**Yes**	2x USART 2x SPI 2x I2C	-	SMPS + LDO
STM32WBA62			**-**	3x USART 3x SPI 4x I2C	USB HS	LDO

STM32WBA6x block diagram

STM32

STM32WBA6x ID card

Best-in-class architecture

- 2 Mbytes Flash (2x 1 Mbytes) / 512 Kbytes RAM
- Single Arm Cortex-M33 TrustZone® 100 MHz
- USB2.0 HS /w PHY
- Up to 86 GPIOs with 14x GPIOs supporting 1.2 V
- SESIP Level 3 certified

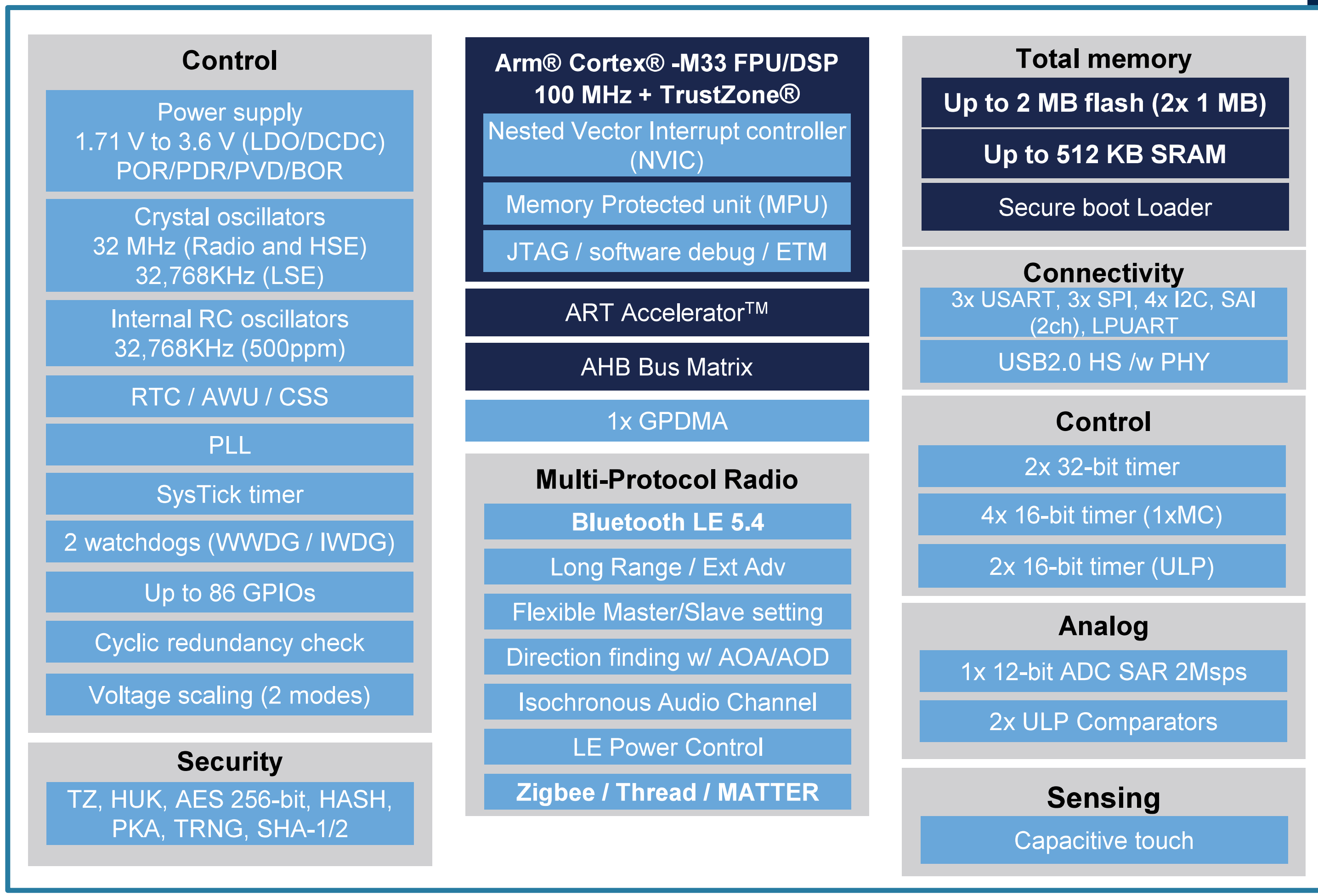
SESIP™3

Strong radio performance

- Multiprotocol: BLE 5.4, Zigbee R22/23, OT 1.3, Matter 1.3
- +10 dBm max output power + ext PA support
- TX=5.94 mA (0 dBm) / Rx = 4.3 mA (3.3 V SMPS)
- Rx Sensitivity: -98 dBm Bluetooth LE @ 1 Mbps; -100 dBm 802.15.4 @250 Kbps
- Packet Traffic Arbitration

Best-in-class flexibility

- UQFN48 (7x7x0.6 – P=0.5mm) 34 GPIOs
- WLCSP88 (3.78x3.46x0.5 - P=0.35 mm) - 54GPIOs
- QFN68 (8x8 – P=0.4 mm) - 46 GPIOs
- UFBGA121 (6x6 – P=0.5 mm) – 86 GPIOs
- LGAxx Module (WLCSP88-based)



Bluetooth® ZigBee® THREAD matter

Maximize integration efficiency

WLCSP88	Size: 3.78 x 3.46 P=0.35 mm - 54 GPIOs
QFN48	Size: 7 x 7 P=0.5 mm - 34 GPIOs
QFN68	Size: 8 x 8 P=0.4 mm - 46 GPIOs
BGA121	Size: 6 x 6 P=0.5 mm - 86 GPIOs
QFN48 no USB	Size: 7 x 7 P=0.5 mm - 31 GPIOs, pin-to-pin compatible with STM32WBA5X, no USB high speed

USB high speed
(480 Mbps)

STM32WBA65 power consumption

RUN at 100 MHz	34 µA / MHz
RUN at 16 MHz	29 µA / MHz
SLEEP at 100 MHz	15 µA / MHz
SLEEP at 32 MHz	26 µA / MHz
SLEEP at 16 MHz	16 µA / MHz
STOP 0 (full retention)	49 µA
STOP 1 (full retention)	7.2 µA*
STOP 1 (64 KB RAM)	6.9 µA*
STOP 2 (64 KB RAM)	5 µA*
STANDBY (64 KB RAM)	1.25 µA*
STANDBY	120 nA

RF operation available

Wake-up times

14 cycles
13.5 µs
19.1 µs
45.5 µs

Typ @ SMPS ON 3.3 V @ 25°C

** with RTC*

STM32WBA ecosystem

STM32WBA55 and STM32WBA6 development boards

Discover many use cases with the STM32WBA using Arduino® connectivity USB HS, and I/Os

STM32WBA55G-DK1 Discovery kit

- UFQFPN48 package
  7 x 7 mm 0.5 mm pitch
- Small serial LCD for simple GUI use cases
- Arduino® and STMod+ connectors
- RF certified for protocols & regulations

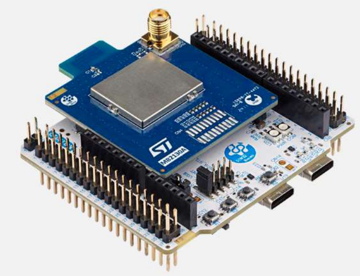
NUCLEO-WBA55CG Nucleo-64 board

- UFQFPN48 package
  7 x 7 mm 0.5 mm pitch
- 35 GPIOs
- Arduino® and Morpho connectors
- RF certified for protocols & regulations

STM32WBA65I-DK1 Discovery kit

- VFQFPN68 package
  8 x 8 mm 0.4 mm pitch
- USB HS, Small serial LCD for simple GUI use cases, High performance Serial EEPROM
- Arduino® and STMod+ connectors
- RF certified for protocols & regulations

NUCLEO-WBA65RI Nucleo-64 board

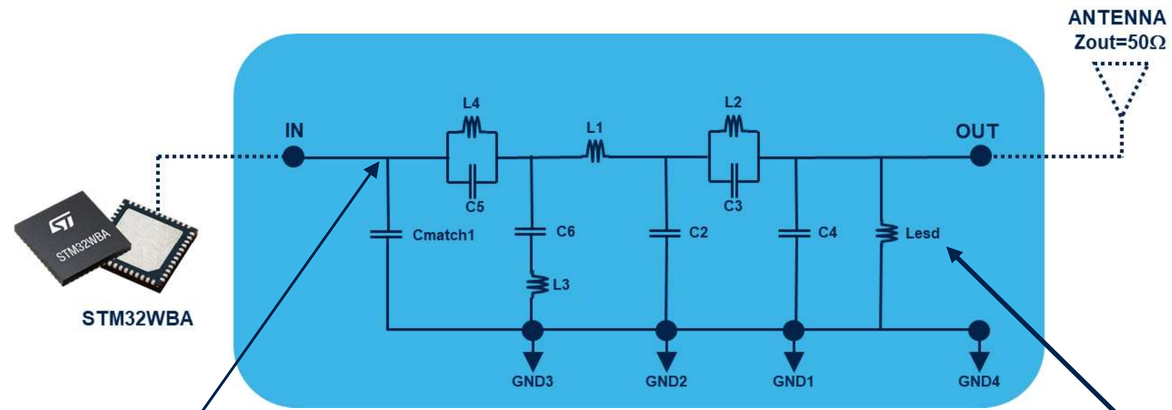


- VFQFPN68 package
  8 x 8 mm 0.4 mm pitch
- 46 GPIOs, USB HS
- Arduino® and Morpho connectors
- RF certified for protocols & regulations

RF IPD companion chip to STM32WBA series

Designed to ensure harmonics filtering, impedance matching and ESD protection in one die

- All-in-one: matching, filtering and antenna protection in one die
- Designed to simplify the RF path between STM32WBA and antenna
- Optimized to answer optimized performances
- BOM reduction, reliability improvement
- System integration: small die size 1.6 x 1 mm²

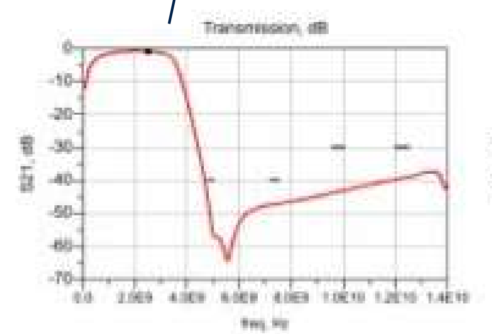


ESD protection

Chip scale package on glass 6 bumps

MLPF-WB-04D3
1.6 x 1 mm²

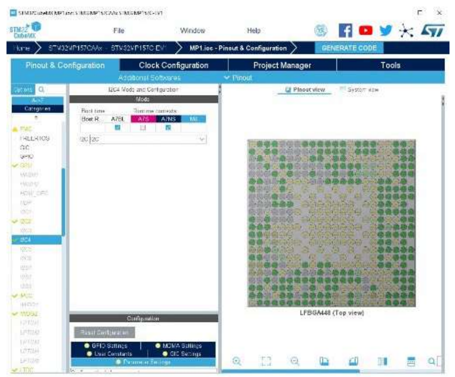
Direct match of STM32WBA impedance

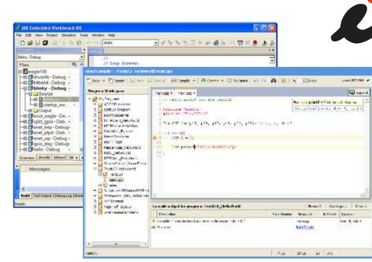


Deep attenuation to answer system requirements

Software tools for STM32WBA

Complete support of Arm® Cortex®-M33 architecture





STM32CubeMX	IDEs Compile and debug	**STM32** programming & monitoring tools
Graphical tool for easy configuration • Configure and generate code • Peripherals and middleware configuration	**Simple, powerful solutions** • Partners IDE (Arm® Keil®) **FREE** • IDE based on Eclipse **FREE** • RTOS aware debug	**STM32CubeProg STM32CubeMonitor** • Device and memory configuration • Program the application • Monitor variables at runtime

Releasing your creativity

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- [@ST_World]
- community.st.com
- www.st.com/stm32wba
- wiki.st.com/stm32mcu
- github.com/stm32-hotspot
- STM32 MCU Developer Zone

Our technology starts with You

Find out more at www.st.com/STM32WBA