The BL54L15 Series – Just Smaller!

Experience a new pinnacle of performance, efficiency, and security with our new BL54L15μ series, built on Nordic Semiconductor's powerful **nRF54** silicon. Elevating what you know and love from the nRF52 series, this next generation redefines Bluetooth LE and 802.15.4 solutions. Unleashing enhanced processing power, expanded memory, and innovative peripherals, the BL54L15μ is the ultimate choice for low power connectivity, in the smallest footprint.

Powered by **Nordic's nRF54L15** (WLCSP 300um) SoC, our ultra compact BL54L15μ modules deliver secure and robust Bluetooth LE and 802.15.4 with flexible programming via the Nordic SDK, Zephyr RTOS and Canvas Software Suite.

Featuring a **128MHz ARM Cortex M33** and **128MHz RISC-V coprocessor**, supported by 1.5 MB non-volatile memory and 256 KB RAM, the BL54L15μ modules offer double the processing power (vs prior BL654 – nRF52840). The BL54L15μ series brings out all nRF54L15 hardware features and capabilities including up to **+8 dBm** transmit power, **1.7V –3.6V** supply considerations, and **NFC A-Tag** implementation.

It's further enhanced with state-of-the-art security and is designed for PSA Certified level 3. It supports services such as Secure Boot, Secure Firmware Update, Secure Storage plus protection from physical attacks.

NORDIC SEMICONDUCTOR

Zephyr™ Project

CANVAS DEVICE MANAGER

- **Nordic nRF54L15** – 2.4 x 2.25mm WSCLP with 32 GPIOs utilized.
- **Multi-protocol support:** Bluetooth LE Core 6.0, 802.15.4 (Thread/Matter)
- **Cortex M33** processor core: 128 MHz ARM Cortex M33
- **RISC-V** co-processor core: 128 MHz VPR
- **Memory:** 1.5MB non-volatile memory, 256 KB RAM
- **High Speed Peripherals**: - HS-SPI/UART, software defined peripherals on 128 MHz VPR, GPIO - 1x 64 MHz Port, 1.7 – 3.6V, 11 GPIOs
- **Low Leakage Peripherals:** 2x QDEC, 7x Timer, Global RTC, 2x WDT, NFC A-Tag, TEMP, I2S, COMP, 3x PWM, LPCOMP, 14-bit 8CH ADC, 5x TWI/SPI/UART, GPIO (2x 16 MHz Port (P0, P1), 20 GPIO's, 1.7-3.6V, 32 GPIO)
- **Antenna choice** – integrated pre-certified **Chip antenna** or external antenna support via **Trace Pad**
- **Ultra-small footprint** (6.3 mm x 7.9 mm x 1.75 mm)
- **Extended** Industrial **Temperature Rating** (-40° to +105 °C)
- **Development choice:** Zephyr RTOS, Nordic nRF Connect SDK & Canvas
- **Bluetooth LE**: Peripheral/Central, 2 Mbps (high throughput), LE Coded (long range), AoA/AoD, Mesh
- Firmware Over the Air **(FOTA)** via MCUboot and Zephyr
- **Hostless operation** – Multi Core MCU reduces BOM
- **Fully featured development kits** to jump start Bluetooth LE development

Key Features

Best in Class Multiprotocol Radio
Best-in-class multiprotocol radio with up to 8 dBm TX power (with 1 dB steps) and -98 dBm RX sensitivity for 1 Mbps BLE. Supports BT 5.4 features and upcoming BT specifications, as well as Bluetooth mesh, Thread, and Matter.

Advanced Security
Designed for PSA Certified Level 3 with Secure Boot, Secure Firmware Update, and Secure Storage. Integrated tamper sensors detect attacks and take action, and cryptographic accelerators are hardened against side-channel attacks.

True Industrial Operating Range
Designed and certified to the highest industrial temperature range of -40 ºC to +105 ºC for every component utilized.

Global Approvals – Make Yourself at Home
Carries several modular FCC, ISED, EU, RCM, MIC, KC for Bluetooth & 802.15.4

Personal Support from Design to Manufacture
Our industry-renowned support is passionate about helping you speed your design to market.

Application Areas

Building Automation

Security

Medical Peripherals

Industrial Sensors

Interested in our BL54L15μ?
Visit www.ezurio.com/product/bl54l15-micro-series-bluetooth-le-802-15-4-nfc

Specifications

Category	Feature	Specification
Wireless Specification	Bluetooth®	Bluetooth Core 6.0
	802.15.4	Thread and Matter
	NFC	A-Tag
	Frequency	2.402 - 2.480 GHz
	Transmit Power	+ 8 dBm (maximum). Configurable down to -8 dBm
	Receive Sensitivity	-98 dBm (typical BLE 1 Mpbs) -106 dBm (typical BLE 125 kbps)
	Link Budget	106 dB (@ Bluetooth LE l Mbps), 114 dB (@ Bluetooth LE 125 kbps)
	Antenna Options	Chip antenna or Trace Pad for external antennas
	Raw Data Rates (Air)	BLE: 1 Mbps, 2 Mbps, 125 kbps, 500kps 802.15.4-2006: 250kbps
Host Interface and Peripherals	UART Interface	TX, RX, CTS, RTS. DTR, DSR, DCD, RI (GPIO) Default: 115200, N, 8, 1. Configurable from 1200 bps to 1 Mbps
	Other	32 multifunction GPIO's that can provide: • 5x UART/SPI/TWI • 8x ADC channels (1 pin each) • 2x I2S (5 GPIO pins) • 3x PWM output (1 GPIO pin per PWM) • 7x TIMER (no GPIO needed unless required) • 2 GPIO pins for 32.768 kHz crystal • 1x NFC (2 GPIO pins) • 2x QDEC • 21x Wakeup pins
Key Bluetooth LE Features	Bluetooth Low Energy	• GATT client & GATT server – Any adopted/custom services • Central/Peripheral roles • Bluetooth LE Mesh • CODED PHY • 2M PHY • LE advertising extensions • LE secure connections • Data packet length extensions • LE privacy v1.2 • LE ping • DTM Firmware (Test Modes)
Programmability Options	Nordic SDK	Software/Support available from Nordic directly https://devzone.nordicsemi.com/
	Zephyr RTOS	Software/Support available from https://www.zephyrproject.org/
	Canvas SW Suite	Software/ Support available from https://www.ezurio.com/canvas/software-suite
FW upgrade		Via UART or JTAG
Supply Voltage		Normal Voltage Mode: 1.7V – 3.6V
Power Consumption	Current	Max Peak Radio Current (@ +7 dBm TX) – 29 mA (LE1M at 1.8V)
		Max Peak Radio Current (@ -40 dBm TX) – 9 mA (LE1M at 1.8V)
		Standby Doze – 3.1 µA
		Deep Sleep –0.6 µA (external signal wake-up)
Physical	Dimensions	6.3 mm x 7.9 mm x 1.75 mm
Environmental	Temp Range	-40°C to +105°C
Miscellaneous	Lead Free	Lead-free and RoHS-compliant
	Development Kit	Development board and free software tools
Development Tools	Utilities	Nordic nRFConnect - Android and iOS applications UART firmware upgrade Xbit Tools and utilities
Qualifications	Bluetooth®	Complete Declaration ID
Regulatory	Approvals	FCC, ISED, EU, UKCA, RCM, MIC, KC – All BL54L15 Series are Bluetooth & 802.15.4 certified

For full specifications on BL54L15μ modules, please see the appropriate datasheet.

Ordering Information

Part	Description
453-00223R	Module, BL54L15μ, (Nordic nRF54L15), Chip antenna, Tape/Reel
453-00224R	Module, BL54L15μ, (Nordic nRF54L15), RF Trace Pin, Tape/Reel
453-00223C	Module, BL54L15μ, (Nordic nRF54L15), Chip antenna, Cut Tape
453-00224C	Module, BL54L15μ, (Nordic nRF54L15), RF Trace Pin, Cut Tape
453-00223-K1	Development kit, Module, BL54L15μ (Nordic nRF54L15), Chip antenna
453-00224-K1	Development kit, Module, BL54L15μ (Nordic nRF54L15), RF Trace Pin

Ezurio's products are subject to standard Terms & Conditions.