AIROC™ Bluetooth® LE module

General description

The CYW20829B0-P4TAI100 and CYW20829B0-P4EPI100 are fully integrated Bluetooth® LE wireless modules. The CYW20829B0-P4XXI100 (CYW20829B0-P4XXI100 is used to refer to both CYW20829B0-P4TAI100 and CYW20829B0-P4EPI100) includes an onboard crystal oscillator, passive components, flash memory, and the CYW20829 silicon device. Refer to the **CYW20829** datasheet for additional details on the capabilities of the silicon device used in this module.

The CYW20829B0-P4XXI100 supports high-performance analog-to-digital conversion audio input, I^2S/PCM, CAN, LIN for automotive use cases and other standard communication and timing peripherals. The CYW20829B0-P4XXI100 includes a royalty-free Bluetooth® stack compatible with Bluetooth® 5.4 core spec in a 14.5 × 19 × 1.95 mm package.

The CYW20829B0-P4XXI100 includes 1 MB of onboard serial flash memory and is designed for standalone operation. The CYW20829B0-P4XXI100 uses an integrated power amplifier to achieve Class I or Class II output power capability.

The CYW20829B0-P4XXI100 is fully qualified by Bluetooth® SIG and is targeted at applications requiring cost-optimized Bluetooth® wireless connectivity.

The CYW20829B0-P4XXI100 is offered in two certified versions CYW20829B0-P4TAI100, and CYW20829B0-P4EPI100. The CYW20829B0-P4TAI100 includes an integrated trace antenna. The CYW20829B0-P4EPI100 supports an external antenna through a RF solder pad output.

Features

- Module description
  - Module size: 14.5 × 19 × 1.95 mm
  - Bluetooth® 5.4 core spec qualified module
    - QDID: TBD
    - Declaration ID: TBD
  - Certified to FCC, ISED, MIC, and CE regulations
  - Castelated solder pad connections for ease-of-use
  - 1-MB on-module serial flash memory
  - Up to 26 GPIOs
  - Temperature range: –40°C to +85°C
  - 96-MHz Arm® Cortex®-M33 CPU with single-cycle multiply and memory protection unit (MPU)
  - Maximum TX output power
    - Programmable TX power: up to 10 dBm
      Bluetooth® LE connection range of up to 500 meters at 10 dBm[1]
  - RX sensitivity:
    - LE-1 Mbps: –98 dBm
    - LE-2 Mbps: –95 dBm
    - Coded PHY 500 kbps (LE-LR): –101 dBm
    - Coded PHY 125 kbps (LE-LR): –106 dBm

Note

1. Connection range tested module-to-module using Bluetooth® Low Energy Long Range Coded PHY technology in full line-of-sight environment, free of obstacles or interference sources with output power of +10.0 dBm. Actual range will vary based on end product design, environment, receive sensitivity, and transmit output power of the central device.

Features

- Power consumption
  - Bluetooth® LE current consumption
    - RX current: 5.6 mA @ LE 1 Mbps
    - TX current: 5.2 mA @ 0 dBm
    - Deep Sleep mode current with 64 KB SRAM retention: 4.5 µA
    - Hibernate mode: 0.5 µA
- Functional capabilities
  - Flexible clocking options
    - 8-MHz internal main oscillator (IMO) with ±2% accuracy
    - Ultra-low-power 32-kHz internal low-speed oscillator (ILO)
    - 48-MHz low power IHO (internal oscillator)
    - Frequency-locked loop (FLL) for multiplying IMO frequency
    - Integer and fractional peripheral clock dividers
  - Serial communication
    - Three run-time configurable Serial Communication Blocks (SCBs)
      First SCB: Configurable as SPI or I^2C
      Second SCB: Configurable as SPI or UART
      Third SCB: Configurable as I^2C or UART
  - Audio subsystem
    - Two pulse density modulation (PDM) channels and one I^2S channel with time division multiplexed (TDM) mode
  - Timing and pulse-width modulation
    - Seven 16-bit and two 32-bit Timer/Counter Pulse-Width Modulator (TCPWM) blocks, for MCU. Multiple PWMs needed for color LEDs.
    - PWM supports center-aligned, edge, and pseudo-random modes
  - ADC and MIC
    - Sigma-delta switched cap ADC for audio and DC measurements
  - Up to 26 programmable GPIOs
    - One I/O port (8 I/Os) enables Boolean operations on GPIO pins; available during system Deep Sleep
    - Programmable drive modes, strengths, and slew rates
    - Two overvoltage-tolerant (OVT) pins
  - Security built into platform architecture
    - ROM-based root of trust via uninterruptible “Secure Boot”
    - Step-wise authentication of execution images
    - Secure execution of code in execute-only mode for protected routines
    - All debug and test ingress paths can be disabled
    - Up to four protection contexts (One available for customer code)
    - Secure debug support via authenticated debug token
    - Encrypted image support for external SMIF memory
  - Cryptography hardware
    - Hardware Acceleration for symmetric cryptographic methods and hash functions
    - True Random Number Generation (TRNG) function

Benefits

CYW20829B0-P4XXI100 provides all necessary components required to operate Bluetooth® LE communication standards.

- Proven ready-to-use hardware design
- Cost optimized for applications without space constraints
- Nonvolatile memory for self-sufficient operation and over-the-air updates
- Bluetooth® SIG listed with QDID and declaration ID
- Fully certified module eliminates the time needed for design, development, and certification processes
- ModusToolbox™ provides an easy-to-use integrated design environment (IDE) to configure, develop, and program a Bluetooth® application

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1 Overview

1.1 Functional block diagram

Figure 1 illustrates the CYW20829B0-P4XXI100 functional block diagram.

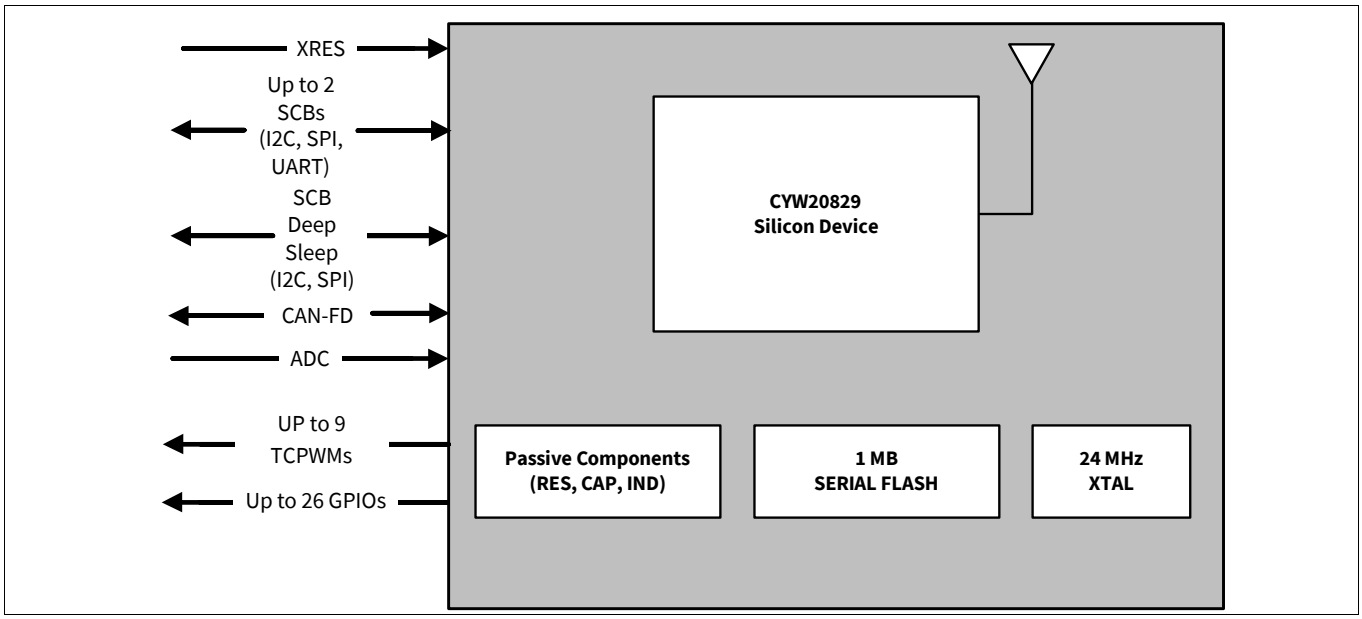


Figure 1 Functional block diagram (GPIOs)

1.2 Module description

The CYW20829B0-P4XXI100 module is a complete module designed to be soldered to the application's main board.

1.2.1 Module dimensions and drawing

Infineon reserves the right to select components from various vendors to achieve the Bluetooth® module functionality. Such selections will still guarantee that all mechanical specifications and module certifications are maintained. Designs should be held within the physical dimensions shown in the mechanical drawings in **Figure 2**. All dimensions are in millimeters (mm).

Table 1 Module design dimensions

Dimension item		Specification
Module dimensions	Length (X)	14.5 ± 0.15 mm
	Width (Y)	19 ± 0.15 mm
Antenna connection location dimensions	Length (X)	14.5 mm
	Width (Y)	4.62 mm
PCB thickness	Height (H)	0.50 ± 0.05 mm
Shield height	Height (H)	1.45-mm typical
Maximum component height	Height (H)	1.45-mm typical
Total module thickness (bottom of module to highest component)	Height (H)	1.95-mm typical

See **Figure 2** for the mechanical reference drawing for CYW20829B0-P4XXI100.

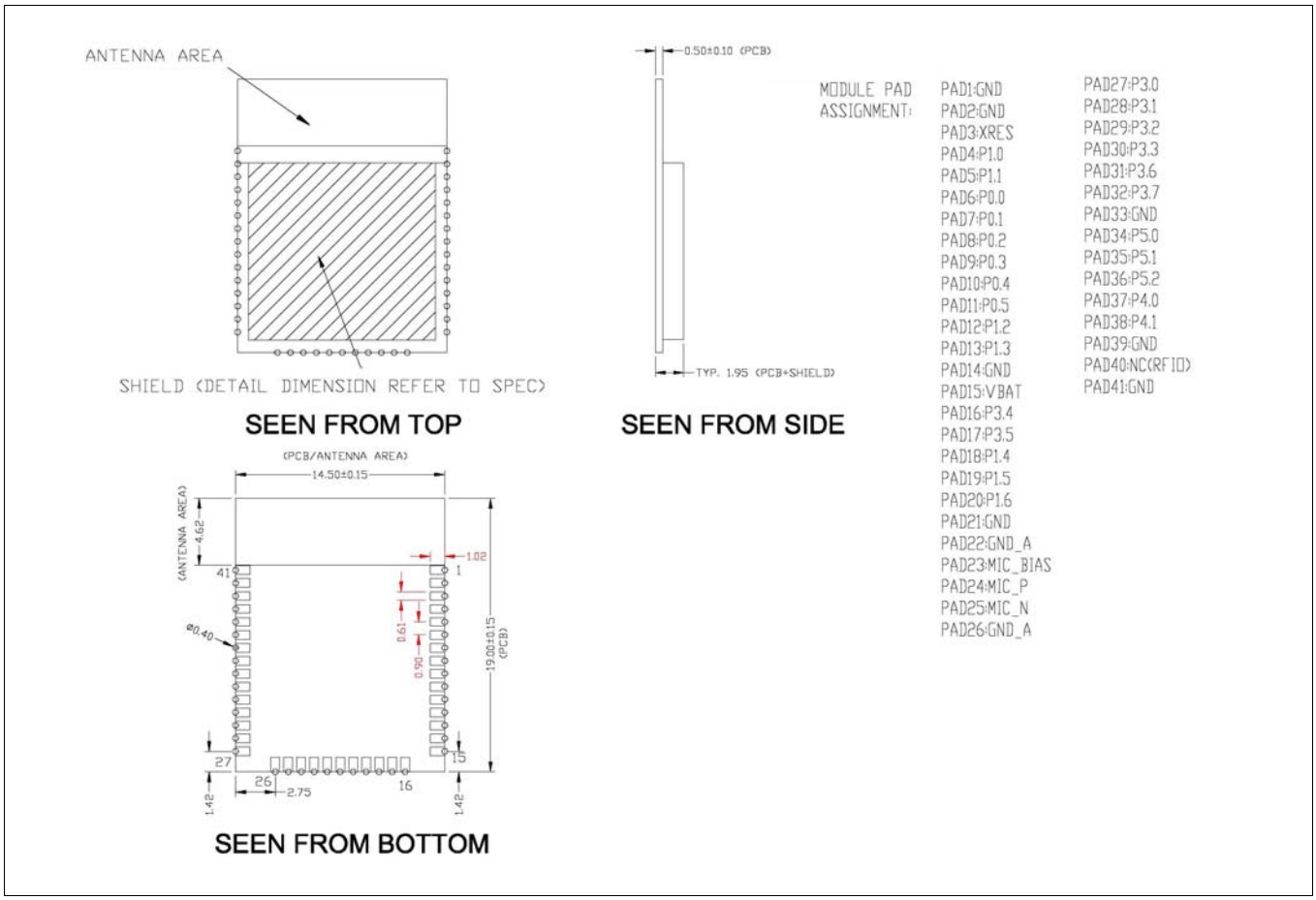


Figure 2 Module mechanical drawing

Notes

2. No metal should be located beneath or above the antenna area. Only bare PCB material should be located beneath the antenna area. For more information on recommended host PCB layout, see **"Recommended host PCB layout"** on page 9.
3. The CYW20829B0-P4TAI100, CYW20829B0-P4EPI100 includes castellated pad connections, denoted as the circular openings at the pad location above.

2 Pad connection interface

As shown in the bottom view of **Figure 2**, the CYW20829B0-P4XXI100 connects to the host board via solder pads on the backside of the module. **Table 2** and **Figure 3** detail the solder pad length, width, and pitch dimensions of the CYW20829B0-P4XXI100 module.

Table 2 Connection description

Product	Name	Connections	Connection type	Pad length dimension	Pad width dimension	Pad pitch
CYW20829B0-P4TAI100	SP	41	Solder pads	1.02 mm	0.61 mm	0.90 mm
CYW20829B0-P4EPI100	SP	41	Solder pads	1.02 mm	0.61 mm	0.90 mm

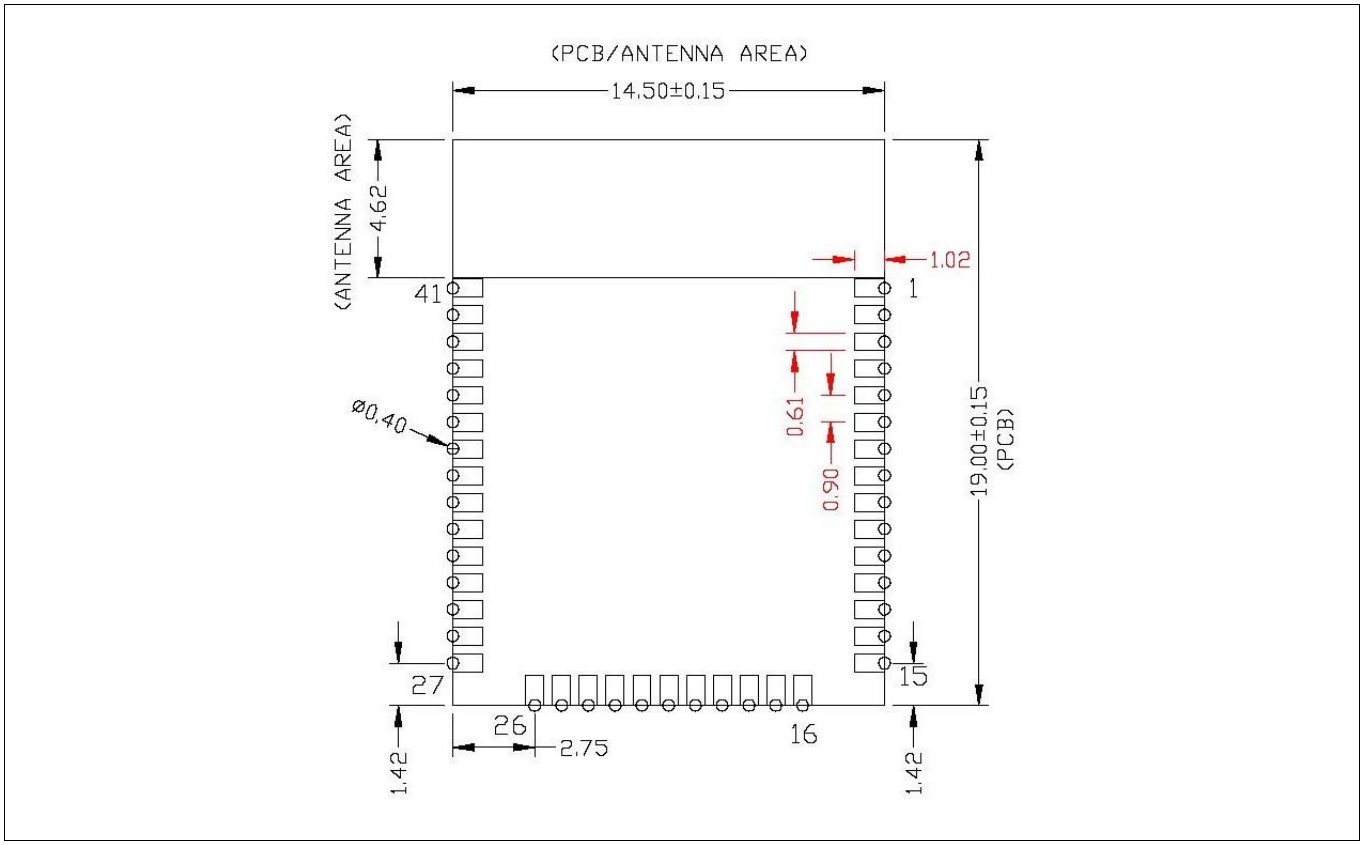


Figure 3 Solder pad dimensions (seen from bottom)

Pad connection interface

To maximize RF performance, the host layout should follow these recommendations:

1. Antenna Area Keepout: The host board directly below the antenna area of the module (see **Figure 4**) must not contain ground or signal traces. This keepout area requirement applies to all layers of the host board.
2. Module Placement: The ideal placement of the Bluetooth® module is in a corner of the host board with the PCB trace antenna located at the far corner. This placement minimizes the additional recommended keepout area stated in item 2. Refer to **KBA97095** for module placement best practices.

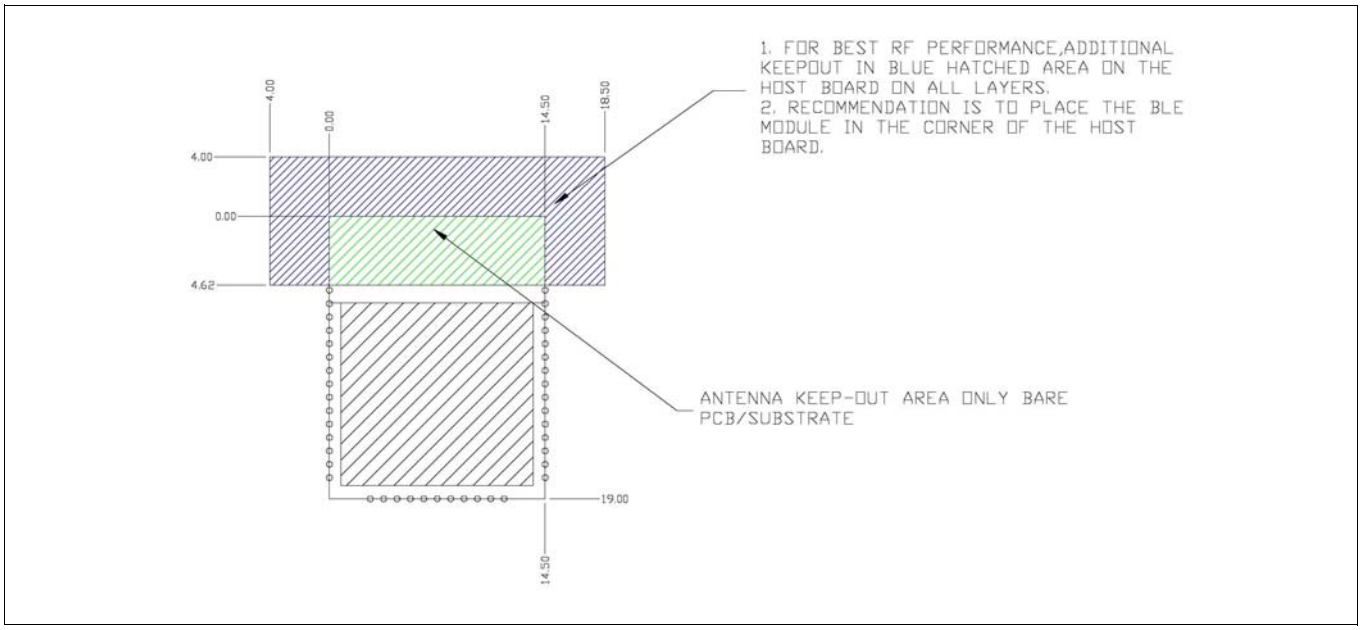


Figure 4 Recommended host PCB keepout area around the CYW20829B0-P4XXI100 antenna

3 Recommended host PCB layout

Figure 5 provides details that can be used for the recommended host PCB layout pattern for the CYW20829B0-P4XXI100. Dimensions are in millimeters unless otherwise noted. Pad length of 1.27 mm (0.64 mm from center of the pad on either side) shown in **Figure 4** is the minimum recommended host pad length. The host PCB layout pattern can be completed using either **Figure 5**. It is not necessary to use all figures to complete the host PCB layout pattern.

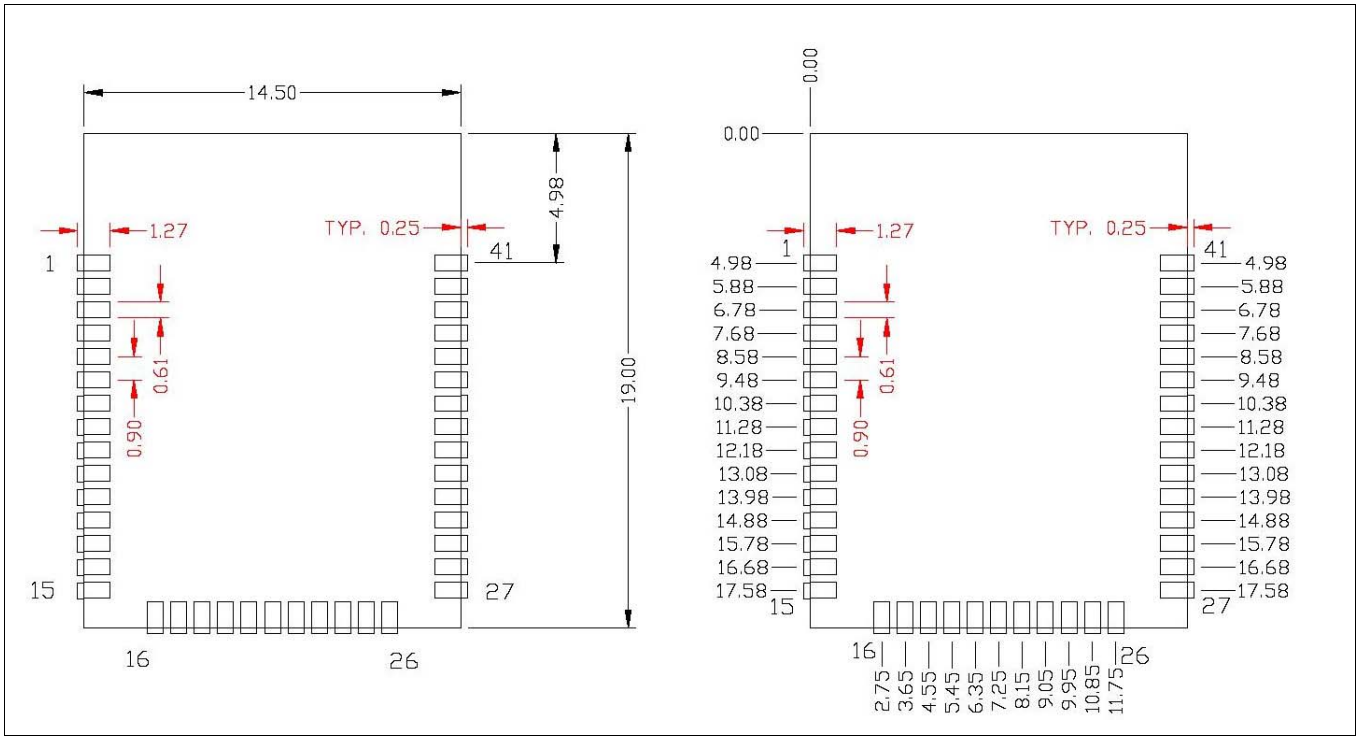


Figure 5 CYW20829B0-P4XXI100 host layout (dimensioned)

4 Module connections

Table 3 details the solder pad connection definitions and available functions for the pad connections for the CYW20829B0-P4XXI100 module. Table 3 lists the solder pads on the CYW20829B0-P4XXI100 module, the silicon device pin, and denotes what functions are available for each solder pad.

Table 3 Pin assignments

Module pad name	Module pad number	Silicon pin name	Silicon pin number	I/O	Power domain	Description
Microphone		**Microphone**				
MIC_P	24	MIC_P	54	I	V_{bat}	Microphone positive input
MIC_N	25	MIC_N	55			Microphone negative input
MIC_BIAS	23	MIC_BIAS	53	O		Microphone bias supply
GND_A	22, 26	–	–	–	–	Analog ground for microphone; connected to GND inside module
Power supply						
V_{BAT}	15	2.75 V~3.6 V	–	–	–	–
Ground pins						
GND	1, 2, 14, 21, 33, 39, 41	–	–	–	–	–
Radio I/O						
RFIO	40	–	–	I/O	–	External antenna port (only for CYW20829B0-P4EPI100)

Table 4 GPIO pin descriptions

Module pad name	Module pad number	Silicon pin name	Silicon pin number	Direction	POR state	Power domain	Description
P0.0	6	P0.0	32	I/O	Floating	V_{bat}	General input and output port. See **Table 5** for alternate functions.
P0.1	7	P0.1	33	I/O	Floating	V_{bat}	
P0.2	8	P0.2	34	I/O	Floating	V_{bat}	
P0.3	9	P0.3	35	I/O	Floating	V_{bat}	
P0.4	10	P0.4	36	I/O	Floating	V_{bat}	
P0.5	11	P0.5	37	I/O	Floating	V_{bat}	
P1.0	4	P1.0	38	I/O	Floating	V_{bat}	
P1.1	5	P1.1	39	I/O	Floating	V_{bat}	
P1.2	12	P1.2	40	I/O	Floating	V_{bat}	
P1.3	13	P1.3	41	I/O	Floating	V_{bat}	
P1.4	18	P1.4	43	I/O	Floating	V_{bat}	
P1.5	19	P1.5	44	I/O	Floating	V_{bat}	
P1.6	20	P1.6	45	I/O	Floating	V_{bat}	
P3.0	27	P3.0	1	I/O	Floating	V_{bat}	
P3.1	28	P3.1	2	I/O	Floating	V_{bat}	
P3.2	29	P3.2	3	I/O	Floating	V_{bat}	
P3.3	30	P3.3	4	I/O	Floating	V_{bat}	
P3.4	16	P3.4	5	I/O	Floating	V_{bat}	
P3.5	17	P3.5	6	I/O	Floating	V_{bat}	
P3.6	31	P3.6	8	I/O	Floating	V_{bat}	
P3.7	32	P3.7	9	I/O	Floating	V_{bat}	
P4.0	37	P4.0	13	I/O	Floating	V_{bat}	
P4.1	38	P4.1	14	I/O	Floating	V_{bat}	
P5.0/ WCO_OUT	34	P5.0/ WCO_OUT	10	I/O	Floating	V_{bat}	
P5.1/ WCO_IN	35	P5.1/ WCO_IN	11	I/O	Floating	V_{bat}	
P5.2	36	P5.2	12	I/O	Floating	V_{bat}	
XRES	3	XRES	23	I	Floating	V_{bat}	

Notes

4. The CYW20829B0-P4XXI100 contains a single SPI (SPI1) peripheral supporting both master or slave configurations. SPI2 is used for on-module serial memory interface.
5. In Master mode, any available GPIO can be configured as SPI1_CS.

Each port pin has multiple alternate functions. These are defined in **Table 5**.

Table 5 Multiple alternate functions[6]

Port/Pin	Analog	ACT #0	ACT #1	ACT #4	ACT #5	ACT #6	ACT #7	ACT #8	ACT #9	ACT #10	ACT #11	ACT #12	ACT #13	ACT #14	ACT #15	DS #2	DS #3	DS #5	DS #6	DS #7
P0.0	–	tcpwm[0].line_compl[0]:3	tcpwm[0].line_compl[262]:0	–	–	–	–	–	pdm.pdm_clk[1]:0	–	–	tdm.tdm_tx_mck[0]:0	tdm.tdm_rx_mck[0]:0	–	–	keyscan.ks_col[2]	–	–	scb[0].spi_select1:0	–
P0.1	–	tcpwm[0].line[1]:3	tcpwm[0].line[256]:1	–	–	–	–	–	pdm.pdm_data[1]:0	–	–	tdm.tdm_tx_sck[0]:0	–	–	–	keyscan.ks_col[3]	–	–	scb[0].spi_select2:0	–
P0.2	–	tcpwm[0].line_compl[1]:3	tcpwm[0].line_compl[256]:1	–	–	–	–	–	–	peri.tr_io_input[4]:0	–	tdm.tdm_tx_fsync[0]:0	–	–	–	keyscan.ks_col[11]	scb[0].i2c_scl:0	–	scb[0].spi_mosi:0	–
P0.3	–	tcpwm[0].line[0]:4	tcpwm[0].line[257]:1	–	–	–	–	scb[1].spi_select3:0	–	–	–	tdm.tdm_tx_sd[0]:0	–	–	–	keyscan.ks_col[12]	scb[0].i2c_sda:0	–	scb[0].spi_miso:0	–
P0.4	–	tcpwm[0].line_compl[0]:4	tcpwm[0].line_compl[257]:1	srss.ext_clk:0	cpuss.trace_data[3]:1	–	–	scb[1].spi_select2:0	–	peri.tr_io_input[0]:0	–	tdm.tdm_rx_sck[0]:0	–	–	–	keyscan.ks_row[0]	–	–	scb[0].spi_clk:0	–
P0.5	–	tcpwm[0].line[1]:4	tcpwm[0].line[258]:1	–	cpuss.trace_data[2]:1	–	–	scb[1].spi_select1:0	–	peri.tr_io_input[1]:0	–	tdm.tdm_rx_fsync[0]:0	–	–	smif.spihb_select1	keyscan.ks_row[1]	–	–	scb[0].spi_select0:0	–
P1.0	–	tcpwm[0].line_compl[1]:4	tcpwm[0].line_compl[258]:1	–	cpuss.trace_data[1]:1	scb[1].uart_cts:0	–	scb[1].spi_select0:0	–	–	peri.tr_io_output[0]:0	tdm.tdm_rx_sd[0]:0	–	–	–	keyscan.ks_row[2]	–	cpuss.swj_swo_tdo	–	–
P1.1	–	tcpwm[0].line[0]:5	tcpwm[0].line[259]:1	–	cpuss.trace_data[0]:1	scb[1].uart_rts:0	–	scb[1].spi_clk:0	–	–	peri.tr_io_output[1]:0	–	–	–	–	keyscan.ks_row[3]	–	cpuss.swj_swdoe_tdi	–	–
P1.2	–	tcpwm[0].line_compl[0]:5	tcpwm[0].line_compl[259]:1	–	cpuss.trace_clock:1	scb[1].uart_rx:0	scb[2].i2c_scl:1	scb[1].spi_mosi:0	–	peri.tr_io_input[2]:0	–	–	–	–	–	keyscan.ks_row[4]	–	cpuss.swj_swdio_tms	–	–
P1.3	–	tcpwm[0].line[1]:5	tcpwm[0].line[260]:1	–	–	scb[1].uart_tx:0	scb[2].i2c_sda:1	scb[1].spi_miso:0	–	peri.tr_io_input[3]:0	–	–	–	–	–	keyscan.ks_row[5]	–	cpuss.clk_swj_swclk_tclk	–	–
P1.4	–	tcpwm[0].line_compl[1]:5	tcpwm[0].line_compl[260]:1	–	–	–	–	–	–	–	lin[0].lin_en[1]:0	–	–	–	–	keyscan.ks_col[4]	–	–	–	–
P1.5	–	tcpwm[0].line[0]:6	tcpwm[0].line[261]:1	–	–	–	–	–	–	–	lin[0].lin_rx[1]:0	–	–	–	–	keyscan.ks_col[5]	–	–	–	–
P1.6	–	tcpwm[0].line_compl[0]:6	tcpwm[0].line_compl[261]:1	–	–	–	–	–	–	–	lin[0].lin_tx[1]:0	–	–	–	–	keyscan.ks_col[6]	srss.cal_wave	–	–	–
P2.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif.spihb_select0	–	–	–	–	–
P2.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif.spihb_data3	–	–	–	–	–
P2.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif.spihb_data2	–	–	–	–	–
P2.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif.spihb_data1	–	–	–	–	–

Note

6. The notation for a signal is of the form IPName[x].signal_name[u]:y.
IPName = Name of the block (such as tcpwm), x = Unique instance of the IP, Signal_name = Name of the signal, u = Signal number where there are more than one signals for a particular signal name, y = Designates copies of the signal name.
For example, the name tcpwm[0].line_compl[3]:4 indicates that this is instance 0 of a tcpwm block, the signal is line_compl # 3 (complement of the line output) and this is the fourth occurrence (copy) of the signal. Signal copies are provided to allow flexibility in routing and to maximize utilization of on-chip resources.

Table 5 Multiple alternate functions[6] *(continued)*

Port/Pin	Analog	ACT #0	ACT #1	ACT #4	ACT #5	ACT #6	ACT #7	ACT #8	ACT #9	ACT #10	ACT #11	ACT #12	ACT #13	ACT #14	ACT #15	DS #2	DS #3	DS #5	DS #6	DS #7
P2.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif. spihb_ data0	–	–	–	–	–
P2.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	smif. spihb_ clk	–	–	–	–	–
P3.0	adcmic. gpio_ adc_in[0]	tcpwm[0]. line[0]:0	tcpwm[0]. line[256]:0	–	cpuss. trace_ data[3]:0	scb[2]. uart_cts:0	–	scb[1].spi_ select0:1	–	–	–	–	–	btss. uart_ cts:0	–	keyscan. ks_col[13]	–	–	–	–
P3.1	adcmic. gpio_ adc_in[1]	tcpwm[0]. line_ compl[0]:0	tcpwm[0]. line_ ompl[256]:0	–	cpuss. trace_ data[2]:0	scb[2]. uart_rts:0	–	scb[1].spi_ clk:1	–	–	lin[0].lin_ en[0]:0	–	–	btss. uart_ rts:0	–	keyscan. ks_col[14]	–	cpuss.rst_ swj_trstn	–	–
P3.2	adcmic. gpio_ adc_in[2]	tcpwm[0]. line[1]:0	tcpwm[0]. line[257]:0	–	cpuss. trace_ data[1]:0	scb[2]. uart_rx:0	scb[2].i2c_ scl:0	scb[1].spi_ mosi:1	pdm. pdm_ clk[0]:0	peri.tr_io_ input[6]:0	lin[0].lin_ rx[0]:0	canfd[0]. ttcan_rx[0]	adcmic. clk_pdm:0	btss. uart_ rxd:0	–	keyscan. ks_col[15]	–	–	–	–
P3.3	adcmic. gpio_ adc_in[3]	tcpwm[0]. line_ compl[1]:0	tcpwm[0]. line_ ompl[257]:0	–	cpuss. trace_ data[0]:0	scb[2]. uart_tx:0	scb[2].i2c_ sda:0	scb[1].spi_ miso:1	pdm. pdm_ data[0]:0	peri.tr_io_ input[7]:0	lin[0].lin_ tx[0]:0	canfd[0]. ttcan_tx[0]	adcmic. pdm_ data:0	btss. uart_ txd:0	–	keyscan. ks_col[16]	–	–	–	–
P3.4	adcmic. gpio_ adc_in[4]	tcpwm[0]. line[0]:1	tcpwm[0]. line[258]:0	–	cpuss. trace_ clock:0	–	–	scb[1].spi_ select3:1	–	–	–	–	–	–	–	keyscan. ks_col[7]	–	–	–	–
P3.5	adcmic. gpio_ adc_in[5]	tcpwm[0]. line_ compl[0]:1	tcpwm[0]. line_ ompl[258]:0	–	–	–	–	scb[1].spi_ select2:1	–	–	–	–	–	–	–	keyscan. ks_col[8]	–	–	–	–
P3.6	adcmic. gpio_ adc_in[6]	tcpwm[0]. line[1]:1	tcpwm[0]. line[259]:0	–	–	–	–	scb[1].spi_ select1:1	–	–	–	–	–	–	–	keyscan. ks_col[9]	–	–	–	–
P3.7	adcmic. gpio_ adc_in[7]	tcpwm[0]. line_ compl[1]:1	tcpwm[0]. line_ ompl[259]:0	–	–	–	–	–	–	–	–	–	–	–	–	keyscan. ks_col[10]	–	–	–	–
P4.0	–	tcpwm[0]. line_ compl[1]:2	tcpwm[0]. line_ ompl[261]:0	–	–	–	–	–	–	–	–	–	–	–	–	keyscan. ks_row[6]	scb[0]. i2c_scl:1	–	scb[0]. spi_ mosi:1	–
P4.1	–	tcpwm[0]. line[0]:3	tcpwm[0]. line[262]:0	–	–	–	–	–	–	–	–	–	–	–	–	keyscan. ks_row[7]	scb[0]. i2c_sda:1	–	scb[0]. spi_ miso:1	–
P5.0/ WCO_OUT	–	tcpwm[0]. line[0]:2	tcpwm[0]. line[260]:0	srss.ext_ clk:1	–	scb[2]. uart_cts:1	–	scb[1].spi_ select0:2	pdm. pdm_ clk[0]:1	–	–	–	adcmic. clk_pdm:1	btss. uart_ cts:1	–	keyscan. ks_col[17]	–	–	–	–
P5.1/ WCO_IN	–	tcpwm[0]. line_compl [0]:2	tcpwm[0]. line_ ompl[260]:0	–	–	–	–	–	pdm. pdm_ data[0]:1	–	–	–	adcmic. pdm_ data:1	–	–	keyscan. ks_col[0]	–	–	–	–
P5.2	–	tcpwm[0]. line[1]:2	tcpwm[0]. line[261]:0	–	–	–	–	–	–	–	–	–	–	–	–	keyscan. ks_col[1]	–	–	–	–

Note
6. The notation for a signal is of the form IPName[x].signal_name[u]:y.
IPName = Name of the block (such as tcpwm), x = Unique instance of the IP, Signal_name = Name of the signal, u = Signal number where there are more than one signals for a particular signal name, y = Designates copies of the signal name.
For example, the name tcpwm[0].line_compl[3]:4 indicates that this is instance 0 of a tcpwm block, the signal is line_compl # 3 (complement of the line output) and this is the fourth occurrence (copy) of the signal. Signal copies are provided to allow flexibility in routing and to maximize utilization of on-chip resources.

5 Connections and optional external components

5.1 Power connections (V_{BAT})

The CYW20829B0-P4XXI100 contains one power supply connection, V_{BAT}, which accepts a supply input range of 2.75 V to 3.6 V for CYW20829B0-P4XXI100. **Table 9** provides this specification. The maximum power supply ripple for this power connection is 100 mV, as shown in **Table 9**.

It is not required to place any power supply decoupling or noise reduction circuitry on the host PCB. If desired, an external ferrite bead between the supply and the module connection can be included, but is not necessary. If used, the ferrite bead should be positioned as close as possible to the module pin connection and the recommended ferrite bead value is 330 Ω, 100 MHz.

5.1.1 Considerations and optional components for Brown Out (BO) conditions

Power supply design must be completed to ensure that the CYW20829B0-P4XXI100 module does not encounter a Brown Out condition, which can lead to unexpected functionality, or module lock up. A Brown Out condition may be met if power supply provided to the module during power up or reset is in the following range:

$$2.75\ V \leq V_{bat} \leq 3.6\ V$$

System design should ensure that the condition above is not encountered when power is removed from the system. In the event that this cannot be guaranteed (that is, battery installation, high-value power capacitors with slow discharge), it is recommended that an external voltage detection device be used to prevent the Brown Out voltage range from occurring during power removal. Refer to **Figure 6** for the recommended circuit design when using an external voltage detection IC.

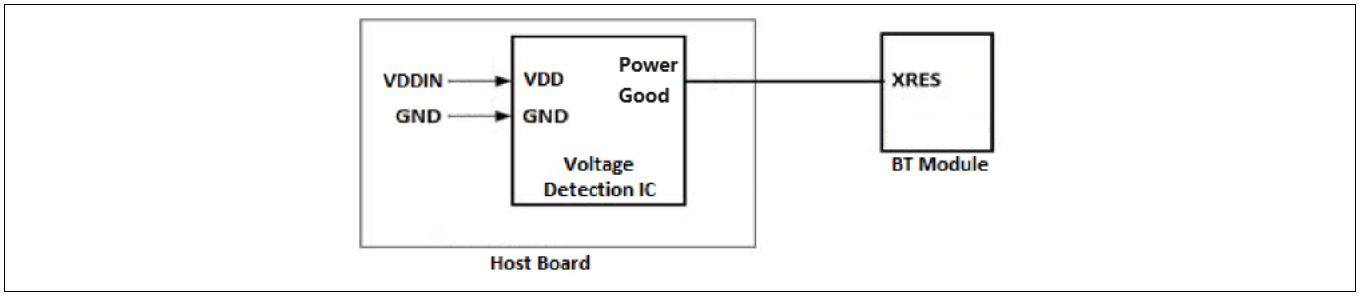


Figure 6 Reference circuit block diagram for external voltage detection IC

In the event that the module does encounter a Brown Out condition, and is operating erratically or is not responsive, power cycling the module will correct this issue and once reset, the module should operate correctly. Brown Out conditions can potentially cause issues that cannot be corrected, but in general, a power-on-reset operation will correct a Brown Out condition.

5.2 External reset (XRES)

The CYW20829B0-P4XXI100 has an integrated power-on reset circuit, which completely resets all circuits to a known power-on state. This action can also be evoked by an external reset signal, forcing it into a power-on reset state. The XRES signal is an active-low signal, which is an input to the CYW20829B0-P4XXI100 module (solder pad 3). The CYW20829B0-P4XXI100 module does not require an external pull-up resistor on the XRES input

During power-on operation, the XRES connection to the CYW20829B0-P4XXI100 is required to be held low 50 ms after the V_{BAT} power supply input to the module is stable. This can be accomplished in the following ways:

- If CYW20829B0-P4XXI100 is connected to a host device, the host device should connect a GPIO to the XRES of the CYW20829B0-P4XXI100 module and pull XRES low until V_{BAT} is stable. XRES is recommended to be released 50 ms after V_{BAT} is stable.
- If the XRES connection of the CYW20829B0-P4XXI100 module is not used in the application, a 10-µF capacitor and a 4.7-kΩ pull-up resistor may be connected to the XRES solder pad of the CYW20829B0-P4XXI100 to delay the XRES release. The capacitor value for this recommended implementation is approximate, and the exact value may differ depending on the V_{BAT} power supply ramp time of the system. The capacitor value should result in an XRES release timing of 50 ms after V_{BAT} stability.
- The XRES release timing may be controlled by an external voltage detection IC. XRES should be released 50 ms after V_{BAT} is stable.

5.3 Antenna design

Table 6 details trace antenna used in the CYW20829B0-P4XXI100 module.

Table 6 Trace antenna specifications

Item	Description
Frequency range	2400 MHz–2500 MHz
Peak gain	–0.5-dBi typical
Return loss	10-dB minimum

Table 7 details the qualified dipole antenna used in the CYW20829B0-P4EPI100 module. Any antenna of equivalent or less gain can be used without additional application and testing for FCC regulations. Please refer to the design files on **CYW920829B0M2P4EPI100-EVK** for RF trace routing.

Table 7 Dipole antenna specifications

Item	Description
Manufacture	Pulse
Part number	W1010
Frequency range	2400 MHz–2500 MHz
Peak gain	2.0-dBi typical

6 Electrical characteristics

All specifications are valid for –40°C < T_A < 85°C and for 1.71 V to 3.6 V except where noted.

6.1 Absolute maximum ratings

Table 8 Absolute maximum ratings[7]

Rating	Symbol	Value	Unit
V_{BAT}	–	4	V
Voltage on input or output pin	–	–0.5 to V_{BAT} + 0.5	V
Operating ambient temperature range	Topr	–40 to +85	°C
Storage temperature range	Tstg	–40 to +85	°C

6.2 Operating conditions

Table 9 Power supply specifications

Parameter	Description	Min	Typ	Max	Unit
V_{BAT}	Power supply input	2.75	–	3.6	V
V_{BAT_RIPPLE}	Maximum power supply ripple for V_{BAT} input voltage	–	–	100	mV

Note

7. Usage above the absolute maximum conditions listed in **Table 8** may cause permanent damage to the device. Exposure to absolute maximum conditions for extended periods of time may affect device reliability. The maximum storage temperature is 150°C in compliance with JEDEC Standard JESD22-A103, High Temperature Storage Life. When used below absolute maximum conditions but above normal operating conditions, the device may not operate to specification.

7 Environmental specifications

7.1 Environmental compliance

This CYW20829B0-P4XXI100 Bluetooth® LE module is produced in compliance with the Restriction of Hazardous Substances (RoHS) and Halogen-Free (HF) directives. The Infineon module and components used to produce this module are RoHS and HF compliant.

7.2 RF certification

The CYW20829B0-P4XXI100 module will be certified under the following RF certification standards at production release.

- FCC: WAP829I10
- CE
- ISED: 7922A-829I10
- MIC: 020-230434

7.3 Safety certification

The CYW20829B0-P4XXI100 module complies with the following safety regulations:

- Underwriters Laboratories, Inc. (UL): Filing E331901
- CSA
- TUV

7.4 Environmental conditions

Table 10 describes the operating and storage conditions for the Bluetooth® LE module.

Table 10 Environmental conditions for CYW20829B0-P4XXI100

Description	Minimum specification	Maximum specification
Operating temperature	–40°C	85°C
Operating humidity (relative, non-condensation)	5%	85%
Thermal ramp rate	–	3°C/minute
Storage temperature	–40°C	85°C
Storage temperature and humidity	–	85°C at 85%
ESD: Module integrated into end system components[8]	–	15 kV Air 2.0 kV Contact

7.5 ESD and EMI protection

Exposed components require special attention to ESD and electromagnetic interference (EMI).

A grounded conductive layer inside the device enclosure is suggested for EMI and ESD performance. Any openings in the enclosure near the module should be surrounded by a grounded conductive layer to provide ESD protection and a low-impedance path to ground.

Device handling: Proper ESD protocol must be followed in manufacturing to ensure component reliability.

Note
8. This does not apply to the RF pins (ANT).

8 Regulatory information

8.1 FCC

FCC NOTICE:

The device CYW20829B0-P4XXI100 complies with Part 15 of the FCC Rules. The device meets the requirements for modular transmitter approval as detailed in FCC public Notice DA00-1407.transmitter Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION:

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Infineon may void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

This module is only FCC authorized for the specific rule FCC 15.247 listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification, final host product requires Part 15 Subpart B compliance testing with the modular transmitter installed.

LABELING REQUIREMENTS:

The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Infineon FCC identifier for this product as well as the FCC Notice above. The FCC identifier is FCC ID: WAP829I10.

In any case the end product must be labeled exterior with "Contains FCC ID: WAP829I10".

ANTENNA WARNING:

This device is tested with a standard SMA connector and with the antenna listed in **Table 6**. When integrated in the OEMs product, these fixed antennas require installation preventing end-users from replacing them with non-approved antennas. Any antenna not in the following table must be tested to comply with FCC Section 15.203 for unique antenna connectors and Section 15.247 for emissions.

RF EXPOSURE:

To comply with FCC RF Exposure requirements, the Original Equipment Manufacturer (OEM) must ensure to install the approved antenna in the previous.

The preceding statement must be included as a CAUTION statement in manuals, for products operating with the approved antenna in **Table 6**, to alert users on FCC RF Exposure compliance. Any notification to the end user of installation or removal instructions about the integrated radio module is not allowed.

The radiated output power of CYW20829B0-P4XXI100 with the trace antenna is far below the FCC radio frequency exposure limits. Nevertheless, use CYW20829B0-P4XXI100 in such a manner that minimizes the potential for human contact during normal operation.

End users may not be provided with the module installation instructions. OEM integrators and end users must be provided with transmitter operating conditions for satisfying RF exposure compliance.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 13 mm between the radiator and your body.

8.2 ISED

Innovation, Science and Economic Development Canada (ISED) Certification

CYW20829B0-P4XXI100 is licensed to meet the regulatory requirements of Innovation, Science and Economic Development Canada (ISED),

ISED ID: 7922A-829I10

Manufacturers of mobile, fixed, or portable devices incorporating this module are advised to clarify any regulatory questions and ensure compliance for SAR and/or RF exposure limits. Users can obtain Canadian information on RF exposure and compliance from **www.ic.gc.ca**.

This device has been designed to operate with the antennas listed in **Table 6**, having a maximum gain of –0.5 dBi. Antennas not included in this list or having a gain greater than –0.5 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

ISED NOTICE:

The device CYW20829B0-P4XXI100 including the built-in trace antenna complies with Canada RSS-GEN Rules. The device meets the requirements for modular transmitter approval as detailed in RSS-GEN. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

L'appareil CYW20829B0-P4XXI100, y compris l'antenne intégrée, est conforme aux Règles RSS-GEN de Canada. L'appareil répond aux exigences d'approbation de l'émetteur modulaire tel que décrit dans RSS-GEN. L'opération est soumise aux deux conditions suivantes: (1) Cet appareil ne doit pas causer d'interférences nuisibles, et (2) Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.

ISED INTERFERENCE STATEMENT FOR CANADA

This device complies with Innovation, Science and Economic Development (ISED) Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme à la norme sur l'innovation, la science et le développement économique (ISED) norme RSS exempte de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED RADIATION EXPOSURE STATEMENT FOR CANADA

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 16 mm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations ISED prévues pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un minimum de 16 mm de distance entre la source de rayonnement et votre corps.

LABELING REQUIREMENTS:

The Original Equipment Manufacturer (OEM) must ensure that ISED labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Infineon IC identifier for this product as well as the ISED Notices above. The IC identifier is 7922A-829I10. In any case, the end product must be labeled in its exterior with “Contains IC: 7922A-829I10”

8.3 European declaration of conformity

Hereby, Infineon declares that the Bluetooth® module CYW20829B0-P4XXI100 complies with the essential requirements and other relevant provisions of Directive 2014. As a result of the conformity assessment procedure described in Annex III of the Directive 2014, the end-customer equipment should be labeled as follows:

All versions of the CYW20829B0-P4XXI100 in the specified reference design can be used in the following countries: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, The Netherlands, the United Kingdom, Switzerland, and Norway.

8.4 MIC Japan

CYW20829B0-P4XXI100 is certified as a module with certification number 020-230434. End products that integrate CYW20829B0-P4XXI100 do not need additional MIC Japan certification for the end product.

End product can display the certification label of the embedded module.

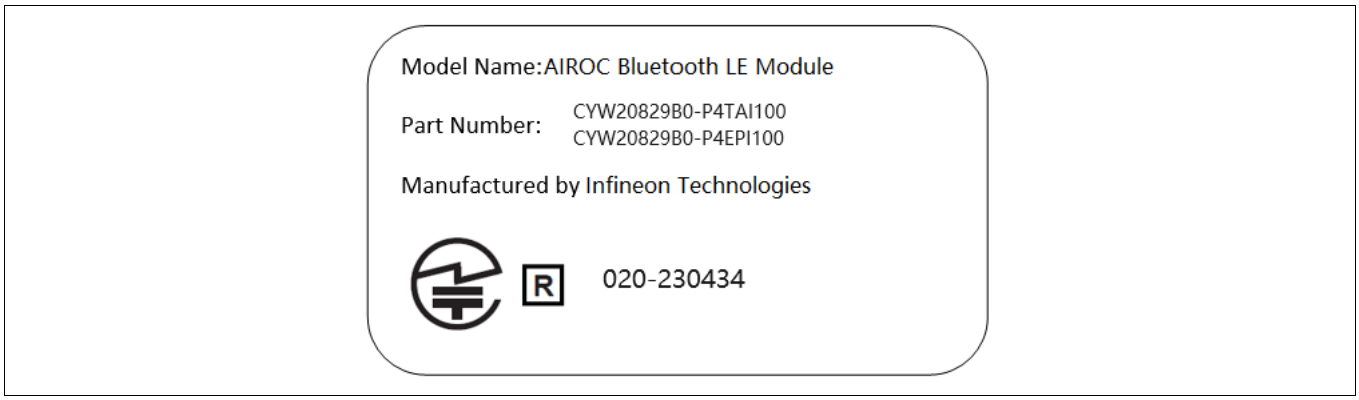


Figure 7 MIC label

9 Packaging

Table 11 Solder Reflow peak temperature

Product	Package	Maximum peak temperature	Maximum time at peak temperature	No. of cycles
CYW20829B0-P4TAI100	41-pad SMT	260°C	30 seconds	2
CYW20829B0-P4EPI100	41-pad SMT	260°C	30 seconds	2

Table 12 Package Moisture Sensitivity Level (MSL), IPC/JEDEC J-STD-2

Product	Package	MSL
CYW20829B0-P4TAI100	41-pad SMT	MSL 3
CYW20829B0-P4EPI100	41-pad SMT	MSL 3

The CYW20829B0-P4XXI100 is offered in tape and reel packaging. **Figure 8** details the tape dimensions used for the CYW20829B0-P4XXI100.

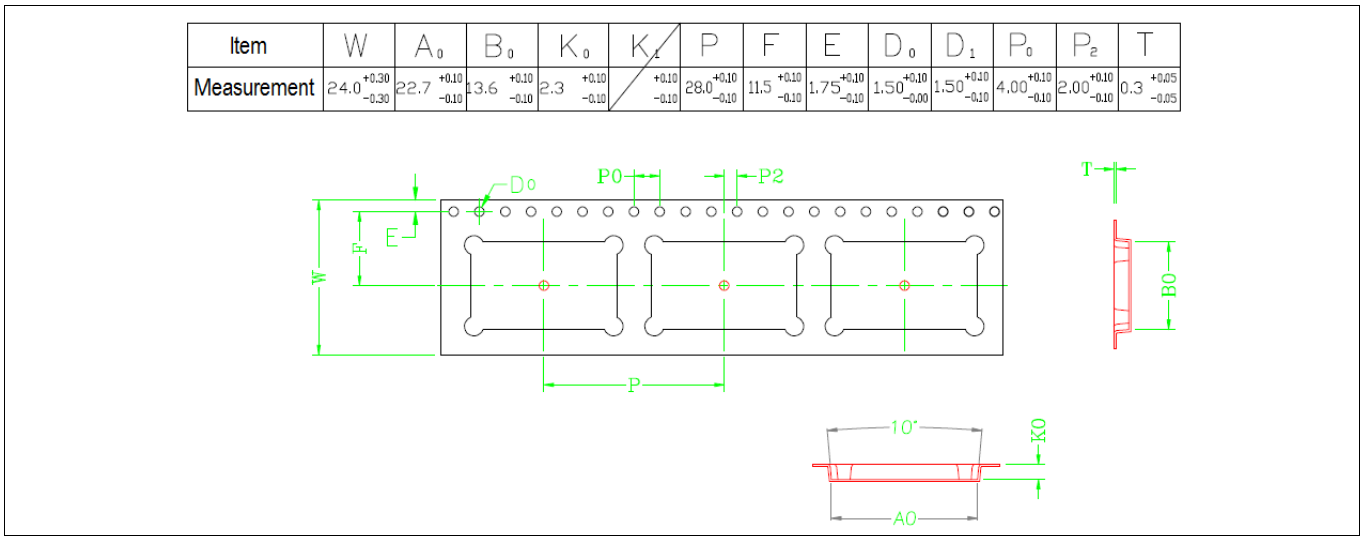


Figure 8 CYW20829B0-P4XXI100 tape dimensions

Figure 9 details the orientation of the CYW20829B0-P4XXI100 in the tape as well as the direction for unreeling.

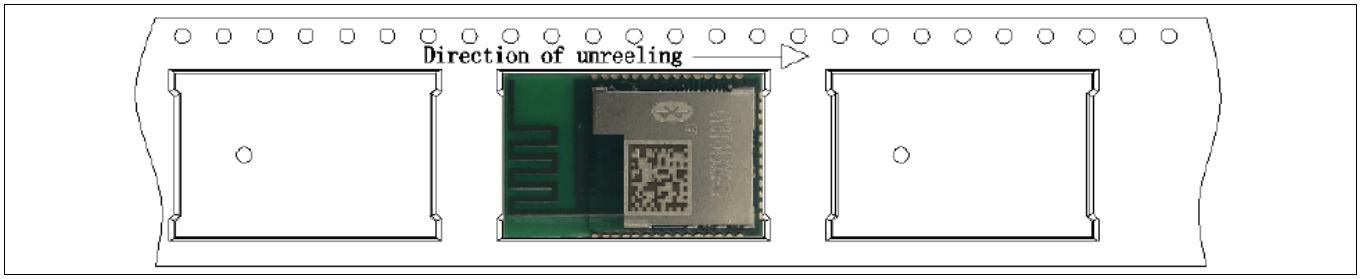
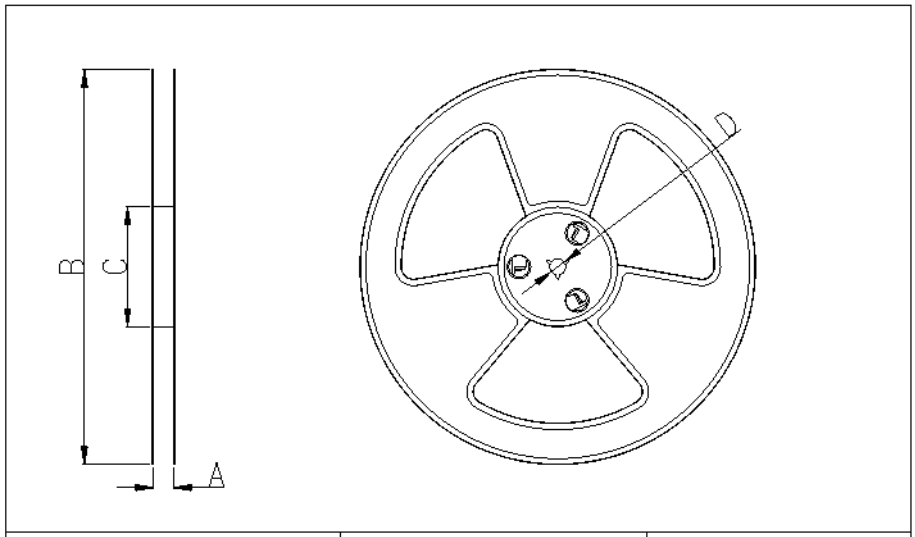


Figure 9 Component orientation in tape and unreeling direction

Figure 10 details reel dimensions used for the CYW20829B0-P4XXI100.



Index	NOTE	Dimension	Tolerance	
A	Inside Width	24.5	+0.5mm	−0.5mm
B	Reel Diameter	330.00	+1.5mm	−1.5mm
C	Outer Axis Diameter	100.00	+1.5mm	−1.5mm
D	Inner Axis Diameter	13.00	+0.5mm	−0.5mm

Figure 10 Reel dimensions

10 Ordering information

Table 13 lists the CYW20829B0-P4XXI100 part number and features. **Table 14** lists the reel shipment quantities for the CYW20829B0-P4XXI100.

Table 13 Ordering information

Product	CPU speed (MHz)	Flash size (KB)	RAM size (KB)	UART	I^2C (BSC)	PWM	Antenna	Package	Packaging
CYW20829B0-P4TAI100	96	1024	256	Yes	Yes	9	Trace	41-SMT	Tape and reel
CYW20829B0-P4EPI100	96	1024	256	Yes	Yes	9	Pad	41-SMT	Tape and reel

Table 14 Tape and reel package quantity and minimum order amount

Description	Minimum reel quantity	Maximum reel quantity	Comments
Reel quantity	500	500	Ships in 500 unit reel quantities.
Minimum order quantity (MOQ)	500	–	–
Order increment (OI)	500	–	–

The CYW20829B0-P4XXI100 is offered in tape and reel packaging. The CYW20829B0-P4XXI100 ships in a reel size of 500.

For additional information and a complete list of Infineon Wireless products, contact your local Infineon sales representative. To locate the nearest Infineon office, visit our website.

U.S. headquarters address	198 Champion Court, San Jose, CA 95134
U.S. headquarter contact info	(408) 943-2600
Website address	**https://www.infineon.com**

11 Acronyms

Table 15 Acronyms used in this document

Acronym	Description
ADC	analog-to-digital converter
ADV	advertising
ALU	arithmetic logic unit
AMUXBUS	analog multiplexer bus
API	application programming interface
Arm®	advanced RISC machine, a CPU architecture
BLE	Bluetooth® Low Energy
Bluetooth® SIG	Bluetooth® Special Interest Group
BW	bandwidth
CAN	Controller Area Network, a communications protocol
CE	European Conformity
CMRR	common-mode rejection ratio
CPU	central processing unit
CRC	cyclic redundancy check, an error-checking protocol
CSA	Canadian Standards Association
ECC	error correcting code
ECO	external crystal oscillator
EEPROM	electrically erasable programmable read-only memory
EMI	electromagnetic interference
EMIF	external memory interface
EOC	end of conversion
EOF	end of frame
ESD	electrostatic discharge
FCC	Federal Communications Commission
FET	field-effect transistor
FIR	finite impulse response, see also IIR
FPB	flash patch and breakpoint
FS	full-speed
GPIO	general-purpose input/output, applies to a PSoC pin
HCI	host controller interface
HVI	high-voltage interrupt, see also LVI, LVD
I/O	input/output, see also GPIO, DIO, SIO, USBIO
I2C, or IIC	Inter-Integrated Circuit, a communications protocol
IC	integrated circuit
IC	Industry Canada
IDAC	current DAC, see also DAC, VDAC
IDE	integrated development environment

Table 15 Acronyms used in this document *(continued)*

Acronym	Description
IHO	internal high-speed oscillator
IIR	infinite impulse response, see also FIR
ILO	internal low-speed oscillator, see also IMO
IMO	internal main oscillator, see also ILO
INL	integral nonlinearity, see also DNL
IPOR	initial power-on reset
IPSR	interrupt program status register
IRQ	interrupt request
ITM	instrumentation trace macrocell
KC	Korea Certification
LCD	liquid crystal display
LIN	Local Interconnect Network, a communications protocol.
LNA	low noise amplifier
LR	link register
LUT	lookup table
LVD	low-voltage detect, see also LVI
LVI	low-voltage interrupt, see also HVI
LVTTL	low-voltage transistor-transistor logic
MAC	multiply-accumulate
MCU	microcontroller unit
MIC	Ministry of Internal Affairs and Communications (Japan)
MISO	master-in slave-out
NC	no connect
NMI	nonmaskable interrupt
NRZ	non-return-to-zero
NVIC	nested vectored interrupt controller
NVL	nonvolatile latch, see also WOL
Opamp	operational amplifier
PA	power amplifier
PAL	programmable array logic, see also PLD
PC	program counter
PCB	printed circuit board
PGA	programmable gain amplifier
PHUB	peripheral hub
PHY	physical layer
PICU	port interrupt control unit
PLA	programmable logic array
PLD	programmable logic device, see also PAL
PLL	phase-locked loop
PMDD	package material declaration data sheet

Table 15 Acronyms used in this document *(continued)*

Acronym	Description
POR	power-on reset
PRES	precise power-on reset
PRS	pseudo random sequence
PS	port read data register
PSoC™	Programmable System-on-Chip™
PSRR	power supply rejection ratio
PWM	pulse-width modulator
QDID	qualification design ID
RAM	random-access memory
RISC	reduced-instruction-set computing
RMS	root-mean-square
RTC	real-time clock
RTL	register transfer language
RTR	remote transmission request
RX	receive
S/H	sample and hold
SAR	successive approximation register
SC/CT	switched capacitor/continuous time
SCL	I2C serial clock
SDA	I2C serial data
SINAD	signal to noise and distortion ratio
SIO	special input/output, GPIO with advanced features. See GPIO.
SMT	surface-mount technology; a method for producing electronic circuitry in which the components are placed directly onto the surface of PCBs
SOC	start of conversion
SOF	start of frame
SP	solder pads
SPI	Serial Peripheral Interface, a communications protocol
SR	slew rate
SRAM	static random access memory
SRES	software reset
STN	super twisted nematic
SWD	serial wire debug, a test protocol
SWV	single-wire viewer
TD	transaction descriptor, see also DMA
THD	total harmonic distortion
TIA	transimpedance amplifier
TN	twisted nematic
TRM	technical reference manual
TTL	transistor-transistor logic

Table 15 Acronyms used in this document *(continued)*

Acronym	Description
TUV	Germany: Technischer Uberwachungs-Verein (Technical Inspection Association)
TX	transmit
UART	Universal Asynchronous Transmitter Receiver, a communications protocol
UDB	universal digital block
USB	Universal Serial Bus
USBIO	USB input/output, PSoC pins used to connect to a USB port
VDAC	voltage DAC, see also DAC, IDAC
WDT	watchdog timer
WOL	write once latch, see also NVL
WRES	watchdog timer reset
XRES	external reset I pin
XTAL	crystal

12 More information

Infineon provides a wealth of data at **www.infineon.com** to help you to select the right module for your design, and to help you to quickly and effectively integrate the module into your design.

12.1 CYW20829B0-P4XXI100 schematic

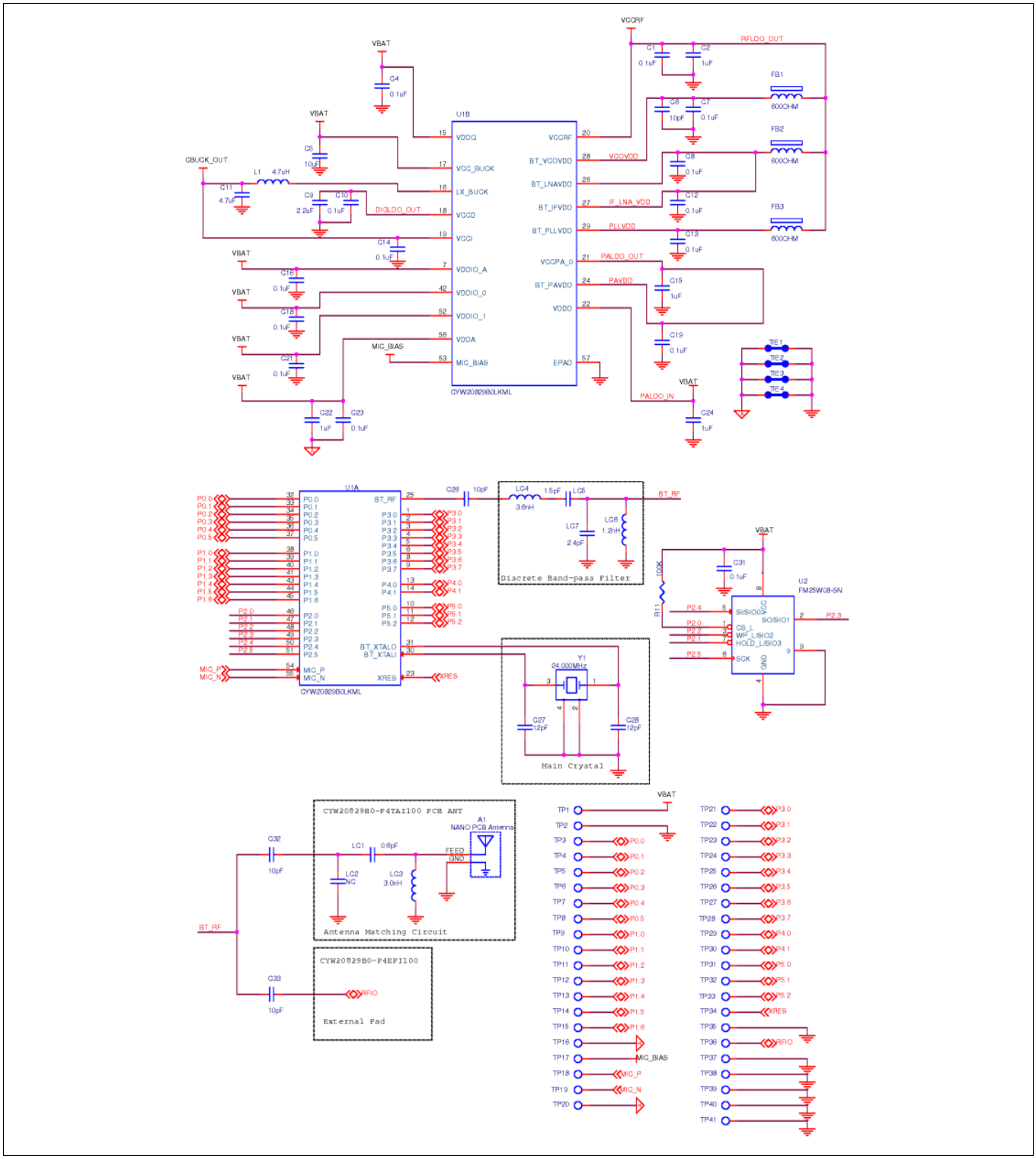


Figure 11 CYW20829B0-P4XXI100 schematic diagram

12.2 References

- Overview: **AIROC™ Bluetooth® LE & Bluetooth® portfolio**
- **CYW20829 Bluetooth® silicon datasheet**
- Development kits:
  - **CYW920829B0M2P4TAI100-EVK**, CYW20829B0-P4TAI100 evaluation board
  - **CYW920829B0M2P4EPI100-EVK**, CYW20829B0-P4EPI100 evaluation board
- Test and debug tools:
  - **AIROC™ Bluetooth® Connect App**, Bluetooth® LE test and debug tool (Windows)
  - **AIROC™ Bluetooth® Connect App— Mobile App**, Bluetooth® LE test and debug tool (Android/iOS Mobile App)
- Knowledge base article
  - **KBA97095** - EZ-Bluetooth® LE module placement
  - **KBA213976** - FAQ for Bluetooth® LE and regulatory certifications with EZ-BLE modules
  - **KBA210802** - Queries on Bluetooth® LE qualification and declaration processes
  - **KBA218122** - 3D Model Files for EZ-BLE/EZ-BT modules

12.3 Development environments

ModusToolbox™ software is a modern, extensible development environment supporting a wide range of Infineon microcontroller devices. It provides a flexible set of tools and a diverse, high-quality collection of application-focused software. These include configuration tools, low-level drivers, libraries, and operating system support, most of which are compatible with Linux®, macOS®, and Windows®-hosted environments. ModusToolbox™ software does not include proprietary tools or custom build environments. This means you choose your compiler, your IDE, your RTOS, and your ecosystem without compromising usability or access to our industry leading CAPSENSE™, AIROC™, Bluetooth®, Wi-Fi, security, and low-power features.

For more detailed information, refer to the following documentation:

- Board Support Package (BSP) documentation

  BSPs are available on **GitHub**. They are aligned with Infineon kits and provide files for basic device functionality such as hardware configuration files, startup code, and linker files. The BSP also includes other libraries that are required to support a kit. Each BSP has its own documentation, but typically includes an API reference such as the example **here**. This **search link** finds all currently available BSPs on the Infineon **GitHub** site.

- Hardware Abstraction Layer (HAL) API reference manual

  The Infineon HAL provides a high-level interface to configure and use hardware blocks on Infineon MCUs. It is a generic interface that can be used across multiple product families. You can leverage the HAL's simpler and more generic interface for most of an application, even if one portion requires finer-grained control. The **HAL API Reference** provides complete details. Example applications that use the HAL download it automatically from the GitHub repository.

12.4 Technical support

- **Infineon community:** Whether you are a customer, partner, or a developer interested in the latest innovations, the developer community offers you a place to learn, share, and engage with both Infineon experts and other embedded engineers around the world.
- Visit our **support** page and contact a **local sales representatives**.

13 Document conventions

13.1 Units of measure

Table 16 Units of measure

Symbol	Unit of measure
°C	degrees Celsius
dB	decibel
dBm	decibel-milliwatts
fF	femtofarads
Hz	hertz
KB	1024 bytes
kbps	kilobits per second
Khr	kilohour
kHz	kilohertz
kΩ	kilo ohm
ksps	kilosamples per second
LSB	least significant bit
Mbps	megabits per second
MHz	megahertz
MΩ	mega-ohm
Msps	megasamples per second
µA	microampere
µF	microfarad
µH	microhenry
µs	microsecond
µV	microvolt
µW	microwatt
mA	milliampere
ms	millisecond
mV	millivolt
nA	nanoampere
ns	nanosecond
nV	nanovolt
Ω	ohm
pF	picofarad
ppm	parts per million
ps	picosecond
s	second
sps	samples per second
sqrtHz	square root of hertz
V	volt

Revision history

Document version	Date of release	Description of changes
**	2024-01-23	Initial release.
*A	2024-04-03	Replaced “CYW20829B0-P4TAI100” with “CYW20829B0-P4XXI100” in required instances across the document. Added “CYW20829B0-P4EPI100” part related information in all instances across the document. Updated **General description**: Updated description. Updated **Features**: Updated description. Updated **Pad connection interface**: Updated description. Updated hyperlinks. Updated **Module connections**: Updated **Table 3**. Updated **Table 4**. Updated **Connections and optional external components**: Updated **Power connections (VBAT)**: Updated description. Updated **Considerations and optional components for Brown Out (BO) conditions**: Updated description. Updated **Figure 6**. Updated **External reset (XRES)**: Updated description. Removed figure “CYW20829B0-P4TAI100 schematic diagram”. Removed “Critical components list”. Updated **Antenna design**: Updated description. Added hyperlinks in required places. Removed “Block diagram”. Removed “Functional description”. Removed “System resources”. Updated **Electrical characteristics**: Updated description. Updated **Absolute maximum ratings**: Updated **Table 8**. Updated **Operating conditions**: Updated **Table 9**. Removed table “CPU current, and transition time specifications”. Removed “XRES”. Removed “GPIO”. Removed “Analog peripherals”. Removed “Digital peripherals”. Removed “Audio subsystem”. Removed “System resources”. Removed “Bluetooth® LE”. Updated **Environmental specifications**: Updated **Environmental conditions**: Updated **Table 10**.

Revision history

Document version	Date of release	Description of changes
*A (cont.)	2024-04-03	Updated **More information**: Added **CYW20829B0-P4XXI100 schematic**. Updated **References**: Updated description. Updated hyperlinks. Updated **Development environments**: Updated description. Updated **Technical support**: Updated description. Updated hyperlinks.

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