

General Description

BDE-BW3301N is a 2.4-GHz Wi-Fi 6 and Bluetooth Low Energy Combo wireless module based on TI's 10th generation connectivity combo chip CC3301 which is based upon proven technology and complements the TI integrated devices for connectivity portfolio. This module is ideal for use in cost sensitive embedded applications with a Linux or RTOS host running TCP/IP, where the peak throughput requirement is 50 Mbps maximum at the IP layer. BDE-BW3301N could be the best choice for bringing the efficiency of Wi-Fi 6 to embedded device applications with a small PCB footprint and highly optimized bill of materials with lower cost.



Key Features

- Highly optimized Wi-Fi 6 and Bluetooth Low Energy 5.2 system for low cost embedded IoT applications
- Seamless integration with TI Sitara MPU (Linux) / MCU+ (FreeRTOS) as well as other application processors
- 3-wire or 1-wire PTA for external coexistence with additional 2.4GHz radios (e.g. Thread or Zigbee)
- Multirole support e.g. STA and AP to connect directly with other Wi-Fi devices on different RF channels (Wi-Fi networks)
- Optional antenna diversity or selection
- Operating temperature: -40°C to +85°C
- Wi-Fi 6®
 - MAC, Baseband and RF Transceiver with support for IEEE 802.11 a/b/g/n/ax Wi-Fi6
 - Medium access controller (MAC)
- Hardware-based encryption and decryption using supporting WPA2 and WPA3
- TWT and OFDMA for optimal embedded performance
- Application throughput up to 50 Mbps
- Supports 4-bit SDIO and SPI host interfaces
- Bluetooth® Low Energy 5.2
 - Bluetooth 5.2 supporting long-range and highspeed PHYs (up to 2 Mbps)
 - Host controller interface (HCI) transport for Bluetooth with option for shared SDIO or UART
 - Bluetooth Low Energy certified stack
- Integrated 2.4G-Hz PA for complete wireless solution with up to +20dBm output power
- Security
 - Secured host interface
 - Firmware authentication
 - Anti-rollback protection
- Power Management
 - V_{MAIN}, V_{IO}, V_{PP}: 1.8 V
 - V_{PA}: 2.1 V - 4.2 V
- Clock Source:
 - 40 MHz XTAL fast clock
 - External 32.768-kHz slow clock by default
- Package
 - 60-QFM, 11-mm x 11-mm x 2-mm
- Regulatory (In Progress)
 - FCC
 - IC
 - CE-RED
 - Bluetooth SIG

Applications

- Grid Infrastructure
 - Electricity Meter
 - String Inverter
 - Micro Inverter
 - Energy Storage Power Conversion System (PCS)
- Building and Home Automation
 - HVAC Controller
 - HVAC Gateway
 - Thermostat
 - Building Security Gateway
 - Garage door system
 - IP network camera/ Video doorbell
 - Wireless security camera
- Appliances
 - Refrigerator & freezer
 - Oven
 - Washer & dryer
 - Residential water heater & heating system
- Air purifier & humidifier
- Coffee machine
- Air conditioner indoor unit
- Vacuum robot
- Robotic lawn mower
- Medical
 - Infusion pump
 - Electronic hospital bed & bed control
 - Multiparameter patient monitor
 - Blood glucose monitor
 - Blood pressure monitor
 - CPAP machine
 - Telehealth systems
 - MRI
 - Ultrasound scanner
 - Ultrasound smart probe
 - Electric toothbrush
- Retail Automation and Payment

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1. References

TBD

2. Block Diagram

BDE-BW3301N module is based on the TI's 10th generation connectivity combo chip CC3301.

The module, as seen in Figure 2-1, comprises of:

- 40-MHz XTAL
- 32.768-kHz XTAL (Not populated by default)
- Bandpass filter
- Decoupling capacitors

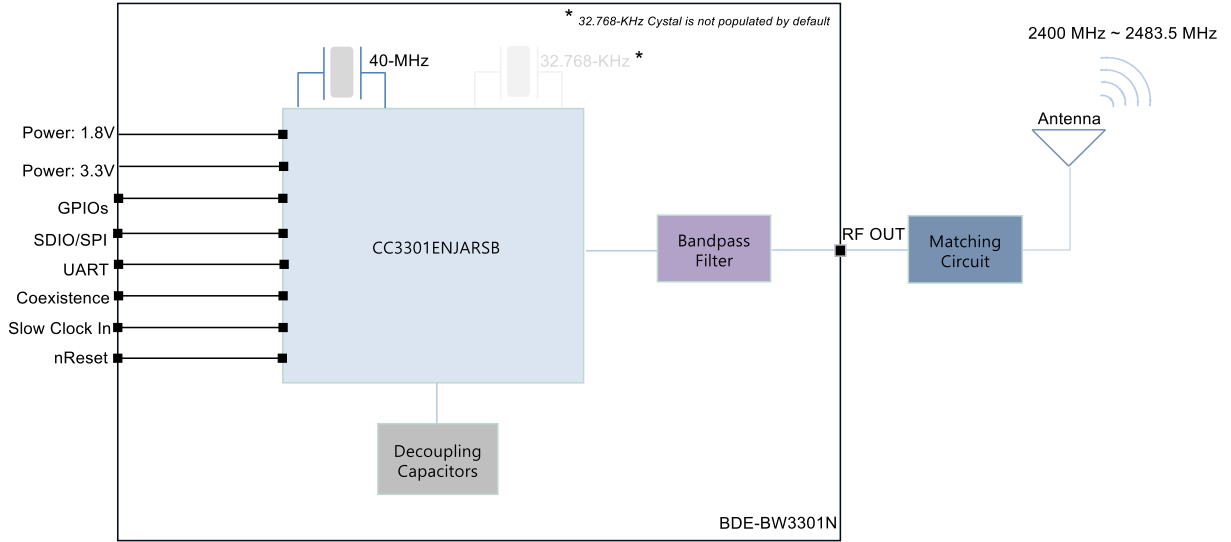


Figure 2-1. BDE-BW3301N Module Block Diagram

3. Terminal Configuration and Functions

3.1 Pin Diagram

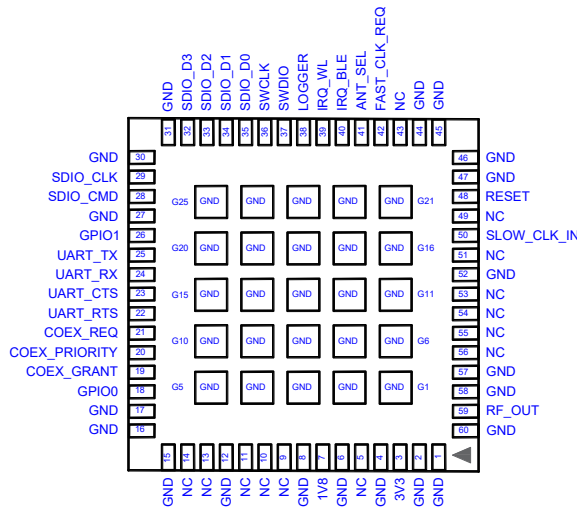


Figure 3-1. Pin Diagram (Bottom View)

3.2 Pin Attributes and Pin Multiplexing

Table 3-1. Pin Description

Module Pin #	Pin Name	Type	Description
1	GND	Ground	Power ground
2	GND	Ground	Power ground
3	3V3	Power	3.3V Power supply
4	GND	Ground	Power ground
5	NC	-	No Connect
6	GND	Ground	Power ground
7	1V8	Power	1.8V Power supply
8	GND	Ground	Power ground
9	NC	-	No Connect
10	NC	-	No Connect
11	NC	-	No Connect
12	GND	Ground	Power ground
13	NC	-	No Connect
14	NC	-	No Connect
15	GND	Ground	Power ground
16	GND	Ground	Power ground
17	GND	Ground	Power ground
18	GPIO0	I/O	GPIO
19	COEX_GRANT	O	External Coexistence Interface - Grant
20	COEX_PRIORITY	I	Connect to MAIN DC2DC 1.8-V out. Requires 10-μF capacitor to GND
21	COEX_REQ	I	External Coexistence Interface - Priority
22	UART_RTS	O	UART RTS for Flow Control for Bluetooth Low Energy HCI
23	UART_CTS	I	UART CTS for flow control for BLE HCI
24	UART_RX	I	UART RX for BLE HCI

Module Pin #	Pin Name	Type	Description
25	UART_TX	O	UART TX for BLE HCI
26	GPIO1	I/O	GPIO
27	GND	Ground	Power ground
28	SDIO_CMD	I	SDIO_CMD_WL (SPI_DIN)
29	SDIO_CLK	I	SDIO_CLK_WL (SPI_CLK). Must be driven by host.
30	GND	Ground	Power ground
31	GND	Ground	Power ground
32	SDIO_D3	I/O	SDIO_D3_WL (SPI_CSX)
33	SDIO_D2	I/O	SDIO_D2_WL
34	SDIO_D1	I/O	SDIO_D1_WL
35	SDIO_D0	I/O	SDIO_D0_WL (SPI_DOUT)
36	SWCLK	I	Serial Wire CLK
37	SWDIO	I/O	Serial Wire DIN/DOUT
38	LOGGER	O	Tracer (UART TX Debug Logger)
39	IRQ_WL	O	IRQ_WL to Host
40	IRQ_BLE	O	IRQ_BLE to Host (in shared SDIO mode)
41	ANT_SEL	O	Antenna Select Control
42	FAST_CLK_REQ	O	Fast Clock Request from the device
43	NC	-	No Connect
44	GND	Ground	Power ground
45	GND	Ground	Power ground
46	GND	Ground	Power ground
47	GND	Ground	Power ground
48	RESET	I	Reset
49	NC	-	No Connect
50	SLOW_CLK_IN	I	External Slow Clock Input
51	NC	-	No Connect
52	GND	Ground	Power ground
53	NC	-	No Connect
54	NC	-	No Connect
55	NC	-	No Connect
56	NC	-	No Connect
57	GND	Ground	Power ground
58	GND	Ground	Power ground
59	RF_OUT	ANA	Bluetooth Low Energy and WLAN 2.4-GHz RF Port
60	GND	Ground	Power ground

4. Specifications

4.1 Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, so functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification are not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

PARAMETER	MIN	MAX	UNIT	Notes
V _{PA}	TBD	TBD	V	
V _{MAIN}	TBD	TBD	V	
V _{IO}	TBD	TBD	V	VDD IO Voltage
	TBD	TBD	V	Input Voltage to all digital pins
	TBD	TBD	V	HFXT_P Input Voltage
RF pin	TBD	TBD	dBm	
Storage Temperature	TBD	TBD	°C	

4.2 ESD Ratings

		VALUE	UNIT
V (ESD) Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾	TBD	V
	Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002 ⁽²⁾	TBD	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

5. Mechanical Specifications

5.1 Dimensions

Fig 5-1 shows the overall dimensions of BDE-BW3301N. The module measures 11mm long by 11mm wide by 2mm height with the shield.

Note: All dimensions are in mm.

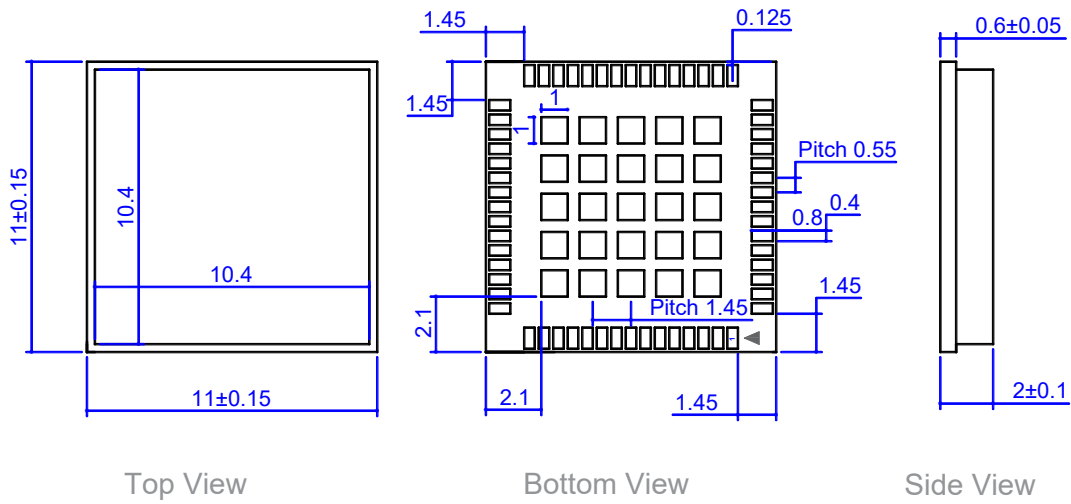


Figure 5-1. Mechanical Drawing

6. Ordering Information

Part Number	Size (mm)	Core Chip	Shipping Form	MOQ
BDE-BW3301N	11 x 11 x 2.15	CC3301	Tape & Reel	1K

7. Revision History

Revision	Date	Description
V0.1	17-Oct-2022	Preliminary, draft
V0.2	16-Nov-2022	Preliminary, changed part number, updated diagram, pinout, mechanical
V0.3	8-Dec-2022	Preliminary, updated product image, diagram, mechanical

Contact

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