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PTR5302

***Low Power Wi-Fi 6 companion , Dual-Band
Embedded Cortex™ M33F Dual-core processor ,
BLE+WIFI in one , Support Matter , Ideal choice of IoT
and Smart product***

PTR5302 is Compact low power WiFi 6 Companion Modules base on Nordic Semiconductor's WiFi 6 chipset nRF7002 and the BLE chipset nRF5340, providing seamless Wi-Fi connectivity and Wi-Fi-based locationing (SSID sniffing of local Wi-Fi hubs). PTR5302 utilizing decades of ultra-low-power wireless expertise to maximize Wi-Fi's low-power potential in various applications including home automation, smart lighting, and other IoT devices. The module can be used either as a WIFI application or as a BLE application alone.

The PTR5302 is our unique low power Wi-Fi/Wi-Fi 6 module that will combine seamlessly with Nordic's existing ultra-low power technologies. Nordic brings their decades of ultra-low-power wireless IoT and silicon design expertise to Wi-Fi. With Wi-Fi 6 bring added benefits to IoT applications including further efficiency gains that support long-life, battery-powered Wi-Fi operation. The module will support all wireless protocols used in Matter, Bluetooth LE for commissioning, Thread for low power mesh, and Wi-Fi for high-throughput.

Features

- ◆ Base on Nordic nRF7002 Wi-Fi 6 companion IC with integrated RF
- ◆ Base on Nordic nRF5340 with ARM Cortex M33F Dual-core processor
- ◆ Application processor: Flash/RAM: 1024KB/512KB.
- ◆ Supports IEEE 802.11 ax and earlier standards (IEEE 802.11 a/b/g/n/ac)
- ◆ Supports Target Wake Time (TWT), Orthogonal Frequency Division Multiple Access (OFDMA), BSS Coloring
- ◆ Supports Wi-Fi CERTIFIED 6 , Wi-Fi CERTIFIED a/b/g/n/ac, Wi-Fi Enhanced Open
- ◆ Supports WPA3 , WPA2 , WPA - Personal and Enterprise, Protected Management Frames
- ◆ Supports WMM , WMM - Power Save, Wi-Fi Agile Multiband , Wi-Fi Direct
- ◆ Maximum output power +19 dBm
- ◆ Adjustable output power from +5 to +19 dBm
- ◆ Dual-band 2.4 GHz and 5 GHz operation
- ◆ Single-ended 50 Ω antenna port(s)
- ◆ 165mA@+15dBm, 2.4GHz, VBAT=3.6V; 244mA@+15dBm, 5GHz, VBAT=3.6V
- ◆ 56 mA RX 2.4 GHz, 58 mA RX 5 GHz
- ◆ SPI or QSPI host interface, 3 or 4-wire coexistence interface
- ◆ Antenna: BLE—PCB or IPX; WIFI—CHIP 或 IPX
- ◆ 35 General purpose I/O pins
- ◆ Supply voltage range: BLE: 1.7~5.5V; WIFI: 2.9 ~ 4.5 V
- ◆ Size: 23.5*23.5mm

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Typical Applications:

- ◆ Internet of Things (IoT)
- ◆ Smart Home, Matter applications
- ◆ Gateways and Border Routers
- ◆ Industrial IoT sensors and controllers
- ◆ Wearables, Sports and Fitness
- ◆ Wireless Payment Terminals
- ◆ Health Care and Medical
- ◆ Base station Positioning

Quick Specifications:

WIFI	
Multi-protocol	
Version	Supports IEEE 802.11 ax and earlier standards (IEEE 802.11 a/b/g/n/ac)
Security	WPA3(Wi-Fi Protected Access 3)
Radio	
Frequency@2.4G	2.401GHz to 2.495GHz
Frequency@5G	5.150GHz to 5.835GHz
Transmit power	+5~+19 dBm@2.4G / +5~+15 dBm@5G
Receiver sensitivity	-96.5dBm@2.4G / -90.5dBm@5G
Antenna	Dual Band Antenna
Current Consumption	
TX only @ 2.4G +15 dBm	~165 mA
TX only @ 5G +15 dBm	~244 mA
RX only @ 2.4G	~56 mA
RX only @ 5G	~59 mA
I-sleep	15 μ A
Operating conditions	
VBAT Power supply	2.9~4.5V
VDDIO Power supply	1.62~3.3V
Operating temperature	-25~+85 $^{\circ}$ C

BLE	
Multi-protocol	
Version	Bluetooth 5 and Higher/ANT/2.4GHz Proprietary/802.15.4/Zigbee
Security	Arm TrustZone CryptoCell-312
Radio	
Frequency	2.360GHz to 2.500GHz
Modulations	GFSK at 2/1 Mbps, Long range 125/500kbps, 802.15.4- 250 kbps
Transmit power	+3dBm to -20dBm

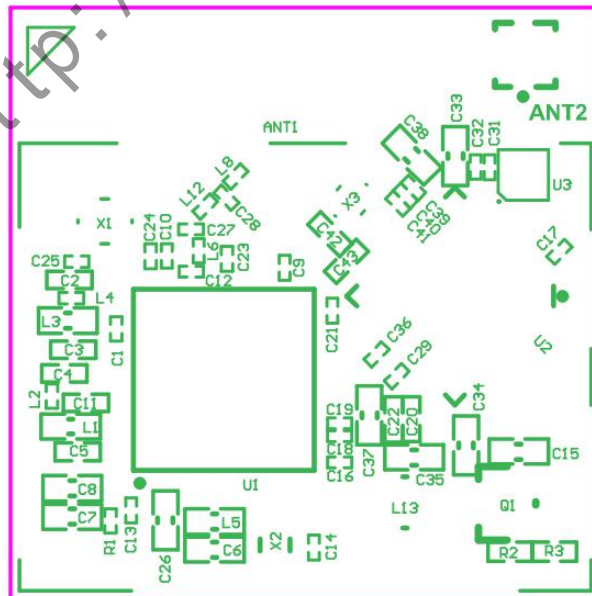
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Receiver sensitivity	-97.5dBm@BLE 1M
Antenna	Integrated PCB Antenna / Ext. IPX Antenna
Current Consumption	
TX only @ 0 dBm @ 3V, DC/DC enabled	3.2 mA
RX only @ 1 Mbps @ 3V, DC/DC enabled	2.6 mA
Application CPU @ 64MHz from flash @ 3V	3.4 mA
Network CPU @ 64MHz from flash @ 3V	2.5 mA
System On, wake on any event	1.5 μ A
System Off, wake on reset	1.1 μ A
Operating conditions	
Power supply	1.7~5.5V

Block diagram:



Module Top View:

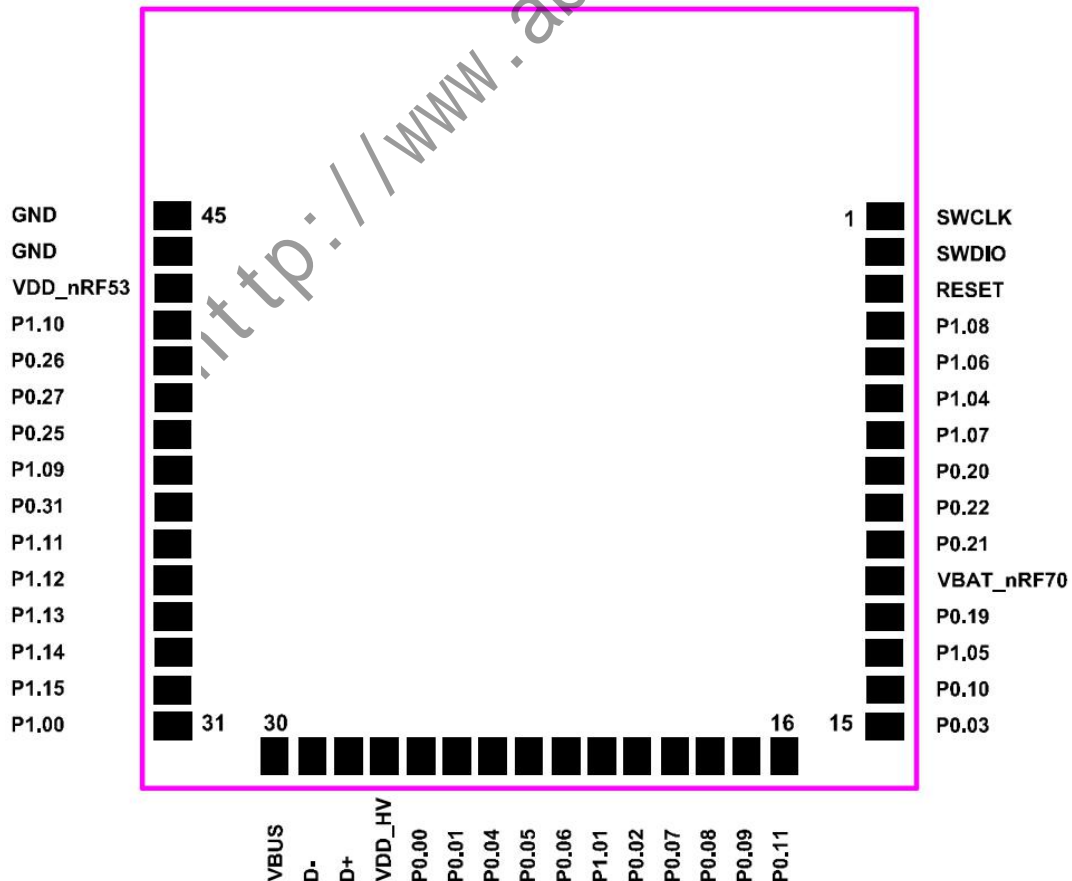


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Pin Connect Description

nRF5340	nRF7002
P0.23	IRQ
P0.29	SW_CTRL1
P1.03	SW_CTRL0
P0.24	COEX_GRANT
P0.30	COEX_STATUS
P0.28	COEX_REQ
P0.16	QSPI_DATA3
P0.15	QSPI_DATA2
P0.14	QSPI_DATA1
P0.13	QSPI_DATA0
P0.18	QSPI_SS
P0.17	QSPI_CLK

Pin Description of Module (Top View) :



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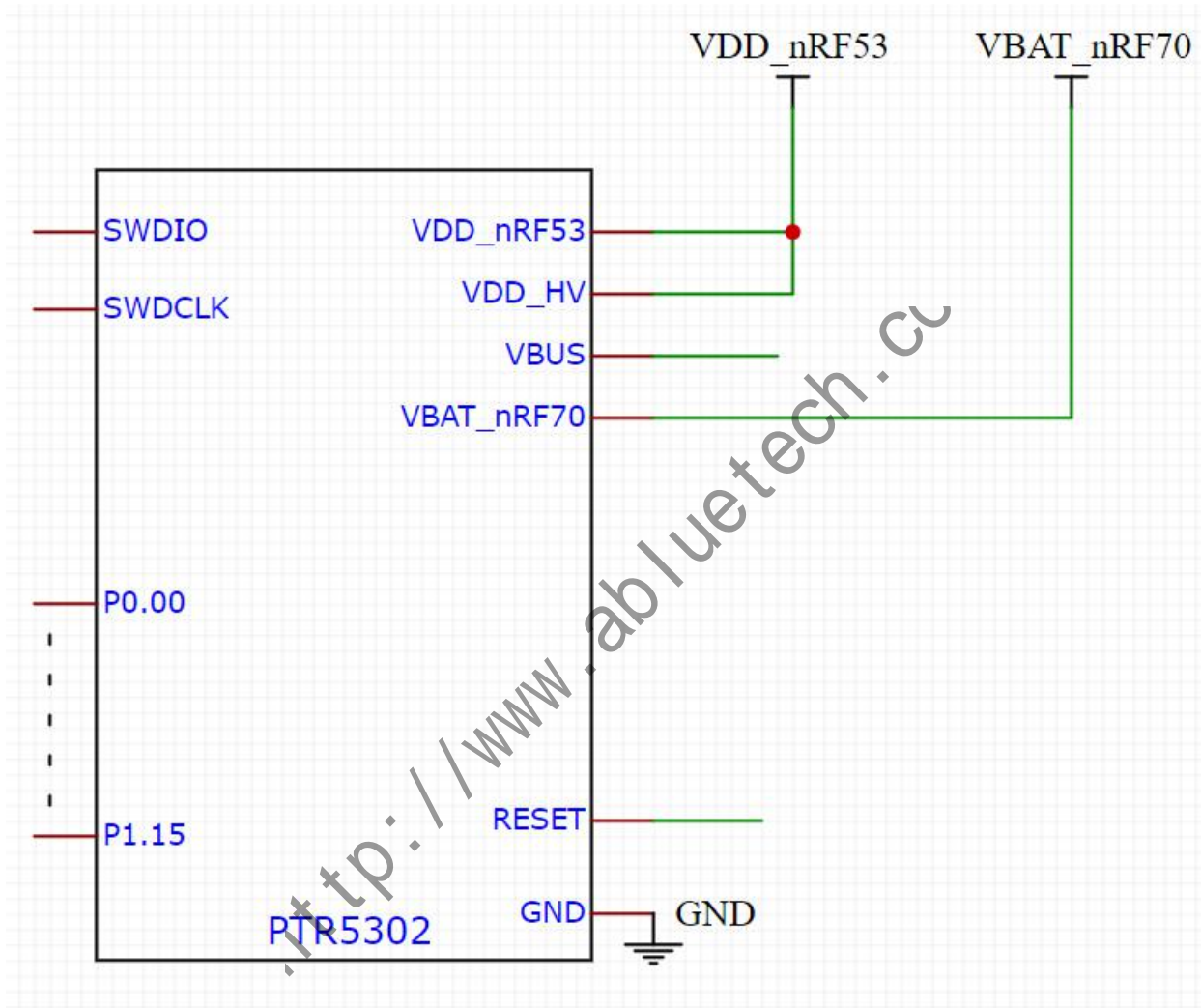
Pin	Name	Description	Recommend usage
Pin1	SWDCLK	HW debug and programming	
Pin2	SWDIO	HW debug and programming	
Pin3	RESET	Digital I/O/RESET	
Pin4	P1.08	Digital I/O	
Pin5	P1.06	Digital I/O	
Pin6	P1.04	Digital I/O	
Pin7	P1.07	Digital I/O	
Pin8	P0.20	Digital I/O	
Pin9	P0.22	Digital I/O	
Pin10	P0.21	Digital I/O/ NFC input	
Pin11	VBAT_nRF70	Power Supply	nRF7002: 2.9~4.5V
Pin12	P0.19	Digital I/O	
Pin13	P1.05	Digital I/O	
Pin14	P0.10	Digital I/O	High-speed SPI
Pin15	P0.03	Digital I/O/NFC input	NFC antenna connection
Pin16	P0.11	Digital I/O	High-speed SPI
Pin17	P0.09	Digital I/O	High-speed SPI
Pin18	P0.08	Digital I/O	High-speed SPI
Pin19	P0.07/AIN3	Digital I/O/Analog input 3	
Pin20	P0.02	Digital I/O/NFC input	NFC antenna connection
Pin21	P1.01	Digital I/O	
Pin22	P0.06/AIN2	Digital I/O/Analog input 2	
Pin23	P0.05/AIN1	Digital I/O/Analog input 1	
Pin24	P0.04/AIN0	Digital I/O/Analog input 0	
Pin25	P0.01	Digital I/O	
Pin26	P0.00	Digital I/O	
Pin27	VDD_HV	High voltage power supply	
Pin28	D+	USB D+	
Pin29	D-	USB D-	
Pin30	VBUS	USB power	5 V input
Pin31	P1.00	Digital I/O	
Pin32	P1.15	Digital I/O	
Pin33	P1.14	Digital I/O	
Pin34	P1.13	Digital I/O	
Pin35	P1.12	Digital I/O	
Pin36	P1.11	Digital I/O	
Pin37	P0.31	Digital I/O	
Pin38	P1.09	Digital I/O	
Pin39	P0.25	Digital I/O	
Pin40	P0.27/AIN6	Digital I/O/Analog input 6	
Pin41	P0.26/AIN5	Digital I/O/Analog input 5	
Pin42	P1.10	Digital I/O	
Pin43	VDD_nRF53	Power Supply	nRF5340: 1.7~5.5v

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Pin44	GND	Ground	
Pin45	GND	Ground	

Application Reference Circuit

Reference Circuit



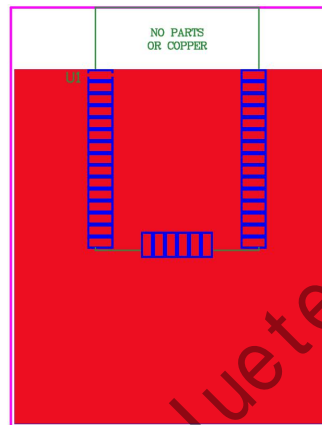
- VBAT_nRF70, nRF7002, Power supply: 2.9~4.5V.
- VDD_nRF53, nRF5340, Power supply: 1.7~5.5V.
- In order to simplify the design of the power supply circuit, VBAT_nRF70 and VDD_nRF53 of the PTR5302 module can use the same power supply voltages, and its voltage range: 2.9~3.6V. The working current of the module during transmission is relatively large, and the PCB trace of the power supply should be as wide as possible, not less than 25~30 mil.
- RESET is the external reset pin of the nRF5340 chip, active low; Can be suspended when not in use.
- VBUS is the USB power supply pin of the nRF5340 chip, and an external 5V power supply is required

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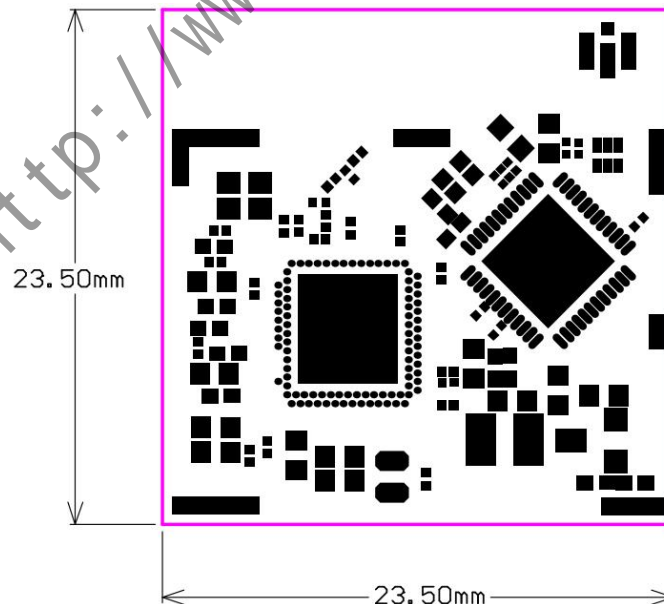
when the USB function is required. (VBAT_nRF70, VDD_nRF53 also need to be properly supplied in accordance with the above requirements);

Recommended RF Layout & Ground Plane:

The module integrated antenna requires a suitable ground plane to radiate effectively. The area under and extending out from the antenna portion of the module should be kept clear of copper and other metal. The module should be placed at the edge of the PCB with the antenna edge facing out. Reducing the ground plane will reduce the effective radiated power. Please add as more as possible via holes on the mother board near the GND pin of module, this will be good for the RF performance of system board.

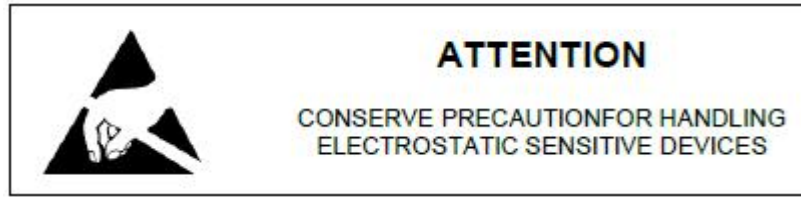


PCB Footprint (Top View) :



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- (4) Do not drop or shock the module.
- (5) Avoid static electricity, ESD and high voltage as these may damage the module.



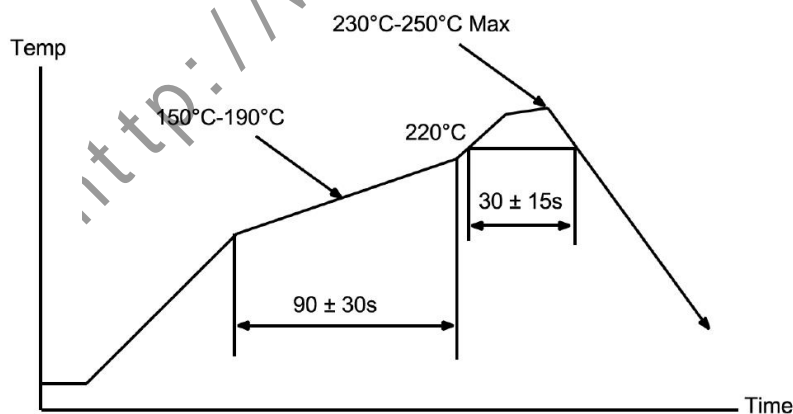
Moisture Sensitivity

All plastic packages absorb moisture. During typical solder reflow operations when SMDs are mounted onto a PCB, the entire PCB and device population are exposed to a rapid change in ambient temperature. Any absorbed moisture is quickly turned into superheated steam. This sudden change in vapor pressure can cause the package to swell. If the pressure exerted exceeds the flexural strength of the plastic mold compound, then it is possible to crack the package. Even if the package does not crack, interfacial delamination can occur.

Since the device package is sensitive to moisture absorption, it is recommended to bake the product before assembly.



Solder Reflow Temperature-Time Profile



Life Support Applications

Products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Customers using or selling these products for use in such applications do so at their own risk.

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Additional Customization

We provide extensive customization, design and manufacturing services to ensure the perfect fit for your product. Our wide selection of modules allows developers to create any number of products. Should you need more information and assistance in integrating this module or developing your product, please contact us.

- Custom Hardware design including Modules, RF and Antenna Design
- Bluetooth Low Energy application 、wifi6 application and Firmware Development
- Mobile Apps for iOS and Android
- Cloud Platform

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Ordering Information:

Part Number	Description
PTR5302	Embedded low power wifi6 + BLE module, Dual-band 2.4 GHz and 5 GHz operation
PTR5302-EVB	Evaluation boards for module,with key, LED, I/O extend