

# ABLUE TECHNOLOGY

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## ***PTR9840***

***Bluetooth 5.3 ready multi-protocol Module  
Embedded Cortex™ M33F Dual-core processor  
Support Bluetooth Direct Finding AOA/AOD,  
Support Zigbee, Thread, MESH, ANT  
Ideal choice of IoT and Smart product***

The PTR9840 ultra-low power Bluetooth 5 ready multiprotocol System on Module based on the nRF5340 from Nordic Semiconductor. The module can support Bluetooth 5.3 by upgrading the protocol stack. The module with an ARM® Cortex™ M33F Dual-core processor, Bluetooth 5.1 Direct Finding AOA/AOD support, embedded 2.4GHz transceiver, provide a complete solution with no additional RF design, Bluetooth 5, ANT/ANT+, 802.15.4 and 2.4GHz proprietary multiprotocol support, allowing faster time to market, while simplifying designs, reducing BOM costs, also reduce the burden of Regulatory approvals to enter the world market. Making you more quickly into the Bluetooth smart application and remove the worries.

### **Features**

- ◆ Nordic nRF5340 with ARM Cortex M33F Dual-core processor
- ◆ Multiprotocol support :Bluetooth 5, Bluetooth Mesh, ANT/ANT+, 2.4GHz proprietary, 802.15.4, Thread and Zigbee
- ◆ Bluetooth 5.0: 2/1Mbps, 500 kbps, 125 kbps
- ◆ IEEE 802.15.4-2006: 250 kbps
- ◆ Proprietary 2.4 GHz: 2 Mbps, 1 Mbps
- ◆ Bluetooth 5.1 Direction Finding AOA/AOD
- ◆ Integrated DC-DC converter
- ◆ Serial Wire Debug (SWD)
- ◆ Nordic SoftDevice Ready
- ◆ Over-the-Air (OTA) firmware update
- ◆ 46 General purpose I/O pins
- ◆ 15 level low-power comparator with wake-up from System OFF mode
- ◆ PCB antenna
- ◆ Size:24.3x17.5 x1.8mm
- ◆ No external components required
- ◆ Operation voltage: 1.7V to 5.5V

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## Application processor

- ◆ Flash/RAM: 1024KB/512KB.
- ◆ Arm TrustZone CryptoCell-312 security subsystem
- ◆ QSPI 32 MHz interface
- ◆ High-speed 32 MHz SPI
- ◆ NFC-A tag interface for OOB pairing
- ◆ 3 SPI Master/ SPI Slave
- ◆ Two 2-wire Master/Slave (I2C compatible)
- ◆ 2 UART (with CTS/RTS and DMA)
- ◆ I2S audio interface
- ◆ 3x 4-channel PWM unit with EasyDMA
- ◆ 12 bit/200KSPS ADC
- ◆ 3 x 32 bits timers,
- ◆ 2 x 24 bits Real Time Counters (RTC)
- ◆ Distributed Programmable Peripheral Interconnect (DPPI)
- ◆ Quadrature Demodulator (QDEC)

## Network processor

- ◆ Flash/RAM: 256KB/64KB
- ◆ 128-bit AES HW encryption
- ◆ TX power: +3dBm to -20dBm
- ◆ 1 SPI Master/ SPI Slave
- ◆ 2-wire Master/Slave (I2C compatible)
- ◆ 1 UART (with CTS/RTS and DMA)
- ◆ 3 x 32 bits timers,
- ◆ 2 x Real Time Counters (RTC)
- ◆ USB 2.0 full speed (12 Mbps) controller

## Typical Applications:

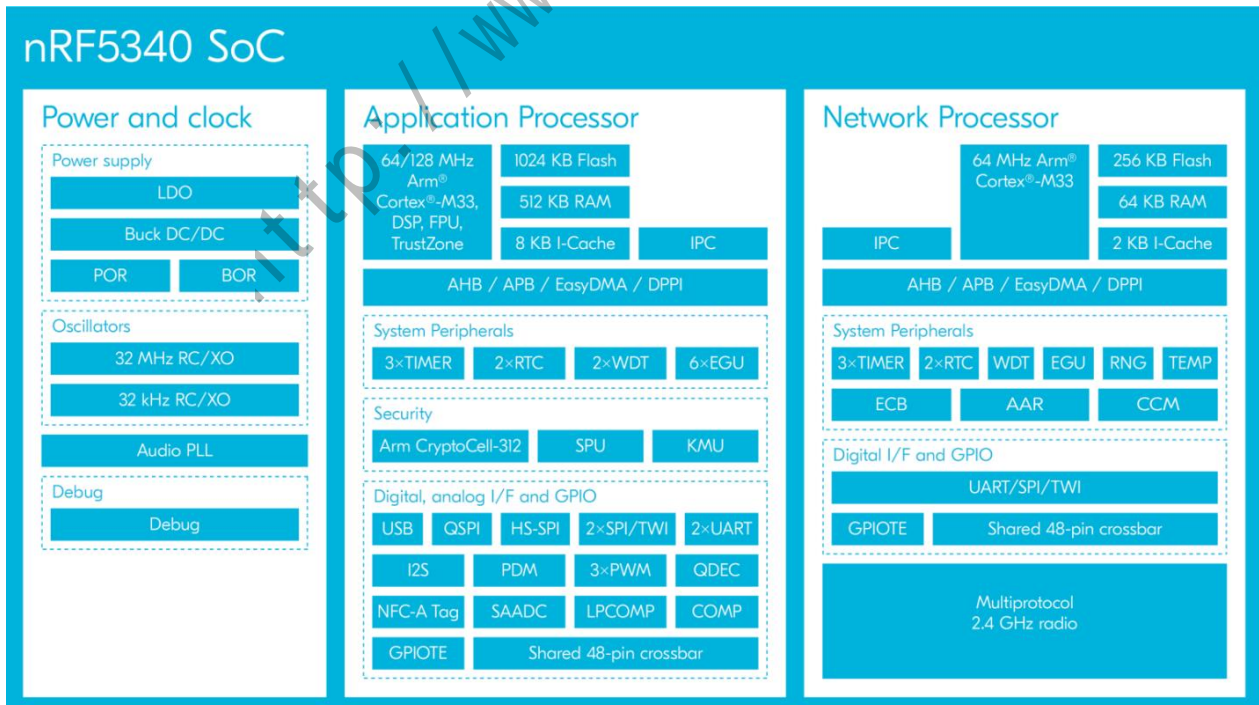
- 2.4 GHz Bluetooth low energy systems
- Proprietary 2.4 GHz systems
- Sports and leisure equipment
- Mobile phone accessories, Connected Appliances
- Health Care and Medical
- Consumer Electronics, Game pads
- Human Interface Devices, Remote control
- Building environment control / monitoring
- RFID, Security Applications, Low-Power Sensors
- Bluetooth Low Energy GateWay
- iBeacons™, Eddystone™, Indoor navigation
- Lighting Products
- Fitness devices, Wearables

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## Quick Specifications:

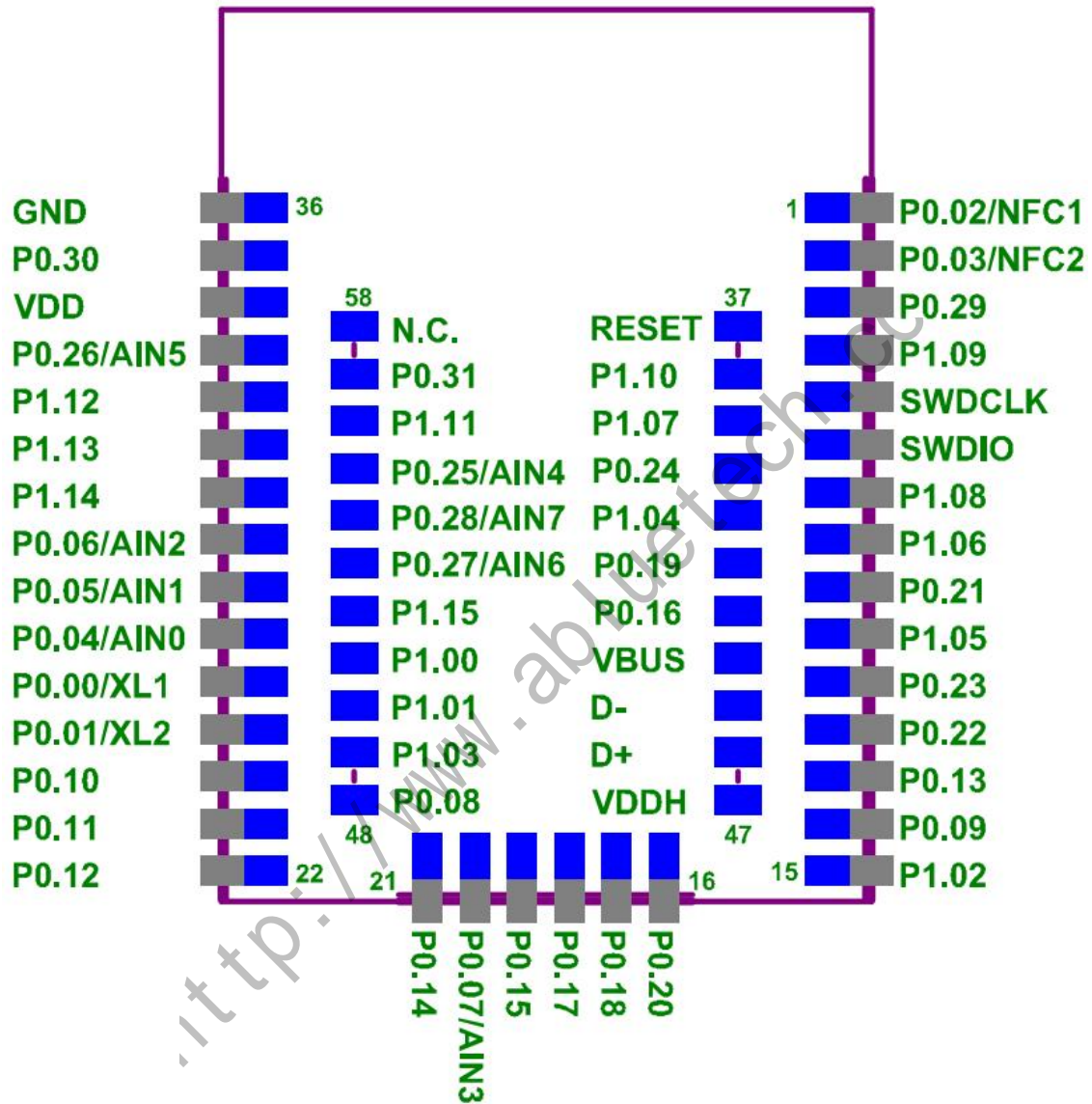
| Multi-protocol                          |   |
|---|---|
| Version                                 | Bluetooth 5 and Higher/ANT/2.4GHz Proprietary/802.15.4/Zigbee |
| Security                                | Arm TrustZone CryptoCell-312                                  |
| Radio                                   |   |
| 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   |
| 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 $\mu$ A   |
| System Off, wake on reset               | 1.1 $\mu$ A   |
| Operating conditions                    |   |
| Power supply                            | 1.7~5.5V  |
| Operating temperature                   | -25~+85 $^{\circ}$ C  |

## Block diagram:



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## Pin Description of Module (Top View) :



| Pin  | Name       | Description              | Recommend usage        |
|------|------------|--------------------------|------------------------|
| Pin1 | P0.02/NFC1 | Digital I/O/ NFC input   | NFC antenna connection |
| Pin2 | P0.03/NFC2 | Digital I/O/ NFC input   | NFC antenna connection |
| Pin3 | P0.29      | Digital I/O              |                        |
| Pin4 | P1.09      | Digital I/O              |                        |
| Pin5 | SWDCLK     | HW debug and programming |                        |
| Pin6 | SWDIO      | HW debug and programming |                        |
| Pin7 | P1.08      | Digital I/O              |                        |

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|       |            |                            |                                   |
|-------|------------|----------------------------|-----------------------------------|
| Pin8  | P1.06      | Digital I/O                |                                   |
| Pin9  | P0.21      | Digital I/O                |                                   |
| Pin10 | P1.05      | Digital I/O                |                                   |
| Pin11 | P0.23      | Digital I/O                |                                   |
| Pin12 | P0.22      | Digital I/O                |                                   |
| Pin13 | P0.13      | Digital I/O                | Quad SPI                          |
| Pin14 | P0.09      | Digital I/O                | High-speed SPI                    |
| Pin15 | P1.02      | Digital I/O                | High-speed pin for 1 Mbps TWI     |
| Pin16 | P0.20      | Digital I/O                |                                   |
| Pin17 | P0.18      | Digital I/O                | Quad SPI                          |
| Pin18 | P0.17      | Digital I/O                | Quad SPI                          |
| Pin19 | P0.15      | Digital I/O                | Quad SPI                          |
| Pin20 | P0.07/AIN3 | Digital I/O/Analog input 3 |                                   |
| Pin21 | P0.14      | Digital I/O                | Quad SPI                          |
| Pin22 | P0.12      | Digital I/O                | High-speed SPI                    |
| Pin23 | P0.11      | Digital I/O                | High-speed SPI                    |
| Pin24 | P0.10      | Digital I/O                | High-speed SPI                    |
| Pin25 | P0.01/XL2  | for 32.768KHz use          |                                   |
| Pin26 | P0.00/XL1  | for 32.768KHz use          |                                   |
| Pin27 | P0.04/AIN0 | Digital I/O/Analog input 0 |                                   |
| Pin28 | P0.05/AIN1 | Digital I/O/Analog input 1 |                                   |
| Pin29 | P0.06/AIN2 | Digital I/O/Analog input 2 |                                   |
| Pin30 | P1.14      | Digital I/O                |                                   |
| Pin31 | P1.13      | Digital I/O                |                                   |
| Pin32 | P1.12      | Digital I/O                |                                   |
| Pin33 | P0.26/AIN5 | Digital I/O/Analog input 5 |                                   |
| Pin34 | VDD        | Power Supply               |                                   |
| Pin35 | P0.30      | Digital I/O                |                                   |
| Pin36 | GND        | Ground                     |                                   |
| Pin37 | RESET      | RESET                      |                                   |
| Pin38 | P1.10      | Digital I/O                |                                   |
| Pin39 | P1.07      | Digital I/O                |                                   |
| Pin40 | P0.24      | Digital I/O                |                                   |
| Pin41 | P1.04      | Digital I/O                |                                   |
| Pin42 | P0.19      | Digital I/O                |                                   |
| Pin43 | P0.16      | Digital I/O                | Quad SPI                          |
| Pin44 | VBUS       | USB Power                  | 5 V input for USB 3.3 V regulator |
| Pin45 | D-         | USB D-                     | USB                               |
| Pin46 | D+         | USB D+                     | USB                               |
| Pin47 | VDDH       | High voltage power supply  |                                   |
| Pin48 | P0.08      | Digital I/O                | High-speed SPI                    |
| Pin49 | P1.03      | Digital I/O                | High-speed pin for 1 Mbps TWI     |
| Pin50 | P1.01      | Digital I/O                |                                   |
| Pin51 | P1.00      | Digital I/O                |                                   |

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|       |            |                            |  |
|-------|------------|----------------------------|--|
| Pin52 | P1.15      | Digital I/O                |  |
| Pin53 | P0.27/AIN6 | Digital I/O/Analog input 6 |  |
| Pin54 | P0.28/AIN7 | Digital I/O/Analog input 7 |  |
| Pin55 | P0.25/AIN4 | Digital I/O/Analog input 4 |  |
| Pin56 | P1.11      | Digital I/O                |  |
| Pin57 | P0.31      | Digital I/O                |  |
| Pin58 | N.C.       | NC                         |  |

\*External 32.768 kHz RC oscillator is used to provide low frequency clock by default.

Note: An internal 4.7 $\mu$ F bulk capacitor has been included on the module. For those application that with heavy GPIO usage and/or current draw, it is good design practice to add additional bulk capacitance as required for your application.

## General Purpose I/O:

Each GPIO can be accessed individually with the following user configurable features:

- Input/output direction
- Output drive strength
- Internal pull-up and pull-down resistors
- Wake-up from high or low level triggers on all pins
- Trigger interrupt on all pins
- All pins can be used by the PPI task/event system; the maximum number of pins that can be interfaced through the PPI at the same time is limited by the number of GPIOTE channels
- All pins can be individually configured to carry serial interface or quadrature demodulator signals

## Hardware RESET:

There is on-chip power-on reset circuitry, But can still be used in external reset mode, in this case, RESET pin as an external hardware reset pin. The RESET pin pull up in the internal.

## HW debug and flash programming of Module :

The Module support the two pin Serial Wire Debug (SWD) interface and offers flexible and powerful mechanism for non-intrusive debugging of program code. Breakpoints, single stepping, and instruction trace capture of code execution flow are part of this support.

| Pin    | Flash Program interface         |
|--------|---------------------------------|
| SWDIO  | Debug and flash programming I/O |
| SWDCLK | Debug and flash programming I/O |

This is the hardware debug and flash programming of module, J-Link Lite support, please refer [www.segger.com](http://www.segger.com).

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## Power and Configuration:

The module has two internal regulator stages.

Normal voltage mode uses the main regulator (VREGMAIN) and the radio regulator (VREGRADIO). The VREGMAIN and VREGRADIO regulators operate in LDO mode by default. DC/DC mode can be enabled independently for each regulator using VREGMAIN.DCDCEN and VREGRADIO.DCDCEN respectively.

High voltage mode uses the main regulator (VREGMAIN), the high voltage regulator (VREGH), and the radio regulator (VREGRADIO). All regulators operate in LDO mode by default. DC/DC mode can be enabled independently for each regulator using VREGMAIN.DCDCEN, VREGH.DCDCEN and VREGRADIO.DCDCEN.

Here all regulators are in DC/DC mode by default. An external LC filter is required for each of the regulators in DC/DC mode. If a regulator is only to be used in LDO mode, the inductor for this regulator is not needed.

| Mode                    | Pin of Module | Name | Power Connection        |
|-------------------------|---------------|------|-------------------------|
| Normal/Low Voltage (LV) | Pin 34        | VDD  | 1.7V to 3.6V source in  |
|                         | Pin 47        | VDDH | Same source as VDD      |
| High Voltage (HV)       | Pin 34        | VDD  | 1.8V to 3.3V supply out |
|                         | Pin 47        | VDDH | 2.5V to 5.5V source in  |

**Important:** In both LV and HV modes, the GPIO logic level voltage is determined by the VDD pin. In HV mode, all external devices that are connected to the Module's GPIO must either be powered by the module (from VDD) or use level translation.

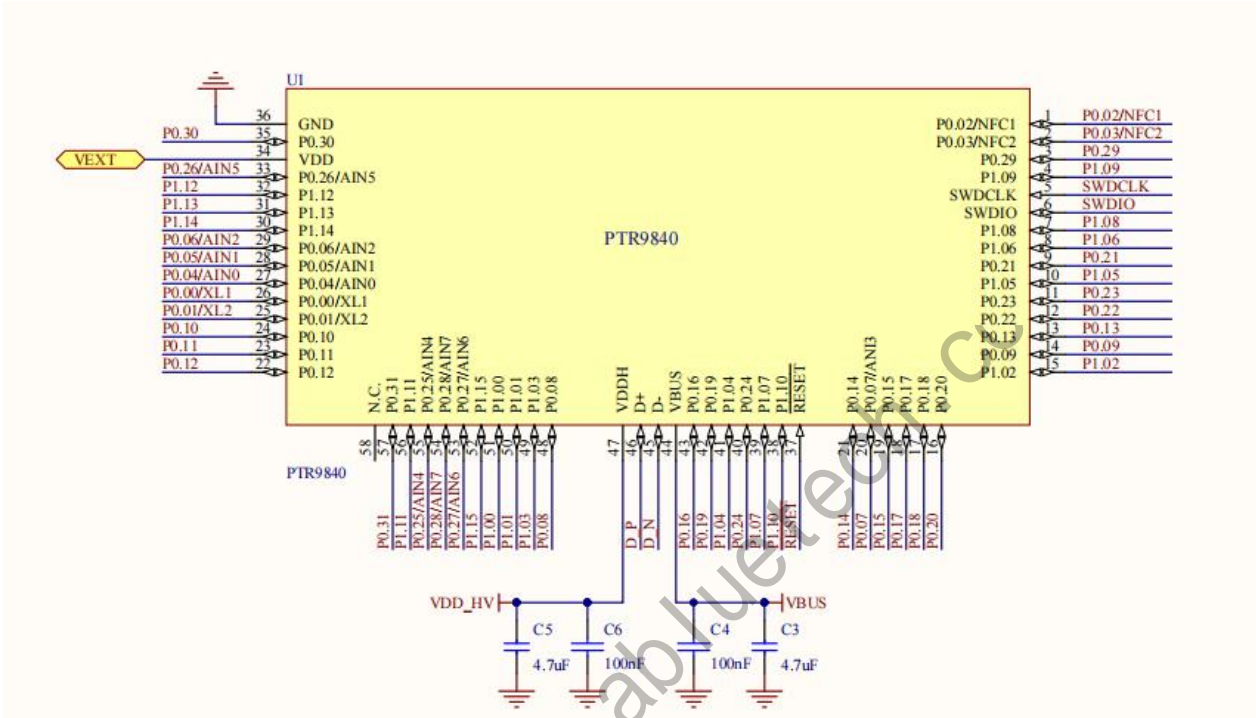
**USB Power:** The USB interface on the Module can be used when the module is in either Normal /Low Voltage (LV) or High Voltage (HV) mode. The Module USB PHY is powered by a dedicated, internal LDO regulator that is fed by the VBUS pin (Pin43). This means that applying power to only the VBUS pin will not power the rest of the module. In order for the USB PHY to operate, VBUS must be externally powered.

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## Reference circuitry:

In this section there are 1 reference circuits to show how to design an application circuit with this module.

### Reference Circuit configuration 1



Configurations summary for reference circuit 1

| Config no. | Main Supply           |     | EXT Supply Output | USB |
|------------|-----------------------|-----|-------------------|-----|
|            | VDDH                  | VDD |                   |     |
| Config.1   | Battery/Ext.regulator | N/A | Yes               | Yes |

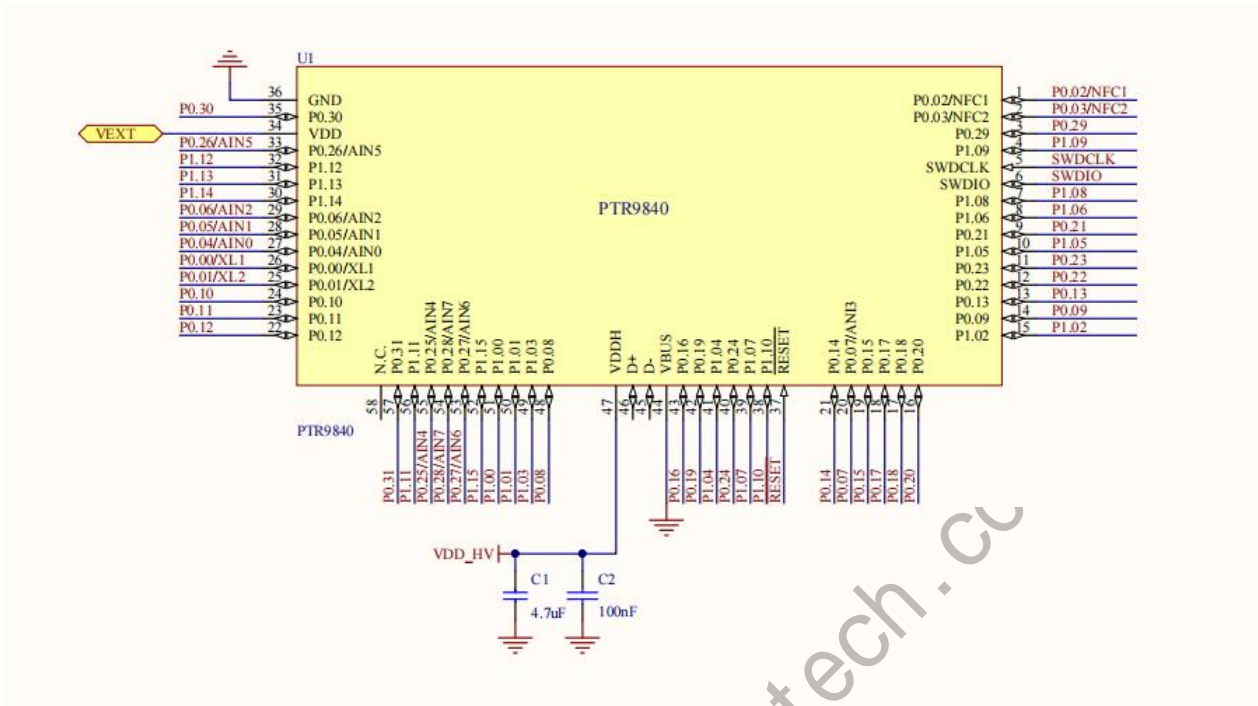
Explanation of symbols in reference circuit 1 schematic

| Symbol           | Parameter  | Min. | Typ. | Max. | Units |
|------------------|--|------|------|------|-------|
| V <sub>DDH</sub> | Main supply voltage in high voltage mode   | 2.5  | 3.7  | 5.5  | V     |
| V <sub>BUS</sub> | Supply voltage on VBUS pin   | 4.35 | 5    | 5.5  | V     |
| V <sub>EXT</sub> | Voltage output on VDD when supplied from internal regulator (VREGH). VDDH is the input to VREGH. | 1.8  |      | 3.3  | V     |



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## Reference Circuit configuration 2



Configurations summary for reference circuit 2

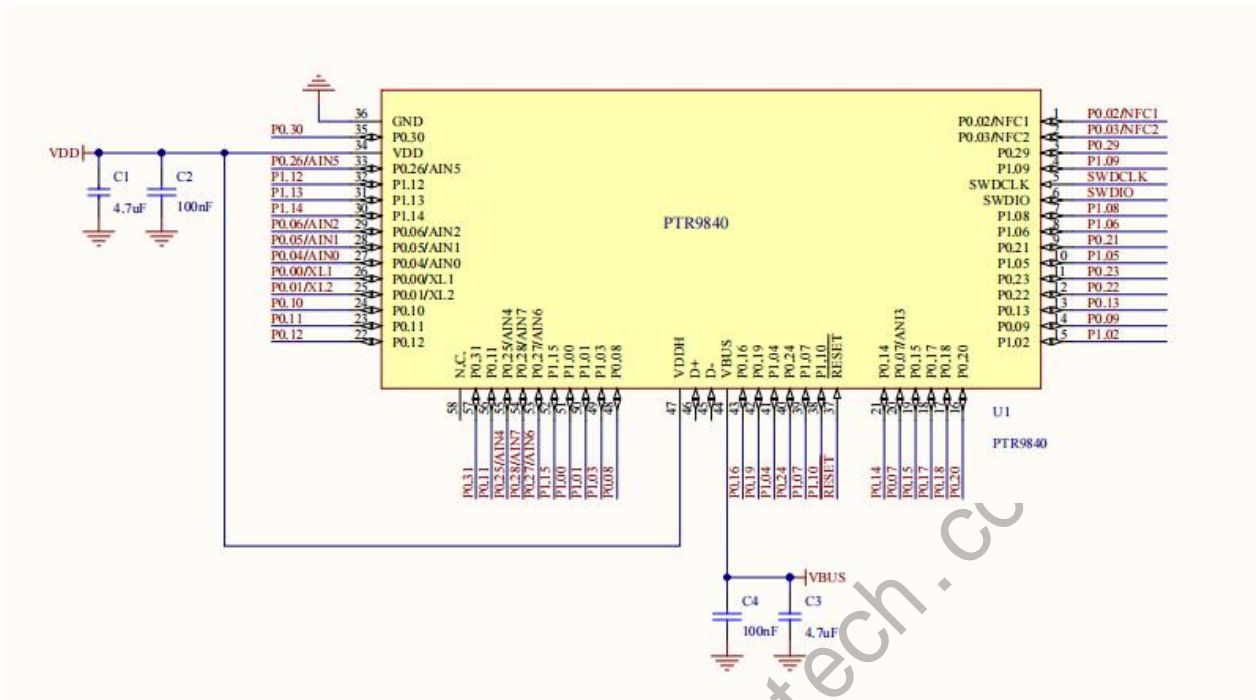
| Config no. | Main Supply           |     | EXT Supply Output | USB |
|------------|-----------------------|-----|-------------------|-----|
|            | VDDH                  | VDD |                   |     |
| Config.2   | Battery/Ext.regulator | N/A | Yes               | No  |

Explanation of symbols in reference circuit 2 schematic

| Symbol           | Parameter  | Min. | Typ. | Max. | Units |
|------------------|--|------|------|------|-------|
| V <sub>DDH</sub> | Main supply voltage in high voltage mode   | 2.5  | 3.7  | 5.5  | V     |
| V <sub>EXT</sub> | Voltage output on VDD when supplied from internal regulator (VREGH). VDDH is the input to VREGH. | 1.8  |      | 3.3  | V     |

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## Reference Circuit configuration 3



Configurations summary for reference circuit 3

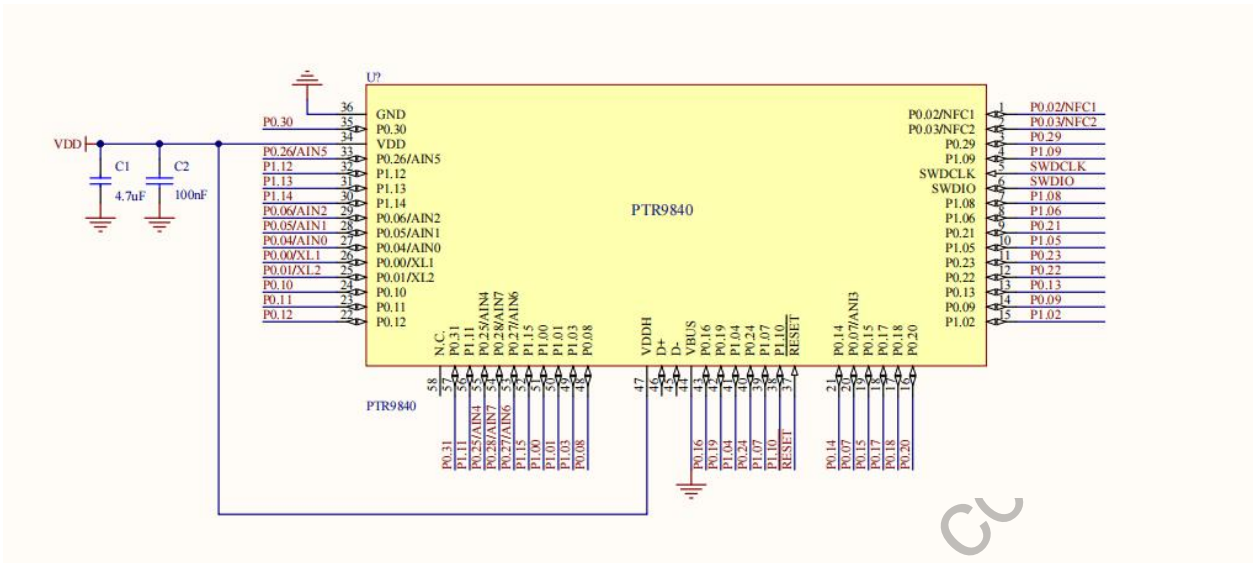
| Config no. | Main Supply |                       | EXT Supply Output | USB |
|------------|-------------|-----------------------|-------------------|-----|
|            | VDDH        | VDD                   |                   |     |
| Config.3   | N/A         | Battery/Ext.regulator | No                | Yes |

Explanation of symbols in reference circuit 3 schematic

| Symbol           | Parameter                                  | Min. | Typ. | Max. | Units |
|------------------|--|------|------|------|-------|
| V <sub>DD</sub>  | Main supply voltage in normal voltage mode | 1.7  | 3    | 3.6  | V     |
| V <sub>BUS</sub> | Supply voltage on VBUS pin                 | 4.35 | 5    | 5.5  | V     |

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## Reference Circuit configuration 4



Configurations summary for reference circuit 4

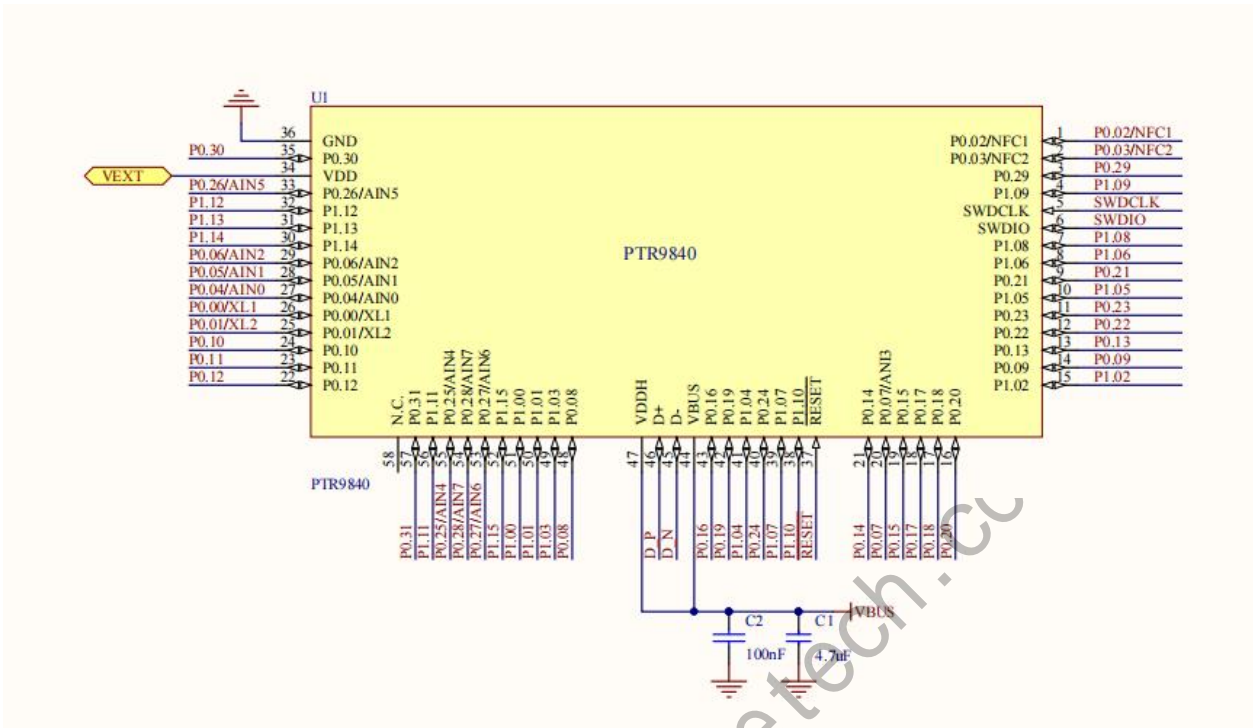
| Config no. | Main Supply |                       | EXT Supply Output | USB |
|------------|-------------|-----------------------|-------------------|-----|
|            | VDDH        | VDD                   |                   |     |
| Config.4   | N/A         | Battery/Ext.regulator | No                | No  |

Explanation of symbols in reference circuit 4 schematic

| Symbol          | Parameter                                  | Min. | Typ. | Max. | Units |
|-----------------|--|------|------|------|-------|
| V <sub>DD</sub> | Main supply voltage in normal voltage mode | 1.7  | 3    | 3.6  | V     |

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## Reference Circuit configuration 5



Configurations summary for reference circuit 5

| Config no. | Main Supply      |     | EXT Supply Output | USB |
|------------|------------------|-----|-------------------|-----|
|            | VDDH             | VDD |                   |     |
| Config.5   | USB(VDDH = VBUS) | N/A | Yes               | Yes |

Explanation of symbols in reference circuit 5 schematic

| Symbol           | Parameter  | Min. | Typ. | Max. | Units |
|------------------|--|------|------|------|-------|
| V <sub>BUS</sub> | Supply voltage on VBUS pin   | 4.35 | 5    | 5.5  | V     |
| V <sub>EXT</sub> | Voltage output on VDD when supplied from internal regulator (VREGH). VBUS is the input to VREGH. | 1.8  |      | 3.3  | V     |

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## Some general guidance is summarized here:

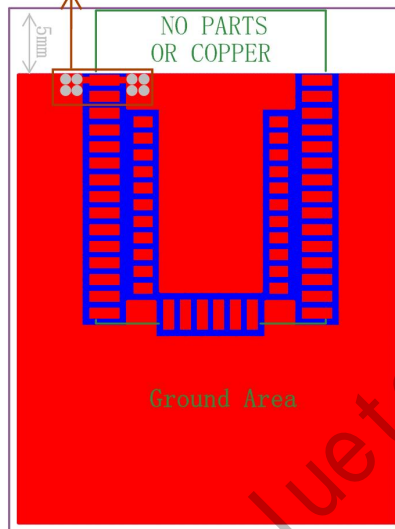
- Main supply voltage is connected to VDD/VDDH. The system will enter one of two supply voltage modes, normal or high voltage mode, depending on how the supply voltage is connected to these pins. Normal voltage mode is entered when the supply voltage is connected to both the VDD and VDDH pins (so that VDD equals VDDH). High voltage mode is entered when the supply voltage is only connected to the VDDH pin and the VDD pin is not connected to any voltage supply.
- By default, the LDO regulators in the chip are enabled and the DC/DC regulators stage is disabled. Register DCDCEN is used to enable the DC/DC regulator. External LC filters have been connected in the Module for DC/DC regulators being used.
- The GPIO high reference voltage always equals the level on the VDD pin. In normal voltage mode, the GPIO high level equals the voltage supplied to the VDD pin, and in high voltage mode it equals the level specified in the register VREGHVOUT, the default value is 1.8V.
- When the power is supplied to VDDH, the output from the VDD pin could be used to supply external circuitry. The feature must be configured in the EXTSUPPLY register. The output voltage range is 1.8~3.3V which can be set by the VREGHVOUT register. It can be used to power external low-power devices, such as sensors. The maximum output current is 7mA (DC/DC mode), please refer to the register VREGH.
- When using the USB peripheral, 5V USB supply needs to be provided on the VBUS pin.

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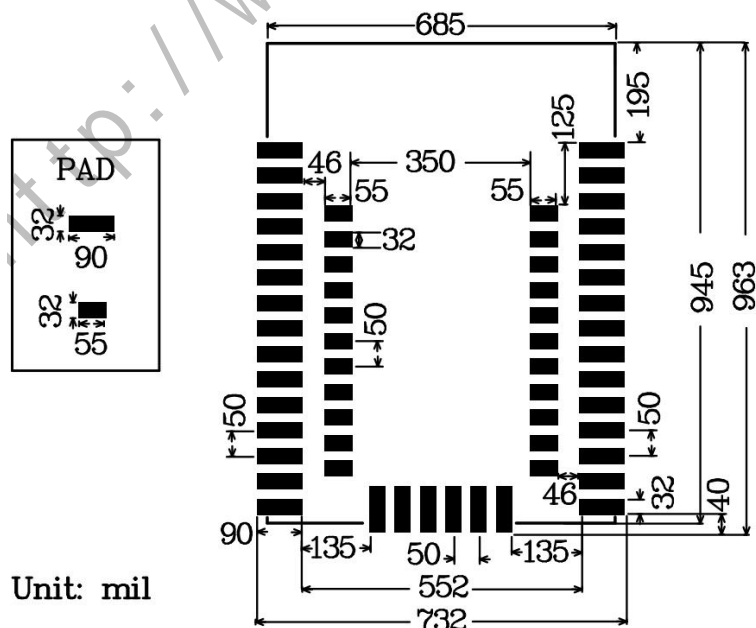
## Recommended RF Layout & Ground Plane:

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.

Please add via holes in  
GROUND area as many as possible.



## PCB Footprint (Top View):



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## Radio Specifications:

| Parameter                       | Min. | Typ.  | Max. | Unit |
|---------------------------------|------|-------|------|------|
| Frequency Range                 | 2402 |       | 2480 | MHz  |
| Maximum Output Power            |      | +3    |      | dBm  |
| Rx Sensitivity Level, BLE1 Mbps |      | -97.5 |      | dBm  |
| Data Rate on air                | 125  |       | 2000 | kbps |
| Operating Temperature Range     | -40  | 25    | 85   | °C   |

## Radio current consumption (transmitter):

| Parameter                                  | Min. | Typ. | Max. | Unit |
|--|------|------|------|------|
| TX only current (DC/DC, 3 V) PRF = +3 dBm  |      | 5.1  |      | mA   |
| TX only current (DC/DC, 3 V) PRF = +0 dBm  |      | 3.4  |      | mA   |
| TX only current (DC/DC, 3 V) PRF = -4 dBm  |      | 2.7  |      | mA   |
| TX only current (DC/DC, 3 V) PRF = -8 dBm  |      | 2.2  |      | mA   |
| TX only current (DC/DC, 3 V) PRF = -20 dBm |      | 1.7  |      | mA   |

## Radio current consumption (Receiver):

| Parameter                               | Min. | Typ. | Max. | Unit |
|---|------|------|------|------|
| RX only current (DC/DC, 3 V) 1 Mbps BLE |      | 2.7  |      | mA   |
| RX only current (LDO, 3 V) 1 Mbps BLE   |      | 6.7  |      | mA   |
| RX only current (DC/DC, 3 V) 2 Mbps BLE |      | 3.1  |      | mA   |
| RX only current (LDO, 3 V) 2 Mbps BLE   |      | 7.9  |      | mA   |

## Operating Conditions:

| Parameter                   | Min. | Typ. | Max. | Unit |
|-----------------------------|------|------|------|------|
| Supply voltages             |      |      |      |      |
| VDD                         | 1.7  | 3.0  | +3.6 | V    |
| VDDH                        | 2.5  | 3.7  | +5.5 | V    |
| VBUS                        | 4.35 | 5    | +5.5 | V    |
| Operating Temperature Range | -40  | 25   | 85   | °C   |

## Absolute Maximum Ratings:

| Parameter                                | Min. | Max.        | Unit |
|--|------|-------------|------|
| Supply voltages                          |      |             |      |
| VDD                                      | -0.3 | +3.9        | V    |
| VDDH                                     | -0.3 | +5.8        | V    |
| VBUS                                     | -0.3 | +5.8        | V    |
| VSS                                      | 0    | 0           | V    |
| I/O pin voltage                          |      |             |      |
| Voltage on GPIO pins ( $VDD \leq 3.6V$ ) | -0.3 | $VDD + 0.3$ |      |

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|   |      |       |                    |
|---|------|-------|--------------------|
| Voltage on GPIO pins (V <sub>DD</sub> > 3.6V) | -0.3 | +3.9  |                    |
| <b>RF input level</b>                         |      | 10    | dBm                |
| <b>Environmental</b>                          |      |       |                    |
| ESD Human Body Model                          |      | 2     | kV                 |
| ESD Charged Device Model                      |      | 500   | V                  |
| <b>Storage temperature</b>                    | -40  | 125   | °C                 |
| <b>Flash memory Endurance</b>                 |      | 10000 | Write/erase cycles |

**Note:** Exceeding one or more of the limiting values may cause permanent damage to the module.

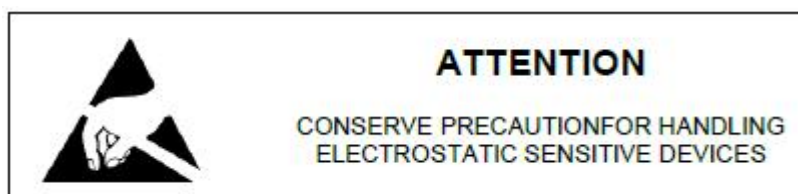
## Notes and Cautions:

### Design Notes

- (1) It is critical to following the recommendations of this document to ensure the module meets the specifications.
- (2) Power supply must be free of AC ripple voltage. If such noise is present, it is critical to provide proper filtering and decoupling.
- (3) The module should not be stressed mechanically after installation.
- (4) Exposing the module to significant temperatures will result in degradation and decreased lifetime.
- (5) Keep module away from other high frequency devices which may interfere with operation such as other transmitters and devices generating high frequencies.
- (6) Avoid static electricity, ESD and high voltage as these may damage the module.

### Handling and Storage

- (1) Keep module away from other high frequency devices which may interfere with operation such as other transmitters and devices generating high frequencies.
- (2) Do not expose the module to the following conditions: Corrosive gasses such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NOX Extreme humidity or salty air Prolonged exposure to direct Sunlight Temperatures beyond those specified for storage.
- (3) Do not apply mechanical stress.
- (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



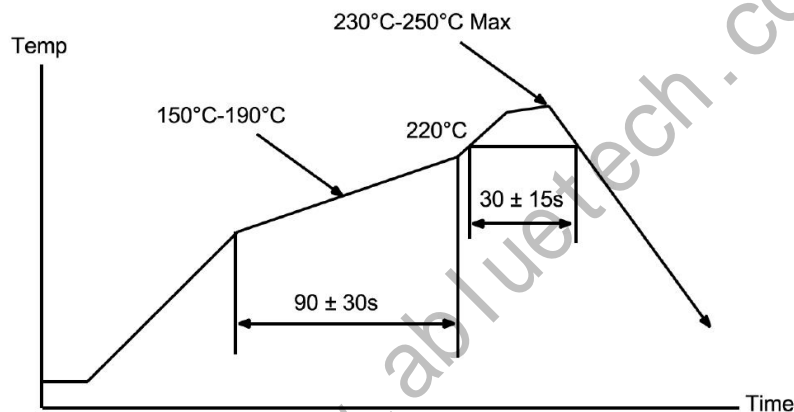
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temperature. Any absorbed moisture is quickly turned into superheated steam. This sudden change in vapor pressure can cause the package to swell. If the pressure exerted exceeds the flexural strength of the plastic mold compound, then it is possible 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.

## 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 and Firmware Development
- Mobile Apps for iOS and Android
- Cloud Platform

# ABLUE TECHNOLOGY

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## Ordering Information:

| Part Number  | Description   |
|--------------|---|
| PTR9840      | Bluetooth 5.2 System on Module, On board PCB antenna  |
| PTR9840+     | Bluetooth 5.2 System on Module, use with Ext. IPX Antenna                                   |
| XANT-IPX-10  | 2.4GHz FPC Antenna with IPX connector, 2dB gain   |
| XANT-SMA-10  | 2.4GHz Omni Antenna with SMA connector, 3dB gain  |
| XIPX-SMA-10  | IPX to SMA Converter RF cable, use for IPX type connector of RF module to SMA type Antenna. |
| MPTR9840-EVB | Evaluation boards for module, with key, LED, I/O extend                                     |