

WB103N (nRF52833)



Nordic BT5.1 Solution

Design By

OPTO-SENSOR

Manufactured By

LiteON

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光電藍芽模組:

WB103N 是一款採用 nRF52833 (含天線) 以 ARM Cortex M4 為核心處理器的高性能、低功耗的藍芽 5.1 射頻收發系統模組，擁有超小體積封裝，整體尺寸為 12.2*17.1mm (+/- 0.3mm)(含天線)支持完整的藍芽 4.0 至 5.1 的功能。另外也支持 NFC、Thread、與 Zigbee。

用戶的 MCU 通過串口 (UART) 跟模組進行連接，可實現和移動智慧設備進行数据的雙向通訊。模組接收到來自使用者 CPU 串口的数据後，將自動轉發給移動智慧設備；移動智慧設備可以通過 APP 發送資料到模組，模組將收到的数据通過串口發送給用戶的 MCU。

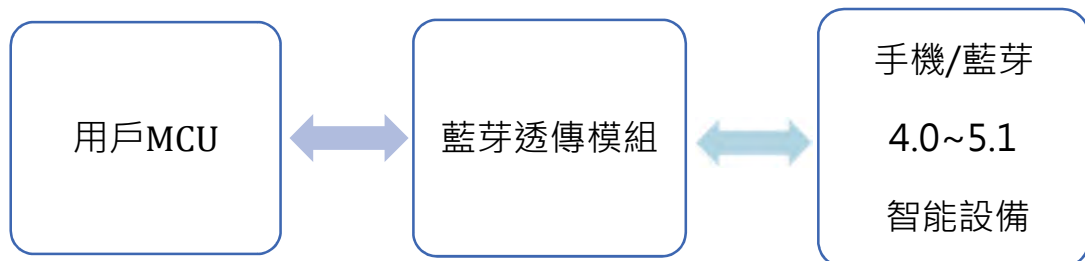
 **性能特點**

- ✓ 透明傳輸（橋接方式），使用方便快捷，無藍芽協定開發經驗者亦可使用
- ✓ 使用者介面採用標準的 UART（TTL）介面，雙向資料收發，操作簡單
- ✓ 任意串口數據包長度，無限制，更自由
- ✓ 藍芽廣播資料可相容 ibeacon 模式
- ✓ 通信距離：TBD
- ✓ 支援傳輸速率：Max 2 Mbps
- ✓ 供電電壓：1.7~3.6V (3.3V typical) or 2.5~5.5V (3.7V or 5V typical)
- ✓ 模組尺寸：12.2*17.1mm (+/- 0.3mm) * TBD (+/- 0.2mm) (含天線)
- ✓ 工作溫度：-40° C~85° C

 產品應用

- ✓ 短距離自動化資料獲取
- ✓ 工業控制，監測
- ✓ 掌機、手持機、POS機
- ✓ 無線鍵盤、無線滑鼠、遊戲手柄
- ✓ 藍牙調光、燈控系統
- ✓ 智慧家居控制系統
- ✓ 防丟器
- ✓ 手機附屬產品
- ✓ ibeacon應用

Application block diagram



1. OPTO-SENSOR BT5.1 Demo Board

This EVB made by [OPTO-SENSOR](#) includes "module" and "development board". The module allows users to evaluate the performance of Nordic nRF52833 IC. Module dimension is 12.2*17.1mm (+/- 0.3mm) * TBD (+/- 0.2mm). The development board can be connected to PC USB port, which provides power source and enables communication through emulated UART interface.

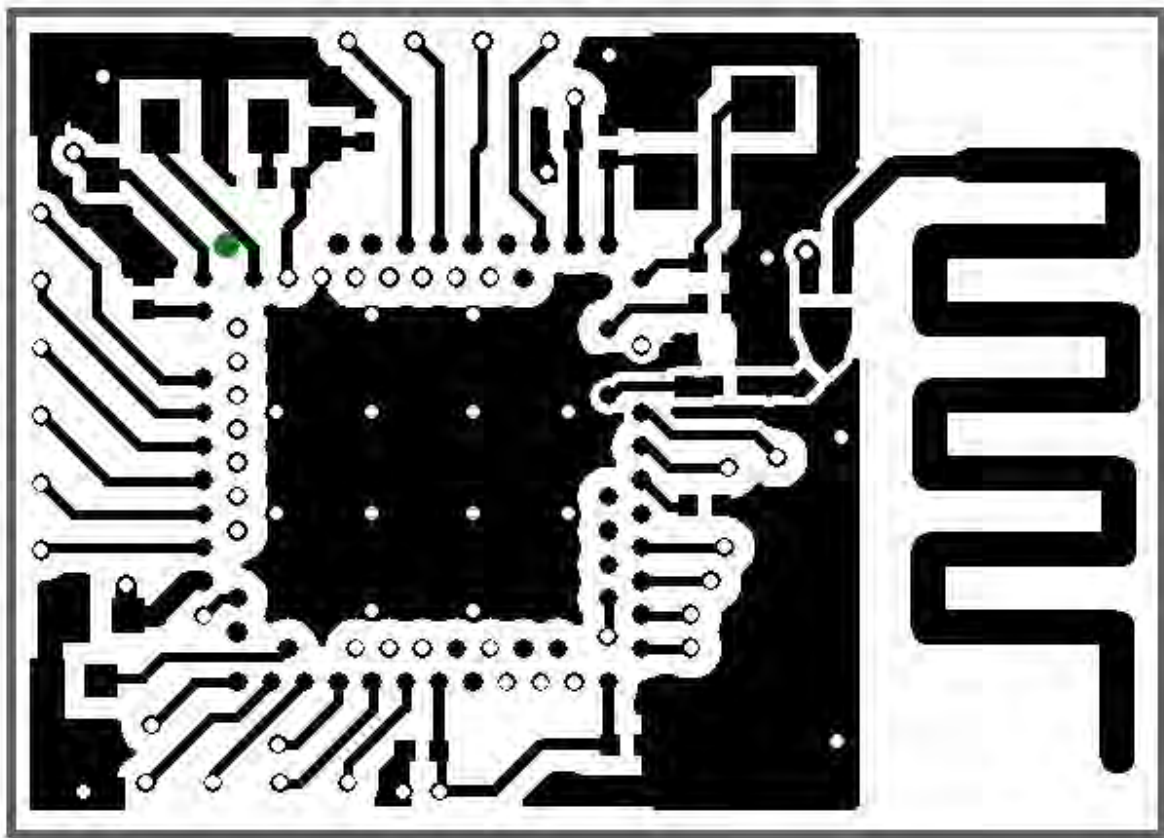


Fig 1. WB103N Module Layout

2. WB103N Module Spec. (Base on nRF52833)

Product Specifications

MAIN CHIPSET

- Nordic nRF52833

Bluetooth® 5.1, IEEE 802.15.4-2006, 2.4 GHz transceiver

- -96 dBm sensitivity in 1 Mbps Bluetooth® low energy mode
- -103 dBm sensitivity in 125 kbps Bluetooth® low energy mode (long range)
- -20 to +8 dBm TX power, configurable in 4 dB steps
- -91 dBm sensitivity in Bluetooth® low energy mode
- **Supported data rates:**
 - Bluetooth® 5.1 – 2 Mbps, 1 Mbps, 500 kbps, and 125 kbps
 - IEEE 802.15.4-2006 – 250 kbps
 - Proprietary 2.4 GHz – 2 Mbps, 1 Mbps
- Angle-of-arrival (AoA) and angle-of-departure (AoD) direction finding using Bluetooth®
- Single-ended antenna output (on-chip balun)
- 128-bit AES/ECB/CCM/AAR co-processor (on-the-fly packet encryption)
- 4.9 mA peak current in TX (0 dBm)
- 4.6 mA peak current in RX
- RSSI (1 dB resolution)

ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz

- 217 EEMBC CoreMark® score running from flash memory
- 52 µA/MHz running CoreMark from flash memory
- 38 µA/MHz running CoreMark from RAM memory
- Watchpoint and trace debug modules (DWT, ETM, and ITM)
- Serial wire debug (SWD)

Flexible power management

- 1.7 V to 5.5 V supply voltage range
- On-chip DC/DC and LDO regulators with automated low current modes
- Automated peripheral power management
- Fast wake-up using 64 MHz internal oscillator
- 0.6 μ A at 3 V in System OFF mode, no RAM retention
- 1.5 μ A at 3 V in System ON mode, no RAM retention, wake on RTC

Memory

- 512 kB embedded flash program memory
- 128 kB RAM

Other Features

- Nordic SoftDevice ready with support for concurrent multiprotocol
- Type 2 near field communication (NFC-A) tag with wake-on field and touch-to-pair support
- 12-bit, 200 ksps ADC – 6 configurable channels with programmable gain
- 15 level low power comparator with wake-up from System OFF mode
- Temperature sensor
- 37 general purpose I/O pins
- Four channel pulse width modulator (PWM) unit with EasyDMA
- Audio peripherals – I2S, digital microphone interface (PDM)
- 5x 32-bit timer with counter mode
- Up to 4x SPI master/3x SPI slave with EasyDMA
- Up to 2x I2C compatible two-wire master/slave
- 2x UART (CTS/RTS) with EasyDMA
- 3x real-time counter (RTC)
- Operating temperature from -40 to 85 °C

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- Programmable peripheral interconnect (PPI)
- Quadrature decoder (QDEC)

[Download nRF52833 Datasheet Here](#)

3. Module PIN Define

WB103N

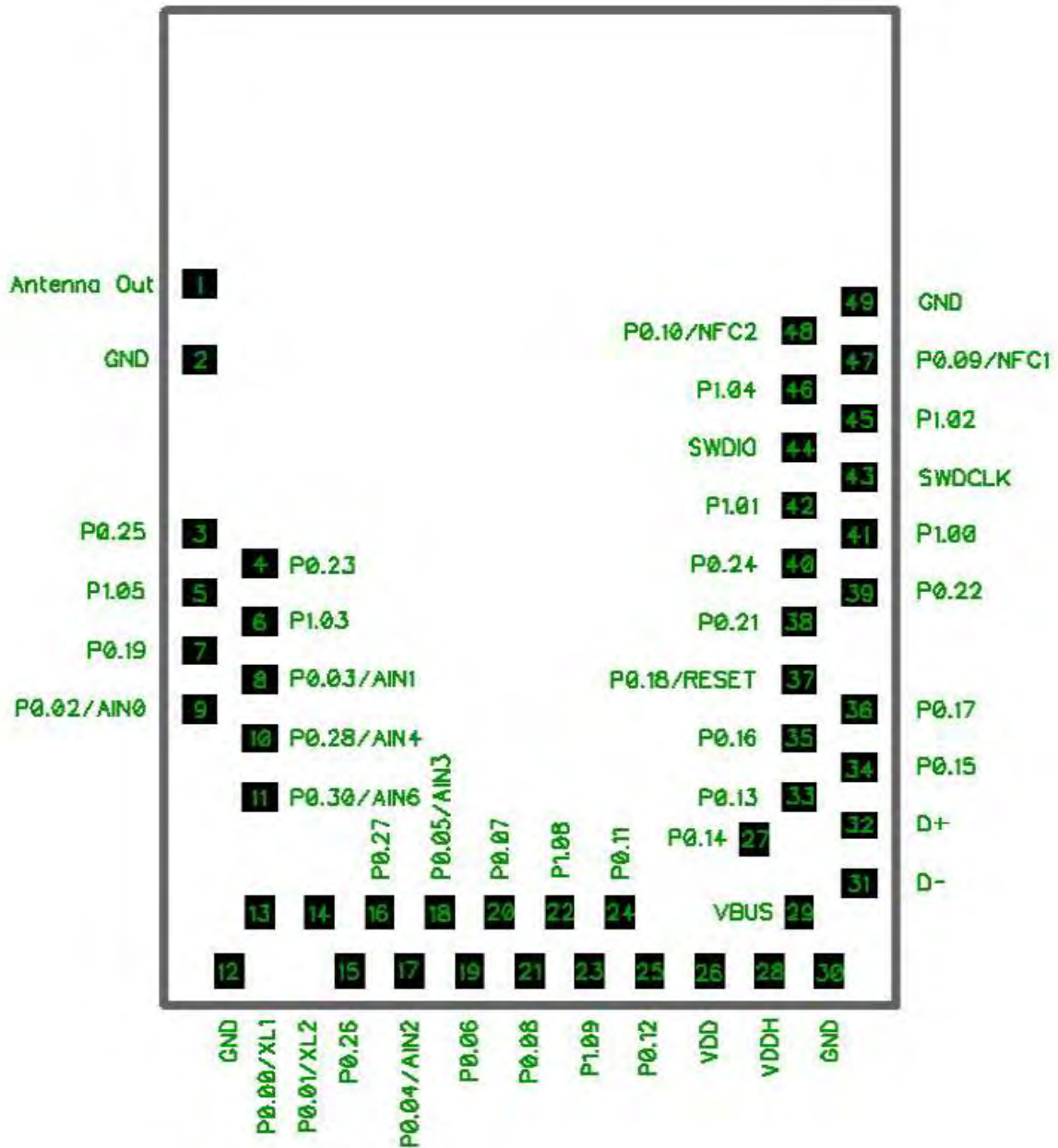


Fig 3. WB103N Module PIN Define

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Pin	Name	Recommended Usage	SPI, I2C, UART
1	Antenna Out	External filter and antenna	No
2	GND	Ground	No
3	P0.25	Standard drive / low frequency only	No
4	P0.23	Standard drive / low frequency only	No
5	P1.05	Standard drive / low frequency only	No
6	P1.03	Standard drive / low frequency only	No
7	P0.19	Standard drive / low frequency only	No
8	P0.03/AIN1	Standard drive / low frequency only, Analog	No
9	P0.02/AIN0	Standard drive / low frequency only, Analog	No
10	P0.28/AIN4	Standard drive / low frequency only, Analog	No
11	P0.30/AIN6	Standard drive / low frequency only, Analog	No
12	GND	Ground	No
13	P0.00/XL1	GPIO, external 32.768 kHz crystal connection	No
14	P0.01/XL2	GPIO, external 32.768 kHz crystal connection	No
15	P0.26	GPIO	Yes
16	P0.27	GPIO	Yes*
17	P0.04/AIN2	GPIO, Analog	Yes**
18	P0.05/AIN3	GPIO, Analog	Yes*
19	P0.06	GPIO	Yes
20	P0.07	GPIO, Tracer buffer clock	Yes*
21	P0.08	GPIO	Yes
22	P1.08	GPIO	Yes*
23	P1.09	GPIO, Tracer buffer TRACEDATA[3]	Yes**
24	P0.11	GPIO, Tracer buffer TRACEDATA[2]	Yes*
25	P0.12	GPIO, Tracer buffer TRACEDATA[1]	Yes
26	VDD	Low voltage power supply	No
27	P0.14	GPIO	Yes*
28	VDDH	High voltage power supply	No
29	VBUS	USB power supply	No
30	GND	Ground	No
31	D-	USB data line D-	No
32	D+	USB data line D+	No
33	P0.13	GPIO	Yes***

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34	P0.15	GPIO	Yes
35	P0.16	GPIO	Yes*
36	P0.17	GPIO	Yes
37	P0.18/RESET	GPIO, Reset pin	Yes*
38	P0.21	GPIO	Yes*
39	P0.22	GPIO	Yes
40	P0.24	GPIO	Yes
41	P1.00	GPIO, Tracer buffer TRACEDATA[0], SW Output	Yes
42	P1.01	Standard drive / low frequency only	No
43	SWDCLK	Serial wire debug clock	No
44	SWDIO	Serial wire debug data I/O	No
45	P1.02	Standard drive / low frequency only	No
46	P1.04	Standard drive / low frequency only	No
47	P0.09/NFC1	Standard drive / low frequency only, NFC	No
48	P0.10/NFC2	Standard drive / low frequency only, NFC	No
49	GND	Ground	No

*: These pins are not recommended to run high speed peripherals despite the pin hardware supports them.

** : These pins are recommended to be used as SPI SCK when running at 8 Mbps or faster.

***: These pins are not recommended to run high speed peripherals when USB D (VBUS, D+, D-) is being used.

4. Reference Design

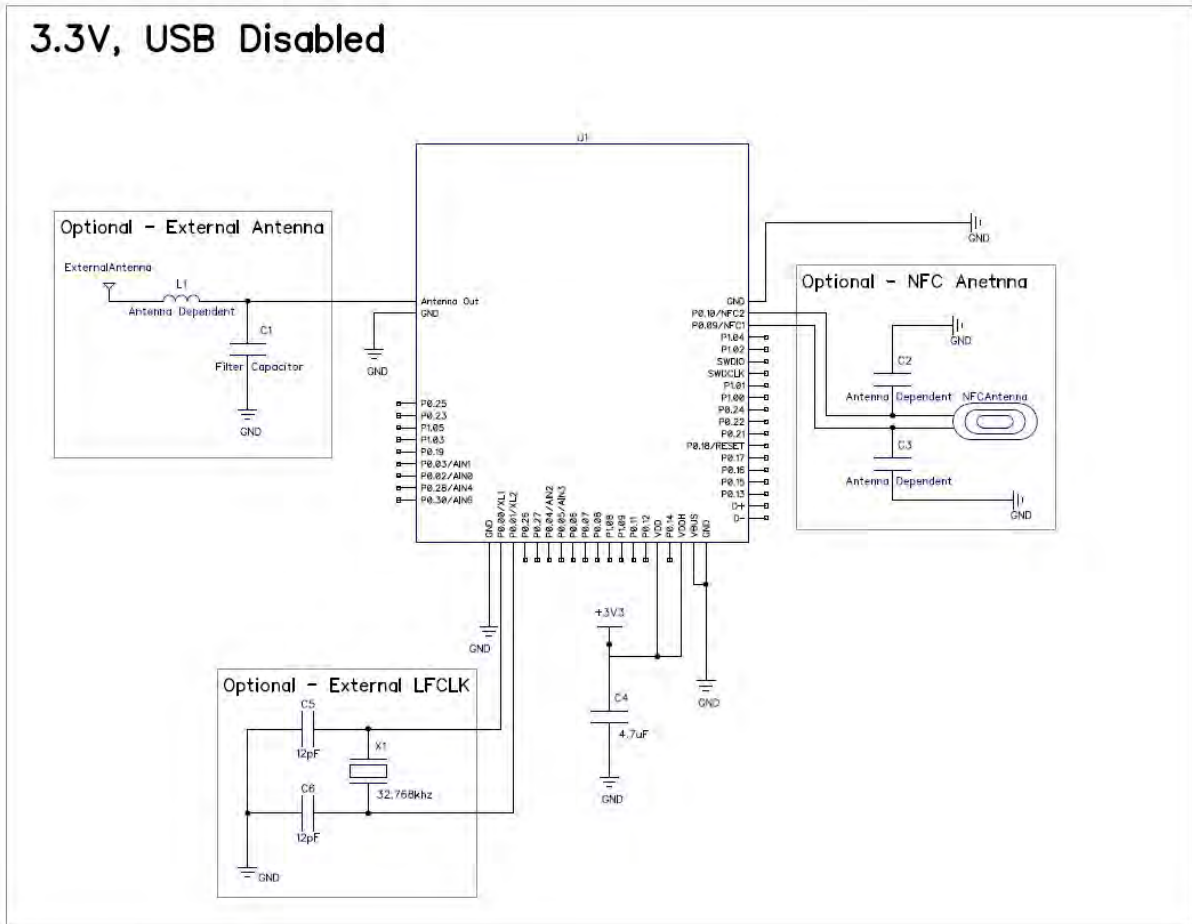


Fig 4. Power from 3.3V with no USB connection

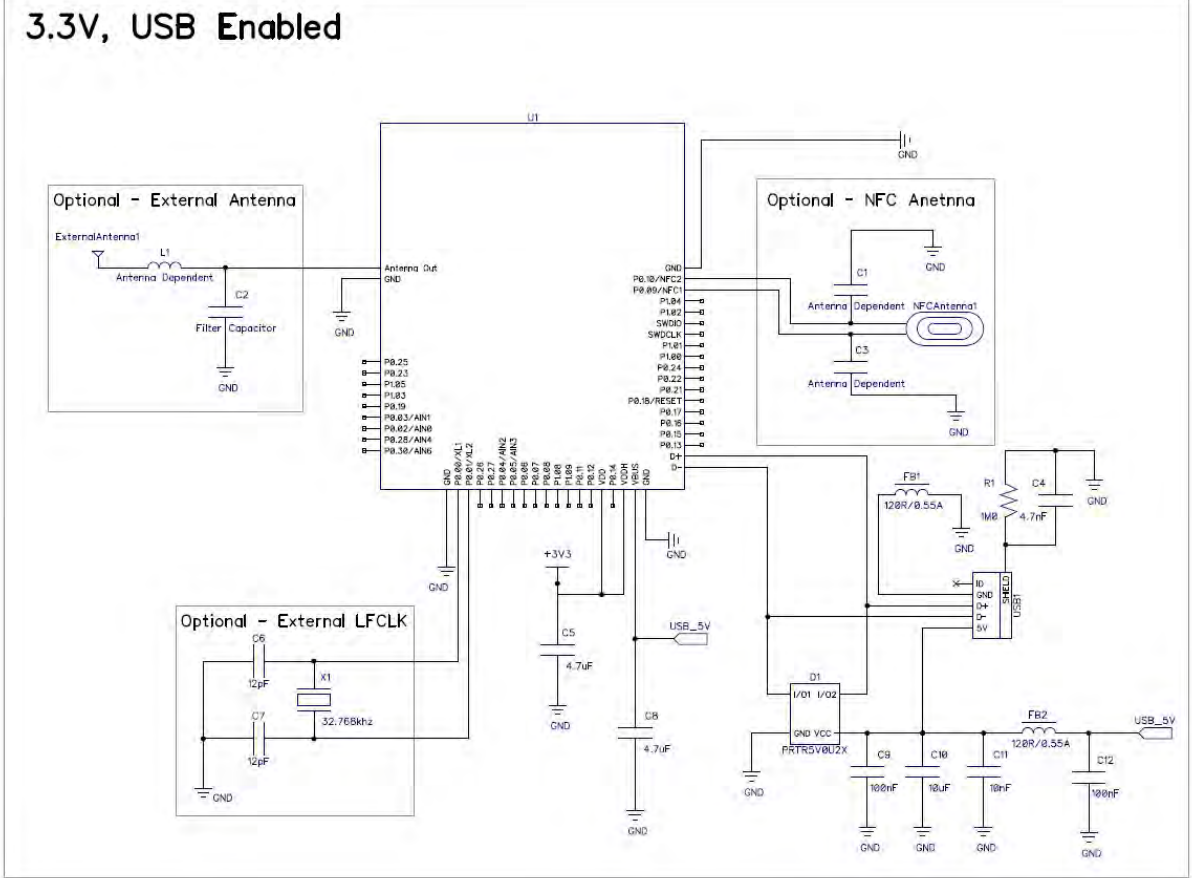


Fig 5. Power from 3.3V with USB connection

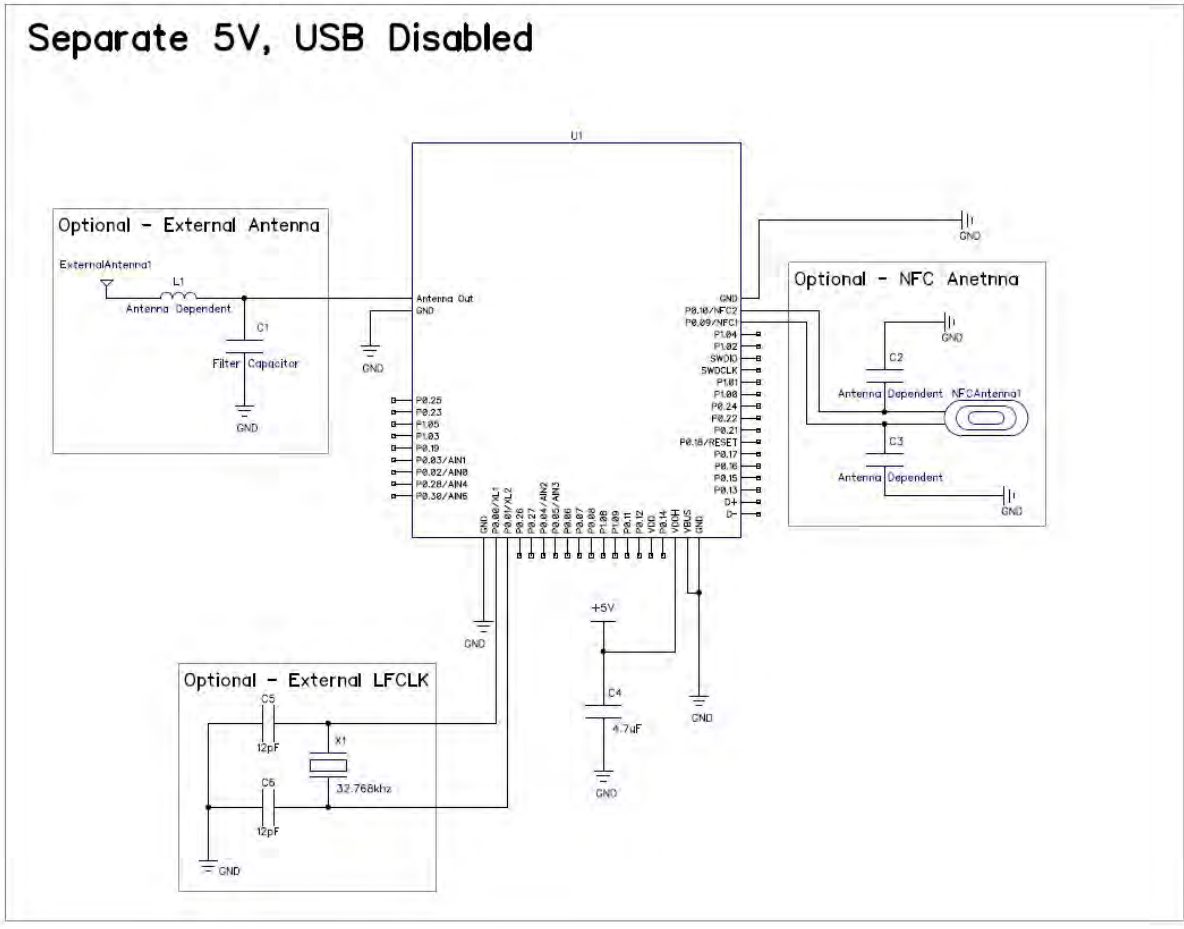


Fig 6. Power from 5V with no USB connection

Separate 5V, USB Enabled

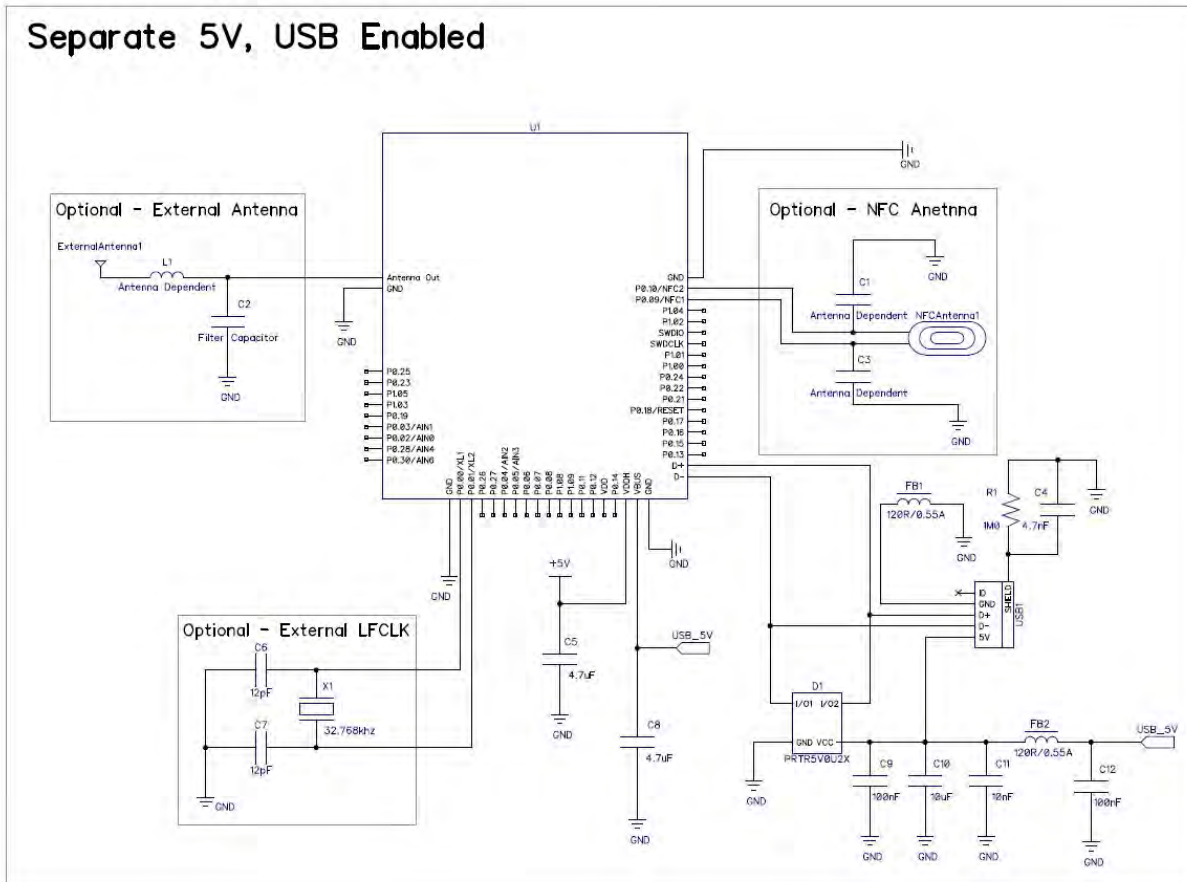


Fig 7. Power from 5V with USB connection

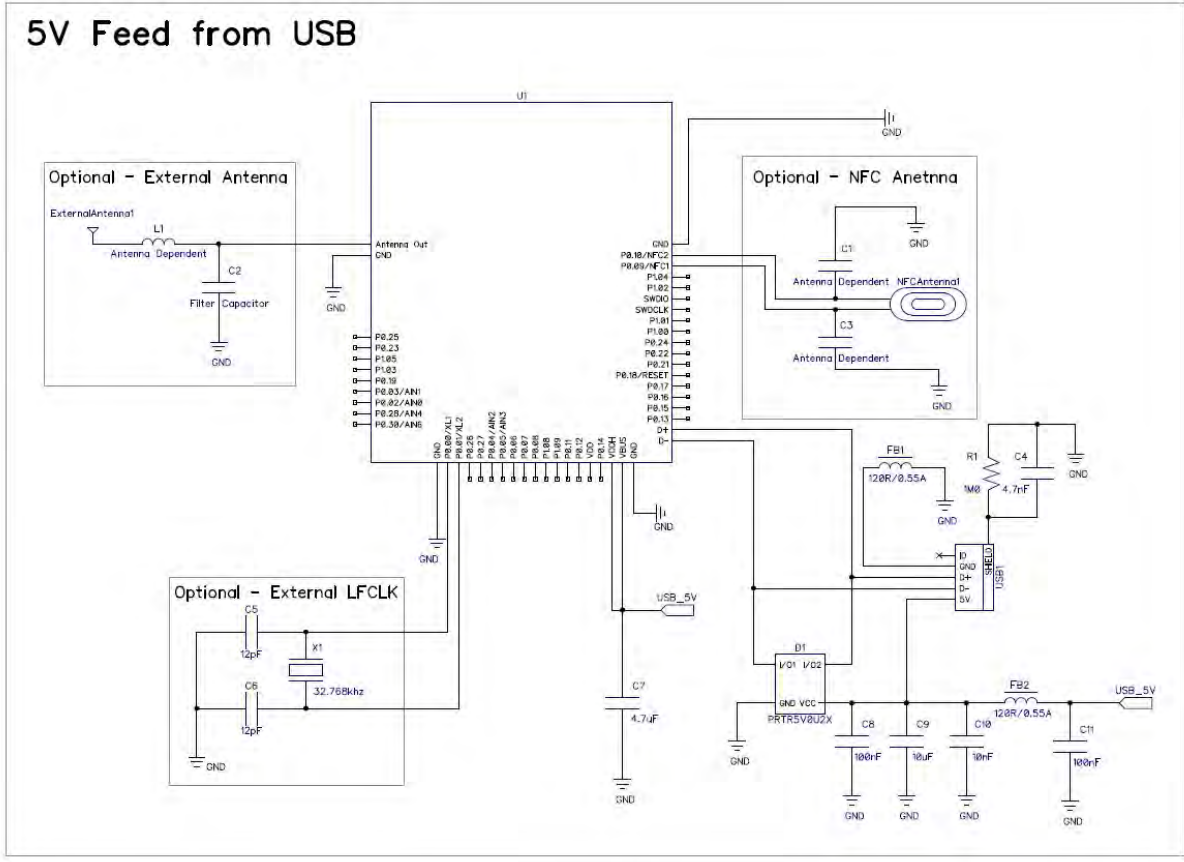
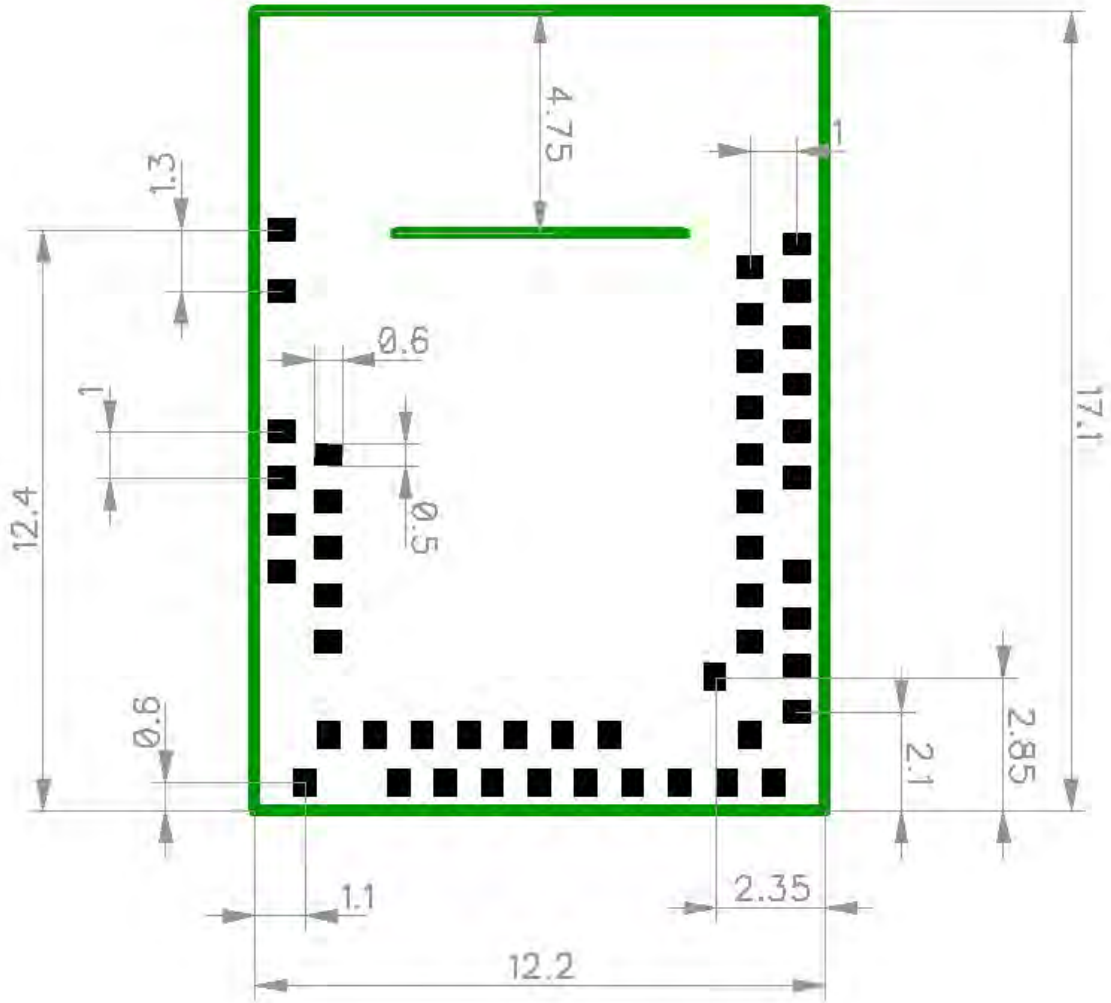


Fig 4. Power from USB connection

5. Mechanical Specifications and Footprint Design

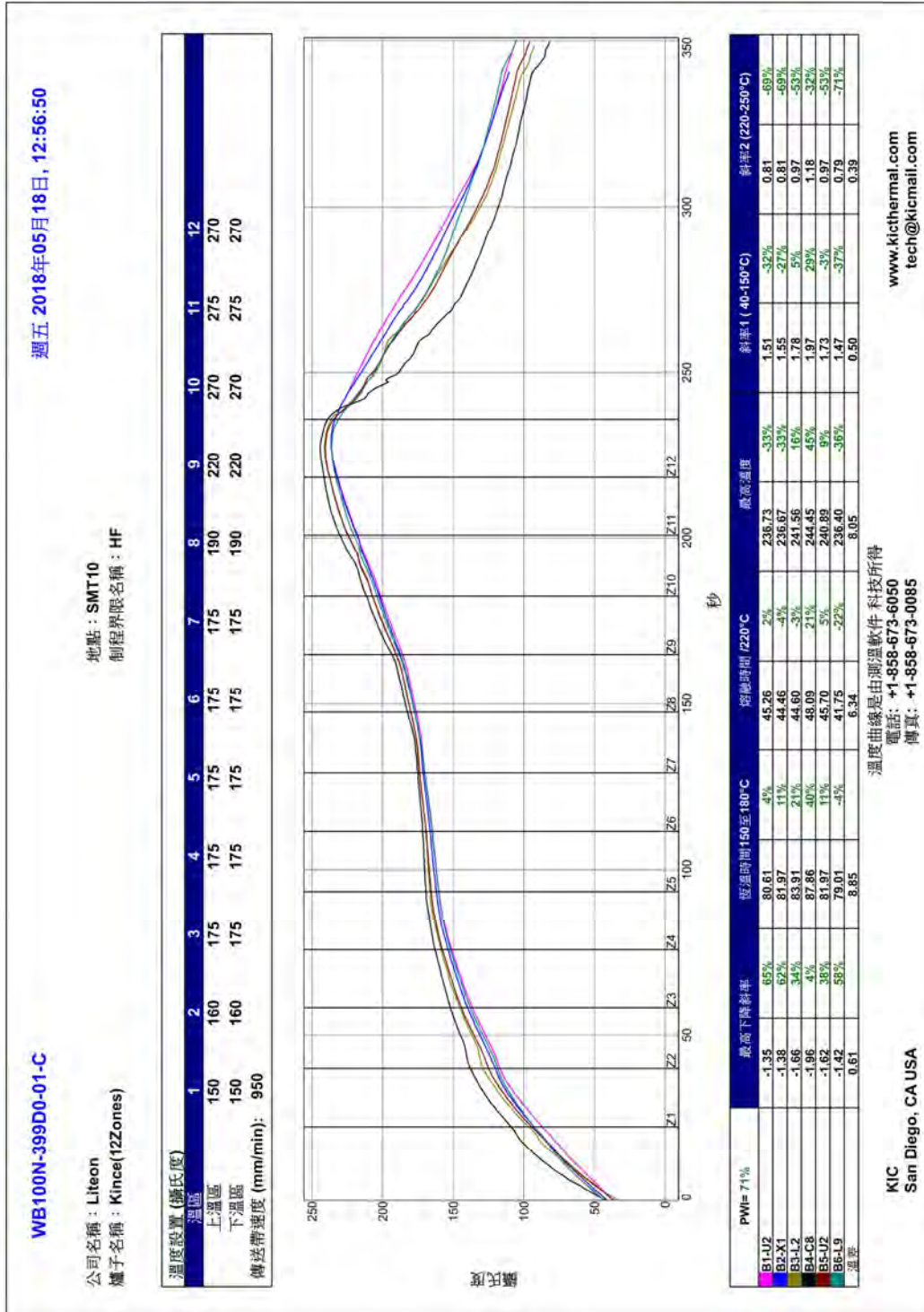
Unit: mm



WB103N mechanical specification and recommended footprint

Note: Avoid ground plane coverage for 4.75mm from antenna side of module

6. Reflow Profile



7. Revision History

Date	Version	Description
2020-03-30	1.0	Initial draft.

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More Information

For more information please feel free to contact us at anytime, your inquiry will be answered promptly. Thank you very much.

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