User manual--NRF52840

NRF52840 is powerful, highly flexible ultra-low power BLuetooth low energy(BLE module) using Nordic NRF52840 SoC , with ARM Cortex-M4 CPU , which has floating Point unit (FPU), 1MB flash with cache and 256kB RAM, It offers a wealth of peripherals that include NFC, USB and multiple interface options including Quad SPI (QSPI). it also has high-end security features included to achieve best in clas security with an ARM CryptoCEll cryptographic system on chip and a full AES 128-bit encryption suite ., it also support BLE mesh

Full Bluetooth 5 support for long range

Processing power and flash flexibility

Multiprotocol radio

Power Efficiency

Specifications:

- Bluetooth 5 ready multi-protocol radio
  - 2Mbps
  - Long range
  - Advertising extensions
  - Improved coexistence (CSA #2)
- IEEE 802.15.4 radio support
  - Thread
  - Zigbee
- 32-bit ARM Cortex-M4F @ 64MHz
- Up to 111 dB link budget for Bluetooth long range mode
- Full-speed 12Mbs USB controller
- NFC Tag-A
- Software stacks available as downloads
- Programmable output power from +8dBm to -20dBm
- On-air compatible with nRF51, nRF24L and nRF24AP Series
- High-precision RSSI
- 128 bit AES/ECB/CCM/AAR co-processor
- Single-ended antenna output (on-chip balun)
- Software stacks available as downloads
- Application development independent of protocol stack
- Wide supply voltage range + 1.7V to 5.5V
- QSPI/SPI/2-wire/I^2S/PDM/QDEC
- Programmable Peripheral Interface - PPI
- High speed SPI interface 32MHz
- Quad SPI interface 32MHz
- EasyDMA for all digital interfaces
- RAM mapped FIFO using EasyDMA
- 12bit/200K SPS ADC
- On-chip DC-DC buck converter
- Quadrature demodulator
- -96dBm Sensitivity for Bluetooth low energy
- Arm CryptoCell CC310 crytographic security module
- QSPI/SPI/2-wire/I^2S/PDM/QDEC

Applications

- Internet of Things (IoT)
- SmartHome sensors
- Computer peripherals
- A4WP ‘Rezence’ wireless charging
- Sports and fitness sensors and hubs
- Smart watches
- Interactive games
- Wearables
- Connected white goods
- Voice-command smart remotes
- Beacons
- Connected health products
- RC Toys
- Building automation and sensor networks

Model :

model	NRF52840
Chip	nRF52840
Size	18mm(L)*14mm(W)*1.6mm(H)
BLE Antenna	Chip antenna

Contents

1. Introduction

NRF52840 is powerful, highly flexible ultra-low power BLuetooth low energy(BLE module) using Nordic NRF52840 SoC , with ARM Cortex-M4 CPU , which has floating Point unit (FPU), 1MB flash with cache and 256kB RAM, It offers a wealth of peripherals that include NFC, USB and multiple interface options including Quad SPI (QSPI).
it also has high-end security features included to achieve best in clas security with an ARM CryptoCEll cryptographic system on chip and a full AES 128-bit encryption suite .

1.1. Programmer

NRF52840 module using the Serial Wire Debug(SWD port) , the module which layout the SWDIO ,SWCLK ,VCC,GND for debug and flash your own firmware ,more info about the SWD ,please see here .
https://www.silabs.com/community/mcu/32-bit/knowledge-base.entry.html/2014/10/21/serial_wire_debugs-qKCT
You can using the Jlink or Jtag for programmer .

1.2. Software development Tool

It supports the standard Nordic Software Development Tool-chain using Segger Embedded Studio, Keil, IAR and GCC,
More info please visit here :
http://infocenter.nordicsemi.com/index.jsp?topic=/com.nordic.infocenter.nrf52/dita/nrf52/development/nrf52_dev_kit.html&cp=1_1

1.3. Protocols

This module support Bluetooth ,Bluetooth Low Energy,Bluetooth mesh,Thread,802.15.4,ANT,2.4GHz proprietary
So we can use in different situation using different protocols ,
Software Development Kit
Nordic Semiconductor's Software Development Kits (SDK) are your starting point for software development on the nRF51 and nRF52 Series. It contains source code libraries and example applications covering wireless functions, libraries for all peripherals, bootloaders, Wired and OTA FW upgrades, RTOS examples, serialization libraries and more.
More infos please visit here http://www.nordicsemi.com/eng/Products/nRF52840-DK
You can also download the SDK for coding development .

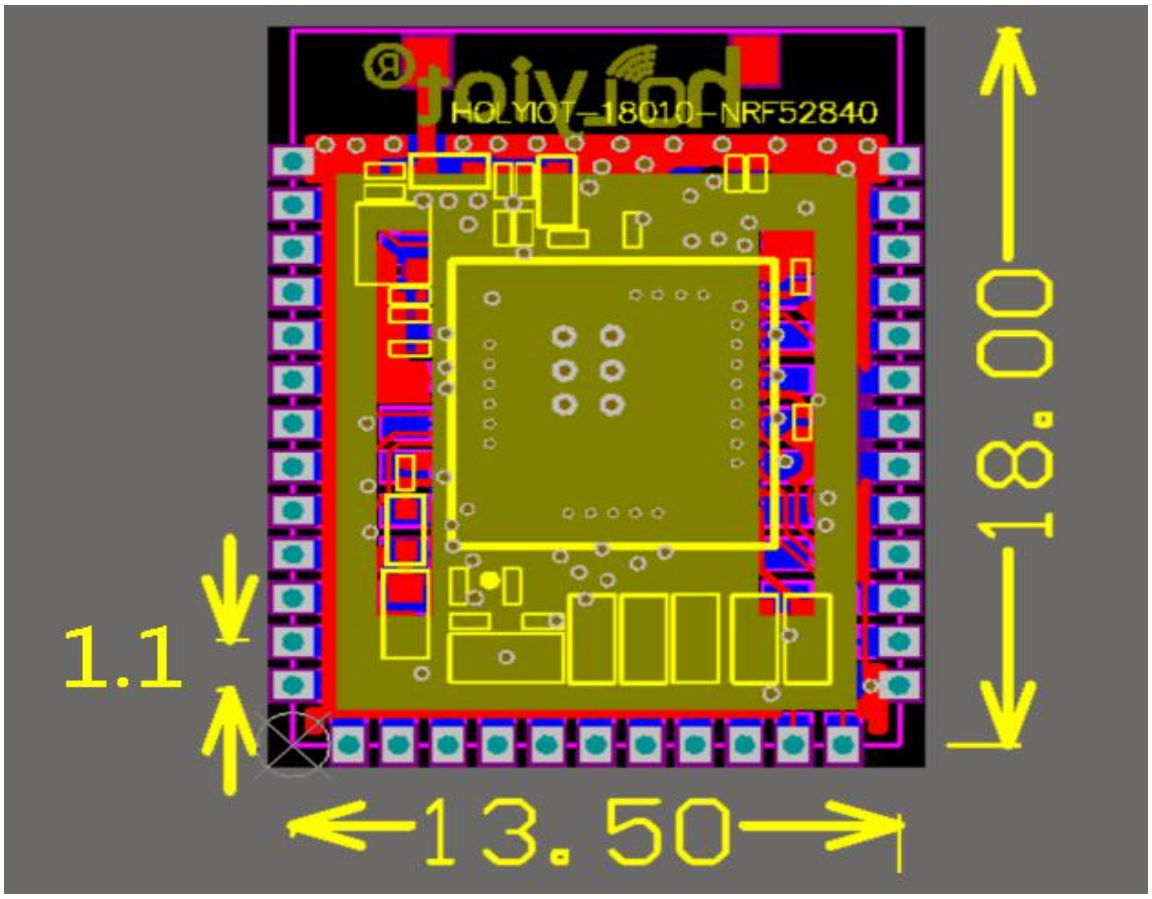
1.4. SoftDevices

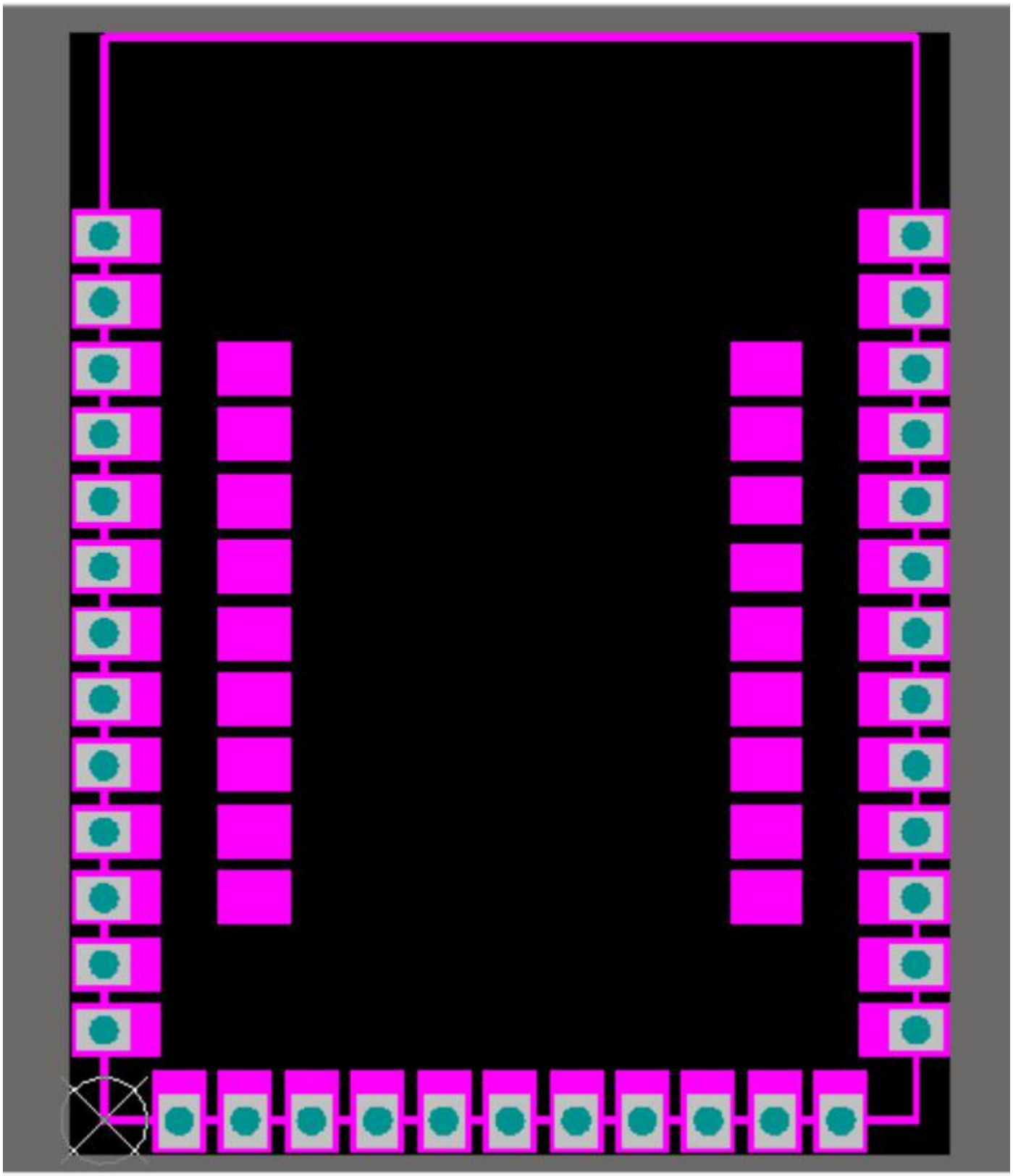
Nordic Semiconductor protocol stacks are known as SoftDevices.SoftDevices are pre-compiled, pre-linked binary files. SoftDevices can be programmed in nRF5 series devices, and are freely downloadable from the Nordic website.please download that here :http://www.nordicsemi.com/eng/nordic/download_resource/60625/19/19221576/116072

Over-The-Air DFU
The SoC is supported by an Over-The-Air Device Firmware Upgrade (OTA DFU) feature. This allows for in the field updates of application software and SoftDevice.

2. Product decriptions

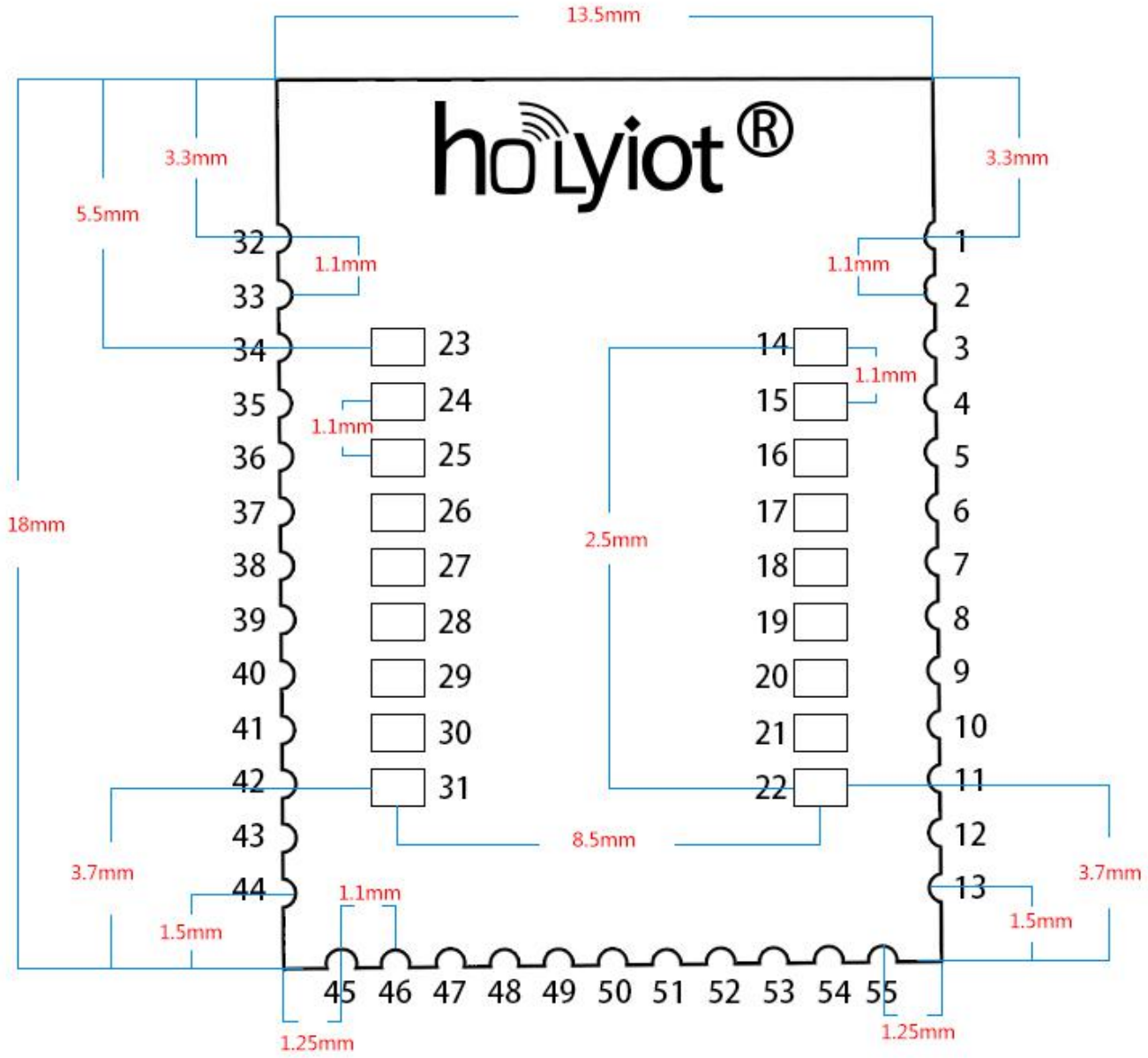
2.1. mechanical drawings





Back

2.2. Pin assignments



Bottom of the board

PIN# number	PIN define	Functions
1	GND	Ground
2	P1.10	Digital I/O
3	P1.11	Digital I/O Trace data

4	P1.13	Digital I/O
5	P1.15	Digital I/O
6	P0.03	Digital I/O Analog input
7	P0.02	Digital I/O Analog input
8	P0.28	Digital I/O Analog input
9	P0.29	Digital I/O Analog input
10	P0.30	Digital I/O Analog input
11	P0.31	Digital I/O Analog input
12	P0.04	Digital I/O Analog input
13	P0.05	Digital I/O Analog input
14	P1.14	Digital I/O
15	P1.12	Digital I/O
16	P0.25	Digital I/O
17	P0.11	Digital I/O
18	P1.08	Digital I/O
19	P0.27	Digital I/O
20	P0.08	Digital I/O
21	P0.06	Digital I/O
22	P0.26	Digital I/O
23	P1.07	Digital I/O
24	P1.05	Digital I/O
25	P0.24	Digital I/O
26	P0.20	Digital I/O
27	P0.17	Digital I/O
28	P0.15	Digital I/O
29	P0.14	Digital I/O
30	P0.13	Digital I/O
31	P0.16	Digital I/O
32	GND	Ground
33	P0.10	Digital I/O NFC input
34	P0.09	Digital I/O NFC input
35	P1.06	Digital I/O

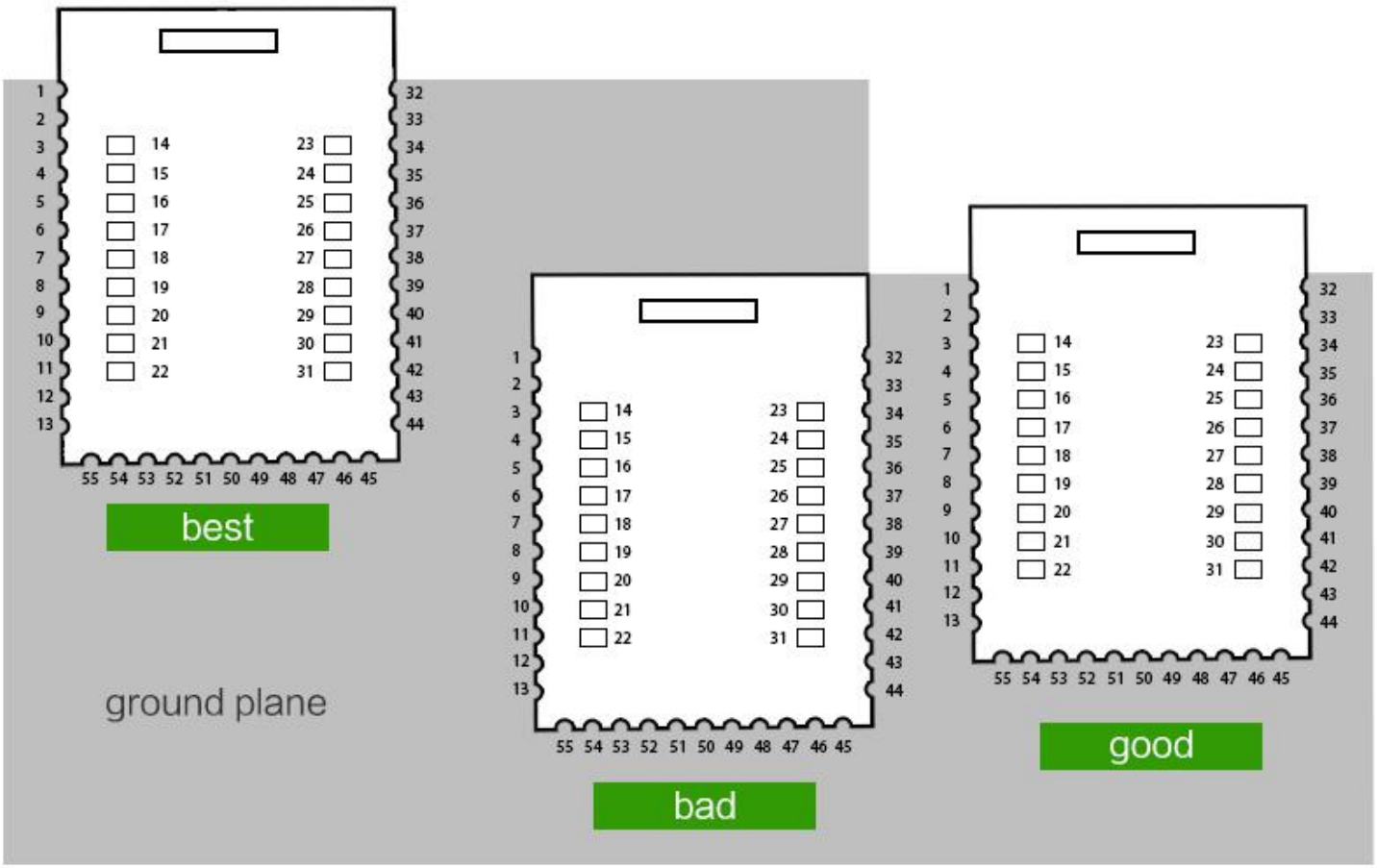
36	P1.04	Digital I/O
37	SWDIO	SWD for debug and programming
38	SWDCLK	SWD for debug and programming
39	P1.02	Digital I/O
40	P1.01	Digital I/O
41	P1.03	Digital I/O
42	P1.00	Digital I/O
43	P0.22	Digital I/O
44	GND	Ground
45	D+	Digital I/O
46	D-	Digital I/O
47	VBUS	Power
48	P0.18	Digital I/O
49	P0.19	Digital I/O
50	P0.21	Digital I/O
51	P0.23	Digital I/O
52	P0.12	Digital I/O Trace data
53	P1.09	Digital I/O Trace data
54	P0.07	Digital I/O Trace clock
55	V_nRF(VDD/VDDH)	VDD/VDDH

3. Mounting our board on the host PCBA

We suggest that you mounting our RF board(Holyiot-18010_nRF52840) on the board , something like that .

1 . for the best Bluetooth performance , the antenna of the area need to extends about several mml without ground under the antenna of the edge of the host PCB

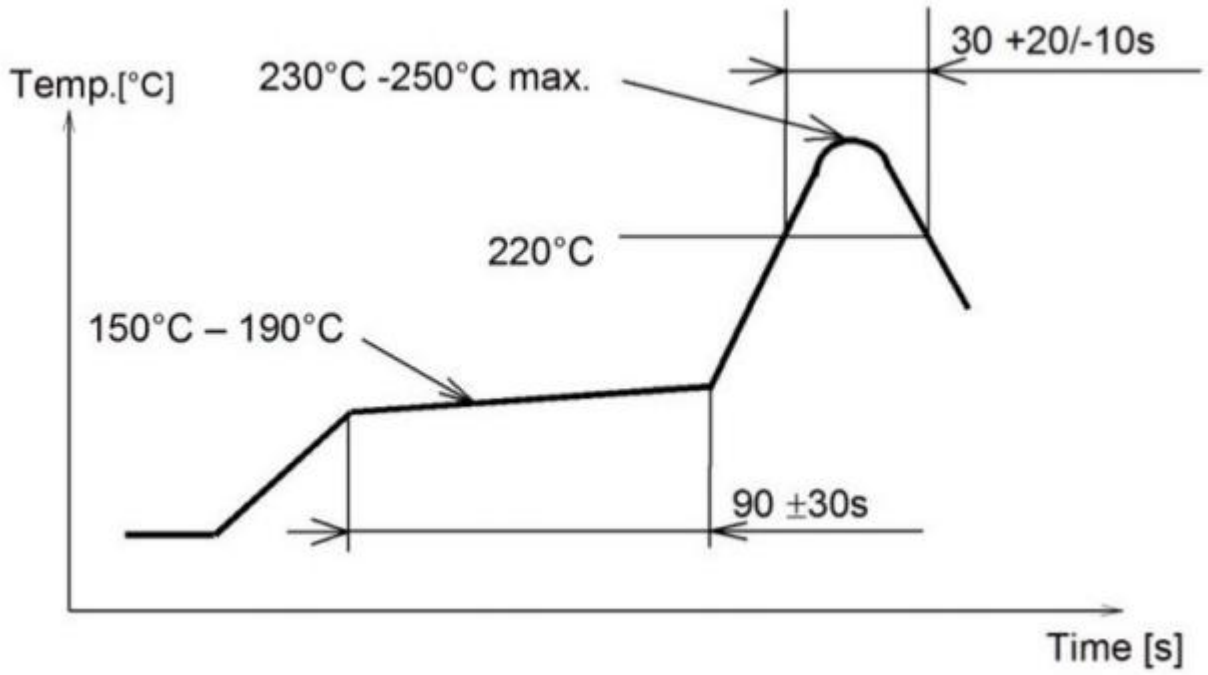
2 . the next choise is that place our board at the corner of host PCB , the antenna of board need to extends several mm outside of the Ground plane of the host PCB



4. Miscellaneous

Soldering Temperature-Time Profile for Re-Flow Soldering

Maximum number of cycles for re-flow is 2. No opposite side re-flow is allowed due to module weight.



5. Absolute maximum ratings

Maximum ratings are the extreme limits to which the chip can be exposed for a limited amount of time without permanently damaging it. Exposure to absolute maximum ratings for prolonged periods of time may affect the reliability of the device.

Absolute maximum ratings

	Note	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	V
I/O pin voltage				
$V_{I/O}$, VDD ≤3.6 V		-0.3	VDD + 0.3 V	V
$V_{I/O}$, VDD >3.6 V		-0.3	3.9 V	V
NFC antenna pin current				
$I_{NFC1/2}$			80	mA
Radio				
RF input level			10	dBm
Environmental (AQFN package)				
Storage temperature		-40	+125	°C
MSL	Moisture Sensitivity Level		2	
ESD HBM	Human Body Model		4	kV
ESD CDM_{QF}	Charged Device Model (AQFN73, 7×7 mm package)		750	V
Flash memory				
Endurance		10 000		Write/erase cycles
Retention		10 years at 40°C		


ATTENTION
OBSERVE PRECAUTION FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICE
HBM (Human Body Model): Class 3A

This device complies with part 15 of the FCC Rules.
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.

Note: 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.

Warning: Changes or modifications to this unit not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement
This equipment complied with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

7. contact us

Shenzhen holyiot technology Co.,LTD

Rm.308, 310, Bldg 9. Wangtang industrial Park xinwei Vil., xili Town. Nanshan Dist, Shenzhen China.

TEL：+8615220262142

Email： spring@hyyunjia.com

Website :www.hyyunjia.com/www.holyiot.com

IMPORTANT NOTE:

This module is intended for OEM integrator only and the OEM integrators and instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee.

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter. then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The module will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device.

The module must in the end-product be installed in such manner that the authorized antennas can be used, any change of the antenna will void the certification.

LABEL OF THE END PRODUCT:

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2ALGY-NRF52840 If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of the FCC Rules. 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.