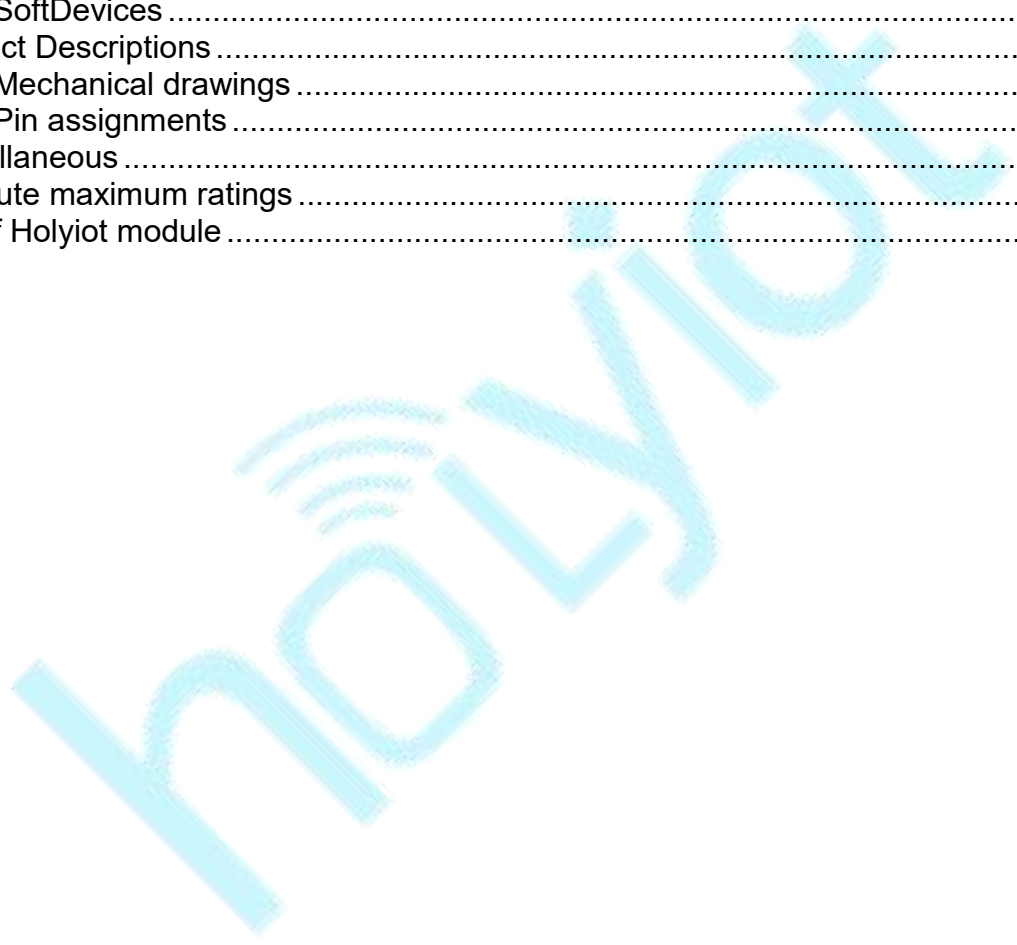


Datasheet

产品名称 (Product): BT 5.0 module (nRF52840)

产品型号 (Model No.): Holyiot-20079-NRF52840+PA

1. Description	3
Hardware :	3
Features :	4
Application:	5
2. Introduction	6
2.1 Programmer	6
2.2 Software development Tool	6
2.3 Protocols	6
2.4 SoftDevices	6
3. Product Descriptions	7
3.1 Mechanical drawings	7
3.2 Pin assignments	8
4. Miscellaneous	11
5. Absolute maximum ratings	11
6. List of Holyiot module	12



1. Description

HOLYIOT-20079-NRF52840+PA is based on Nordic nRF52840 Soc, the nRF52840 SoC is an advanced, highly flexible single chip solution for today's increasingly demanding ULP wireless applications for connected devices on our person, connected living environments and the IoT at large. It is designed ready for the major feature advancements of Bluetooth® 5 and takes advantage of Bluetooth 5's increased performance capabilities which include long range and high throughput modes. The nRF52840 employs the same hardware and software architecture as existing nRF52 Series SoCs. At its core is an ARM Cortex-M4F processor allowing quicker and more efficient computation of complex functions for DSP and those requiring floating point math. There is extensive memory availability in both flash and RAM, 1MB/256kB respectively. A full-speed (12Mbps) USB 2.0 controller is included on-chip. An extensive range of peripherals are available with a number of high performance digital interfaces such as high speed SPI (32MHz) and quad SPI (32MHz) to allow direct interfacing to displays and external memory sources. The nRF52840 can operate from +5.5v down to 1.7v supply voltages allowing direct supply from rechargeable batteries and USB supplies. Of greatest importance is the support for longer range (up to x4 compared to Bluetooth 4.x) and doubling of on-air data-rate, up to 2Mbps from 1Mbps in Bluetooth 4.x. This adds to the already existing radio support for Bluetooth low energy, ANT/ANT+ and 2.4GHz for proprietary.

Hardware :

SWD programmer (SWDIO,SWCLK,VDD,GND)

nRF52840 QIAA

Size :27.2mm*16mm

BLE stack & RF 2.4Ghz

Power Amplifier(PA): RFX2401C

Features :

- Bluetooth 5, 2.4GHz transceiver
 - -95 dBm sensitivity in 1 Mbps Bluetooth® low energy (BLE) mode
 - -103 dBm sensitivity in 125 kbps BLE mode (long range)
 - +4 dBm TX power (down to -20 dBm in 4 dB steps)
 - On-air compatible with nRF52, nRF51, nRF24L and nRF24AP Series
 - Supported data rates:
 - Bluetooth 5: 2 Mbps, 1 Mbps, 500 kbps, 125 kbps
 - Proprietary 2.4 GHz: 2 Mbps, 1 Mbps
 - Single-ended antenna output (on-chip balun)
 - 4.9 mA peak current in TX (0 dBm)
 - 4.8 mA peak current in RX
 - RSSI (1 dB resolution)
- ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz
 - 212 EEMBC CoreMark如 score running from flash memory
 - 56 µA/MHz running from flash memory
 - Watchpoint and trace debug modules (DWT, ETM and ITM)
 - Serial wire debug (SWD)
- Flexible power management
 - Supply voltage range 1.7 V to 5.5 V
 - On-chip DC/DC and LDO regulators with automated low current modes
 - Regulated supply for external components from 1.8 V to 3.3 V
 - Automated peripheral power management
- Memory
 - 1 MB flash/256 kB RAM
- HW accelerated security
 - ARM® TrustZone® Cryptocell 310 cryptographic accelerator
 - 128 bit AES/ECB/CCM/AAR co-processor (on-the-fly packet encryption)
 - Advanced on-chip interfaces

- USB 2.0 full speed (12 Mbps) controller
- QSPI 32 MHz interface
- High speed 32 MHz SPI
- Programmable peripheral interconnect (PPI)
- 48 general purpose I/O pins

- Nordic SoftDevice ready and with support for concurrent multi-protocol
- 12-bit, 200 ksps ADC - 8 configurable channels with programmable gain
- 5x 32-bit timers with counter mode
- Up to 4x SPI masters/3x SPI slaves with EasyDMA
- Up to 2x I2C compatible 2-wire masters/slaves
- 2x UART(CTS/RTS) with EasyDMA
- 3x real-time counters (RTC)
- Package variants
 - AQFN73 package, 7x7 mm

Application:

- Advanced computer peripherals and I/O devices
 - Mouse
 - Keyboard
- Advanced wearables
 - Health/fitness sensor and monitor devices
 - Wireless payment enabled devices
- Internet of things (IoT)
 - Smart home sensors and controllers
 - Industrial IoT sensors and controllers
- Interactive entertainment devices
 - Remote controls
 - Gaming controllers

2. Introduction

2.1 Programmer

HOLYIOT-20079-NRF52840+PA use the Serial Wire Debug(SWD port), the module which layout the SWDIO, SWCLK, VDD, GND for debug and flash your own firmware, more info about the SWD, please visit 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.

2.2 Software development Tool

It supports the standard Nordic Software Development Tool-chain using Segger Embedded Studio, Keil, IAR and GCC. More info please visit <https://www.nordicsemi.com/Software-and-Tools/Development-Tools>

2.3 Protocols

This USB support Bluetooth 5, Bluetooth Low Energy,Bluetooth mesh,Thread,802.15.4,ANT, 2.4GHz proprietary. So we can use different protocols for different situations.

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.

More info please visit <https://www.nordicsemi.com/Software-and-Tools/Software/nRF5-SDK>

You can also download the SDK for coding development .

2.4 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:

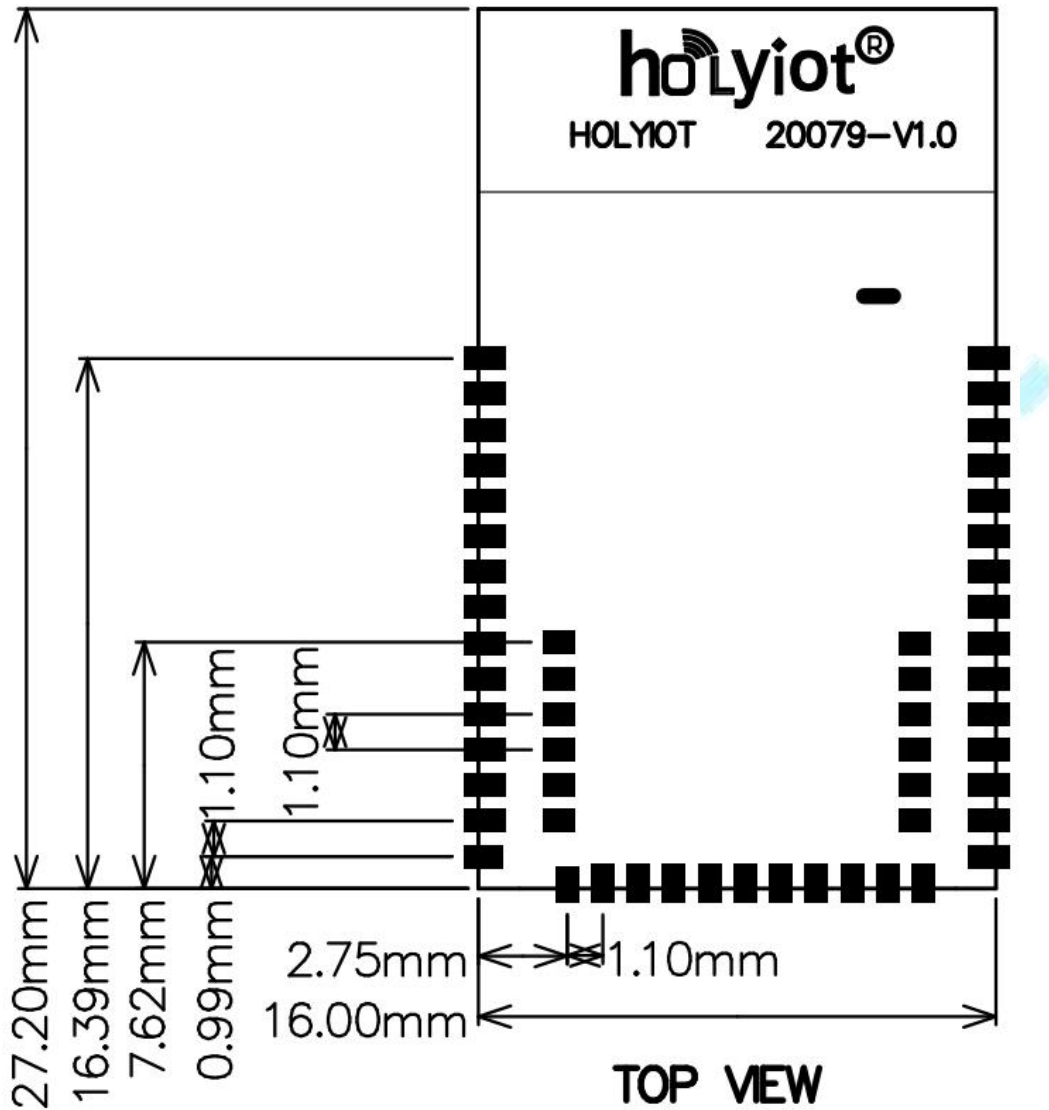
<https://www.nordicsemi.com/Software-and-Tools/Software/S140>

Over-The-Air DFU

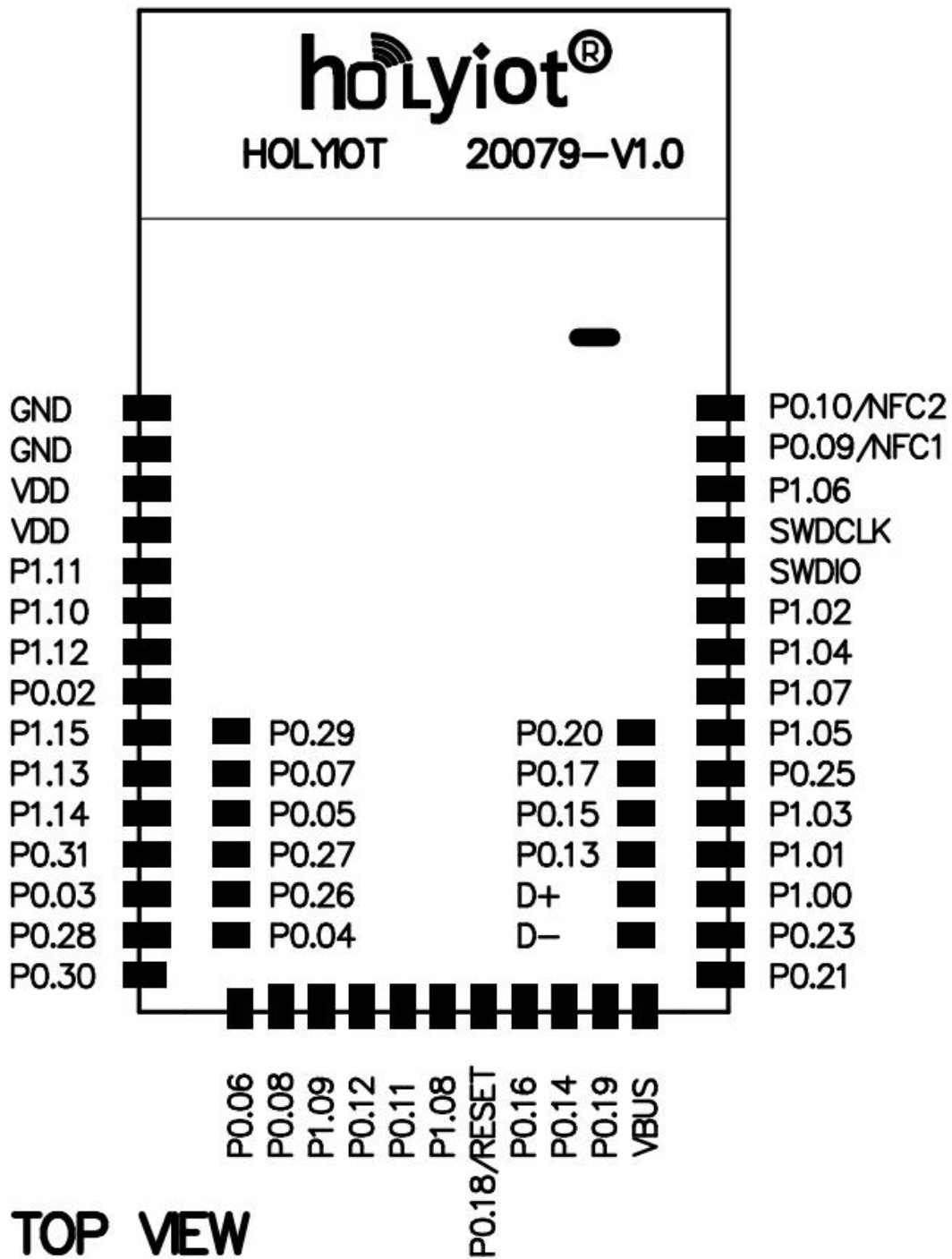
The SoC is supported by an Over-The-Air Device Firmware Upgrade (OTA DFU) feature. This allows for in the field updates of application software and SoftDevice.

3. Product Descriptions

3.1 Mechanical drawings



3.2 Pin assignments



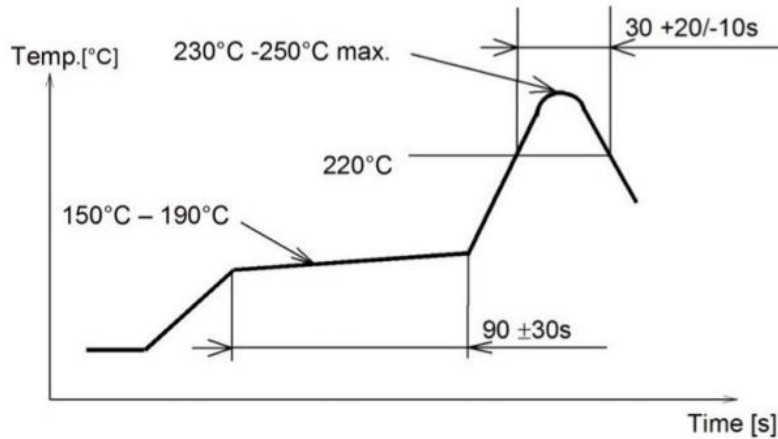
PIN No.	PIN define	Functions
1	GND	Ground
2	GND	Ground
3	VDD	Power supply
4	VDD	Power supply
5	P1.11	General purpose I/O
6	P1.10	General purpose I/O

7	P1.12	General purpose I/O
8	P0.02 AIN0	General purpose I/O Analog input
9	P1.15	General purpose I/O
10	P1.13	General purpose I/O
11	P1.14	General purpose I/O
12	P0.31 AIN7	General purpose I/O Analog input
13	P0.03 AIN1	General purpose I/O Analog input
14	P0.28 AIN4	General purpose I/O Analog input
15	P0.30 AIN6	General purpose I/O Analog input
16	P0.06	General purpose I/O
17	P0.08	General purpose I/O
18	P1.09 TRACEDATA3	General purpose I/O Trace buffer TRACEDATA[3]
19	P0.12 TRACEDATA1	General purpose I/O Trace buffer TRACEDATA[1]
20	P0.11 TRACEDATA2	General purpose I/O Trace buffer TRACEDATA[2]
21	P1.08	General purpose I/O
22	P0.18 nRESET	General purpose I/O Configurable as pin RESET
23	P0.16	General purpose I/O
24	P0.14	General purpose I/O
25	P0.19	General purpose I/O
26	VBUS	5 V input for USB 3.3 V regulator
27	P0.21	General purpose I/O
28	P0.23	General purpose I/O
29	P1.00	General purpose I/O
30	P1.01	General purpose I/O
31	P1.03	General purpose I/O
32	P0.25	General purpose I/O
33	P1.05	General purpose I/O
34	P1.07	General purpose I/O

35	P1.04	General purpose I/O
36	P1.02	General purpose I/O
37	SWDIO	Serial wire debug I/O for debug and programming
38	SWDCLK	Serial wire debug clock input for debug and programming
39	P1.06	General purpose I/O
40	P0.09 NFC1	General purpose I/O NFC antenna connection
41	P0.10 NFC2	General purpose I/O NFC antenna connection
42	P0.29 AIN5	General purpose I/O Analog input
43	P0.07 TRACECLK	General purpose I/O Trace buffer clock
44	P0.05 AIN3	General purpose I/O Analog input
45	P0.27	General purpose I/O
46	P0.26	General purpose I/O
47	P0.04 AIN2	General purpose I/O Analog input
48	D-	USB D-
49	D+	USB D+
50	P0.13	General purpose I/O
51	P0.15	General purpose I/O
52	P0.17	General purpose I/O
53	P0.20	General purpose I/O

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.

	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_{IO} , VDD ≤ 3.6 V		-0.3	VDD + 0.3	V
V_{IO} , VDD > 3.6 V		-0.3	3.9	V
NFC antenna pin current				
$I_{NFC1/2}$			80	mA
Radio				
RF input level			10	dBm
Environmental aQFN™ 73 package				
Storage temperature		-40	+125	°C
MSL	Moisture Sensitivity Level		2	
ESD HBM	Human Body Model		2	kV
ESD HBM Class	Human Body Model Class		2	
ESD CDM	Charged Device Model		450	V

Environmental QFN48 package

Storage temperature		-40	+125	°C
MSL	Moisture Sensitivity Level		2	
ESD HBM	Human Body Model		4	kV
ESD HBM Class	Human Body Model Class		3A	
ESD CDM	Charged Device Model		1	kV

Environmental WLCSP 3.544 x 3.607 mm package

Storage temperature		-40	+125	°C
MSL	Moisture Sensitivity Level		1	
ESD HBM	Human Body Model		1	kV
ESD HBM Class	Human Body Model Class		1C	
ESD CDM	Charged Device Model		500	V





Flash memory

Endurance		10 000		write/erase cycles
Retention at 85 °C		10		years




6. List of Holyiot module



Part No.	Nordic chip	Holyiot No.	PA	Antenna	Picture
Part No.	Nordic chip	Holyiot No.	PA	Antenna	Picture
1	nRF51822	Holyiot-17085-PA	✓	IPX antenna	
2	nRF51822	YJ-15011-nRF51822	×	PCB antenna	
3	nRF51822	YJ-14015-nRF51822	×	PCB antenna	
4	nRF52832	YJ-16048-nRF52832	×	PCB antenna	

5	nRF52832	YJ-17029-nRF52832	✓	Ceramic antenna	 
6	nRF52832	YJ-16002-nRF52832	✗	PCB antenna	 
7	nRF52832	YJ-17024-nRF52832	✓	IPX antenna	 
8	nRF52832	YJ-17095-nRF52832	✗	Ceramic antenna	 
9	nRF52832	YJ-17017-USB	✗	Ceramic antenna	 
10	nRF52832	YJ-17076-USB	✗	PCB antenna	 
11	nRF52840	YJ-17120-USB	✗	PCB antenna	 
12	nRF52840	YJ-18010-nRF52840	✗	Ceramic antenna	 

13	nRF52840	YJ-18039-nRF52840	×	IPX antenna & PCB antenna	
14	nRF52840	HOLYIOT-19059- nRF52840	√	IPX antenna & PCB antenna	

holyiot