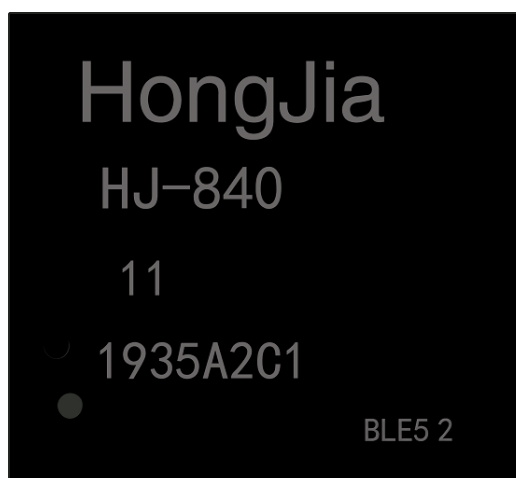


**HJ-840 Chip-level High Performance Ultra-small  
(6.2mmx7mmx0.9mm Ultra-thin, Built-in Long-distance  
antenna) Ultra-low Power BLE5.2 Module Data Sheet  
V1.3**

**Module model: HJ-840 (based on NRF52840)**



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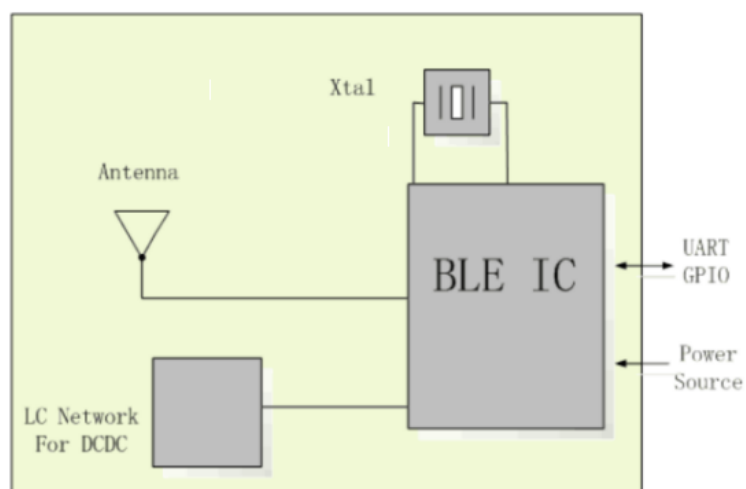
# 1、Characteristics

- Operating Frequency: 2.4GHz, Support ISM free Frequency band
- Support BLE 5.2, embedded low energy Bluetooth protocol stack and GATT service
- Transmitting Power: -20 - +8dBm
- Receiver sensitivity: -96dBm
- Transmit peak current < 4.8mA @0dBm
- **Built-in long-distance high-performance antenna (can also be connected externally)**
- Supply voltage range: 1.7V-5.5V
- Support BLE master-slave integration (Master and slave work at the same time without affecting each other)
- Ultra-low power consumption:
  - ✓ Sleep current < 2 $\mu$ A
  - ✓ 1Second broadcast current: 12uA
  - ✓ 2Second broadcast current: 7uA
- GPIO max: 48
- ***On-board long-distance high-performance antenna Open ground distance: 50-80 meters @ 0dBm***
- Support connect to an external antenna
- Size: 6.2mm \* 7mm \* 0.9mm (Ultra-thin, built-in antenna inside) ,Weight:0.3g, Comply with ROHS standards
- Pad pitch: 0.65mm, Package: LGA64
- Automotive grade operating temperature range: -40 - +105 $^{\circ}$ C (Maximum limit stable temperature +120 $^{\circ}$ C)

## 2、 Part Number

Type	Model	Description
Standard Edition	HJ-840	Standard bare modules, customers need to use Nordic SDK for development and use.

## 3、 Internal Structure



## 4、Electrical Parameters

### 4.1、Absolute Maximum Range

Table 4-1 Absolute maximum ratings

Parameter	MIN	MAX	Unit
Power Supply Voltage (VCC)	1.7	5.5	V
IO Supply Voltage	0	VCC	V
Operating Temperature	-45	+120	°C
Storage Temperature	-55	+150	°C

### 4.2、Recommended Operating Conditions

Table 4-2 Recommended operating conditions

Parameter	MIN	TYP	MAX	Unit
Power Supply Voltage (VCC)	1.8	3.3	5.5	V
IO Supply Voltage	0	3.3	VCC	V
Dormant working current		<2.0		μA
Maximum Operating Current		6.0		mA
Operating Temperature	-40	+25	+105	°C

### 4.3、I/O DC Characteristics

Table 4-3 I/O DC Characteristics

I/O Pin	Driving Capability	MIN	MAX	Unit
Input low voltage		0	0.4	V
Input high voltage		0.7	VCC	V
Output low voltage	5mA	0	0.6	V
Output high voltage	5mA	3.3	VCC	V

## 4.4、RF Features

Table 4-4 RF Features

Attribute	Value	Remarks
Modulation	GFSK	
Frequency range	2.402 ~ 2.480Ghz	Bandwidth: 2Mhz
Number of channels	40	
Air speed	1Mbps、 2Mbps、 125Kbps	
RF Port Impedance	50Ω	
Transmit Power	MAX: +8 dbm	
TX Current consumption	TYP: 4.8 mA	
RX Current consumption	TYP: 4.6 mA	
Receive sensitivity	TYP: -95dbm, MAX: -96dbm	
Antenna	Onboard long distance Antenna	External antenna can be used

## 4.5、Power Dissipation

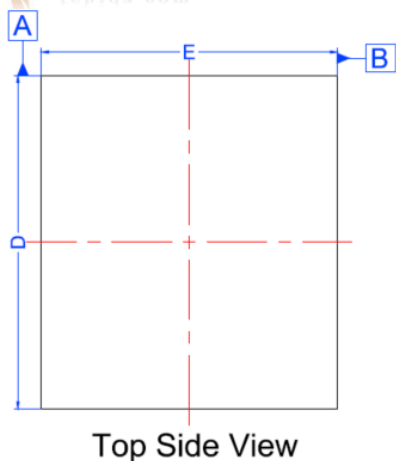
Table 4-5 Power Dissipation

Test conditions	@0dBm	TYP	Unit
Dormancy mode		2.0	μA
20ms Interval Broadcasting in Slave Mode		55	μA
1S Interval Broadcasting in Slave Mode		12	μA
20ms Connection Gap Holding Connection in Slave Mode		190	μA
Scanning in Host Mode		4.5	mA
20ms Connection Gap Holding Connection in Host Mode		180	μA

## 5、 Hardware specification

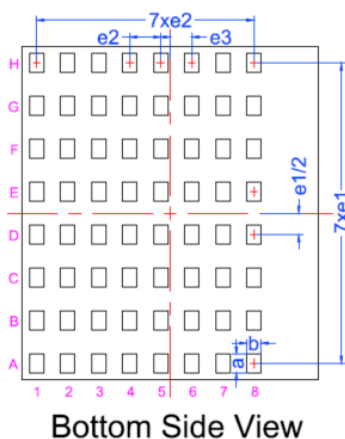
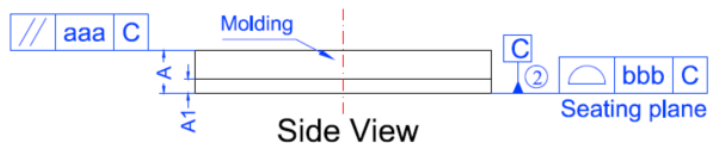
Package	LGA	
Pad pitch	0.65mm	

### Package and dimensions (Scale 1:1)



DIMENSIONAL REFERENCES Units:mm

SYMBOL	DIMENSIONAL REQMTS			SYMBOL	Tolerance of Form & Position
	MIN	NOM	MAX		
A	0.86	0.90	0.94	aaa	0.10
A1	0.27	0.30	0.33	bbb	0.10
D	6.90	7.00	7.10		
E	6.10	6.20	6.30		
a	0.35	0.40	0.45		
b	0.25	0.30	0.35		
e1	0.90 REF				
e2	0.65 REF				
e3	0.45 REF				



Pin correspondence table

	1	2	3	4	5	6	7	8
A	GND	P1.01	P0.21	P0.20	P0.17	P0.14	ANT	BOARD_ANT



<b>B</b>	P0.22	P1.04	P1.07	P0.09	P1.05	P0.24	P1.06	P1.14
<b>C</b>	P0.25	SWDIO	SWCLK	DEC5	P0.10	P0.13	P1.11	P1.12
<b>D</b>	P0.19	P1.00	P1.02	P1.03	P0.23	P1.10	P1.13	P0.31
<b>E</b>	P0.18/RESET	P0.15	P0.16	P1.08	P1.15	P0.02	P0.28	P0.03
<b>F</b>	D+	VBUS	P0.11	P0.07	P0.27	P0.00	P0.30	P0.29
<b>G</b>	D-	DECUSB	P0.12	P1.09	P0.05	P0.01	P0.26	P0.06
<b>H</b>	DCCH	VDDH	VDD	VDD	P0.08	DEC1	P0.04	GND

## 6、 Notice for Hardware Design

A. The module should not be placed in a metal-based enclosure. If a metal enclosure is required, the antenna must be lead out.

B. Among the products that need to install this wireless module, some metal materials such as screws, inductors, etc. should be kept away from the RF antenna part of the wireless module.

C. On the wireless module antenna, Do not place other components. Because other components can degrade wireless performance.

D. Place the wireless module on the peripheral edge of the motherboard as much as possible. The antenna part should be close to the side or corner of the motherboard. The motherboard PCB under the module antenna should be hollowed out with the keepout layer. If hollowing is prohibited, copper or wiring is not allowed under the antenna. Otherwise it will affect RF performance.

E. Please pay attention to the pin diagram for all pins. Please pay attention to the IO mode and status of the IO connected to it.

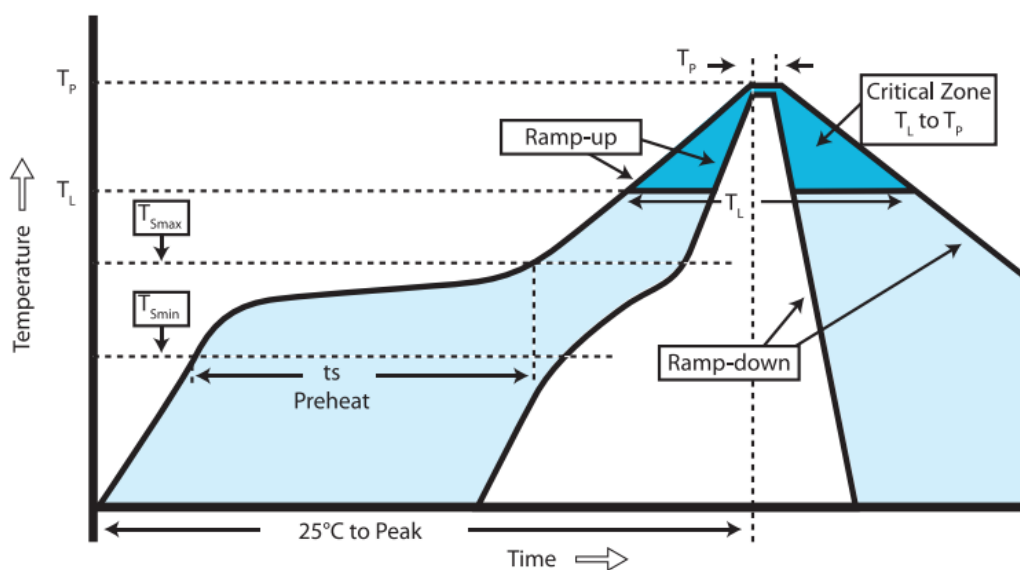
F. GND must be sound grounding.

G. It is recommended that magnetic beads or inductance filters be applied to the input power supply.

## 7、Reflow Soldering Information

HJ-840 module use high temperature resistant materials, manufacturing by Lead-free Process. The maximum temperature resistance is 265°C. Ten continuous reflow soldering has no effect on properties and strength, details as follows:

Parameter	Value
Features	Lead-free process
Average ramp up rate( $T_{S\text{MAX}}$ to $T_p$ )	3°C/sec. max
Temperature Min( $T_{S\text{min}}$ )	150°C
Temperature Max( $T_{S\text{max}}$ )	200°C
Preheat time (Min to Max) (tS)	80~100sec.
Peak Temperature ( $T_p$ )	250±5°C
Ramp-down Rate	6°C/sec. max
Time 25°C to Peak Temp ( $T_p$ )	8 min. max



## 8、 Packaging method

(Relevant pictures of tape packaging and the size information of the tape)

8.1、 Sealed with chip-level anti-static aluminum foil bag, each bag contains desiccant, use industrial grade vacuum machine to ensure airtight, moisture-proof, waterproof and dustproof (IP65). (As shown below)



8.2、 All packages will be labeled with goods information. All packages will be marked with the cargo information, including ROHS and anti-static signs. The production batch information in the item number is 15 bits.

TangShan HongJia Electronic Technology Co., Ltd. <b>HJ-840</b> Pb Free Reflow(260℃) DATE CODE:P16aI15bS17c001 QTY:500PCS SEAL DATE:20170504
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Remarks:P16a I15b S17c001 represents PCB production in January 2016, IC production in February 2015, and SMT patch in the first time in March 2017.

## 9、FCC Warning

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

### 2.2 List of applicable FCC rules

FCC Part 15.247

### 2.3 Specific operational use conditions

This transmitter/module and its antenna(s) must not be co-located or operating in conjunction with any other transmitter. This information also extends to the host manufacturer's instruction manual.

### 2.4 Limited module procedures

not applicable

### 2.5 Trace antenna designs

It is "not applicable" as trace antenna which is not used on the module.

### 2.6 RF exposure considerations

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This compliance to FCC radiation exposure limits for an uncontrolled environment, and minimum of 20cm separation between antenna and body.

The host product manufacturer would provide the above information to end users in their end-product manuals.

### 2.7 Antennas

PCB antenna; 3.2dBi; 2.402 GHz~2.480GHz

### 2.8 Label and compliance information

The end product must carry a physical label or shall use e-labeling followed KDB784748D01 and KDB 784748 stating "Contains Transmitter Module FCC ID: 2AGPMHJ-840".

### 2.9 Information on test modes and additional testing requirements

For more information on testing, please contact the manufacturer.

### 2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

## FCC Statements

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.109) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

The final host device, into which this RF Module is integrated" has to be labeled with an auxiliary label stating the FCC ID of the RF Module, such as "Contains FCC ID: 2AGPMHJ-840

"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."

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

the Integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into the host device.

## Module statement

The single-modular transmitter is a self-contained, physically delineated, component for which compliance can be demonstrated independent of the host operating conditions, and which complies with all eight requirements of § 15.212(a)(1) as summarized below.

- 1) The radio elements have the radio frequency circuitry shielded.
- 2) The module has buffered modulation/data inputs to ensure that the device will comply with Part 15 requirements with any type of input signal.
- 3) The module contains power supply regulation on the module.
- 4) The module contains a permanently attached antenna.
- 5) The module demonstrates compliance in a stand-alone configuration.
- 6) The module is labeled with its permanently affixed FCC ID label.
- 7) The module complies with all specific rules applicable to the transmitter, including all the conditions provided in the integration instructions by the grantee.
- 8) The module complies with RF exposure requirements.

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