

HJ-580Nano

ultra-low power Bluetooth module, based on Dialog DA14580

Data Sheet version: V5.7



CATALOG

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1 Version History

Table 1-1 Revision history

No.	Version number	Release time	Reviser	Checker	Description
1	V5.2	20190705	ZDY	LMY	First edition
2	V5.3	20190730	ZDY	LMY	Update chapter definitions
3	V5.5	20190805	ZDY	LMY	Update the transmission distance within the radio frequency characteristics of Section 2.1 Update pin definition, P00, Reset and P11
4	V5.6	20200330	LMY	LJH	Update pin definition
5	V5.7	20231109	FJW	LMY	Update pages

2 Overview

2.1 Features

- Power supply: 2.5V(Cold boot, the minimum voltage for normal operation is 1.8V)~3.7V
- GPIO maximum number: 8
- on-board PCB antenna
- Optional 64K external EEPROM, can be used to save data or programs(SDA=P06, SCL=P07)

- Function
 - Embedded Bluetooth low energy protocol stack and GATT service
 - BLE supported master-slave integration
 - Supported WeChat, MiSDK. You also can develop your own firmware and download to the unprogrammed module.

- RF Features
 - Operating Frequency is 2.4GHz, support ISM free Frequency band
 - Maximum Transmit Power: 0dBm
 - High Receive sensitivity: -93dBm
 - On the open land, the wireless signal can spread more than 20 metres and less than 50 metres.

- Low Power Dissipation
 - Dormant current < 2uA
 - One second broadcast current: 11.5uA
 - Two second broadcast current: 6.3uA

- Size: 11mm*12mm(Built-in antenna inside)
- Welding pad with stamp hole pattern, pad spacing: 1.27mm
- Weight: 0.16g
- Operating temperature range: -40~85°C
- ROHS compliant

3 Hardware specification

3.1 Package and Dimensions

Size: 11mm*12mm, 14 welding feet, pad spacing is 1.27mm. Detailed dimensions are shown in the figure 3-1, 3-2.

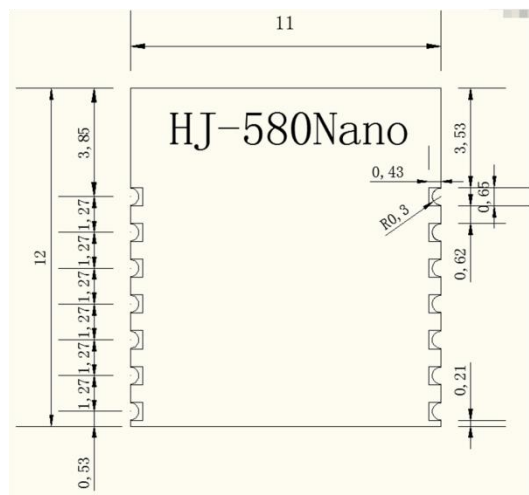


Figure 3-1 Dimensions picture

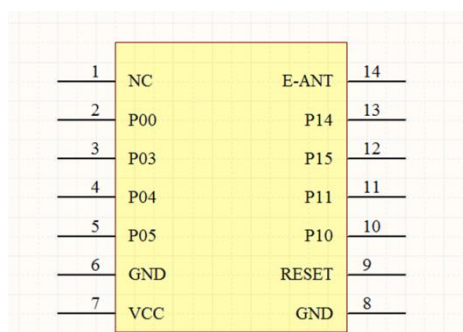


Figure 3-2 Pin diagrams

3.2 Pin Definition

Table 3-1 Pin definition table

Pin	Name	Type	Description	Remarks
1	NC			
2	Mode select (P00)	INPUT	Mode select: Input low: the module enter configuration mode.	Can be customized for other functions

			Input high or NC: the module enter Uart transparent transportation mode (Uart RX enable (P10) must be put to low.)	
3	APP Data ready (P03)	OUTPUT	After receiving data from mobile phone or other host, the module will pull the pin to low for about 20ms, then data will be output from the serial port TX pin, after complete data sending, the pin will automatically pull high.	Can be customized for other functions
4	BLE TX (P04)	UART TX	BLE Uart : TX pin	Can be customized for other functions
5	BLE RX (P05)	UART RX	BLE Uart : RX pin	Can be customized for other functions
6	GND	Power Ground	GND	
7	VCC	Power In	Power supply pin	Range =2.5V ~ 3.8V
8	GND	Power Ground	GND	
9	Reset	INPUT	Reset pin	When this pin is at high level, the module can be reset. Please refer to Section 3.5 to design the connection scheme of the Reset pin.
10	Uart RX enable (P10)	INPUT	Pull this pin to low at least 5ms When the external device needs to sent data to the BLE module, and then send the data to BLE module. (If power consumption is not considered, this pin can be pulled down or connected to GND.) After data sending completion, pull the pin high to save power.	Can be customized for other functions
11	Connection state indication (P11)	Connect status	Disconnected=High(1), connected=Low(0)	Can be customized for other functions
12	P15		NC	NOT USE
13	Master-slave selection	Master slave select	During power on, if P14=0, then enter host mode. If P14=1 or NC,	Can be customized for other functions

	(P14)		then enter slave mode.	
14	EX-ANT	RF out	RF Output Pin of External Antenna	Interface of external antenna

3.3 Internal Structure

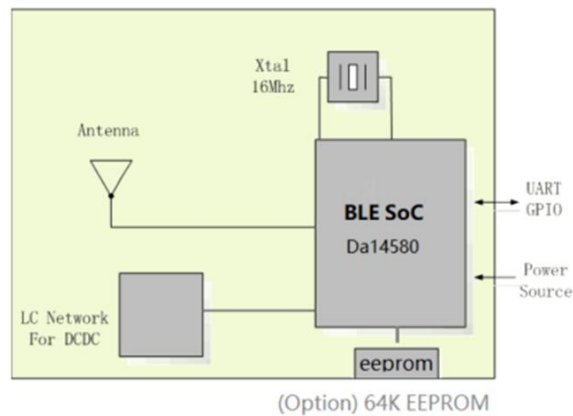


Figure 3-3 HJ-580Nano internal structure frame

3.4 Additional functions

HJ-580Nano optionally adds 64K EEPROM memory, it can be used to store some parameters, use as OTA storage, etc. If there is any need, please contact us. Thank you.

3.5 Reference Design

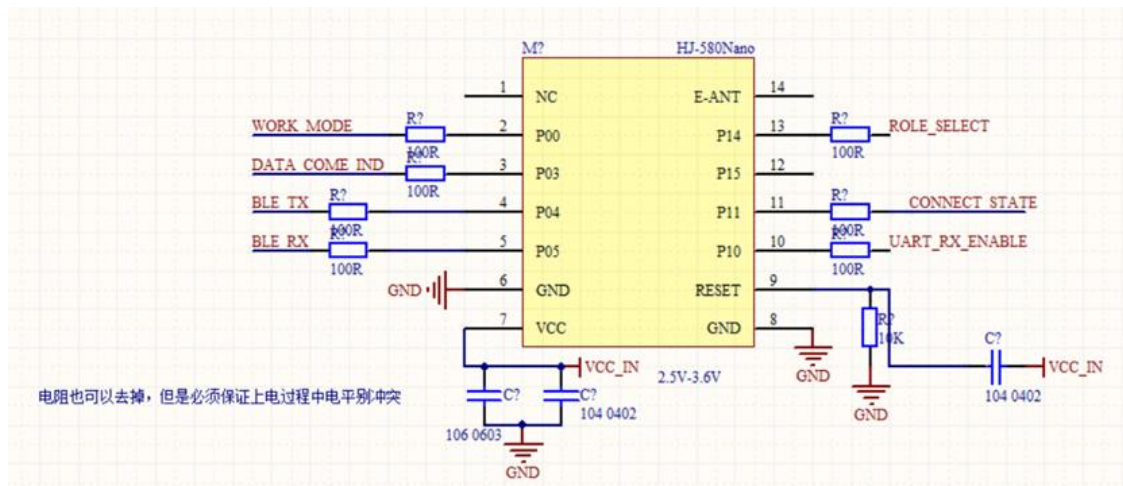


Figure 3-4 HJ-580Nano Reference design drawings

Tips: A.Unneeded pins can be suspended for handling. B.RST pin should be connected according to the diagram if conditions permit, externally add a 105 capacitor to Pin9, then a 1K-10K resistor is connected to GND. If the PCB space is really not available, RST can be suspended for handling or directly connected to GND.

3.6 Matters needing attention in the use of products

A. The module should not be placed in a metal-based enclosure. If a metal enclosure is required, the antenna must be taken 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. The wireless module should be placed on the four sides 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 the request cannot be hollowed out, no copper or trace is 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.

4 Electrical Parameters

4.1 Absolute Maximum Ratings

Table 4-1 Absolute maximum ratings

Parameter	MIN	MAX	Unit
Power Supply Voltage (VCC)	2.5	3.8	V
IO Supply Voltage	0	VCC	V
Vpp(OTP Program Voltage)	6.6	6.8	V
Operating Temperature	-40	+85	°C
Storage Temperature	-40	+85	°C

4.2 Recommended Operating Conditions

Table 4-2 Recommended operating conditions

Parameter	MIN	TYP	MAX	Unit
Power Supply Voltage (VCC)	2.6	3.3	3.7	V
Vpp(OTP Program Voltage)	6.6	6.7	6.8	V
IO Supply Voltage	0	3.3	3.4	V
Dormant working current		<2.0		μA
Maximum Operating Current		4.8		mA
Operating Temperature	-40	+25	+85	°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	4.8mA	0	0.6	V
Output high voltage	4.8mA	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	
RF Port Impedance	50Ω	
Transmit Power	MAX: +0dBm	
TX Current consumption	TYP: 4.8mA	
RX Current consumption	TYP: 5mA	
Receive sensitivity	TYP: -91dBm, MAX: -93dBm	
Antenna	Onboard PCB Antenna	

4.5 Power Dissipation

Table 4-5 Power Dissipation

Test conditions	TYP	Unit
Dormancy mode	1.5	μA
20ms Interval Broadcasting in Slave Mode	51.5	μA
1S Interval Broadcasting in Slave Mode	11.5	μA
20ms Connection Gap Holding Connection in Slave Mode	170	μA
Scanning in Host Mode	3.05	mA
20ms Connection Gap Holding Connection in Host Mode	175	μA

5 Reflow Soldering Information

Reflow soldering is recommended for welding.

HJ-580Nano 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. Specific parameters as shown in Table 5-1.

Table 5-1 Reflow soldering parameters

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) (t_S)	80~100secs.
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

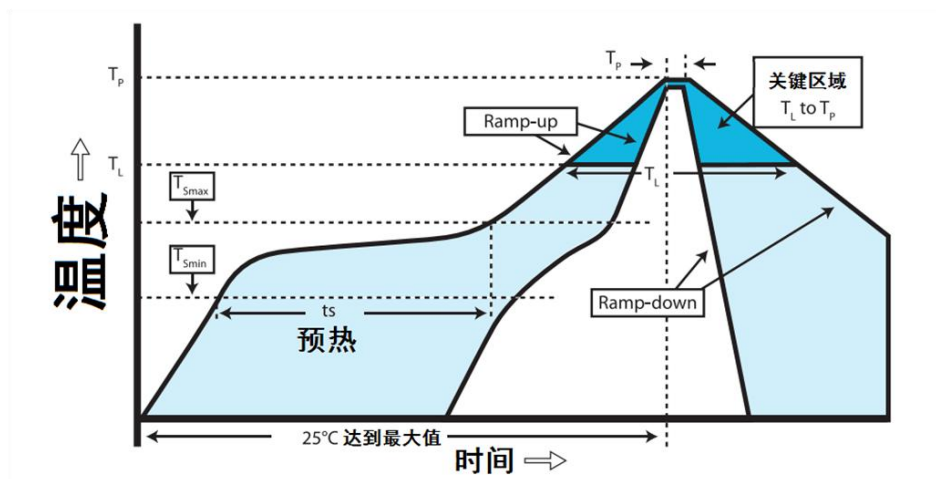


Figure 5-1 Temperature Curve of Reflow Welding

6 Notices for Ultrasound Welding

Warning: Please carefully consider using ultrasonic welding technology. If it is necessary to use ultrasonic welding technology, please use 40KHz high frequency ultrasound welding technology. Keep the module away from the ultrasonic soldering line and the fixing column during the design method to prevent damage to the module!

For specific ultrasonic welding matters, please contact our company for technical consultation.

7 Supply Information

7.1 Model Definition

Table 7-1 Model Definition

Type	Model	Description
Standard Edition of uart transparent transmission	HJ-580Nano_SPPv2	Include UART port transparent transmission firmware, the firmware module is a bridge between the Bluetooth device or the mobile phone and the MCU. The Customer does not need to understand the BLE protocol stack, and control the UART port command operation and the UART port data, and the operation is simple, short Development cycle to speed up product launch.
Custom version	HJ-580Nano_CUSv2	This version supports custom firmware, the customer proposes functions according to the product requirements, and we will customize the module with the special version firmware to supply the customer.
MI profile Version	HJ-580Nano_MICv2	This version of the firmware is similar to the "Custom Version", but it include Xiaomi MISDK certification protocol, other functional requirements are also customized according to customer requirements.
WeChat Edition of uart transparent transmission	HJ-580Nano_WSPPv2	This version of the firmware adds the WeChat serial port transparent transmission function based on the "Standard Edition of uart transparent transmission" version. The external GPIO can select the WeChat data transmission and reception method.
Customer development Version	HJ-580Nano_EMP	This version of the module has no built-in firmware, customer can develop their own firmware according to the Dialog official chip data sheet and support documents, and only need to provide firmware for us to burn.

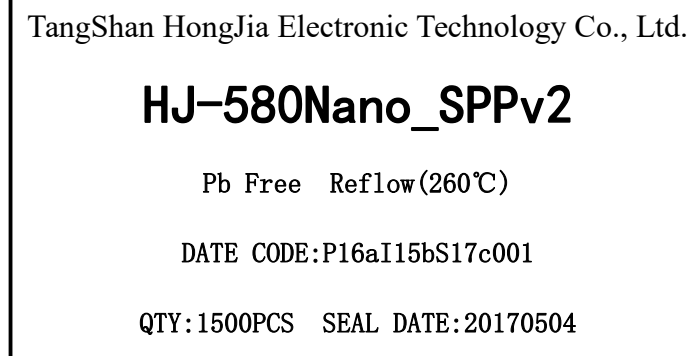
7.2 Packaging method

Packaging with tapes and reel. 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). The actual packing effect is shown in Figure 7-1.



Figure 7-1 External Packing Image

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.



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.

Figure 7-2 Label Sample Diagram

8 Appendixes

8.1 ROHS(TUV)

 Technical Report No. 68.420.18.1357.01 Dated 2018-12-04	
Client:	Tangshan Hongjia Electronic Technology Co., Ltd.
Address:	352 No. 2 # Building Power Springs In Qianxi County, Tangshan City, Hebei Province
Attn.:	Liu Ying
Sample Description:	Hongjia electronic bluetooth BLE4.2 ultra-low power module
Model No.:	HJ-580Nano
Brand name:	Hongjia
Sample Received Date:	2018-11-24
Test Period:	From 2018-11-24 to 2018-12-04
Location of Testing:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Purpose of examination:	Test according to RoHS (Restriction of Hazardous Substances) directive 2011/65/EU on submitted samples
Test Result:	Refer to following page(s)
Remark:	The result relates only to the items tested.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
TÜV SÜD Group

Prepared by:	Reviewed by:
 Will Zheng Project Handler	 Scarlett Liang Designated Reviewer



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