JS-BLMN5F31

Fihonest Bluetooth Module User Manual

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Revision History

Date	Version	Description	Author
2014-12-23	V1.0	n First Release	

CONTENT

1. INTRODUCTION

The JS-BLMN5F31 Bluetooth® module is a perfect solution for bluetooth low energy single mode application. It can be configured,command and contorlled via simple ASCII string with customer application embeded onto the unit. It is slim and light so the designers can have better flexibilities for the bluetooth low energy product shapes.

The JS-BLMN5F31 Bluetooth® module complies with Bluetooth® specification version 4.0(single mode). It includes integrated software stack,profiles,and AT modem like commands.It supports maximum bluetooth data rates via UART interface and provides PIO,I2C,SPI interface for external hardware requirement.

The detail information of JS-BLMN5F31 Bluetooth® module is presented in this document below.

1.1 Block Diagram

PCB Antenna

RF match

Crystal 16MHz

nRF51822

UART

PIO

I2C

SWD
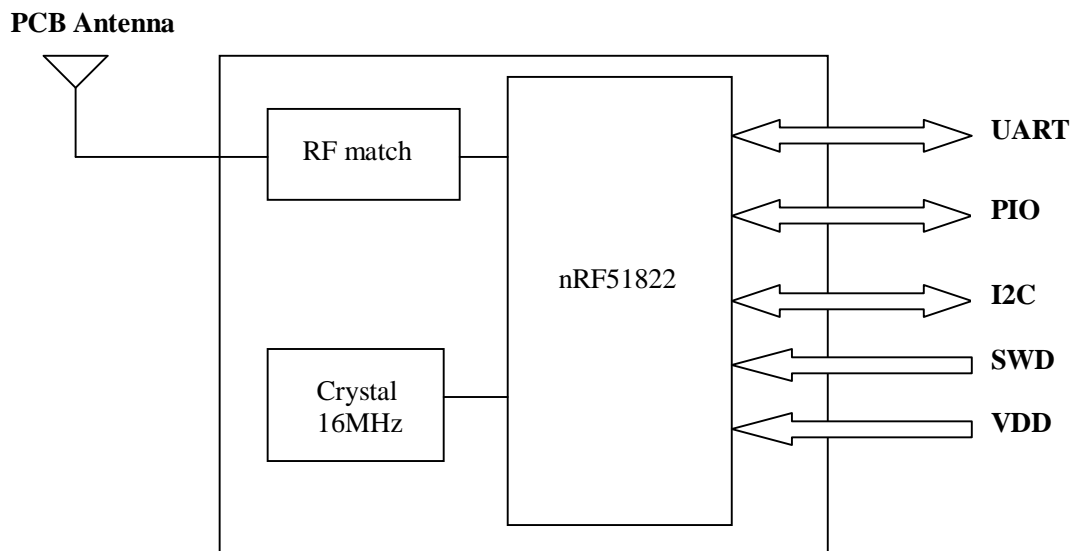
VDD

1.2 Features

ü Small overall dimension

ü Bluetooth specification V4.0(single mode)

ü Class 2 support

ü -93dBm sensitivity in Bluetooth low energy mode.

ü TX Power -20dBm to +4dBm

ü ARM Cortex-M0 32 bit processor,256KB Flash memory,16KB RAM
  n Serial Wire Debug (SWD)

ü Complete power-optimized stack,includeing contoller and host

ü Embedded *bluetooth* stack protocols and profiles include: GAP, GATT, SMP, ATT, L2CAP

ü Low power consumption *(13mA RX, 10.5mA TX, @ 0dBm)*

ü Ultra low current consumption,flexible power management
  n 0.4uA @ 3V off mode
  n 0.5uA @ 3V in off mode + 1 region RAM retention
  n 2.3uA @ 3V on mode,all blocks IDLE

ü Secure and robust communication link with billions of unique codes
  n FHSS (Frequency Hopping Spread Spectrum)
  n 24 bit CRC Error correction for guaranteed packet delivery
  n Lead Free design which is compliant with RoHS requirements

ü Flexible real-time counter and two 16 bit and one 24 bit times with counter mode

ü AES Coprocessor,random number generator,watchdog timer

ü Configurable I/O mapping (I/0 signals can use any pin,simple layout of external application)

ü Physical connection as SMD type

  ※ *Some features are optional for customization on demand.*

1.3 Application

- ü 2.4-GHz Bluetooth low energy Systems

- ü Human-interface devices (Keyboard, Mouse,Portable Devices, Remote Control)

- ü Sports and fitness devices (Heart rate monitor,Foot pod,Cycle speed/power/cadence)

- ü Mobile Phone Accessories

- ü Remote controller via BLE connection

- ü Health devices (Glucose meter)

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2. GENERAL SPECIFICATION

General Specification	
Chip Set	Nordic nRF51822
Module ID	JS-BLMN5F31
BT Standard	Bluetooth$^{®}$ V4.0 specification(single mode)
Frequency Band	2.402GHz~2.480GHz ISM Band
Modulation	GFSK, 250 KHz deviation
Number of channels	40 channels for Bluetooth Low Energy
Output Power(Class II)	0±1dBm(L ch), -1±1dBm(M ch),-1±1dBm(H ch)
Receive sensitivity	-90dBm @ 0.1% BER
Baseband Crystal OSC	32MHz,32.768KHz(optional)
RF Input Impedance	50 ohms
Host Interface	l UART l I2C l PIO l SWD
Temperature	-20ºC to +70ºC

3. PHYSICAL CHARACTERISTIC

GND	1	
VDD		
P0.25		
P0.26		
P0.27		
P0.28		
P0.29	7	

15	P0.19
	P0.18
	P0.17
	SWCLK
	SWDIO
	P0.12
	P0.09
8	P0.08
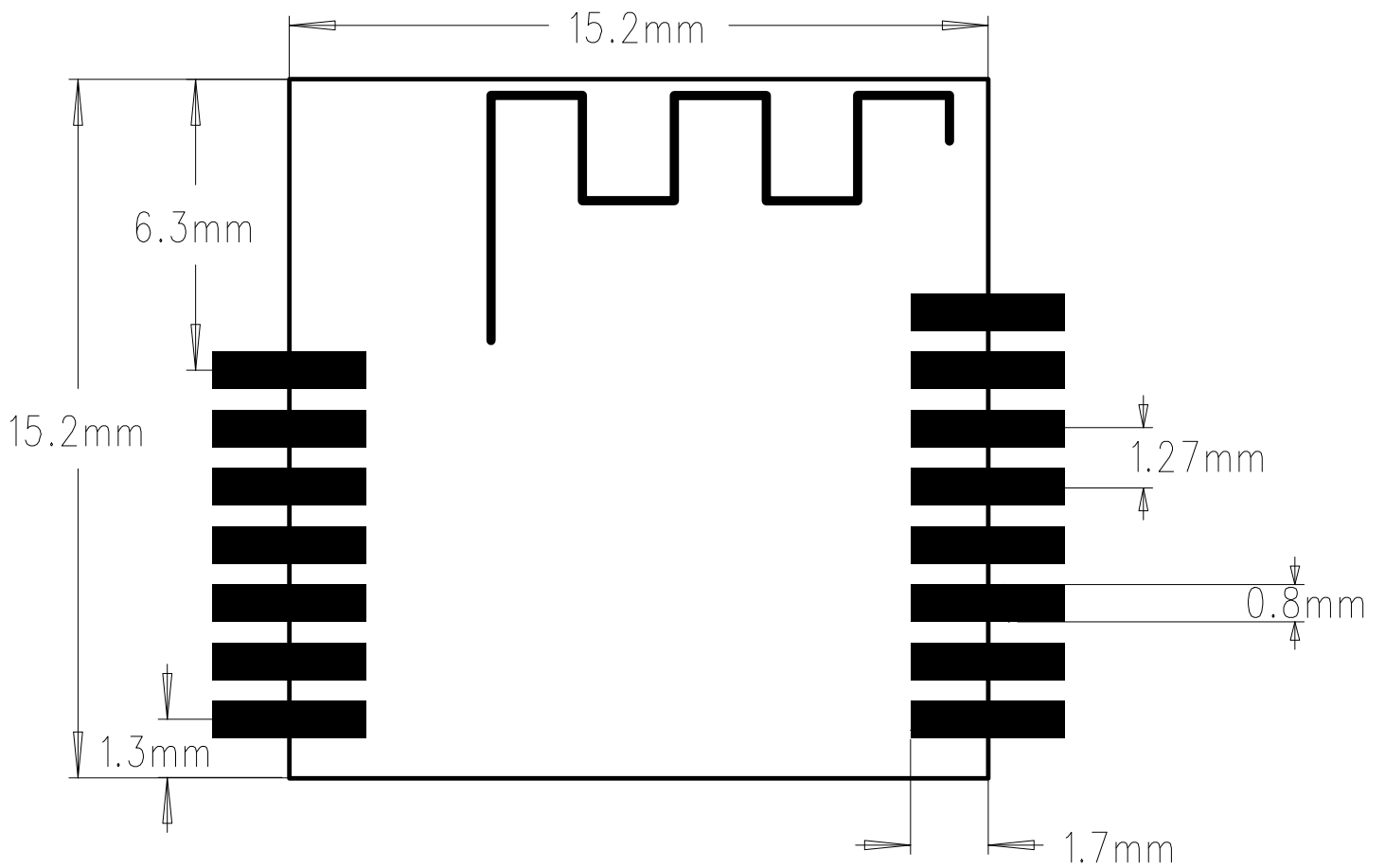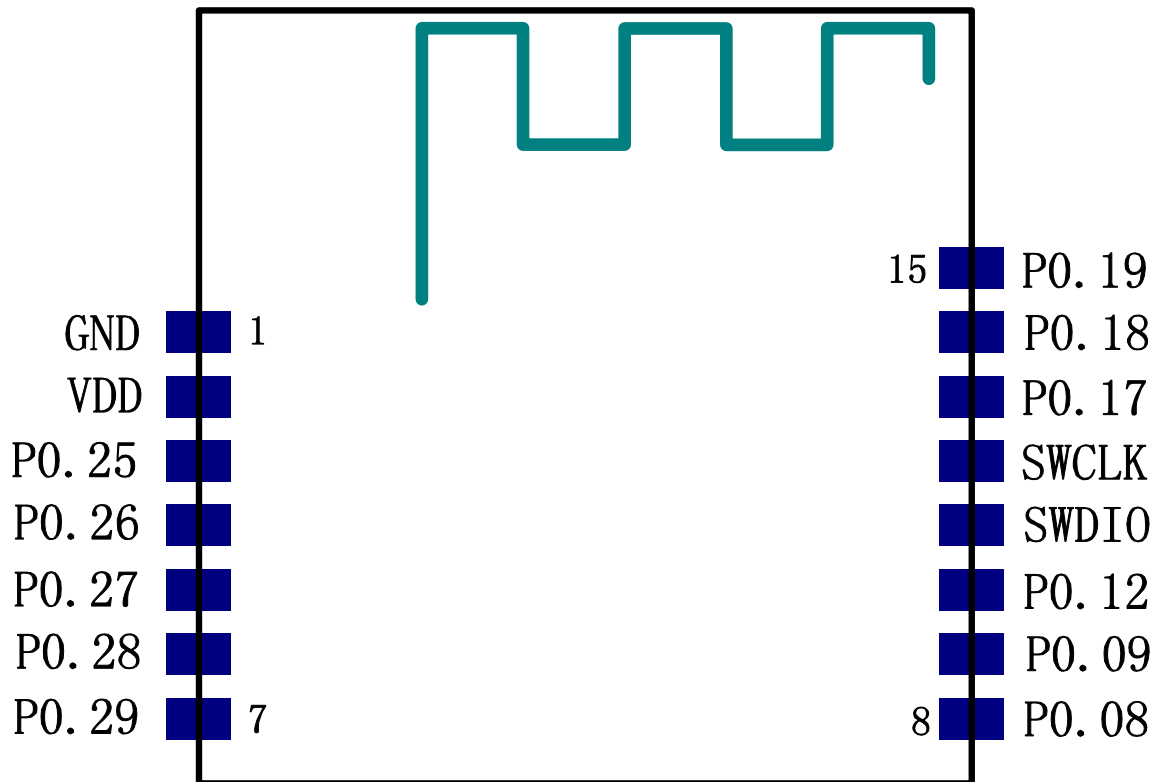
3.1 Pin Description

Pin#	Pin Name	Pin Type	Description
1	GND	Ground	Ground
2	VDD	Power	Power Supply
3	P0.25	Digital I/O	General purpose I/O
4	P0.26	Digital I/O	General purpose I/O
5	P0.27	Digital I/O	General purpose I/O
6	P0.28	Digital I/O	General purpose I/O
7	P0.29	Digital I/O	General purpose I/O
8	P0.08	Digital I/O	General purpose I/O
9	P0.09	Digital I/O	General purpose I/O
10	P0.12	Digital I/O	General purpose I/O
11	SWDIO	Digital I/O	Debug and flash programming I/O
12	SWCLK	Digital input	Debug and flash programming I/O
13	P0.17	Digital I/O	General purpose I/O
14	P0.18	Digital I/O	General purpose I/O
15	P0.19	Digital I/O	General purpose I/O

4. PHYSICAL INTERFACE

4.1 Power Supply

The transient response of the regulator is important. If the power rails of the module are supplied from an external voltage source, the transient response of any regulator.

4.2 General Purpose IO

There are nine general purpose digital IOs defined in the module. It can configure whether peripheral modules control certain pins or whether they are under software control, and if so, whether each pin is configured
as an input or output and if a pullup or pulldown resistor in the pad is connected. Each peripheral that connectsto the I/O pins can choose between two different I/O pin locations to ensure flexibility in various applications.

4.3 UART

This is a standard UART interface for communicating with other serial devices. The UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol.
When the module is connected to another digital device,UART_RX and UART_TX transfer data between the two devices.

4.4 I2C

Any three PIOs can be used as a master I^{2}C interface by configuring the hardware bit serialiser with suitable firmware. The strong pull-ups in the PIO pads eliminate the need for external pull-up resistors.

4.5 Debugger Support

The two pin Serial Wire Debug (SWD) interface provided as a part of the Debug Access Port (DAP) offers a flexible and powerful mechanism for non-intrusive debugging of program code. Breakpoints and single stepping are part of this support.

5. ELECTRICAL CHARACTERISTIC

5.1   Absolute Maximum Ratings

Description	Min	Max	Unit
Supply voltage	-0.3	3.9	V
Voltage on any digital pin	-0.5	VDD+0.3<=3.9	V
Storage temperature range	-40	125	ºC

5.2   Recommended Operating Conditions

Description	Min.	Typ.	Max.	Unit
VDD pin operating supply	2.0	3.3	3.6	V
Operating temperature	-20	25	70	ºC

5.3   RF Performance

Description	Min.	Typ.	Max.	Unit
Maximum output power	-20	0	4	dBm
Sensitivity(0.1%BER) @1Mbps		-90		dBm

5.4   Power consumptions

Test conditions: T_A = 25°C, VDD = 3.3 V and f_c = 2440 MHz,
1 Mbsp, GFSK, 250-kHz deviation, Bluetooth™ low energy Mode, 1% BER[1]

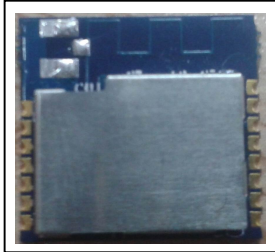| Description	Min	Type	Max	Unit
TX mode,0dBm		10.5		mA
RX mode,0dBm		13		mA
System-on base current		2.3		uA

6. PACKAGING INFORMATION

1. BLUETOOTH® Module: JS-BLMN5F31

Note: Warning

  This device and its antenna must not be located or operating in conjunction with any other antenna and transmitter.

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 not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

  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

Important announcement

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following" Contains TX FCC ID: 2AB2RJS-BLMN5F31

". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of 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.

To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a portable exposure condition must not exceed -1dBi.

A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

The end product with an embedded Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

Do not simultaneously emit.