

利尔达科技集团股份有限公司

LIERDA SCIENCE & TECHNOLOGY GROU P CO. , LTD

LSD1BT-STBLEPCB

Product manual



Product Name: BlueNRG-A Bluetooth module PCBA

P/N: LSD1BT-STBLEPCB

Document version: V4.0

Revision history

Product Name	BlueNRG-A Bluetooth module PCBA	Product Type		LSD1BT-STBLEPCB	
Editor	Qiumg	Date		20170726	
No.	Revision record	Modifier	Auditor	Versions	Date
1	Initial release	Liuzh		V1.0	20161012
2		Liuzh		V1.1	20161210
3	Add descriptions of product information; Modify partial data; Add figure comments	Marco Qiu		V2.0	20170726
4	The module power is divided into BAT1 and BAT2 in pin definition	Marco Qiu		V3.0	20171225
5	Add FCC&CE Information	Marco Qiu		V4.0	20180108
6		Marco Qiu		V5.0	20180118

Information

Part Number	Description	Package Size
LSD1BT-STBLEPCB	The PN is pure hardware without shield or any firmware. Please contact us if there is other requirements for second development of end users.	13mm*10mm*2.3mm
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The Label



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.

Contents

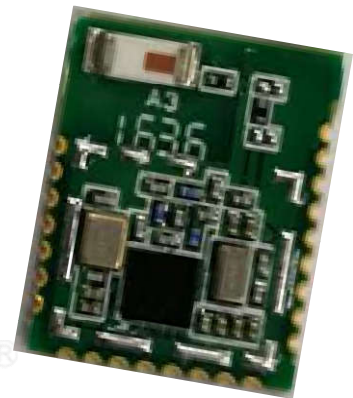
1 Features	5
2 Specifications	6
3 Hardware	7
3.1 Dimensions Diagram	7
3.2 Pin Description	8
4 Applications	9
4.1 Application circuit	9
4.2 Precautions	10
4.3 Download and Debug	10
4.4 Development board	10
4.5 Reference manual	10
5 Federal Communications Commission (FCC) Interference Statement	11
Note	12



1 Features

The low-power Bluetooth module is a high-performance Bluetooth SOC solution based on ST's BLUENRG-134 chip, which is a compact, practical and convenient, high integration module with stamp-type interface. The module provides a complete wireless solution and perfect support for customers application development, saving the trouble of complicated RF hardware design, development and production. With modular ceramic antenna, the product has the feature of low power consumption, small size, anti-interference ability and etc..

- High performance 32M and 32.768K Crystal
- 160K Flash /24-KB RAM
- 32-bit, ARM® Cortex®-M0
- Support for 14 GPIOs
- BLE SOC
- 13mm*10mm



2 Specifications

Table1: Module Parameters

Parameters	performance		Note
Working voltage	1.7V~3.6V		
Working temperature range	-40°C~85°C		
Frequency range	2400MHz~2483.5MHz		
Modulation scheme	GFSK		
RF channel center frequency	2402M--2480M(Ch0 -- Ch39)		Channel spacing 2M
Tx Power	8--10dBm		Typical value 9dBm
Tx current	8.6mA		Typical value 8.6mA @3.3V 0 dBm
Rx current	8.1mA		Typical value 8.1mA @3.3V
Sensitivity	-84dBm		
Power consumption	Sleep mode	0.9uA	32 kHz XO
	Sleep mode	2.1uA	32 kHz RO
	Standby mode	500nA	Standby
Transmission distance(Open area and 0dBm)	>15m		See Notes
Dimensions	13mm*10mm*2.3mm		Length * width * height
Antenna			
Antenna Type	Multilayer Chip Antenna		
Average Gain (XZ-V)	-0.5 dBi typ		Peak Gain 0.5 dBi typ
Dimensions (L × W)	3.2× 1.6 mm		

Notes: "Transmission distance" is subject to surrounding environment, air humidity and other factors, for reference only.

3 Hardware

3.1 Dimensions Diagram

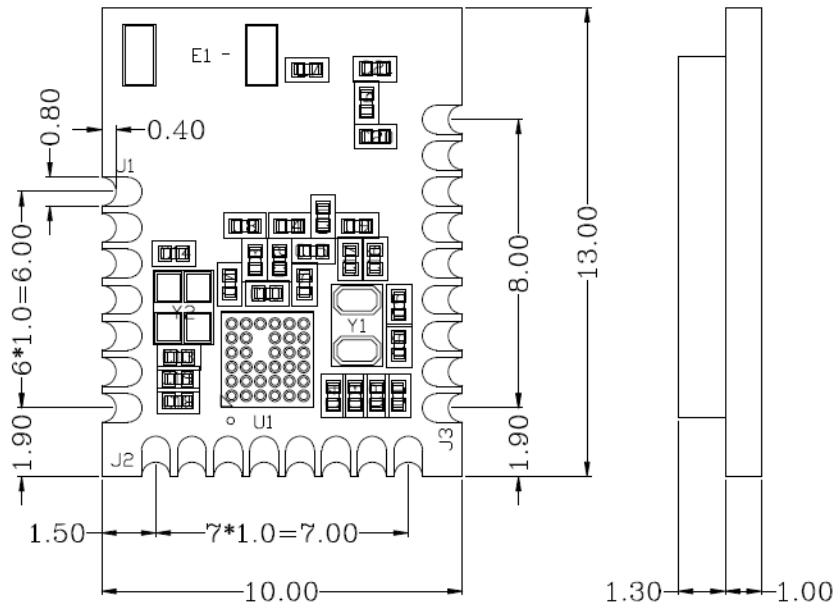


Figure 1: Dimensions Diagram

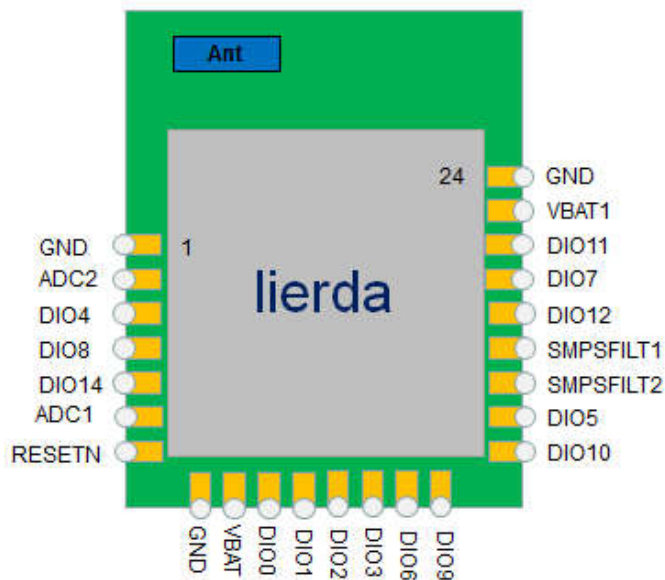


Figure 2: Pin Diagram

3.2 Pin Description

Pin Number	Pin Name	Type	Description
1	GND		Ground reference
2	ADC2	GPIO	ADC2
3	DIO4	GPIO	UART_RXD
4	DIO8	GPIO	UART_TXD
5	DIO14	GPIO	I2C1_CLK
6	ADC1	GPIO	ADC1
7	RESETN		Reset Pin
8	GND		Ground reference
9	BAT1	Power	1.7~3.6V
10	DIO0	GPIO	UART_CTS [®]
11	DIO1	GPIO	UART_RTS
12	DIO2	GPIO	PWM0
13	DIO3	GPIO	PWM1
14	DIO6	GPIO	UART_RTS
15	DIO9	GPIO	SWCLK
16	DIO10	GPIO	SWDIO
17	DIO5	GPIO	UART_TXD
18	SMPSFILT2	GPIO	DC-DC
19	SMPSFILT1	GPIO	DC-DC
20	DIO12	GPIO	I2C1_CLK
21	DIO7	GPIO	I2C2_DAT
22	DIO11	GPIO	UART_RXD
23	BAT2	Power	1.7~3.6V
24	GND		Ground reference

For more details, refer to BlueNRG-1DataSheet.

<http://www.st.com/content/ccc/resource/technical/document/datasheet/group3/ac/c1/ad/80/54/fa/49/9d/DM0>

4 Applications

4.1 Application circuit

Active DC-DC Converter:

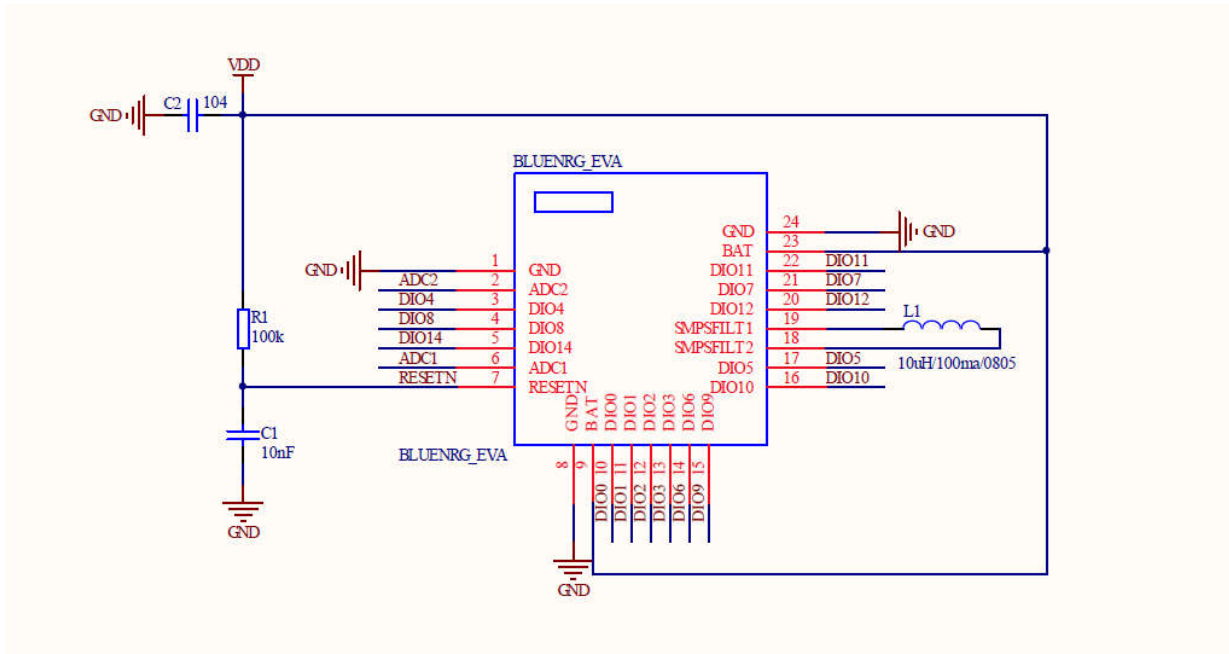


Figure 3: Application circuit: active DC-DC converter

Non-active DC-DC Converter:

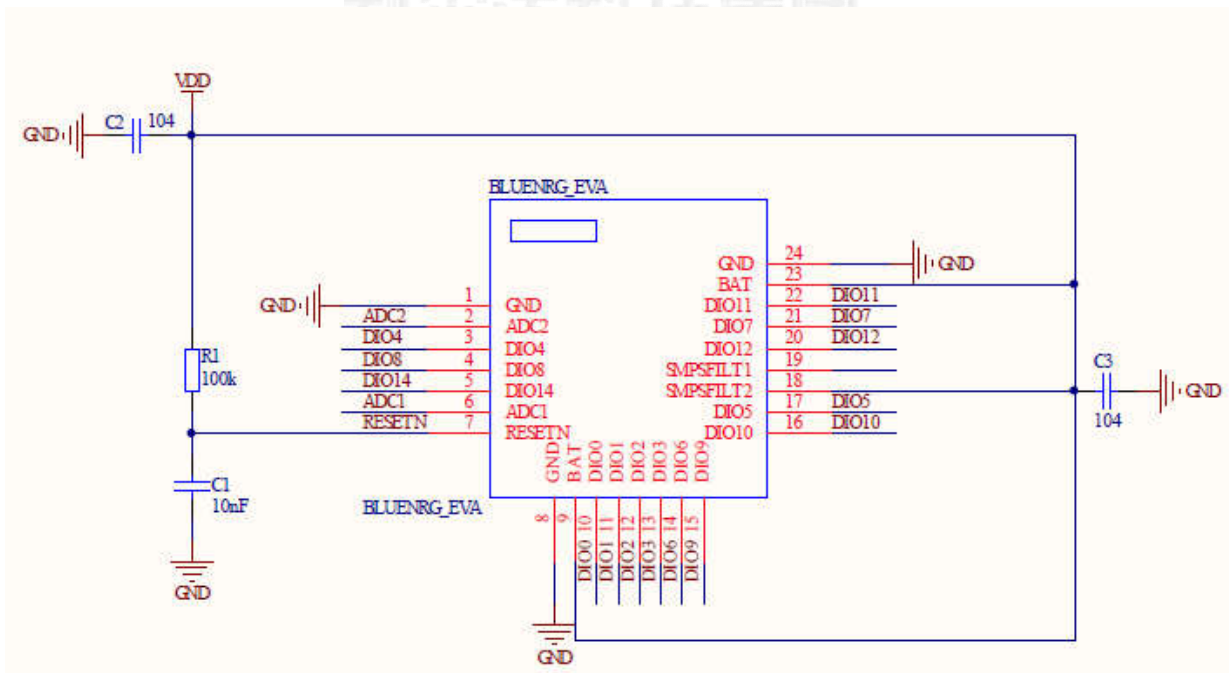


Figure 4: Application circuit: non active DC-DC converter

Active DC-DC Converter will greatly reduce system power consumption, but will affect

sensitivity of the system. Using an internal LDO increases sensitivity, but system power consumption will be slightly higher.

4.2 Precautions

To ensure the module's RF performance in the application of its maximum possible effectiveness, the user should follow the following principles:

1. It is recommended to supply the module with DC power supply. The power supply ripple coefficient should be as small as possible. The module should be reliably grounded. Please pay attention to the correct connection of positive and negative poles of the power supply. If the connection is reversed, the module may be damaged permanently.
2. Module recommendations placed on the edge of the floor open space, the antenna should be outward;
3. The module under the antenna PCB (double-sided board and multi-layer board) need clearance, can not be deposited copper, that is all the layout layer below the antenna can not have grounding or signal trace;
4. It is better to keep metal parts away from the antenna, or module communication distance in different environments will be shortened at different degrees. Please refer to recommended locations in following figure:

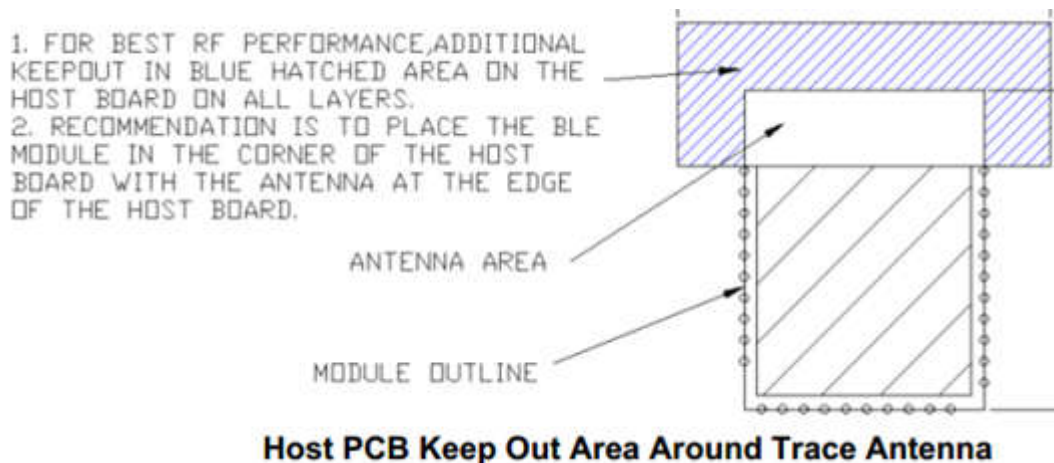


Figure4: Module recommended placement

4.3 Download and Debug

The module supports the ARM serial wire debug (SWD) port, the SWD port pin is DIO9(SWCLK),DIO10(SWDIO).Through J-link or ST-LINK, you can download and debug. When the module is power up or hardware reset, if DIO7 is high, you can enter the boot mode, the module is not available at this time, the module can be programmed through the serial port code.

4.4 Development board

Refer to LSD1RF-EVBGP001 data.

4.5 Reference manual

BlueNRG-1_GATT_database_size.pdf
BlueNRG-1_Over_The_Air_Bootloader.pdf
BlueNRG-1_UART_bootloader_protocol.pdf
PM0257-BlueNRG-1 BLE stack programming guidelines.pdf
AN4820-BlueNRG-1 low power modes.p

5 Federal Communications Commission (FCC) Interference Statement

This equipment has been tested and found to comply with the limits for a Class C 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.

Note: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Note

Welcome to use Lierda products, please read this notice before using our products. If you have already used them, it means that you have read and accepted this notice.

Lierda reserves the right to interpret and modify all information contained herein without prior notice.

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