Shanghai ChargeDot New Energy Technology Co.,Ltd

LSD1BT-STSHLZ02

Product manual

Product Name: SHLZ Bluetooth transmission module 5.0

P/N: LSD1BT-STSHLZ02

Document version: V2.0

Revision history

Product Name	SHLZ Bluetooth transmission module 5.0	Product Type		LSD1BT-STSHLZ02	
Editor	Denan Wang	Date		2191118	
No.	Revision record	Modifier	Auditor	Versions	Date
1	Initial release	Denan Wang		V1.0	20191118
2	Increase the device name length to 20 byte	Denan Wang		V1.1	20191219
3	Add firmware version Correction of some parameters	Denan Wang		V2.0	20200109

Information

Part Number	Description	Package Size
LSD1BT-STSHLZ02	The PN is pure hardware without shield or any firmware. Please contact us if there is other requirements for second development of end users.	11.2mm*15.6mm*2.3 mm
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The FCC ID of the module is FCC ID: 2AWGLLSD1BTSTSHLZ02

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

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**
- **256K Flash /24-KB RAM**
- **32-bit, ARM® Cortex®-M0**
- **Support Ble5.0 SOC**

2 Specifications

Table1: Module Parameters

Parameters	performance		Note
Working voltage	2.1V~3.6V		
Working temperature range	-40℃~85℃		
Frequency range	2400MHz~2483.5MHz		
Modulation scheme	GFSK		
RF channel center frequency	2402M--2480M(Ch0 -- Ch39)		Channel spacing 2M
Tx Power	4dBm(Default)		Max value 8dBm
Tx current	22mA		Typical value 22mA @3.3V 4 dBm
Rx current	16.5mA		Typical value 16.5mA @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	11.2mm*15.6mm*2.3mm		Length * width * height

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

3 Hardware

3.1 Dimensions Diagram

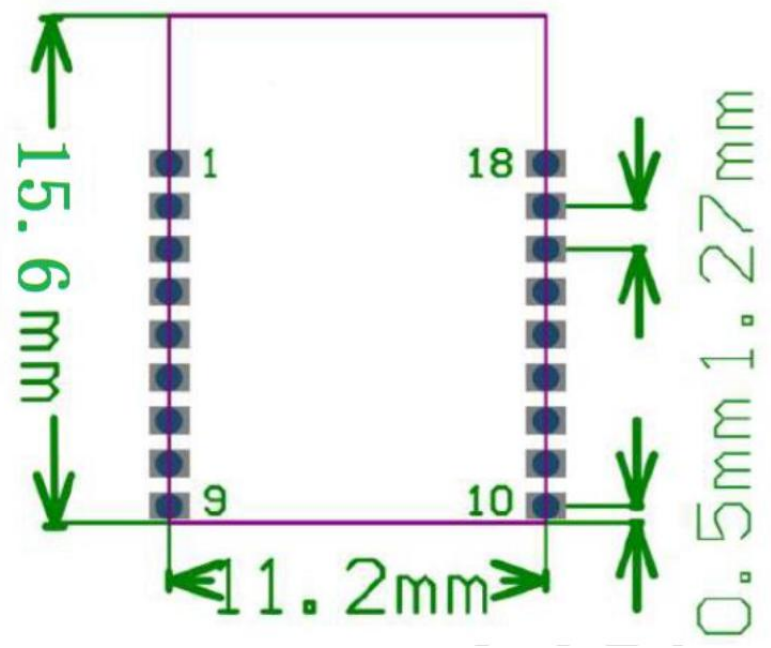


Figure 1: Dimensions Diagram

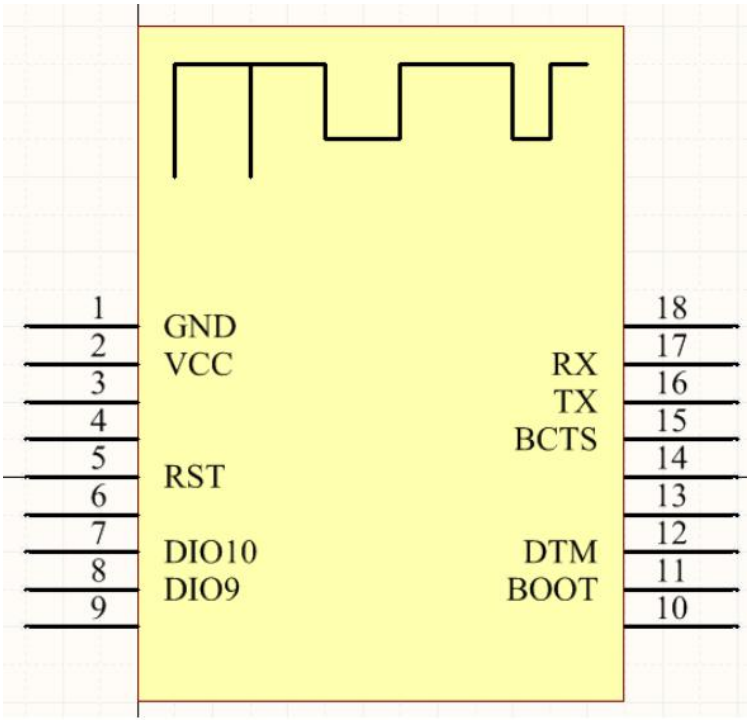


Figure 2: Pin Diagram

3.2 Pin Description

Pin Number	Pin Name	Type	Description
1	GND	P	Ground reference
2	VCC	P	2.1~3.6V
3	-	-	-
4	-	-	-
5	RST	I	Module reset, low active
6	-	-	-
7	DIO10	I/O	SWD DIO
8	DIO9	I/O	SWD CLK
9	-	-	-
10	-	-	-
11	BOOT	I/O	High level active, power on in normal mode Must be low
12	DTM	I	Factory test mode control pin, high level effective
13	-	-	-
14	-	-	-
15	BCTS	O	Data entry model 0: the module has data sending 1: the module sends no data
16	TX	O	UART_TXD
17	RX	I	UART_RXD
18	-	-	-

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/DM00262983/files/DM00262983.pdf/jcr:content/translations/en.DM00262983.pdf

4 Applications

4.1 Application circuit

Non-active DC-DC Converter:

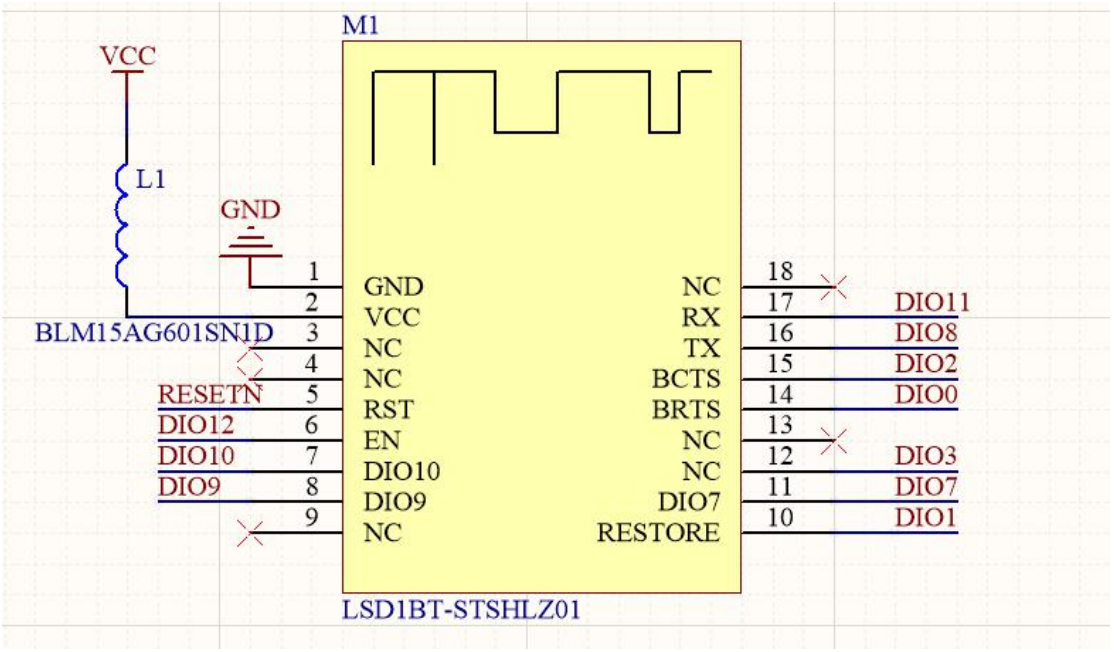


Figure 3: Application circuit: non active DC-DC converter

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:

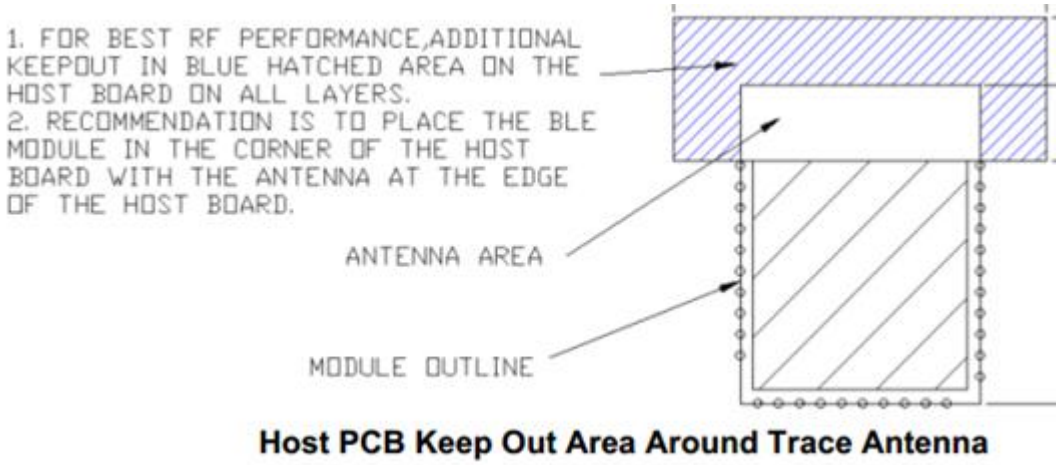


Figure4: Module recommended placement

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

FCC Statement：
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.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications 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

- This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

RF Exposure Information and Statement :

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

Instructions to the OEM/Integrator:

This module has been granted modular approval for mobile applications. OEM integrators for host products may use the module in their final products without additional FCC certification if they meet the following conditions. Otherwise, Additional FCC approvals must be obtained.

- The OEM must comply with the FCC labeling requirements. If the module's label is not visible when installed, then an additional permanent label must be applied on the outside of the finished product which states: "Contains transmitter module FCC ID: 2AWGLLSD1BTSTSHLZ02,Additionally, the following statement should be included on the label and in the final product's user manual:

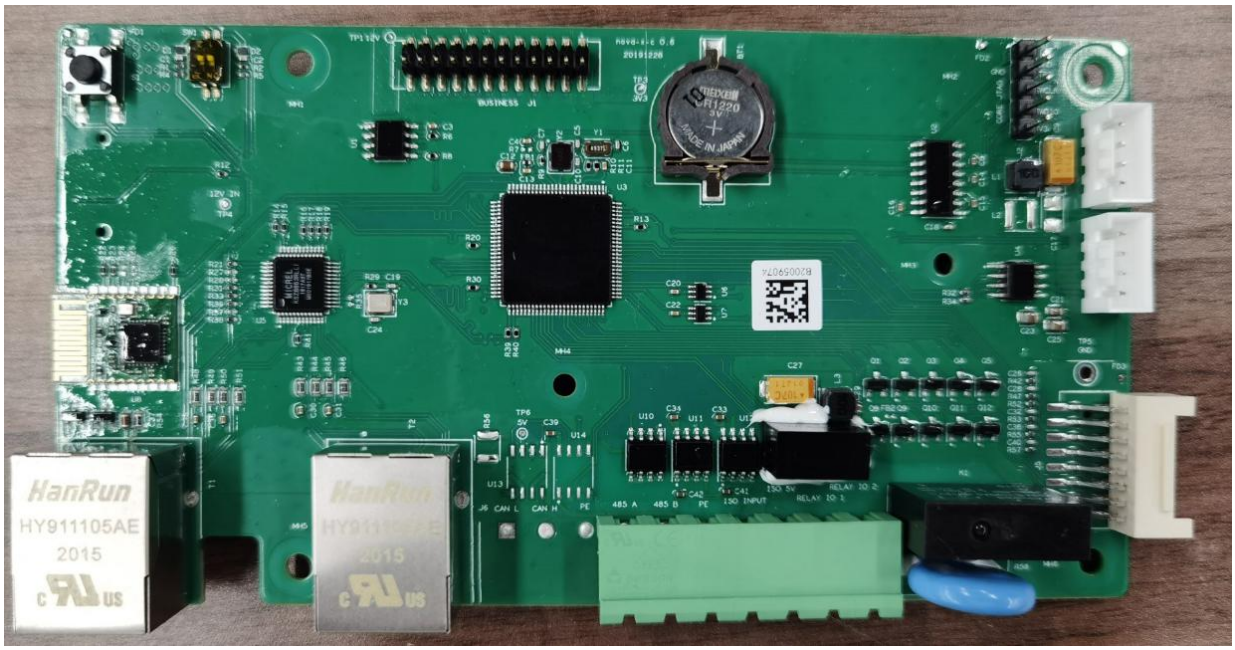
  "This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation."

- The user's manual for the host product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.
- The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.
- This Module is full modular approval, it is limited to OEM installation ONLY.
- The module is limited to installation in mobile application.
- A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.
- The OEM integrator is responsible for ensuring that the end-user has no manual instruction

to remove or install module.

- The Grantee will provide guidance to the Host Manufacturer for compliance with the Part 15B requirements if requested.

NOTE:
The Bluetooth module of this product meets FCC certification only based on this board



Note

Welcome to use ChargeDot 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.
ChargeDot reserves the right to interpret and modify all information contained herein without prior notice.

Released by： Shanghai ChargeDot New Energy Technology

ORIGINAL EQUIPMENT MANUFACTURER (OEM) NOTES

The OEM must certify the final end product to comply with unintentional radiators before declaring compliance of the final product to Part 15 of the FCC rules and regulations. Integrationinto devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change.

The OEM must comply with the FCC labeling requirements. If the module's label is not visible when installed, then an additional permanent label must be applied on the outside of the finished product which states:

"Contains transmitter module FCC ID: 2AWGLLSD1BTSTSHLZ02. Additionally, the following statement should be included on the label and in the final product's user manual: "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 interferences, and

(2) this device must accept any interference received, including interference that may cause undesired operation."

The module is limited to installation in mobile or fixed applications. Separate approval is required for all other operating configurations, including portable configuration with respect to Part 2.1093 and different antenna configurations.

Professional installation:

This module need to be installed under professional guidance, if there is any questions, please contact us.

Host device: NovaX-P3B-UL-v0.5

Antenna information：Gain: 0.82dBi; Type: PCB antenna; Impedance: 50Ω

The module can work on the host device, it means the driver is matched, different host devices have the different drives.

The host manufacturer can not get the module drive authorization to remain compliant, until the host device compliance with the requirements.

Note: The module has the antenna schematics, so the host device just provide the antenna connector for this device. The antenna port and connector is designed by OEM, it need to compliance with the 15.203 requirement, and it is not designed for use with high-gain directional antennas.

A module or modules can only be used without additional authorizations if they have been tested and granted under the same intended end-use operational conditions, including simultaneous transmission operations.

When they have not been tested and granted in this manner, additional testing and/or FCC application filing may be required. The most straightforward approach to address additional testing conditions is to have the grantee responsible for the certification of at least one of the modules submit a permissive change application.

When having a module grantee file a permissive change is not practical or feasible, the following guidance provides some additional options for host manufacturers. Integrations using modules where additional testing and/or FCC application filing(s) may be required are: (A) a module used in devices requiring additional RF exposure compliance information (e.g., MPE evaluation or SAR testing); (B) limited and/or split modules not meeting all of the module requirements; and (C) simultaneous transmissions for independent collocated transmitters not previously granted together.

This Module is full modular approval, it is limited to OEM installation ONLY.

Integration into devices that are directly or indirectly connected to AC lines must add with Class II Permissive Change. (OEM) Integrator has to assure compliance of the entire end product incluld the integrated Module.

Additional measurements (15B) and/or equipment authorizations (e.g Verification) may need to be addressed depending on co-location or simultaneous transmission issues if applicable. (OEM) Integrator is reminded to assure that these installation instructions will not be made available to the end user of the final host device.