Leader in IOT Embedded Solution

LSD4RF0436-10D0

2.4GHz Wireless Module

LSD4RF0436-10D0 wireless module is a wireless module designed on the basis of TI RF integrated chip CC2510. It is a high-performance 1mW IOT wireless transceiver. With the adoption of PCB antenna, the module is compact and small in terms of overall design and can be widely used for short distance IOT wireless communications in various applications. It is characterized by small volume, low power consumption, long transmission distance, strong anti-interference capacity, low cost, etc.

Product Features

- **Working frequency range**
  - Working frequency range 2400~2483.5MHz
- **Multiple ways of modulation**
  - The ways of modulation including 2-FSK are adopted to increase the capacity of data anti-burst interference and random interference
- **Power supply**
  - 2.0~3.6V (recommended to use 3.3V)
  - I / O interface control level: 0~ VCC
- **High link budget**
  - High receiving sensitivity: -95 ± 1dBm (@10KBaud)
  - Transmit power: Max. 0 ± 1dBm
- **Super long transmission distance**
  - Excellent transmission performance, reliable transmission distance is greater than 15m
- **Rapid channel switching**
  - < 90uS channel switching time, especially suitable for FM communication system
- **Convenient for programming**
  - On-chip integrated 51 internal core, very convenient for software programming

Applicable Situations

- Industrial remote sensing, telemetry communication
- Home wireless security alarm system
- Personnel positioning system in mine
- Consumer electronic wireless applications, wireless mouse keyboard, etc.

Foreword

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Revision Histories

Revision	Date	Author	Change Description
Rev01	June 14, 2019	You Xuecheng	Initial Revision

1. Specification Parameter

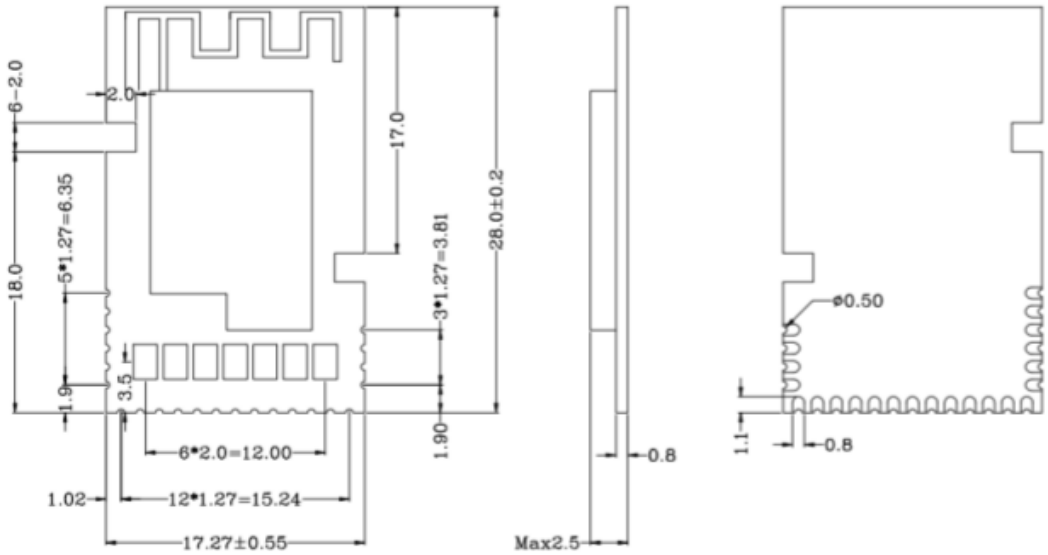
Form 1-1 Module Working Parameter[1]

Major Parameter	Performance[1]			Remarks
	Min. Value	Typical Value	Max. Value	
Working Voltage (V)	2.0	3.3	3.6	
Working Temperature (℃)	-40	-	85	
Initial Frequency Deviation (KHz)	-40	-	+40	
Working Frequency Range (MHZ)	2400		2483.5	The customer can customize the working frequency
Transmit power (dBm)	-30	0	1	The customer can customize the transmit power
Receiving sensitivity (dBm)	-	-95	-	FSK modulation, PER <1%; Deviation:38KHz, Data rate: 10KBaud
Communication rate kBaud	1.2	-	500	2-FSK can be customized by the user
Ways of modulation	2-FSK			The programming may be customized by the user
Type of interface	Stamp hole			
Overall dimensions (mm)	(Refer to Drawing 2-1 for more information)			-
Dimension accuracy	Grade GB / T 1804-C			In conformity with the requirements of dimensional tolerance Grade C

[1] The above testing conditions are as follows: temperature: 25°c, center frequency: 2433MHz and working voltage: 3.3V

2. Dimensional Drawing and Interface Description

2.1 Module Dimensional Drawing



Drawing 2-1 Dimensional Drawing for LSD4RF0436-10D0 PCBA (Unit: mm)

2.2 Real Module Drawing

Drawing 2-2 Real Module Drawing for LSD4RF0436-10D0

2.3 Interface Description

The following figure shows the serial number of the pins of the module and describes the corresponding pins:

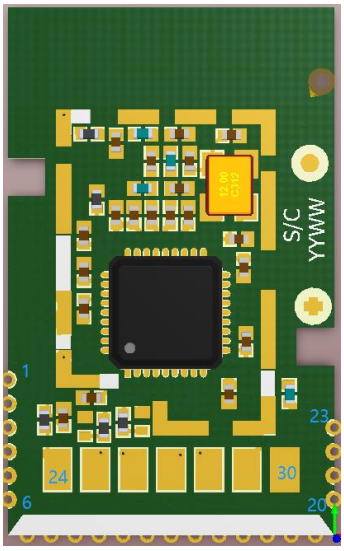


Table 2-1 Functional Description of Pins of LSD4RF-10D0 Module

Module Pin	Name	Function	Remarks
1	VDD	Power supply	
2	D_CLK	Programmed	
3	D_DATA	Programmed	
4	RST	Reset	
5	GND	Ground	
6	GND	Ground	
7	GND	Ground	
8	P1_5	GPIO	
9	P1_4	GPIO	
10	P1_3	GPIO	
11	P1_2	GPIO	
12	GND	Ground	
13	GND	Ground	
14	GND	Ground	
15	GND	Ground	
16	RX	UART RX	
17	TX	UART TX	
18	GND	Ground	
19	GND	Ground	

20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	VDD	Power supply	
24	RST	Reset	
25	P1_3	GPIO	
26	P1_2	GPIO	
27	RX	RX	
28	TX	TX	
29	VDD	Power supply	
30	GND	Ground	

2.4 PCB antenna instructions

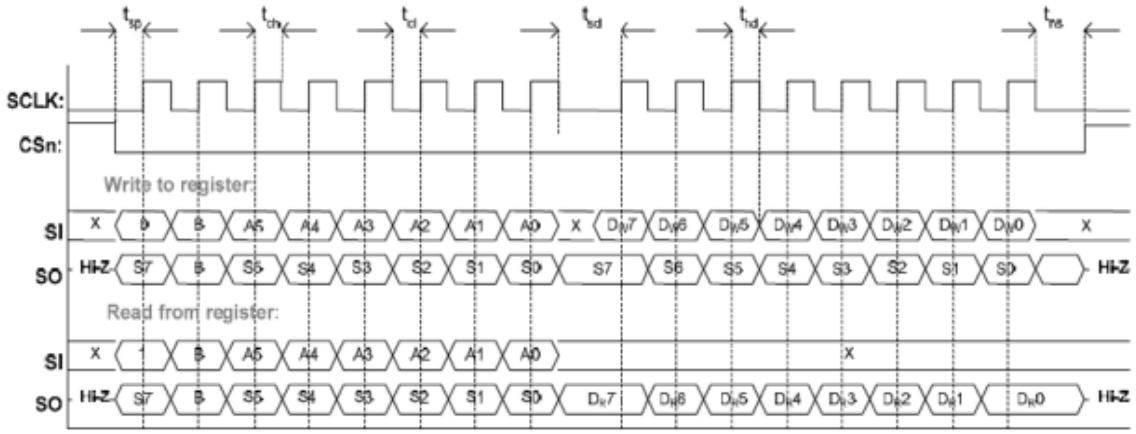
The module has an on-board PCB antenna. During the layout of the board, please make sure the area right below the antenna is completely clear, as shown in the following figure. The red part is the user's backplane area or the copper-clad area, the grey part is the clear area of the antenna of the user's backplane, and the boundary point of the clear area is the upper edge of the shielding cover. Make sure there is no any metal in 360 degrees around the antenna; otherwise, the radiation efficiency of the antenna will be affected, and the communication distance will be greatly affected.

Drawing 2-3 Description of Clear Area of Antenna

3. Basic Operation

The module is installed on the user's product. Since the module is equipped with MCU, it can be

directly operated via the built-in MCU control register and the transceiver buffer, which can complete the receiving function of wireless data. The read-write operation timing sequence of the module register is shown in the drawing. For more operation information, please refer to the latest data manual CC2510.



Drawing 3-1 SPI Timing Sequence

4. Frequently Asked Questions

4.1 The communications cannot be made if the module is at close range

- To verify whether the sending and receiving configurations are matching and the communications cannot be made if the configurations are different.
- The voltage is abnormal; and the transmission will be abnormal if the voltage is too low.
- The battery is low; and the transmission will be abnormal if the voltage is lowered due to the low volume battery.
- The RF signal does not reach the antenna or π circuit soldering occurs error if antenna welding is abnormal.

4.2 Module communication distance is not enough

- The power transmitted is small due to bad antenna impedance matching.
- Objects such as metal around the antenna or the metal inside the module may cause serious signal attenuation.
- Any other interference signals in the test environment may cause the module to communicate close.

- Insufficient power supply will make the module's transmit power abnormal.
- Harsh test environment will make signal attenuation greater.
- When the module communicates with other end after passing through the wall, the wall will have a great impact on signal attenuation. The signal will be attenuated greatly when most of signals are passing through the wall.
- If the module is too close to the ground, resulting in poor communication due to being absorbed and reflected.

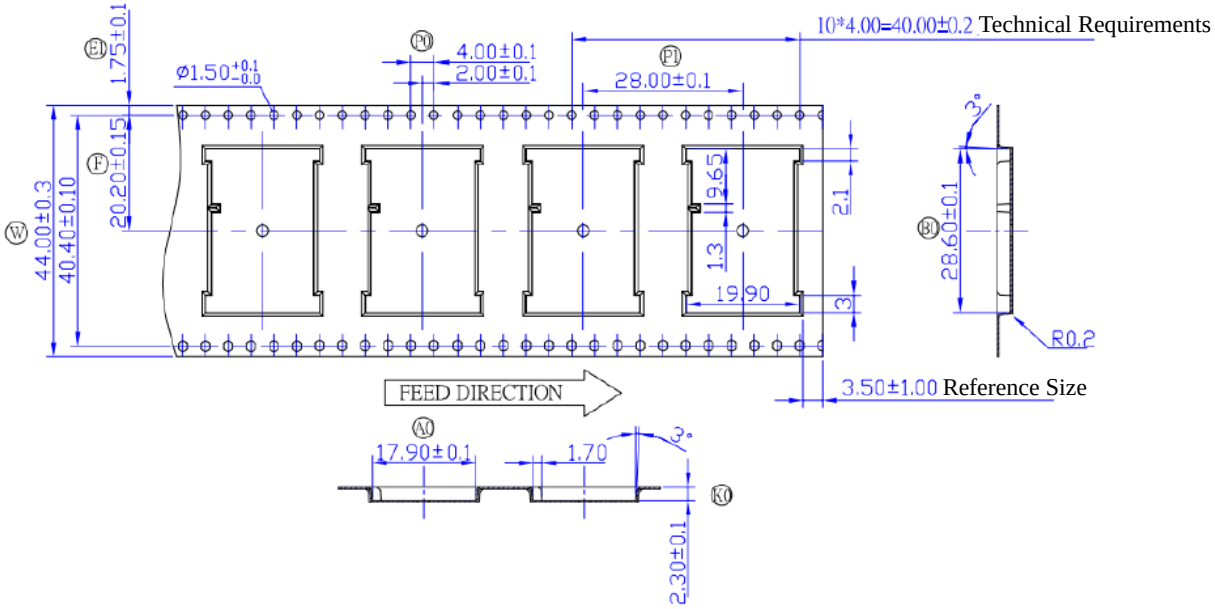
5. Notation of Annexes

1. Recommended to use DC stabilized power supply to power for the module. The power ripple coefficient should be as close as possible and the module needs to be reliably grounded. Please be noted that the positive and negative poles of power supply shall be correctly connected. The module may be permanently damaged if connected reversely.
2. Prohibited to have any metal objects around the module antenna. Otherwise, the communication distance may be seriously affected.

6. Packing

6.1 Ways of Packing

■ Roll ☐ Foam ☐ ESD bag



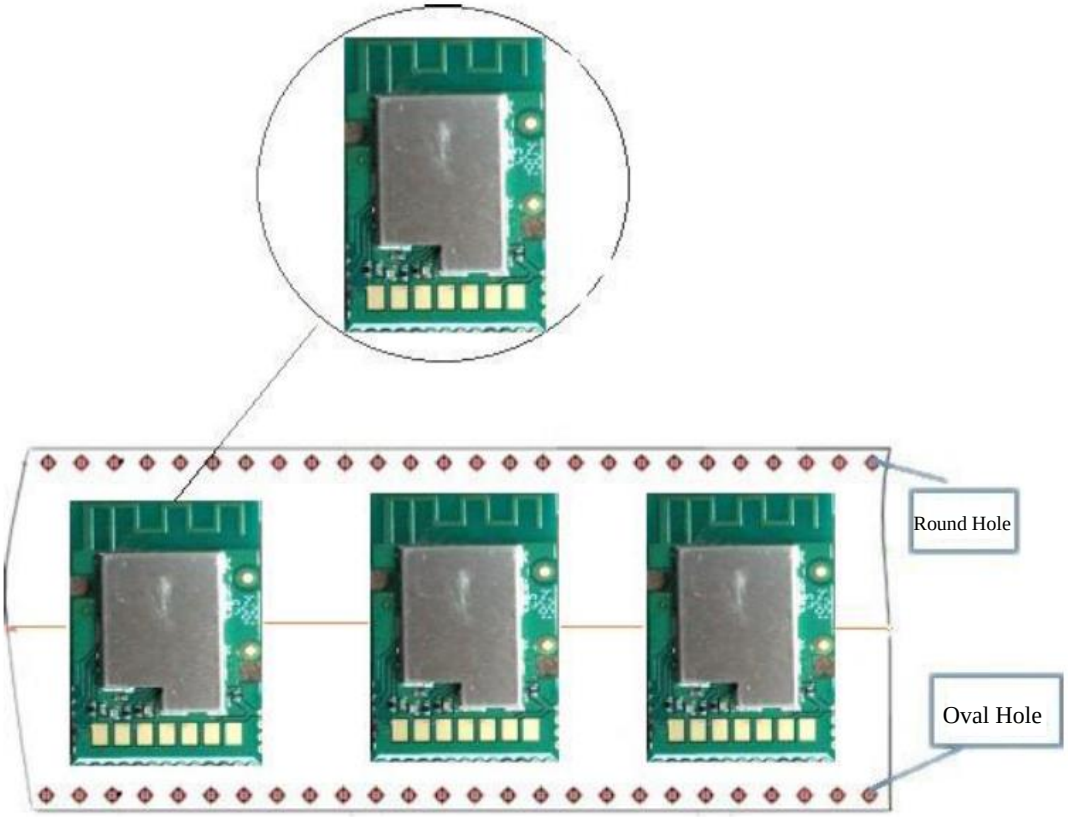
W	44.00±0.3
E1	1.75±0.1
F	20.20±0.15
P0	4.00±0.1
P1	28.00±0.1
A0	17.90±0.1
B0	28.60±0.1
K0	2.30±0.1

Technical requirements

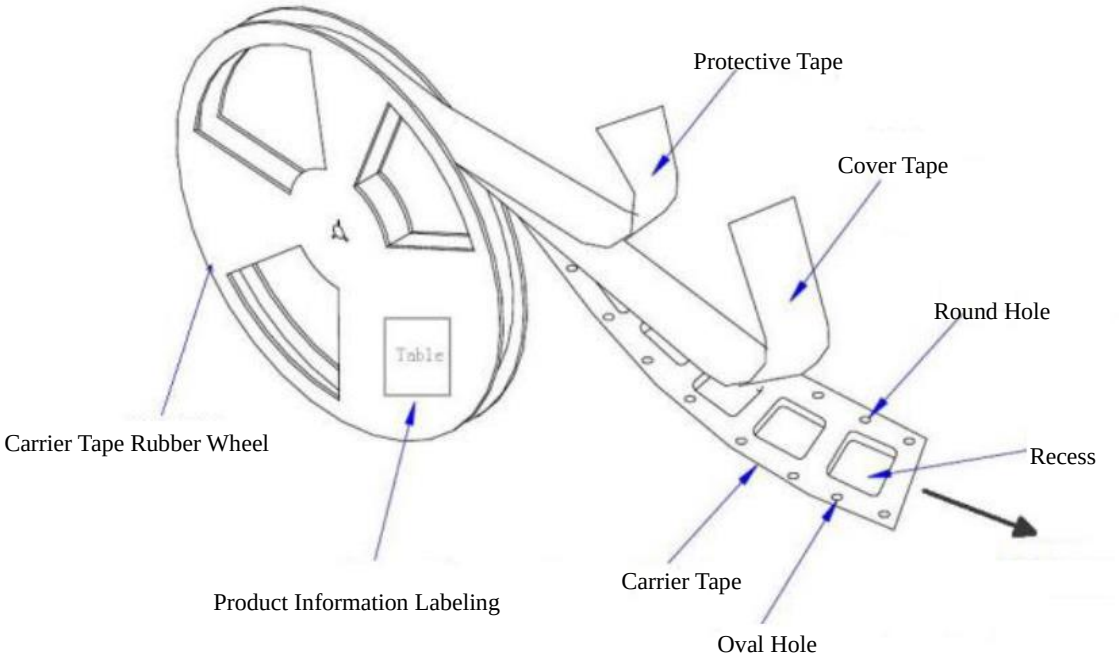
1. The accumulative error per 10 drive holes should be within±0.2;
2. The inner bending of 250MM shall not be higher than 1;
3. Loaded with the materials: black PS and thickness: 0.30±0.05;
4. Surface impedance ranges from 10^6 to 10^{11} Ohm;
5. 23.5m per reel and packed in 13" plastic tray; the number of elements accommodated:800 Pcs;
6. A0 and B0 shall be subject to the measurement made at the place 0.3mm away from the lowest bottom inside the cavity, K0 is the inner depth and R angle unmarked is 0.3;
7. The product complies with Standard EIA-481 ;
8. Product requirements comply with "ROHS".

Drawing 6-1 Roll Dimensional Drawing

The diagram of roll wrapping module placement direction is as follows:



Drawing 6-2 Schematic Diagram of Module Placement



Drawing 6-3 Packaging Diagram

Federal Communication Commission Interference 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.
(2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: 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.

RF Warning Statement

To comply with FCC RF exposure compliance requirements, the antennas 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.
This device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as two conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements

The module is limited to OEM installation ONLY. The module is limited to installation in mobile or fixed application. We hereby acknowledge our responsibility to provide guidance to the host manufacturer in the event that they require assistance for ensuring compliance with the Part 15 Subpart B requirements.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product(including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID:N8NLSD4RF043610D0". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

The following FCC part 15.19 statement 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.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

In the user manual of the end product, the end user has to be informed that the equipment complies with FCC radio-frequency exposure guidelines set forth for an uncontrolled environment.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The end user manual shall include all required regulatory information/warning as show in this manual.

The maximum operating ambient temperature of the equipment declared by the manufacturer is: **-40~85**℃

Receiver category 2

Regulatory statement

This device complies with Part 15 of the FCC Rules and with RSS-247 of Industry Canada. 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.