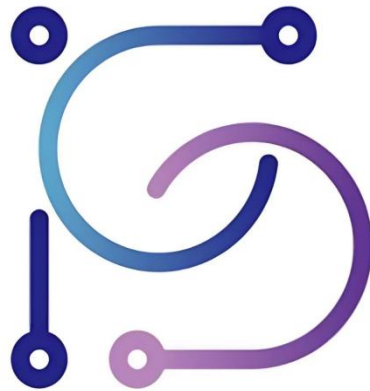




INDIESEMIC

ISC-SX1262-B

An advanced LoRa Module

DATASHEET

Version: V2.2

Revision history:

Revision	Description	Date
1.0	– Initial Release	25/11/2025
2.0	– Restructured datasheet – Added FAQ – Power Consumption data – Reflow Diagram	04/06/2026
2.1	– Updated FAQs	08/07/2026
2.2	– Added Shield Image	27/08/2026

Table of Content

1. Description	1
2. Features	2
3. Applications	3
4. Block Diagram	4
5. Module Pin-out	4
6. PCB Footprint	6
7. Pin Descriptions	7
8. Electrical Specifications	8
9. LoRaWAN	9
10. Installation of Antenna	9
11. Power Consumption Analysis:	10
12. Reflow Diagram:	12
13. FAQs:	13
Contact & Support:	15

List of Tables:

<i>Table 1- Pin Descriptions</i>	<i>7</i>
<i>Table 2- Maximum Rating.....</i>	<i>8</i>
<i>Table 3- Operating Ratings.....</i>	<i>8</i>
<i>Table 4 - Power Consumption.....</i>	<i>11</i>
<i>Table 5 - Reflow Rate</i>	<i>12</i>

List of Figures:

Figure 1- ISC-SX1262-B	1
Figure 2- Block Diagram.....	4
Figure 3- Module Pinout (back view)	4
Figure 4- Pin Diagram (back view)	5
Figure 5- Pin Diagram (front view)	5
Figure 6 - PCB Footprint	6
Figure 7- Sleep Mode	10
Figure 8- TX current profile	11
Figure 9- RX Current profile	11
Figure 10- Reflow Graph	12
Figure 11- Connection Diagram.....	13

1. Description

ISC-SX1262-B is a LoRa series module designed and developed by INDIESEMIC. The module is used for ultra-long-range extended frequency communication. Its radio frequency chip SX1262 mainly uses LoRa™ remote modem, which is used for ultra-long range extended frequency communication. the ISC-SX1262-B can transmit up to +18.87dBm with highly efficient integrated power amplifiers.

The devices support LoRa® and Long Range FHSS modulation for LPWAN use cases and (G)FSK modulation for legacy use cases. The device is highly configurable to meet different application requirements utilizing the global LoRaWAN® standard or proprietary protocols. The devices are designed to comply with the physical layer requirements of the LoRaWAN specification released by the LoRa Alliance®.



Figure 1- ISC-SX1262-B

2. Features

- ▶ Semtech SX1262 Sub-GHz LoRa Transceiver
 - Frequency range: 150 MHz to 960 MHz
 - LoRa®, (G)FSK and Long Range FHSS (LR-FHSS) modulation support
 - LoRa spreading factors SF5 to SF12
 - Programmable coding rates for optimized range and robustness
 - RSSI measurement and packet status monitoring
 - Support for public and private LoRaWAN® networks
 - Long Range FHSS support for enhanced network capacity and robustness
 - Integrated DC-DC converter and LDO regulator support
- ▶ RF Performance
 - Up to +18.87 dBm transmit power
 - Receiver sensitivity:
 - Up to -148 dbm (LoRa, SF12)
 - Up to -125 dbm (FSK mode)
 - High blocking immunity and adjacent channel rejection
 - Supports antenna mismatch up to 10:1 VSWR
- ▶ Digital Interfaces
 - High-speed SPI interface, half-duplex communication, a packet engine of up to 256 bytes
 - BUSY status indication pin
 - Interrupt (IRQ) support
 - External RF switch control
- ▶ Electrical Characteristics
 - Operating supply voltage: 1.8 V to 3.7 V
 - Operating temperature: -40°C to +85°C
 - QFN-24 package (4 mm × 4 mm)
- ▶ Clock and Timing
 - 32 MHz crystal oscillator (XTAL) support
 - Built-in RC oscillators:
 - 13 MHz RC oscillator
 - 64 kHz RC oscillator
- ▶ CRC generation and verification
- ▶ Dedicated UFL Connector for Antennas
- ▶ The antenna interface is compatible with stamp hole /through-hole and IPEX, which support more scheme selection
- ▶ Preamble detection

3. Applications

- Internet of things (IOT)
 - Smart home products
 - Smart meters
 - Smart city infrastructure
 - Supply chain and logistic
 - Agricultural sensors
 - Retail stores sensors
 - Asset tracking
 - Parking sensors
 - Environmental sensors
 - Healthcare
 - Safety and security sensors
 - Remote control applications
 - Building automation

4. Block Diagram

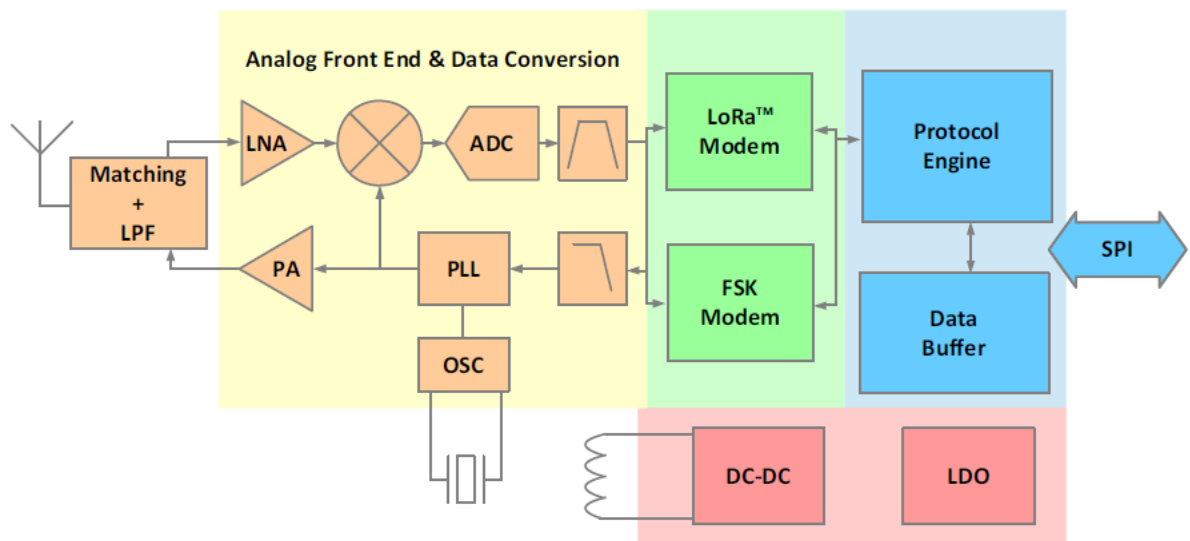


Figure 2- Block Diagram

5. Module Pin-out

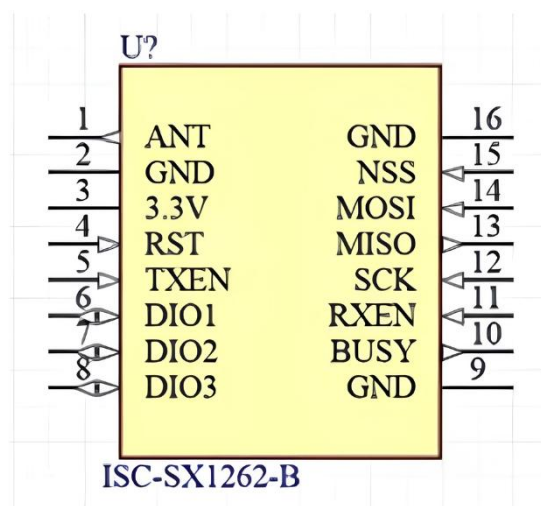


Figure 3- Module Pinout (back view)

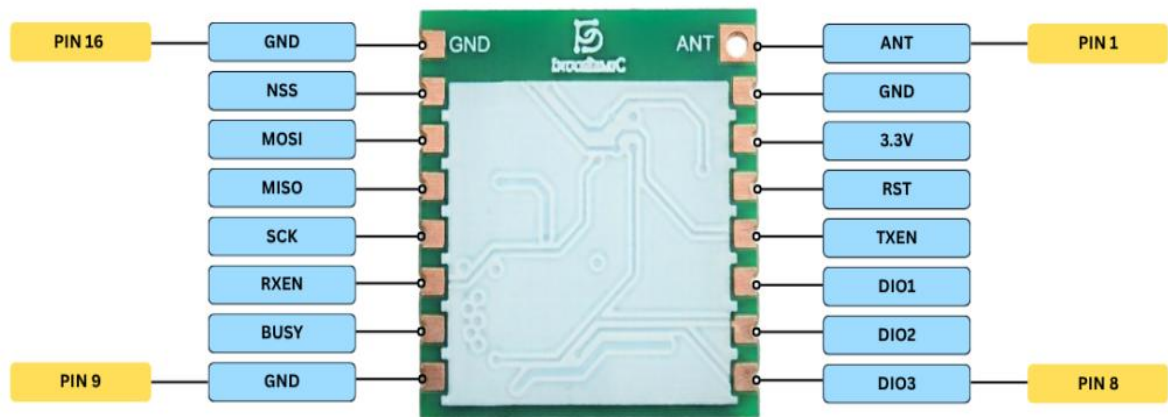


Figure 4- Pin Diagram (back view)

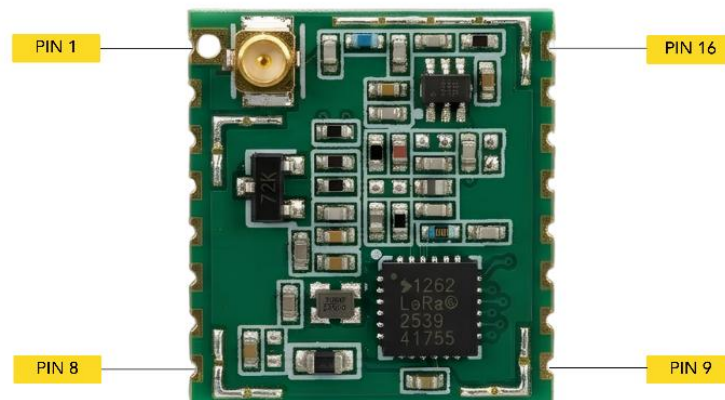


Figure 5- Pin Diagram (front view)

6. PCB Footprint

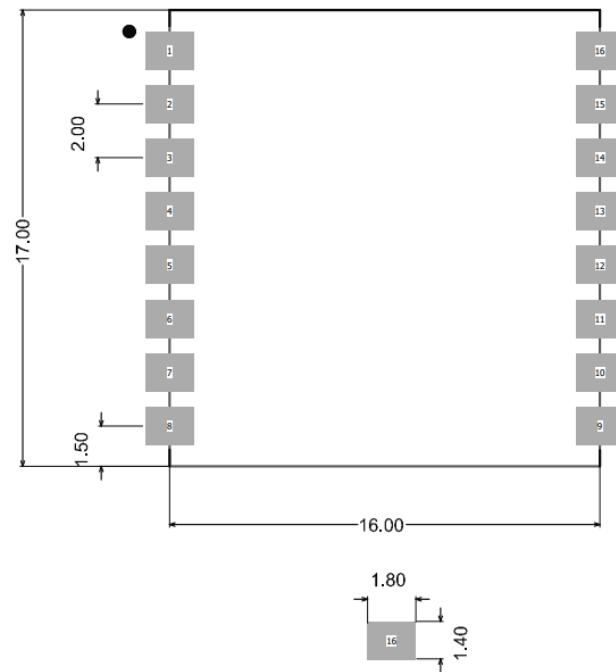


Figure 6 - PCB Footprint

7. Pin Descriptions

PIN No.	Name	I/O Type	Description
1	ANT	-	Connect Antenna
2	GND	Power	Ground
3	3.3V	Power	Power supply
4	RESET	-	Reset Pin
5	TXEN	-	RF control port
6	DIO1	Digital I/O	Digital I/O1 software configuration
7	DIO2	Digital I/O	Digital I/O2 software configuration
8	DIO3	Digital I/O	Digital I/O3 software configuration
9	GND	Power	Ground
10	BUSY	Output	Status indicator pins, which must be connected to the IO port of the master MCU
11	RXEN	-	RF control port
12	SCK	Input	SPI clock input
13	MISO	Output	SPI data output
14	MOSI	Input	SPI data input
15	NSS	Input	SPI selection input
16	GND	Power	Ground

Table 1- Pin Descriptions

8. Electrical Specifications

8.1 Absolute Maximum Ratings

Parameter	Condition	Min.	Typical	Max.
Storage Temperature		-55		125 °C
ESD Protection	VESD			1000 V
Supply Voltage	VCC, VBus	-0.5 V		3.9 V
Voltage on Any I/O Pin		-0.3 V		3.63 V

Table 2- Maximum Rating

8.2 Recommended Operating Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Temperature	TA	-40	25	85	°C
Power Supply	VCC	1.7	3.3	3.6	V
Input Low Voltage	VIL	0		0.3×VCC	V
Input High Voltage	VIH	0.7×VCC		VCC	V

Table 3- Operating Ratings

9. LoRaWAN

The ISC-4012-B integrates **Semtech**'s SX1262 LoRa® transceiver, designed for ultra-long-range and low-power wireless communication applications.

The SX1262 supports LoRa®, Long Range FHSS, and (G)FSK modulation schemes, making it suitable for LPWAN deployments, proprietary wireless systems, and legacy FSK-based networks. The device is optimized for long battery life, offering ultra-low receive current consumption and highly efficient power amplifier performance.

The transceiver is designed to comply with the physical layer requirements defined by the LoRaWAN® specification released by the **LoRa Alliance**.

Please Refer [here](#) for More Information related to protocol.

***Note: ISC-SX1262-B Supports all three classes (Class A, Class B and Class C) as end nodes.**

10. Installation of Antenna

- The ISC-SX1262-B requires a welding antenna, and the module is compatible with a half-hole disc and an IPEX holder.
- In order to achieve the optimal effect, the antenna assembly should be located far away from the metal parts.
- The antenna installation structure has a great impact on the performance of the module, so make sure that the antenna is exposed, preferably vertical upward. When the module is mounted inside the enclosure, a high-quality antenna extension line can be used to extend the antenna to the outside of the enclosure.
- The antenna must not be installed inside the metal shell, which greatly weakens the transmission distance.

11. Power Consumption Analysis:

The ISC-SX1262-B module is optimized for low-power, long-range wireless communication. Actual power consumption depends on the selected operating mode, RF configuration, transmit power level, firmware implementation, and application duty cycle. The values provided in this section are representative measurements obtained under controlled test conditions. Power consumption may vary depending on the specific application and operating environment.

12.1 Sleep Mode Current Profile

Observed Characteristics:

- Peak Current: $\sim 3.23 \mu\text{A}$
- Average Current: $\sim 2.20 \mu\text{A}$
- Charge Consumption (10 s window): $\sim 0.53 \text{ C}$

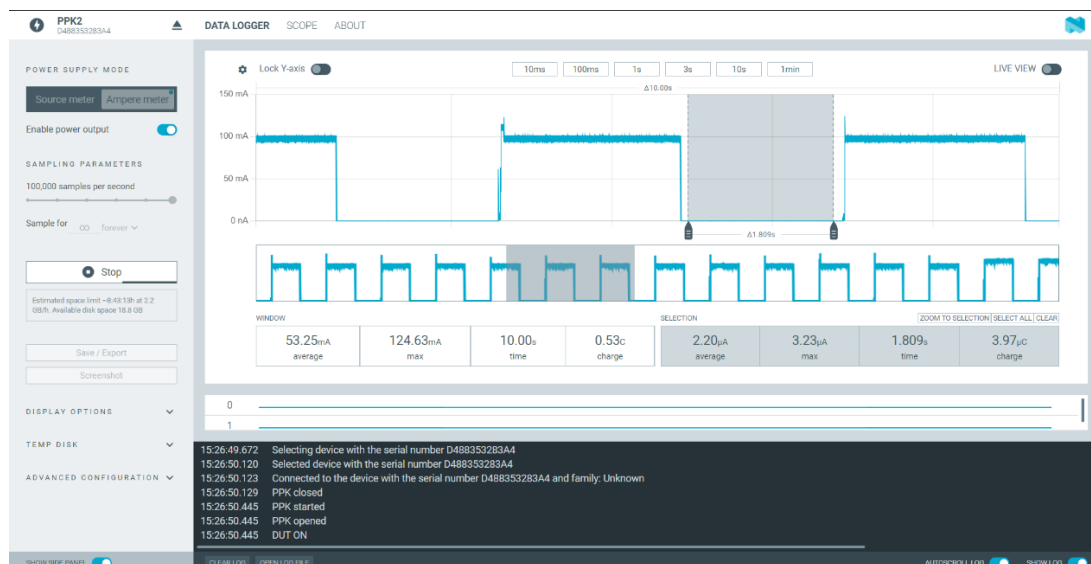


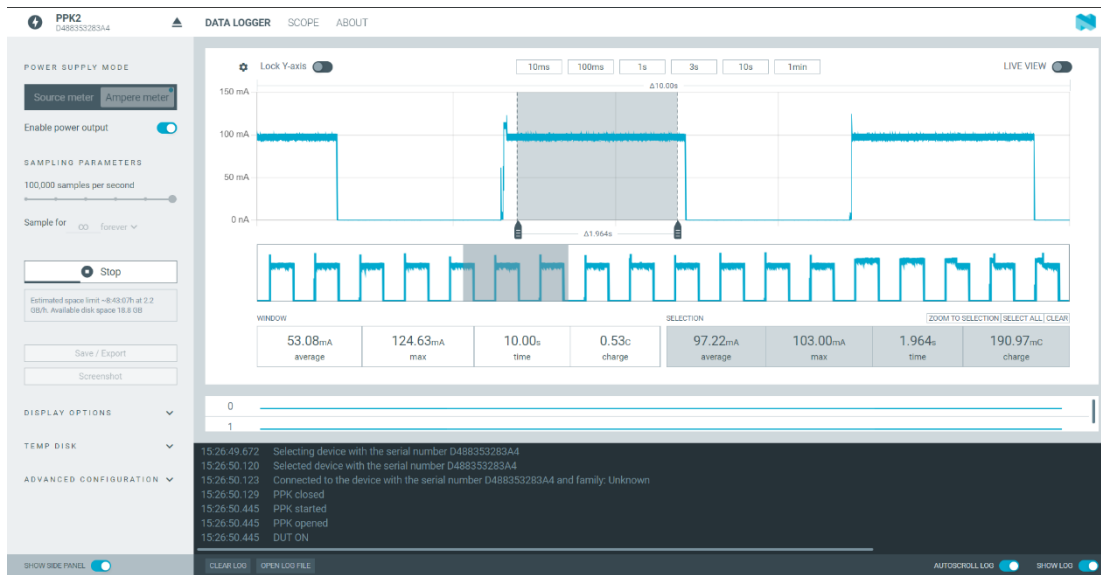
Figure 7- Sleep Mode

12.2 TX at 18.87 dbm current profile

During Transmission, the module exhibits periodic current spikes corresponding to radio transmission events.

Observed Characteristics:

- Peak Current @18.87dBm: $\sim 97.22 \text{ mA}$
- Average Current: $\sim 103 \text{ mA}$
- Charge Consumption (10 s window): $\sim 0.53 \text{ C}$

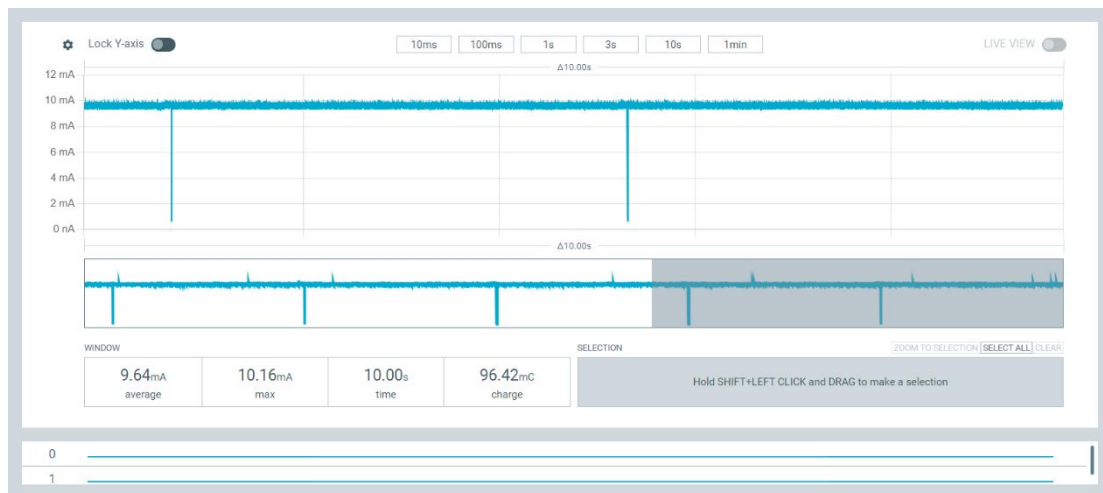


12.3 RX current profile

During Reception, the module stays on and ready to receive continues.

Observed Characteristics:

- Peak Current @18.87dBm: ~10 mA
- Average Current: ~9.64 mA
- Charge Consumption (10 s window): ~96 mC



11.4 Summary

Mode	Peak Current	Average Current	Notes
TX at@18.87dBm	~97.22 mA	~103 mA	Dominated by TX bursts
RX Mode	~10 mA	~9.64 mA	Reception Mode
Sleep Mode	~3.23 μ A	~ 2.20 μ A	Sleep / Low Power Mode

Table 4 - Power Consumption

12. Reflow Diagram:

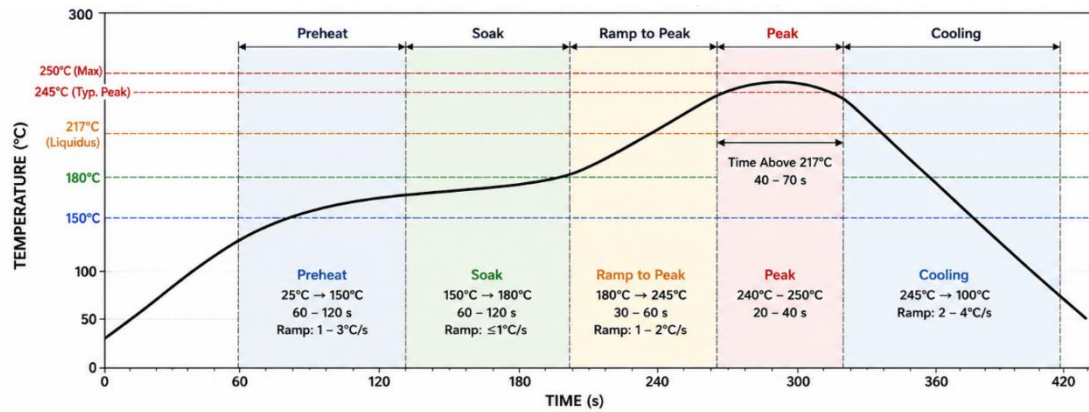


Figure 10- Reflow Graph

Stage	Temperature Range	Time Duration	Ramp Rate
Preheat	25°C → 150°C	60–120 sec	1–3°C/sec
Soak	150°C → 180°C	60–120 sec	≤1°C/sec
Ramp to Peak	180°C → 245°C	30–60 sec	1–2°C/sec
Peak Temp	240°C → 250°C	20–40 sec	—
Cooling	245°C → 100°C	—	2–4°C/sec

Table 5 - Reflow Rate

13. FAQs:

► **Does the module use a TCXO or an XTAL crystal?**

The module uses a **32 MHz XTAL crystal oscillator** as its clock reference. It does **not** use a TCXO. The 32 MHz XTAL provides the reference clock required for the module's RF operation and overall system timing.

► **Necessary Connections:**

Make the following connections between Microcontroller and the ISC-SX1262-B module, the Controller used here is [EVK-ISC-nRF52832-A](#):

- **SCK** → **SCK**
- **MISO** → **MISO**
- **MOSI** → **MOSI**
- **NSS** → **NSS**
- **RST** → **GPIO**
- **DIO1** → **GPIO**
- **BUSY** → **GPIO**
- **VCC (3.3 V)** → **VCC**
- **GND** → **GND**

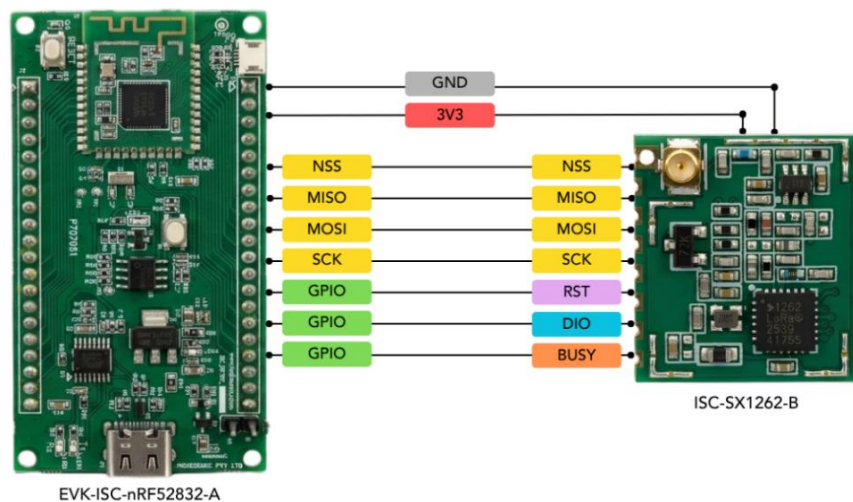


Figure 11- Connection Diagram

***Note:** Please ensure that DIO1 is connected to a GPIO that supports an interrupt-based mechanism.

- There is no need to physically connect the TX_EN and RX_EN pins, as the RF switch automatically configures the RF path. However, if you wish to control the RF path manually, then these pins will be required.
- During the design phase, it is recommended to keep Test Points (TPs) for these signals to support debugging and any future use cases.

► For a wider range of RF modules and evaluation kits, or to find this module:

LoRa Module: [ISC-SX1262-B](#)

Other: [RF Modules](#)

- ▶ If you would like your schematic or Gerber files reviewed before Production, you can contact sales@indiesemic.com.

Contact & Support:

For further technical assistance, customization requests, or queries regarding Indiesemic ISC Series Modules and Evaluation Kits, please contact our sales team:

Email: sales@indiesemic.com

We are committed to providing prompt responses and ensuring seamless integration of our solutions into your applications.

You can also visit us at www.indiesemic.com.

FCC Warning

15.19 Labeling requirements.

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.

15.21 Information to user.

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

15.105 Information to the user.

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.

FCC RF Radiation Exposure Statement:

- 1.This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- 2.This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

2.1 Conditions on using INDIESEMIC PRIVATE LIMITED regulatory approvals:

A. Customer must ensure that its product (The "CUSTOMER Product") is electrically identical to INDIESEMIC PRIVATE LIMITED reference designs.

Customer acknowledges that any modifications to INDIESEMIC PRIVATE LIMITED reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.

B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to INDIESEMIC PRIVATE LIMITED

C. Customer is responsible for regression testing to accommodate changes to Sichuan AI-Link Technology Co., Ltd. reference designs, new antennas, and portable RF exposure safety testing/approvals.

D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.

E. A user's manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below:

2.2 List of applicable FCC rules (customers' product must also comply with these rules)

The module complies with FCC Part 15.247

2.3 Specific operational use conditions

The module has been certified for Mobile/portable applications. The host product operating conditions must be such that there is a minimum separation distance of 5mm between the antenna radiating structures and nearby persons. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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. The end user manual shall include all required regulatory information/warning as shown in this manual. If the end product manufacturer uses it to a portable product, please provide the SAR compliance.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable.

2.6 RF exposure considerations

The device can be used in mobile exposure condition without restriction and if RF exposure statement or module layout is changed, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

This equipment complies with FCC's and IC's RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be installed and operated to provide a separation distance of at least 5mm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. Installers must ensure that 20cm separation distance will be maintained between the device and users.

Note: the OEM product manuals must include a statement in order to alert the users of FCC RF exposure compliance.

2.7 Antennas

This device is intended only for host manufacturers under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna;

The module shall be only used with the following antennas of the same type with equal or lower gain.

The antenna must be installed such that 20cm can be maintained between the antenna and users.

Antenna Type	Antenna Gain	Frequency Range	Connector Type	Min separation
External Antenna	1.7dBi	902.300MHz~914.900MHz	i-pex	20cm

2.8 Label and compliance information

Host product manufacturers must provide a physical or e-label stating “Contains FCC ID:2BVP2ISC-SX1262-B ” with their finished product.

2.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. If no other module used and no change to this module, the product can only to compliance with FCC part 15 B to meet the sale requirement. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.