



SI4432 Specification

Version V1.1

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Document Revision History

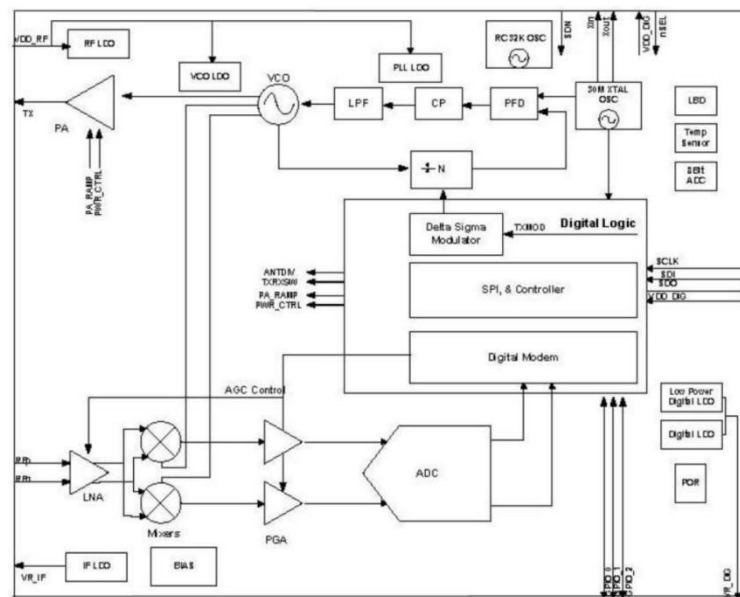
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V1.0	2016-12-14	First edition	Yang Xiaofei	
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1 Product Overview

The Ai-Thinker SI4432 wireless module is designed and developed by Ai-Thinker Technology. The module uses Silicon Labs latest highly integrated wireless ISM transceiver chip, the SI4432. The default frequency range is 410 – 525MHz. Its extremely high receiver sensitivity (-117dBm) and transmit power (+20dBm) greatly improve penetration capability and transmission range. At +20dBm output power, the communication distance in open, unobstructed line-of-sight conditions can exceed 1000 meters.



Features

- Configurable packet structure
- Frequency range: 410 – 525MHz by default
- Preamble detection
- Receiver sensitivity: -117dBm
- 64-byte transmit/receive data register (FIFO)
- Maximum output power: +20dBm
- Low-voltage detection
- Data rate: 1.2 – 128kbps
- Temperature sensing and 8-bit digital-to-analog converter
- Supports FSK, GFSK, and OOK modulation
- Operating temperature range: -20°C – +70°C

- 1.8 – 3.6 V power supply
- Integrated voltage regulator
- Ultra-low-power shutdown mode
- Frequency hopping function
- Digital received signal strength indicator (RSSI)
- Power-on reset function
- Timed wake-up function
- Built-in crystal adjustment function
- Automatic antenna matching and bidirectional switch control

Key Specifications

Table 1 Key Specifications

Model	SI4432
Dimensions	16.5 × 16.5 × 2 (±0.2) mm
Package	DIP-14 or SMD-14
Frequency Range	410 – 525MHz (default)
Max Output Power	+20dBm
Max Receiver Sensitivity	-117dBm
Data Transmission Rate	1.2 – 128kbps
Interface	GPIO/SPI
Operating Temperature	-20°C – 70 °C
Storage Conditions	-40°C – 125°C, < 90%RH
Supply Power Range	Supply voltage: 1.8V – 3.6V, supply current ≥250mA (3.3V recommended)
Power Consumption	Sleep Mode: Average RX current of 10μA at 50kbps with 1 second sleep interval
	RX: Average RX current of 6mA at 1.2kbps
	TX: 22.2mA
Transmission Distance	Outdoor open-line-of-sight: 80m – 150m

2 Electrical Parameters

Electrical Characteristics

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Supply Voltage	2.7	3.3	3.6	V
I/O Supply Voltage (VCCIO)	-0.3	-	3.6	V
Operating Temperature	-20	-	+70	°C
Storage Temperature	-40	-	+125	°C

Power Consumption

Parameter	Typ	Unit
TX Power Consumption	85	mA
RX Power Consumption	6	mA
Sleep	10	uA

RF Parameters

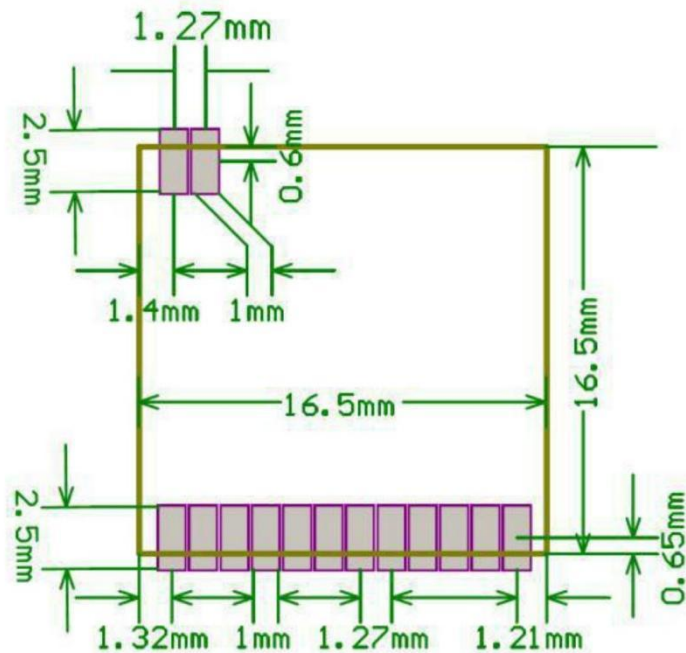
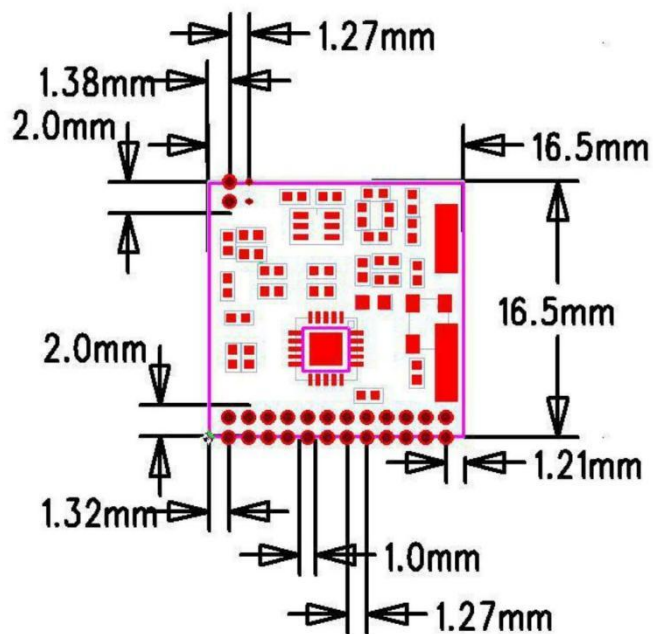
Transmit Power

Parameter	Min	Typ	Max	Unit
Average Power	16	18	20	dBm

Receiver Sensitivity

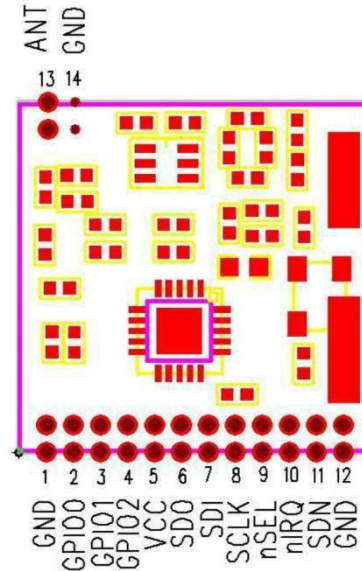
Parameter	Min	Typ	Max	Unit
Receiver Sensitivity	-117	-115	-113	dBm

3 Appearance and Dimensions



4 Pin Definition

The SI4432 module exposes a total of 14 pins, as shown in the pin diagram. The pin function definition table provides the detailed interface specifications.



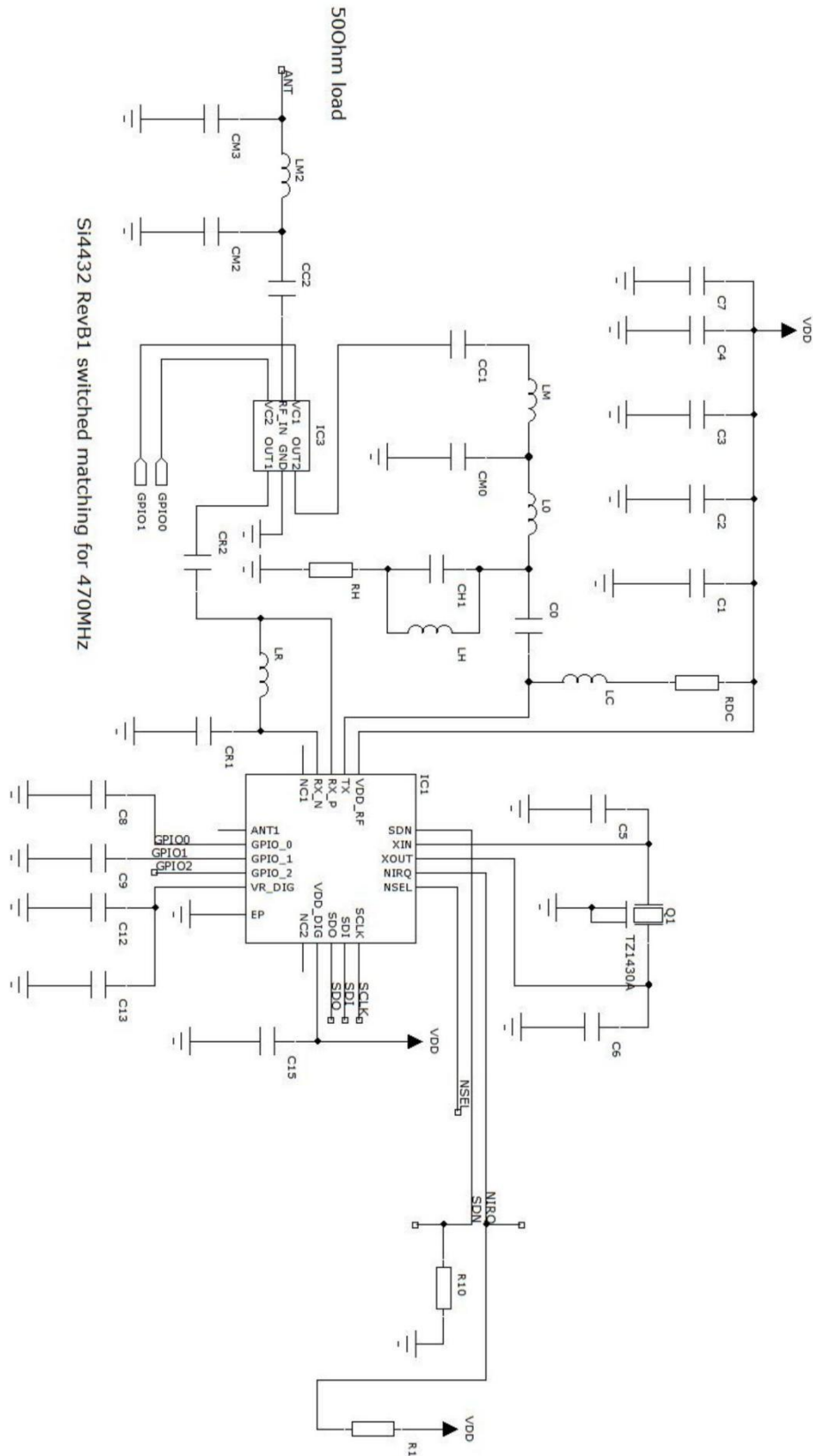
SI4432 Pin Diagram

Pin Function Definition

No.	Name	Function
1	GND	Ground
2	GPIO0	Internally connected to the module transmit control pin
3	GPIO1	Internally connected to the module receive control pin
4	GPIO2	Directly connected to the chip GPIO2 pin
5	VCC	3.3V power supply
6	SDO	Serial data output
7	SDI	Serial data input
8	SCLK	Serial clock input
9	nSEL	Serial interface select input
10	nIRQ	Interrupt output pin
11	SDN	Shutdown input pin

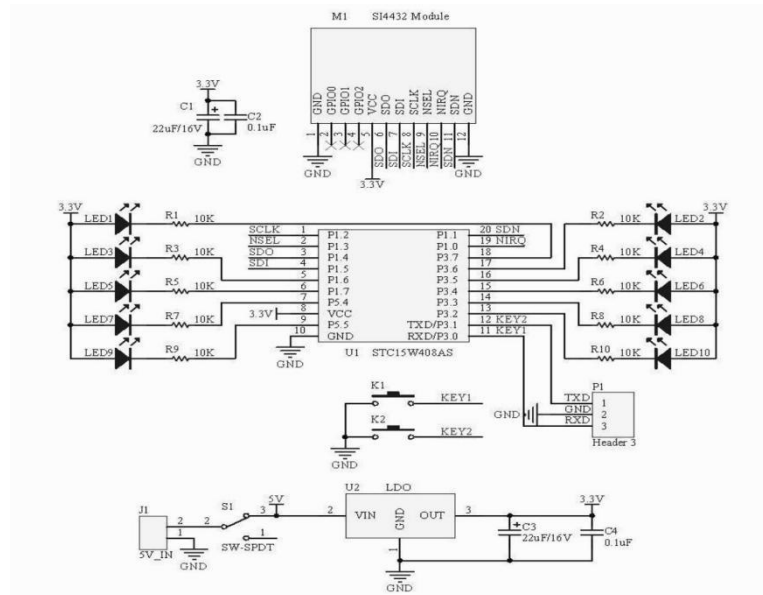
12	GND	Ground
13	ANT	50Ω antenna interface
14	GND	Ground

5 Schematic



6 Design Guide

1. Application Reference Circuit

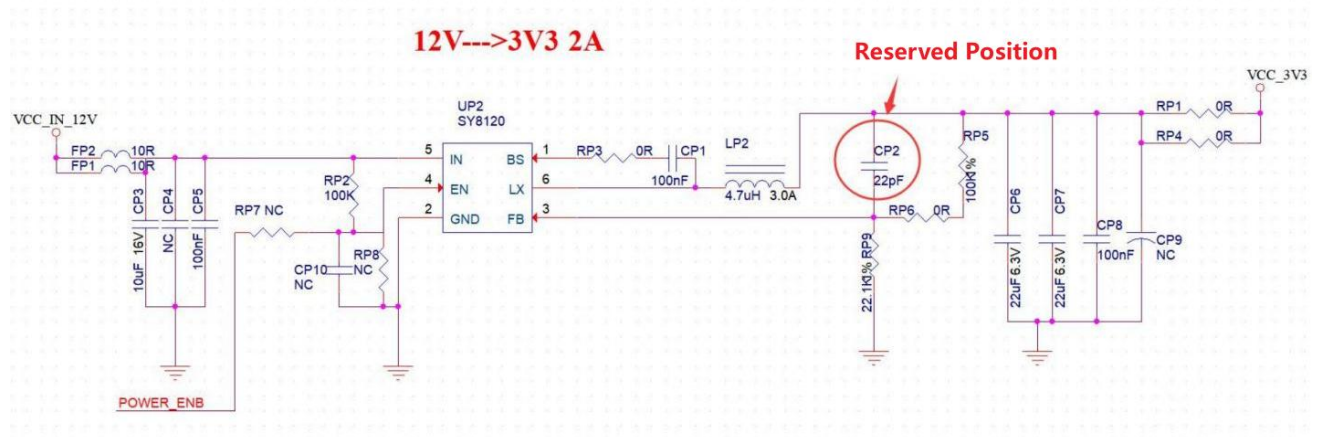


2. Antenna Layout Requirements

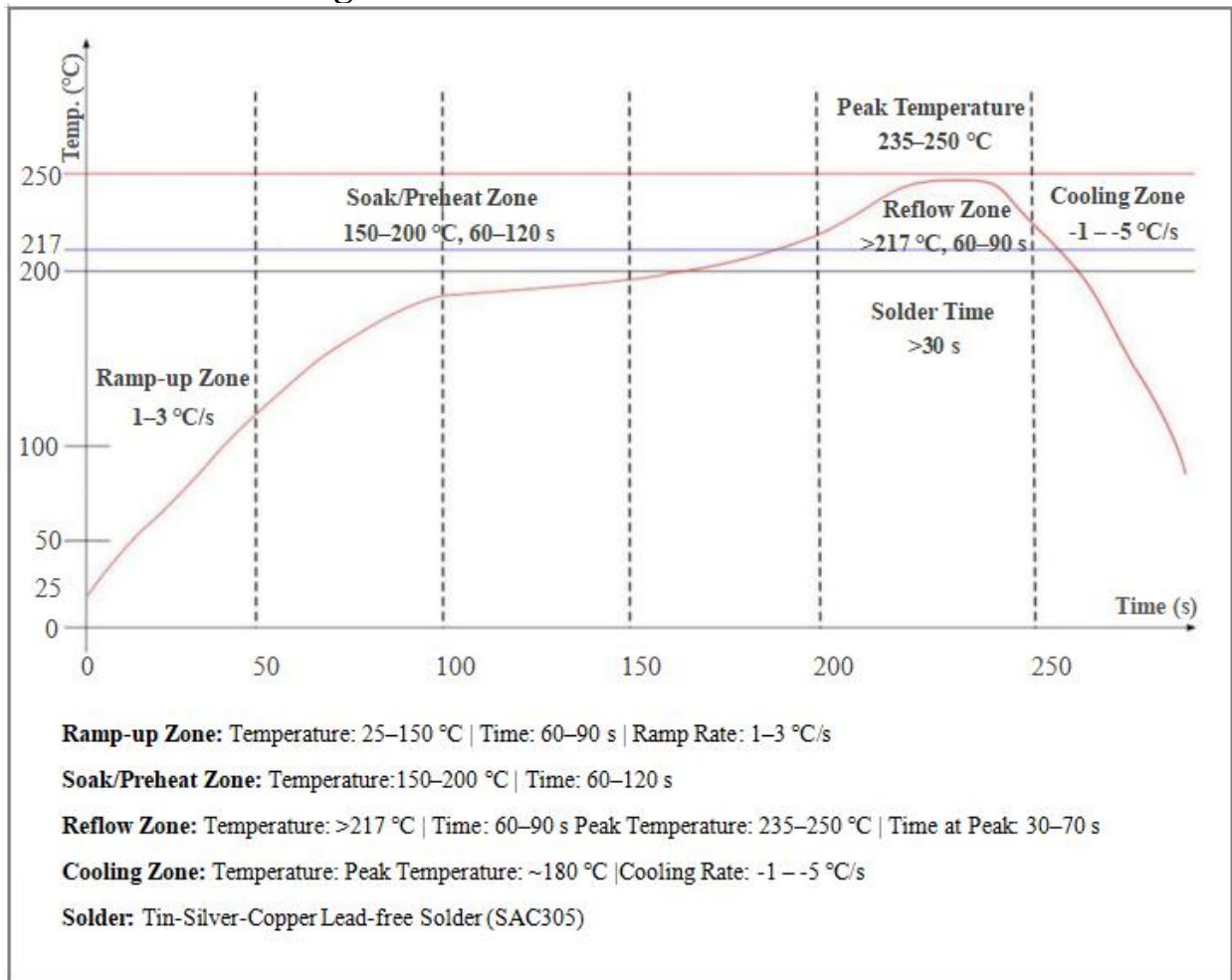
- (1) Place the module at the edge of the main board. Metal components should be kept away from the antenna area, and the antenna should be placed as far as possible from high-frequency devices.

3. Power Supply

- (1) A 3.3V supply voltage is recommended, with a peak current above 250mA.
- (2) An LDO is recommended for power supply; if using DC-DC, the ripple should be controlled within 30mV.
- (3) For the DC-DC power supply circuit, it is recommended to reserve space for dynamic response capacitors to optimize output ripple under large load transients.
- (4) It is recommended to add ESD protection devices to the 3.3V power interface.



7 Reflow Soldering Profile



8 Packing Information

As shown in the figure below, the SI4432 is packaged in tape and reel.



9 Contact Us

Official Website: <https://www.ai-thinker.com>

Development DOCS: <https://docs.ai-thinker.com>

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