S1SPI-HA/UA/NA-A-434 Module Datasheet V1.0

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Module Name Information

S1SPI - xx - A - xxx

Module Type:	Antenna Type :	PCB Version: A	Frequency:
Spirit1	UA: UFL Antenna		434=434MHZ
	HA: Helical Antenna		868=868MHZ
	NA: No Antenna		915=915MHZ

Description

S1SPI-HA/UA/NA-A Module is designed based on Spirit1. The Spirit1 is a very low-power RF transceiver, intended for RF wireless applications in the sub-1 GHz band. It is designed to operate both in the license-free ISM and SRD frequency bands at 169, 315, 433, 868, and 915 MHz, but can also be programmed to operate at other additional frequencies in the 300-348 MHz, 387-470 MHz, and 779-956 MHz bands. The air data rate is programmable from 1 to 500 kbps, and the Spirit1 can be used in systems with channel spacing of 12.5/25 kHz, complying with the EN 300 220 standard. It uses a very small number of discrete external components and integrates a configurable baseband modem, which supports data management, modulation, and demodulation. The data management handles the data in the proprietary fully programmable packet format also allows the M-Bus standard compliance format (all performance classes).However, the Spirit1 can perform cyclic redundancy checks on the data as well as FEC encoding/decoding on the packets. The Spirit1 provides an optional automatic acknowledgement, retransmission, and timeout protocol engine in order to reduce overall system costs by handling all the high-speed link layer operations.

Moreover, the Spirit1 supports an embedded CSMA/CA engine. An AES 128-bit encryption co-processor is available for secure data transfer. The Spirit1 fully supports antenna diversity with an integrated antenna switching control algorithm. The Spirit1 supports different modulation schemes: 2-FSK, GFSK, OOK, ASK, and MSK. Transmitted/received data bytes are buffered in two different three-level FIFOs (TX FIFO and RX FIFO), accessible via the SPI interface for host processing.

Features

- Frequency bands: 150-174 MHz, 300-348 MHz, 387-470 MHz, 779-956 MHz
- Modulation schemes: 2-FSK, GFSK, MSK, GMSK, OOK, and ASK
- Air data rate from 1 to 500 kbps
- Very low power consumption (9 mA RX and 21 mA TX at +11 dBm)
- Programmable RX digital filter from 1 kHz to 800 kHz
- Programmable channel spacing (12.5 kHz min.)
- Excellent performance of receiver sensitivity (- 118 dBm), selectivity, and blocking
- Programmable output power up to +16 dBm
- Fast startup and frequency synthesizer settling time (6 µs)
- Frequency offset compensation
- Integrated temperature sensor
- Battery indicator and low battery detector
- RX and TX FIFO buffer (96 bytes each)
- Configurability via SPI interface
- Automatic acknowledgment, retransmission, and timeout protocol engine
- AES 128-bit encryption co-processor
- Antenna diversity algorithm
- Fully integrated ultra low power RC oscillator
- Wake-up on internal timer and wake-up on external event
- Flexible packet length with dynamic payload length
- Sync word detection
- Address check
- Automatic CRC handling
- FEC with interleaving
- Digital RSSI output
- Programmable carrier sense (CS) indicator
- Automatic clear channel assessment (CCA) before transmitting (for listen- before-talk systems). Embedded CSMA/CA protocol
- Programmable preamble quality indicator (PQI)
- Whitening and de-whitening of data
- Operating temperature range from -40 °C to 85 °C

Antenna Style Selection

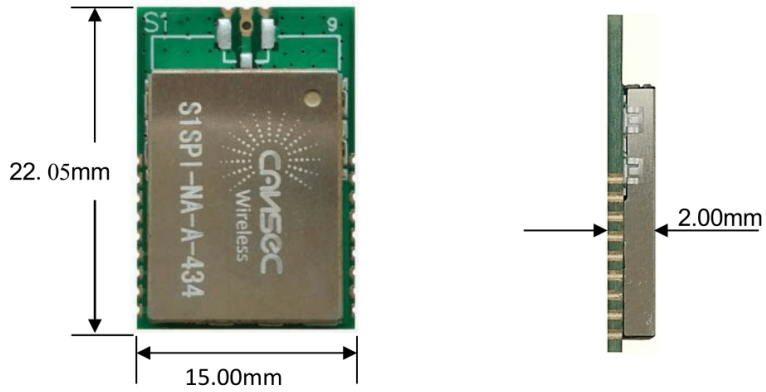
1.S1SPI-UA-A-434(UFL Antenna)

2.S1SPI-NA-A-434(No Antenna)

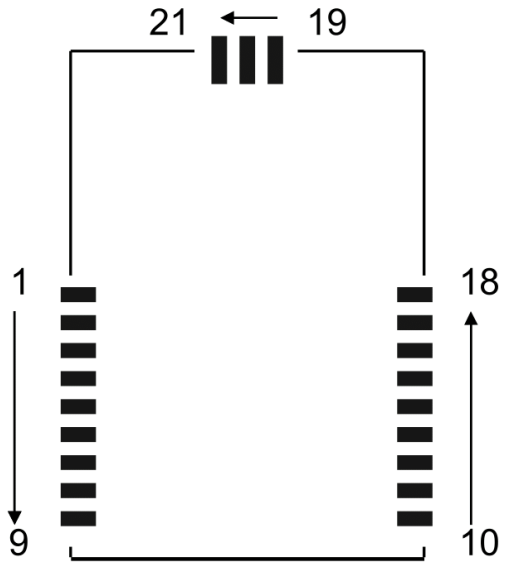
3.S1SPI-HA-A-434(Helical Antenna)

Mechanical Drawing

Tolerance: ±0.2mm



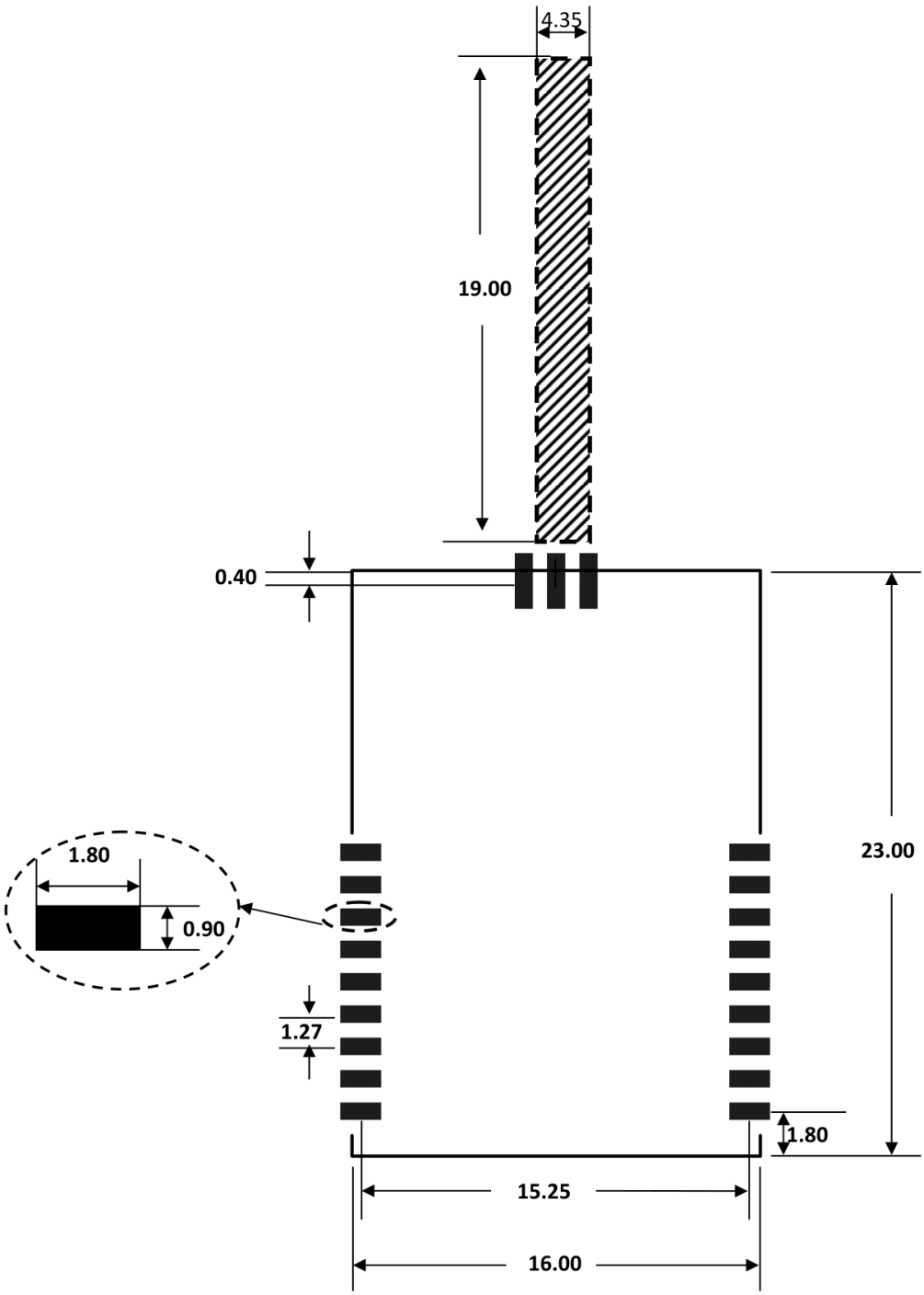
Terminal Description



Pad Number	Name	Description	Pin Type
1	SDO	SPI slave data output	Digital out
2	SDI	SPI slave data input	Digital in
3	SCLK	SPI slave clock input	Digital in
4	CSn	SPI chip select	Digital in
5	GPIO0	General purpose I/O that may be configured through the SPI registers to perform various functions	Digital I/O
6	GPIO1	General purpose I/O that may be configured through the SPI registers to perform various functions	Digital I/O
7	GPIO2	General purpose I/O that may be configured through the SPI registers to perform various functions	Digital I/O
8	GPIO3	General purpose I/O that may be configured through the SPI registers to perform various functions	Digital I/O
9	GND	Connect to GND	Ground pin
10	SDN	Shutdown input pin. SDN should be = '0' in all modes, but SHUTDOWN mode	Digital in
11	GND	Connect to GND	Ground pin
12	GND	Connect to GND	Ground pin
13	VCC	1.8 V to 3.6 V power	Power Supply
14	VCC	1.8 V to 3.6 V power	Power Supply
15	GND	Connect to GND	Ground pin
16	GND	Connect to GND	Ground pin
17	GND	Connect to GND	Ground pin
18	GND	Connect to GND	Ground pin
19	GND	Connect to GND	Ground pin
20	ANT	Connect to an external Antenna	Antenna Interface
21	GND	Connect to GND	Ground pin

Recommended PCB Layout for Package

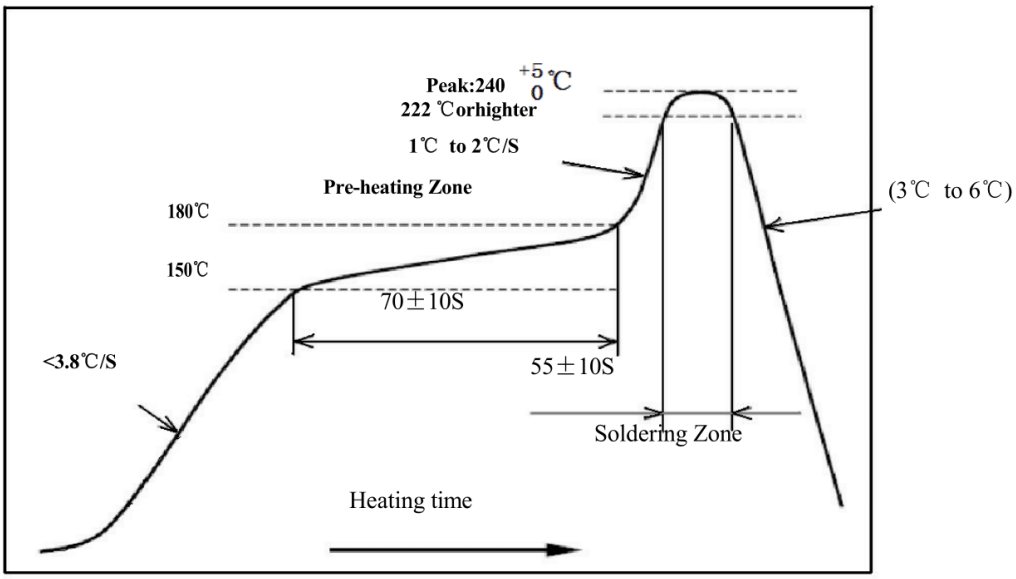
Unit: mm



Specifications

Parameter		Min	Max	Unit
Operating Voltage		1.8	3.6	V
Operating Temperature		-40	85	℃
Current consumption	Shutdo	-	2.5	nA
	Standby	-	600	
	Sleep	-	850	uA
TX Power		-	16	dBm
RX Sensitivity		-	-118	dBm

Soldering Recommendations



Contact details

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