

ISP090401 2.4 GHz Transceiver Module with Integrated Antenna (Preliminary)

Applications

- Advanced media center remote controls
- VoIP headsets
- Game controllers
- Sports watches and sensors
- Home and commercial automation
- Ultra low power sensor networks
- Asset tracking systems
- Toys

Description

This module is based on Nordic Semiconductor nRF24L01+ ultra low power transceiver. The nRF24L01+ is a single chip transceiver with an embedded baseband protocol engine, suitable for ultra low power wireless applications. The nRF24L01+ is designed for operation in the worldwide ISM frequency band at 2.400 – 2.4835 GHz.

This transceiver is specifically designed for both PC peripherals and ultra low power applications such as sports and wellness sensors. For sensor applications, the ultra low power consumption and advanced power management enables battery lifetimes up to several years on a coin cell battery.

The ISP090401 module size is 8x12 mm. The total module thickness including over molding is 1.45 mm. ISP090401 integrates all decoupling capacitors as well as crystal load capacitors so there is no need to mount any additional components on the application board. As the module has several end applications, the antenna was designed to be compatible with several ground plane sizes including that of a USB dongle and a cell phone.

Functional Block Diagram

The module high level block diagram is shown in figure 1 below.

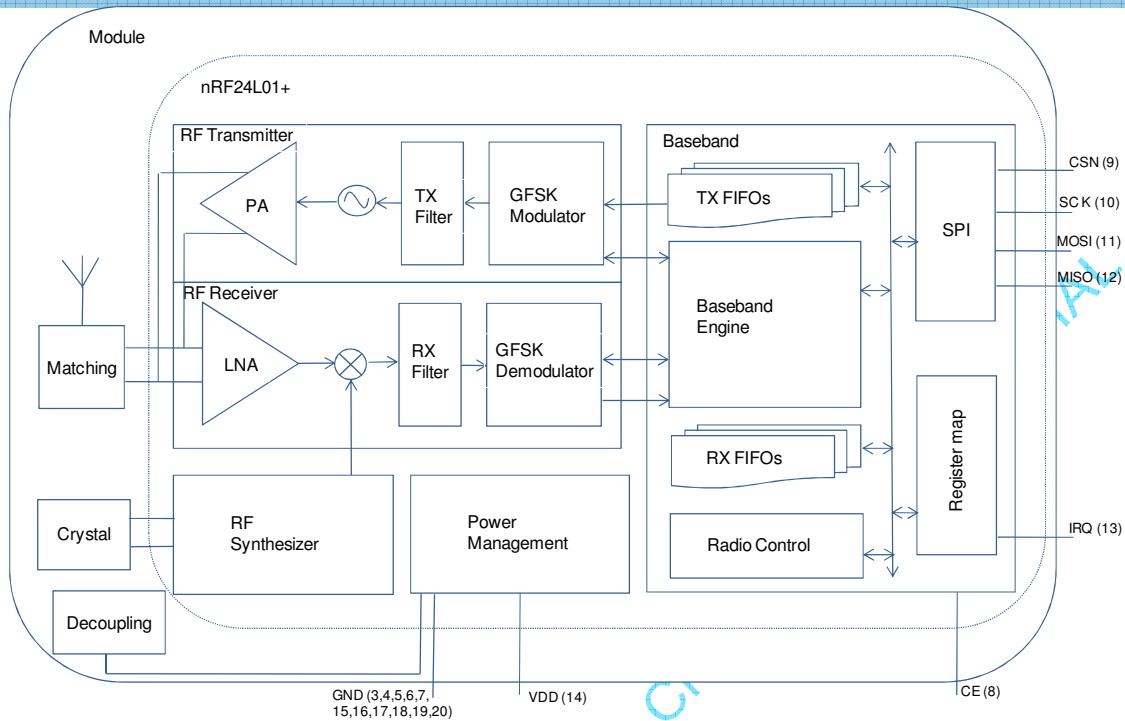


Figure 1: Functional block of the ISP090401

Pin Information

Pin	Name	Pin function	Description
8	CE	Digital Input	Chip Enable Activates Rx or TX mode
9	CSN	Digital Input	SPI Chip Select
10	SCK	Digital Input	SPI Clock
11	MOSI	Digital Input	SPI Slave Data Input
12	MISO	Digital Output	SPI Slave Data Output, with tri-state option
13	IRQ	Digital Output	Maskable Interrupt Pin. Active low
14	VDD	Power	Power Supply (+1.9V -+3.6V DC)

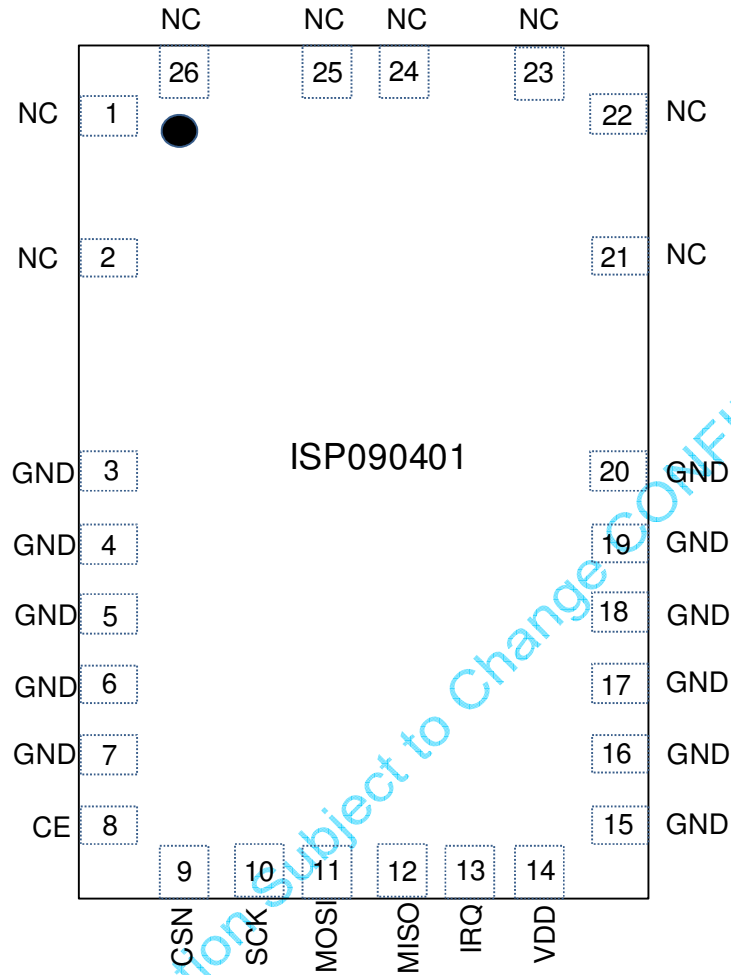


Figure 2: ISP090401 pin assignment (top view) for the QFN package

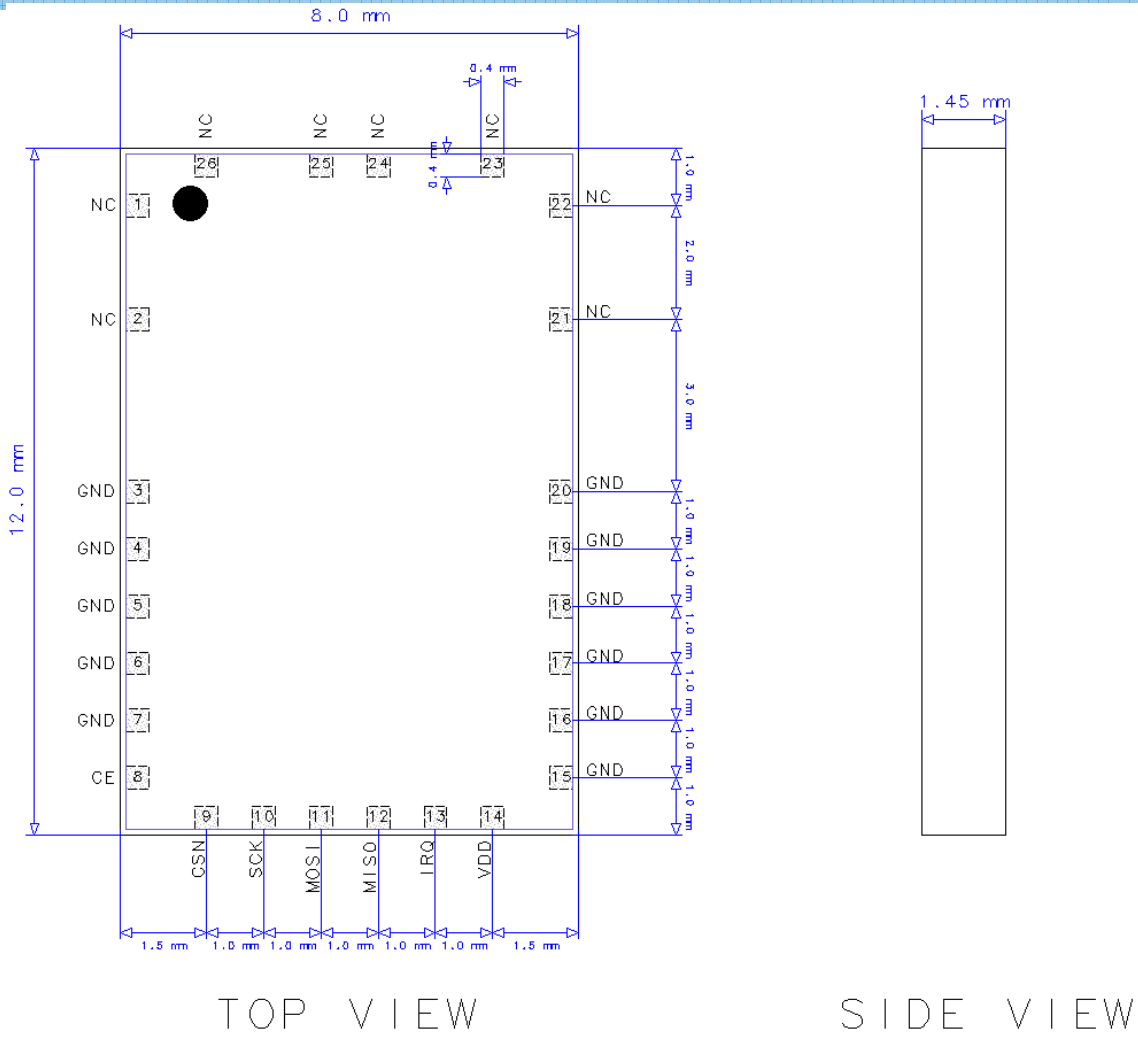


Figure 3: Dimensional drawing for a 8 x 12 x 1.45 mm, 26-Pad Package

Preliminary Info

Electrical Specifications

Temperature range -45 to +85 °C

Parameter	Value	Unit
Supply voltage		
Min. Supply Voltage	1.9	V
Max. Supply Voltage	3.6	V
Current consumption		
Idle Modes		
Supply current in standby-I mode	26	μA
Supply current in standby-II mode	320	μA
Transmit		
Supply current @ 0dBm output power	11.2	mA
Supply current @ -6dBm output power	8.9	mA
Supply current @ -12dBm output power	7.5	mA
Supply current @ -18dBm output power	6.9	mA
Receive		
Supply current 2Mbps	13.5	mA

RF & radiation characteristics

Parameter	Value		Unit
	USB dongle test board	Mobile phone test board	
EIRP	-2	-1	dBm
Rx sensitivity	63.3	62.4	dBμV/m
Max range	> 40		m

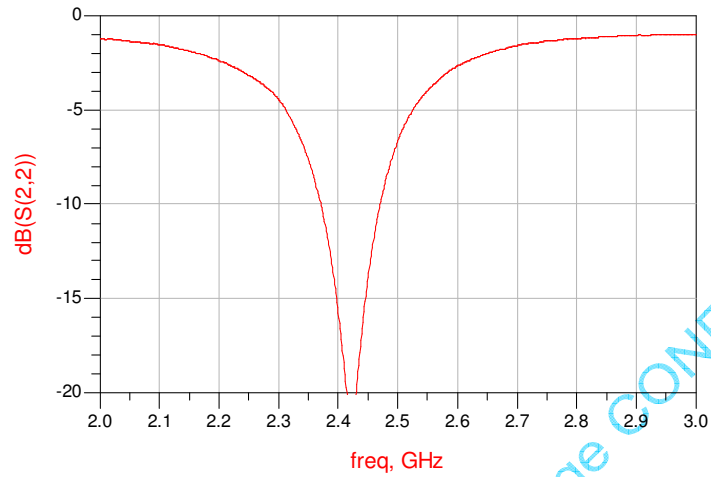
Antenna Pattern & return loss


Figure 4: antenna return loss measurement

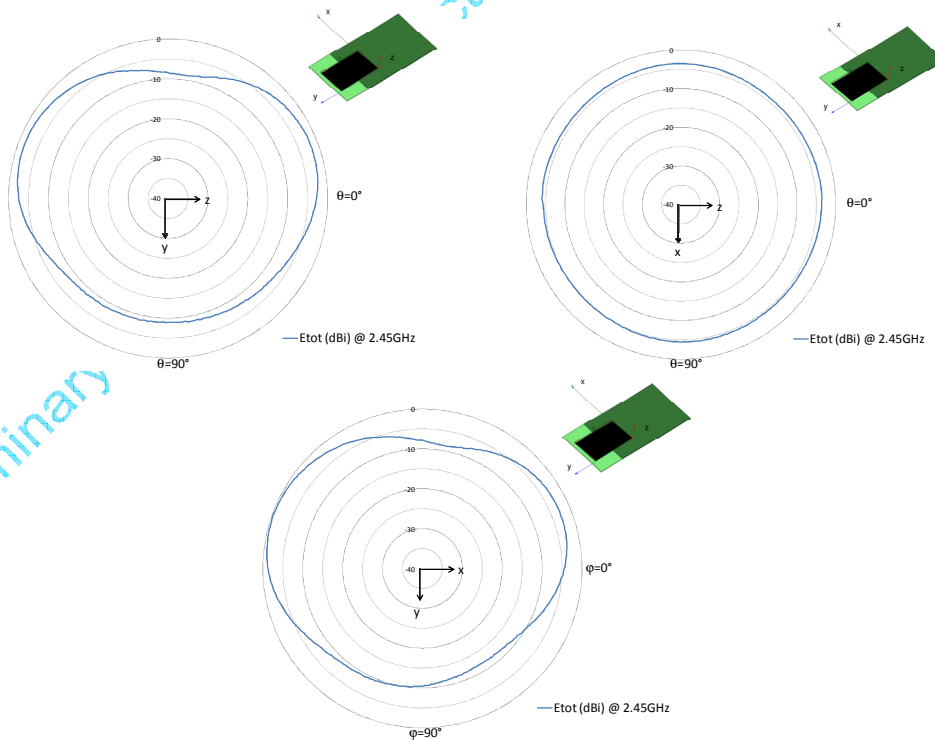


Figure 5 : radiation pattern in 3 planes

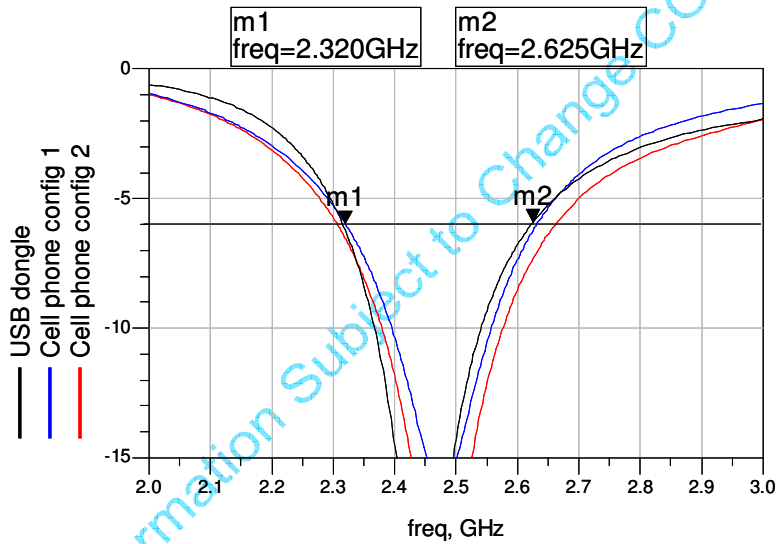
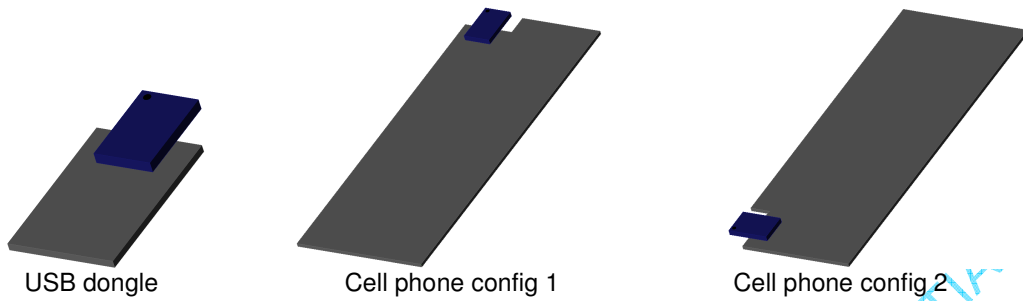


Figure 6 : ground plane effect simulation