SPECIFICATION

Single Chip Low Cost/Low Power RF Transceiver

**Chipcon Products
from Texas Instruments**
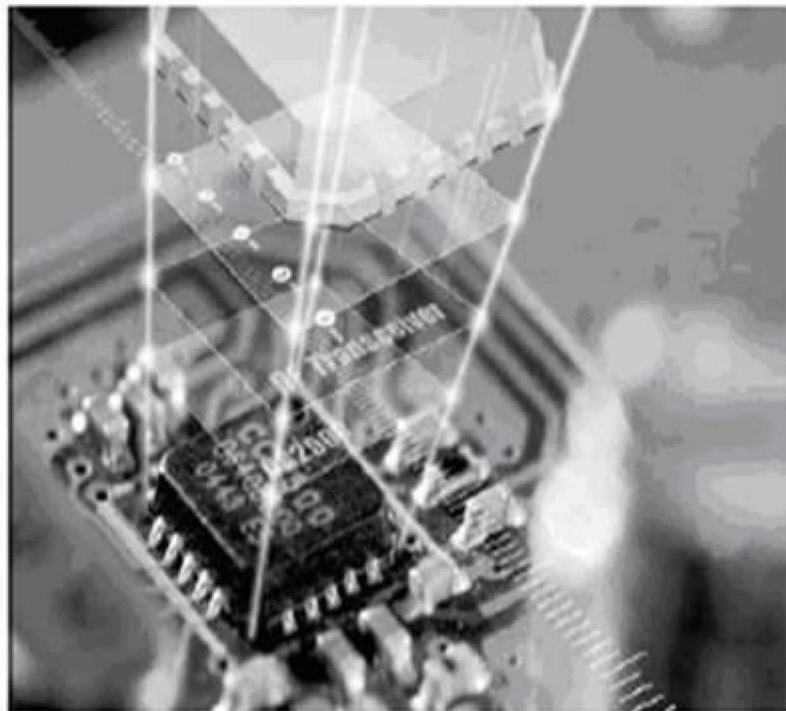
Model: 2.4GHz TRANSCEIVER MODULE
Part no: QFM-TRX1-24G
Version: V1.0

2.4GHz TRANSCEIVER MODULE

Description

QFM-TRX1-24G is developed by the Chipcon Solution(CC2500),which is a FSK /MSK Transceiver module. It provide extensive hardware support for packet handling ,data buffering ,burst transmissions , clear channel assessment, link quality indication and wake on radio .

Its data stream can be Manchester coded by the modulator and decoded by the demodulator .It has a high performance and easily to design your product. It can be used in 2400-2483.5MHz ISM/SRD band systems, Consumer Electronics, Active RFID,Wireless game controllers, wireless KB/Mouse and others wireless systems.

2.4GHz FSK/MSK TRANSCEIVER

Features

- Low current consumption.
- Easy for application.
- Efficient SPI interface
- Operating temperature range : － 40°C to +85°C
- Operating voltage :1.8 to 3.6 Volts.
- Available frequency at : 2400 to 2483GHz
- Programmable output power and sensitivity

Applications

- 2400-2483 MHz ISM/SRD band systems
- Consumer Electronics
- Wireless game controllers
- Wireless audio
- Wireless keyboard and mouse

Absolute Maximum Ratings

Parameter	Rating	Units
Supply Voltage	3	VDC
Operating Temperature	-40 to +85	^{o}C

Pin Descriptions

Pin No	Pin Name	Pin Type	Description
1	VCC	Power	1.8V-3.6V digital power supply for digital I/O's and for the digital core voltage regulator
2	SI	Digital Input	Serial configuration interface, data input
3	SCLK	Digital Input	Serial configuration interface, clock input
4	SO	Digital Output	Serial configuration interface, data output. Optional general output pin when CSn is high
5	GDO2	Digital Output	Digital output pin for general use: • Test signals • FIFO status signals • Clear Channel Indicator • Clock output, down-divided from • Serial output RX data
6	GND	Ground	GND
7	GDO0	Digital I/O	Digital output pin for general use: • Test signals • FIFO status signals • Clear Channel Indicator • Clock output, down-divided from XOSC • Serial output RX data • Serial input TX data Also used as analog test I/O for prototype/production testing
8	CSn	Digital Input	Serial configuration interface, chip select

2 Absolute Maximum Ratings

Under no circumstances must the absolute maximum ratings given in Table 1 be violated. Stress exceeding one or more of the limiting values may cause permanent damage to the device.

Caution! ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

Parameter	Min	Max	Units	Condition
Supply voltage	−0.3	3.6	V	All supply pins must have the same voltage
Voltage on any digital pin	−0.3	VDD+0.3, max 3.6	V	
Voltage on the pins RF_P, RF_N and DCOUPL	−0.3	2.0	V	
Input RF level		TBD	dBm	
Storage temperature range	−50	150	°C	
Solder reflow temperature		260	°C	T = 10 s
ESD		2	kV	All pads (excluding RF) have 2kV HBM ESD protection

Table 1: Absolute Maximum Ratings

3 Operating Conditions

The operating conditions for *CC2500* are listed Table 2 in below.

Parameter	Min	Max	Unit	Condition
Operating temperature	−40	85	°C	
Operating supply voltage	1.8	3.6	V	All supply pins must have the same voltage

Table 2: Operating Conditions

4 Electrical Specifications

Tc = 25°C, VDD = 3.0V if nothing else stated. Measured on Chipcon's *CC2500* EM reference design.

| Parameter	Min	Typ	Max	Unit	Condition
Current consumption		8.7		μA	Automatic RX polling once each second, using low-power RC oscillator, with 460Hz filter bandwidth and 250kbps data rate, PLL calibration every 4th wakeup. Average current with signal in channel *below* carrier sense level.
		35		μA	Same as above, but with signal in channel *above* carrier sense level, 1.9ms RX timeout, and no preamble/sync word found.
		1.4		μA	Automatic RX polling every 15th second, using low-power RC oscillator, with 460kHz filter bandwidth and 250kbps data rate, PLL calibration every 4th wakeup. Average current with signal in channel below carrier sense level.
		16		μA	Same as above, but with signal in channel *above* carrier sense level, 14ms RX timeout, and no preamble/sync word found.
		1.8		mA	Only voltage regulator to digital part and crystal oscillator running (IDLE state)
		7.6		mA	Only the frequency synthesizer running (after going from IDLE until reaching RX or TX states, and frequency calibration states)
		15.6		mA	Receive mode, input near sensitivity limit (RX state)
		13.3		mA	Receive mode, input 30dB above sensitivity limit (RX state)
		11.5		mA	Transmit mode, –12dBm output power (TX state)
		15.4		mA	Transmit mode, -6dBm output power (TX state)
		21.6		mA	Transmit mode, 0dBm output power (TX state)
Current consumption in power down modes		180		μA	Voltage regulator to digital part on, all other modules in power down (XOFF state)
		100		μA	Voltage regulator to digital part off, register values retained, XOSC running (SLEEP state with `MCSM0.OSC_FORCE_ON` set)
		900		nA	Voltage regulator to digital part off, register values retained, low-power RC oscillator running (SLEEP state with WOR enabled)
		500		nA	Voltage regulator to digital part off, register values retained (SLEEP state)

Table 3: Electrical Specifications

5 General Characteristics

Parameter	Min	Typ	Max	Unit	Condition/Note
Frequency range	2400		2483.5	MHz	
Data rate	1.2		500	kbps	Modulation formats supported: (Shaped) MSK (differential offset QPSK, up to 500kbps) 2-FSK (up to 250kbps) OOK/ASK (up to 250kbps) Optional Manchester encoding (halves the data rate).

Table 4: General Characteristics

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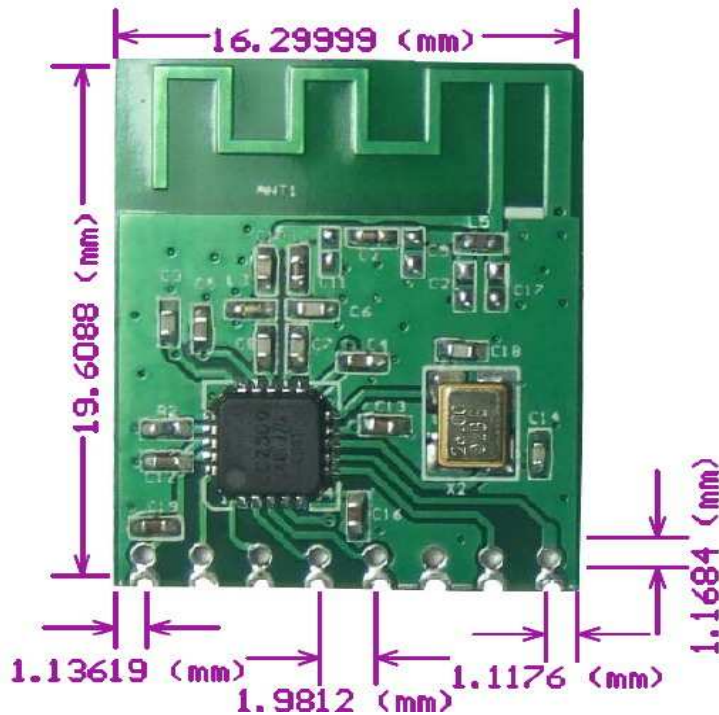
Remark:

1. **About detailed Specifications , Please kind check with www.ti.com & CC2500 Data sheet .(http://focus.ti.com/lit/ds/symlink/cc2500.pdf) .**

2. **The Module don't re-manufacture by SMT**