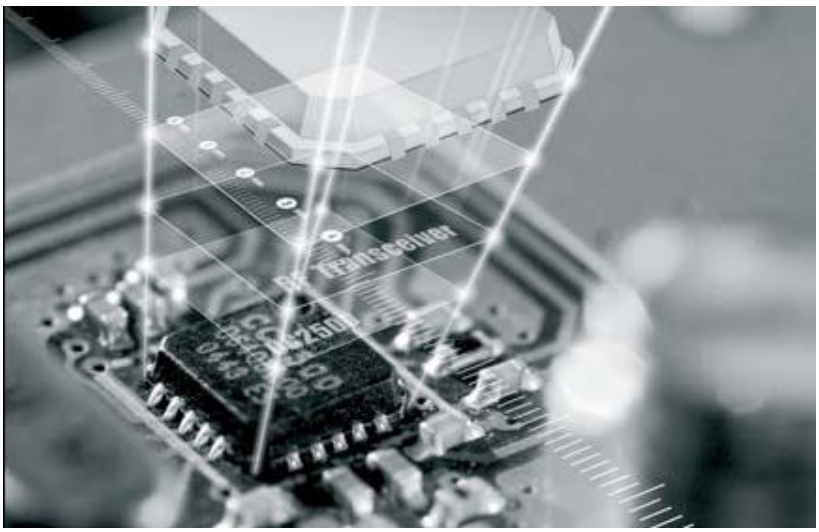
SPECIFICATION

Single Chip High Performance low Power
RF Transceiver
(Narrow band solution)



Model : **Sub. 1GHz RF Module**
Part No : TC1200TCXO-PTIx-N
Version : V1.2
Date : 2013.11.11

■ Function Description

The **TC1200TCXO-PTIx-N** is a fully integrated single-chip radio transceiver design for high performance at very low power and low voltage operation in cost effective wireless system. The circuit is mainly intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency bands at 433, 868, and 915 MHz.

■ Applications

- ***Low power, high performance, wireless systems with up to 1250 Kbit/s data rate***
- ***operating in the 433/868/915/920 MHz ISM/SRD bands***
- ***Wireless alarm and security systems***
- ***Industrial monitoring and control***
- ***Wireless sensor networks***
- ***AMR – utomatic Meter Reading***
- ***Home and building automation***
- ***Wireless MBUS, all modes***
- **Wireless healthcare application**

■ Selection Guide

Denomination：Sub. 1GHz Transceiver Module

Part No. ：TC1200TCXO-PTI**x - N**

4: 4xx MHz / **8**:8xx MHz / **9**:9xxMHz

N: not include Antenna

Note: ***Antenna Design is should be considered and based on the mechanism design.***

We can be your consultant and we also provide customize antenna solution.

■ 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	3.9	V	All supply pins must have the same voltage
Voltage on any digital pin	–0.3	VDD + 0.3, max 3.9	V	
Voltage on the pins	–0.3	2.0	V	
Input RF level		+10	dBm	
Storage temperature range	–40	125	°C	

■ Operating Conditions

Parameter	Min	Max	Units	Condition
Operating temperature	–40	85	°C	
Operating supply voltage	2.0	3.6	V	All supply pins must have the same voltage

■ General Characteristics

Parameter	Min	Typ	Max	Units	Condition/Note
Frequency Bands	820		950	MHz	
	410		475	MHz	
Frequency Resolution		30		Hz	In 820-950 MHz Band
		15		Hz	In 410-475 MHz Band
Data Rate	0		1250	Kbps	Packet Mode
	0		625	Kbps	Transparent Mode

■ Electrical Specifications

● Current Consumption

TA= 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition
Power Down with Retention		0.3	1	uA	
		0.5		uA	Low-Power RC oscillator running
XOFF Mode		180		uA	Crystal Oscillator/TCXO disable
Idle Mode		1.5		mA	Clock running. System waiting with no radio activity

Transition mode for 868/915/920 MHz Bands

TA= 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition
TX Current Consumption +14 dBm		46		mA	
TX Current Consumption +10dBm		36		mA	

Transition mode for 434 MHz Bands

TA= 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition
TX Current Consumption +14 dBm		46		mA	
TX Current Consumption +10dBm		35		mA	

Receive mode for 868MHz Band

TA= 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition
RX Wait for Sync					
1.2K bps, 3 Byte Preamble		3.4		mA	Using RX Sniffer Mode, where the receiver wakes up at regular intervals looking for an incoming packet
38.4Kbps,12Byte Preamble		3.4		mA	Sniffer Mode configured to terminate on Carrier Sense, and is measured using RSSI_VALID_COUNT =1
38.4Kbps, 4 Byte Preamble		10.7		mA	
50Kbps, 24Byte Preamble		2.1		mA	
RX Packet Current 1.2Kbps		23.6		mA	

● RF Receive Section

General Receive Parameter(High Performance mode)

TA = 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition/Note
Saturation		10		dBm	
IIP3		-14		dBm	At maximum gain
Optimum Source Impedance 868/915/920 MHz bands 434 MHz bands 169 MHz bands		 60+j60 / 30+j30 100+j60 / 50+j30 140+j40 / 70+j20		 ohm ohm 0hm	(Differential / Single Ended RX configuration)

RX Performance in 868/915/920MHz

TA = 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition/Note
Receiver sensitivity		-120		dBm	1.2Kbps 2-FSK, DEV=4KHz CHF=11KHz
		-109		dBm	38.4Kbps 2-GFSK, DEV=20KHz CHF=104KHz
		-96		dBm	500Kbps 2-GFSK, CHF=833KHz
		-96		dBm	1Mbps 4-GFSK, DEV=400KHz CHF=1.66MHz
Blocking and Selectivity 1.2 kbps 2-FSK, 12.5 kHz channel separation, 4 kHz deviation, 11 kHz channel filter		54		dB	+/- 12.5KHz (adjacent channel)
		55		dB	+/- 25KHz(alternate channel)
		77		dB	+/- 2MHz
		82		dB	+/- 10MHz
Blocking and Selectivity 38.4 kbps 2-GFSK, 100 kHz channel separation, 20 kHz deviation, 104 kHz channel filter		44		dB	+/- 100KHz (adjacent channel)
		44		dB	+/- 200KHz(alternate channel)
		64		dB	+/- 2MHz
		72		dB	+/- 10MHz
Blocking and Selectivity 500 kbps GMSK, 833 kHz channel filter		42		dB	+/- 1MHz (adjacent channel)
		42		dB	+/- 2MHz(alternate channel)
		57		dB	+/- 10MHz
Blocking and Selectivity 1 Mbps 4-GFSK, 400kHz deviation, 1.6MHz channel filter		46		dB	+/- 2MHz (adjacent channel)
		52		dB	+/- 4MHz(alternate channel)
		59		dB	+/- 10MHz

RX Performance in 434MHz

T_A = 25°C, VDD = 3.0 V if nothing else stated.

Parameter	Min	Typ	Max	Units	Condition/Note
Receiver sensitivity		-122		dBm	1.2 kbps 2-FSK, DEV=4 kHz CHF=11 kHz
		-110		dBm	38.4 kbps 2-GFSK, DEV=20 kHz CHF=104 kHz
Blocking and Selectivity 1.2 kbps 2-FSK, 12.5 kHz channel separation, 4 kHz deviation, 11 kHz channel filter		60		dB	+/- 12.5KHz (adjacent channel)
		61		dB	+/- 25KHz(alternate channel)
		82		dB	+/- 2MHz
		85		dB	+/- 10MHz
Blocking and Selectivity 38.4 kbps 2-GFSK, 100 kHz channel separation, 20 kHz deviation, 104 kHz channel filter		49		dB	+/- 100KHz (adjacent channel)
		48		dB	+/- 200KHz(alternate channel)
		66		dB	+/- 2MHz
		74		dB	+/- 10MHz

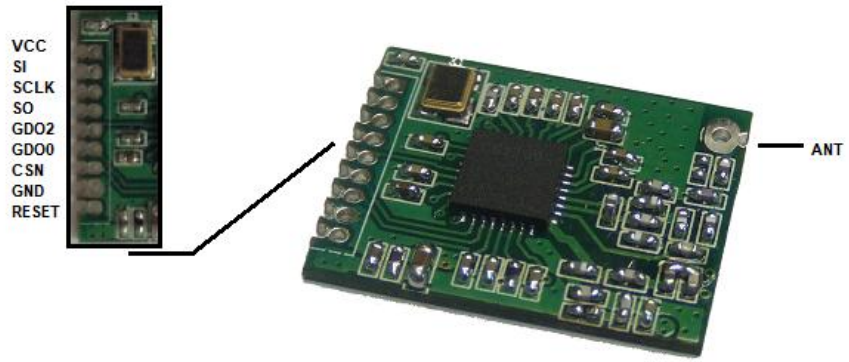
● RF Transmit Section

General Receive Parameter(High Performance mode)

T_A = 25°C, VDD = 3.0 V if nothing else stated.

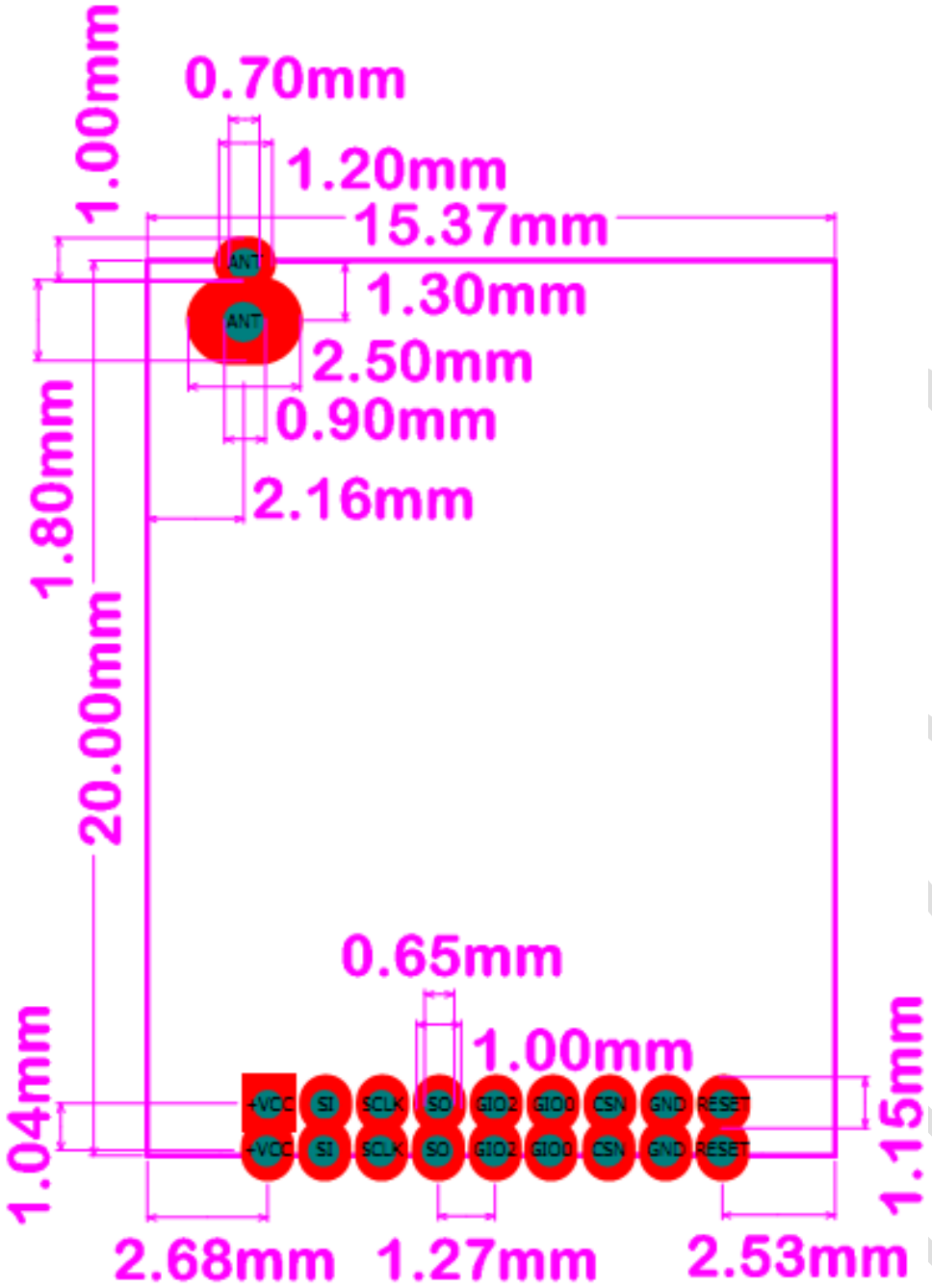
Parameter	Min	Typ	Max	Units	Condition/Note
Max Output Power		+14		dBm	At 915/920 MHz
		+14		dBm	At 868 MHz
		+14		dBm	At 433 MHz
Mini Output Power		-12		dBm	Within fine step size range
		-38		dBm	With coarse step size range
Harmonics					Transmission at +14 dBm
2nd Harm, 433 MHz		-59		dBm	Suitable for systems targeting compliance with ETSI EN 300-220, FCC Part 15, FCC Part 90, ARIB STD-T108, ARIB STD-T67, ARIB STD-30
3rd Harm, 433 MHz		-51		dBm	
4th Harm, 433 MHz		-63		dBm	
2nd Harm, 868 MHz		-50		dBm	
3rd Harm, 868 MHz		-44		dBm	
4th Harm, 868 MHz		-56		dBm	
2nd Harm, 915 MHz		-58		dBm	
3rd Harm, 915 MHz		-46		dBm	
4th Harm, 915 MHz		-62		dBm	

■ TC1200-PTIx-N RF Module Pin Configuration

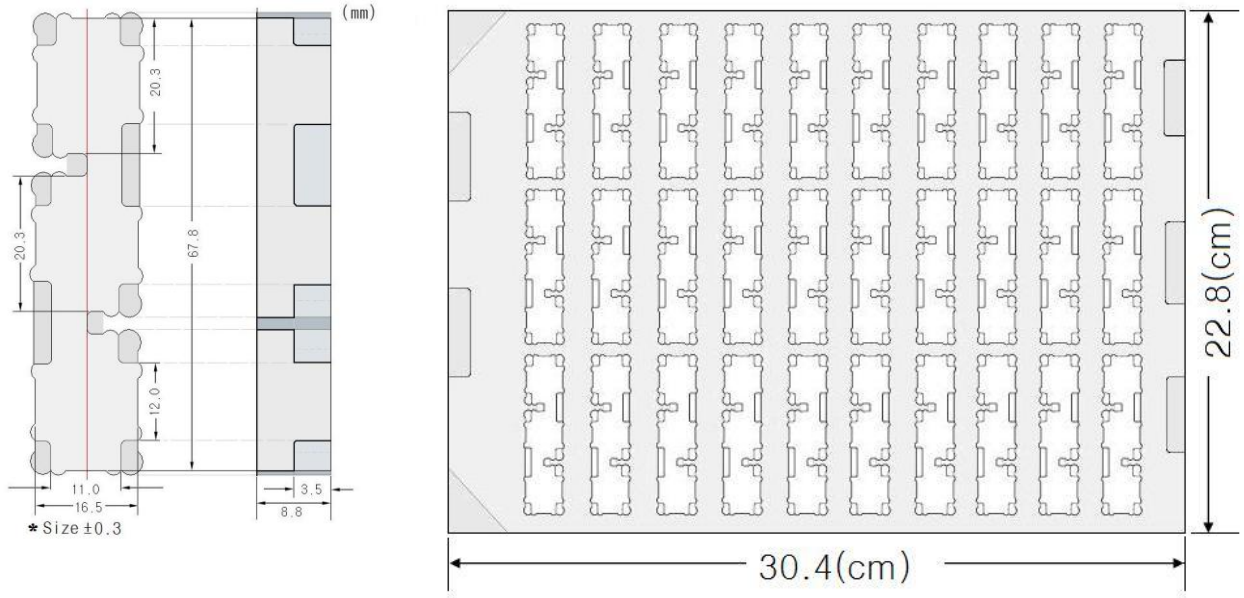


Pin #	Pin name	Pin type	Description
1	VCC	Power (Digital)	Power supply 3.3V
2	SI	Digital Input	Serial configuration interface, data input
3	SCLK	Digital Input	Serial configuration interface, clock input
4	SO	Digital Output	Serial configuration interface, data output. Optional general output pin when 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 XOSC • Serial output RX data
6	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
7	CSN	Digital Input	Serial configuration interface, chip select
8	GND	Ground	Ground
9	RESET	Digital Input	Asynchronous, active-low digital reset
10	ANT	RF signal	50 ohm impedance / RX configuration

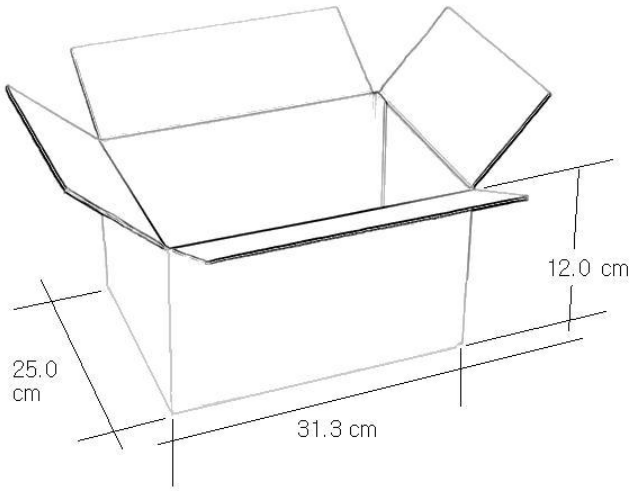
■ Recommended PCB layout for Module



■ Skin packing Information



■ Skin packing box Information



Device	Type	SPQ	Length(cm)	Width(cm)	Height(cm)
TC1200-PTIx - N	Module	600	31.3	25.0	12.0

■ Document History

Revision	Date	Description/Changes
1.1	2013/11/11	First Release
1.2	2013/12/11	Change skin package box information

■ Address Information

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