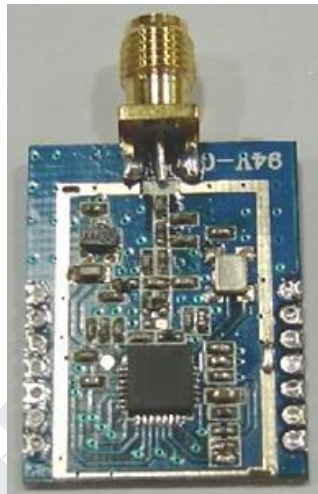

TRW-5051

**Version History**

Version	Date	Changes
V1.01	Jul 1, 2011	1 st . Edition

Application

400-470 MHz and 800-930 MHz data transmission and reception in the Short Range Devices (SRD) band.

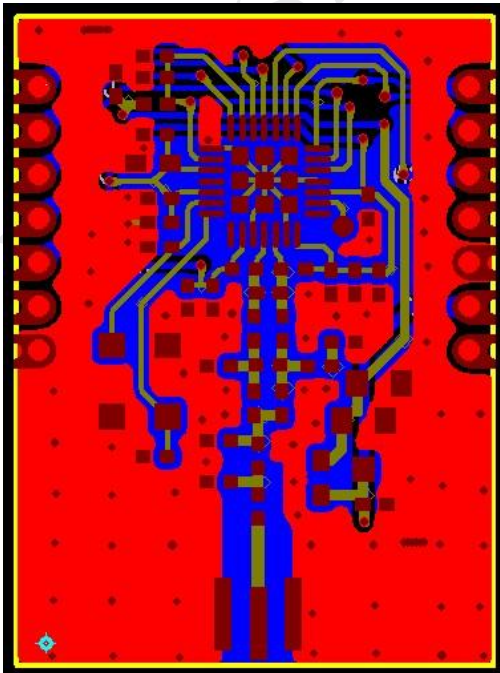
- Telemetric applications, sensor readout
- Toys
- Wireless audio
- Wireless networks
- Wireless USB
- Access control
- Remote keyless entry
- ARIB compatible
- Pointing devices and keyboards
- Active RFID
- RFID base station transmitter
- 433/868/915 MHz SRD band systems

Key Feature

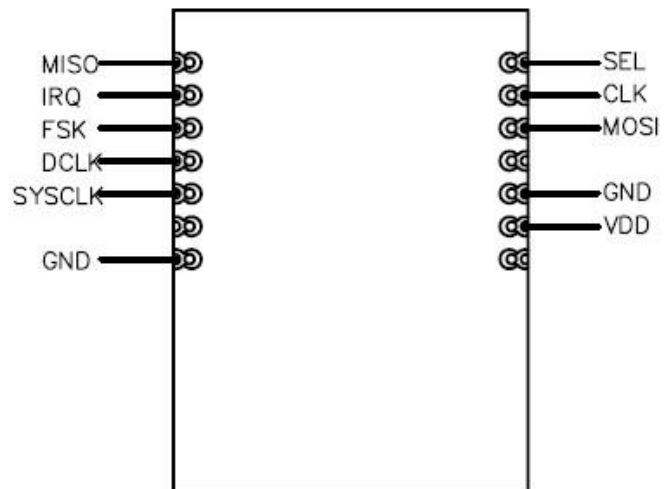
- Advanced multi-channel single chip UHF transceiver
- Configurable for usage in 400-470 MHz and 800-930 MHz SRD bands
- Wide variety of shaped modulations supported in RX and TX (ASK, PSK, MSK, FSK)
- Data rates from 1.2 to 300 kbps (FSK, MSK) and to 600 kbps (ASK, PSK)
- Ultra fast settling RF frequency synthesizer for low-power consumption
- Variable channel filtering from 40 kHz to 600 kHz
- 802.15.4 compatible
- RF carrier frequency and FSK deviation programmable in 1 Hz steps
- Fully integrated RF frequency synthesizer with VCO auto-ranging and band-width boost modes for fast locking Sensitivity down to -110 dBm
- Up to $+15$ dBm programmable transmitter power amplifier for long range operation
- QFN28 package
- Automatic frequency control (AFC)
- SPI micro-controller interface

1. Performance for Low Power Modules

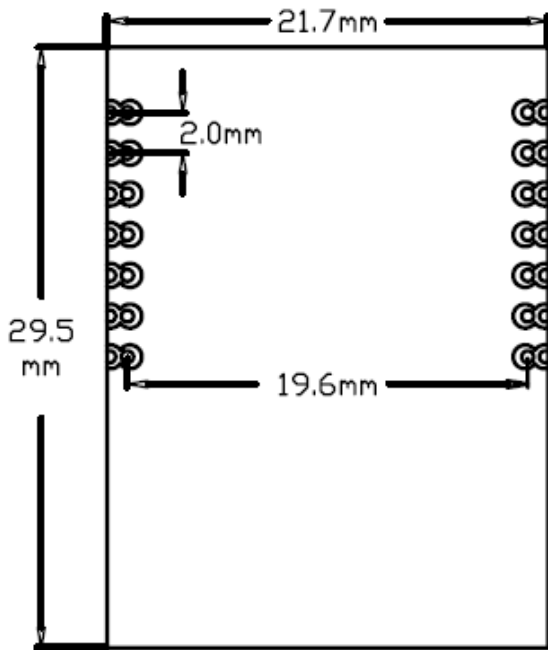
1.1 TRW-5051



TRW-5051 Top PCB Layout



TRW-5051 Pinout Top view

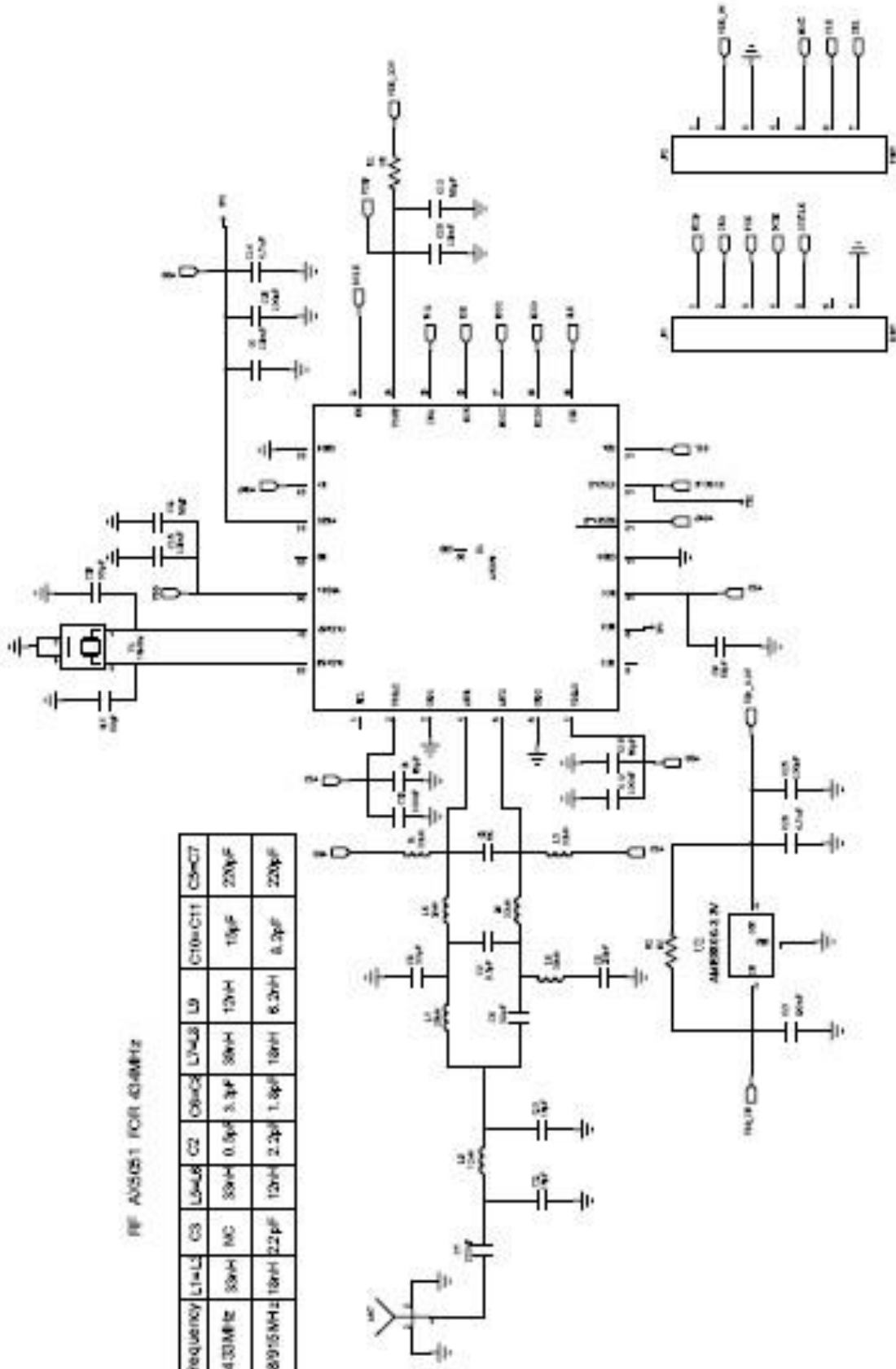


Top view
TRW-5051 PCB Layout dimensions

2. Application Circuit and external components:
1.2 Application Circuit

RF A5051 FOR 40MHz

Frequency	L1=L2	C3	L3=L4	C2	C5=C6	L7=L8	L9	C10=C11	C5=C7
40MHz	30nH	NC	30nH	0.5pF	3.3pF	30nH	12nH	15pF	22nF
86.8975MHz	18nH	2.2pF	12nH	2.2pF	1.8pF	18nH	8.2nH	8.2pF	22nF



1.1 Overview of external components

規格	位置號	用量
8.2pF 50V+/-5% NPO 0402	C10, C11	2
2.2pF 50V+/-0.25pF NPO 0402	C2, C3	2
1.8pF 50V+/-0.25pF NPO 0402	C6, C8	2
220pF 50V+/-5% NPO 0402	C5, C7	2
100nF 50V+/-20% Y5V 0402	C4, C14, C15, C18, C20, C22, C23, C25	8
33pF 50V+/-5% NPO 0402	C16, C17	2
56pF 50V+/-5% NPO 0402	C1, C9, C13, C19, C21	5
4.7 μ F 50V+/-20% Y5V 0805	C14, C26	2
OR 1/16W+/-5% 0402	R1	1
NC	R2	
12nH +/-0.3nH 0402	L5, L6	2
6.2nH +/-0.3nH 0402	L9	1
18nH +/-0.3nH 0402	L1, L3, L7, L8	4
AME8800-3.3V SOT-23	U2	1
TRW-0501 QFN28	U1	1
RF4 厚度 1MM		1
16MHz +/-10ppm SMD 4025	Y1	1
MC901	ANT	1

3. TRW-0501 RF model Pinout overview

Symbol	Pin(s)	Type	Description
MISO	1	o	Serial peripheral interface data output
IRQ	2	I/O	Default functionality: Transmit and receive interrupt Can be programmed to be used as a general purpose I/O pin
DDATA	3	o	Test model: data output
DCLK	4	o	Test model: dclock output
SYSCLK	5	I/O	Default functionality: Crystal oscillator (or divided) clock output Can be programmed to be used as a general purpose I/O pin
NC	6	NC	
GND	7		GND
NC	8		
VDD	9		VCC.2.2V-3.6V
GND	10		GND
NC	11		
MOSI	12	I	Serial peripheral interface data input

CLK	13	I	Serial peripheral interface clock
SEL	14	I	Serial peripheral interface select

4. Electrical Specifications

SYMBOL	DESCRIPTION	CONDITION	MIN.	TY P.	MA X.	UNIT
	Power-down current	PWRMODE=0x00		0.5		uA
RX_I	Current consumption RX High sensitivity mode: VCO_I=001; REF_I=011	433MHz 10 kbit/s		20		mA
ITX	Current consumption TX VCO_I=001; REF_I=011; LOCURST=1	433 MHz, 15dBm		45		MA

4.1 RF Transmit Section

Measured on **CC2520** EMS reference design with $T_A=25^\circ\text{C}$, $V_{DD}=3.0\text{V}$, and nominal output power unless stated otherwise.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT		
PTX868	Transmitter power @434MHz LOCURST=1	TXRNG=0000			-40	dBm	
		TXRNG=0001		-7.5		dBm	
		TXRNG=0101		5.5			
		TXRNG=0110		6.5			
		TXRNG=0111		7.5			
		TXRNG=1000		8.5			
		TXRNG=1001		9.5			
		TXRNG=1010		10			
		TXRNG=1011		10.5			
		TXRNG=1100		11			
		TXRNG=1101		11.5			
		TXRNG=1110		12.5			
		TXRNG=1111		15			dBm

TX868	harm2 Emission @ 2nd harmonic			-50		dBc
TX868	harm3 Emission @ 3rd harmonic			-55		dBc

4.2 RF Receive Section

Measured on **TRW-0501** reference design with $T_A=25^\circ\text{C}$ and $V_{DD}=3.0\text{V}$ unless stated otherwise.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT	
Receiver sensitivity	Input sensitivity at BER = 10 for 434 MHz operation High sensitivity mode: VCO_I=001; REF_I=011; RXIMIX=01	FSK 2.4K	-112	-111	-109	dBm
		FSK38.4K		-103		dBm
		FSK 50K		-102		
		FSK100K		-100		
		FSK 200K		-98		
		ASK 38.4K		-103		
		ASK 50K		-101		
		ASK100K		-100		
		ASK 200K		-97		
		PSK200K		-98		
		PSK400K		-95		
		PSK 600K		-93		
	802.15.4		-100			
RSSIS1	RSSI step size.	Before digital channel filter; calculated from register AGCCOUNTE R	0.625			d B