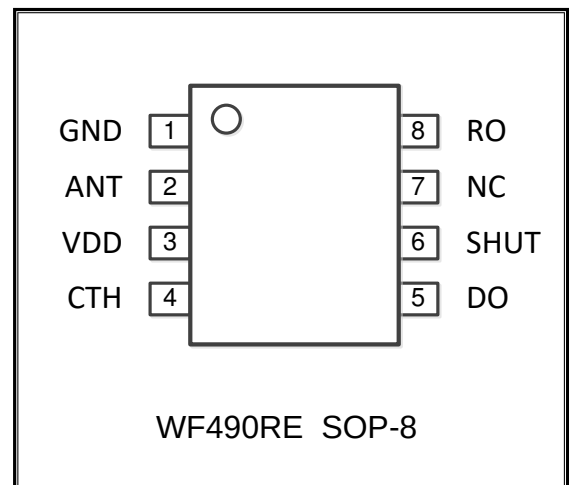


High sensitivity and low_power315/433MHz ASK/OOK RF Receiver

FEATURES

- Frequency range: 300MHz - 440MHz
- High receiver sensitivity: 2kbps, BER 10E-2
 - 113 dBm @ 315MHz
 - 113dBm @ 433.92MHz
- Low Power Consumption:
 - 5.5mA/3.3V @ 315MHz
 - 5.9mA/3.3V @ 433.92MHz
 - 0.01uA/3.3V @ Shut Down Mode
- Start_up: <3ms
- Symbol rate: ≤4kbps
- Supply voltage: DC 2.0V~ 5.5V
- Excellent selectivity and noise rejection
- Receive bandwidth: ±200KHz
- 8KV HBM ESD
- Independent operation without external MCU control
- No register configuration required
- ROHS compliant
- SOP8 Package



APPLICATIONS

- Consumer electronics and appliances lost-cost solution
- Automotive Remote Keyless Entry (RKE)
- Home security and building automation
- Industrial monitoring and control
- Long distance RFID

DESCRIPTION

WF490RE Low power High integrated ASK/OOK RF receiver chip . All RF and IF tuning are accomplished within IC ,no extra external component is required except reference crystal and antenna matching network.The result is a highly reliable yet low cost solution.. This device is a true “antenna-in to data-out” monolithic device.

WF490RE is packaged in SOP8, with a normal operating voltage range of 2.0 -5.5V, a normal operating current of 5.5mA, a startup time of 2.3ms, and a maximum receiving sensitivity of -113dBm. It is very suitable for various consumption requirements of equipment, etc. Automatically complete all RF and IF tuning within the chip, within Omitting the manual adjustment process in development and production can reduce costs and accelerate product launch. This upgrade is based on the original WF490RE architecture, which is relatively mature and stable, and the CTH pin capacitor is eliminated, completely solving the problem of poor chip quality caused by capacitor quality.

1 APPLICATION CIRCUIT

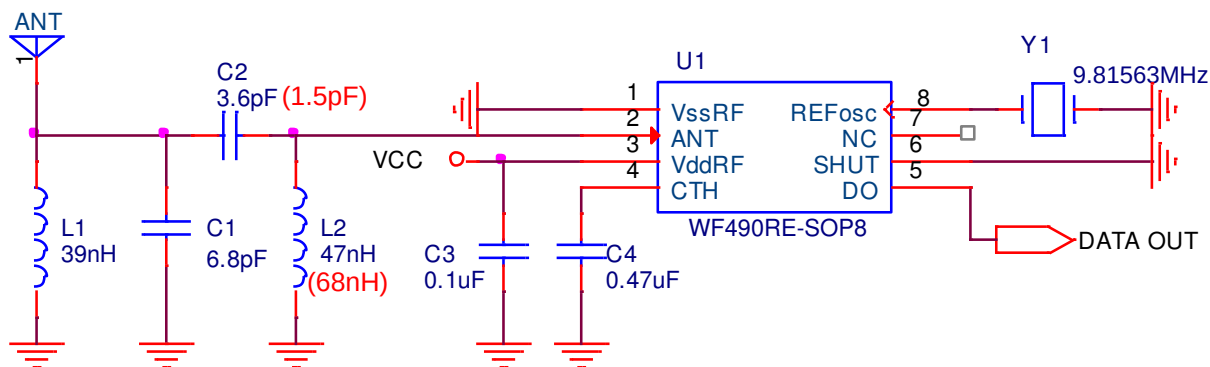


Figure1 315MHz 1.5kbps circuit

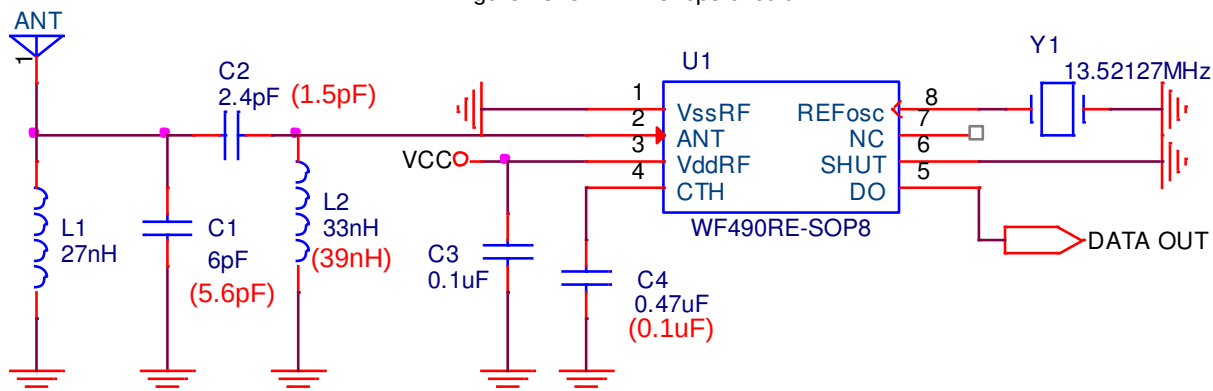


Figure2 433.92MHz 1.5kbps circuit

2 PIN CONFIGURATION

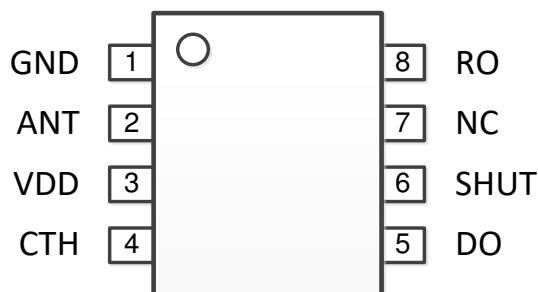


Figure3 WF490RE Foot bitmap

Table 1 WF490RE Foot bitmap

Pin No.	Pin Name	I/O	Description
1	GND	P	Ground
2	ANT	I	RF Input
3	VDD	P	Power Supply DC2.0-5.5V
4	CTH	--	Reference signal mode selection for internal data comparator
5	DO	O	Data out
6	SHUT	I	Shutdown mode: Power on; Work mode: grounding
7	NC	--	Not connection
8	RO	I	Reference Crystal Oscillator

3 Electrical characteristics

3.1 Working conditions

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage		2.0	3.3	5.5	V
T_A	Operating Temperature Range		-40		+125	°C
θ	Supply voltage slope		1			mV/μs

3.2 Limit parameter

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage ^[1]		-0.3		5.5	V
V_{IN}	Input/Output Voltage		-0.3		$V_{DD} + 0.3$	V
T_J	Junction Temperature		-40		150	°C
T_{STG}	Storage Temperature Range		-65		150	°C
T_{SDR}	Lead Temperature	soldering, 10 sec			255	°C
V_{HBM}	ESD Rating ^[2]	human body model HBM	-8		8	kV

[1] Exceeding the absolute maximum rating may damage the device.

[2] Devices are ESD sensitive, use appropriate ESD precautions.

3.3 Receiver specifications

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
VDD	Supply Voltage		2.0		5.5	V
f _{RF}	Operating frequency range	f _{RF} =9.81563MHz		315		MHz
		f _{RF} =13.52127MHz		433.92		MHz
DR	Data rate				10	kbps
I _{OP}	Working current	f _{RF} =315MHz, VDD=3.3V		5.51		mA
		f _{RF} =315MHz, VDD=5V		5.54		mA
		f _{RF} =433.92MHz, VDD=3.3V		5.92		mA
		f _{RF} =433.92MHz, VDD=5V		5.96		mA
I _{STBY}	Sleep current	V _{SHUT} =VDD		0.01		μA
	Receiver Sensitivity	f _{RF} = 315MHz / 2kbps		-113		dBm
		f _{RF} = 433.92MHz / 2kbps		-113		dBm
BW	Bandwidth	f _{RF} = 315MHz		250		kHz
		f _{RF} = 433.92MHz		250		kHz
f _{IF}	IF Center Frequency			0.86		MHz
f _{BW}	IF Bandwidth			0.43		MHz
	Saturated input level	RSC = 50Ω		-20		dBm
	Spurious Reverse Isolation	ANT pin, R _{SC} = 50Ω		30		μVr/ms
Z _{REFOSC}	Reference Oscillator Input Impedance			290		kΩ
	Reference Oscillator Source Current			5.2		μA
f _T	Crystal oscillator frequency			13.52127 433.92M		MHz
Z _{CTH}	CTH Source Impedance			145		kΩ
I _{ZCTH(leak)}	CTH Leakage Current	TA = +85°C		±100		nA
	Receiver startup times	From VDD to reception		3		ms
	HUTstartup times	SHUT pin pulled to receive		2.3		ms

3.4 Crystal Oscillator Specification

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
FXTAL315	Crystal frequency ^[1]	FRF =315 MHz	2.0	9.81563		MHz
FXTAL390		FRF =390 MHz		12.15269		MHz
FXTAL318		FRF =418 MHz		13.02519		MHz
FXTAL433.92		FRF =433.92 MHz		13.52127		MHz
	Crystal frequency accuracy ^[2]			±20		ppm
C _{LOAD}	Load capacitor			15		pF
R _m	Crystal equivalent resistance				60	Ω
t _X TAL	Crystal startup time ^[3]			400		μs
Remark: [1] Drive the REFOSC pins directly using an external reference clock through a coupling capacitor. The peak to peak value of the external clock signal is required to be between 0.3 and 0.7 V [2] The acceptable crystal frequency error is limited by the receiver's bandwidth and the RF frequency deviation between the transmitter and the receiver. 。 [3] The parameter is largely related to the crystal. 。						

WF490RE uses a basic Colpitts structured crystal oscillator circuit, with external load capacitors built into the chip. Only a suitable frequency crystal oscillator needs to be connected externally

Can provide accurate reference clocks.

crystal frequency Formula:

$$F_{OSC} = FRF / (32 + 1.1/12)$$

For 433.92MHz, FOSC=13.52127MHz

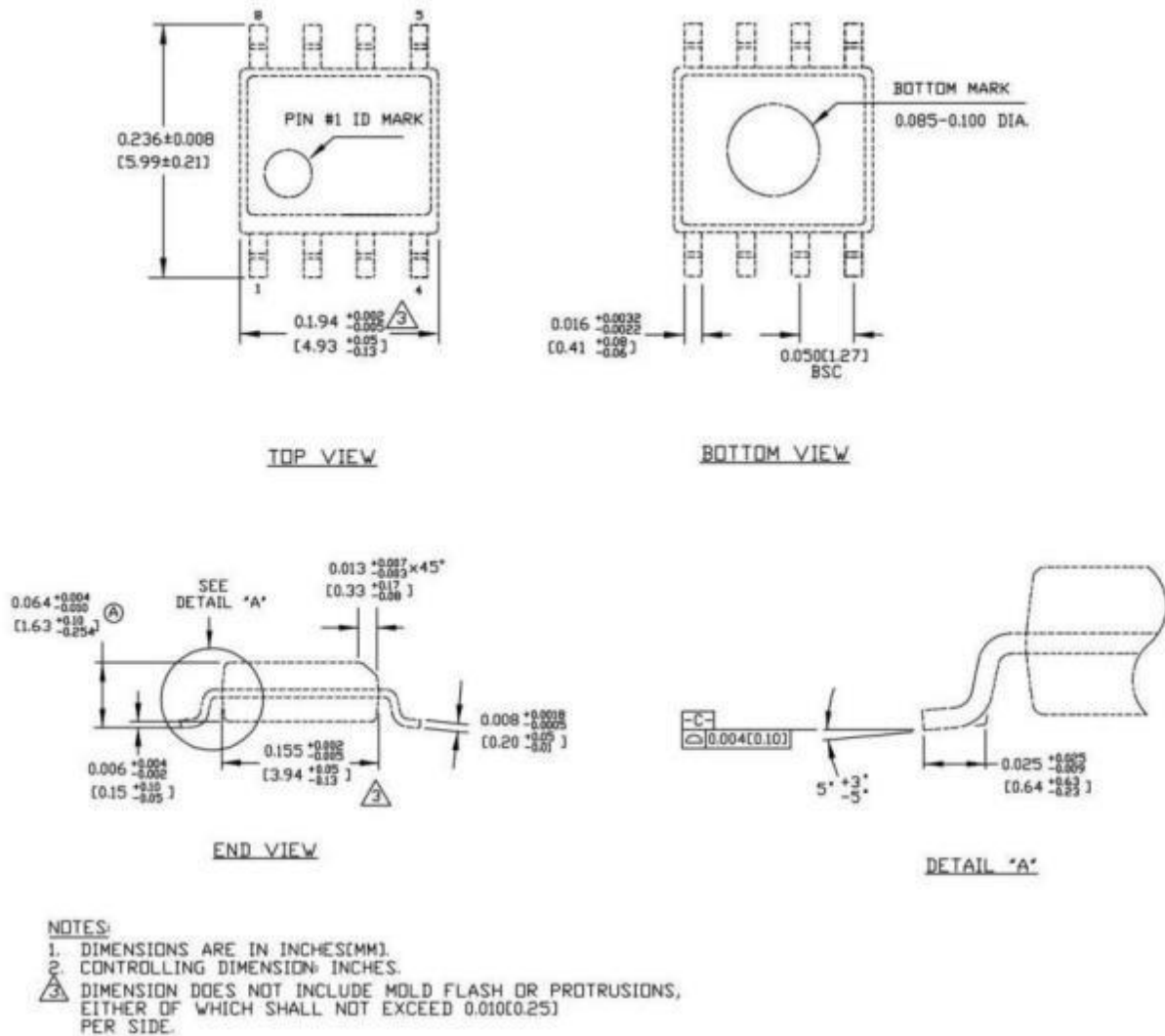
4 SHUTDOWN function

SHUT pin (6pin) is used to control the working status of WF480RE chip 。

SHUT for High voltage level, WF490RE in sleep mode, with a current of 0.1uA, and the DO pin outputs a low level.

SHUT for low voltage level, WF490RE In normal working condition, the current is 5.5mA/315MHz, and the DO pin outputs a fixed level or demodulated signal.

5 Package



8-Pin SOP Package