XNS1042

Technology Reference Manual

V1.0

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Contents

1 General Description

The XNS1042 is a member of the low-cost high-perfomance family of intelligent 2.4GHz RF transceivers with embedded the mircoprocessor. The XNS1042 is optimized to provide a single chip solution for ULP wireless applications.

The XNS1042 uses RISC architecture to make most of the instruction execution time is an instruction cycle, only a small number of indirect address access instructions need two instruction cycles. The XNS1042 has 2K Bytes OTP memories and and 128 byte data memory, makes it suitable for variety applications. In addition the XNS1042 offers a rich set of peripherals, including up to 6 channels 12-bit ADC, 9 GPIOs, 3 channles PWM and so on.

The RF transceiver of XNS1042 with an embedded baseband protocol engine is designed for operation in the world wide ISM frequency band from 2.400 to 2.483GHz. The high sensitivity combined with the integrated 11dBm output power makes it more suitable for ULP wireless applications.

1.1 Key Features

Featrues of the XNS1042 include:

- MCU
    - SCM working frequency ~ 4MHz@VDD≧2.5V; ~ 2MHz@VDD≧2.2V
    - 2KW OTP program memory
    - 128 Byte data RAM
    - 87 powerful instructions
    - Most instructions are 1T execution cycle
    - Programmable stack pointer to provide adjustable stack level
    - Direct and indirect addressing modes for data and instructions
    - All data memories are available for use as an index pointer
    - Separated IO and memory space
- Peripherals
    - Clock sources: internal high RC oscillator(IHRC), internal low RC oscillator(ILRC) and external crystal oscillator
    - 6 channels 12-bit ADC
    - Differential Voice PWM Output (DPWM)
    - Up to 9 channel GPIO ~ every IO pin can be configured to enable wake-up function
    - Four levels of LVR reset ~ 3.1V/2.8V/2.5V/2.2V
    - Selectable external interrupt pins
    - Provided 1T 8×8 hardware multiplier
    - One build-in hardware 16-bit timer
    - One hardware 11-bit timers with PWM generation
    - Two hardware 8-bit timers with PWM generation
    - Provided a hardware comparator
- RF
    - Radio

- ✓ Frequency band: 2.400~2.483GHz
- ✓ Data rate: 2Mbps, 1Mbps, 250kbps
- ✓ GFSK modulation
  - − Receiver
    - ✓ -91dBm sensitivity at 250Kbps
    - ✓ -87dBm sensitivity at 1Mbps
    - ✓ -83dBm sensitivity at 2Mbps
  - − Transmitter
    - ✓ Programmable output power: -5dBm--13dBm
    - ✓ 18mA at 2dBm output power
    - ✓ 30mA at 9dBm output power
  - − RF Synthesizer
    - ✓ Fully integrated synthesizer
    - ✓ Accept low cost ±60ppm 16MHz crystal for the data rate of 1Mbps and 2Mbps
    - ✓ Accept low cost ±20ppm 16MHz crystal for the data rate of 250Kbps
  - − Protocol engine
    - ✓ Support 1 to 32 or 64 byte payload length
    - ✓ Support automatic reply and automatic retransmission
    - ✓ 6 data pipes receiver for 1:6 star networks
- ● Power Manage
  - − Integrated voltage regulator
  - − 2.2V to 3.3V supply range
- ● Package
  - − XNS1042-S16: SOP16(150mil)
  - − RoHS (Green)
- ● Operating Condition
  - − Operating temperature: -20~70℃
  - − Storage temperature: -20~70℃
  - − Node temperature: 150℃

1.2 Typical Applications

- ● Wireless mouse keyboard
- ● TV and set-top box telecontroller
- ● Wireless game handle

- Remote control toys

- Smart home and security system

2 Block Diagram
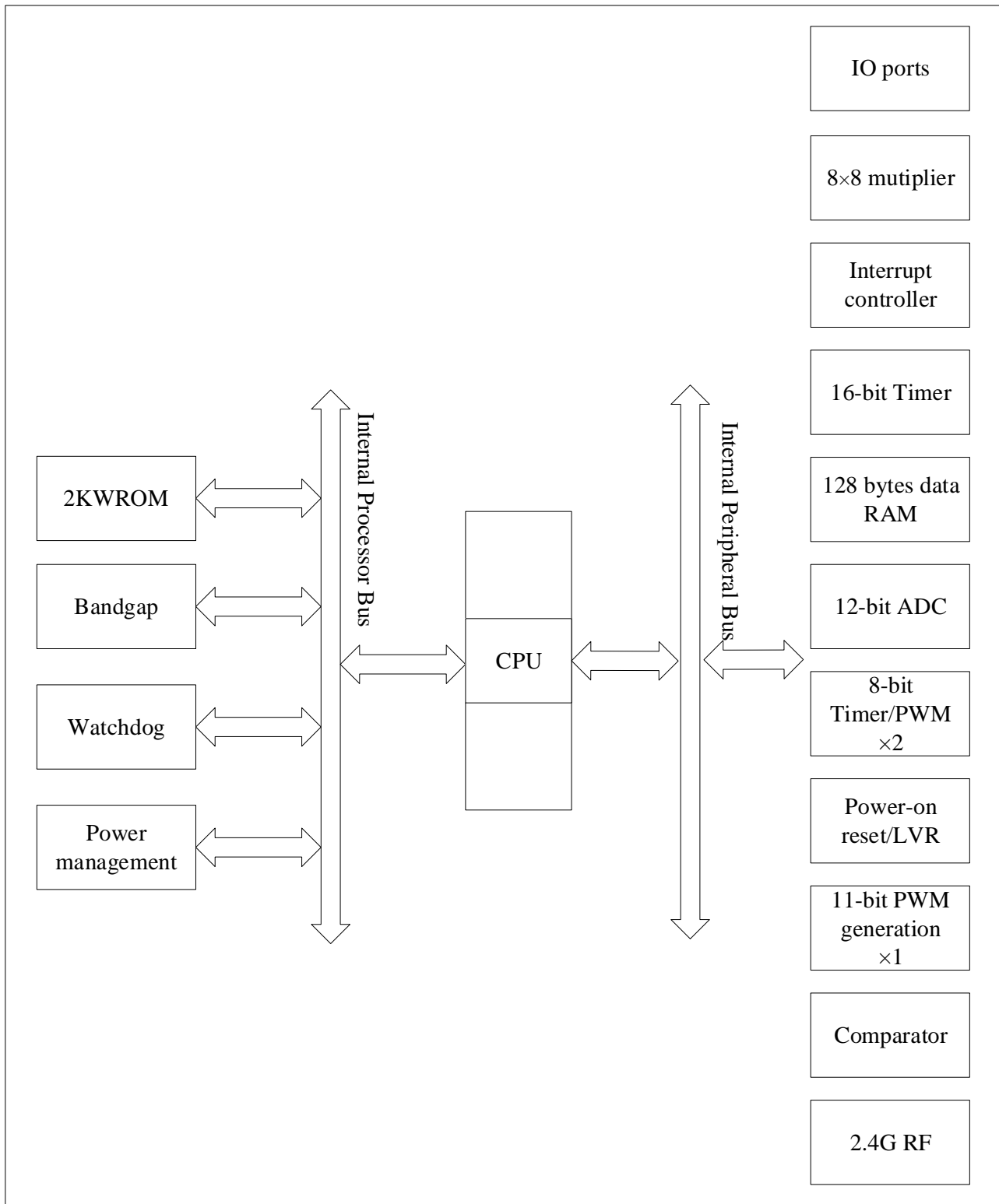

Figure 2-1 XNS1042 block diagram
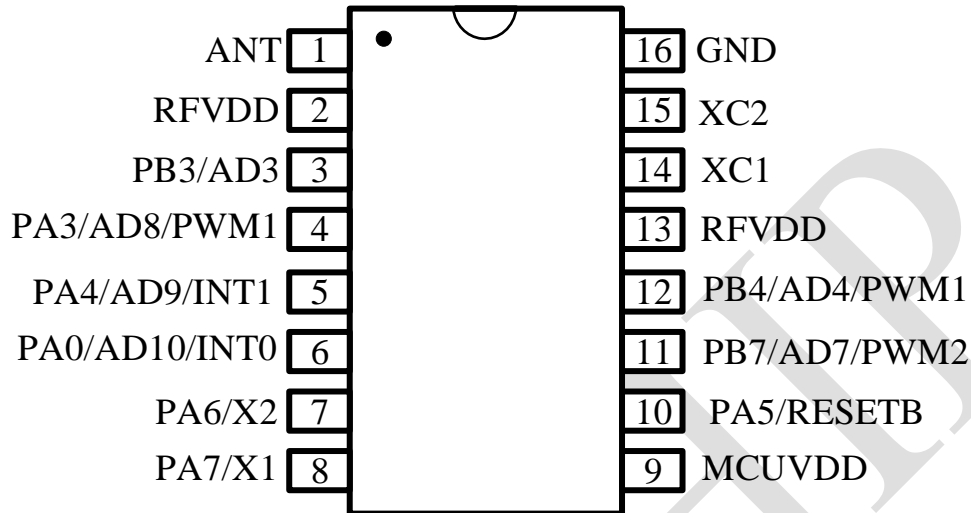
3 Pin Information

3.1 Pin Assignment

Figure 3-1XNS1042 pin assignment

3.2 Pin Descriptions

Table 3-1 XNS1042 pin description

PIN	Name	Type	Function
1	ANT	AIO	Antenna interface
2	RFVDD	P	Wireless chip power supply
3	PB3	I/O	Purpose input/output pin, port B, bit3
	AD3	AI	ADC input channel 3
4	PA3	I/O	Purpose input/output pin, port A, bit3
	AD8	AI	ADC input channel 8
	PWM1	O	PWM output of Timer2
5	PA4	I/O	Purpose input/output pin, port A, bit4
	AD9	AI	ADC input channel 9
	INT1	O	Interrupt signal
6	PA0	I/O	Purpose input/output pin, port A, bit0
	AD10	AI	ADC input channel 10
	INT0	O	Interrupt signal
7	PA6	I/O	Purpose input/output pin, port A, bit6
	X2	O	Oscillator output pin
8	PA7	I/O	Purpose input/output pin, port A, bit7
	X1	I	Oscillator input pin
9	MCUVDD	P	Microcontroller power supply

10	PA5	I/O	Purpose input/output pin, port A, bit5
	RESETB	I	Reset input
11	PB7	I/O	Purpose input/output pin, port B, bit7
	AD7	AI	ADC input channel 7
	PWM2	O	PWM output of Timer3
12	PB4	I/O	Purpose input/output pin, port B, bit4
	AD4	AI	ADC input channel 4
	PWM1	O	PWM output of Timer2
13	RFVDD	O	Wireless chip power supply
14	XC1	AI	Oscillator input
15	XC2	AO	Oscillator output
16	GND	G	Ground (GND)

3.3 Chip Control Connection

Table 3-2 RF and MCU internal connection pin instructions

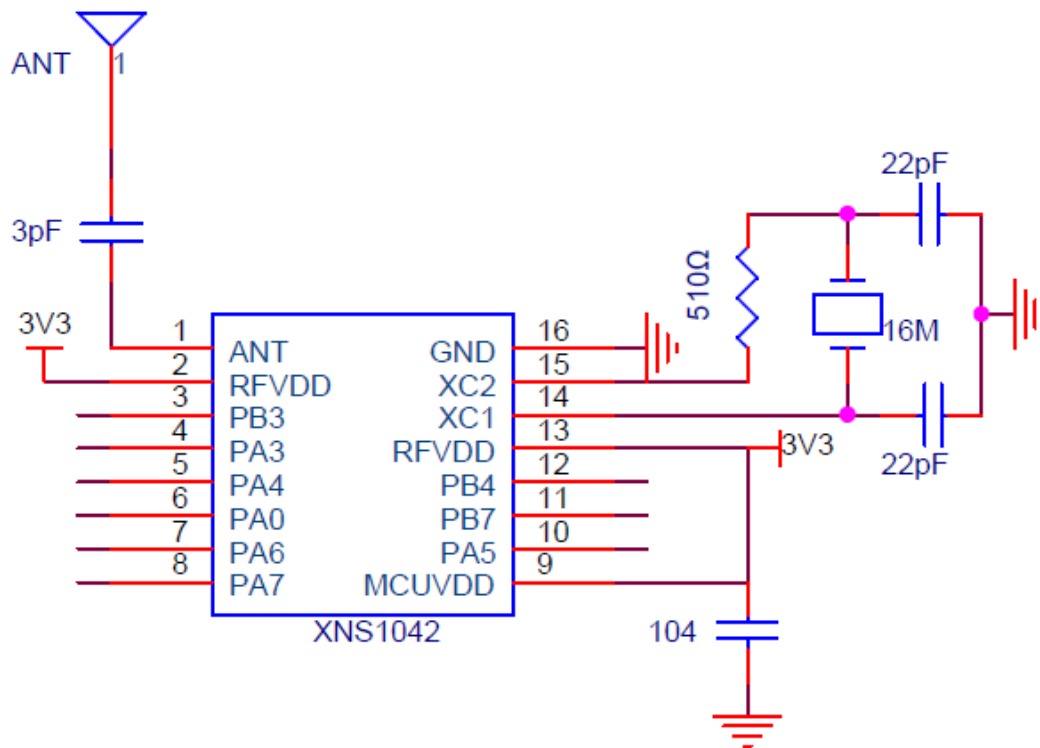| RF Pin	MCU	Instructions
CSN	PB1	Internal strapped connection
SCK	PB0	Internal strapped connection
MOSI	PB2	Internal strapped connection
MISO	PB6	Internal strapped connection
IRQ	PB5	Internal strapped connection

4 Reference Schematic Diagram

Figure 4-1 XNS1042 reference schematic diagram

5 Package Dimensions
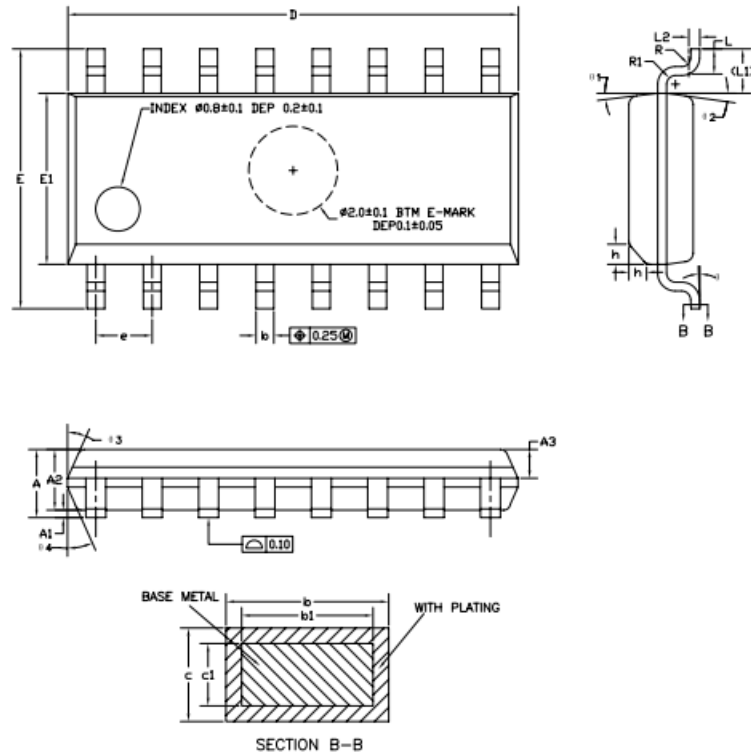

Figure 5-1 XNS1042 package size

Table 5-1Package detail parameters for the SOP16

DIM SYMBOL	MIN.	NOM.	MAX.
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
A3	0.55	0.65	0.75
b	0.36	-	0.51
b1	0.35	0.40	0.45
c	0.17	-	0.25
c1	0.17	0.20	0.23
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
L	0.45	0.60	0.80
L1	1.04REF		

L2	0.25BSC		
R	0.07	-	-
R1	0.07	-	-
h	0.30	0.40	0.50
0	0°	-	8°
01	6°	8°	10°
02	6°	8°	10°
03	5°	7°	9°
04	5°	7°	9°

6 Precautions

1) This product is a CMOS device and should be protected against static electricity during storage, transportation and use.

2) Grounding when device is in use.

3) Reflow temperature can not exceed 260℃.

7 Storage Conditions

1) Products should be stored in sealed packages: when the temperature is less than 30 degrees and the humidity is less than 90%, it can last for 12 months.

2) After the package is opened, the components will be used in the reflow process or other high-temperature processes. The following conditions must be met:

   a) Completed within 72 hours and the factory environment is less than 30°C≤ 60% RH.

   b) Stored in 10% RH environment.

   c) Exhaust at 125°C for 24 hours to remove internal water vapor before used.

8 Revision History

Version	Date	Description	Related documents
V1.0	Apr. 2017	Initial	《01_XN297L Series product manual_V4p7》 《PMS132 datasheet 》

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