RF 2.4Ghz SOC

NST TECHNOLOGIES

M16255 Series DataSheet

Version 1.00

1. Description

The M16255 is a low cost, high integration 2.4Ghz,the wireless transceiver chip SOC, integrated on-chip transmitter, receiver, frequency Integrated device, a GFSK modem and a low power MCU.

The transmitter branch,the adjustable power, receiver using digital extended communication mechanism, in the complex ring environment and strong interference conditions, can achieve excellent performance of the transceiver.

Peripheral circuit, the circuit is simple, only a few external passive devices. M16255 transmission GFSK Signal, the maximum transmit power can reach 6dBm.

Using low intermediate frequency receiver, the structure, the receiving sensitivity can reach -87dBm. The digital channel energy detection, you can monitor the
Channel quality.

MCU power on-chip low, can wake up, 4Kbyte OTP Program space, the use of assembly language, while providing a complete simulation and burn device, convenient for customers to use.

In order to improve the service life of the battery, chip reduces power in all aspects Consumption, minimum working voltage to 2.2V chip .

Chip SOP16 to the package pin, accord with RoHS standard.

2.Feature

- The SOC chip comprises a RF front-end and the digital baseband solution Case.
- Very low power consumption
- SOP16 support package
- To support the single panel
- The effective distance of 10 meters
- Support 33 mm wire ANT
- The 9 features a custom pin
- 16 bit instruction
- 4K x 16-bit OTP-ROM Program Memory
- Low voltage reset and check the settings
- To support two wire communication sensor
- To Support 0℃,90℃,180℃,270℃ Sensor.

3.Application

- remote-controlled car
- Remote access control
- Wireless doorbell
- remote-controlled lighting

4.Pin Configuration

4.1 Pin Assignment

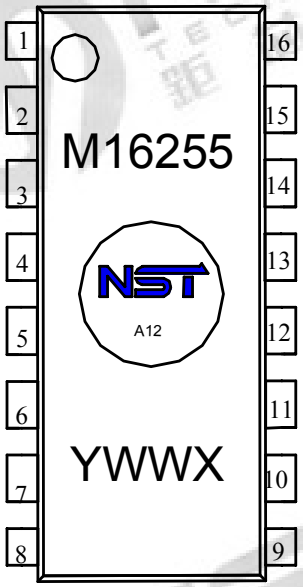


Figure 1:Top View Pinout

4.2 Pin Description

Pin	Name	Type	Description
1	ANT	Balanced RF	射頻輸入輸出
2	GND	GND	地
3	VDD_IO	Power	電源
4	PA6	I/O	自定義功能腳
5	PA7	I/O	自定義功能腳
6	PC0	I/O	自定義功能腳
7	PC1	I/O	自定義功能腳
8	VDD/VDDL	Power	電源
9	PB0	I/O(w)	自定義功能腳(燒錄腳)
10	PB1	I/O(w)	自定義功能腳(燒錄腳)
11	PB3	I/O(w)	自定義功能腳(燒錄腳)
12	PB5	I/O(w)	自定義功能腳(燒錄腳)
13	PB4	I/O(w)	自定義功能腳(燒錄腳)
14	XTALO	AO	晶體振蕩器輸出腳
15	XTALI	AI	晶體振蕩器輸入腳
16	VCO_VDD	Power	電源

5.The interface of Communication

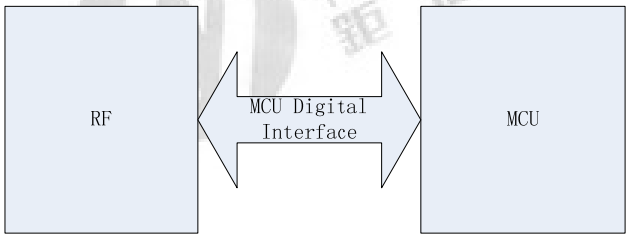


Figure 2. Communication Interface

6.Electrical Characteristics

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Supply voltage	**Vin_max**		**+3.7**	**V**	
Operating Temperature	**T_O**	**-40**	**+85**	**℃**	
Storage Temperature	**T_S**	**-55**	**+125**	**℃**	
1.8 Voltage	**VDD_Max**		**+2.5**	**V**	
I/O voltage	**Vin_out**	**-0.5**	**+3.7**	**V**	
Input RF signal strength	**Pin**		**+10**	**dB**	

7.Application Circuit

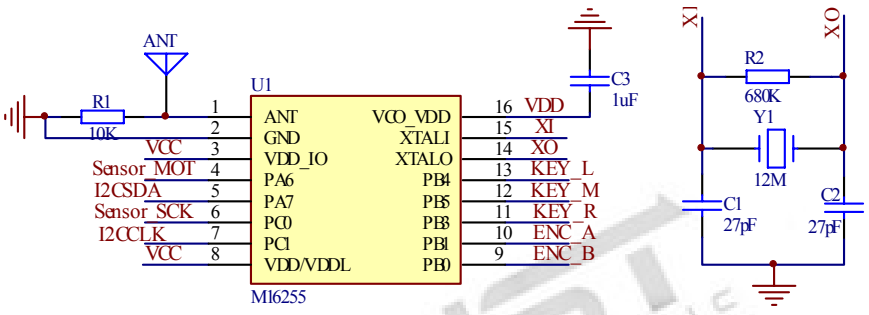


Figure 3. The core circuit of M16255

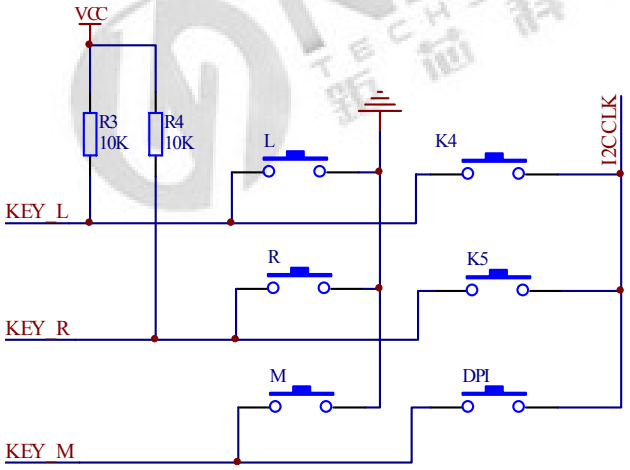


Figure 4 . The button Section

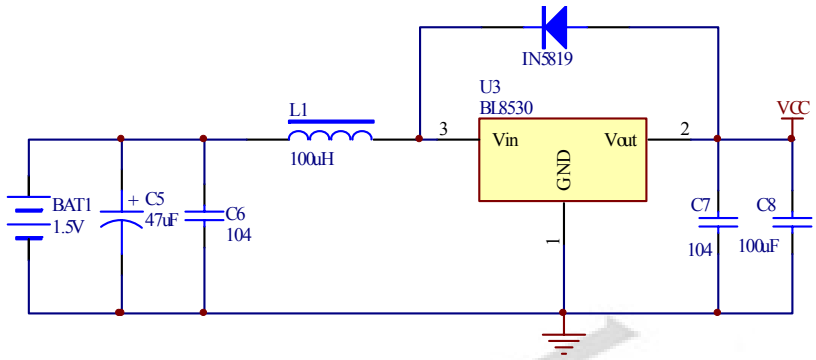


Figure 5. The part of Signal Power

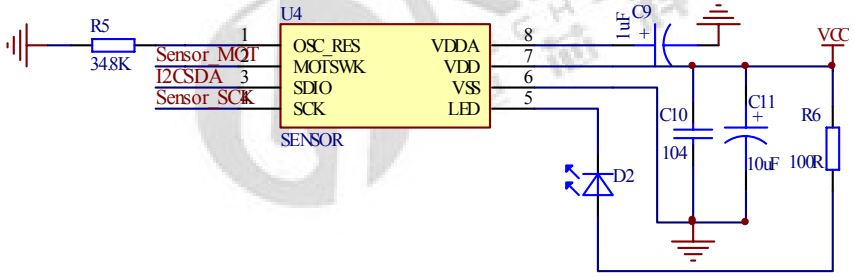


Figure 6 . The Part of Sensor

8.PCB wiring matters needing attention

8.1 Power Wiring

Due to power supply, ground wire is not considerate of interference, can make the product performance degradation, sometimes even affect the success rate of the product Electricity, ground wire of the wiring should be taken seriously, the noise produced by power supply, ground down to a minimum, to ensure the quality of the products.

Try to widen the power supply, ground wire width, it is best to ground wider than the power cord, their relationship is: ground > power > signal lines, usually signal Line width: 0.2 ~ 0.3 mm, thin line width can be up to 0.05 ~ 0.05 mm, the power cord is 1.2 ~ 2.5 mm. The digital circuit PCB available width Wire to form a loop, which constitute a ground network to use.

Copper layer for ground, large area on the PCB are not used everywhere as earth wire connected to ground. Or made into laminated, power supply, Each takes up a layer of earth.

8.2 Crystals circuit wiring

As far as possible close to the XTALO, crystals circuit XTALI, connection crystals printing line is short, as far as possible to reduce the noise interference and distributed capacitance of crystals ring.

Crystal resonance capacitance earth wire should be used wide and short, as far as possible to print line connected to the device nearest crystals digital pins, hole should be reduced as far as possible, because the space is limited in practical design, the crystals on the top below the line, if space allows, should avoid as far as possible.

For fixed crystals, reducing the external radiation, improve the anti-interference ability, vibration crystal shell should be good grounding.

8.3 ANT Wiring

When the antenna Layout need to pay attention to:

Antenna top part and bottom layer are need clearance, not laying copper; After short-circuit arm is connected to the antenna, there are at least two to ground via directly to the bottom layer;

To the distance between the antenna and the PCB shop copper should be greater than 0.5 mm, close to the antenna along the ground plane should be played in a row of holes;

Around the antenna is best not to have metal structures or components, floor plane, side the most distance regular intervals (at least 5 mm) can put some components.

The characteristics of the mouse:

1. Working voltage: 0.9V-3.2V (DC/DC) or 1.9V-3.5V (without DC/DC)

2. Working Current

- Operating current (voltage=2.7V, Sensor PAN3204, LED current limiting resistor =100 ohm conditions):

  Slide Normal: 8mA

  Standby1: no action after 0.5sec: 1.4MA

  Standby2: no action after 20sec: 140uA

  Sleep: no action after about 15 minutes (or unplug the Dongle about 3 seconds): 15uA

- **Operating current (voltage =2.7V, Sensor PAN3205, LED current limiting resistor =100 ohm conditions):**
  Slide Normal: 6mA
  Standby1: no action after 0.5sec: 1.2MA
  Standby2: no action after 20sec: 130uA
  Sleep: no action after about 15 minutes (or unplug the Dongle about 3 seconds): 15uA

- **Operating current (voltage =2.7V, Sensor WT8589, LED current limiting resistor =100 ohm conditions):**
  Slide Normal: 4.4mA
  Standby1: no action after 0.5sec: 1.2MA
  Standby2: no action after 20sec: 130uA
  Sleep: no action after about 15 minutes (or unplug the Dongle about 3 seconds): 15uA.

- **Operating current (voltage =2.7V, Sensor WT8583, LED current limiting resistor =68 ohm conditions):**
  Slide Normal:6mA
  Standby1: no action after 0.5sec: 1.2MA
  Standby2: no action after 20sec: 130uA
  Sleep: no action after about 15 minutes (or unplug the Dongle about 3 seconds): 15uA

3. The effective transmission distance (Report Rate >110):10M

4. USB Specifications is USB 1.1 Version.

5. Mouse has left, right, Middle,k4, k5, DPI function key (according to the mold needs).

6. The resolution of CPI is divided into four stages CPI：800、1000、1200、1600.

7. Random ID using 16bits, can use at the same time in the same working environment of multi group Mouse, without interfering with each other.

9. Operation ways

1. Put Mouse on the desktop does not move, after about 0.5 seconds in the Stand by Mode Mouse will be induced to energy-saving, the sliding Mouse, press the button or scroll wheel, can be in normal reaction (the current 1.25MA).

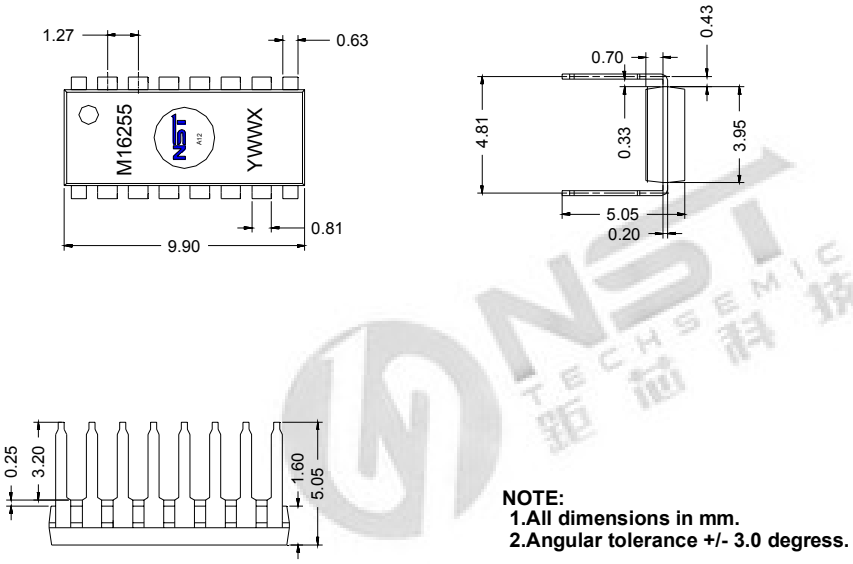
2. Put Mouse in the table do not move, after about 20 seconds, the Mouse will be in Sleep Mode II with more power, the sliding Mouse, press the button or scroll wheel can be a normal reaction (when the current is about 100uA).

3. In the Sleep Mode II state, if the human body for a long time to leave or not mobile key operation, 15 minutes after the Mouse will turn sensor into the lowest power consumption of Sleep Ⅲ state, this situation only through the keys and a roller wake (when the current is about 20uA).

4. PC power off or unplug the Dongle from PC, Mouse will enter the power saving mode of Sleep in about 3 seconds(when the current is about 20UA); PC is restarted or theplug in Dongle, Mouse will be at most 3 seconds automatic connection is successful, and the normal use.

5. Mouse shut off the power to open or to replace the battery, Mouse will automatically recognize the Dongle connection ,without re mating.

10. Package Information



NOTE:
1.All dimensions in mm.
2.Angular tolerance +/- 3.0 degress.

11. Version History

Version	Description	Date
M16255_V1.00	Create the preliminary version	2013/07/11