

ZigBee Module (WE1005)

Hardware Specification



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● Overview

ZigBee RF module WE1005 is based on chip CC2530 from TI. With advantages of low power consumption, compact design, long transmission distance and strong anti-interference capability, the module can be widely used in low power local area network communication.

The module adopts the High Dielectric Constant, low loss plates and four layer wiring design; Capacitor and inductor use high-precision, high Q muRATA series. With on-board power filter and optimized RF match circuitry, the module has better stability and transmission distance. In addition, the module can add a shielding case to enhance the anti-interference capability, so it can be used industrial applications. The module has passed the FCC certification.

● Version History

Version No.	Date	Updates
V1.0	2016/09/27	✓ First Release

● Module Features

1. Small size, with the 1.27mm gap and half hole stamp design, easy to connect and develop, can reduce the volume.
2. Low power consumption, long distance transmission, and well filtering process; add magnetic bead to better control the EMI.
3. For better use of customers, all the chip I/Os are pined.

➤ Parameters:

Parameter	WE1005
Working Voltage	2.0V—3.6V
Working Frequency	2394MHz—2507MHz
TX Power	3dBm±1.5
Sensitivity	-85dBm
Frequency Error	±20KHz
TX Current	29mA
RX Current	24mA
Stand-by Current	PM1: <300μA PM2: <2μA PM3: <1μA
Working Temperature	-20℃ -- +70℃ (Chip can support -40℃~+125℃, can adjust the working temperature by change the crystal)
Storage Temperature	-40℃ -- +85℃ (Chip can support -40℃~+125℃, can adjust the working temperature by change the crystal)

➤ **Module Resources:**

- High-efficient & low energy 8051 processor
- 256KB programmable flash
- 8KB RAM
- 5 channels DMA
- IEEE 802.15.4 MAC timer; one 16-byte, two 8-byte common timers.
- IR (infrared ray) Generation Circuits
- Voltage monitored circuitry & temperature sensor with inner chip
- 8 channel & 12-byte ADC
- 2 channel UART ·21 normal IOs
- With watch dog circuitry inside

➤ **Module Applications:**

- 2.4GHz IEEE 802.15.4 system**
- RF4CE remote control system**
- ZigBee system
- Home / Building automation**
- Lighting control system**
- Industrial controlling & monitoring**
- Low power consumption wireless sensor internet**
- Consumer electronics**
- Health care

● **Pin Definition&Assignment**

Figure 2 shows the pin assignment of module. Table 1 shows the pin definition.

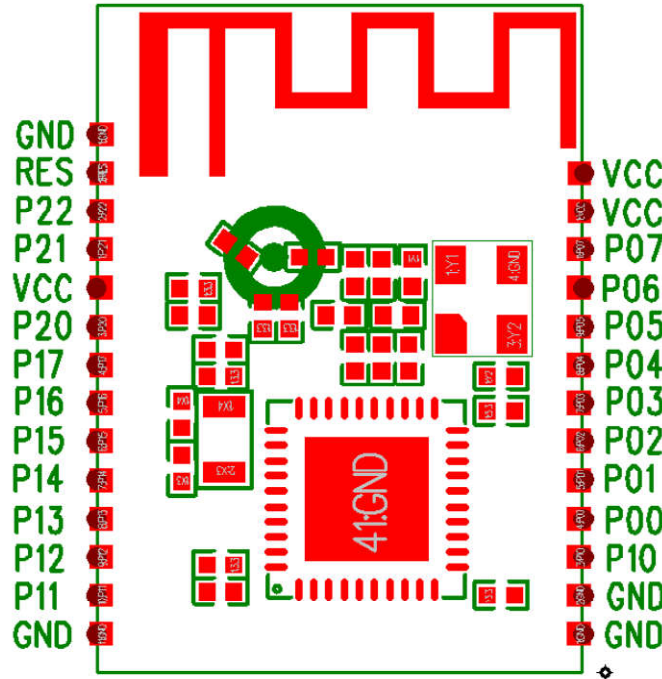


Figure 1 Pin Assignment

Pin No.	Name	Function	Remarks
Pin1	GND	GROUND	Grounding
Pin2	RES	RESET	Reset, Active Low
Pin3	P22	DC	Adjust Interface DC
Pin4	P21	DD	Adjust Interface DD
Pin5	VCC	Positive Supply	Power Supplu: 2.0V-3.6V
Pin6	P20	I/O	GPIO
Pin7	P17	I/O	GPIO
Pin8	P16	I/O	GPIO
Pin9	P15	I/O	GPIO
Pin10	P14	I/O	GPIO
Pin11	P13	I/O	GPIO
Pin12	P12	I/O	GPIO
Pin13	P11	I/O	GPIO
Pin14	GND	GROUND	Grounding
Pin15	GND	GROUND	Grounding
Pin16	GND	GROUND	Grounding
Pin17	P10	I/O	GPIO
Pin18	P00	I/O	GPIO
Pin19	P01	I/O	GPIO
Pin20	P02	I/O	GPIO
Pin21	P03	I/O	GPIO
Pin22	P04	I/O	GPIO

Pin23	P05	I/O	GPIO
Pin24	P06	I/O	GPIO
Pin25	P07	I/O	GPIO
Pin26	VCC	Positive Supply	Power Supply: 2.0V-3.6V
Pin27	VCC	Positive Supply	Power Supply: 2.0V-3.6V

Table 1 Pin Definition

● PCB Package Size

Figure 2 shows the PCB package size of Module

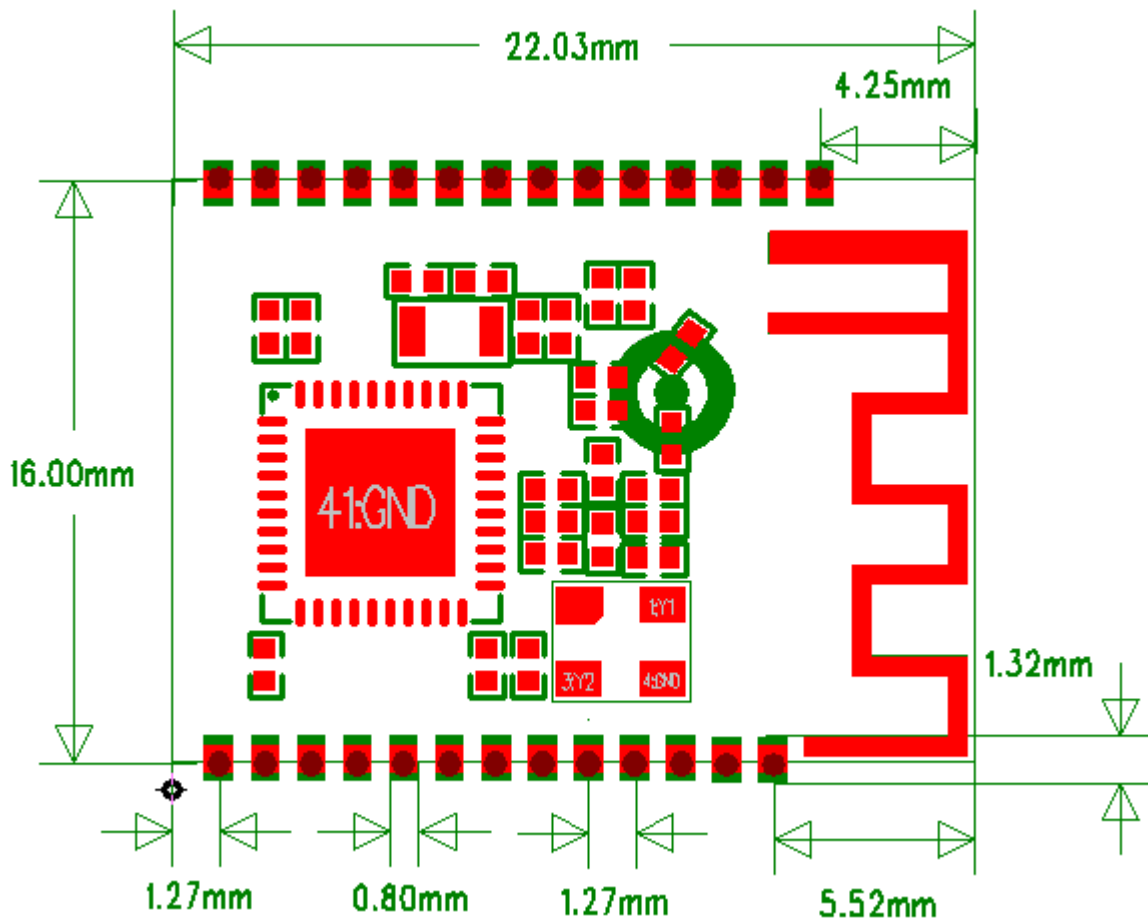


Figure 2 Package Size

● Suggestions on Layout

The serpentine PCB antenna accommodates free space electro-magnetic radiation. The position of the antenna and area where it is laid is crucial to optimization of data rate and transmission range. The positioning and routing of the antenna would hence be suggested as follows:

- 1, Place the antenna on the edge(corner) of the PCB backplane.
- 2, Make sure there is no signal wire or copper foil in each layer.
- 3, Hollowing out the blue pane part (figure 6) to make less S11 interference.

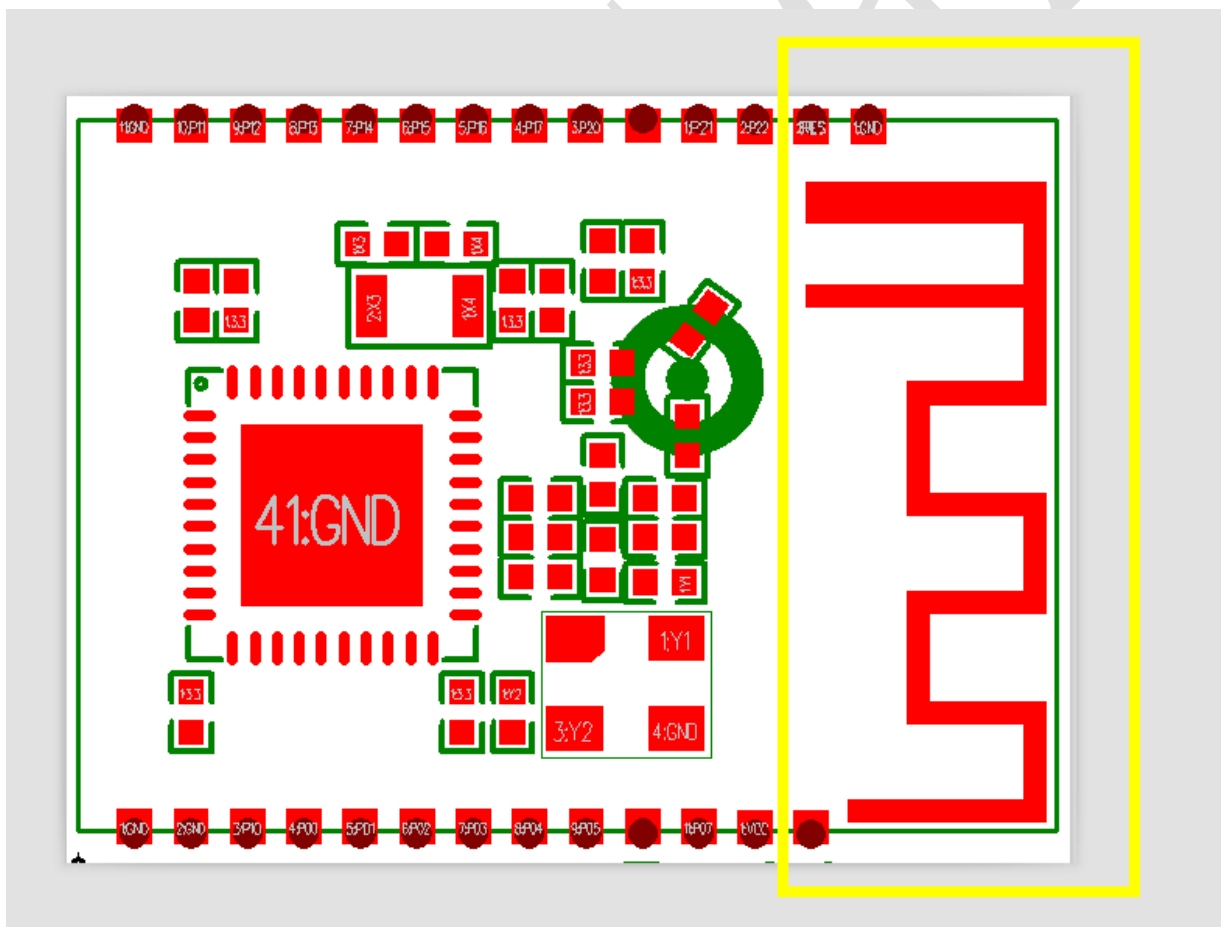


Figure 3

● Recommended Operating Conditions

Notes: Make sure to operate within the range of condition parameters listed below. Long time operating outside of the range will impact the reliability of the module.

- (1) The operating temperature is subject to the change of the crystal's frequency;
- (2) To ensure the RF performance, the ripple wave on the source must be less than $\pm 300\text{mV}$.

Identification	Condition	Minimum	Typical Value	Maximum	Unit
Source & IO	Battery Mode	2.0	3.3	3.6	V
Operating Temperature	/	-20	25	70	°C
Environment Temperature Amplitude		-20		20	°C/Min

● Reflow Conditions

1. Heating mode: conventional convection or IR convection;
2. Times allowed to reflow: 2 times, based on the reflow conditions below (figure 7) ;
3. Temperature curve: the reflow should be in accordance with the temperature curve shown below (figure 7);
4. Highest temperature: 245°C.

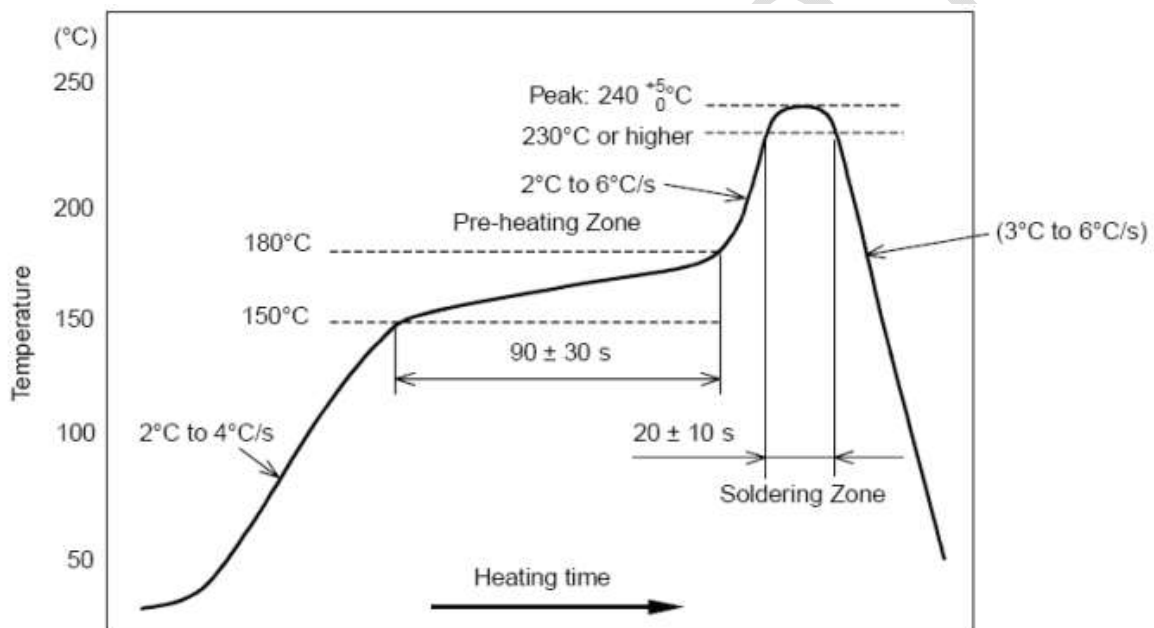


Figure 4 Parts' heat-resistance temperature curve for welding(welding point)

● Warnings on Static Discharge



Since the module may be damaged by static discharge, RF-star recommend to handle with it with three precautions below:

- 1, According to the anti-static measures, bare hands are not allowed to touch modules.
- 2, Modules must be placed in anti- static areas.
- 3, In product design, anti-static circuitry should be arranged at where high voltage or high frequency input is introduced. Static discharge may incur impact to the device ranging from slight performance downgrade to total failure.