WM9800BD
Bluetooth Low Energy Module

Version	Date	Change Description
1.0	25 Feb 2016	Initial release

Description

WM9800BD is a Bluetooth 4.0 BLE module, which is a high performance, cost effective, low power. The Bluetooth module provides a complete 2.4GHz Bluetooth system based on CSR1010 chip which is a single chip data transfer and baseband IC for Bluetooth 2.4GHz system.

This module is fully compliant to Bluetooth v4.0 BLE, Qualified Bluetooth v4.0 system. The WM9800BD is compatible with the latest iOS and Android phones. Bluetooth device develops can now easily build BLE profile compliant devices.

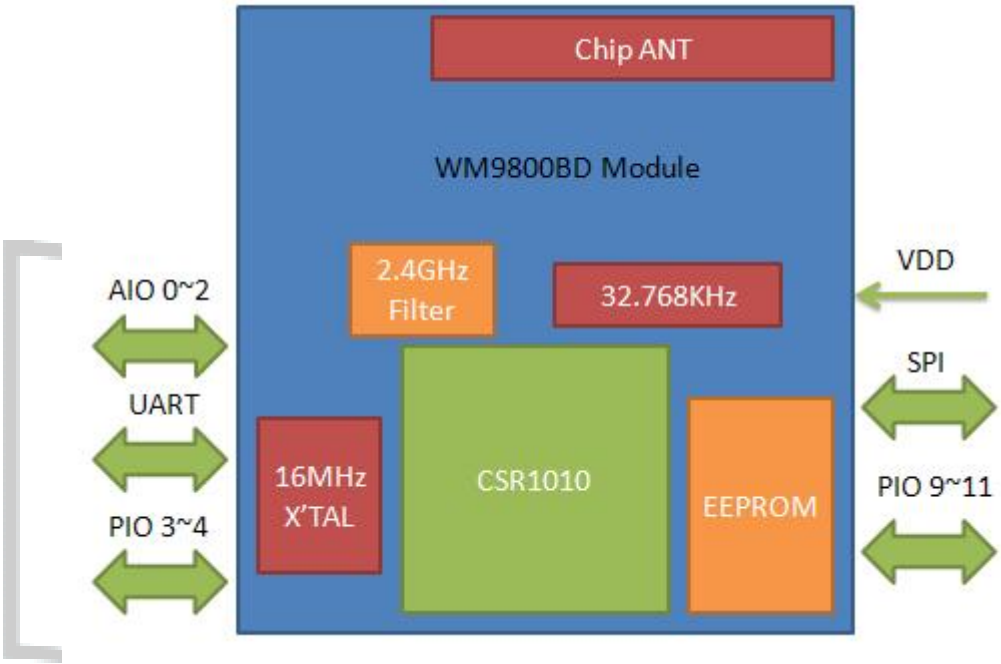
Features

- 128KB memory: 64KB RAM and 64KB ROM.
- Support for Bluetooth v4.0 specification host stack including ATT, GATT, SMP, L2CAP, GAP
- RSSI monitoring for proximity applications.
- 32KHz and 16MHz crystal or system clock.
- Programmable general purpose PIO controller.
- UART, SPI interfaces available to various applications.
- 5 GPIO ports available for user's application.
- 3 Analog IO ports available for user's application.
- Small footprint: 18×13×2.2mm, half-holes PCB module
- OS support: iOS, Android.
- RoHS compliance

Application

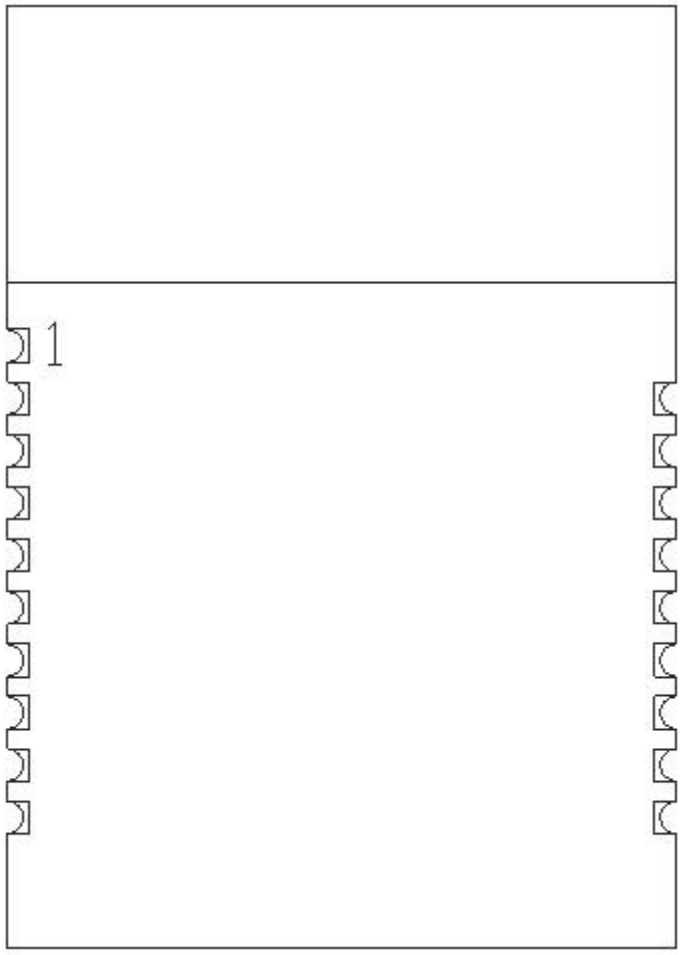
- Sports and fitness sensors.
- Health sensors.
- Mobile accessories.
- Smart home.

Functional Block Diagram



Block Diagram

Pin Assignment (Top view)

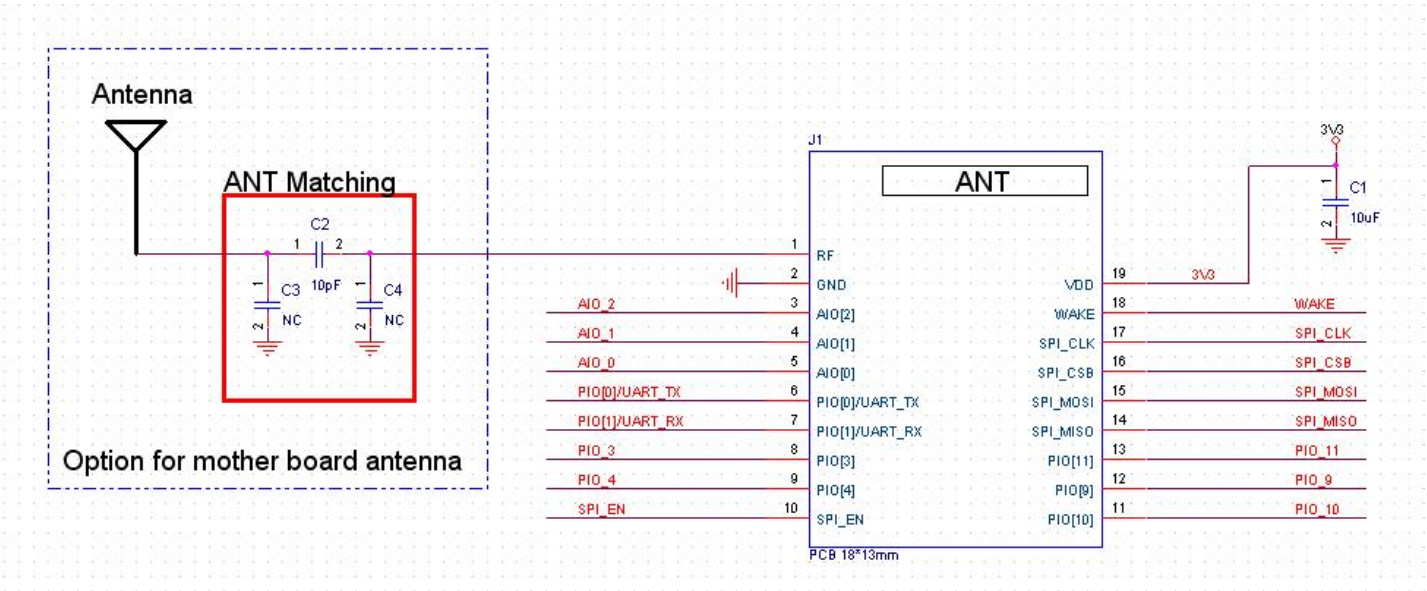


Pin Definition

Pin	Signal	Input /Output	Description
1	RF	I/O	RF Port
2	GND	Power	Ground
3	AIO[2]	Bidirectional analogue	Analogue programmable I/O line
4	AIO[1]	Bidirectional analogue	Analogue programmable I/O line
5	AIO[0]	Bidirectional analogue	Analogue programmable I/O line
6	PIO[0]/UART_TX	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line or UART_TX
7	PIO[1]/UART_RX	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line or UART_RX
8	PIO[3]	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line
9	PIO[4]	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line
10	SPI_EN	Input with internal pull-down	Selects SPI debug
11	PIO[10]	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line
12	PIO[9]	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line
13	PIO[11]	Bidirectional with programmable strength internal pull-up/down	Programmable I/O line
14	SPI_MISO	CMOS output, tri-state, with weak internal pull-down	Serial Peripheral Interface data output
15	SPI_MOSI	CMOS input with weak internal pull-down	Serial Peripheral Interface data input
16	SPI_CSB	CMOS input with weak internal pull-up	Chip select for synchronous Serial Interface active low
17	SPI_CLK	CMOS input with weak internal pull-down	Serial Peripheral Interface clock

18	WAKE	Input has no internal pull-up or pull-down, use external pull-down	Input to wake the module from hibernate or dormant
19	VDD	Power	3.3V input

Application Circuit



Functional Specification

Product Description	
Standard	Bluetooth 4.0 Low Energy
Main Chipset	CSR1010
Host Interface	UART
Dimension	18mm x 13mm x 2.2mm
Package	Half-hole PCB module
Electrical Specifications	
Frequency Range	2.4GHz ISM band(2402MHz to 2480MHz)
Data Rate/Modulation	1Mbps, GFSK, 250KHz deviation
TX Output Power	4dBm (+/- 1dB)
RX Sensitivity	-90dBm (min)
Operational Channel	Ch0 to Ch78
Operating Voltage	3.3V

Temperature Limit Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-40	+85	^{o}C
Operating Temperature	0	+70	^{o}C

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD	Supply Voltage	-0.4 to 3.6	V

Recommended Operating Range

Symbol	Parameter	Min	Typ	Max	Units
VDD	Supply Voltage	1.8	3.3	3.6	V

RF Characteristics

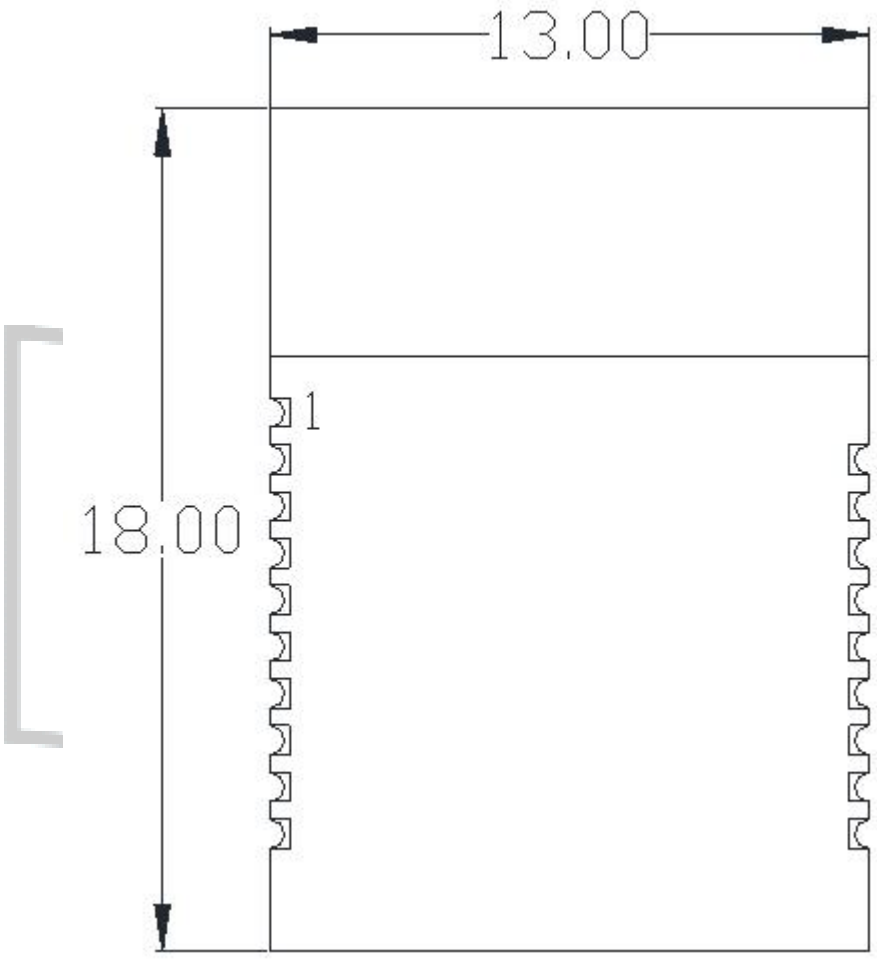
	Min	Type	Max	BLE SPEC	Unit
Output					
Max	4			< 10.0	dBm
Min	-20			>-20.0	dBm
Peak to Average		0.58		< 3.0	dB
Carrier drift					
Fn		2		<= +/-150	KHz
Drift rate		-7.7		<= +/-20	KHz/50us
Max Drift		-6		<= +/-50	KHz
Modulation Characteristic					
'F1avg','F1max'	225		275	225<= <=275	KHz
'F2avg','F2max'		213		>= 185	KHz
F1/F2 ratio		0.88		>= 0.8	
Receiver Sensitivity (-90dBm)					
Frame Error Rate		23		<= 30.8	%
PER Integrity (-30dBm)					
Frame Error Rate	50		65.4	50<= <=65.4	%
Maximum Input Level (-10dBm)					
Frame Error Rate		0		<= 30.8	%

Power Consumption Characteristics

VDD=3.3V

Description	Performance	
	TYP	UNITS
RX/TX mode @ peak current	16	mA
Deep Sleep mode	5	uA

Module Dimensions

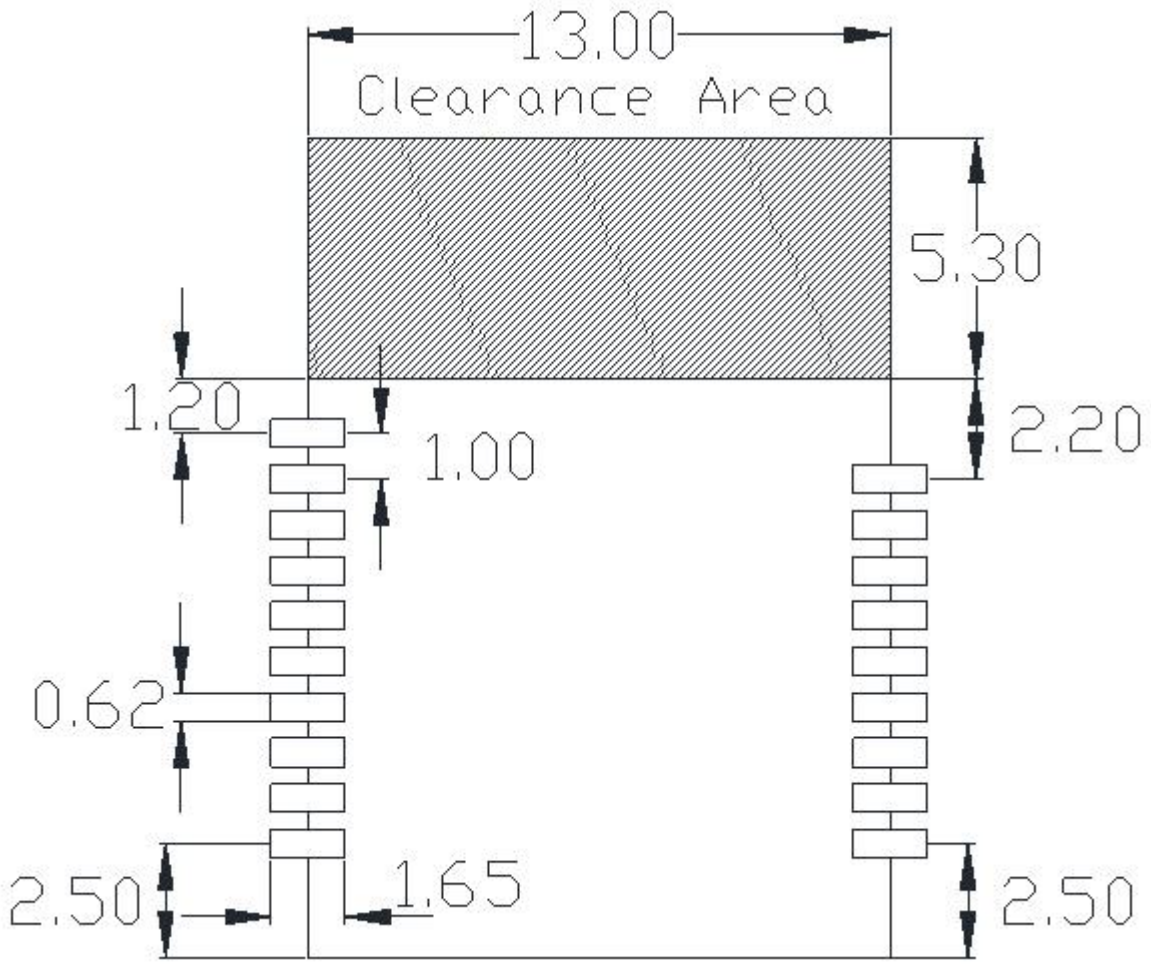


All dimensions are in millimeters.
Tolerance: +- 0.15mm

Layout Design Guide

The recommended layout pads for WM9800BD module are shown below. (module top view)

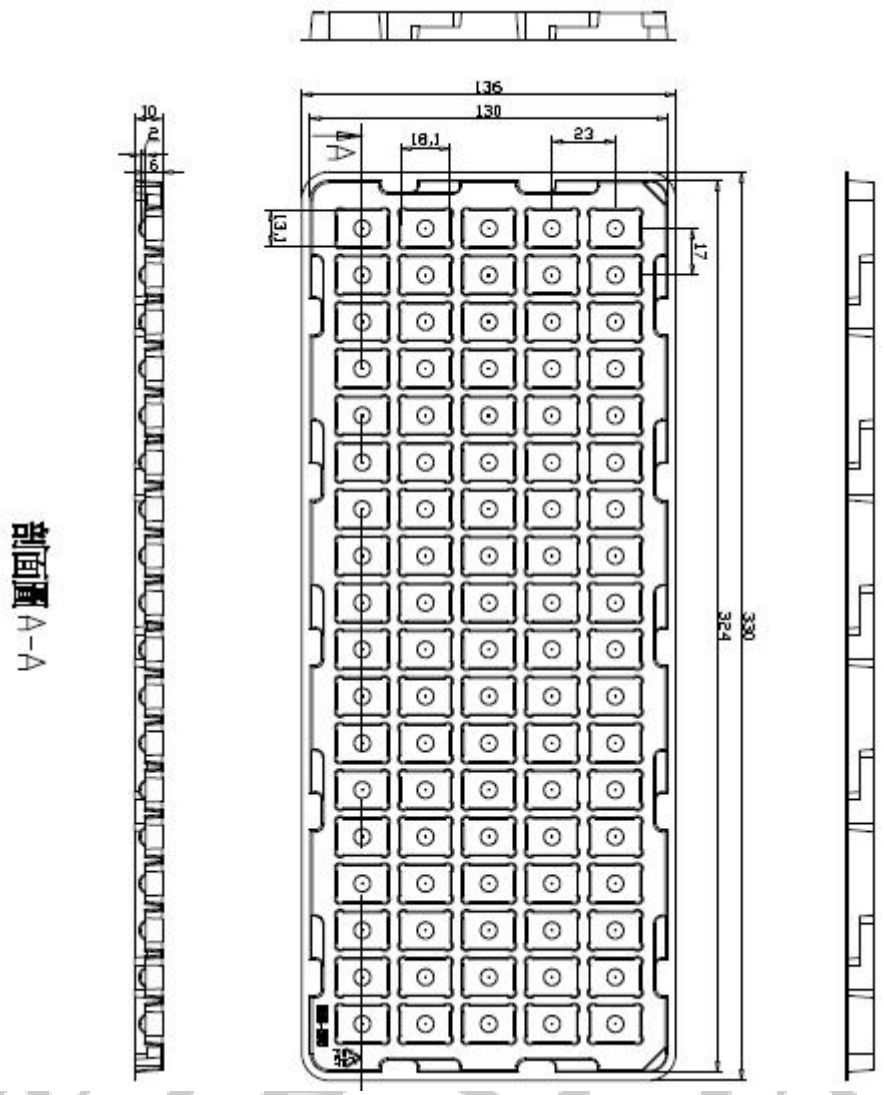
- Do not route any digital or analog signal traces between the RF traces and reference ground.
- don't put any metal shielding in the surrounding area of module and try to leave the module placed in the corner of chassis board as close as possible.



All dimensions are in millimeters.
Tolerance: +- 0.1mm

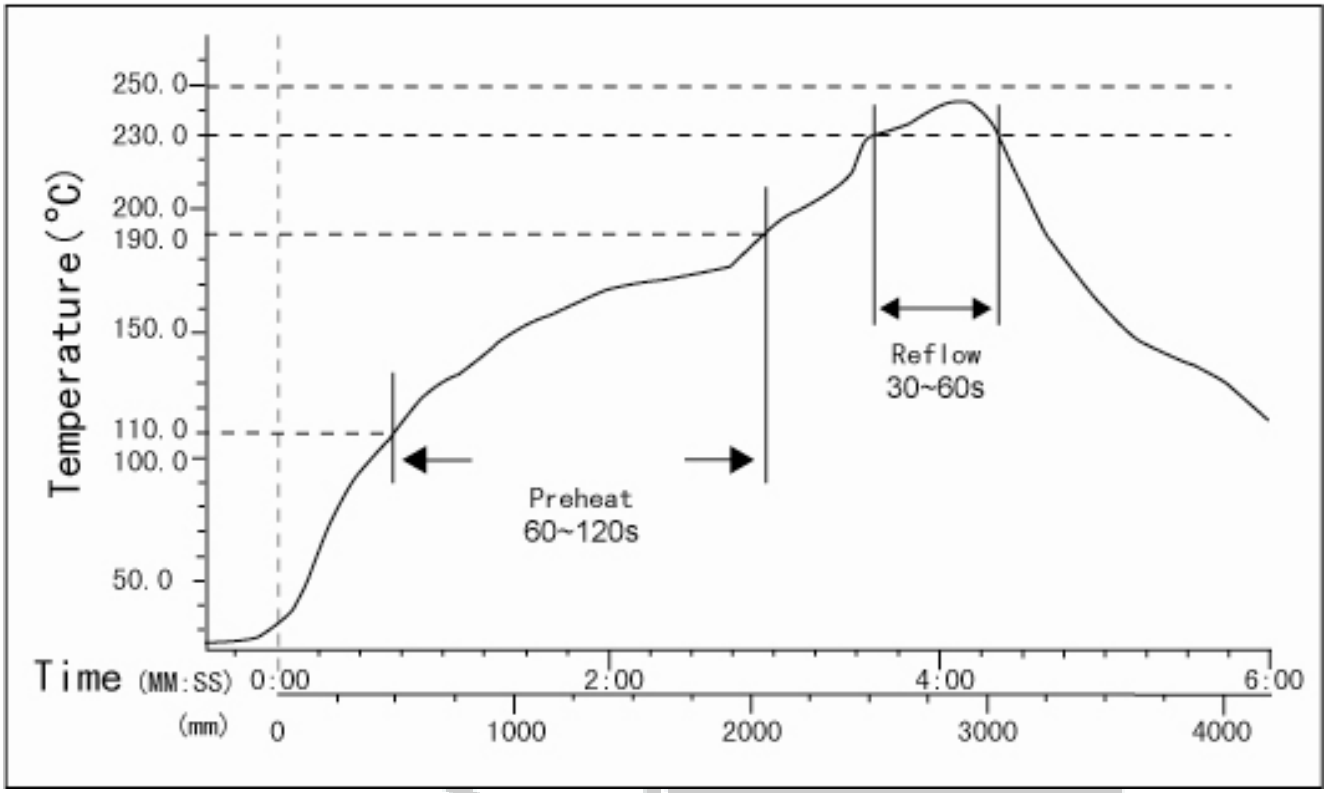
Package Information

Wieson offer one box for 900 pcs module. Each box has 11 trays inside. The top of empty tray is using for fixed the first package tray. The other 10 trays packaged module inside. Each tray dimensions is shown below.



All dimensions are in millimeters.

Reference Temperature Reflow Chart



Note:

1. If the system PCBA is double side design please reflow the side without this module first.
2. Don't let the solder machine temperature over 250℃ or follow solder paste vender's recommended temperature.
3. The Ramp-up temperature speed is 1~4 ^{o}C per second, the Ramp-down temperature speed is 1~4 ^{o}C per second.
4. This temperature reflow chart is for reference only, it depends on the manufaturing machine's characters requirement.

Compliance Information

- FCC Compliance

  This equipment has been tested and found to comply with the limits for a Class digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to the radio communications. However, there are no guarantees that interference will not occur in a particular installation.

- Troubleshooting

  If this equipment does cause harmful interference to radio reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following instructions.
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Consult dealer or an experienced radio technician.

- Conditions

  Operation is subject to the following conditions
  - This device may not cause harmful interference.
  - This device must accept any interference received, including interference that may cause undesired operation.

- FCC Caution

  This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

  Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

- FCC RF Radiation Exposure Statement

  - This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
  - This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

  End Product Labeling
  The final end product must be labeled in a visible area with the following:
  “Contains FCC ID: 2AAK6WM9800BD”

Manual Information to the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module
in the user's manual of the end product which integrates this module.The end user manual shall include all required regulatory information/warming as shown in this manual.

- IC Caution

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- this device may not cause interference
- this device must accept any interference, including interference that may cause undesired operation of the device

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage, et
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas être co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:
"Contains IC ID: 20126-WM9800BD"

■ NCC 警語

根據 NCC 低功率電波輻射性電機管理辦法　規定:

第十二條　經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條　低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。
低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示「本產品內含射頻模組：ID 編號」字樣。