Hyper Wi-Fi Module

Brand:SUNMI
Model :NSC1-00

Product overview

The Turbolink module is a low-power, long-distance wireless module. The maximum negotiation rate of the SPI interface PHY is 15 Mbps, and the maximum negotiation rate of the SDIO interface PHY is 32.5 Mbps. A single AP supports up to 8191 IoT device connections, is compatible with IPv6, supports WPA3, and has strong wall penetration performance. The basic information and key features of the module are shown in Table 1 and Table 2.

Table 1 Basic information of Turbolink module

encapsulation	DFN
Number of pins	32
Size	13±0.2mm*13±0.2mm*2.0mm(max)

Table 2 Turbolink module key features

Supply voltage	MN_VBAT_3.3V:3.0-3.6V, recommended value 3.3V
	MN_VDD_IO:1.8V/3.3V(VDD_IO≤Vbat)
	MN_VDD_FEM_4.8V:4.6-4.8V, recommended value 4.8V
temperature conditions	Operated temperature:-10~+55℃
	Storage temperature:-30~+85℃
Hardware interface	SPI

Radio frequency characteristics

The basic radio frequency characteristics and key radio frequency transceiver indicators are shown in Table 3 and Table 4.

Table 3Basic RF characteristics

Operated frequency range	863.5MHz-867.5MHz for EU 903.5MHz-926.5MHz for US
Modulation type	OFDM with BPSK/QPSK/16QAM/64QAM
Mode of operation	AP, Station
PHY rate(EU)	1MHz: 0.15 to 3.0Mbps
PHY rate(US)	1MHz: 0.15 to 3.0Mbps, 2MHz: 0.65 to 6.5Mbps, 4MHz: 1.35 to 13.5Mbps

Table 4Key RF transceiver indicators (25℃)

Condition	IEEE EVM standards (dB)	EVM (dB)	903.5MHz-926.5MHz		863.5MHz-867.5MHz	
			Power (dBm)	Sensitivity (dBm)	Power (dBm)	Sensitivity (dBm)
1MHz@MCS10	-4	⩽-4	25(max)	-106±2	14(max)	-106±2
1MHz@MCS0	-5	⩽-5	25(max)	-104±2	14(max)	-104±2
2MHz@MCS0	-5	⩽-5	25(max)	-100±2	/	/
4MHz@MCS0	-5	⩽-5	25(max)	-98±2	/	/
1MHz@MCS7	-27	⩽-27	19(max)	-87±2	14(max)	-87±2
2MHz@MCS7	-27	⩽-27	19(max)	-80±2	/	/
4MHz@MCS7	-27	⩽-27	19(max)	-79±2	/	/

Power consumption description

Turbolink module is shown in Table 5.

Table 5Power consumption data

Signaling mode	standby mode	Deep sleeping	I_MN_VBAT_3.3V	I_MN_VDD_IO	I_MN_VDD_FEM_4.8V	unit
	power saving mode (average current)	DTIM=2	1300	/	10	uA
		DTIM=3	800	/	10	uA
		DTIM=10	300	/	10	uA
non-signaling mode	Deep sleeping		4	1	1	uA
	1MHz@MCS0/24dBm		140	20	320	mA
	1MHz@MCS7/18dBm		130	20	200	mA

Storage, production, packaging

(1) Storage conditions

Modules are shipped in vacuum sealed bags. The humidity sensitivity level of the module is MSL3, and its storage must comply with the following conditions:

- Recommended storage conditions: temperature 25 ±5 ° C, relative humidity 35~60%.
- Under recommended storage conditions, modules can be stored in vacuum sealed bags for 12 months.
- Under workshop conditions of a temperature of 25±5° C and a relative humidity of less than 60%, the workshop life of the module after unpacking is 168 hours. Under this condition, the module can be directly subjected to reflow production or other high-temperature operations. Otherwise, the module needs to be stored in an environment with a relative humidity of less than 10% to keep the module dry.
- If the module is in the following conditions, the module needs to be baked before mounting to prevent the module from absorbing moisture and causing PCB blistering, cracks and delamination after high-temperature soldering:
    - ■ Storage temperature and humidity do not meet recommended storage conditions.
    - ■ After the module is unpacked, the production or storage cannot be completed according to Article 3 above.
    - ■ Vacuum packaging leaks and materials are in bulk.
    - ■ Before module return for repair.
- Module baking process:

■ Requires high temperature baking at 120 ±5 ° C for 8 hours.

■ The secondary baked modules must be welded within 24 hours after baking, otherwise they still need to be stored in a moisture-proof cabinet.

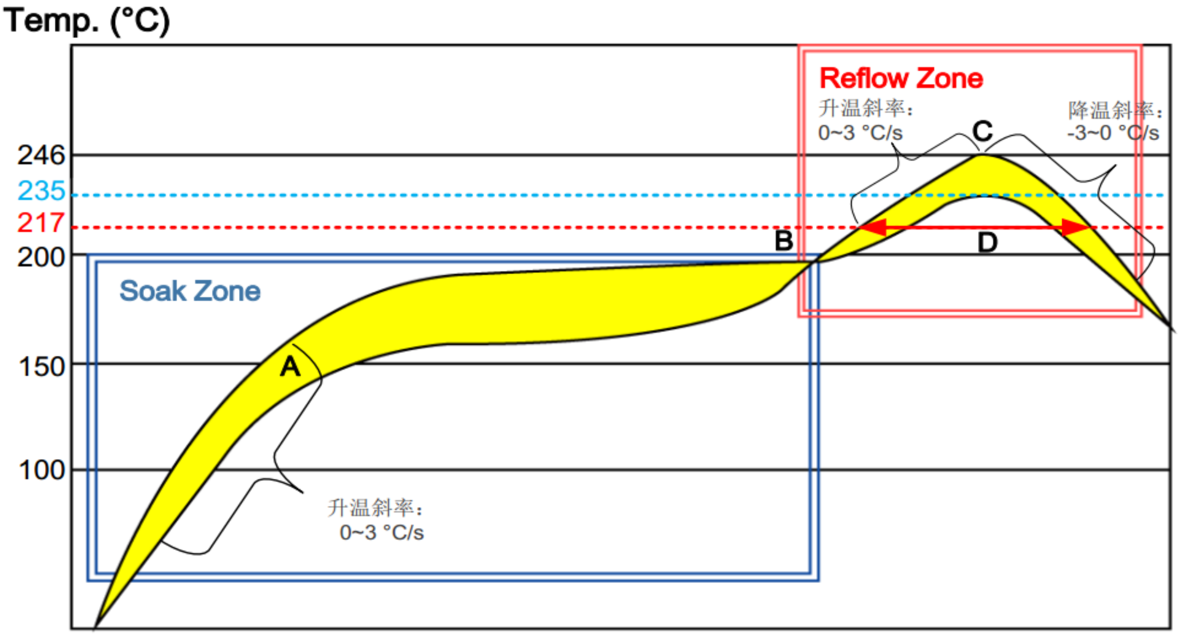
Remark:

- In order to prevent and reduce the occurrence of welding defects such as blistering and delamination of modules due to moisture, strict control should be carried out. It is not recommended to expose the module to the air for a long time after unpacking the vacuum package.
- Before baking, the module needs to be taken out of the package and the bare module placed on a high-temperature-resistant appliance to avoid high temperature damage to the plastic tray or reel.

(2) Production welding

Use a printing squeegee to print solder paste on the stencil so that the solder paste leaks onto the PCB through the stencil opening. The strength of the printing squeegee needs to be adjusted appropriately. In order to ensure the quality of the module printing paste, the thickness of the steel mesh corresponding to the module pad part is recommended to be 0.15~0.18 mm.

The recommended peak reflow temperature is 235~246 °C. To avoid damage to the module due to repeated heat exposure, it is recommended to complete the reflow soldering on the first side of the PCB board before attaching the module. The recommended oven temperature profile (lead-free SMT reflow soldering) and related parameters are shown in below.



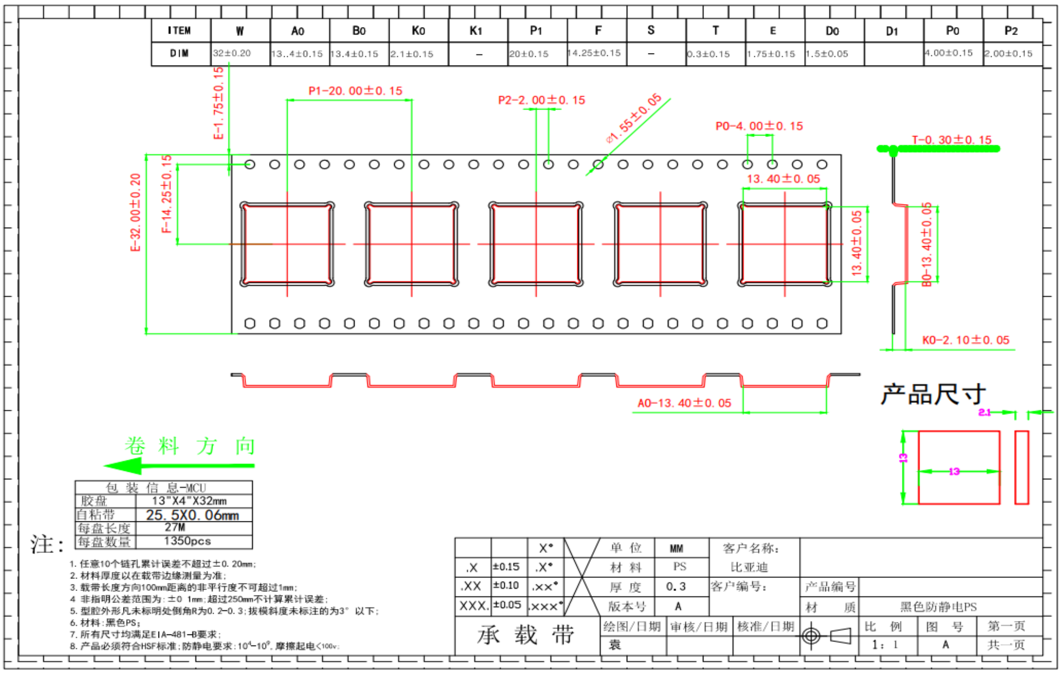
Recommended reflow soldering temperature curve

(3) Packaging specifications

This section is only used to reflect the key parameters and packaging process of packaging. All illustrations are for reference only. The appearance and structure of specific packaging materials are subject to actual delivery.

Carrier tape specifications

The dimensional drawing of the carrier tape packaging is shown in below:


ITEM | W | A0 | B0 | K0 | K1 | P1 | F | S | T | E | D0 | D1 | P0 | P2
DIM | 32±0.20 | 13..4±0.15 | 13.4±0.15 | 2.1±0.15 | – | 20±0.15 | 14.25±0.15 | – | 0.3±0.15 | 1.75±0.15 | 1.5±0.05 | | 4.00±0.15 | 2.00±0.15
E-1.75±0.15
P1-20.00±0.15
P2-2.00±0.15
⌀1.55±0.05
P0-4.00±0.15
T-0.30±0.15
13.40±0.05
E-32.00±0.20
F-14.25±0.15
13.40±0.05
B0-13.40±0.05
K0-2.10±0.05
A0-13.40±0.05
产品尺寸
2.1
13
13
卷 料 方 向
包 装 信 息-MCU
胶盘 13"X4"X32mm
自粘带 25.5X0.06mm
每盘长度 27M
每盘数量 1350pcs
注：
1. 任意10个链孔累计误差不超过±0.20mm；
2. 材料厚度以在载带边缘测量为准；
3. 载带长度方向100mm距离的非平行度不可超过1mm；
4 非指明公差范围为：±0 1mm；超过250mm不计算累计误差；
5. 型腔外形凡未标明处倒角R为0.2–0.3；拔模斜度未标注的为3° 以下；
6. 材料：黑色PS；
7. 所有尺寸均满足EIA-481-B要求；
8. 产品必须符合HSF标准；防静电要求：10⁴–10⁹，摩擦起电<100v；
X° .X ±0.15 .X° .XX ±0.10 .xx° XXX. ±0.05 .xxx°
单 位 MM
材 料 PS
厚 度 0.3
版本号 A
客户名称： 比亚迪
客户编号：
产品编号
材 质 黑色防静电PS
承 载 带
绘图/日期 袁
审核/日期
核准/日期
比 例 1：1
图 号 A
第一页
共一页

Carrier tape packaging dimensions diagram

Carrier tape size parameters

Carrier tape width	Bubble spacing	bubble width
32mm	20mm	13.4mm

Reel packaging

Schematic diagram of the reel

Aluminum foil and pizza box packaging

载带卷盘
铝箔袋
披萨盒

Schematic diagram of aluminum foil and pizza box packaging

FCC regulatory compliance statement

§15.19 Statement

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.

§15.21 Information to user

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

- List of applicable FCC rules:

47 CFR Part 15, Subpart C 15.247

- Summarize the specific operational use conditions

The input voltage to the module is nominally 3.3V.

- Limited module procedures

This module is a single module.

- Trace antenna designs

The antenna is not a trace antenna.

- RF exposure considerations

This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- Antennas

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

- Label and compliance information

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains FCC ID:2AH25NSC100” any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.
Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

- Information on test modes and additional testing requirements

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

Test software access to different test modes: Firmware： 10857

Testing item, Frequencies, Transmit Power, Modulation Type can be selected on the test script instructions.

- FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in *§15.105 Information to the user* or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

For Class B

> *Note: This equipment has been tested and found to comply with the limits for a Class B 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 radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*
>
> *—Reorient or relocate the receiving antenna.*
>
> *—Increase the separation between the equipment and receiver.*
>
> *—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
>
> *—Consult the dealer or an experienced radio/TV technician for help.*

For Class A

> *Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

Declaration for EU Compliance

Mode	Frequency	Power(dBm)
802.11ah	863.5MHz-867.5MHz	13.276

EU regulatory conformance
Hereby, Shanghai Sunmi Technology Co., Ltd. declares that the radio equipment type NSC1-00 is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:https://developer.sunmi.com/docs/read/en-US/maaeghjk480.

Manufacturer: Shanghai Sunmi Technology Co., Ltd.
Address: Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China

EU Representative: SUNMI France SAS
186, avenue Thiers,69006 Lyon, France