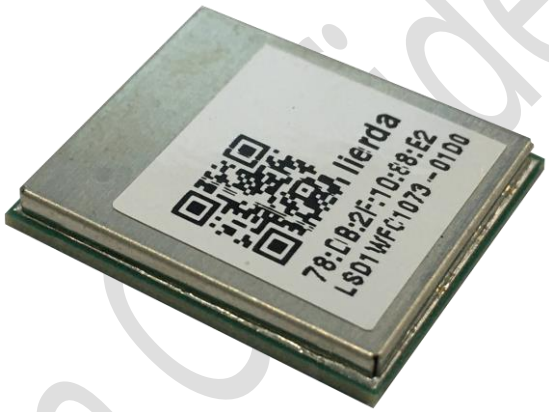
# LSD1WFC1073-01D0

## IEEE 802.11 a/b/g/n Wireless LAN IoT Module






## DataSheet V1.2

# Revision History

| Version | Author | Participants | Date | Description of Changes |
|---|---|---|---|---|
| V1.0 | Yin Han | Yao Dandan | 2021-02-05 | Initial Release |
| V1.1 | Yin Han | Yao Dandan | 2021-06-21 | Updated Figures 2-3-1 & 2-4-1 |
| V1.2 | Yin Han | Yao Dandan | 2021-07-21 | Modified Cover Page & Figure 1-1-1 |
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# Directory

# Chapter 1 Product Introduction

## 1.1Product Overview

The LSD1WFC1073-01D0 (hereinafter referred to as "1073") is a compact, high-performance wireless LAN communication module designed to meet customers' demands for small form factors and superior performance. Supporting UART/SPI interfaces and compliant with IEEE 802.11 a/b/g/n standards, this module integrates an MCU, MAC, baseband, RF, and memory units. It is ideal for smart devices such as cameras, air conditioners, refrigerators, robotic vacuum cleaners, and air purifiers.

The LSD1WFC1073-01D0 module offers exceptional design flexibility, shortened development cycles, and rapid time-to-market, enabling customers to seamlessly implement Wi-Fi embedded development and applications. Additionally, it ensures robust security by supporting WPA/WPA2/WPA3 and WEP encryption protocols for enhanced data protection.


Figure 1-1-1：1073 Module Pic

## 1.2Product Features

### 1.2.1Package

- 1.27mm pitch QFM package;

### 1.2.2Processor

- ARM Cortex-M4 MCU;
- 80MHz clock frequency;

### 1.2.3Memory

- Built-in 256KB RAM;
- Built-in 2MB Flash;

### 1.2.4Wireless Performance

- Compliant with IEEE 802.11 a/b/g/n standards;
- Supports 2.4GHz + 5GHz dual-band operation;
- 1T1R configuration (1 transmit & 1 receive path);

### 1.2.5Peripheral Interfaces

- 1 SPI interface;
- 2 user UART interfaces;
- Multiple GPIO interfaces supported;

### 1.2.6Other Features

- RoHS compliant;

## 1.3Application Fields

◆Smart home appliances ◆Security monitoring ◆Wearable devices

◆Portable devices◆Consumer electronics◆Intelligent transportation

# Chapter 2 Product Description

## 2.2Key Specifications

Table 2-2-1: 1073 Basic Parameters

| Parameter Category | Detailed Description |
|---|---|
| Package Type | QFN 63 PINS |
| Interface Type | WLAN: UART |
| WLAN Standard | IEEE 802.11 a/b/g/n |
| Supported Modes | STA/SoftAP |
| Operating Channels | 1~14 |
| Frequency Range | 2.4GHz+5GHz Band |
| Supported System | Built-in RTOS |
| Antenna Type | Surface-mount pad x1 |
| RF Port Impedance | 50Ω |
| Module Coplanarity | TBD |
| Module Dimensions | 17.7mm(L)x20.7mm(W)x2.6mm(H) |
| Module Weight | TBD |

## 2.3Pin Definitions

### 2.3.1Pin Assignment

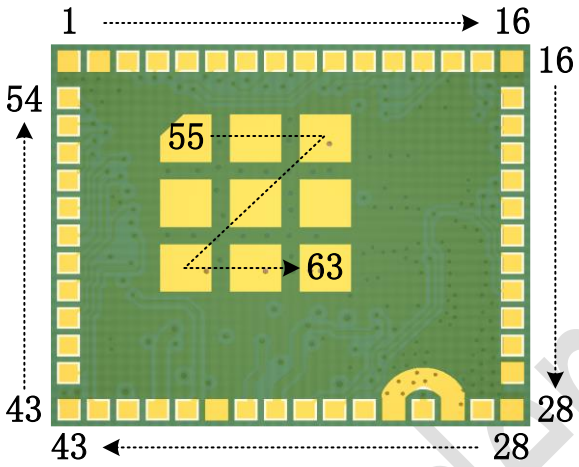



Figure 2-3-1: Pin Assignment Diagram of 1073 (Bottom View)

### 2.3.2Pin Descriptions

Table 2-3-1: Pin Description Table of 1073

| No. | Name | Type | Description |
|---|---|---|---|
| 1 | GND | G | Ground |
| 2 | GND | G | Ground |
| 3 | GPIO10 | I/O | General-purpose I/O |
| 4 | GPIO11 | I/O | General-purpose I/O |
| 5 | GPIO14 | I/O | General-purpose I/O |
| 6 | GPIO15 | I/O | General-purpose I/O |
| 7 | GPIO16 | I/O | General-purpose I/O |
| 8 | GPIO17 | I/O | General-purpose I/O |
| 9 | GPIO12 | I/O | General-purpose I/O |
| 10 | GPIO13 | I/O | General-purpose I/O |
| 11 | GPIO22 | I/O | General-purpose I/O |
| 12 | JTAG_TDI | I | JTAG data input |
| 13 | FLASH_SPI_MISO | I | Flash programming: SPI input |

| | | | |
|---|---|---|---|
| 14 | FLASH_SPI_nCS_IN | I | Flash programming: SPI chip select |
| 15 | FLASH_SPI_CLK | I | Flash programming: SPI clock |
| 16 | GND | G | Ground |
| 17 | FLASH_SPI_MOSI | O | Flash programming: SPI output |
| 18 | JTAG_TDO | O | JTAG data output |
| 19 | GPIO28 | I/O | General-purpose I/O |
| 20 | NC | - | No connect (floating) |
| 21 | JTAG_TCK | I | JTAG clock input |
| 22 | JTAG_TMS | I | JTAG mode select |
| 23 | SOP2 | I | Programming mode selection pin (see chip manual), internally pulled down with 69.8KΩ |
| 24 | SOP1 | I | Programming mode selection pin (see chip manual), internally pulled down with 69.8KΩ |
| 25 | NC | - | No connect (floating) |
| 26 | NC | - | No connect (floating) |
| 27 | GND | G | Ground |
| 28 | GND | G | Ground |
| 29 | NC | - | No connect (floating) |
| 30 | GND | G | Ground |
| 31 | RF_BG | I/O | WLAN RF I/O port |
| 32 | GND | G | Ground |
| 33 | NC | - | No connect (floating) |
| 34 | SOP0 | I | Programming mode selection pin (see chip manual), internally pulled down with 100KΩ |
| 35 | nRESET | I | Reset pin |
| 36 | VBAT_DCDC_ANA | P | 3.3V power supply input |
| 37 | VBAT_DCDC_PA | P | 3.3V power supply input |
| 38 | GND | G | Ground |

| | | | |
|---|---|---|---|
| 39 | NC | - | No connect (floating) |
| 40 | VBAT_DCDC_DIG_IO | P | 3.3V power supply input |
| 41 | NC | - | No connect (floating) |
| 42 | GPIO30 | I/O | General-purpose I/O |
| 43 | GND | G | Ground |
| 44 | GPIO0 | I/O | General-purpose I/O |
| 45 | NC | - | No connect (floating) |
| 46 | GPIO1 | I/O | General-purpose I/O |
| 47 | GPIO2 | I/O | General-purpose I/O |
| 48 | GPIO3 | I/O | General-purpose I/O |
| 49 | GPIO4 | I/O | General-purpose I/O |
| 50 | GPIO5 | I/O | General-purpose I/O |
| 51 | GPIO6 | I/O | General-purpose I/O |
| 52 | GPIO7 | I/O | General-purpose I/O |
| 53 | GPIO8 | I/O | General-purpose I/O |
| 54 | GPIO9 | I/O | General-purpose I/O |
| 55 | GND | G | Ground |
| 56 | GND | G | Ground |
| 57 | GND | G | Ground |
| 58 | GND | G | Ground |
| 59 | GND | G | Ground |
| 60 | GND | G | Ground |
| 61 | GND | G | Ground |
| 62 | GND | G | Ground |
| 63 | GND | G | Ground |

## 2.4Mechanical Dimensions

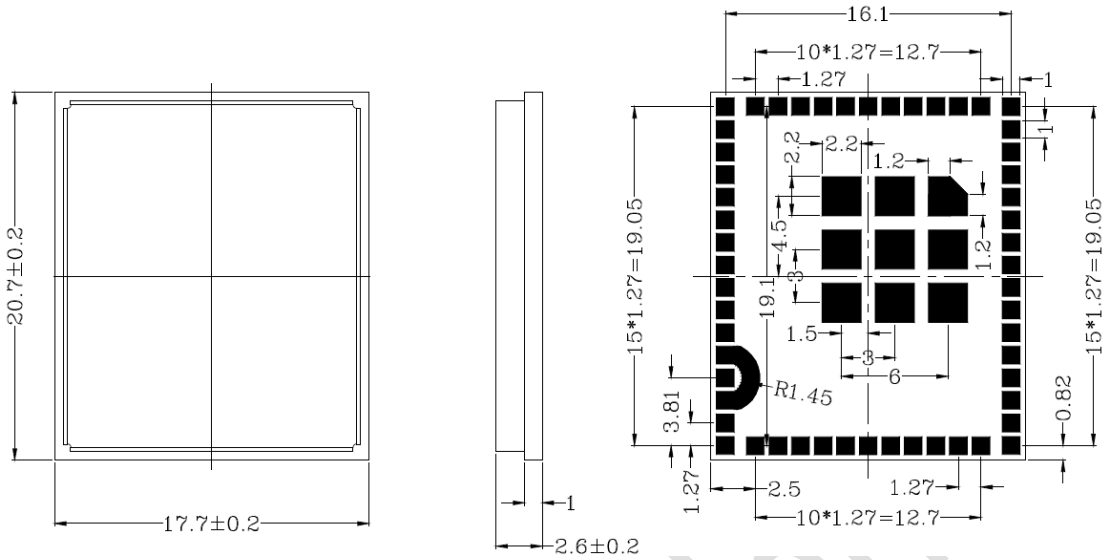



Figure 2-4-1: Structural Dimensions of 1073

# Chapter 3 Electrical Characteristics

## 3.1Voltage Range

### 3.1.1Absolute Maximum Ratings

Table 3-1-1: Absolute Maximum Ratings

| Symbol | Description | Min | Max | Unit |
|---|---|---|---|---|
| $V_{BAT}$ | Input supply voltage | -0.5 | 3.8 | V |

Note: Exceeding these ratings may cause permanent hardware damage.

### 3.1.2Operating Voltage Range

Table 3-1-2: Operating Voltage Range

| Symbol | Description | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| $V_{BAT}$ | Input supply voltage | 2.3 | 3.3 | 3.6 | V |

## 3.2Current Consumption

Table 3-2-1: 2.4GHz Band Current Consumption

| Mode | | Test Condition | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|---|---|
| MCU ACTIVE | NWP ACTIVE | TX | 1 DSSS | - | 272 | - | mA |
| | | | 6 OFDM | - | 248 | - | |
| | | | 54 OFDM | - | 223 | - | |
| | | RX | 1 DSSS | - | 59 | - | |
| | | | 54 OFDM | - | 59 | - | |
| | NWP idle connected(DTIM=1) | | | - | 15.3 | - | |
| MCU SLEEP | NWP ACTIVE | TX | 1 DSSS | - | 269 | - | mA |
| | | | 6 OFDM | - | 245 | - | |
| | | | 54 OFDM | - | 220 | - | |
| | | RX | 1 DSSS | - | 56 | - | |
| | | | 54 OFDM | - | 56 | - | |
| | NWP idle connected(DTIM=1) | | | - | 12.2 | - | |
| MCU LPDS | NWP ACTIVE | TX | 1 DSSS | - | 266 | - | mA |
| | | | 6 OFDM | - | 242 | - | |
| | | | 54 OFDM | - | 217 | - | |
| | | RX | 1 DSSS | - | 53 | - | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 54 OFDM | - | 53 | - | |
| | NWP LPDS | SRAM Retention | 64KB | - | 120 | - | uA |
| | | | 256KB | - | 135 | - | |
| | NWP idle connected(DTIM=1) | | | - | 710 | - | |
| MCU SHUTDOWN | | | | - | 1 | - | uA |
| MCU HIBERNATE | | | | - | 5.5 | - | |
| Peak calibration current | | $V_{BAT}$=3.6V | | - | 420 | - | mA |
| | | $V_{BAT}$=3.3V | | - | 450 | - | |
| | | $V_{BAT}$=2.3V | | - | 610 | - | |

**Notes:**

1、Test conditions: VBAT=3.6V, Temp=25℃

2、 Power consumption may vary with firmware versions

**Table 3-2-2: 5GHz Band Current Consumption**

| Mode | | Test Condition | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|---|---|
| MCU ACTIVE | NWP ACTIVE | TX | 6 OFDM | - | 318 | - | mA |
| | | | 54 OFDM | - | 293 | - | |
| | | RX | 54 OFDM | - | 67 | - | |
| | NWP idle connected(DTIM=1) | | | - | 15.3 | - | |
| MCU SLEEP | NWP ACTIVE | TX | 6 OFDM | - | 315 | - | mA |
| | | | 54 OFDM | - | 290 | - | |
| | | RX | 54 OFDM | - | 64 | - | |
| | NWP idle connected(DTIM=1) | | | - | 12.2 | - | |
| MCU LPDS | NWP ACTIVE | TX | 6 OFDM | - | 312 | - | mA |
| | | | 54 OFDM | - | 287 | - | |
| | | RX | 54 OFDM | - | 61 | - | |
| | NWP LPDS | SRAM Retention | 64KB | - | 120 | - | uA |
| | | | 256KB | - | 135 | - | |
| | NWP idle connected(DTIM=1) | | | - | 710 | - | |
| MCU SHUTDOWN | | | | - | 1 | - | uA |
| MCU HIBERNATE | | | | - | 5.5 | - | |
| Peak calibration current | | $V_{BAT}$=3.6V | | - | 290 | - | mA |

| | | | | | |
|---|---|---|---|---|---|
| | $V_{BAT}$=3.3V | - | 310 | - | |
| | $V_{BAT}$=2.3V | - | 365 | - | |

Notes:

1、Test conditions: VBAT=3.6V, Temp=25℃;

2、Power consumption may vary with firmware versions

## 3.3RF Parameters

Table 3-3-1: RF Specifications

| Category | Standard | Description |
|---|---|---|
| Modulation | 802.11 b | DSSS With DQPSK,DBPSK,CCK |
| | 802.11 a/g | OFDM With 16-QAM,64-QAM,QPSK,BPSK |
| | 802.11 n | OFDM With 16-QAM,64-QAM,QPSK,BPSK |
| Data Rate | 802.11 b | 1,2,5.5,11Mbps |
| | 802.11 g | 6,9,12,18,24,36,48,54Mbps |
| | 802.11 n | MCS0~MCS7 |
| Tx Power | 802.11 a | 12±1.5dBm（@5GHz,54Mbps） |
| | 802.11 b | 16.3±1.5dBm（@2.4GHz,11Mbps） |
| | 802.11 g | 12.5±1.5dBm（@2.4GHz,54Mbps） |
| | 802.11 n | 11±1.5dBm（@2.4GHz,MCS7）<br>11±1.5dBm（@5GHz,MCS7） |
| Rx Sensitivity | 802.11 a | -72dBm±1dBm（@5GHz,54Mbps,OFDM,10%PER） |
| | 802.11 b | -86.5dBm±1.5dBm（@2.4GHz,11Mbps,CCK,8%PER） |
| | 802.11 g | -73dBm±1.5dBm（@2.4GHz,54Mbps,OFDM,10%PER） |
| | 802.11 n | -70dBm±1.5dBm（@2.4GHz,MCS7,OFDM,10%PER）<br>-68dBm±1.5dBm（@5GHz,MCS7,OFDM,10%PER） |

## 3.4Temperature & Humidity Characteristics

Table 3-4-1: Environmental Specifications

| Parameter | Min | Max | Unit |
|---|---|---|---|
| Operating temp | -20 | 85 | ℃ |
| Storage temp | -40 | 85 | ℃ |
| Operating humidity | 20 | 90 | % |

| | | | |
|---|---|---|---|
| Storage humidity | 5 | 95 | % |

## 3.5ESD Performance

Table 3-5-1: ESD Specifications

| Symbol | Description | Standard | Class | Max | Unit |
|---|---|---|---|---|---|
| $V_{ESD(HBM)}$ | Human Body Model | TA=+25℃ JESD22-A114 | 2 | 2000 | V |
| $V_{ESD(CDM)}$ | Charged Device Model | TA=+25℃ JESD22-C101 | II | 500 | V |

# Chapter 4 Design Guidelines

## 4.1Reference Circuit

N/A

## 4.2Antenna Design

The 1073 module features a surface-mount pad antenna interface. RF signals can be routed from Pin 31 to either integrated or external antennas. Regardless of antenna type, π-matching circuits (recommended: 2 sets) must be implemented on the RF path.

### 4.2.1Integrated Antenna

Follow standard PCB antenna design principles when using integrated antennas.

### 4.2.2External Antenna

External antennas must meet specifications in Table 4-2-1:

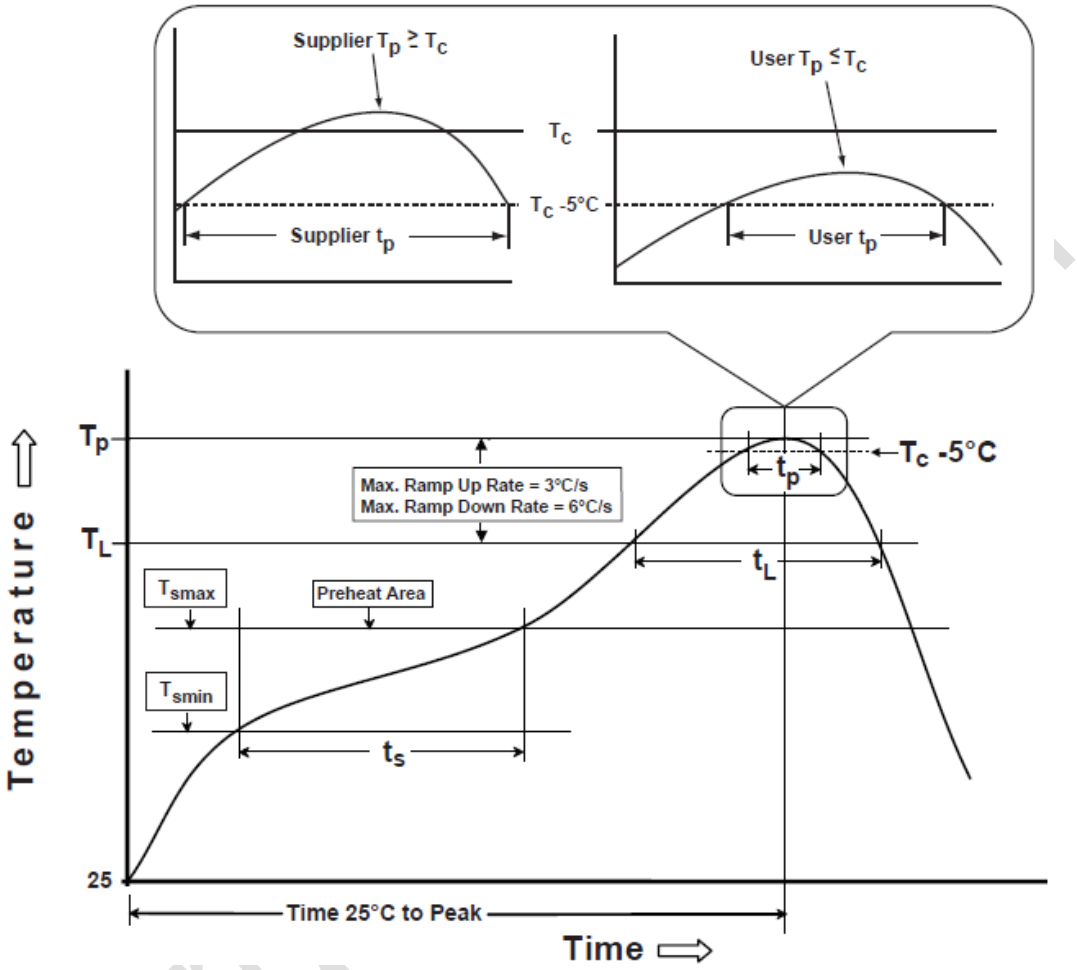
Table 4-2-1: External Antenna Requirements

| Parameter | Specification |
|---|---|
| Frequency range | 2.4GHz+5GHz |
| Impedance | 50Ω |
| Return loss | ≤-10dB |

# Chapter 5 Manufacturing Guidelines

## 5.1Recommended Reflow Profile

Complies with IPC/JEDEC standards (max 2 reflow cycles).




| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| **Preheat/Soak**<br>Temperature Min ($T_{smin}$)<br>Temperature Max ($T_{smax}$)<br>Time ($t_s$) from ($T_{smin}$ to $T_{smax}$) | <br>100 °C<br>150 °C<br>60-120 seconds | <br>150 °C<br>200 °C<br>60-120 seconds |
| Ramp-up rate ($T_L$ to $T_p$) | 3 °C/second max. | 3 °C/second max. |
| Liquidous temperature ($T_L$)<br>Time ($t_L$) maintained above $T_L$ | 183 °C<br>60-150 seconds | 217 °C<br>60-150 seconds |
| Peak package body temperature ($T_p$) | For users $T_p$ must not exceed the Classification temp in Table 4-1.<br>For suppliers $T_p$ must equal or exceed the Classification temp in Table 4-1. | For users $T_p$ must not exceed the Classification temp in Table 4-2.<br>For suppliers $T_p$ must equal or exceed the Classification temp in Table 4-2. |
| Time ($t_p$)* within 5 °C of the specified classification temperature ($T_c$), see Figure 5-1. | 20* seconds | 30* seconds |
| Ramp-down rate ($T_p$ to $T_L$) | 6 °C/second max. | 6 °C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |
| * Tolerance for peak profile temperature ($T_p$) is defined as a supplier minimum and a user maximum. | | |

Figure 5-1-1: Recommended Reflow Temperature Profile

## 5.2Production Precautions

- All operators must wear ESD gloves during production;
- Do not exceed specified baking duration;
- Strictly prohibit explosive, flammable, or corrosive materials in baking process;
- Modules must be placed in high-temperature trays with adequate air circulation;
- Ensure oven door is properly closed to maintain temperature integrity;
- Minimize oven door openings during operation; if necessary, limit opening duration;
- After baking, allow modules to naturally cool below 36° C before handling (to prevent burns);
- Avoid water or contaminant contact with module bottom surfaces;

# Chapter 6 Packaging Information

## 6.1 MOQ Specifications

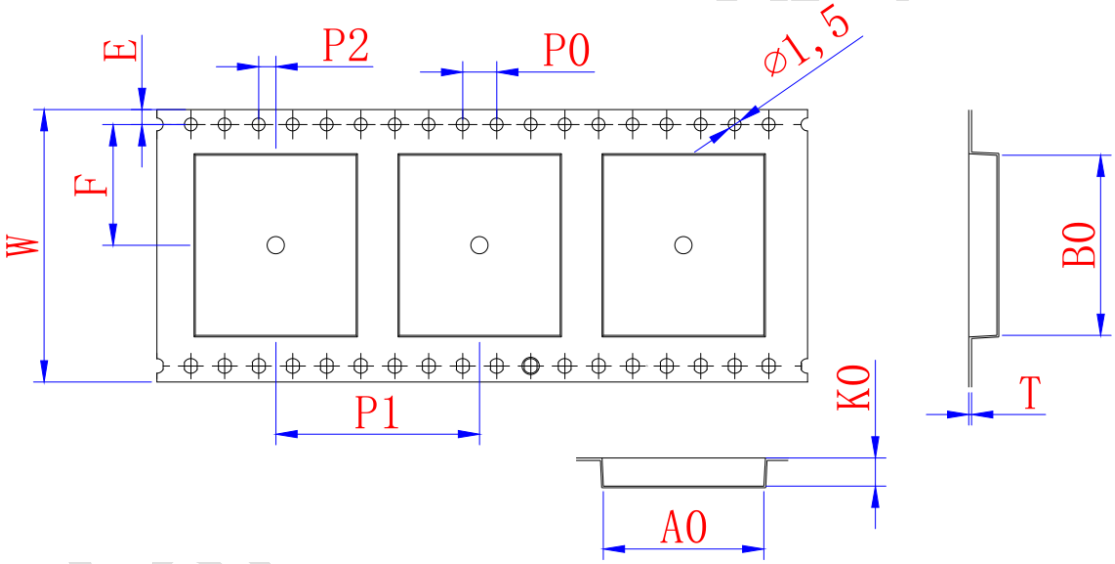
Table 6-1-1: Minimum Order Quantity

| Packaging Type | Reels per Carton | Units per Reel | MOQ |
|---|---|---|---|
| Tape & Reel | 5 | 500PCS | 2500PCS |

## 6.2Packaging Methods

### 6.2.1Tape & Reel Packaging

As shown in Figure 6-2-2, the 1073 modules are packaged in tape-and-reel format, with each reel containing 500PCS. After loading, reels are sealed in aluminum foil bags.




| | | | | | | $D_0$ Ⓑ | $D_1$ Ⓑ | $P_0$ Ⓐ | $P_2$ Ⓐ | E Ⓐ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $1.50^{+0.10}_{-0.00}$ | $2.00^{+0.10}_{-0.00}$ | $4.00 \pm 0.10$ | $2.00 \pm 0.10$ | $1.75 \pm 0.10$ |
| ITEM | W Ⓑ | $A_0$ Ⓐ | $A_1$ Ⓐ | $B_0$ Ⓐ | $B_1$ Ⓐ | $K_0$ Ⓒ | $K_1$ Ⓒ | $P_1$ Ⓐ | F Ⓐ | T Ⓑ |
| DIM | $32.00 \pm 0.30$ | $18.9 \pm 0.10$ | $\pm 0.10$ | $21.2 \pm 0.10$ | $\pm 0.10$ | $3.3 \pm 0.10$ | $\pm 0.10$ | $24.0 \pm 0.10$ | $14.2 \pm 0.10$ | $0.3 \pm 0.05$ |
| ALTERNATE | | | | | | | | | | |

Figure 6-2-1: Tape & Reel Dimension Diagram

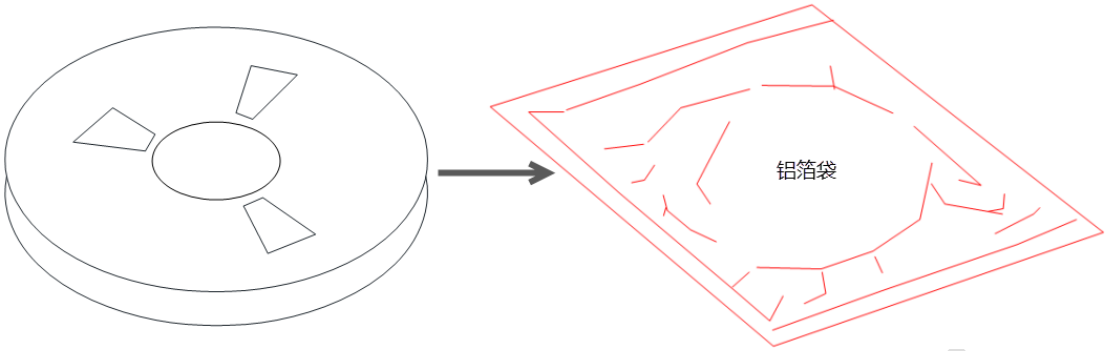



Figure 6-2-2: Tape & Reel Packaging Illustration

### 6.2.2Inner Box Packaging

As shown in **Figure 6-2-3**, the inner box dimensions are 352×348×56mm. Each inner box contains one tape reel (500PCS of 1073 modules).

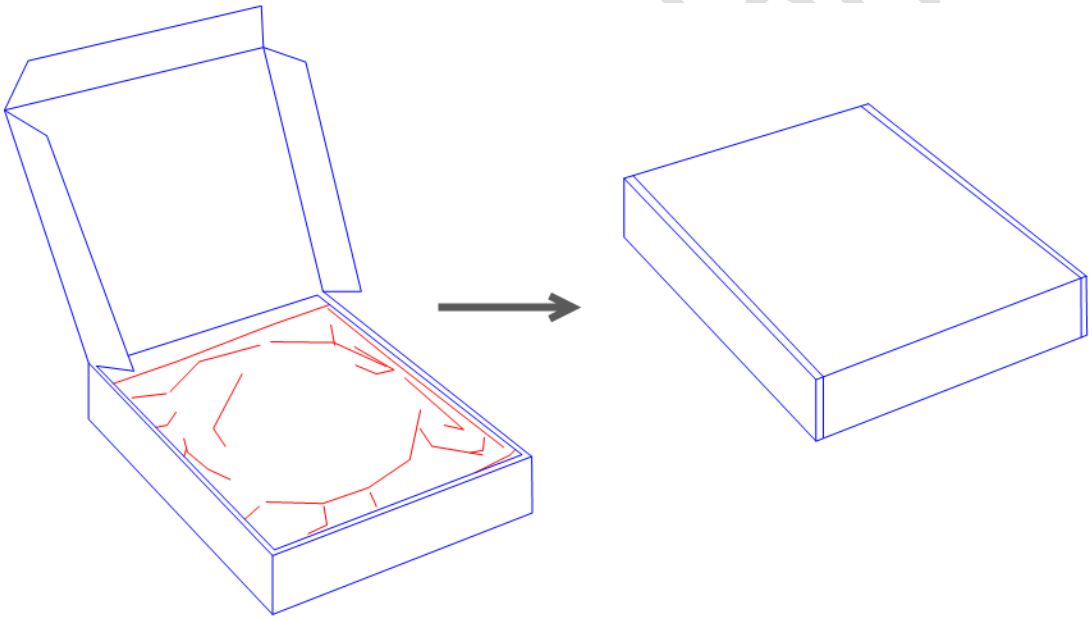


Figure 6-2-3: Inner Box Packaging Illustration

### 6.2.3Outer Box Packaging

As shown in **Figure 6-2-4**, the outer box dimensions are 354×250×362mm. Each outer box holds 5 inner boxes (totaling 2500PCS of 1073 modules).

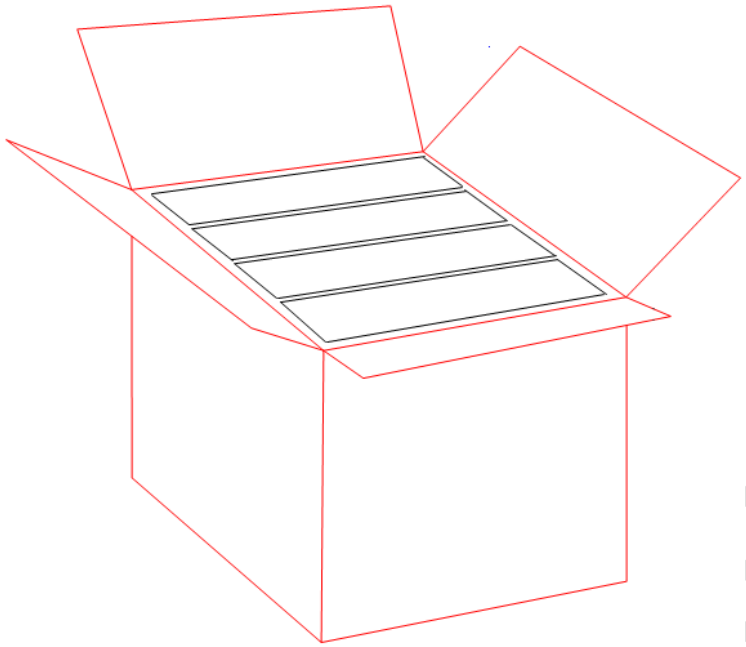


Figure 6-2-4: Outer Box Packaging Illustration

## 6.3Storage Conditions

- **Shelf Life**: 12 months in sealed storage at <40° C & <90% RH;
- **Recommended**: Vacuum-packed storage at <10% RH;
- **Post-unpacking**: Must be used within 24 hours or require re-baking/vacuum-packing;
- **Post-baking**: Re-bake if >12 hours elapse before soldering;
- **Expired**: Prohibit SMT soldering if unpacked >3 months;
- **Baking Specs**: Nitrogen baking recommended (125±5° C for 24 hours);
- **Standards**: Complies with IPC/JEDEC J-STD-020

**A、FCC Radiation Exposure 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.
Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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.
Labelling instruction for Host Product integrator
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: 2BN5S-2503I" any similar wording that expresses the same meaning may be used. Installation Notice to Host Product Manufacturer
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.
Antenna configurations.
Antenna Change Notice to Host manufacturer
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.
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.
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.

**B、ISED Regulatory Compliance**

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference.(2)This device must accept any interference, including interference that may cause undesired operation of the device.
L'émetteur/récepteur exempt de licence contenu dans le present appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :(1)L'appareil ne doitpas produire de brouillage; (2)L'appareil doit accepter tout brouillage radioélectrique subi, même si lebrouillage est susceptible d'en compromettre le fonctionnement.
This equipment complies with IC RSS - 102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm betweenthe radiator and your body.
Cet éauipement est conforme aux limites d'exposition aux radiations IC CNR - 102 établies pour un environnement non contrôlé, Cet équipement doit être installe et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.
Please notice that if the IC 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 IC: 33667-2503I" any similar wording that expresses the same meaning may be used.
L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canadadevra être posée sur le produit hote à un endroit bien en vue, en tout temps. En l'absence d'étiquette.le produit hote doit porter une êtiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le meme sens et qui va comme suit : Contient IC: 33667-2503I est le numéro d'homologation du module.