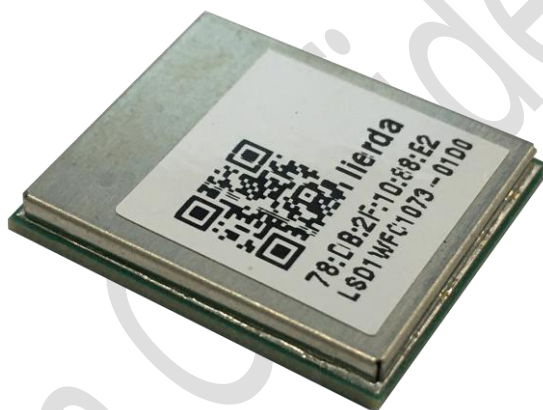


LSD1WFC1073-01D0

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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Chapter 1 Product Introduction

1.1 Product 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

1.2 Product Features

1.2.1 Package

- ◆ 1.27mm pitch QFM package;

1.2.2 Processor

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

1.2.3 Memory

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

1.2.4 Wireless 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);

1.2.5 Peripheral Interfaces

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

1.2.6 Other Features

- ◆ RoHS compliant;

1.3 Application 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	50 Ω
Module Coplanarity	TBD
Module Dimensions	17.7mm (L) x20.7mm (W) x2.6mm (H)
Module Weight	TBD

2.3Pin Definitions

2.3.1Pin Assignment

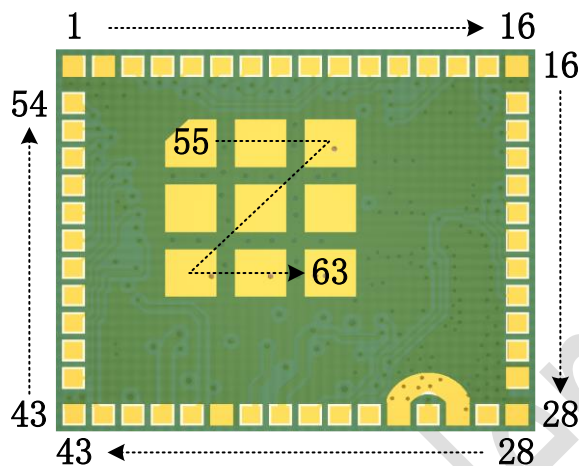


Figure 2-3-1: Pin Assignment Diagram of 1073 (Bottom View)

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	GPI010	I/O	General-purpose I/O
4	GPI011	I/O	General-purpose I/O
5	GPI014	I/O	General-purpose I/O
6	GPI015	I/O	General-purpose I/O
7	GPI016	I/O	General-purpose I/O
8	GPI017	I/O	General-purpose I/O
9	GPI012	I/O	General-purpose I/O
10	GPI013	I/O	General-purpose I/O
11	GPI022	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 69.8K Ω
24	SOP1	I	Programming mode selection pin (see chip manual), internally pulled down with 69.8K Ω
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 100K Ω
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	GPI030	I/O	General-purpose I/O
43	GND	G	Ground
44	GPI00	I/O	General-purpose I/O
45	NC	–	No connect (floating)
46	GPI01	I/O	General-purpose I/O
47	GPI02	I/O	General-purpose I/O
48	GPI03	I/O	General-purpose I/O
49	GPI04	I/O	General-purpose I/O
50	GPI05	I/O	General-purpose I/O
51	GPI06	I/O	General-purpose I/O
52	GPI07	I/O	General-purpose I/O
53	GPI08	I/O	General-purpose I/O
54	GPI09	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

2.4 Mechanical Dimensions

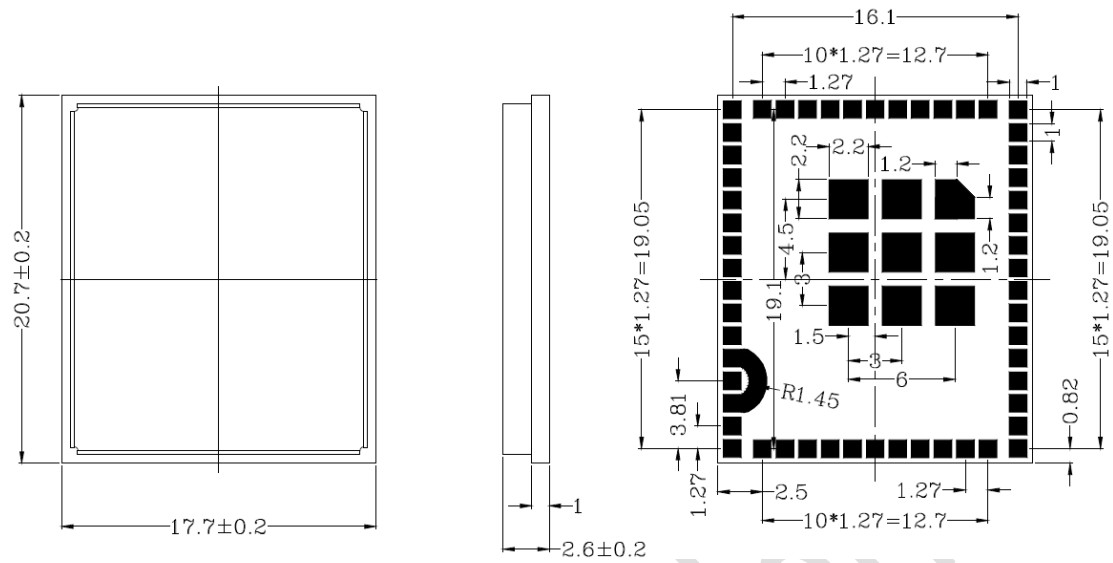


Figure 2-4-1: Structural Dimensions of 1073

Chapter 3 Electrical Characteristics

3.1 Voltage Range

3.1.1 Absolute 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.

3.1.2 Operating 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

3.2 Current 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
		TX 6 OFDM	-	248	-	
		TX 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
		TX 6 OFDM	-	245	-	
		TX 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
		TX 6 OFDM	-	242	-	
		TX 54 OFDM	-	217	-	
	RX	1 DSSS	-	53	-	

			54 OFDM	—	53	—	uA
	NWP LPDS	SRAM Retention	64KB	—	120	—	
			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: $V_{BAT}=3.6V$, 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: V_{BAT}=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) 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) -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

4.1 Reference Circuit

N/A

4.2 Antenna 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.

4.2.1 Integrated Antenna

Follow standard PCB antenna design principles when using integrated antennas.

4.2.2 External Antenna

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

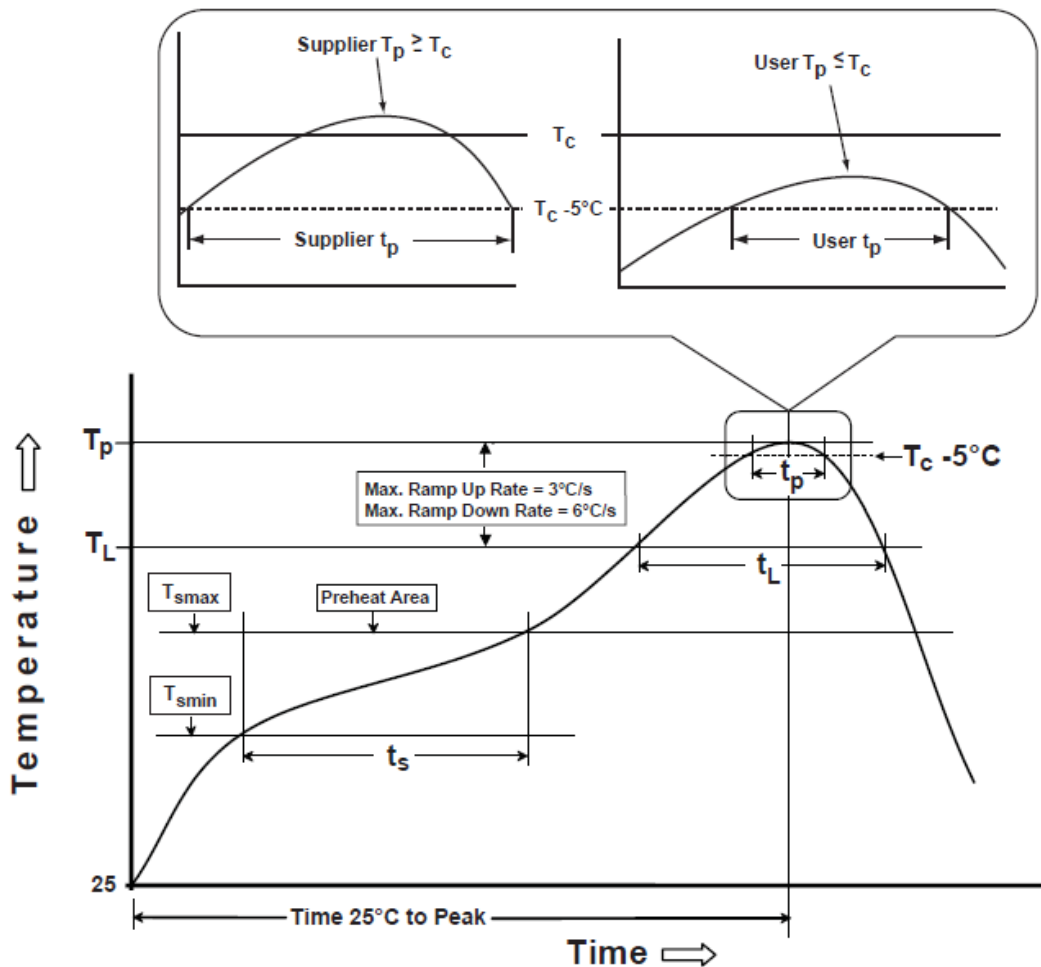
Table 4-2-1: External Antenna Requirements

Parameter	Specification
Frequency range	2.4GHz+5GHz
Impedance	50 Ω
Return loss	$\leq -10\text{dB}$

Chapter 5 Manufacturing Guidelines

5.1 Recommended Reflow Profile

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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Min (T_{smin})	100 °C	150 °C
Temperature Max (T_{smax})	150 °C	200 °C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up rate (T_L to T_p)	3 °C/second max.	3 °C/second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time (t_L) maintained above T_L	60-150 seconds	60-150 seconds
Peak package body temperature (T_p)	For users T_p must not exceed the Classification temp in Table 4-1. 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. 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

5.2 Production 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

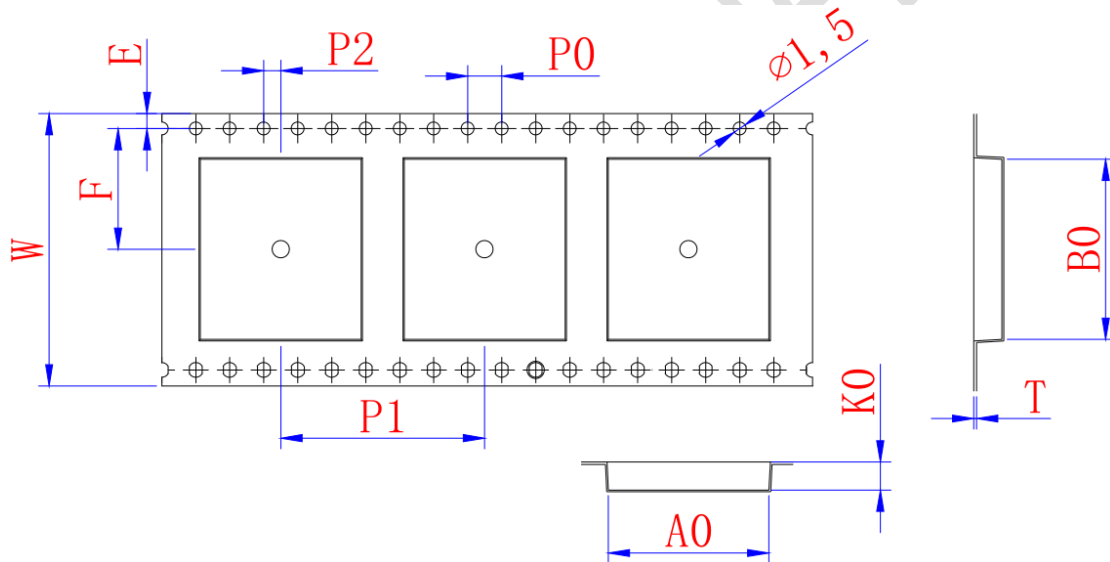
Table 6-1-1: Minimum Order Quantity

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.



ITEM	W [Ⓢ]	A ₀ [Ⓢ]	A ₁ [Ⓢ]	B ₀ [Ⓢ]	B ₁ [Ⓢ]	D ₀ [Ⓢ]	D ₁ [Ⓢ]	P ₀ [Ⓢ]	P ₂ [Ⓢ]	E [Ⓢ]
						1.50 ^{+0.10/-0.00}	2.00 ^{+0.10/-0.00}	4.00 ^{±0.10}	2.00 ^{±0.10}	1.75 ^{±0.10}
DIM	32.00 ^{±0.30}	18.9 ^{±0.10}	^{±0.10}	21.2 ^{±0.10}	^{±0.10}	3.3 ^{±0.10}	^{±0.10}	24.0 ^{±0.10}	14.2 ^{±0.10}	0.3 ^{±0.05}
ALTERNATE										

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

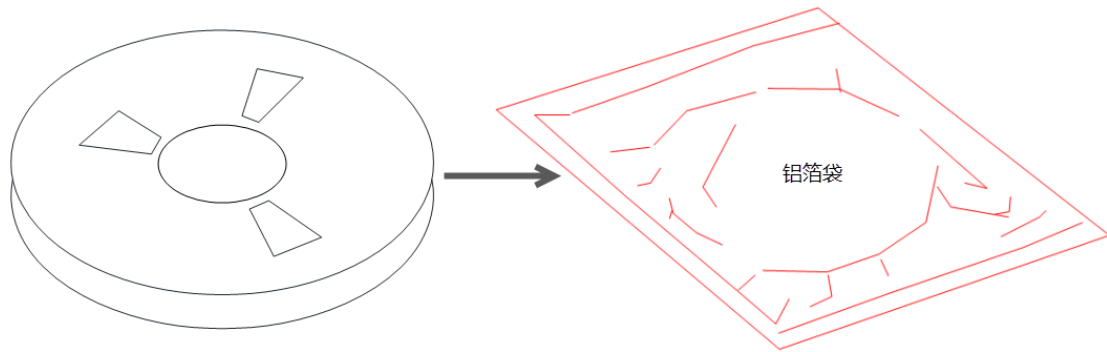


Figure 6-2-2: Tape & Reel Packaging Illustration

6.2.2 Inner Box Packaging

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

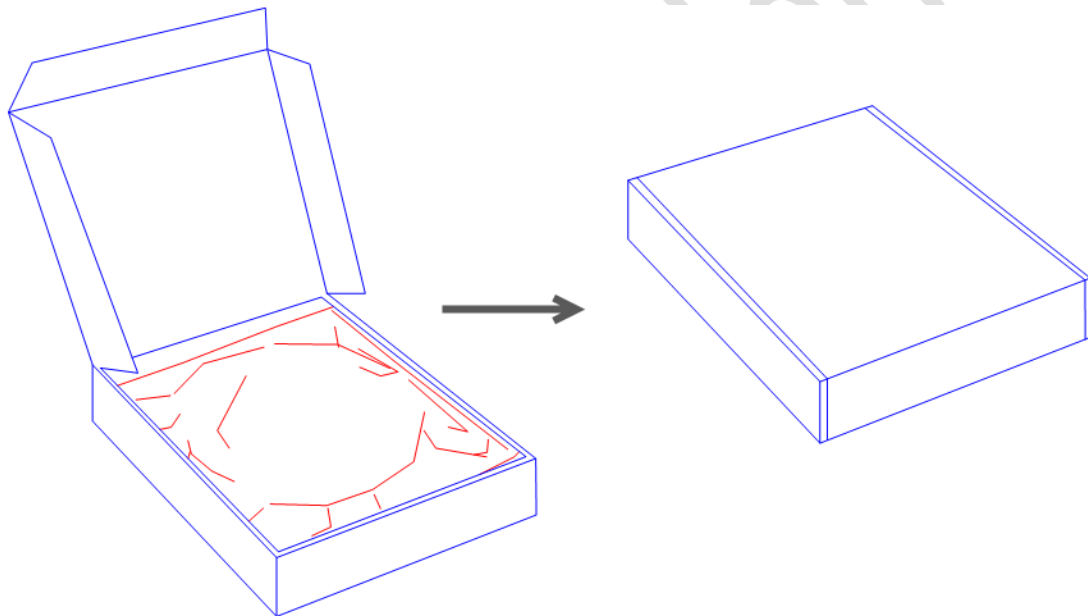


Figure 6-2-3: Inner Box Packaging Illustration

6.2.3 Outer Box Packaging

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

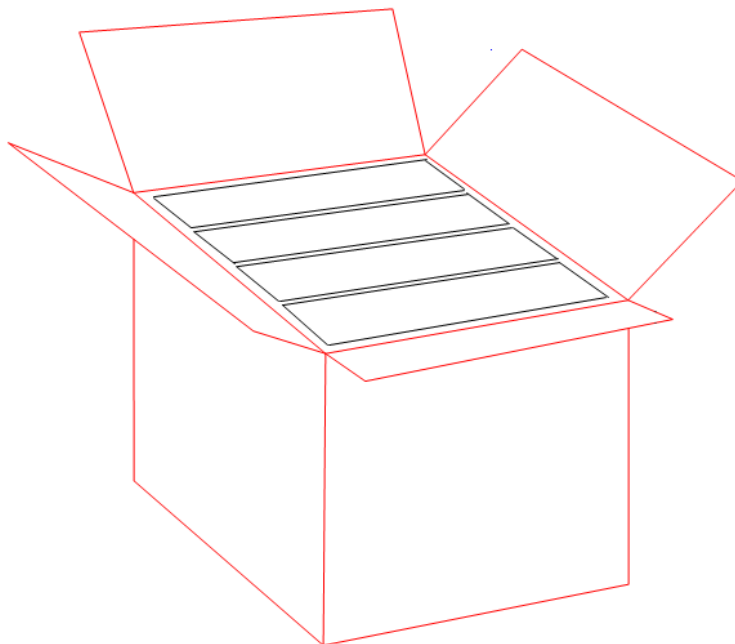


Figure 6-2-4: Outer Box Packaging Illustration

6.3 Storage Conditions

- ◆ Shelf Life: 12 months in sealed storage at $<40^{\circ}\text{C}$ & $<90\%\text{RH}$;
- ◆ Recommended: Vacuum-packed storage at $<10\%\text{RH}$;
- ◆ 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 ($125\pm 5^{\circ}\text{C}$ 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-25031" 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 présent 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 doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage 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 between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR - 102 établies pour un environnement non contrôlé. Cet équipement doit être installé 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: 33667-25031" any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette 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 même sens et qui va comme suit : Contient IC: 33667-25031 est le numéro d'homologation du module.