

PRODUCT SPECIFICATION

6161B-R

Bluetooth5.0 Module Datasheet

Version:v4.1



6161B-R Module Datasheet

Ordering Information	Part NO.	Description
	FG6161BRXX-00	RTL8761BTV,BT v5.0,13x15x2.25mm, With shielding
	FG6161BRXX-01	RTL8761BTV,BT v5.0,13x15x1.65mm, No shielding
	FG6161BRXX-K0	RTL8761BTV,BT v5.0,13x15x1.65mm, No shielding
	FG6161BRXX-K1	RTL8761BTV,BT v5.0,13x15x1.65mm, No shielding

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL:+86-755-2955-8186

Website:www.fn-link.com

CONTENTS

1. General Description.....	5
1.1 Introduction.....	5
1.2 Description.....	5
2. Features.....	6
3. Block Diagram.....	6
4. General Specification.....	7
4.1 Bluetooth Specification.....	7
5. ID setting information.....	8
6. Pin Definition.....	8
6.1 Pin Outline.....	8
6.2 Pin Definition details.....	9
7. Electrical Specifications.....	10
7.1 Power Supply DC Characteristics.....	10
7.2 Power Consumption.....	10
8. Size reference.....	11
8.1 Module Picture.....	11
8.2 Physical Dimensions.....	12
8.3 Layout Recommendation.....	12
9. The Key Material List.....	13
10. Reference Design.....	13
11. Recommended Reflow Profile.....	14
12. RoHS compliance.....	14
13. Package.....	15
13.1 Reel.....	15
13.2 Carrier Tape Detail.....	15
13.3 Packaging Detail.....	15
14. Moisture sensitivity.....	17

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2021/01/08	Initial Release	Lgp	Lgp	Szs
V2.0	2021/04/13	Update power consumption info; Add no shielding version info	Lgp	Lgp	Szs
V3.0	2021/06/07	Add note for recommended reflow profile	Lgp	Lgp	Qjp
V4.0	2021/09/09	Add K1 guest version	Tzq	Tzq	Qjp
V4.1	2022/02/08	Specification update format Update Recommended Reflow Profile	Fc	LXY	QJP

1. General Description

1.1 Introduction

FN-Link Technology would like to announce a low-cost and low-power consumption module which has Bluetooth functionalities. This module is a highly integrated single-chip Bluetooth 5.0 controller with a UART interface and a PCM interface. It complies with Bluetooth core specification v5 and supports dual mode (BR/EDR + Low Energy Controllers). It is compatible with previous versions, including v2.1 + LE. For BR/EDR, it allows multiple active links in either slave mode or master mode. For Low Energy, it supports multiple states and allows multiple active links in slave mode. BR/EDR link and LE link can be active at the same time.

The module is specifically developed for all portable devices. The highly integrated module makes the possibilities of the Bluetooth Controller applications.

1.2 Description

Model Name	6161B-R
Product Description	Support Bluetooth 5.0 functionalities
Dimension	L x W x H: 13 x 15 x 2.25 mm
BT Interface	UART
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C

2. Features

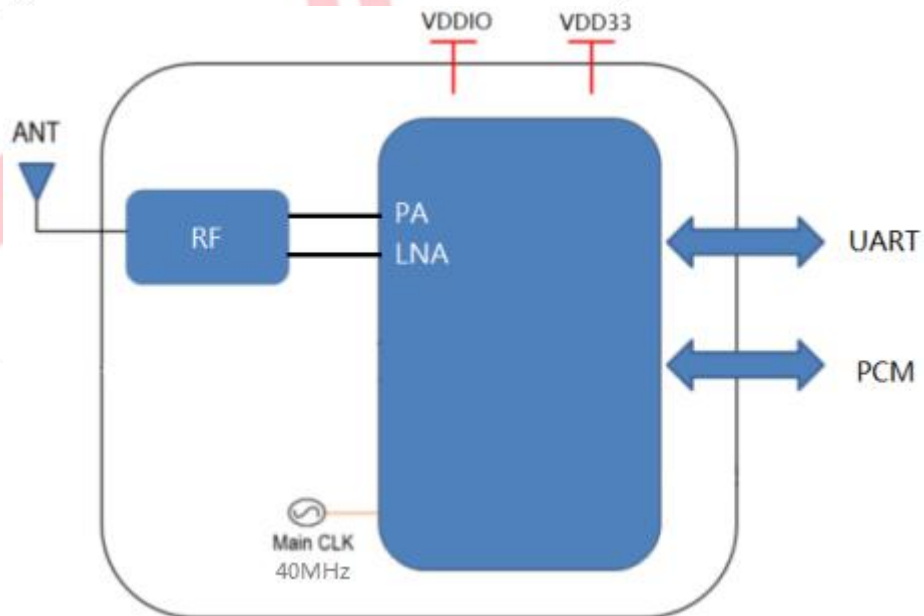
General

- Supports all packet types in basic rate and enhanced data rate
- Supports Secure Simple Pairing
- Enhanced BT/Wi-Fi Coexistence Control to improve transmission quality in different profiles
- Supports multiple Low Energy states
- Complies with HS-UART with configurable baud rate for Bluetooth

Bluetooth Features

- Bluetooth 5 specification compliant
- Supports Bluetooth classic (BDR/EDR)
- Supports Bluetooth Low Energy (BLE)
- Compatible with Bluetooth v2.1 Systems
- Supports PCM interface

3. Block Diagram



4. General Specification

4.1 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.0 of 1, 2 and 3 Mbps.		
Host Interface	UART		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels for BDR+EDR 40 channels for BLE		
Modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK		
RF Specification			
	Min(dBm)	Typical(dBm)	Max(dBm)
BDR Output Power		4	
BLE Output Power		4	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-90	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-85	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80	
Sensitive @PER=30.8% FOR BLE (1Mbps)		-90	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	$\pi/4$ -DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

5. ID setting information

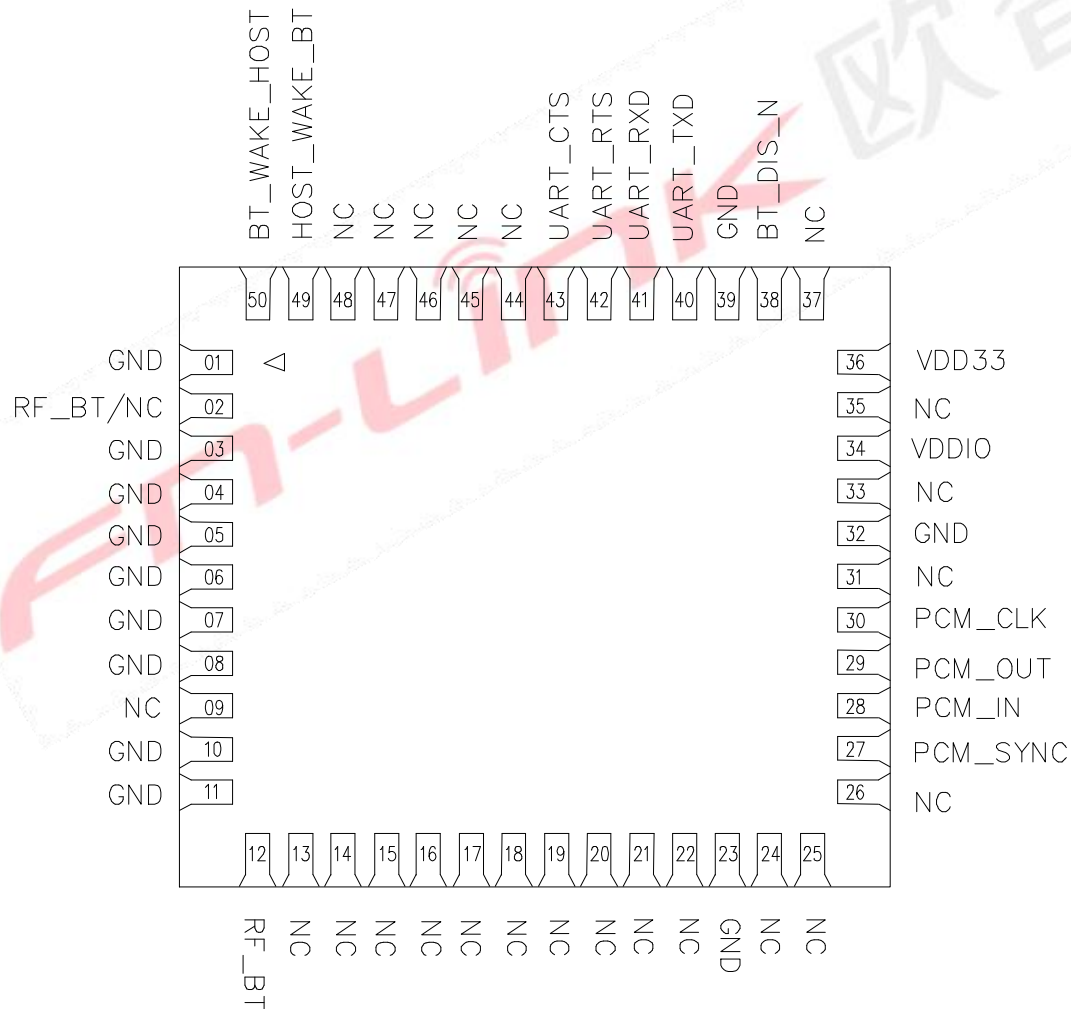
WI-FI

Vendor ID	TBD
Product ID	TBD

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND	—	Ground connections	
2	RF_BT/NC	—	BT RF IO or NC, default NC	
3~8	GND	—	Ground connections	
9	NC	—	No connection	
10, 11	GND	—	Ground connections	
12	RF_BT		BT RF IO	
13~22	NC	—	No connection	
23	GND	—	Ground connections	
24~26	NC	—	No connection	
27	PCM_SYNC	I/O	PCM sync signal	VDDIO
28	PCM_IN	I	PCM data input	VDDIO
29	PCM_OUT	O	PCM Data output	VDDIO
30	PCM_CLK	I/O	PCM clock	VDDIO
31	NC	I	No connection	
32	GND	—	Ground connections	
33	NC	—	No connection	
34	VDDIO	P	VDDIO power input	3.3V/1.8V
35	NC	—	No connection	
36	VDD33	P	Main power source input	3.3V
37	NC	—	No connection	
38	BT_DIS_N	I	Enable pin for Bluetooth device ON: pull high; OFF: pull low Default high	3.3V
39	GND	—	Ground connections	
40	UART_TXD	O	Bluetooth UART interface	VDDIO
41	UART_RXD	I	Bluetooth UART interface	VDDIO
42	UART_RTS	O	Bluetooth UART interface	VDDIO
43	UART_CTS	I	Bluetooth UART interface	VDDIO
44~48	NC	—	No connection	
49	HOST_WAKE_BT	I	HOST wake-up Bluetooth device	VDDIO
50	BT_WAKE_HOST	O	Bluetooth device to wake-up HOST	VDDIO

P:POWER I:INPUT O:OUTPUT

7. Electrical Specifications

7.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	0	25	70	deg.C
VCC33	3.0	3.3	3.63	V
VDDIO	1.8	3.3	3.63	V


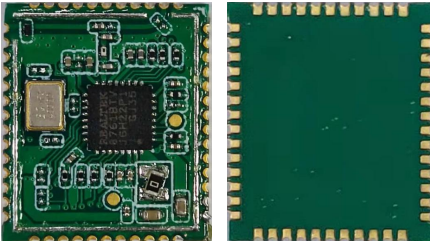
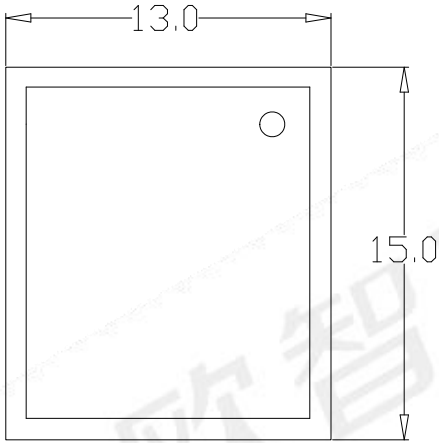

7.2 Power Consumption

Condition: VDD33 = 3.3V, VDDIO = 3.3V

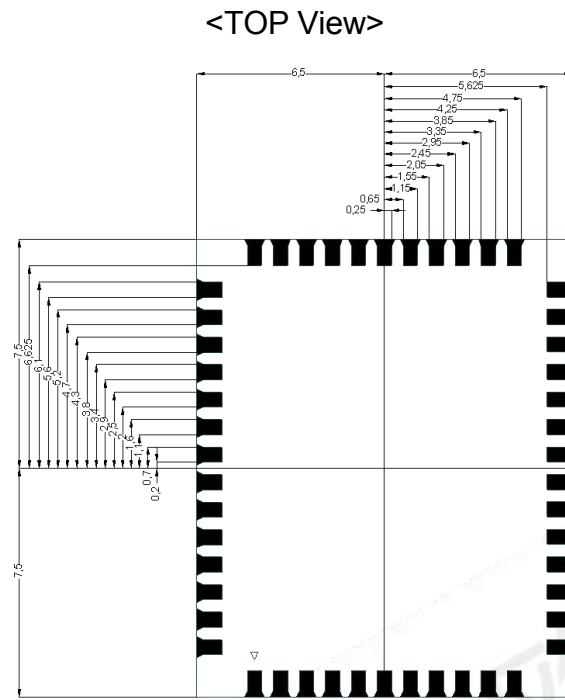
Item	Mode	Current Value (mA)
1	DH5 TX @ 4dBm	53.1
2	2DH5 TX @ 4dBm	53.7
3	3DH5 TX @ 4dBm	53.7
4	BLE 1M TX @ 4dBm	46.71
5	DH5 RX	29.7
6	2DH5 RX	29.7
7	3DH5 RX	29.7
8	BLE RX	27.1

8. Size reference

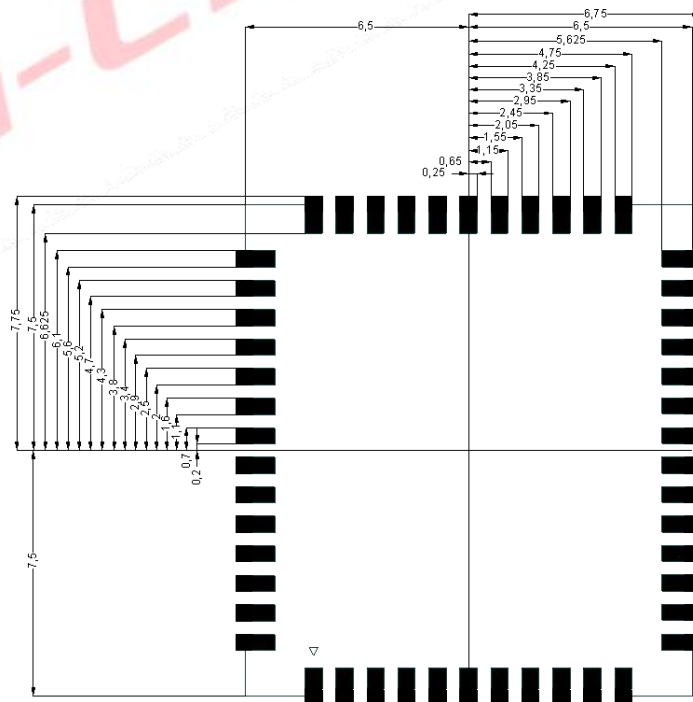
8.1 Module Picture

<p>L x W : 13 x 15 (+0.3/-0.1) mm FG6161BRXX-00 (Shielding)</p>  <p>FG6161BRXX-01/K0/K1 (No shielding)</p> 	
<p>H: 2.25(±0.2)mm (Shielding version) 1.65(±0.2)mm (No Shielding version)</p>	
<p>Weight</p>	<p>0.45±0.1g</p>

8.2 Physical Dimensions



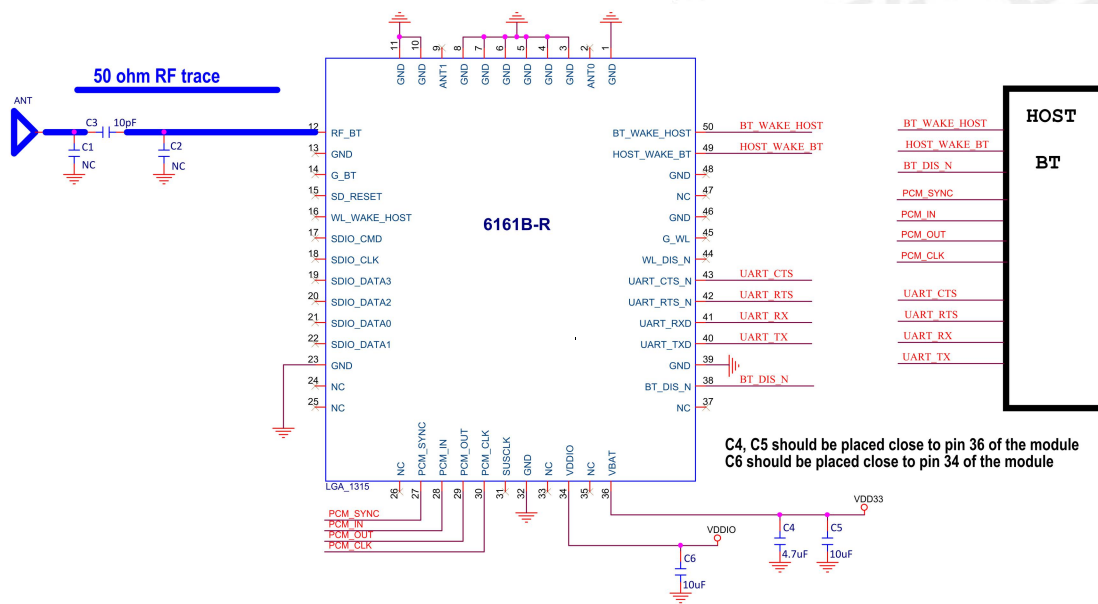
8.3 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	Crystal	3225 40MHz ±10ppm	ECEC, TKD, Hosonic, JWT, TXC
2	Chipset	RTL8761BTV-CG	Realtek
3	PCB	FR4, 4 LAYER, GREEN	XY-PCB, GDKX, Sunlord, SLPCB

10. Reference Design



Note: Module requires independent power supply , supply capacity $\geq 250\text{mA}$ and ripple less than 100mV; Do not share power with amplifier, infrared device, camera, etc.

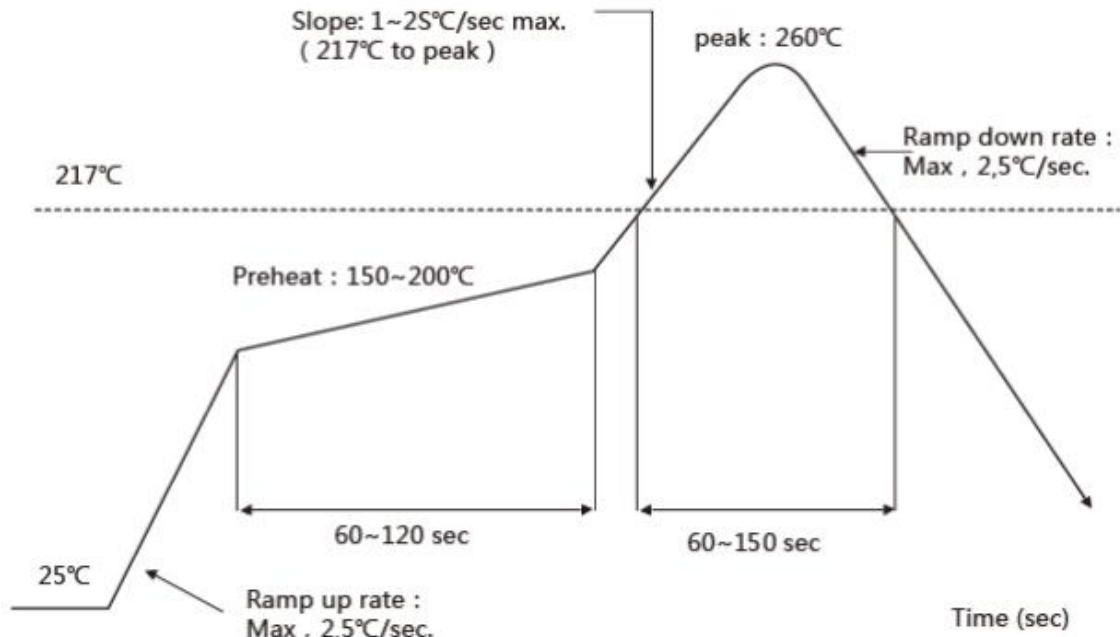
11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: 260 ± 5 °C

5Time within 5° C of peak temperature: ≥ 10 s

Number of Times : ≤ 2 times



Note:

- (1) The stay time in reflow zone (Temperature > 217°C) should no more than 120 seconds;
- (2) The peak temperature should no more than 260 ± 5 °C;
- (3) The stay time in cooling zone should be greater than 10 seconds

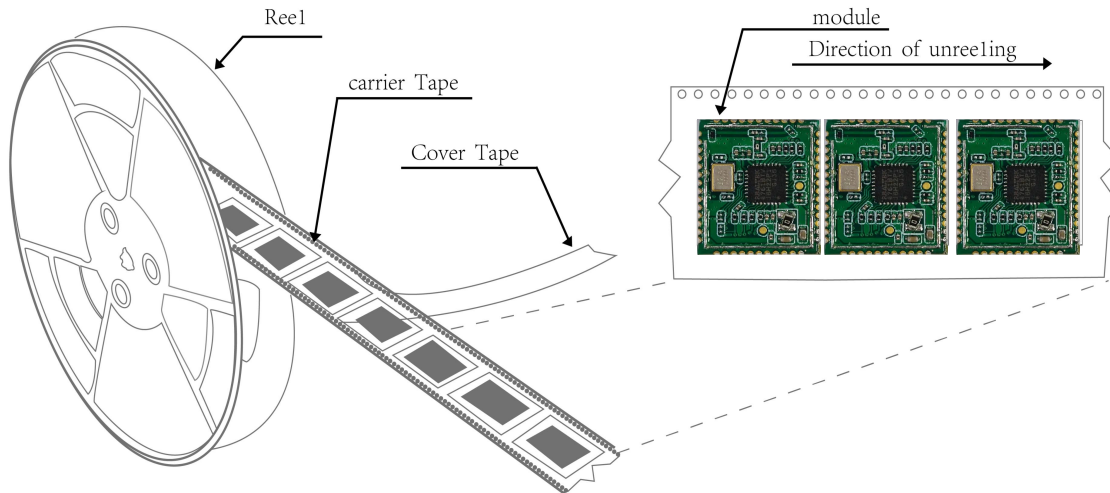
12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

13. Package

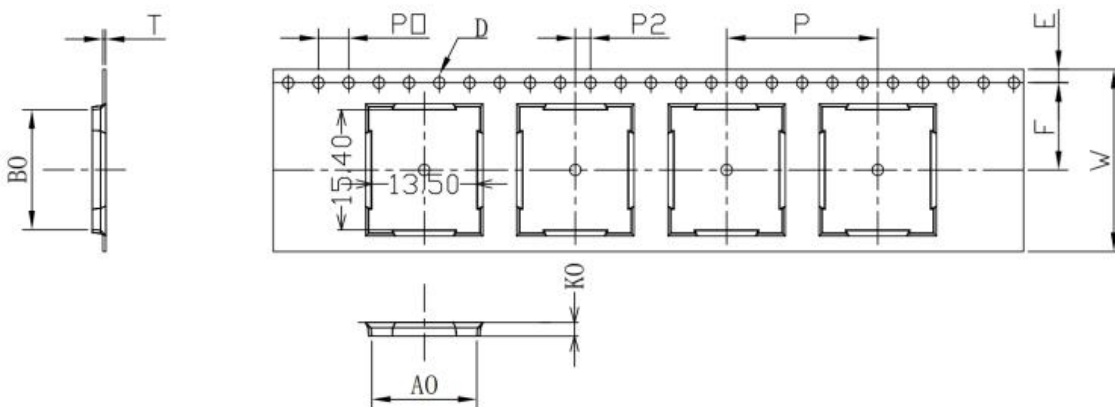
13.1 Reel

A roll of 1500pcs



13.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	13.50	15.40	1.50	11.5	1.75	1.80	4.0	2.0	20.0	0.30
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	+0.1 -0.1	±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



13.3 Packaging Detail

the take-up package



Using self-adhesive tape
Color of plastic disc: blue



NY bag size:415mm*450mm



size : 350X350X35mm



The packing case size:360X210X370mm

14. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <math><40^{\circ}\text{C}</math> and <math><90\%</math> relative humidity (RH)
- b) Environmental condition during the production: - c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
- d) Baking is required if conditions b) or c) are not respected
- e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more