Comchips

KX6338
Module Data sheet

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Website: www.comchips.com

Customer Approval

Company _____

Title _____

Signature _____

Date _____

FTY _____

Version Update Record

Version	Date	Revision Content	Editorialstaff	approval
V1.0	2021/11/22	The first version		

CONTENTS

1 Overview

1.1 Introduction

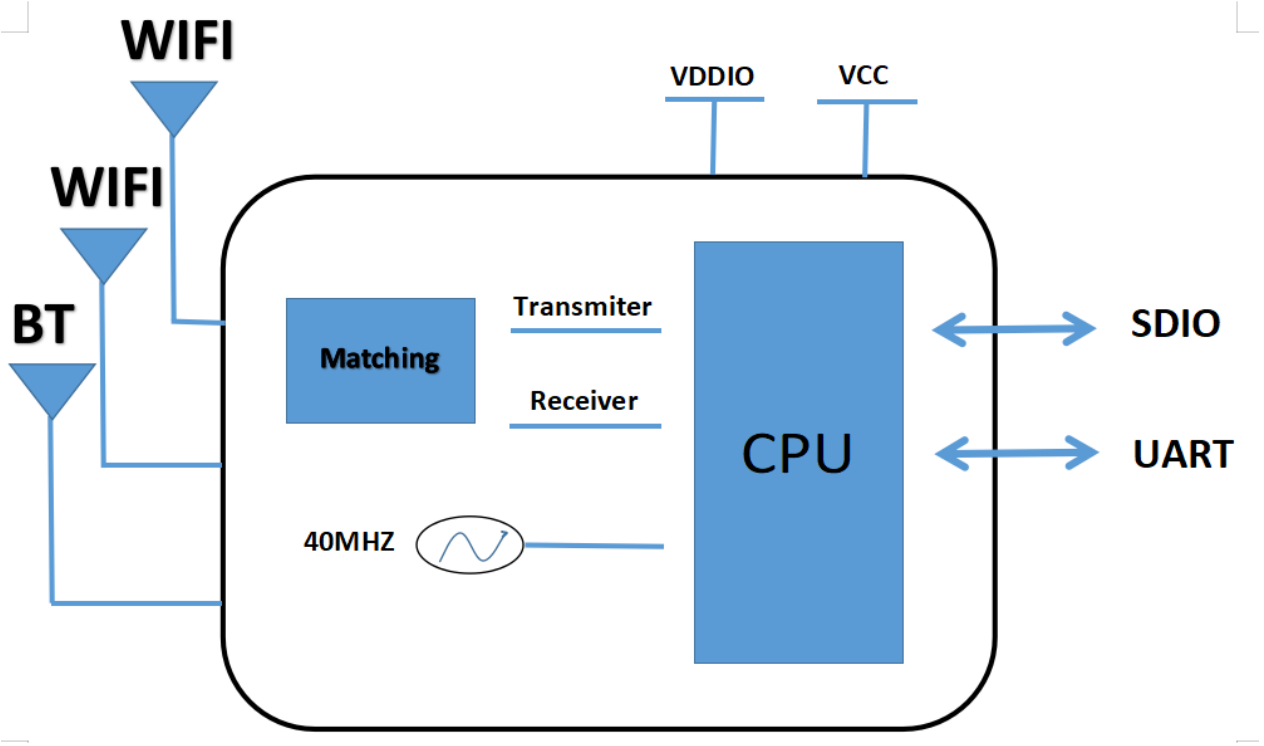
The KX6338 is a highly integrated single-chip that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) USB2.0 network interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The KX6338 provides a complete solution for a high-performance integrated wireless and Bluetooth device.

The KX6338 baseband implements Multi-user Multiple Input, Multiple Output (MU-MIMO) Orthogonal Frequency Division Multiplexing (OFDM) with two transmit and two receive paths (2T2R). Features include two spatial stream transmissions, short Guard Interval (GI) of 400ns, spatial spreading, and support for variant channel bandwidth.The N134 builds-in an enhanced signal detector, an adaptive frequency domain equalizer, and a soft-decision Viterbi decoder to alleviate severe multi-path effects and mutual interference in the reception of multiple streams. For better detection quality, receive diversity with Maximal-Ratio-Combine (MRC) applying up to two receive paths, and Maximum-Likelihood Detection (MLD) are implemented. Robust interference detection and suppression are provided to protect against Bluetooth, cordless phone, and microwave oven interference.

1.2 Features

- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac compatible WLAN
- Supports 802.11ac 2x2, Wave-2 compliant with MU-MIMO
- Complete 802.11n MIMO solution for 2.4GHz and 5GHz band
- Complies with USB2.0 for WLAN and BT controller
- Maximum data rate 54Mbps in 802.11g, 300Mbps in 802.11n and 866.7bps in 802.11ac.
- Support Bluetooth 5.0 system
- Compatible with Bluetooth v2.1 Systems
- Supports Bluetooth Low Energy

1.3 Block Diagra



1.4 General Specification

Model Name	KX6338
Product Description	Support WLAN-Bluetooth coexistence
Dimension	L x W x H: 18.x 27 x 1.8(±0.2) mm
Wi-Fi Interface	Support USB2.0
BT interface	Support USB2.0
Operating temperature	-0°C to 70°C
Storage temperature	-55°C to 125°C
RoHS	All hardware components are fully compliant with EU RoHS directive

1.5 DC Characteristics

Power Supply Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VDD33	3.3V I/O Supply Voltage	3.0	3.3	3.6	V
VD10	1.05V Core Supply Voltage	0.945	1.05	1.155	V

2 RF Specifications

2.1 2.4GHz RF Specification

Features	Description
WLAN Standard	IEEE802.11a/b/g/n/ac/e/i/h
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)
Modulation Method	DSSS,DBPSK, DQPSK, CCK and OFDM (BPSK, QPSK, 16QAM,64QAM and 256-QAM)
Number of Channel	2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan

2.4G Transmitter Specifications

TX Rate	TX Power	TX Power Tolerance	EVM
802.1 1b @ 11 Mbps	17dBm	±2dBm	≤-13dB
802.11g@54Mbps	14dBm	±2dBm	≤-25dB
802.11n@BW20_MCS7	13dBrn	±2dBm	≤-28dB
802.11n@BW40_MCS7	13dBrn	±2dBm	≤-28dB

2.4G Receiver Specifications

RX Rate	Min Input Level(Typ)	Max Input Level(Typ)	PER
802.11b@11Mbps	-85dBm	-85dBm	<8%
802.11g@54Mbps	-68dBm	-68dBm	< 10%
802.11n@BW20_MCS7	-66dBm	-66dBm	< 10%
802.11n@BW40_MCS7	-65dBm	-65dBm	< 10%

2.2 5GHz RF Specification

Features	Description
WLAN Standard	IEEE802.11a/b/g/n/ac/e/i/h
Frequency Range	4.9GHz ~ 6.0GHz (5GHz ISM Band)
Modulation Method	DSSS,DBPSK, DQPSK, CCK and OFDM (BPSK, QPSK, 16QAM,64QAM and 256-QAM)

5G Transmitter Specifications			
TX Rate	**TX Power**	**TX Power Tolerance**	**EVM**
802.1 1a@ 54Mbps	13dBm	±2dBm	≤-25dB
802.11n@BW20_MCS 7	12dBm	±2dBm	≤-28dB
802.11n@BW40_MC S7	12dBrn	±2dBm	≤-30dB
802.11ac@BW80_M CS9	10dBrn	±2dBm	≤-32dB

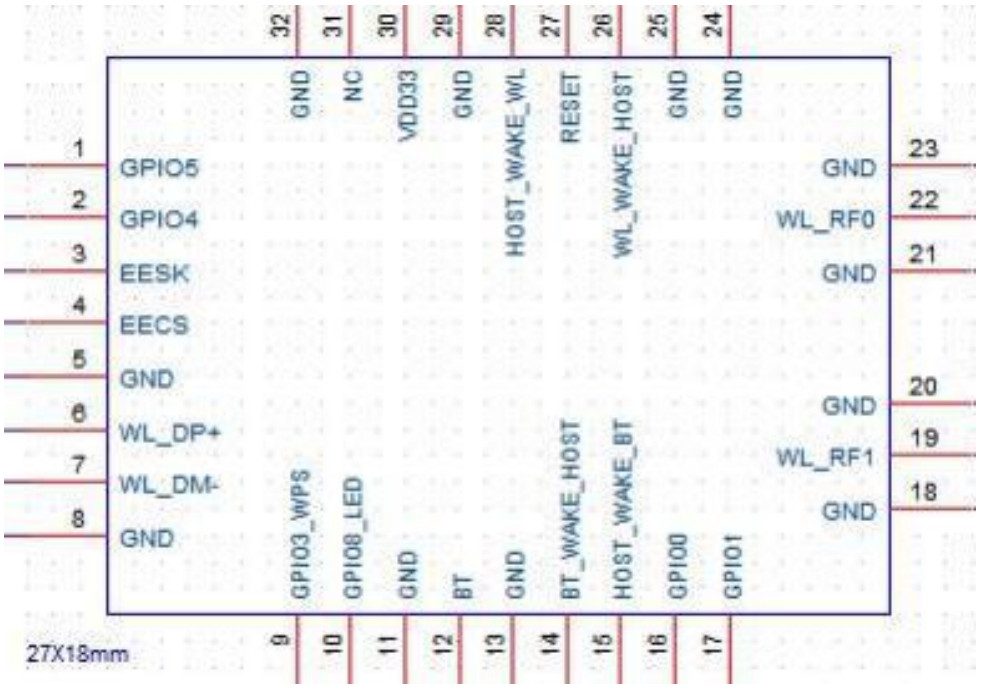
5G Receiver Specifications			
RX Rate	**Min Input Level(Typ)**	**Max Input Level(Typ)**	**PER**
802.11a@54Mbps	-70dBm	-70dBm	<10%
802.11n@BW20_MC S7	-65dBm	-65dBm	< 10%
802.11n@BW40_MC S7	-60dBm	-60dBm	< 10%
802.11ac@BW80_M CS9	-57dBm	-57dBm	< 10%

2.3 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V3.3 of 1, 2 and 3 Mbps.		
Host Interface	USB 2.0		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2.400 GHz ~ 2483.5 GHz		
Number of Channels	79 channels		
Modulation	FHSS, GFSK, DPSK, DQPSK		
RF Specification			
Power (BDR：GFSK/1Mbps)	0dBm	5 dBm	10dBm
Power(EDF：π /4-DQPSK/2Mbps)	0dBm	5 dBm	10dBm
Power (BLE：GFSK/1Mbps)	0dBm	5 dBm	10dBm
Sensitivity @ BER=0.1% for (BDR：GFSK/1Mbps)		-85 dBm	
Sensitivity @ BER=0.1% for(EDF：π /4-DQPSK/2Mbps)		-85 dBm	
Sensitivity @ BER=0.1% for (BLE：GFSK/1Mbps)		-85 dBm	
Initial Freq Error	BDR：GFSK/1Mbps:±75KHZ		
	EDF：π /4-DQPSK/2Mbps :±75KHZ		
	BLE：GFSK/1Mbps :±75KHZ		

3.Pin Assignments

3.1Pin Outline



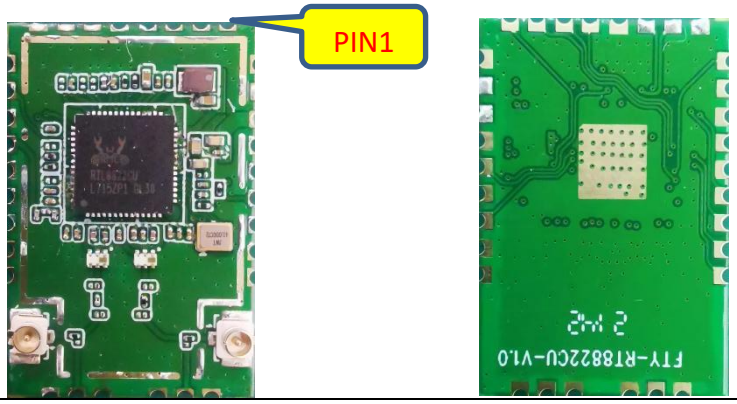
3.2 Pin Definition

NO.	Name	Type	Description
1	GPIO5	I/O	IC GPIO5 (sFlash MISO PIN)
2	GPIO4	I/O	IC GPIO4 (sFlash MOSI PIN)
3	EESK	I/O	External Serial Flash clock (Flash for dongle application)
4	EECS	I/O	External 32K or RTC clock input (Flash CS PIN)
5	GND	—	Ground connections
6	WL DP+	I/O	USB data+ (USB2.0)
7	WL DM-	I/O	USB data- (USB2.0)
8	GND	—	Ground connections
9	GPIO3 WPS	—	IC GPIO3(WLAN WPS)
10	GPIO8 LED	—	IC GPIO8(WLAN LED low active)
11	GND	—	Ground connections
12	BT RF	I/O	BT RF port
13	GND	—	Ground connections
14	BT WAKE HOST	O	BT wake up HOST 3.3V
15	HOST WAKE BT	I	HOST Wake up BT 3.3V
16	GPIO0	—	IC GPIO0
17	GPIO1	—	IC GPIO1
18	GND	—	Ground connections
19	WL RF1	I/O	2.4G/5G Wi-Fi RF port1 / BT Combo (Option)
20	GND	—	Ground connections
21	GND	—	Ground connections
22	WL RF0	I/O	2.4G/5G Wi-Fi RF port0 (Option)
23	GND	—	Ground connections
24	GND	—	Ground connections
25	GND	—	Ground connections
26	WL WAKE HOST	O	WLAN wake up HOST (Shared with IC GPIO6) 3.3V
27	RESET	I	Enable pin for device ON: pull high ; OFF: pull low 3.3V
28	HOST WAKE WL	I	HOST WAKE WLAN (Shared with IC GPIO7) 3.3V
29	GND	—	Ground connections
30	VDD33	P	3.3V Voltage input 3.3V
31	NC	—	No connection (Floating)
32	GND	—	Ground connections

4 Dimensions

4.1 Module Picture

L x W : 18.1 x 27.2 (±0.2) mm

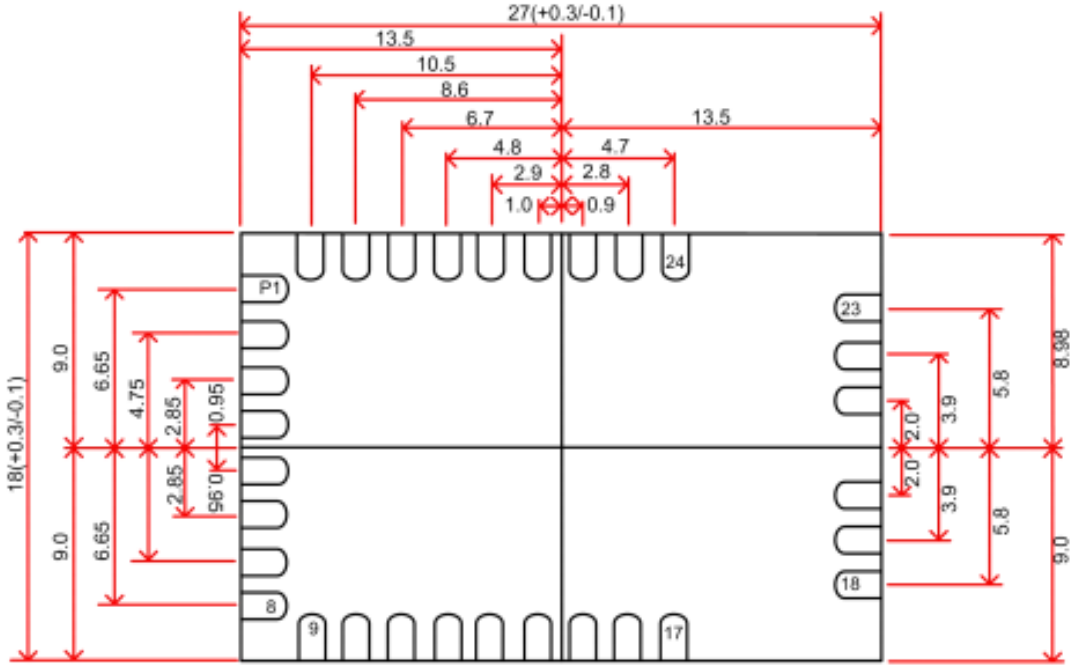


H:1.87(±0.2)mm

4.2 Module Physical Dimensions

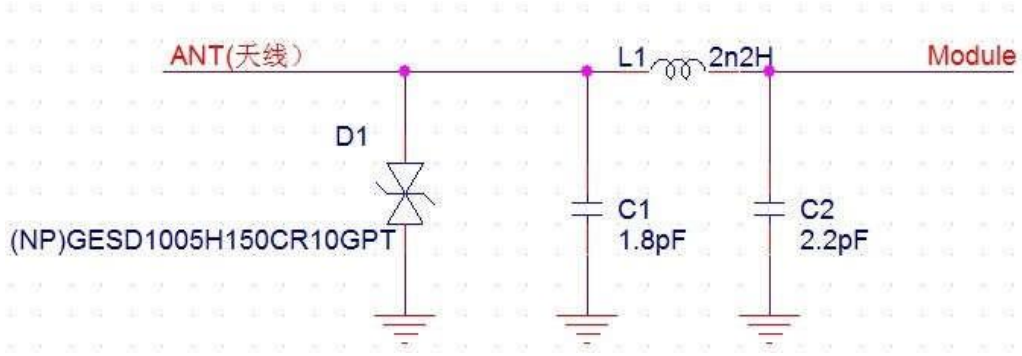
(Unit: mm)

< TOP VIEW >



5 Reference Design

5.1 WIFI RF Circuit reference pictures

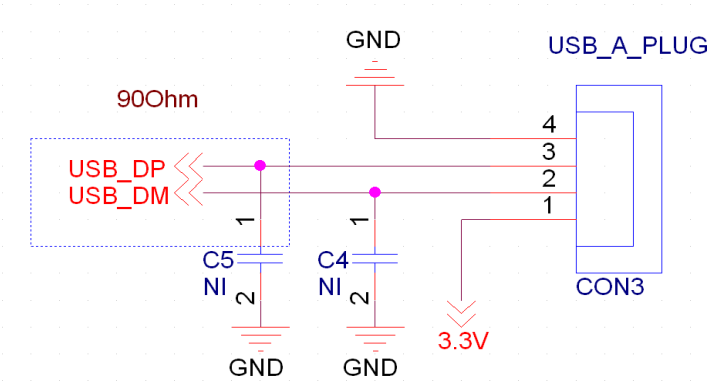


1. Above the dotted box part of the antenna matching is needed, the actual antenna matching electronic parameters shall prevail.

2.For RF part layout to do 50 ohm impedance. can't go on 90°of layout .The line length can't more than 20 mm.

Note: Please be sure to add a TVS tube at the end of the welding antenna to prevent ESD static electricity from damaging the WIFI module (as shown in the reference circuit above).

5.2 USB interface electrical characteristics



Note:

1.USB data cable need to do 90Ohm impedance

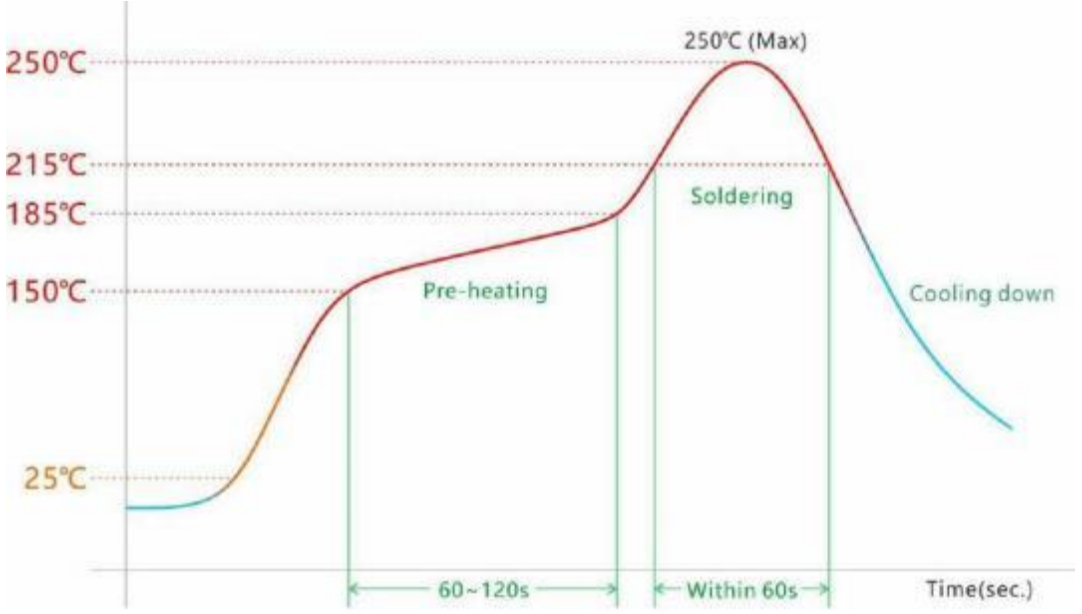
2.It is recommended to keep a power switch at the input end of the power supply. Each time the card is opened or closed, it can be used for power on and power off. WIFI can be reset, so that there will be no error phenomenon of not opening WIFI.

6 The Key Material List

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8821CU-CG QFN56	Realtek Semiconductor Corp	
2	PCB	FTY_RT8821CU_V1.0	Shenzhen xiangyu circuit co., LTD	
3	PCB	FTY_RT8821CU_V1.0	Shenzhen Kexiang Precision Circuit Technology Co., LTD	
4	PCB	FTY_RT8821CU_V1.0	Shenzhen Zhuochuangtong Electronics Co., LTD	
5	Crystal oscillator	2520 40MHZ 10PPM 12PF (-20to+85 度)	hefei jing wei Electronics Co. Ltd.	
6	Crystal oscillator	2520 40MHZ 12PF ± 10PPM -20+70 度	Zhejiang Lanjingxin Microelectronics Co., LTD	

7 Recommended Reflow Profile

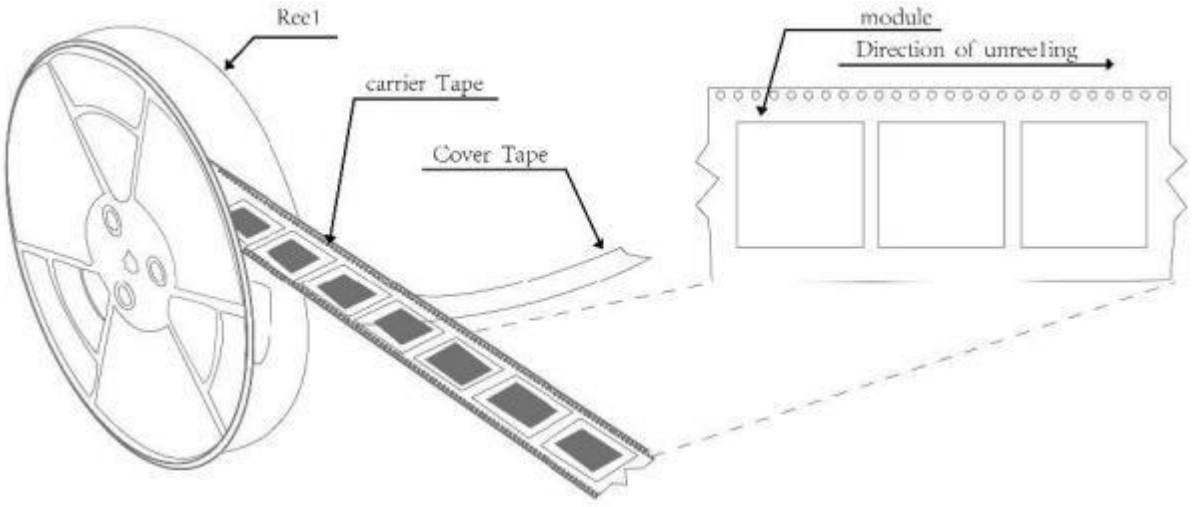
Referred to IPC/JEDEC standard.
Peak Temperature : <250° C
Number of Times : ≤2 times



8 Package Information

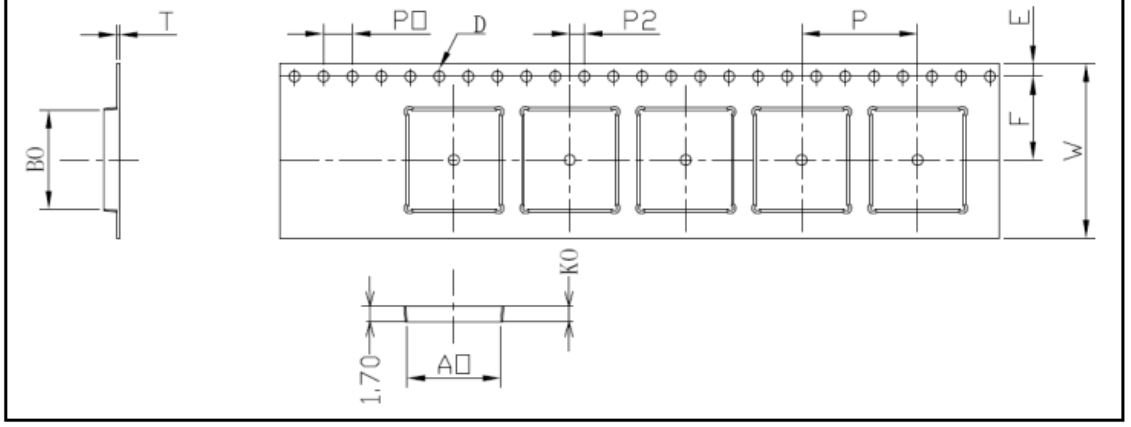
8.1Reel

A roll of 2000pcs

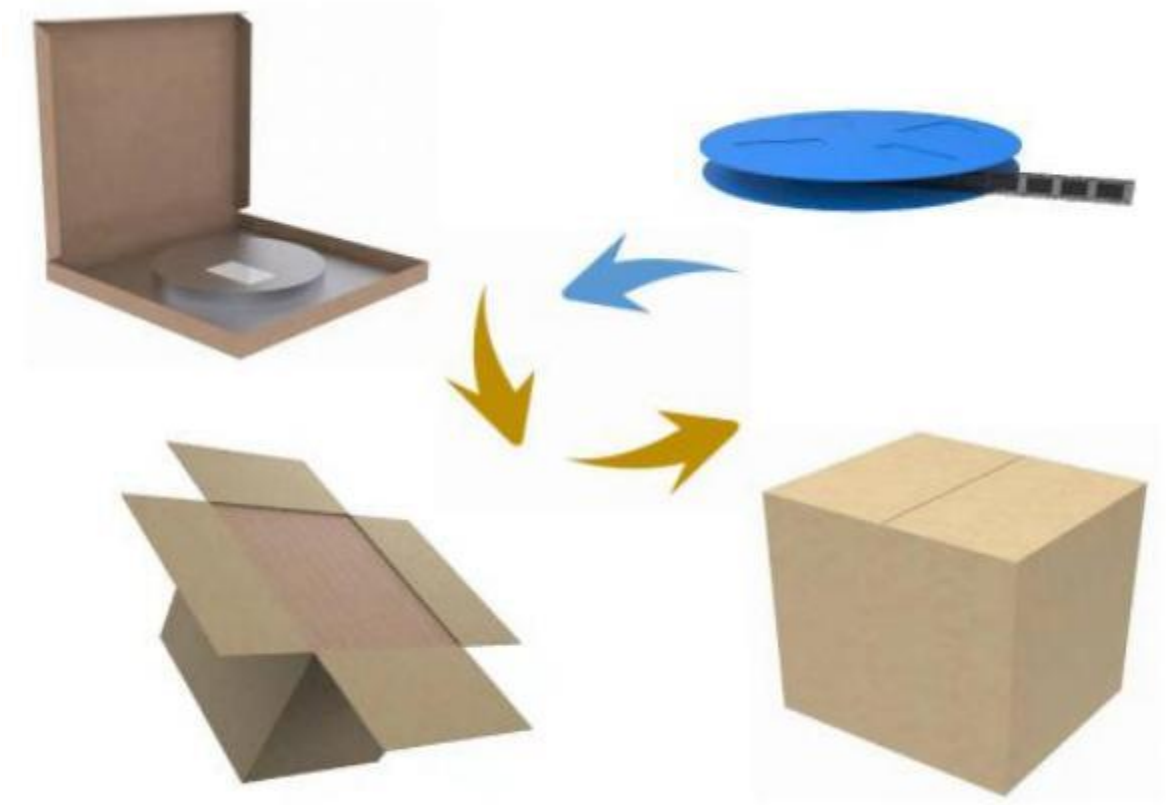


8.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	12.61	13.62	1.50	11.5	1.75	1.70	4.0	2.0	16.0	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



8.3 Packaging Detail



8.4 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 <40°C and <90% relative humidity (RH).

b)Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.

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

e) Baking is required if conditions b) or c) are not respected

f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more