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Comchips

# KX6215
# Module Data sheet

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# Module Data sheet

**Website: www.comchips.com**

Customer Approval

Company _____

Title _____

Signature _____

Date _____

FTY _____

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Version Update Record

| Version | Date | Revision Content | Editorial staff | approval |
|---|---|---|---|---|
| V1.0 | 2021/05/12 | The first version | | |

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# 1 Overview

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## 1.1 Introduction

KX6215 is a small size and low profile of WiFi+BT combo module with LGA (Land-Grid Array) footprint, board size is 12mm*13.5mm with module height of 1.6mm. It can be easily manufactured on SMT process and highly suitable for tablet PC, ultra book, mobile device and consumer products. It provides USB interface for WiFi to connect with host processor and high speed UART interface for BT. It also has a PCM interface for audio data transmission with direct link to external audio codec via BT controller. The WiFi throughput can go up to 150Mbps in theory by using 1x1 802.11n b/g/n MIMO technology and Bluetooth can support BT2.1+EDR/and BT4.0

## 1.2 Features

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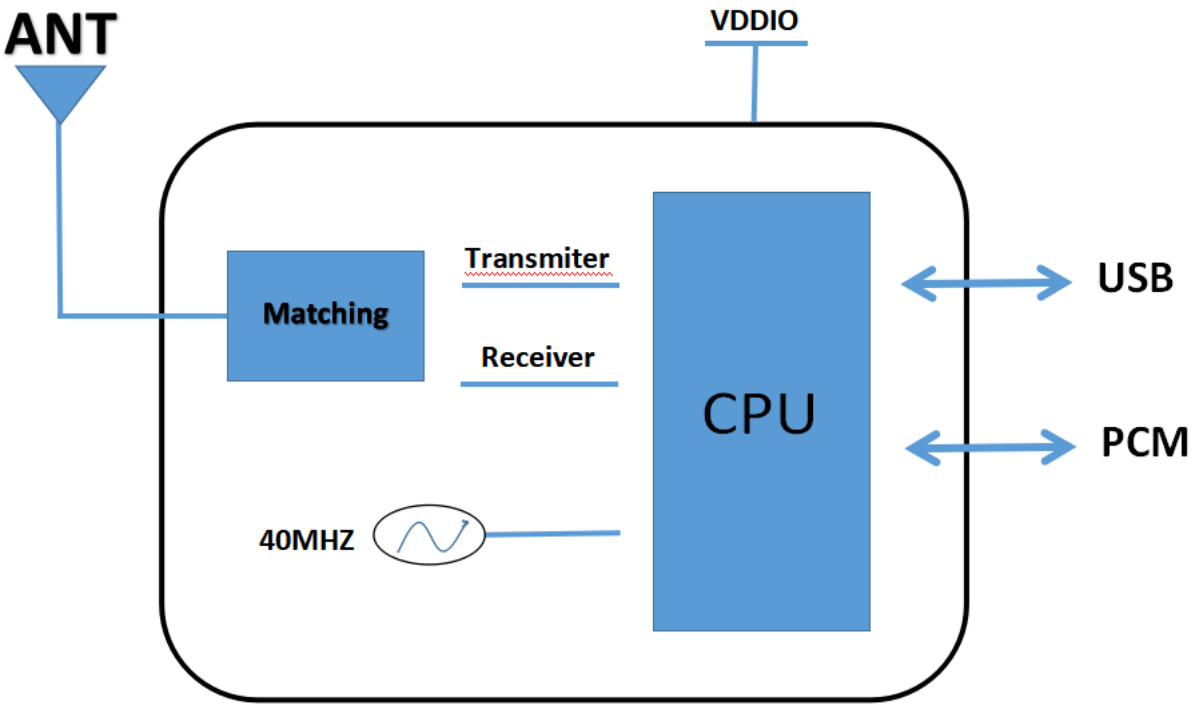
- Operate at ISM frequency bands (2.4GHz)
- USB for Wi-Fi and UART for Bluetooth
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i
- Fully Qualified for Bluetooth 2.1 + EDR 4.0 Supports Bluetooth 4.0 Low Energy(BLE)
- HS-UART interface for Bluetooth data
- Enterprise level security which can apply WPA/WPA2 certification for Wi-Fi.
- Wi-Fi one transmitter and one receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates
- For Wi-Fi/BT, it uses fixed path for Wi-Fi and BT, which means one antenna assigned for Wi-Fi and the other is assigned for BT.

## 1.3 Block Diagram




## 1.4 General Specification

| | |
|---|---|
| Model Name | KX6215 |
| Product Description | Support WLAN-Bluetooth coexistence |
| Dimension | L x W x H: 12x 13(±0.2) mm |
| Wi-Fi Interface | Support USB |
| BT interface | Support USB |
| Operating temperature | 0 to +70° C |
| Storage temperature | -55°C to 125°C |
| RoHS | All hardware components are fully compliant with EU RoHS directive |

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## 1.5 DC Characteristics

### Power Supply Characteristics

| Symbol | Parameter | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|
| VBAT | 3.3V I/O Supply Voltage | 3.0 | 3.3 | 3.6 | V |
| VDDIO | The voltage of VDDIO is depended on system I/O voltage. | 1.75 | 3.3 | 1.155 | V |

# 2 RF Specifications

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## 2.1 2.4GHz RF Specification

| Features | Description |
|---|---|
| WLAN Standard | IEEE802.11b/g/n |
| Frequency Range | 2.4~2.4835GHz (2.4GHz ISM Band) |
| Modulation Method | DSSS,DBPSK, DQPSK, CCK and OFDM<br>(BPSK, QPSK, 16QAM,64QAM ) |
| Number of Channel | 2.4GHz:<br>11: (Ch. 1-11) – United States<br>13: (Ch. 1-13) – Europe<br>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 |

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 | -66dBrn | -66dBrn | < 10% |

## 2.2 Bluetooth Specification

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| 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%<br>for (BDR：GFSK/1Mbps) | | -85 dBm | |
| Sensitivity @ BER=0.1%<br>for(EDF：π /4-DQPSK/2Mbps) | | -85 dBm | |
| Sensitivity @ BER=0.1%<br>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

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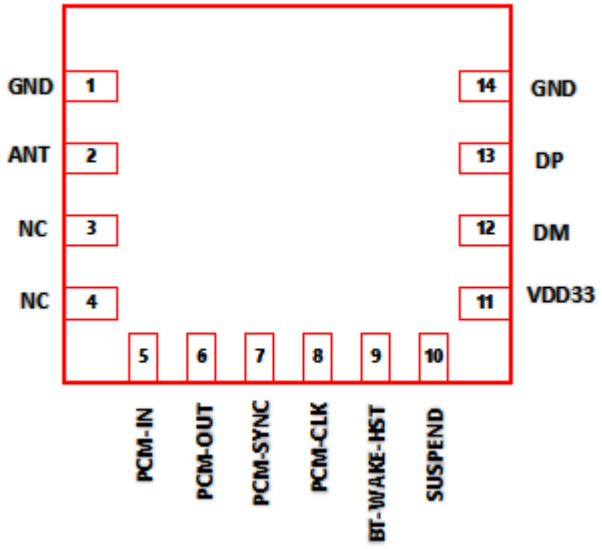
## 3.1 Pin Outline



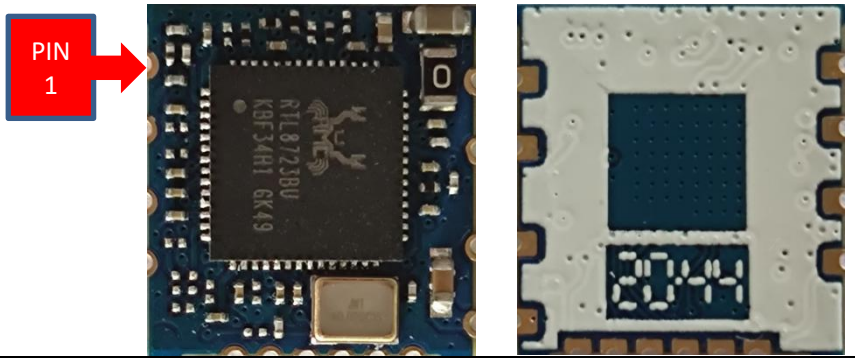

## 3.2 Pin Definition

| PIN | Function | Description |
|---|---|---|
| 1 | GND | Ground |
| 2 | WIFI/BT_ANT | WIFI/BT_ANT |
| 3 | NC | NC |
| 4 | NC | NC |
| 5 | PCM-IN | BT-PCM-IN |
| 6 | PCM-OUT | BT-PCM-OUT |
| 7 | PCM-SYNC | BT-PCM-SYNC |
| 8 | PCM-CLK | BT-PCM-CLK |
| 9 | BT-WAKE-HST | WAKE |
| 10 | SUSPEND | GPIO |
| 11 | VDD33 | 3.3V-IN |
| 12 | DM | USB-DM |
| 13 | DP | USB-DP |
| 14 | GND | GND |

# 4 Dimensions

## 4.1 Module Picture

L x W : 12.1 x 13.2 (±0.2) mm

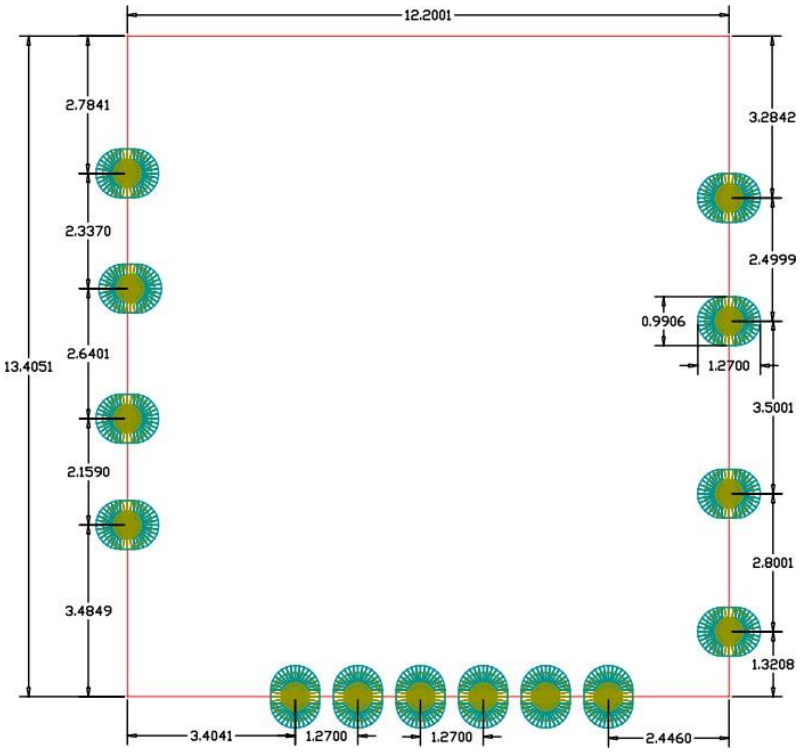



H:1.5(±0.2)mm

## 4.2 Module Physical Dimensions

(Unit: mm)

< TOP VIEW >



# 5 Reference Design

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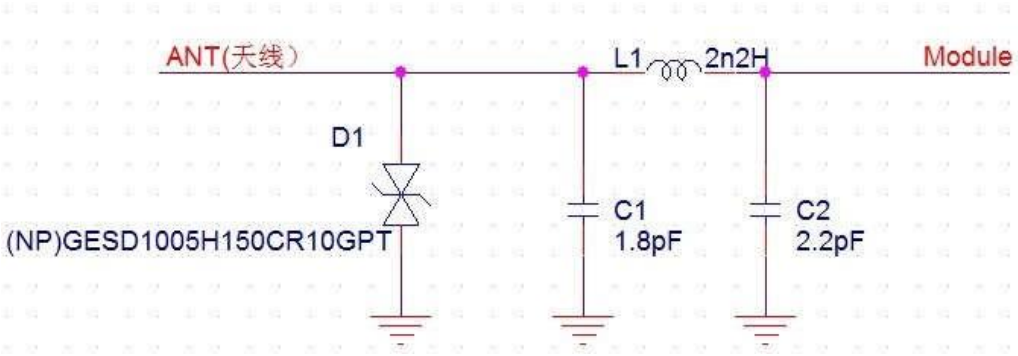
## 5.1 WIFI RF Circuit reference pictures

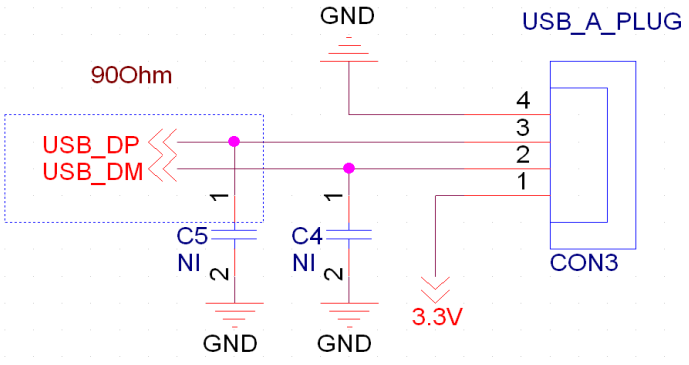



1. Above the dotted box part of the antenna matching is needed, the actual antenna matching electronic parameters shall prevail.

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

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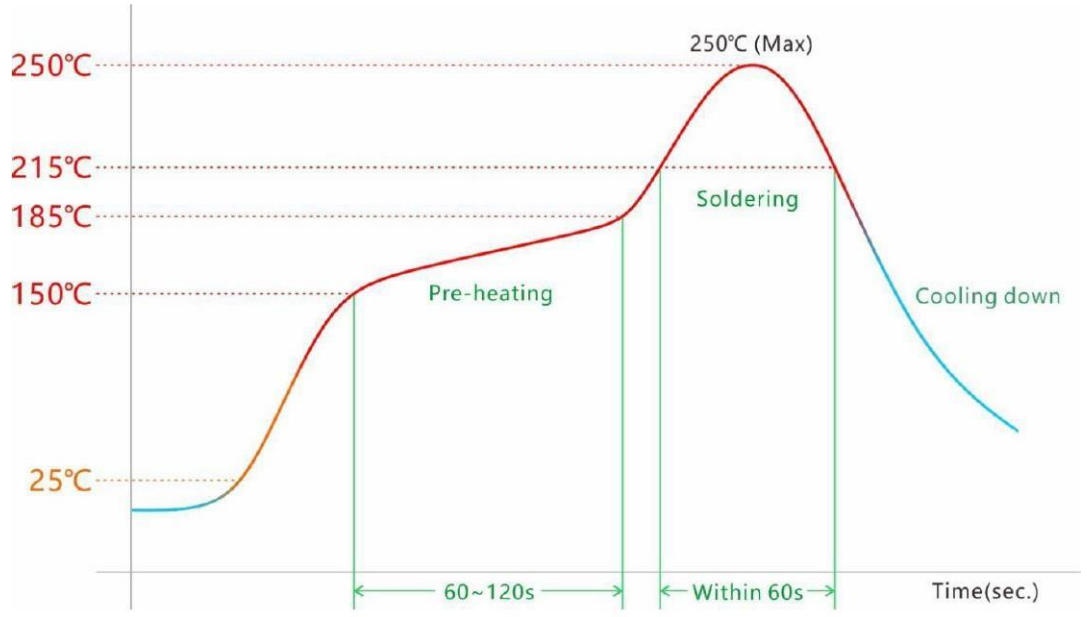
| No. | Parts | Specification | Manufacturer | Note |
|---|---|---|---|---|
| 1 | Chipset | RTL8723BU-CG/QFN56 | Realtek Semiconductor Corp | |
| 2 | PCB | FTY-3804-V1.2 8723BU-V1.2 | Shenzhen xiangyu circuit co., LTD | |
| 3 | PCB | FTY-3804-V1.2 8723BU-V1.2 | Shenzhen Kexiang Precision Circuit Technology Co., LTD | |
| 4 | Crystal oscillator | 3225 40MHZ 15PF ±10PPM -30~+85℃ | hefei jing wei Electronics Co. Ltd. | |
| 5 | Crystal oscillator | 40M000MHZ10PPM 15PF/32*25(蓝晶)-20+85℃ | Zhejiang Lan jing xin Microelectronics Co., LTD | |

# 7 Recommended Reflow Profile

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



# 8 Package Information

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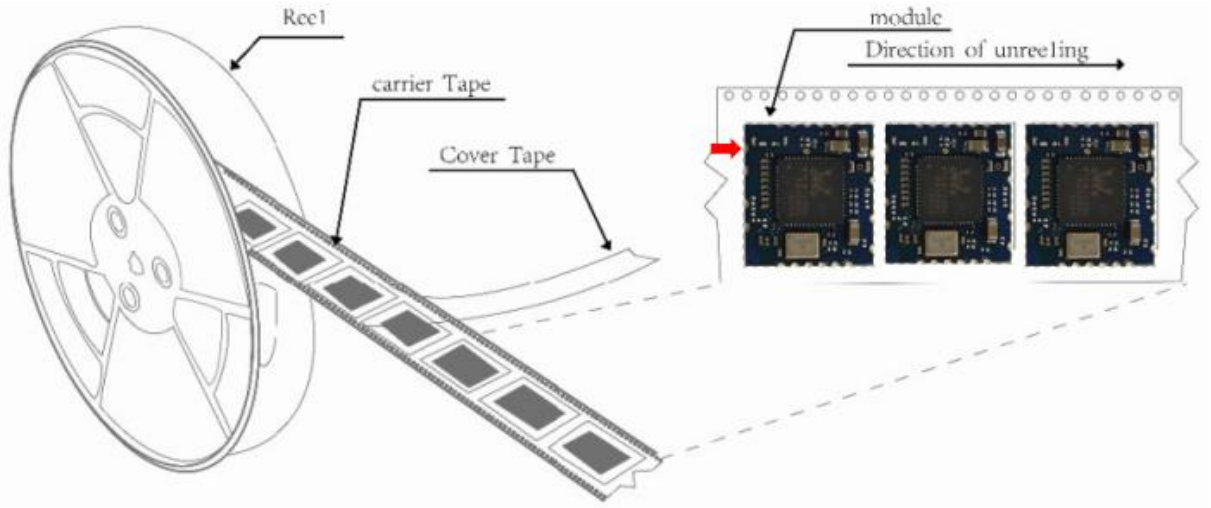
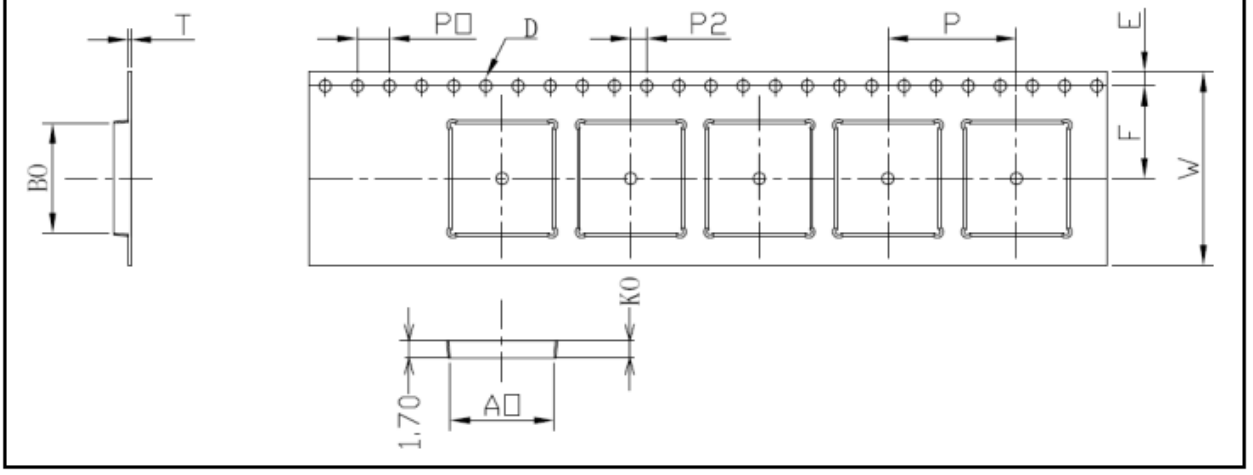
## 8.1Reel

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 |



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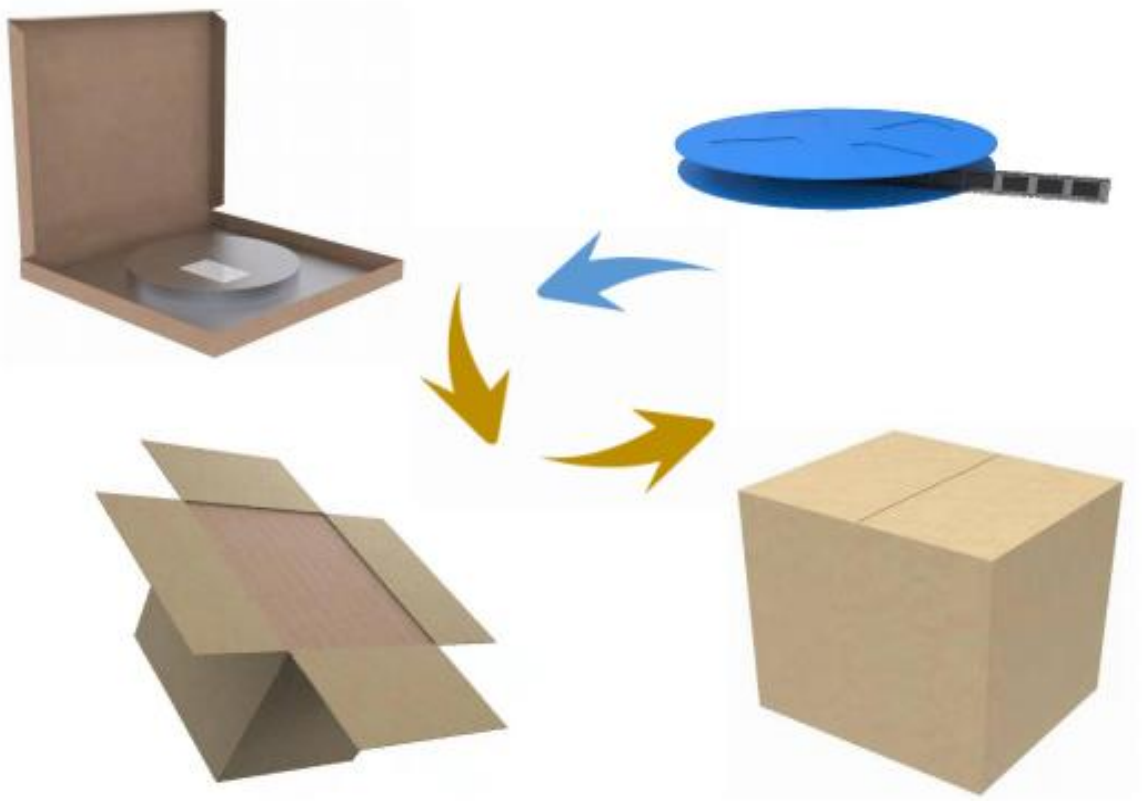
## 8.3 Packaging Detail



## 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