

# FT1821CSV2 Module Datasheet

FTY 飞腾云 技术资料文件



# FT1821CSV2 Module Datasheet

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## Customer Approval

Company \_\_\_\_\_

Title \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

FTY \_\_\_\_\_

## Version Update Record

Version	Date	Revision Content	Editorial Staff	Approval
V1.0	2022/10/25	The first version		
V1.1	2022/10/25	FT1821CS-22SW5BA11CD3 Product name update		
V1.2	2023/08/15	Module Datasheet Template Adjustment	SRX	JQL

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# 1 Overview

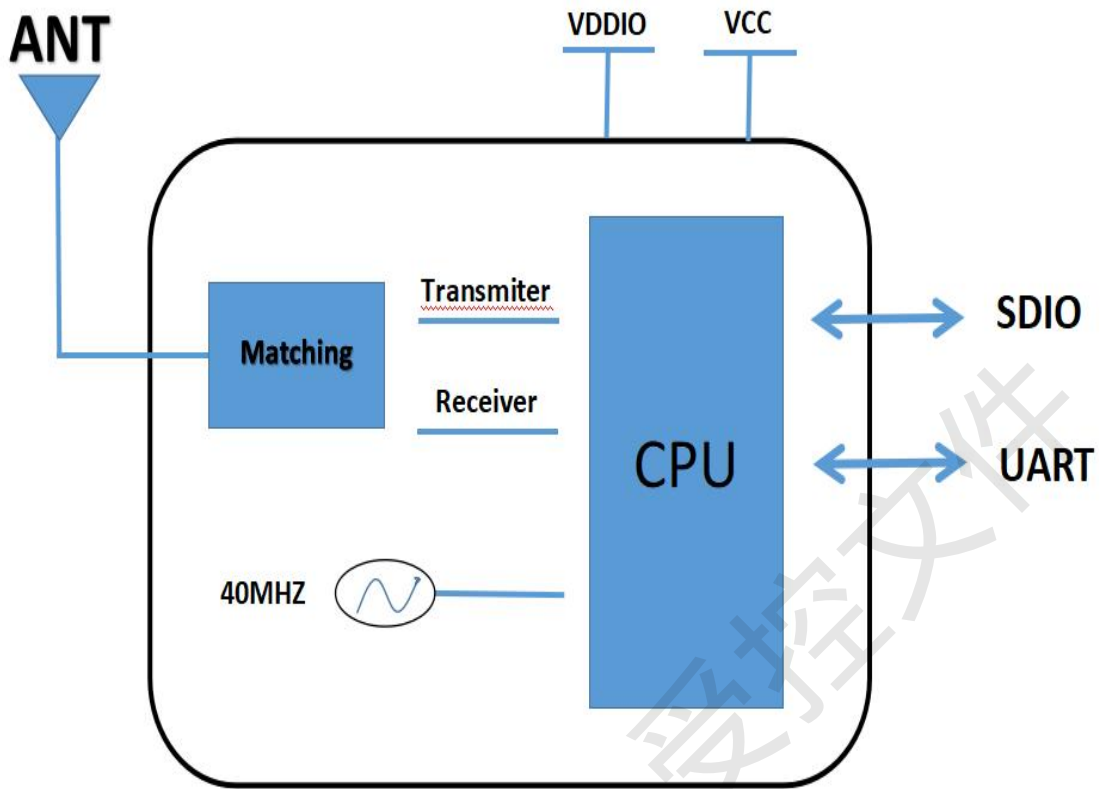
## 1.1 Introduction

The FT1821CSV2 is a highly integrated single-chip that support 1-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) STA mode with integrated Bluetooth 2.1/4.2 controller, SDIO (SDIO 1.1/2.0/3.0) interface, and HS-UART mixed interface. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in a single chip. The RTL8821CS provides a complete solution for a high-performance integrated wireless and Bluetooth device.

## 1.2 Features

- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac compatible WLAN
- Compatible with Bluetooth v2.1+EDR
- Maximum PHY data rate up to 86.7Mbps using 20MHz bandwidth, 200Mbps using 40MHz bandwidth, and 433.3Mbps using 80MHz bandwidth
- WiFi Direct supports wireless peer to peer applications
- 5MHz / 10MHz / 20MHz / 40MHz / 80MHz bandwidth transmission
- Maximum data rate 54Mbps in 802.11g, 150Mbps in 802.11n and 433Mbps in 802.11ac
- Support Bluetooth 4.2 features
- Bluetooth 4.0 Dual Mode support: Simultaneous LE and BR/EDR
- Enhanced BT/WLAN Coexistence Control to improve transmission quality in different profiles

### 1.3 Block Diagram



### 1.4 General Specification

<b>Model Name</b>	FT1821CSV2
<b>Product Description</b>	WIFI5 and Bluetooth SDIO Module
<b>Dimension</b>	L x W x H: 12x12x1.8 ( $\pm 0.3$ ) mm
<b>Wi-Fi Interface</b>	Support SDIO 3.0
<b>BT Interface</b>	Support UART
<b>Operating Temperature</b>	0°C to +70°C
<b>Storage Temperature</b>	-55°C to 125°C

## 1.5 DC Characteristics

### Power Supply Characteristics

Symbol	Min.	Typ.	Max.	Unit
<b>VCC33</b>	3.15	3.3	3.45	V
<b>VDDIO</b>	1.7	1.8 or 3.3	3.45	V
<b>Power Consumption</b>	VCC33=3.3V(Unit:mA)			
	Wi-Fi on Mode	170		
	TX (2.4G HT20)	520		
	RX (2.4G HT20)	300		
	TX (5G HT40)	550		
	RX (5G HT40)	360		

## 2 RF Specifications

### 2.1 2.4GHz RF Specification

Features	Description		
WLAN Standard	802.11b/g/n		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Number of Channel	WiFi 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
802.11b@11Mbps	17dBm	±2dBm	≤-13dB
802.11g@54Mbps	14dBm	±2dBm	≤-25dB
802.11n@BW20_MCS7	13dBm	±2dBm	≤-28dB
802.11n@BW40_MCS7	13dBm	±2dBm	≤-28dB
Frequency Error:±12PPM			
2.4G Receiver Specifications			
RX Rate	Standard Value		PER
802.11b@11Mbps	≤-85dBm		8%
802.11g@54Mbps	≤-68dBm		10%
802.11n@BW20_MCS7	≤-66dBm		10%
802.11n@BW40_MCS7	≤-65dBm		10%



## 2.2 5GHz RF Specification

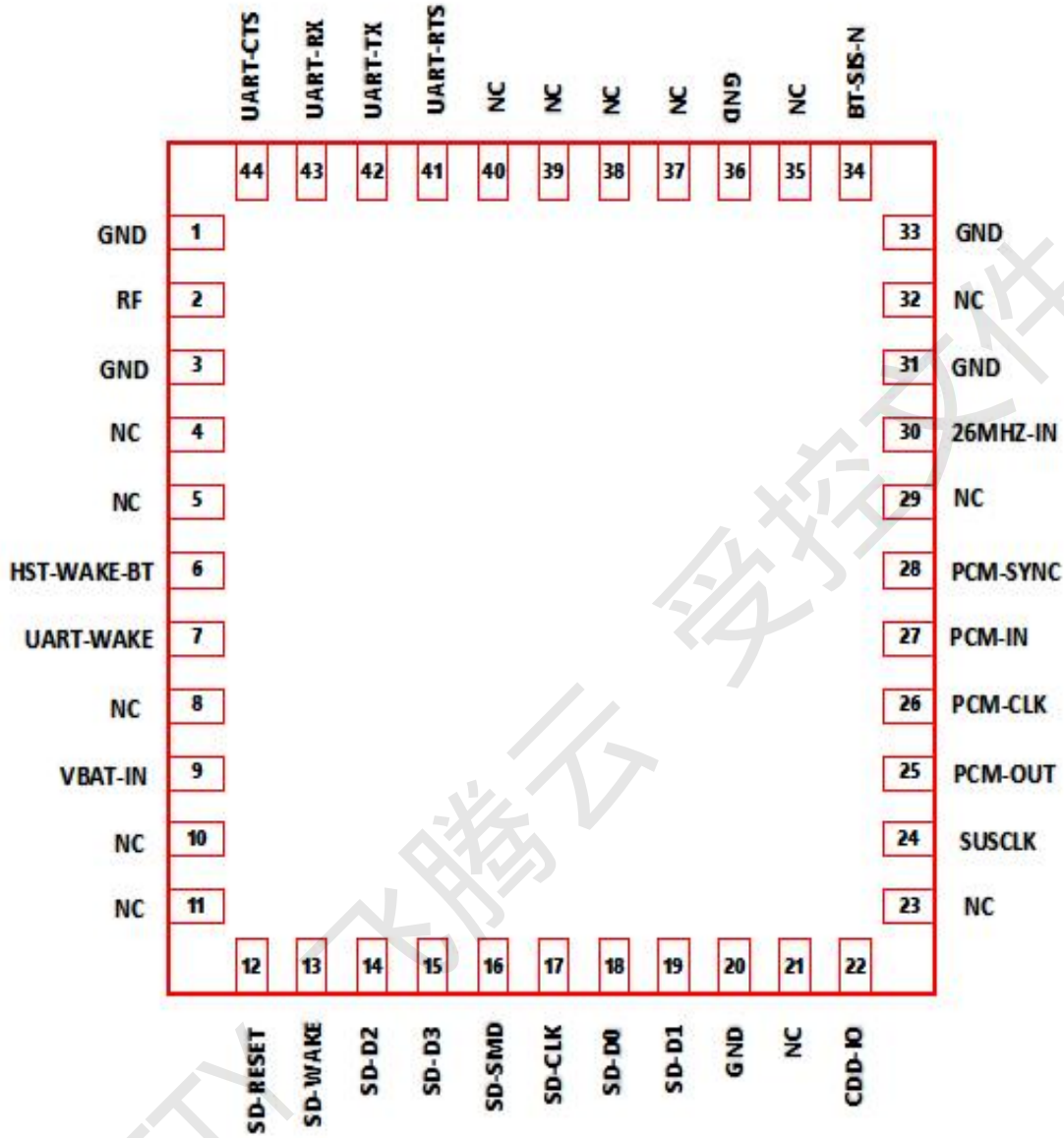
Features	Description		
WLAN Standard	IEEE802.11a/n/ac		
Frequency Range	5.15GHz ~ 5.85GHz (5GHz ISM Band)		
5G Transmitter Specifications			
TX Rate	TX Power	TX Power Tolerance	EVM
802.11a@54 Mbps	13dBm	±2dBm	≤-25dB
802.11n@BW20_MCS7	12dBm	±2dBm	≤-28dB
802.11n@BW40_MCS7	12dBm	±2dBm	≤-28dB
802.11ac@BW80_MCS9	10dBm	±2dBm	≤-32dB
5G Receiver Specifications			
RX Rate	Standard Value		PER
802.11a@54Mbps	≤-70dBm		<10%
802.11n@BW20_MCS7	≤-65dBm		< 10%
802.11n@BW40_MCS7	≤-60dBm		< 10%
802.11ac@BW80_MCS9	≤-57dBm		< 10%

### 2.3 Bluetooth Section:

Feature	Description
<b>General Specification</b>	
Bluetooth Standard	Bluetooth 4.2
Host Interface	UART
Frequency Band	2400~2483.5MHz
Number of Channels	79 channels
Modulation	GFSK, DPSK, DQPSK
<b>RF Specification</b>	
Power (BDR:GFSK/1Mbps)	0dBm~10dBm
Power(EDR:π /4-DQPSK/2Mbps)	0dBm~10dBm
Power(EDR:DPSK/3Mbps)	0dBm~10dBm
Power (LE:GFSK/ 1Mbps)	0dBm~10dBm
Power (LE:GFSK/ 2Mbps)	0dBm~10dBm
Sensitivity@BER=0.1%for(BDR:GFSK/1Mbps)	-91 dBm
Sensitivity@BER=0.1%for(EDR:π/4-DQPSK/2Mbps)	-88 dBm
Sensitivity@BER=0.1%for(EDR:DPSK/3Mbps)	-85 dBm
Sensitivity@BER=30.8%for(BLE:GFSK/ 1Mbps)	-91 dBm
Sensitivity@BER=30.8%for(BLE:GFSK/ 2Mbps)	-90 dBm
Carrier frequency drift	BDR:GFSK/1Mbps:±75KHZ
	EDF:π /4-DQPSK/2Mbps:±75KHZ
	EDR:DPSK/3Mbps:±75KHZ
	BLE:GFSK/ 1Mbps:±75KHZ
	BLE:GFSK/ 2Mbps:±75KHZ

### 3 Pin Assignments

#### 3.1 Pin Outline



### 3.2 Pin Definition

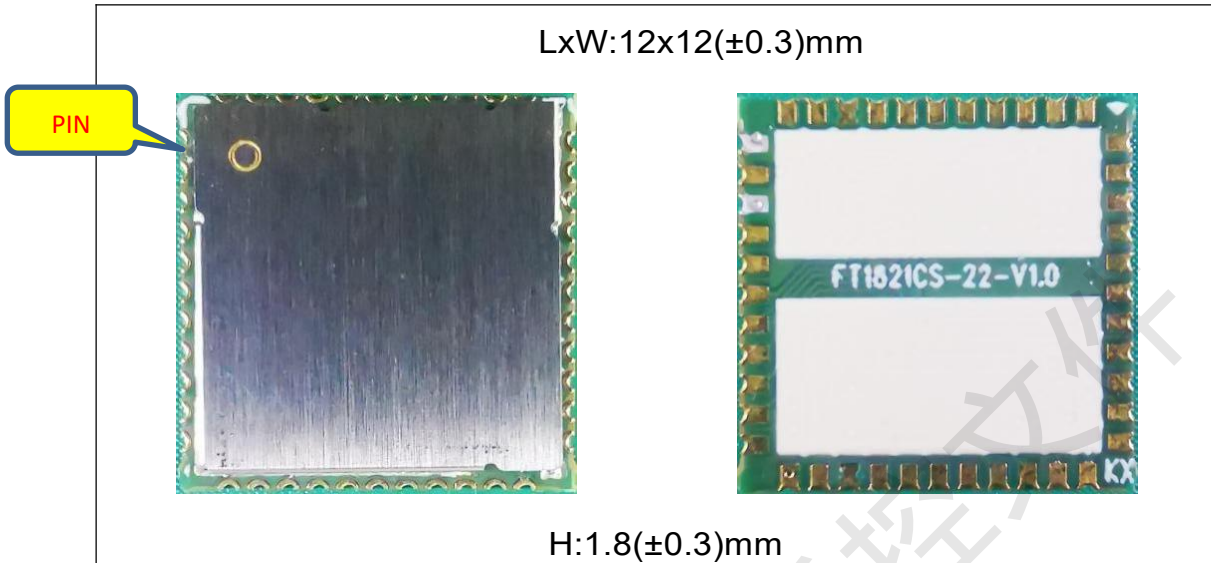
NO	Name	Type	Description	Voltage
1	GND	-	Ground	
2	RF1	I/O	WIFI 2.4G ANT /BT&5G ANT&BT/ANT	
3	GND	-	Ground	
4-5	NC	-	NC	
6	HST_WAKE _BT	I	GPIO13	VDDIO
7	UART_WAK E	O	GPIO14	VDDIO
8	NC	-	NC	
9	VBAT_IN		3.3V_IN	3.3V
10-11	NC	-	NC	
12	SD_RESET	I	GPIO9	VDDIO
13	SD_WAKE	O	GPIO4	VDDIO
14	SD_D2	I/O	SDIO Data Line2	1.8V or 3.3V
15	SD_D3	I/O	SDIO Data Line3	1.8V or 3.3V
16	SD_SMD	I/O	SDIO Command Input	1.8V or 3.3V
17	SD_CLK	I/O	SDIO Clock Input	1.8V or 3.3V
18	SD_D0	I/O	SDIO Data Line0 .	1.8V or 3.3V
19	SD_D1	I/O	SDIO Data Line1	1.8V or 3.3V
20	GND	-	Ground	
21	NC2	-	NC	
22	VDD_I0	P	supply voltage for SDIO IO	1.8V or 3.3V
23	NC	-	NC	
24	SUSCLK	I	Shared with EECS	
25	PCM_OUT	O	GPIO1	VDDIO
26	PCM_CLK	I/O	GPIO3	VDDIO
27	PCM_IN	I	GPIO0	VDDIO
28	PCM_SYNC	I/O	GPIO2	VDDIO
29	NC	-	NC	
30	26MHZ_IN	-	26M/40MHz OSC Input	
31	GND	-	Ground	
32	NC	-	NC	
33	GND	-	Ground	

34	BT_DIS_N	I	GPIO11	VDDIO
35	NC	-	NC	
36	GND	-	Ground	
37-40	NC	-	High-Speed UART RTS	
41	UART_RTS	O	High-Speed UART Data Out	1.8V or 3.3V
42	UART_TX	O	High-Speed UART Data In	1.8V or 3.3V
43	UART_RX	I	High-Speed UART CTS	1.8V or 3.3V
44	UART_CTS	I	High-Speed UART Data Out	1.8V or 3.3V

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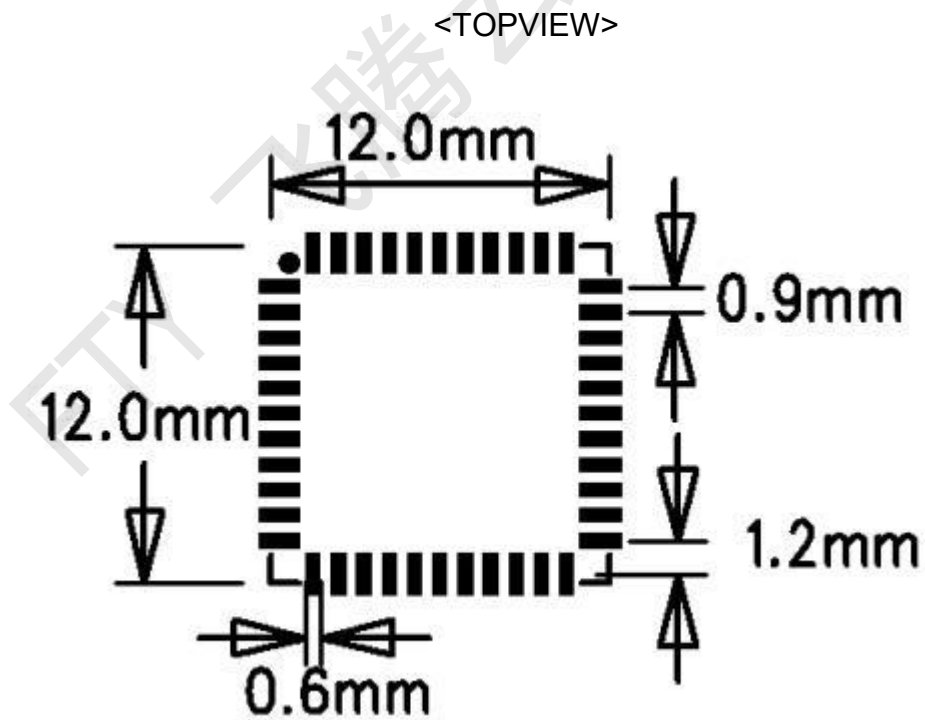
## 4 Dimensions

### 4.1 Module Picture

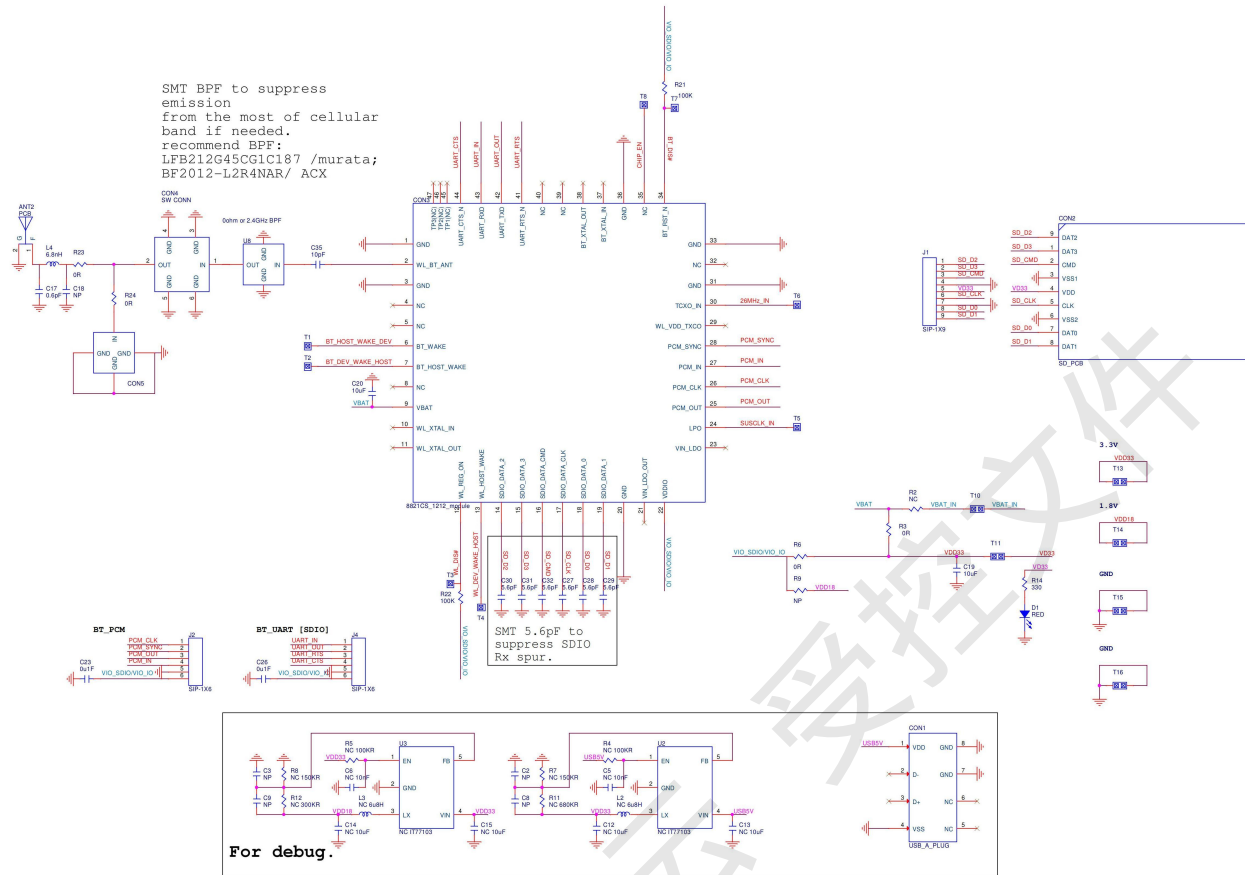


### 4.2 Module Physical Dimensions

(Unit: mm)



# 5 Reference Design



## 6 The Key Material List

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8821CS-CG	Realtek Semiconductor Corp	
2	PCB	FT1821CS-22S-V1.0	Xinfeng Fuchangfa Electronics Co., Ltd	
3	PCB	FT1821CS-22S-V1.0	Shenzhen Kexiang Precision Circuit Technology Co., Ltd	
4	Crystal oscillator	2016 40MHz $\pm 8$ ppm 12pF(-30~85° C)晶威特 CN4040M00012T2893016	Hefei Jing Wei Te Electronics Co. Ltd	
5	Crystal oscillator	2016 40MHz $\pm 8$ ppm 12pF (-20~85° C)蓝晶 L214S400L	Zhejiang Lanjing Micro electronics Co., Ltd	
6	duplexer	双工器 1.6×0.8mm 6P 2.4GHz/5GHz -40_+85° FLT18D254959D-3266B	Shenzhen Feiteer Technology Co., Ltd	
7	duplexer	双工器 1.6×0.8mm 6P 2.4G-5.95G -40_+85° FLT18D24254959D-3268B	Shenzhen Feiteer Technology Co., Ltd	



## 7 Recommended Reflow Profile

Constant temperature and reflow soldering

The heating/reflow phase generates liquid phase temperatures above 216-221°C. Sudden temperature increases need to be prevented as they increase the risk of solder paste collapse.

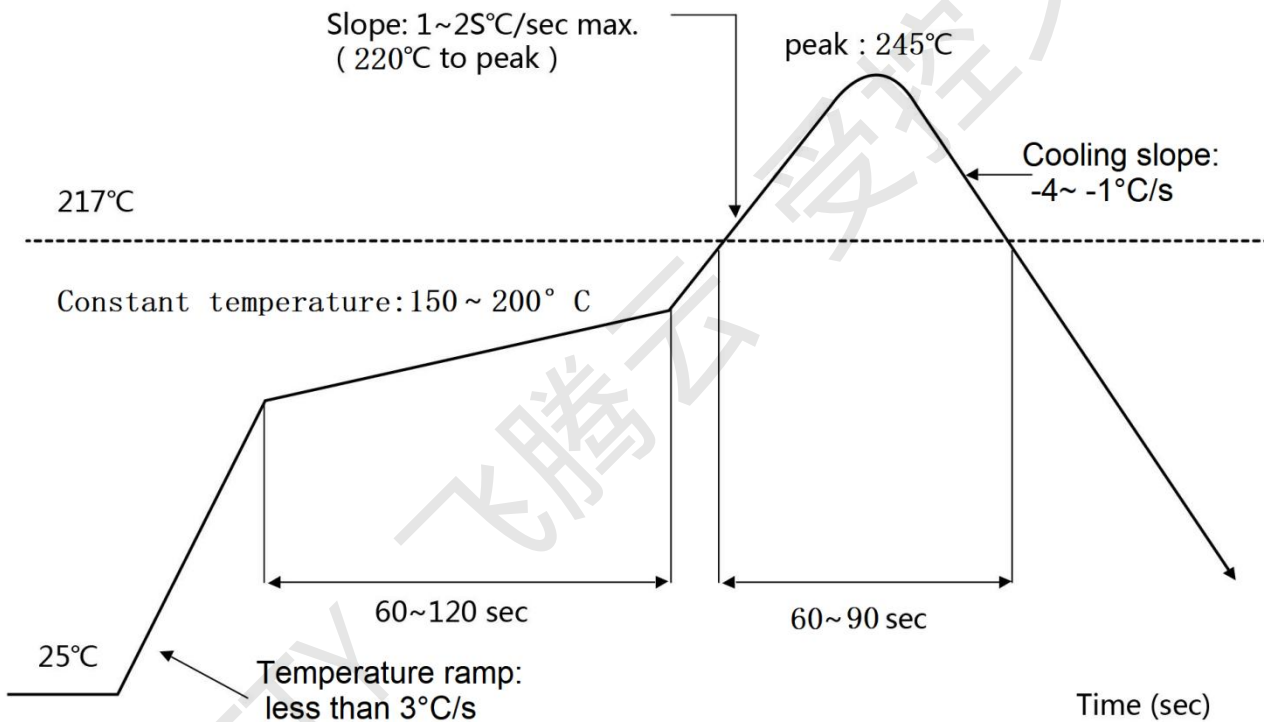
Liquid phase temperature time above 220°C: 60-90 seconds.

Peak reflow temperature: 235~245°C.

Constant temperature time (170~220°C): 60~120 seconds.

Temperature ramp: less than 3°C/s.

Cooling slope: -4~ -1°C/s.



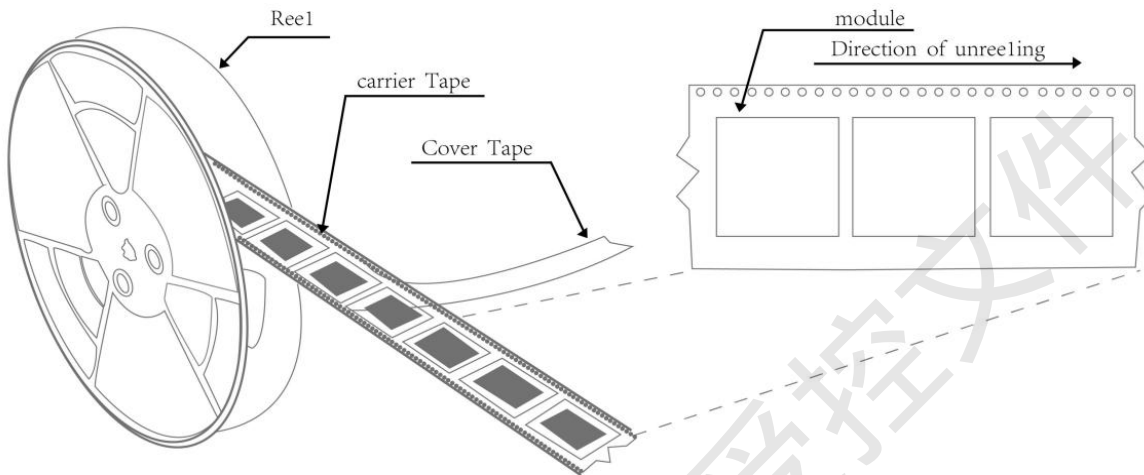
### Notes:

The actual soldering temperature depends on other external factors such as the solder paste selected, the size and thickness of the substrate and the board design. If the maximum soldering temperature in the recommended soldering profile is exceeded, there is a risk of permanent damage to the module.

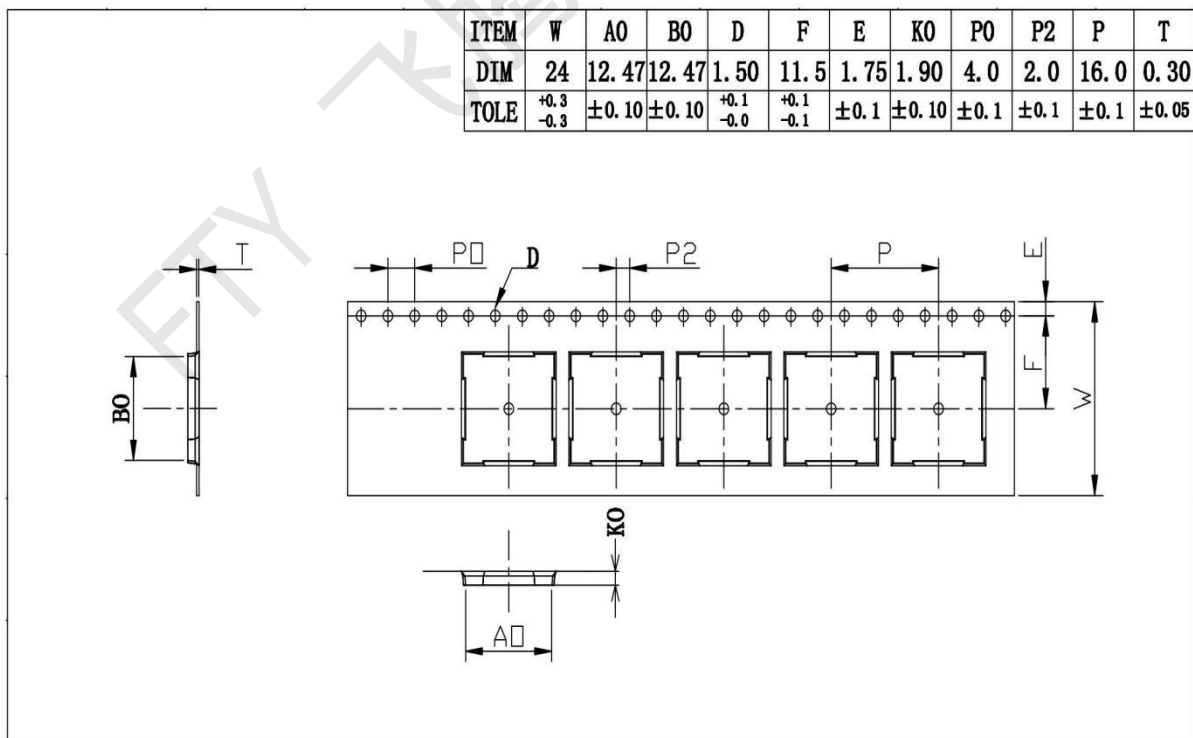
## 8 Package Information

### 8.1 Reel

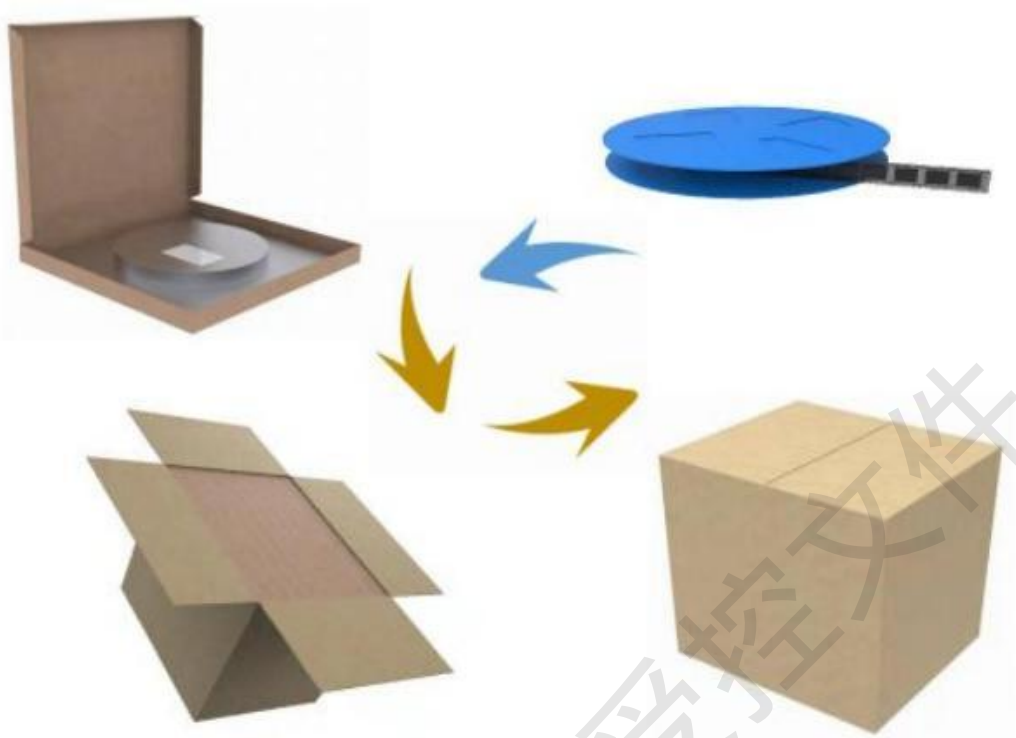
A roll of 1500pcs



### 8.2 Carrier Tape Detail



### 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-020B, 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  $<40^{\circ}\text{C}$  and  $<90\%$  relative humidity (RH).

b) Environmental condition during the production:  $30^{\circ}\text{C}$  / 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

d) "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