PRODUCT SPECIFICATION

6188EG-UG

Wi-Fi Single-band 1x1 Datasheet

Version:v1.0

6188EG-UG Module Datasheet

Ordering Information	Part NO.	Description
	FG6188EGUG-00	RTL8188GTV-CG,802.11b/g/n ,1T1R,12.2*12.9,USB2.0,PCB V1.0 ,Increase CHIP_EN,Without IPEX Connector

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

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CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2022/08/22	New version	TZQ	Lxy	QJP

1. General Description

1.1 Introduction

Fn-Link 6188EG-UG is a low-cost and low-power consumption module which provides a complete solution for a high throughput performance integrated wireless LAN (WLAN) device. This module is based on Realtek RTL8188GTV, a highly integrated single-chip 802.11b/g/n WLAN network USB interface (USB1.0/1.1/2.0 compliant) controller. It provides simple legacy and 20MHz/40MHz co-existence mechanisms to ensure backward and network compatibility.

6188EG-UG can be used to provide up to 11Mbps data rate for IEEE 802.11b, 54Mbps for 802.11g and 150Mbps for 802.11n to connect your WLAN.

This compact module is a total solution for Wi-Fi technology and it is specifically developed for smart phones and portable devices.

1.2 Description

Model Name	6188EG-UG
Product Description	Support Wi-Fi functionalities
Dimension	L x W x H: 12.2 x 13 x1.5mm (typical)
Wi-Fi Interface	Support USB2.0
OS supported	Android /Linux/ Win CE /iOS /XP/WIN7
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C

Note: Module actualy passed at -20°C operating temperature.

2. Features

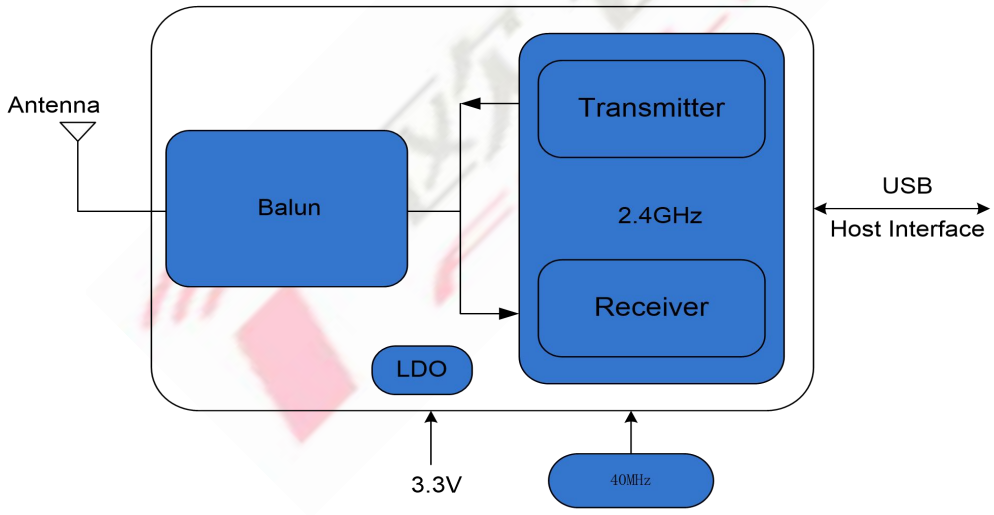
General Features

- Operate at 20/40MHz bandwidth in 2.4GHz band
- USB2.0 interface for Wi-Fi
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11e, IEEE 802.11i
- Security support for WPA/WPA2. Open, shared key and pair-wise key authentication services.
- Wi-Fi 1T1R support up to 150Mbps downstream/upstream PHY rates

WLAN Interface

- USB for Wi-Fi

3. Block Diagram



4. General Specification

4.1 WI-FI Specification

Feature	**Description**	
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch14	
Test Items	**Typical Value**	**EVM**
Output Power	802.11b /11Mbps : 16dBm ± 2 dB	EVM ≤ -10dB
	802.11g /54Mbps : 14dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7 : 13dBm ± 2 dB	EVM ≤ -28dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	±20ppm	
Test Items	**TYP Test Value**	**Standard Value**
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -91 dBm	≤-83
	- 2Mbps PER @ -89 dBm	≤-80
	- 5.5Mbps PER @ -87 dBm	≤-79
	- 11Mbps PER @ -85 dBm	≤-76
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -87 dBm	≤-85
	- 9Mbps PER @ -86 dBm	≤-84
	- 12Mbps PER @ -84 dBm	≤-82
	- 18Mbps PER @ -82 dBm	≤-80
	- 24Mbps PER @ -79 dBm	≤-77
	- 36Mbps PER @ -75 dBm	≤-73
	- 48Mbps PER @ -71 dBm	≤-69
	- 54Mbps PER @ -70 dBm	≤-68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -87 dBm	≤-85
	- MCS=1 PER @ -84 dBm	≤-82
	- MCS=2 PER @ -82 dBm	≤-80
	- MCS=3 PER @ -79 dBm	≤-77
	- MCS=4 PER @ -75 dBm	≤-73
	- MCS=5 PER @ -71 dBm	≤-69
	- MCS=6 PER @ -70 dBm	≤-68
	- MCS=7 PER @ -69 dBm	≤-67
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0, PER @ -85 dBm	≤-82
	- MCS=1, PER @ -82 dBm	≤-79

	- MCS=2, PER @ -80 dBm	≤-77
	- MCS=3, PER @ -77 dBm	≤-74
	- MCS=4, PER @ -73 dBm	≤-70
	- MCS=5, PER @ -69 dBm	≤-66
	- MCS=6, PER @ -68 dBm	≤-65
	- MCS=7, PER @ -67 dBm	≤-64
Maximum Input Level	802.11b : ≦-8 dBm	
	802.11g/n : ≦-20 dBm	

5. ID setting information

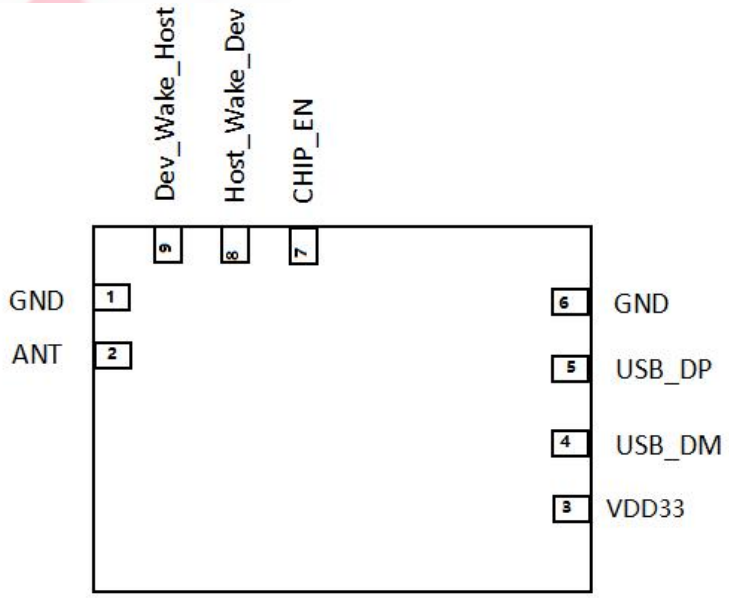
WI-FI

Vendor ID	
Product ID	

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND	—	Ground connections	
2	ANT	I/O	RF I/O port	
3	VDD33	—	Main power voltage source input 3.3V	3.3V
4	USB_DM	I/O	USB2.0 differential pair for WLAN	
5	USB_DP	I/O	USB2.0 differential pair for WLAN	
6	GND	—	Ground connections	
7	Chip EN	I/O	module default pull high，disable when pulled low. (If not used, can NC this pin)	3.3V
8	Host wake device	I/O	Host wake device(if not used can NC this pin)	3.3V
9	Device wake host	I/O	Device wake host (if not used can NC this pin)	3.3V

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	3.15	3.3	3.45	V

7.2 Power Consumption

Power Consumption (Typical by using SWR)	TX Mode: (Throughput mode) 230mA (MCS7/BW20) RX Mode: (Throughput mode) 130mA (MCS7/BW20)

7.3 Interface Circuit time series

7.3.1 USB Bus during Power On Sequence

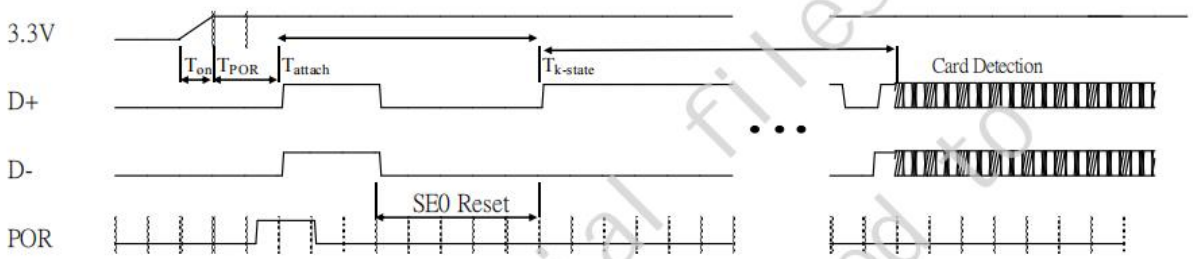


Figure 3 RTL8188GTV USB Bus Power On Sequence

T_{on}: The main power ramp up duration
T_{por}: The power on reset releases and power management unit executes power on tasks
T_{attach}: USB attach state
$T_{k\text{-}state}$: the duration from resister attached to USB host starting card detection procedure

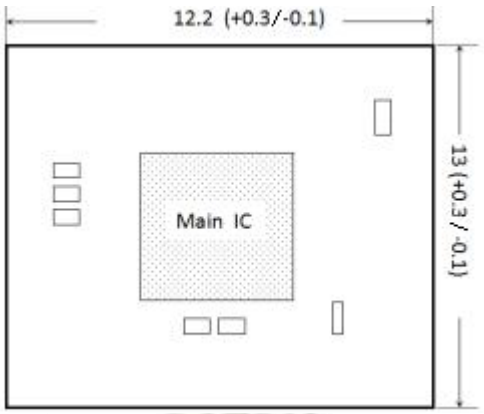
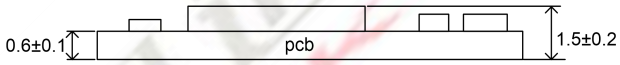
The power on flow description:
After main 3.3V ramp up, the internal power on reset is released by power ready detection circuit and the power management unit will be enabled. The power management unit enables the internal regulator and clock circuits.
The power management unit also enables the USB circuits.
USB analog circuits attach resisters to indicate the insertion of the USB device

Table 9. The typical timing range

	Unit	Min	Typical	Max
T_{on}	ms	0.25	1.5	5
T_{por}	ms	--	2	10
T_{attach}	ms	2	7	15
$T_{k\text{-}state}$	ms	50	250	--

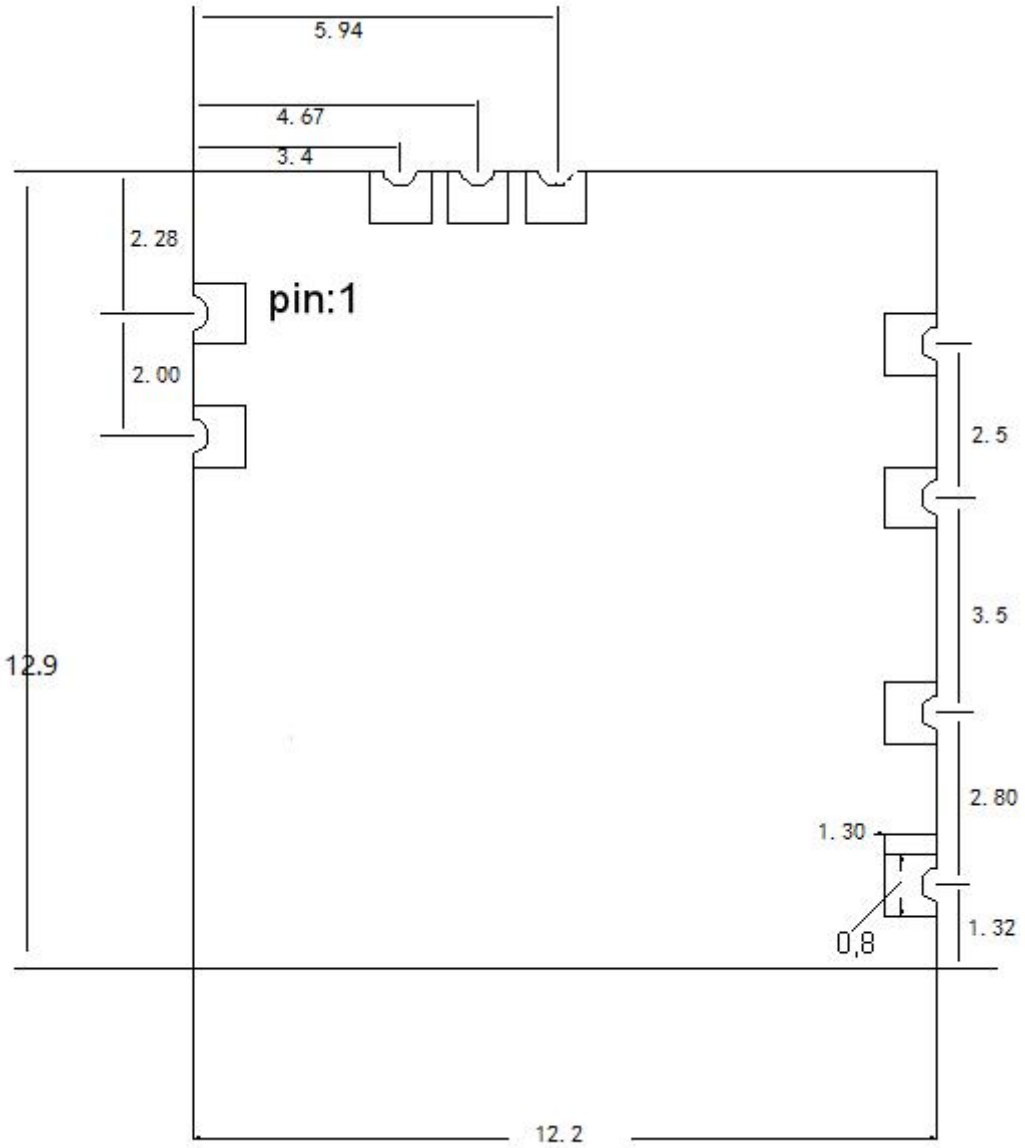
8. Size reference

8.1 Module Picture

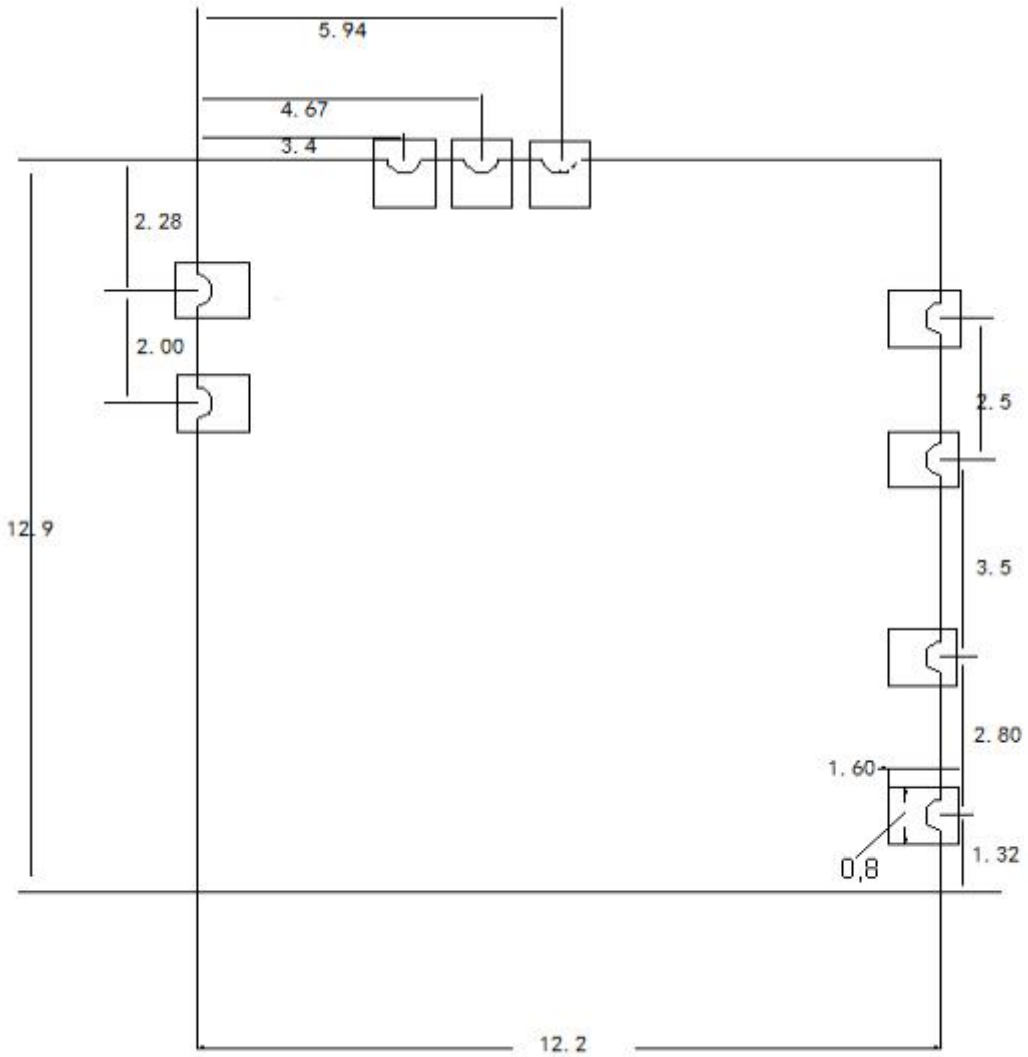
L x W : 12.2 x 13 (+0.3/-0.1) mm  	
H: mm	
Weight	

8.2 Physical Dimensions

<TOP View>



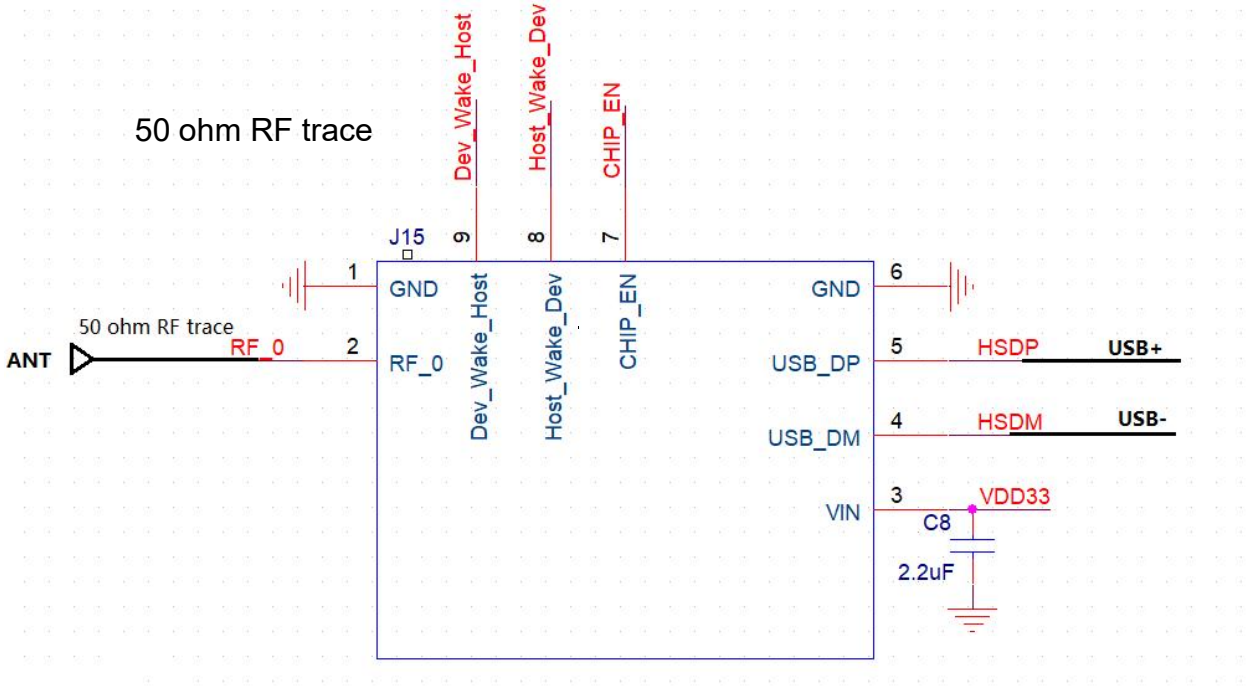
8.3 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	Crystal	3225 40MHz 15pF 10ppm	ECEC, TKD, Hosonic, JWT, TXC, TST, SIWARD
2	Chipset	RTL8188GTV-CG QFN24	Realtek
3	PCB	6188EG-UG	XY-PCB, GDKX, Sunlord, SLPCB,Truly

10. Reference Design



Note:

1, Please add 2.2uF cap for VIN.

2, For USB 2.0 differential signal, requires 90 ohm impedance.

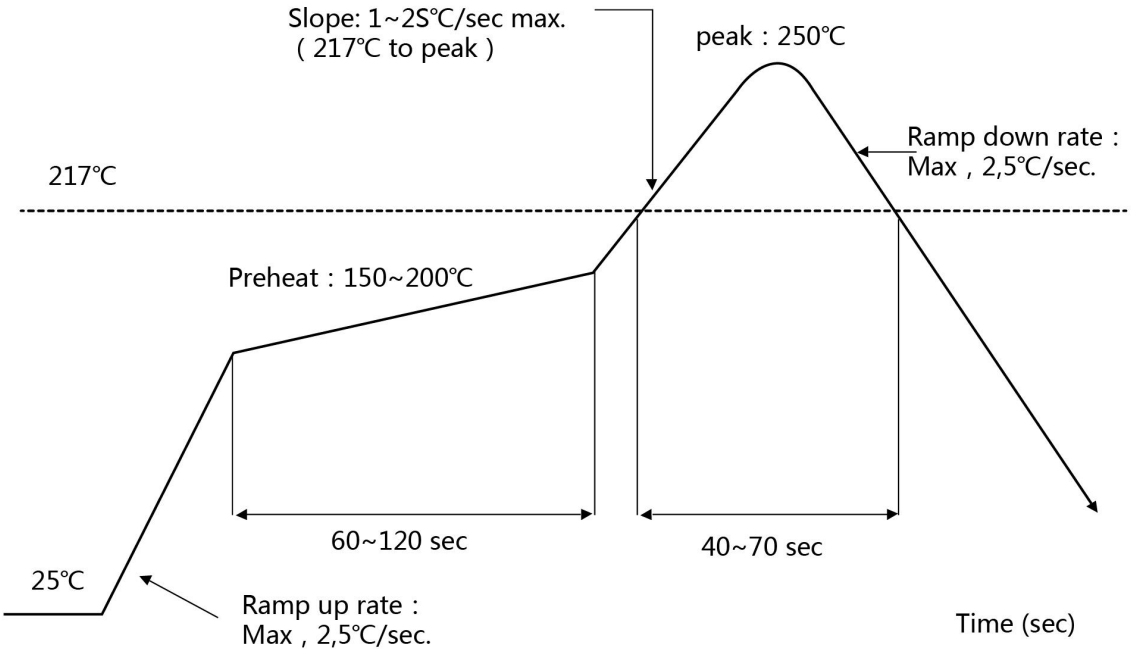
3, For Pin 2 RF IO trace, keep 50 ohm impedance.

11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



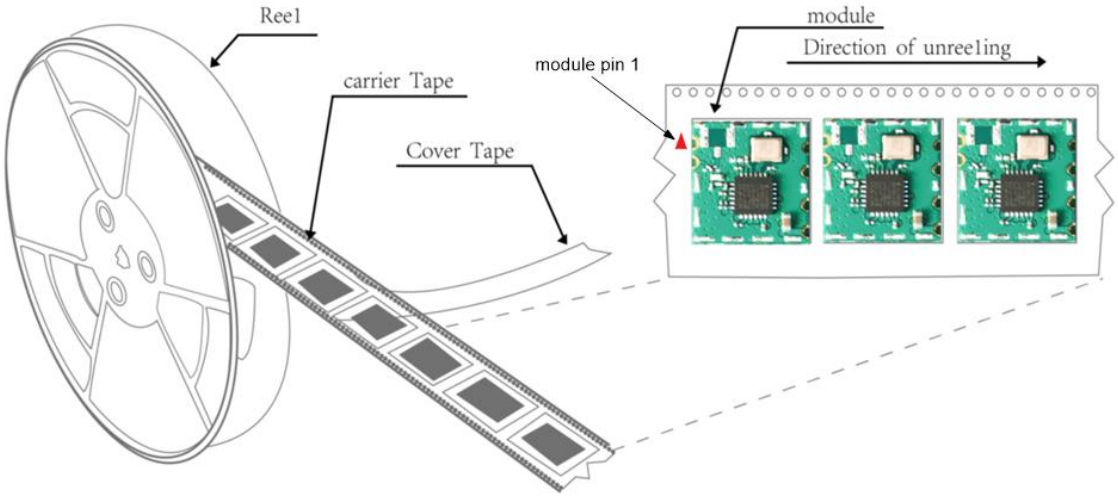
12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

13. Package

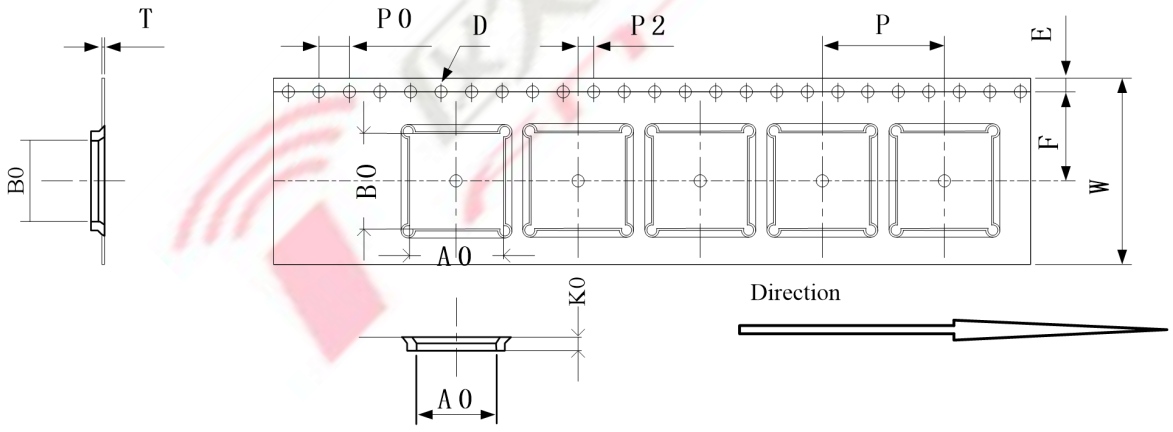
13.1 Reel

A roll of 1500pcs



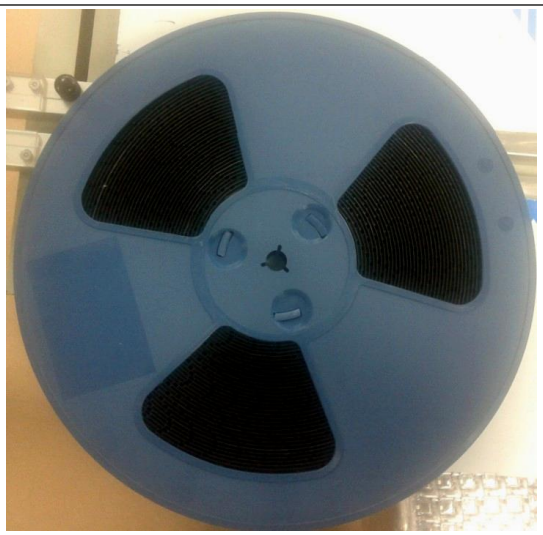
13.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	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



13.3 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape: 24mm*32.6m the cover tape :21.3mm*32.6m

Color of plastic disc: blue

NY bag size:460mm*385mm size ： 350*350*35mm

The packing case size:350*210*370mmg

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 <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

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