

6188S-UF

Wi-Fi Single-band 1X1 802.11 b/g/n

Module Datasheet



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Title

Signature

Date

Fn-Link

Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2019/03/29	New version	Whh	Lxy
1.1	2019/04/30	Add Authentication information(TELEC)---page 11	Whh	Lxy

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1 Overview

1.1 Introduction

6188S-UF is a small size and low profile of Wi-Fi module, board size is 14.8mm*18.2mm with module thickness of 1.9mm. 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 Wi-Fi. The module provides simple legacy and 20MHz/40MHz co-existence mechanisms to ensure backward and network compatibility.

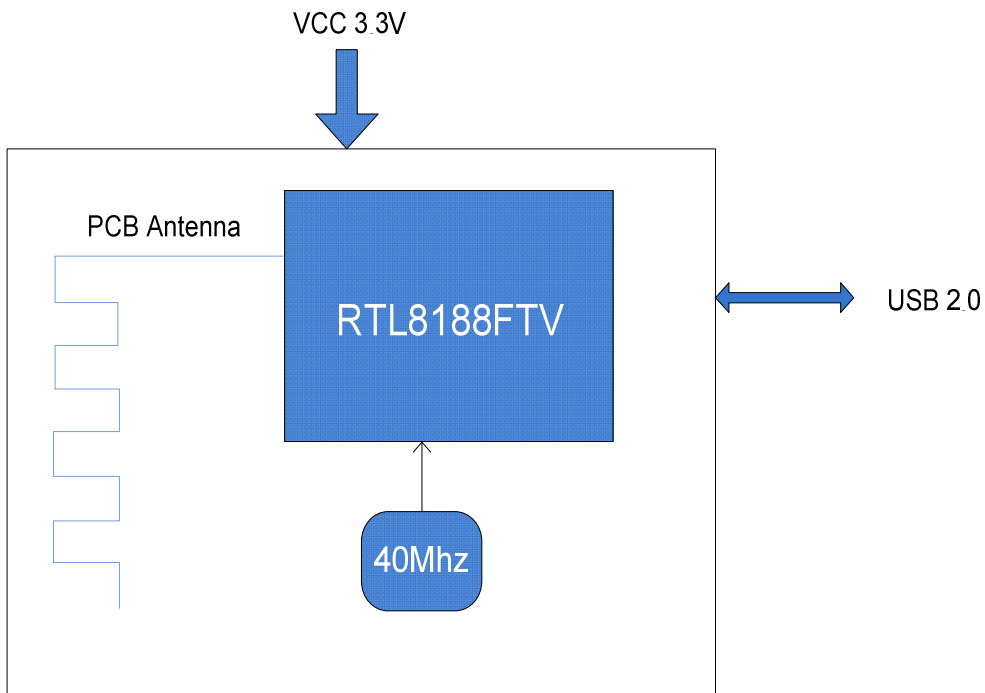
6188S-UF uses highly integrated Wi-Fi single chip based on advanced COMS process. 6188S-UF integrates whole Wi-Fi function blocks into a chip, such as USB/PCM, MAC, BB, AFE, RFE, PA, EEPROM and LDO/SWR, except fewer passive components remained on PCB.

This compact module is a total solution for Wi-Fi technology. The module is specifically developed for Smart phones and Portable devices.

1.2 Features

- Operate at ISM frequency bands (2.4GHz)
- USB for Wi-Fi
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i
- Enterprise level security which can apply WPA/WPA2 certification for Wi-Fi.
- Wi-Fi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

Block Diagram:



1.3 General Specification

Model Name	6188S-UF
Product Description	Support Wi-Fi functionality
Dimension	L x W x H: 14.8 x 18.2 x1.9 (typical) mm
Wi-Fi Interface	Support USB2.0
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C
RoHS	All hardware components are fully compliant with EU RoHS directive

1.4 Recommended Operating Rating

		Min.	Typ.	Max.	Unit
Operating Temperature		0	25	70	deg.C
VCC33		3.15	3.3	3.45	V
Power Consumption		VCC33 = 3.3V(Unit:mA)			
	Wi-Fi on Mode	126			
	TX (2.4G HT40)	232			
	RX (2.4G HT40)	140			

※1.5 EEPROM Information

Wi-Fi

Vendor ID	0BDAh
Product ID	F179h

2 Wi-Fi RF Specification

2.1 2.4GHz RF Specification

Feature	Description			
Operating Frequency	2.400~2.4835GHz			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-40/-31/-41	-	dBr
2st side lobes(to fc ± 22MHZ)	-	-50/-61/-61	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm
Standards	Wi-Fi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i			
Modulation	Wi-Fi: 802.11b: CCK(11,5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM			
PHY Data rates	Wi-Fi:			

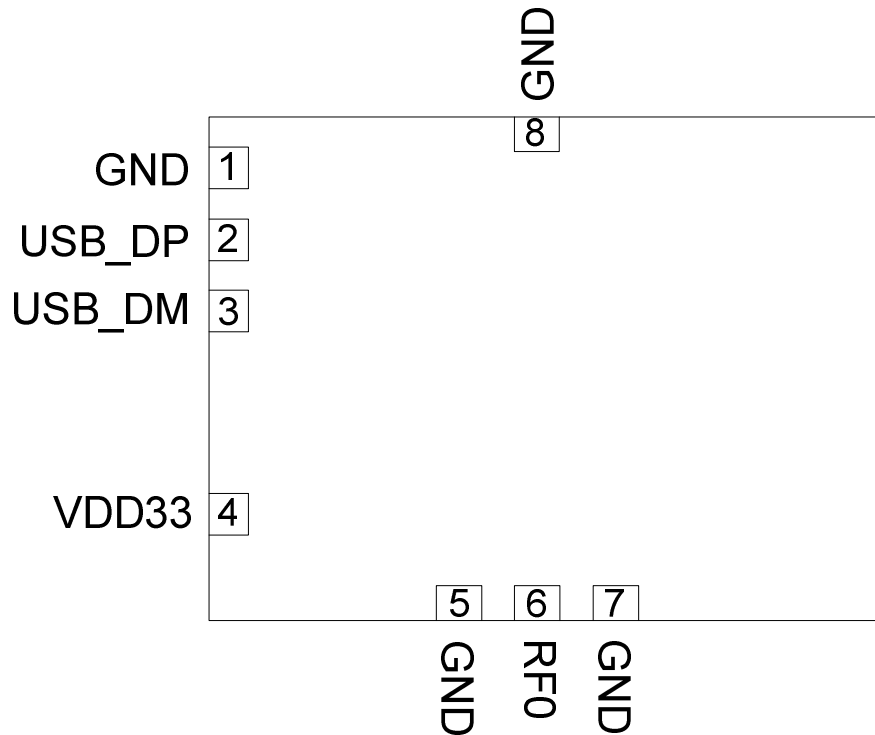
	<p>802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps</p>													
Transmit Output Power	<p>Wi-Fi: 802.11b@11Mbps 16±1.5dBm 802.11g@54Mbps 14±1.5dBm 802.11n@65Mbps 13±1.5dBm (MCS 7_HT20) 13±1.5dBm (MCS 7_HT40)</p>													
EVM	<p>802.11b /1Mbps : EVM ≦ -10dB 802.11b /11Mbps : EVM ≦ -10dB 802.11g /6Mbps : EVM ≦ -5dB 802.11g /54Mbps : EVM ≦ -25dB 802.11n /6.5Mbps : EVM ≦ -5dB 802.11n /65Mbps : EVM ≦ -28dB 802.11n /13.5Mbps : EVM ≦ -5dB 802.11n /135Mbps : EVM ≦ -28dB</p>													
Receiver Sensitivity (Wi-Fi)	<p>802.11b@8% PER 1Mbps ≦ -91dBm 2Mbps ≦ -89dBm 5.5Mbps ≦ -87dBm 11Mbps ≦ -85dBm Max input level ≥ -8</p>													
	<p>802.11g@10% PER 6Mbps ≦ -87dBm 9Mbps ≦ -86dBm 12Mbps ≦ -84dBm 18Mbps ≦ -82dBm 24Mbps ≦ -79dBm 36Mbps ≦ -75dBm 48Mbps ≦ -71dBm 54Mbps ≦ -70dBm Max input level ≥ -20</p>													
	<p>802.11n@10% PER</p> <table border="0"> <tr> <td>HT20_MCS 0 ≦ -87dBm</td> <td>HT40_MCS 0 ≦ -84</td> </tr> <tr> <td>HT20_MCS 1 ≦ -84dBm</td> <td>HT40_MCS 1 ≦ -81</td> </tr> <tr> <td>HT20_MCS 2 ≦ -82dBm</td> <td>HT40_MCS 2 ≦ -79</td> </tr> <tr> <td>HT20_MCS 3 ≦ -79dBm</td> <td>HT40_MCS 3 ≦ -76</td> </tr> <tr> <td>HT20_MCS 4 ≦ -75dBm</td> <td>HT40_MCS 4 ≦ -72</td> </tr> <tr> <td>HT20_MCS 5 ≦ -71dBm</td> <td>HT40_MCS 5 ≦ -68</td> </tr> <tr> <td>HT20_MCS 6 ≦ -70dBm</td> <td>HT40_MCS 6 ≦ -67</td> </tr> </table>	HT20_MCS 0 ≦ -87dBm	HT40_MCS 0 ≦ -84	HT20_MCS 1 ≦ -84dBm	HT40_MCS 1 ≦ -81	HT20_MCS 2 ≦ -82dBm	HT40_MCS 2 ≦ -79	HT20_MCS 3 ≦ -79dBm	HT40_MCS 3 ≦ -76	HT20_MCS 4 ≦ -75dBm	HT40_MCS 4 ≦ -72	HT20_MCS 5 ≦ -71dBm	HT40_MCS 5 ≦ -68	HT20_MCS 6 ≦ -70dBm
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HT20_MCS 6 ≦ -70dBm	HT40_MCS 6 ≦ -67													

	HT20_MCS 7 \cong -69dBm Max input level \geq -20	HT40_MCS 7 \cong -66
Operating Channel	Wi-Fi 2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan	
Media Access Control	Wi-Fi: CSMA/CA with ACK	
Antenna	On board PCB Antenna	
Network Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP Wi-Fi Direct	
Security	WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i	
OS Supported	Android /Linux/ Win CE /iOS /XP/WIN7	
Host Interface	USB2.0	

3 Pin Assignments

3.1 Pin Outline

< TOP VIEW >



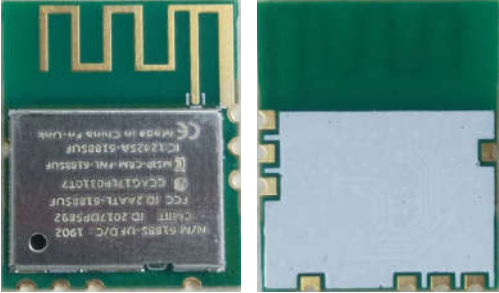
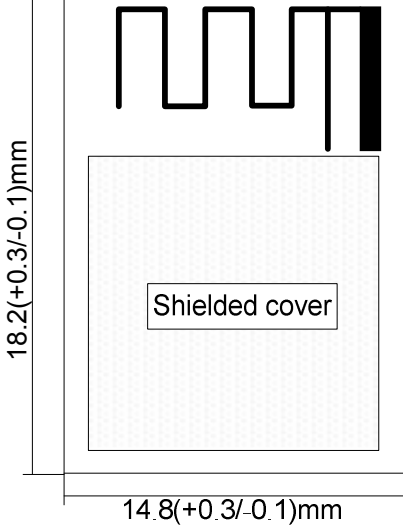
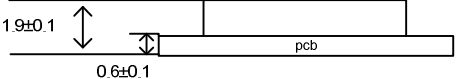
3.2 Pin Definition

NO	Name	Type	Description	Voltage
1	GND	—	Ground connections	
2	USB_DP	I/O	USB2.0 differential pair for WLAN	
3	USB_DM	I/O	USB2.0 differential pair for WLAN	
4	VDD33	P	Main power voltage source input 3.3V	3.3V
5	GND	—	Ground connections	
6	RF0	I/O	Wlan RF I/O, the pin can float if use internal antenna	
7	GND	—	Ground connections	
8	GND	—	Ground connections	

P:POWER I:INPUT O:OUTPUT

4 Dimensions

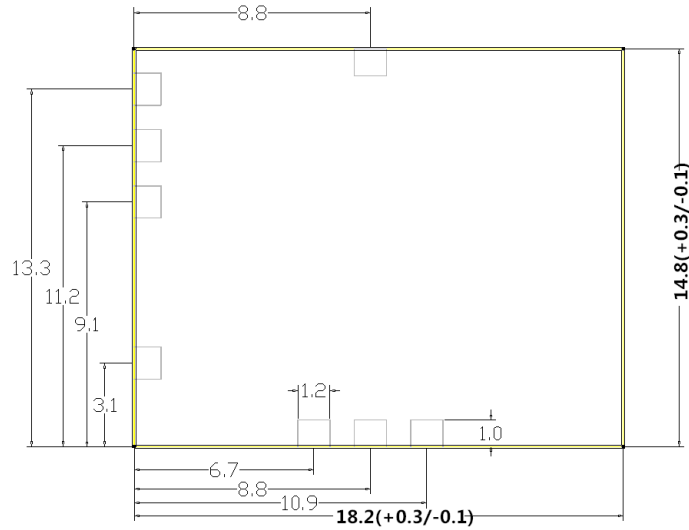
4.1 Physical Dimensions

<p>L x W: 18.2x 14.8(+0.3/-0.1) mm</p> 	
<p>H: 1.9 mm</p>	
<p>Weight</p>	<p>0.68g</p>

4.2 Module Physical Dimensions

(Unit: mm)

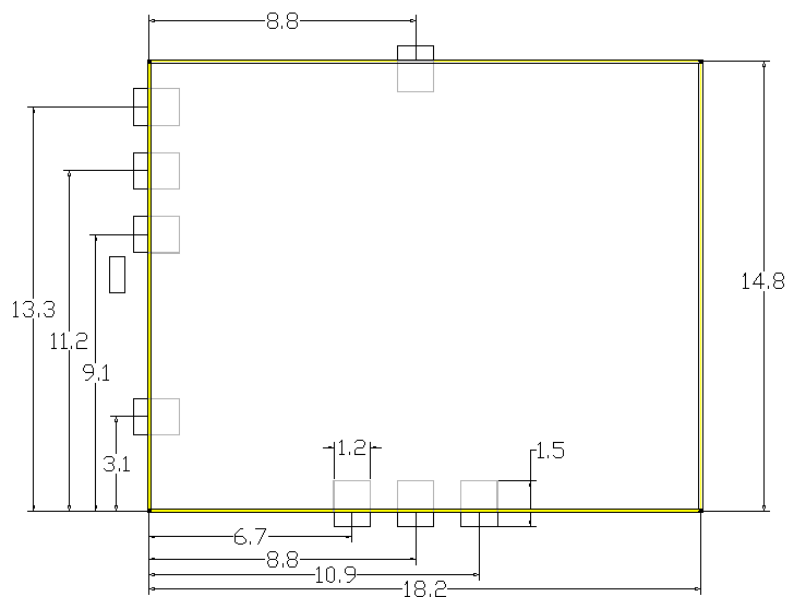
< TOP VIEW >



4.3 Layout Recommendation

(Unit: mm)

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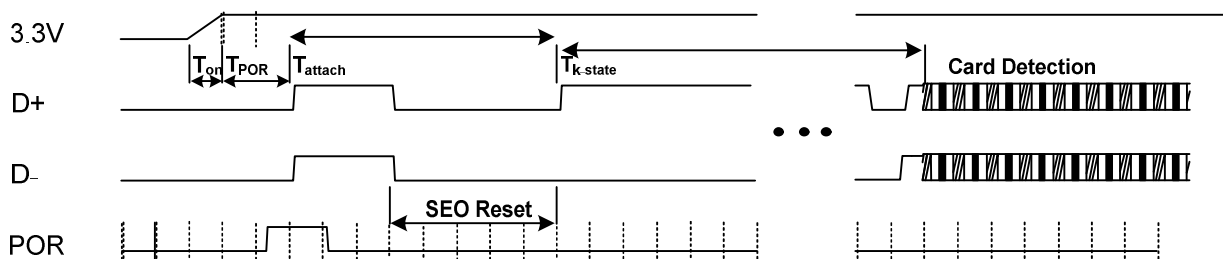
4.4 Marking Description

<TOP VIEW>



5 Interface Timing Specification

5.1 USB Bus during 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

$T_{k-state}$: the duration from resistor 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.

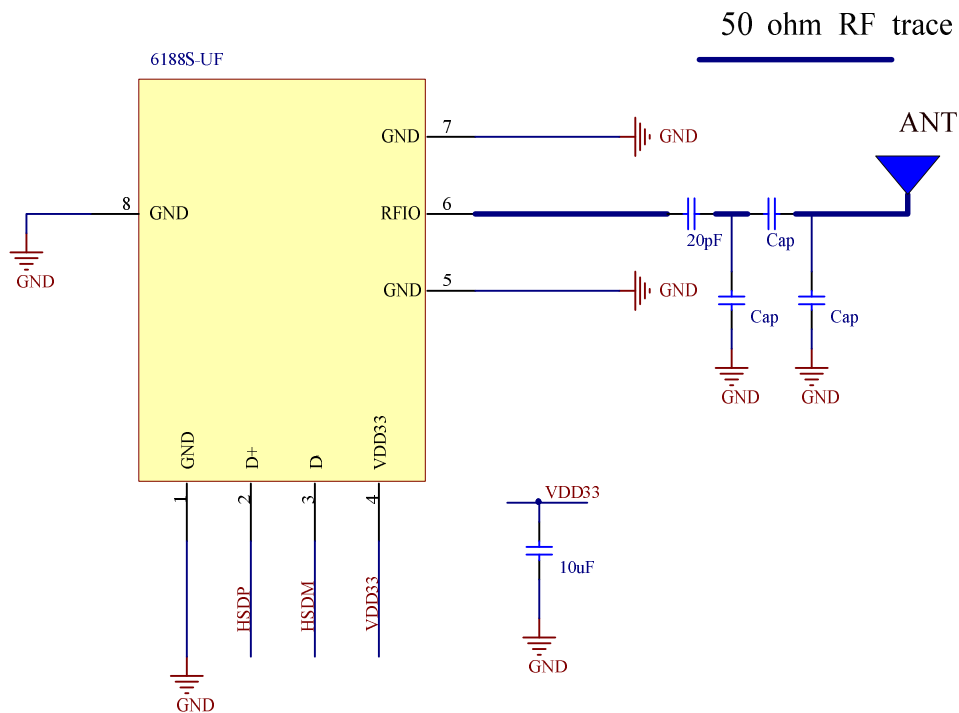
The power management unit also enables the USB circuits.

USB analog circuits attach resistors to indicate the insertion of the USB device

	Unit	Min	Typical	Max
--	------	-----	---------	-----

T_{on}	ms	--	1.5	5
T_{por}	ms	--	2	10
T_{attach}	ms	2	7	15
T_{k-state}	ms	50	250	--

6 Reference Design



7 Ordering Information

Part No.	Description
FG6188SUFX-01	RTL8188FTV-VC, b/g/n,Wi-Fi, 1T1R, 14.8X18.2mm, USB, On board PCB antenna,PCB Version V2.0

8 The Key Material List

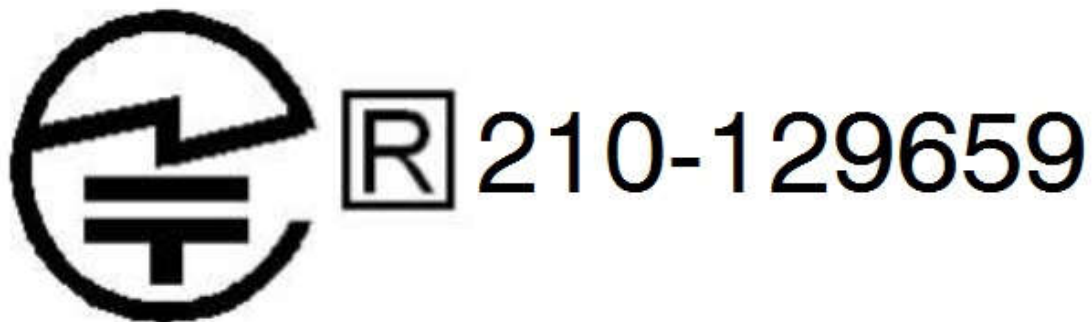
Main	Shielding cover	6188S-UF V2.0 Shielding cover without positioning foot (material: White copper)
Main	Crystal	XTAL-SMD3.2X2.5, 40MHz, CL=16pF, 10ppm, Hosonic: E3SB40E00004UE
Alternative	Crystal	XTAL-SMD3.2X2.5, 40MHz, CL=15pF, 10ppm, temperature: -20~+85℃, SIWARD: XTL571100-W103-033 (SIWARD)
Alternative	Crystal	XTAL-SMD3.2X2.5,40MHz, CL=15pF, 10ppm (TKD)
Main	Chipset	RTL8188FTV-VC-CG

Main	PCB	6188S-UF_V2.0, Dark green 2-ply, 18.2x14.8x0.6mm, White oil added on back (Xiangyu)
Main	ESD	0402 5.5V 0.1pF GESD1005H5R5CR10GPT (Sunlord)

9. Authentication information

9.1 TELEC (Japan)

We have passed Telec (Japan) certification, but this module is too small to put this information. We put the information in this SPC.

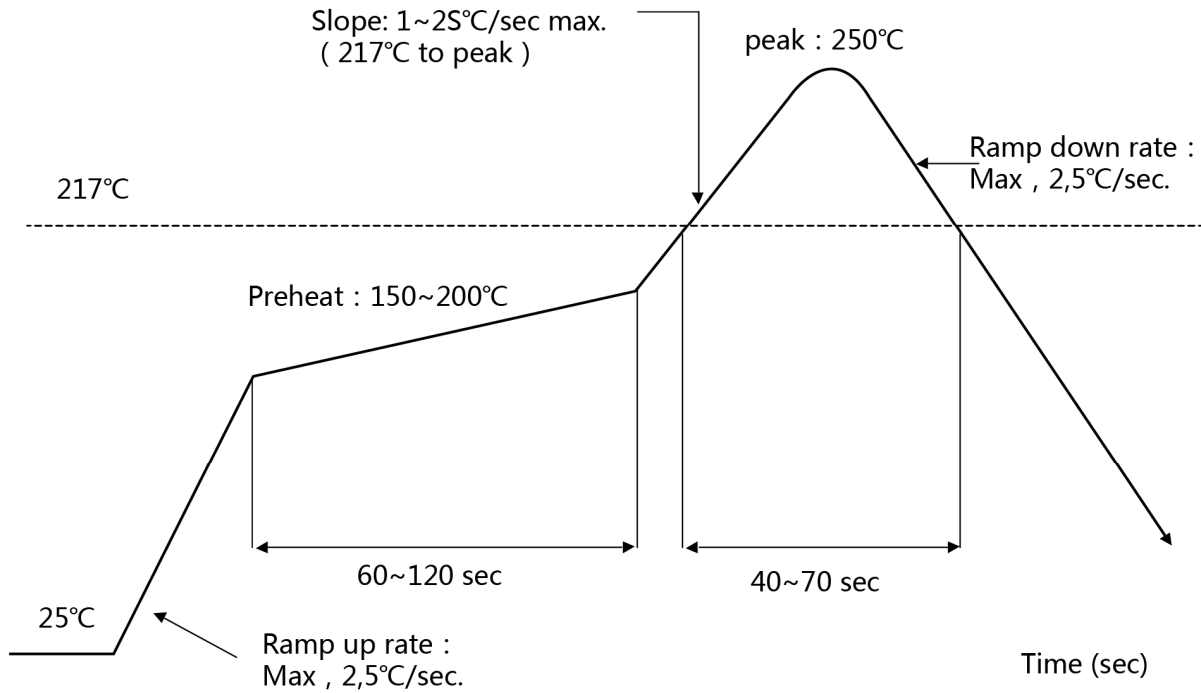


10 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

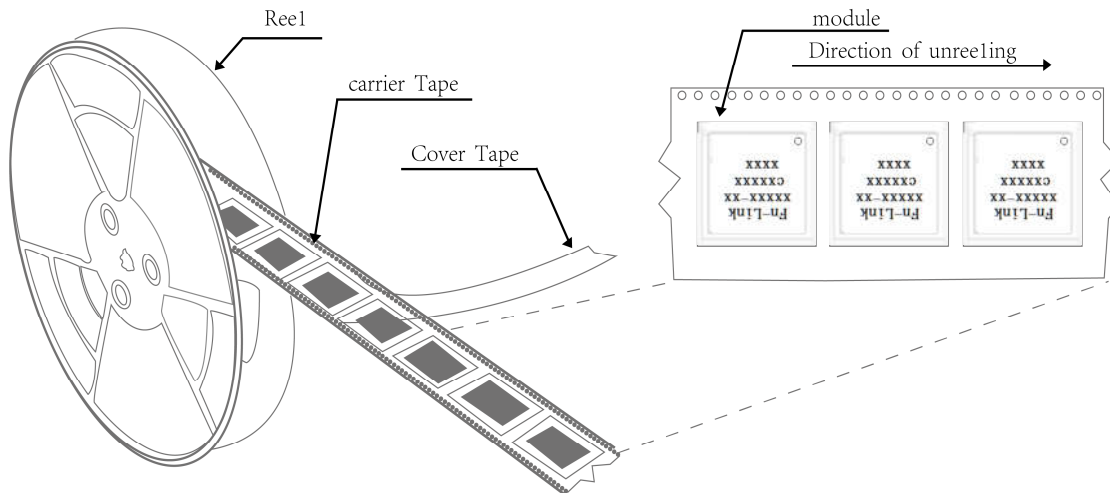
Number of Times : ≤2 times



11 Package Information

11.1 Reel

A roll of 2000pcs



11.2 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape: 24mm*32.6m the cover tape : 21.33mm*32.6m

Color of plastic disc: blue

A roll of 2000pcs



NY bag size:460mm*385mm



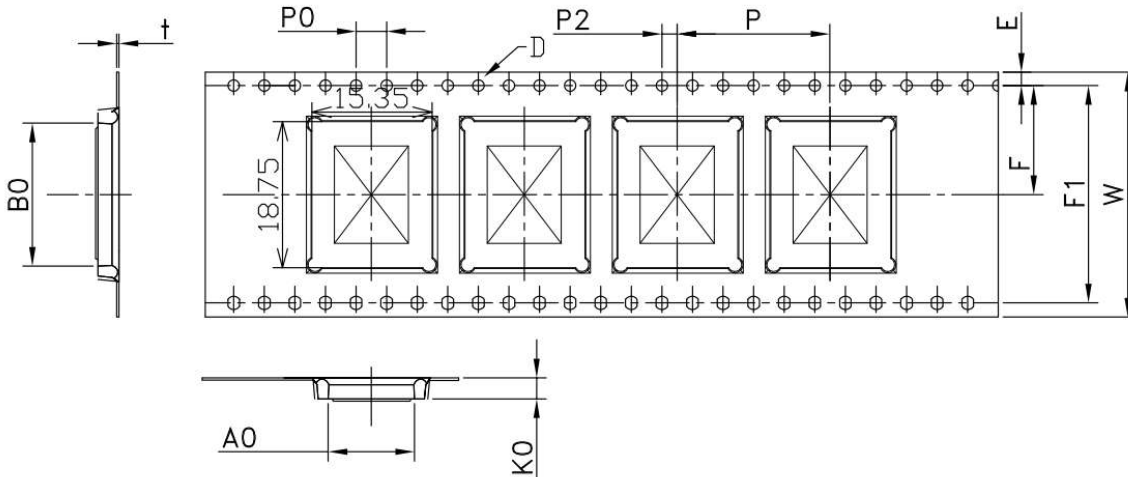
size : 350*350*35mm



The packing case size:350*210*370mm

11.3 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	32	15.35	18.75	1.5	1.75	14.20	28.4	2.10	4.0	2.0	8.0	0.30
TOLE	$\begin{matrix} +0.3 \\ -0.3 \end{matrix}$	± 0.18	± 0.18	$\begin{matrix} +0.1 \\ -0.0 \end{matrix}$	± 0.1	± 0.15	± 0.10	± 0.10	± 0.1	± 0.15	± 0.1	± 0.05



11.4 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:

- Calculated shelf life in sealed bag: 12 months at 40°C and 90% relative humidity (RH)
- Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5
- The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- "IPC/JEDEC J-STD-033A paragraph 5.2" is respected
- Baking is required if conditions b) or c) are not respected
- Baking is required if the humidity indicator inside the bag indicates 10% RH or more