



PRODUCT SPECIFICATION

6235Z-RRB

Wi-Fi Single-band 1x1 + Bluetooth 5.1

Combo Module

Version:v2.2

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL: +86-755-2955-8186

Website: www.fn-link.com

6235Z-RRB Module Datasheet

Ordering Information	Part NO.	Description
	FG6235ZRRB-00	RTL8735BDM-VA4-CG 802.11b/g/n/a 1T1R 带天线座 27.50x20.0 mm



CONTENTS

1. General Description	5
1.1 Introduction	5
1.2 Description	5
2. Features	6
3. Block Diagram	6
4. General Specification	7
4.1 2.4GHz RF Specification	7
4.2 5GHz RF Specification	8
4.3 Bluetooth Specification	10
5. Pin Definition	11
5.1 Pin Outline	11
5.2 Pin Definition details	11
6. Electrical Specifications	14
6.1 Power Supply DC Characteristics	14
6.2 Interface Circuit time series	15
6.2.1 Power On or Resuming from Deep Sleep Sequence	15
6.2.2 Resume from Standby Mode Sequence	15
6.2.3 Power Off Sequence	16
7. Size reference	16
7.1 Module Picture	16
7.2 Marking Description	17
7.3 Physical Dimensions	17
7.4 Layout Recommendation	18
8. The Key Material List	18
9. Recommended Reflow Profile	19
10. Package	19
10.1 Reel	19
10.2 Carrier Tape Detail	20
10.3 Packaging Detail	20
10.4 Tray	22
11. Moisture sensitivity	22

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2022/05/05	New version	FC	ZZQ	QJP
V2.0	2022/10/22	Update ble version	FC	ZZQ	QJP
V2.1	2023/06/01	Modify the height to 3.0 Update Bluetooth format	FC	ZZQ	QJP
V2.2	2023/08/14	Update Reel direction	LXP	ZZQ	QJP
V2.3	2023/09/14	Update General Specification Update VDD33	LXP	ZZQ	QJP

1. General Description

1.1 Introduction

6235Z-RRB is a highly integrated low power 802.11 a/b/g/n Wireless LAN (WLAN) and Bluetooth camera SoC. It combines ARM v8M MCUs (500MHz and 2.23 DMIPS/MHz), WLAN MAC, a 1T1R capable WLAN baseband, Bluetooth MAC, RF, audio codec, ISP and H264/H265 encoder in a single chip. It provides useful high speed connectivity interfaces, such as USB 2.0 host, USB 2.0 device, SD host and Ethernet interfaces. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different application and control usage. The AmebaPro-II series integrates internal memory for full Wi-Fi protocol functions. The embedded memory configuration also enables various application development.

1.2 Description

Model Name	6235Z-RRB
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 27.5 x 20 x 3.0 mm
Wi-Fi Interface	Support UART
BT Interface	UART
Operating temperature	-20°C to 85°C
Storage temperature	-40°C to 105°C

2. Features

General Features

- 802.11 a/b/g/n compatible 1x1, 2.4GHz/5GHz
- 802.11e QoS Enhancement (WMM)
- Wi-Fi WEP, WPA, WPA2, WPA3, WPS. Open, shared key, and pair-wise key authentication services
- Supports low power Tx/Rx for short-range application
- Supports Antenna diversity
- Maximum 4 UART interface, baud rate up to 4MHz and all of them can be configurable as log UART

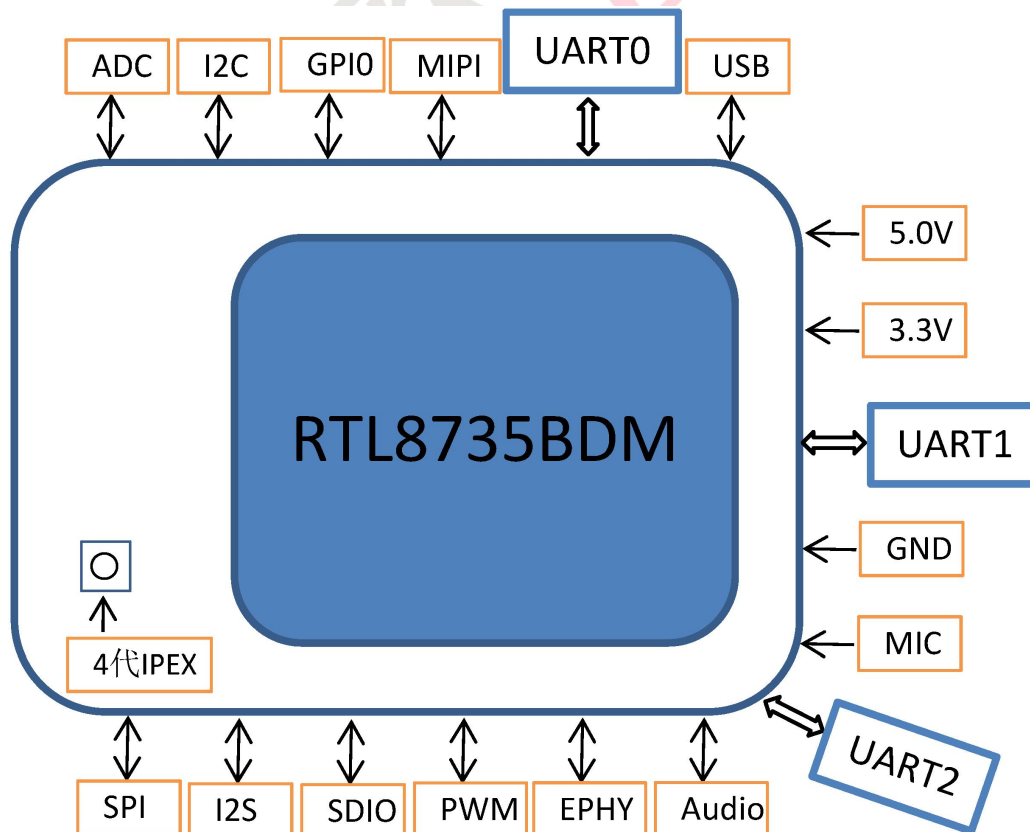
WLAN Interface

- Supports UART interface

Bluetooth Features

- Bluetooth Low Energy (BLE) 5.1
- Supports LE secure connections

3. Block Diagram



4. General Specification

4.1 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.483.5 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz: Ch1 ~ Ch14	
Test Items	Typical Value	EVM
Output Power	802.11b /11Mbps : 19dBm +/- 1.5 dB	EVM ≤ -9dB
	802.11g /54Mbps : 17dBm +/- 1.5 dB	EVM ≤ -25dB
	802.11n /MCS7 : 16dBm +/- 1.5 dB	EVM ≤ -28dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	±20ppm	
Test Items	TYP Test Value	Standard Value
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -92 dBm, typical	≤-83
	- 2Mbps PER @ -90 dBm, typical	≤-80
	- 5.5Mbps PER @ -87 dBm, typical	≤-79
	- 11Mbps PER @ -85 dBm, typical	≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical	≤-85
	- 9Mbps PER @ -88 dBm, typical	≤-84
	- 12Mbps PER @ -87 dBm, typical	≤-82
	- 18Mbps PER @ -84 dBm, typical	≤-80
	- 24Mbps PER @ -81 dBm, typical	≤-77
	- 36Mbps PER @ -78 dBm, typical	≤-73
	- 48Mbps PER @ -73 dBm, typical	≤-69
- 54Mbps PER @ -71 dBm, typical	≤-68	
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical	≤-85
	- MCS=1 PER @ -86 dBm, typical	≤-82
	- MCS=2 PER @ -84 dBm, typical	≤-80
	- MCS=3 PER @ -80 dBm, typical	≤-77
	- MCS=4 PER @ -77 dBm, typical	≤-73
	- MCS=5 PER @ -72 dBm, typical	≤-69
	- MCS=6 PER @ -71 dBm, typical	≤-68
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -88 dBm, typical	≤-82
	- MCS=1 PER @ -85 dBm, typical	≤-79

	- MCS=2	PER @ -83 dBm, typical	≤-77
	- MCS=3	PER @ -79 dBm, typical	≤-74
	- MCS=4	PER @ -76 dBm, typical	≤-70
	- MCS=5	PER @ -71 dBm, typical	≤-66
	- MCS=6	PER @ -70 dBm, typical	≤-65
	- MCS=7	PER @ -68 dBm, typical	≤-64
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		

4.2 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/n Wi-Fi compliant	
Frequency Range	5.15~5.85Ghz (5.0 GHz ISM Band)	
Number of Channels	5.0GHz: Please see the table1	
Output Power	802.11a /54Mbps : 17 dBm +1/- 1.5 dB	EVM ≤ -25dB
	802.11n /MCS7 : 16 dBm +1/- 1.5 dB	EVM ≤ -28dB
Test Items	Test Value	Standard Value
Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -88 dBm	≤-85
	- 9Mbps PER @ -87 dBm	≤-84
	- 12Mbps PER @ -86 dBm	≤-82
	- 18Mbps PER @ -83 dBm	≤-80
	- 24Mbps PER @ -80 dBm	≤-77
	- 36Mbps PER @ -77 dBm	≤-73
	- 48Mbps PER @ -72 dBm	≤-69
	- 54Mbps PER @ -70 dBm	≤-68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -88 dBm	≤-85
	- MCS=1 PER @ -85 dBm	≤-82
	- MCS=2 PER @ -83 dBm	≤-80
	- MCS=3 PER @ -80 dBm	≤-77
	- MCS=4 PER @ -76 dBm	≤-73
	- MCS=5 PER @ -71 dBm	≤-69
	- MCS=6 PER @ -70 dBm	≤-68
	- MCS=7 PER @ -68 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 @ -67 dBm	≤-65
	- MCS=7	PER @ -66 dBm	≤-64
Maximum Input Level		802.11a/n : -30 dBm	

15GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channel center frequencies(MHz)
5150MHz~5250MHz	36	5180
	40	5200
	44	5220
	48	5240
5250MHz~5350MHz	52	5260
	56	5280
	60	5300
	64	5320
5470MHz~5725MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5725MHz~5850MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

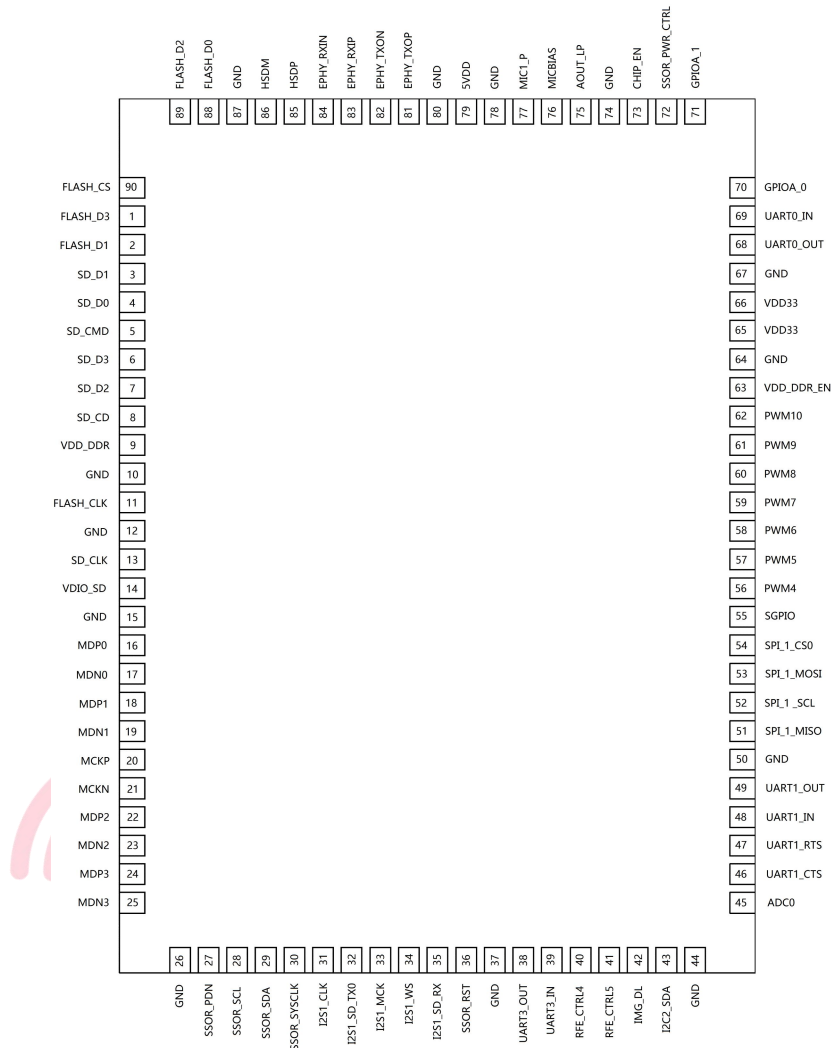
4.3 Bluetooth Specification

Feature	Description
General Specification	
Bluetooth Standard	LE(1Mbps),2LE(2Mbps)
Host Interface	UART
Frequency Band	2.4G~2.4835Ghz
Number of Channels	40 channels for BLE
Modulation	GFSK
RF Specification	
Output Power , tolerance ± 2 dB	
	CL1(dBm)
BLE Output Power	8
Sensitivity, tolerance : /	
Sensitivity @ BLE=30.8% for LE (1Mbps)	-89
Sensitivity @ BLE=30.8% for 2LE (2Mbps)	-88
Maximum Input Level	GFSK (1Mbps):-20dBm

5. Pin Definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	FLASH_D3	I/O	Flash Data Input (Data Input Output 3)	
2	FLASH_D1	I/O	Flash Data Input (Data Input Output 1)	
3	SD_D1	I/O	SD Data 1. Multiplexed with GPIOA_1.	
4	SD_D0	I/O	SD Data 0. Multiplexed with GPIOA_2.	

5	SD_CMD	I/O	SD Command. Multiplexed with GPIO5_3.	
6	SD_D3	I/O	SD Data 3. Multiplexed with GPIO5_5.	
7	SD_D2	I/O	SD Data 3. Multiplexed with GPIO5_5.	
8	SD_CD	I/O	SD Card Detection. Multiplexed with GPIO5_4.	
9	VDD_DDR	P	1.8V/1.35V power input	
10	GND	P	Ground connections	
11	FLASH_CLK	I	Flash Serial Clock Input	
12	GND	P	Ground connections	
13	SD_CLK	I	SD Bus clock. Multiplexed with GPIO5_0.	
14	VDIO_SD	P	I/O Voltage supply input	
15	GND	P	Ground connections	
16	MDP0	I	MIPI sensor lane0 differential data positive input.	
17	MDN0	I	MIPI sensor lane0 differential data negative input.	
18	MDP1	I	MIPI sensor lane1 differential data positive input.	
19	MDN1	I	MIPI sensor lane1 differential data negative input.	
20	MCKP	I	MIPI sensor differential clock positive input.	
21	MCKN	I	MIPI sensor differential clock negative input.	
22	MDP2	I	MIPI sensor lane2 differential data positive input.	
23	MDN2	I	MIPI sensor lane2 differential data negative input.	
24	MDP3	I	MIPI sensor lane3 differential data positive input.	
25	MDN3	I	MIPI sensor lane3 differential data negative input.	
26	GND	P	Ground connections	
27	SSOR_PDN	I/O	GPIO pin	
28	SSOR_SCL	I/O	GPIO pin	
29	SSOR_SDA	I/O	GPIO pin	
30	SSOR_SYSCLK	I/O	GPIO pin	
31	I2S1_CLK	I/O	GPIO pin	
32	I2S1_CD_TX0	I/O	GPIO pin	
33	I2S1_MCK	I/O	GPIO pin	
34	I2S1_WS	I/O	GPIO pin	
35	I2S1_SD_RX	I/O	GPIO pin	
36	SSOR_RST	I/O	GPIO pin	
37	GND	P	Ground connections	
38	UART3_OUT	O	UART Output	VDDIO
39	UART3_IN	I	UART Input	VDDIO
40	RFE_CTRL4	I/O	GPIO pin	
41	RFE_CTRL5	I/O	GPIO pin	

42	IMG_DL/ I2C2_ SCL	I/O	GPIO pin	
43	I2C2_ SDA	I/O	GPIO pin	
44	GND	P	Ground connections	
45	ADC0	I/O	GPIO pin	
46	UART1_ CTS	I/O	UART CTS,	VDDIO
47	UART1_ RTS	I/O	UART RTS,	
48	UART1_ IN	I	UART Input	VDDIO
49	UART1_ OUT	O	UART Output	VDDIO
50	GND	P	Ground connections	
51	SPI_1_ MISO	I/O	GPIO pin	
52	SPI_1_ SCL	I/O	GPIO pin	
53	SPI_1_ MOSI	I/O	GPIO pin	
54	SPI_1_ CS0	I/O	GPIO pin	
55	SGPIO	I/O	GPIO pin	
56	PWM4	I/O	PWM controllers generate pulse signals	
57	PWM5	I/O	PWM controllers generate pulse signals	
58	PWM6	I/O	PWM controllers generate pulse signals	
59	PWM7	I/O	PWM controllers generate pulse signals	
60	PWM8	I/O	PWM controllers generate pulse signals	
61	PWM9	I/O	PWM controllers generate pulse signals	
62	PWM10	I/O	PWM controllers generate pulse signals	
63	VDD_ DDR_ EN	I/O	GPIO pin	
64	GND	P	Ground connections	
65	VDD33	P	3.3V Voltage input	3.3V
66	VDD33	P	3.3V Voltage input	3.3V
67	GND	P	Ground connections	
68	UART0_ OUT	O	UART Output	VDDIO
69	UART0_ IN	I	UART Input	VDDIO
70	GPIOA_ 0	I/O	GPIO pin	
71	GPIOA_ 1	I/O	GPIO pin	
72	SSOR_ PWR_ CTRL	I/O	GPIO pin Shared with GPIOA_ 5 1: Enter into test/debug mode 0: Normal operation mode	
73	CHIP_ EN	I	Whole chip enable control , When asserted, chip function is enabled; when de-asserted, whole chip is shutdown	

74	GND	P	Ground connections	
75	AOUT_LP	O	Speaker output positive signal.	
76	MICBIAS	PO	Microphone bias output.	
77	MIC1_P	I	MIC input positive signal.	
78	GND	P	Ground connections	
79	5VDD	P	5.0V Voltage input	
80	GND	P	Ground connections	
81	EPHY_TXOP	I/O	GPIO pin	
82	EPHY_TXON	I/O	GPIO pin	
83	EPHY_RXIP	I/O	GPIO pin	
84	EPHY_RXIN	I/O	GPIO pin	
85	HSDP	I/O	USB positive differential data lines	
86	HS DM	I/O	USB negative differential data lines	
87	GND	P	Ground connections	
88	FLASH_D0	I/O	Flash Data Input (Data Input Output 0)	
89	FLASH_D2	I/O	Flash Data Input (Data Input Output 2)	
90	FLASH_CS	I	Flash Chip Select Input	

P:POWER I:INPUT O:OUTPUT

6. Electrical Specifications

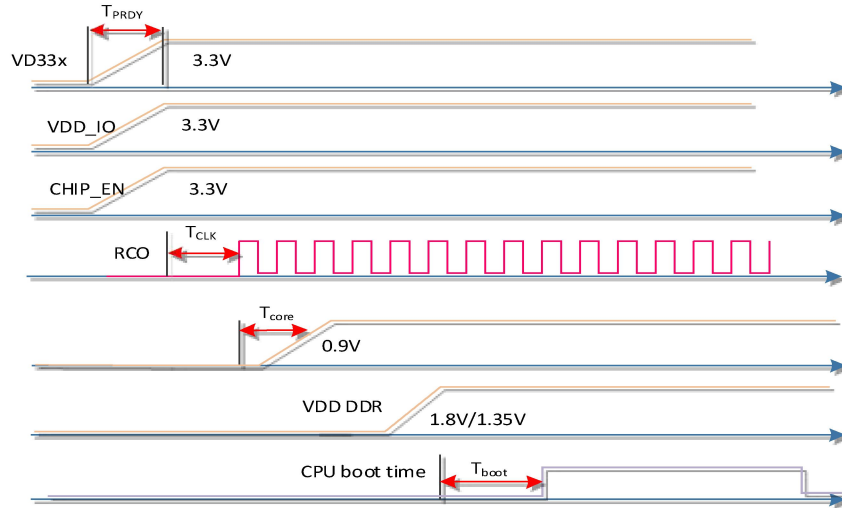
6.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	-20	25	85	deg.C
VDD33	3.0	3.3	3.6	V

6.2 Interface Circuit time series

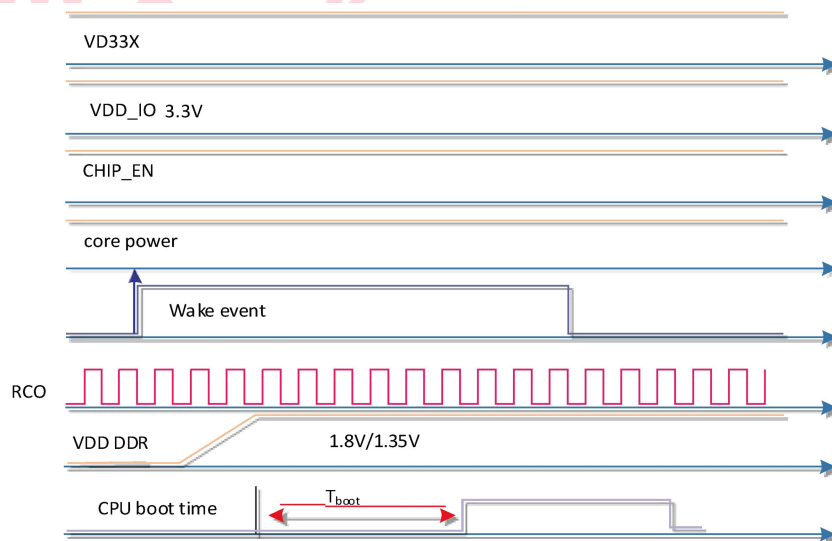
6.2.1 Power On or Resuming from Deep Sleep Sequence

The timing sequence of Power On or Resuming from Deep Sleep is given in Figure 22.



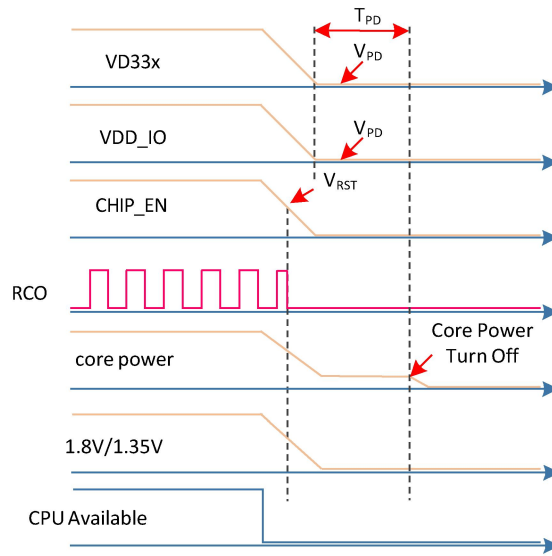
Symbol	Parameter	Min	Typ.	Max	Units
T_{PRDY}	VD33x Ready Time	0.6	-	5	ms
T_{CLK}	Internal ring clock stable time after VD33 ready	1	-	-	ms
T_{core}	Core Power Ready Time	-	1.5	-	ms
T_{boot}	CPU Boot Time	200	-	-	ms

6.2.2 Resume from Standby Mode Sequence



Symbol	Parameter	Min	Typ.	Max	Units
T_{boot}	CPU Boot Time	200	-	-	ms


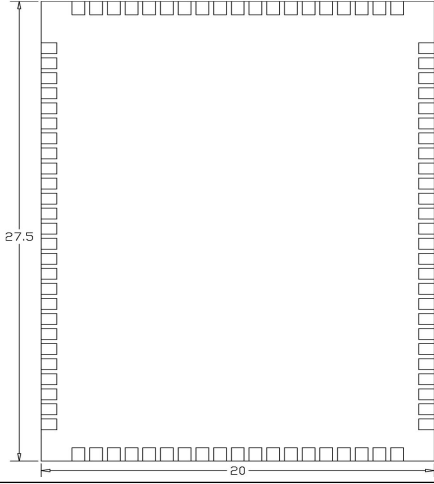
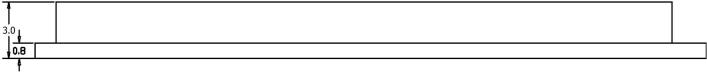
6.2.3 Power Off Sequence



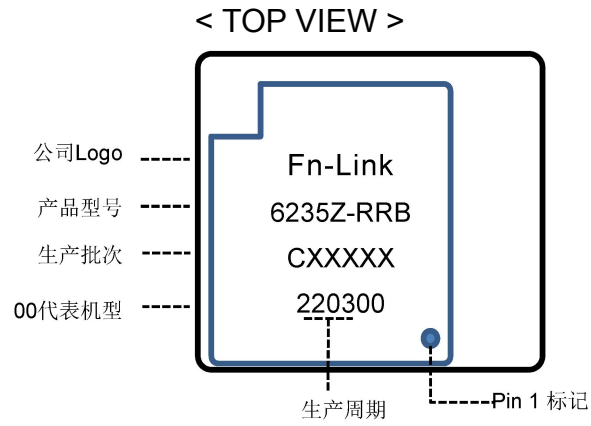
Symbol	Parameter	Min	Typ.	Max	Units
V _{RST}	Shutdown occurs after CHIP_EN lower than this voltage	-	0.8	-	V
V _{PD}	The required voltage of CHIP_EN/VDD33x/ VDD_IO for power down state.	0	0	0.08	V
T _{PD}	The require time that CHIP_EN/VDD33x/ VDD_IO lower than V _{PD}	1	-	-	ms

7. Size reference

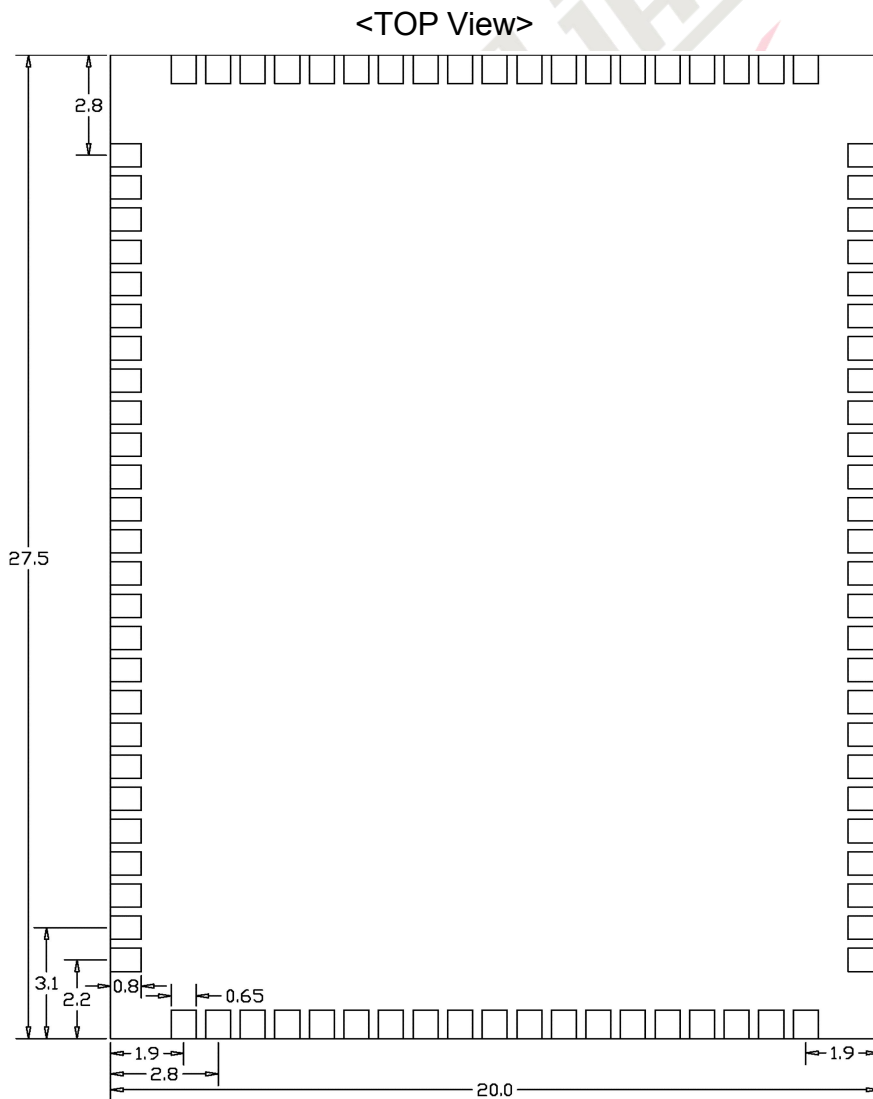
7.1 Module Picture

<p>L x W : 20 x 27.5 (+0.3/-0.1) mm</p> 	
<p>H: 3.0 (±0.2) mm</p>	
<p>Weight</p>	<p>TBD</p>

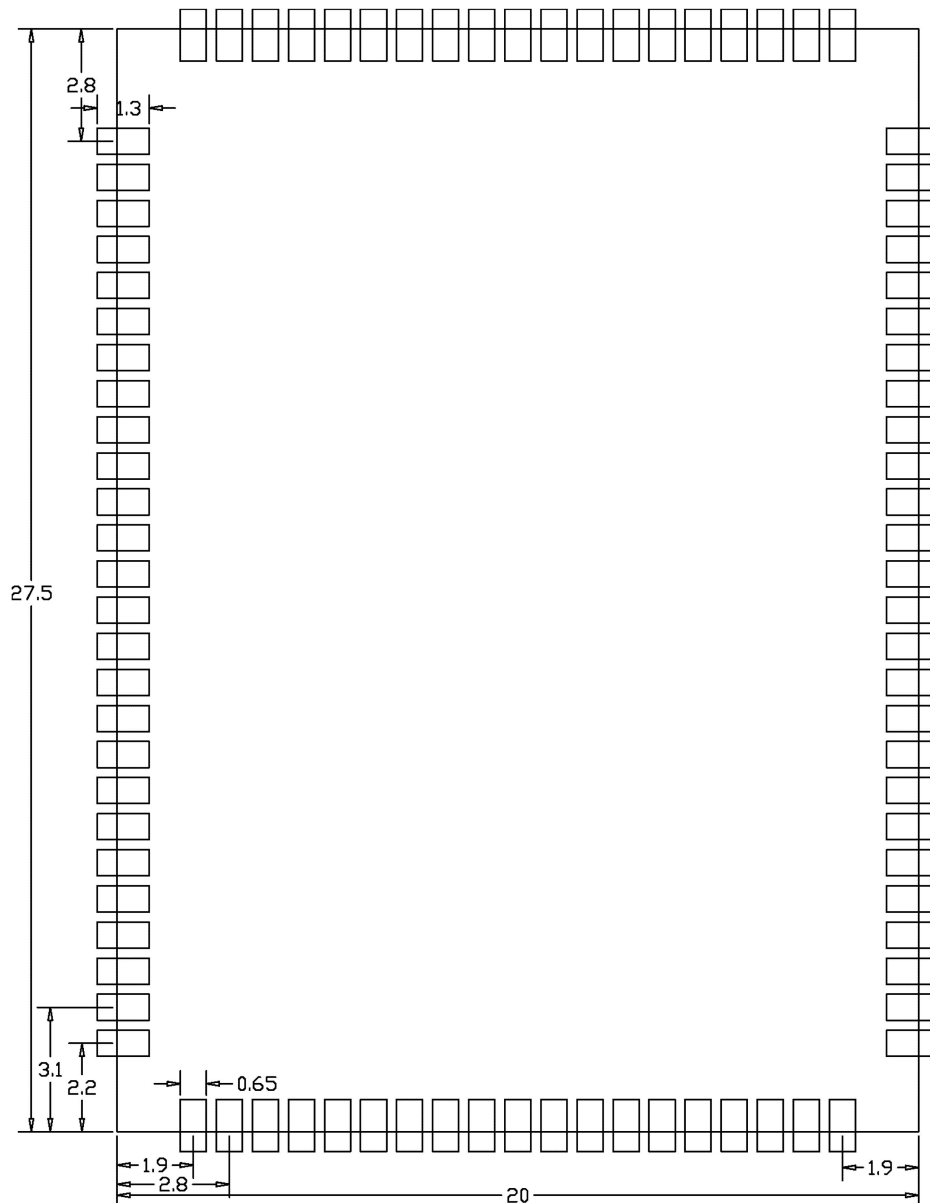
7.2 Marking Description



7.3 Physical Dimensions



7.4 Layout Recommendation



8. The Key Material List

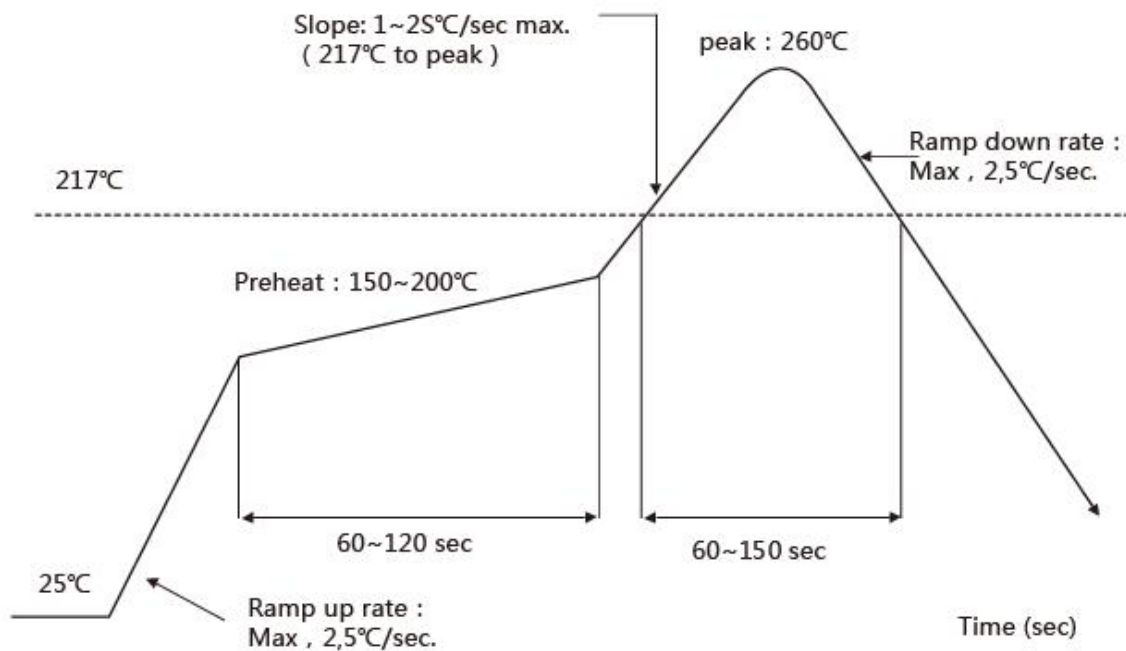
Item	Part Name	Description	Manufacturer
1	PCB	6235Z-RRB 4L FR4 27.50x20.0*0.8mm	XY-PCB, GDKX, Sunlord, SLPCB
2	Crystal	2016 40MHz ±10ppm 12pF	ECEC, Hosonic, TKD, JWT
3	Chipset	RTL8735BDM,QFN128	REALTEK
4	Shielding	6235Z-RRB Shielding	信太, 精力通
5	IPEX	4代,TA-RF03-001-03-811	佳沃

9. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <math><260^{\circ}\text{C}</math>

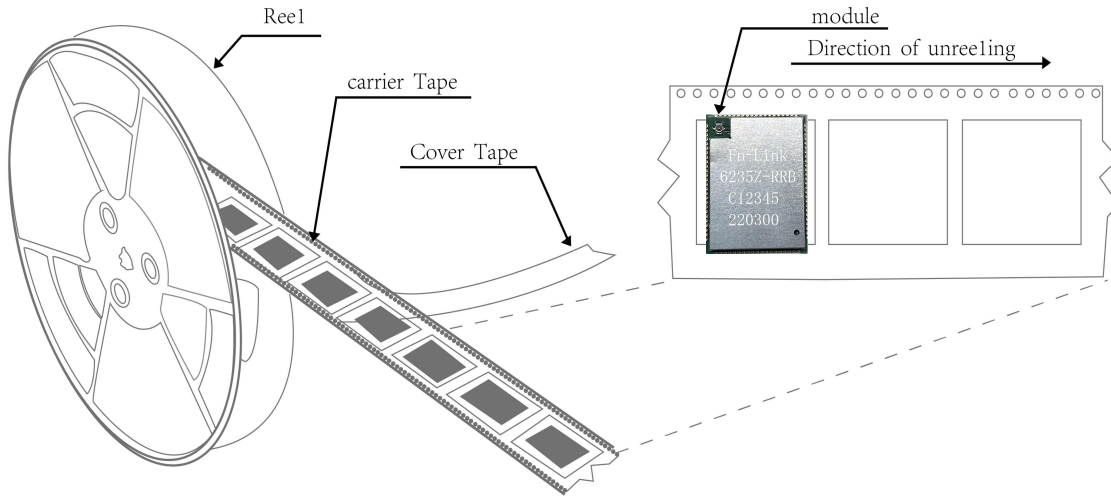
Number of Times : ≤ 2 times



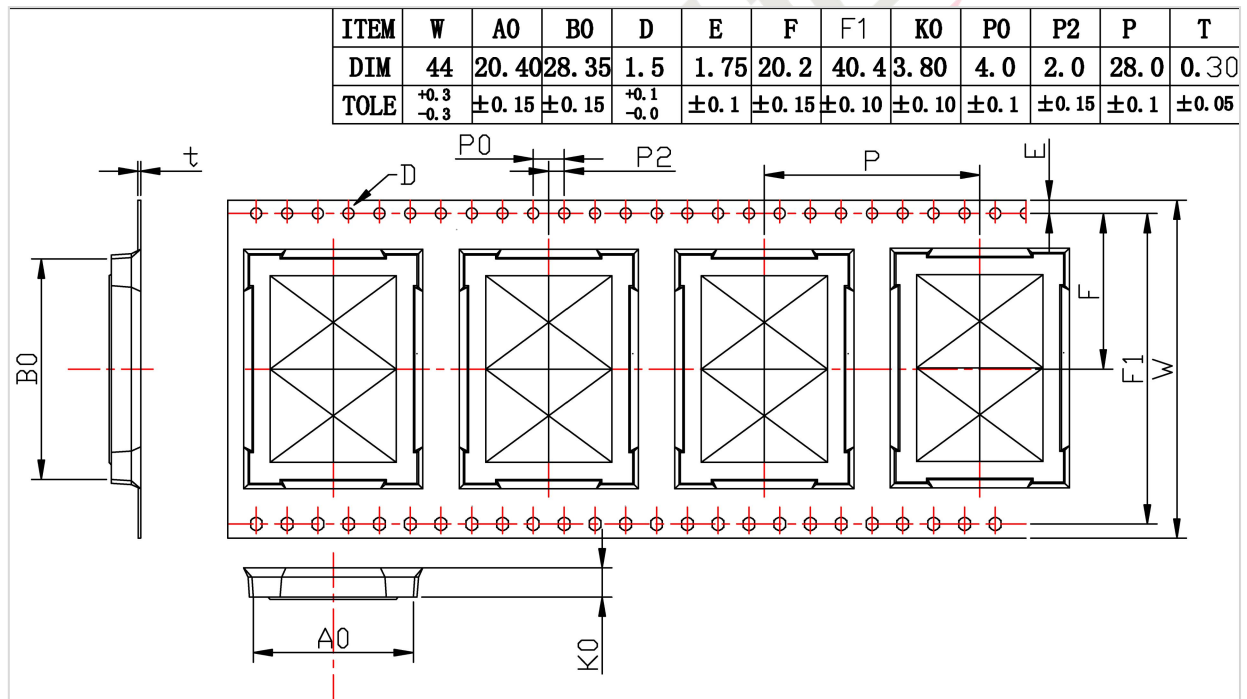
10. Package

10.1 Reel

A roll of 500pcs



10.2 Carrier Tape Detail



10.3 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape: 44mm*15.2m the cover tape :37.5mm*32.6m

Color of plastic disc: blue



NY bag size:500mm*420mm



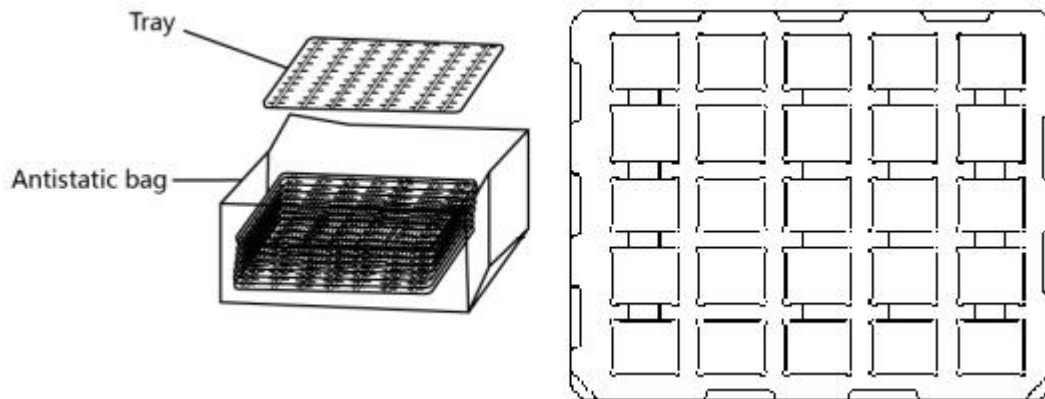
size : 335*335*55mm



The packing case size:360*210*370mm

10.4 Tray

Use pallet packaging for less than 300 pieces



11. 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 $<40^{\circ}\text{C}$ 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