正基科技股份有限公司

SPECIFICATION

SPEC. NO.： ________________ REV： 0.8

DATE： 2015/12/29

PRODUCT NAME： WSDB-750GN_A

Customer APPROVED	
Company	
Representative Signature	

PREPARED	REVIEW		APPROVED	DCC ISSUE
	PM	QA		

AMPAK

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WSDB-750GN_A

Wi-Fi 802.11b/g/n+MCU

Revision History

Date	Revision Content	Revised By	Version
2014/10/08	-Preliminary Specification	Rue	0.0
2014/11/27	-Modify General Specification -Modify Pin Assignments - Dimensions -Add RF path setting and Antenna configuration	Rue	0.1
2015/3/13	-Modify Pin Assignments	Ric	0.2
2015/3/30	-Pin Description(19)	Ric	0.3
2015/4/14	-Modify Power Consumption - Add PCB Pin Outline	Ric	0.4
2015/5/25	-Modify RF Path Settings	Ric	0.5
2015/6/24	-Add Package Information	Ric/Kevin	0.6
2015/12/03	-Add reflow recommendation	Ric	0.7
2015/12/29	-Modify reflow recommendation -Add PCB pad design reference	Ric	0.8

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1. Introduction

AMPAK Technology likes to announce a low-cost and low-power consumption module which has Wi-Fi 802.11b/g/n functionalities. The highly integrated WSDB-750GN module makes the possibilities of web browsing, all types of battery powered device. With seamless roaming capabilities and advanced security, WSDB-750GN can also interact with different vendors' 802.11b/g/n Access Points in the wireless LAN.

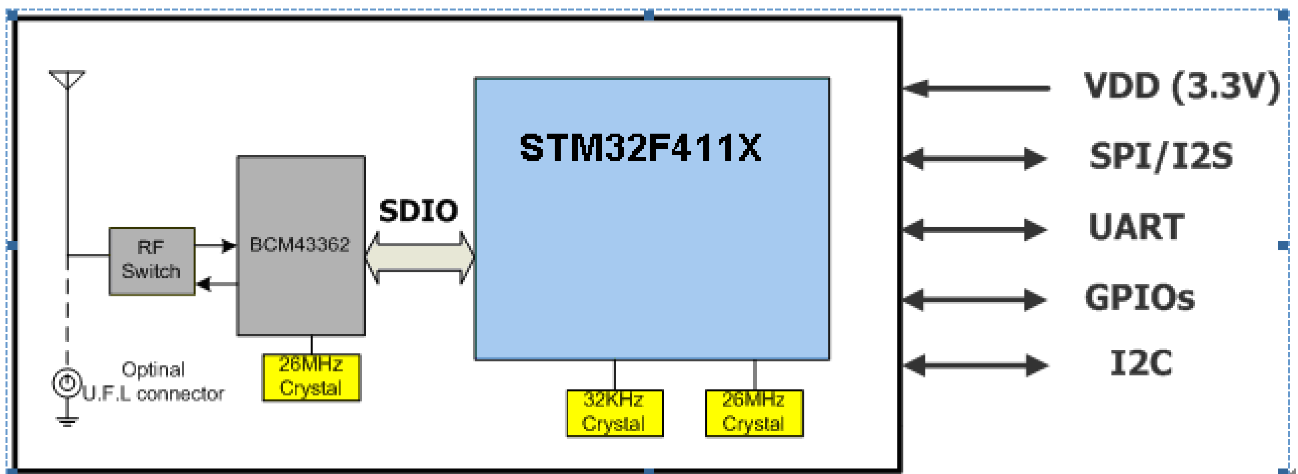
The wireless module complies with IEEE 802.11 b/g/n standard and it can achieve up to a speed of 72.2Mbps with single stream in 802.11n draft 7.0, 54Mbps as specified in IEEE 802.11g, or 11Mbps for IEEE 802.11b to connect to the wireless LAN.

This compact module is a total solution for a combination of Wi-Fi 802.11b/g/n technologies with Microcontroller Processor. The module is specifically developed for embedded system devices.

2.Features

- Single-band 2.4GHz IEEE 802.11b/g/n
- Supports standard interfaces SDIO v2.0
- Integrated ARM Cortex-M4™ CPU with on-chip memory enables running IEEE802.11 firmware that can be field-upgraded with future features.
- Lead-Free / RoHS
- Single power supply voltage 3.3V.
- Security:
  - Hardware WAPI acceleration engine
  - AES and TKIP in hardware for faster data encryption and IEEE 802.11i compatibility
  - WPA™ – and WPA2™ - (Personal) support for powerful encryption and authentication

A simplified block diagram of the module is depicted in the figure below.



3.General Specification

3.1 General Specification

Model Name	WSDB-750GN_A
Product Description	Wi-Fi 802.11b/g/n + MCU Module
Dimension	16 mm x 32 mm x 3.1mm ±0.5mm
Module Interface	SPI/JTAG/UART/USB/I2C/I2S
Operating temperature	-20°C to 70°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95%

3.2 Voltages

3.2.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VDD_3V3	Power supply for SIP Module	-0.4	3.7	V

3.2.2 Recommended Operating Ratings

Symbol	Min.	Typ.	Max.	Unit
VDD_3V3	3.0	3.3	3.6	V

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4.WiFi RF Specification

4.1 RF Specification

Conditions : VDD=3.3V ; Temp:25°C

Feature	Description
WLAN Standard	IEEE 802.11b/g/n, WiFi compliant
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)
Number of Channels	2.4GHz：Ch1 ~ Ch14
Modulation	802.11b : CCK, DQPSK, DBPSK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11b /11Mbps : 15 dBm , typical @ EVM ≤ -9dB
	802.11g /54Mbps : 13 dBm , typical @ EVM ≤ -25dB
	802.11n /65Mbps : 12 dBm , typical @ EVM ≤ -28dB
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -85dBm, typical
	- MCS=1 PER @ -84dBm, typical
	- MCS=2 PER @ -82dBm, typical
	- MCS=3 PER @ -80dBm, typical
	- MCS=4 PER @ -77Bm, typical
	- MCS=5 PER @ -73 dBm, typical
	- MCS=6 PER @ -71 dBm, typical
	- MCS=7 PER @ -69 dBm, typical
Receive Sensitivity (11g) @10% PER	- 6Mbps PER @ -86Bm, typical
	- 9Mbps PER @ -85dBm, typical
	- 12Mbps PER @ -85dBm, typical
	- 18Mbps PER @ -83dBm, typical
	- 24Mbps PER @ -81dBm, typical
	- 36Mbps PER @ -78Bm, typical
	- 48Mbps PER @ -73dBm, typical
	- 54Mbps PER @ -72dBm, typical
Receive Sensitivity (11b) @8% PER	- 1Mbps PER @ -90dBm, typical
	- 2Mbps PER @ -89Bm, typical
	- 5.5Mbps PER @ -88 dBm, typical
	- 11Mbps PER @ -85 dBm, typical
Data Rate	802.11b : 1, 2, 5.5, 11Mbps
	802.11g : 6, 9, 12, 18, 24, 36, 48, 54Mbps

Data Rate (20MHz ,Long GI,800ns)	802.11n: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps
Data Rate (20MHz ,short GI,400ns)	802.11n : 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65,72.2Mbps
Maximum Input Level	802.11b : -10 dBm
	802.11g/n : -20 dBm
Antenna Reference	Internal Printed ANT :Small antennas with 0~2 dBi peak gain

4.2 Power Consumption

Conditions: VDD=3V3 ; Temp:25°C

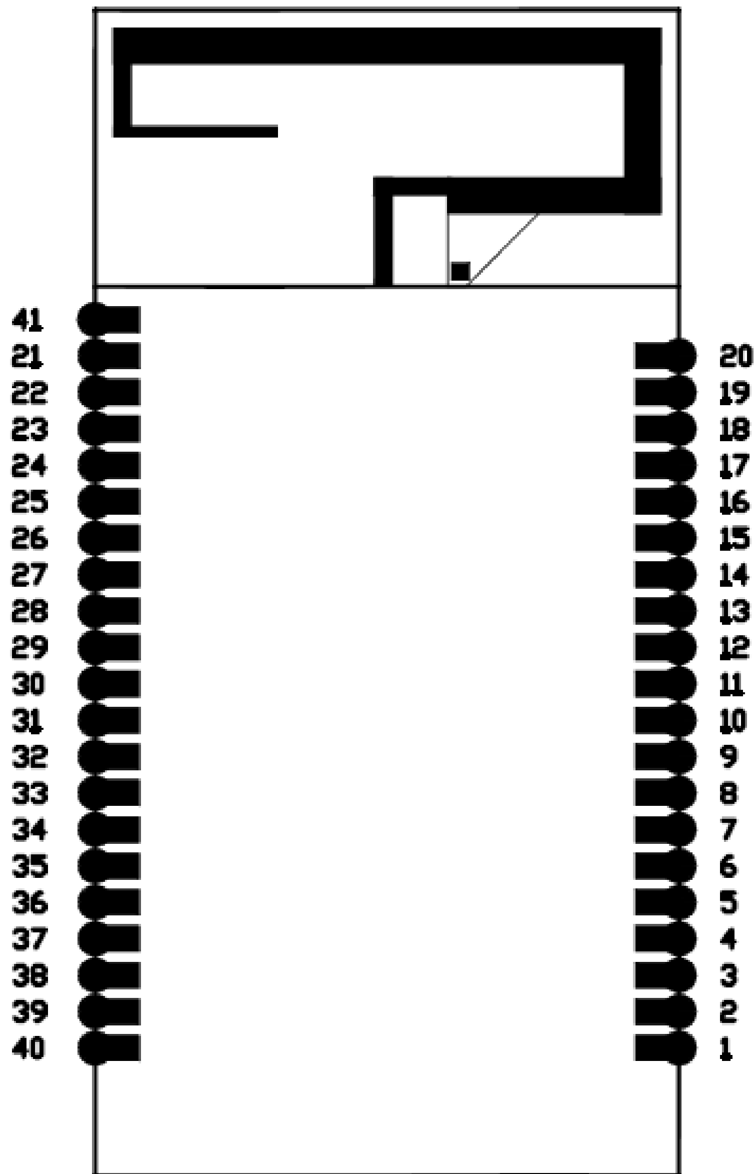
Mode	**Description**	**Min.**	**Typ.**	**Max.**	**Unit**
802.11B	TX 11Mbps @ 15 dBm		300		mA
	RX 11Mbps @ -85dBm		108		mA
802.11G	TX 54Mbps @ 13 dBm		230		mA
	RX 54Mbps @ -72dBm		108		mA
802.11N	TX 65Mbps @ 12 dBm		220		mA
	RX 65Mbps @ -69dBm		108		mA
Low power consumption					
Mode			Consumption		
Stop (PM1&DTIM3)			1.5mA		
Stop (PM1&DTIM2)			2.1mA		
Stop (PM1&DTIM1)			3.3mA		
Idle			500uA		
Stop*			40uA		

Stop*:RTC enable, GPIO& CLK disable , MCU Flash&SPI-Flah DeepPowerMode,

5.Pin Assignments

5.1 PCB Pin Outline

(TOP View)



5.2 Pin Description

This is original define. More Alternate function mapping reference to table 1

No	Name	Type	Description
1	NC	I/O	No function
2	PB2	I/O	GPIO PIN
3	NC	I/O	No function
4	SPI1_MOSI/PA7	I/O	SPI_MOSI
5	NC	I/O	No function
6	SPI1_SCK/PB3	I/O	SPI_SCK
7	SPI1_MISO/PB4	I/O	SPI_MISO
8	UART2_TX/PA2	I/O	UART transmit output/Debug port
9	PA1	I/O	GPIO PIN
10	VBAT	I	MCU operating voltage input (power supply for RTC, external clock, 32 kHz oscillator and backup registers (through power switch) when VDD is not present.)
11	NC	I/O	No function
12	UART2_RX/PA3	I/O	UART receive input/Debug port
13	MICRO_RST_N	I/O	MCU Reset
14	WAKE_UP	I/O	Wake up
15	NC	I/O	No function
16	PC13	I/O	GPIO PIN
17	I2C2_SCL/PB10	I/O	I2C_SCL
18	I2C2_SDA/PB9	I/O	I2C_SDA
19	PB12	I/O	GPIO
20	GND	—	Ground
21	GND	—	Ground
22	NC	I/O	No function
23	NC	I/O	No function
24	NC	I/O	No function
25	SWD_TCK/PA14	I/O	SWD_TCK
26	SWD_TMS/PA13	I/O	SWD_TMS
27	PA12	I/O	GPIO PIN
28	NC	I/O	No function

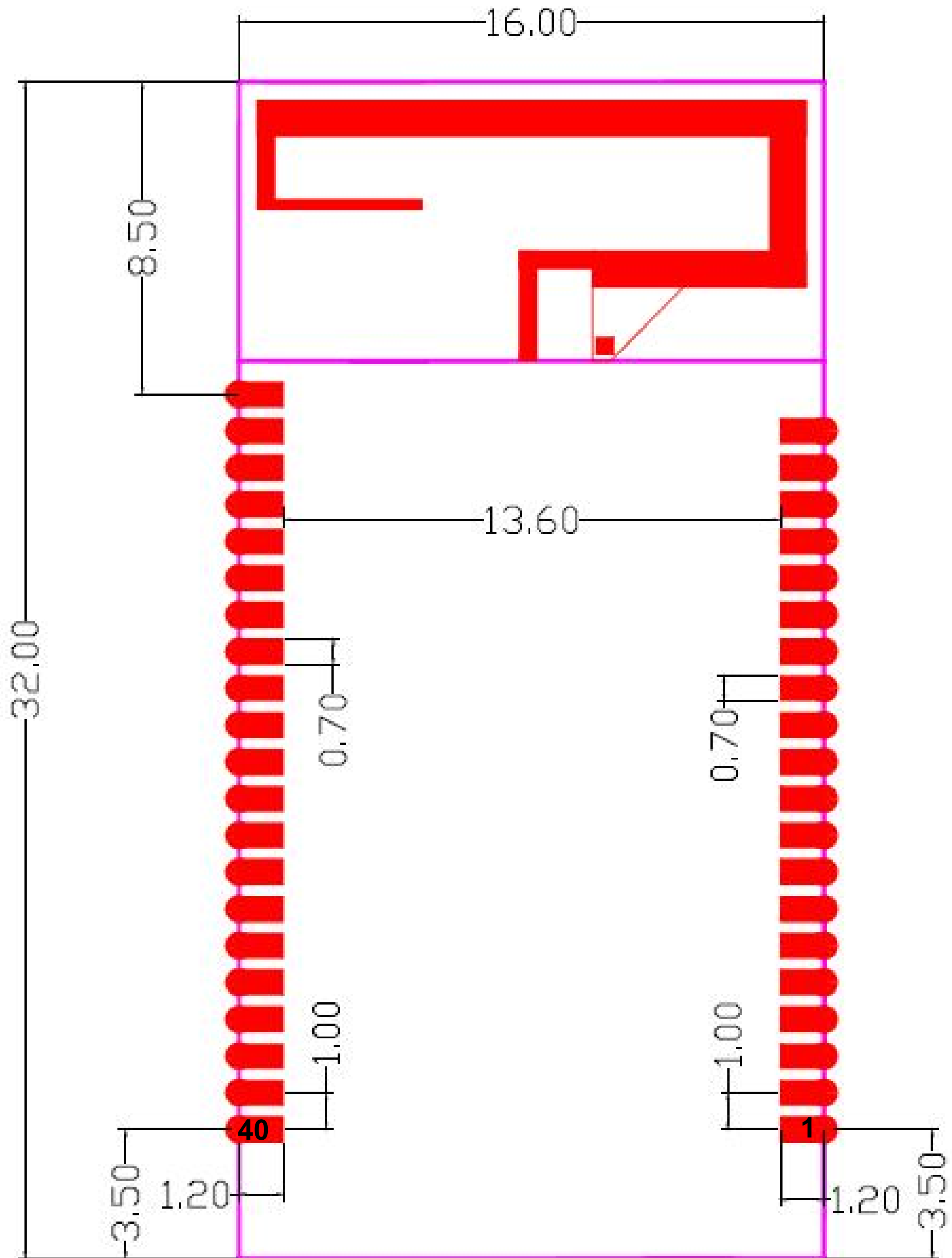
29	PA10	I/O	GPIO PIN
30	PB6	I/O	GPIO PIN
31	PB8	I/O	GPIO PIN
32	NC	I/O	No function
33	PB13	I/O	GPIO PIN
34	PA5	I/O	GPIO PIN
35	PA11	I/O	GPIO PIN
36	PB1	I/O	GPIO PIN
37	PB0	I/O	GPIO PIN
38	PA4	I/O	GPIO PIN
39	VDD_3V3	V	Power supply input
40	VDD_3V3	V	Power supply input
41	ANT	O	RF OUTPUT(option)

Alternate function Table 1

750 pin number		SWD	I2C2/I2C3	SPI1/I2S1/I2S3	I2S3/SPI4/I2S4/SPI5/I2S5	I2S3/USART1/ USART2	USART6	USB
2	PB2							
4	PA7			SPI1_MOSI/I2S1_SD				
6	PB3		I2C2_SDA	SPI1_SCK/I2S1_CK	I2S3_CK			
7	PB4		I2C3_SDA	SPI1_MISO		I2S3ext_SD		
8	PA2			I2S2_CKIN		USART2_TX		
9	PA1			SPI4_MOSI/I2S4_SD		USART2_RTS		
10	VBAT							
12	PA3			I2S2_MCK		USART2_RX		
16	PC13							
17	PB10			I2S2_CK	I2S3_MCK			
18	PB9		I2C2_SDA	I2S2_WS				
19	PB12		I2C2_SMBA	I2S2_WS	SPI4_NSS/I2S4_WS	I2S3_CK		
25	PA14	SWDCLK						
26	PA13	SWDIO						
27	PA12		I2C3_SMBA		SPI5_MISO	UART1_RTS	USART6_RX	USB_FS_DP
29	PA10				SPI5_MOSI/I2S5_SD	UART1_RX		USB_FS_ID
30	PB6					UART1_TX		
31	PB8		I2C3_SDA		SPI5_MOSI/I2S5_SD			
33	PB13			I2S2_CK	SPI4_SCK/I2S4_CK			
34	PA5			SPI1_SCK/I2S1_CK				
35	PA11		I2C3_SCL		SPI4_MISO	UART1_CTS	USART6_TX	USB_FS_DM
36	PB1				SPI5_NSS/I2S5_WS			
37	PB0				SPI5_SCK/I2S5_CK			
38	PA4			SPI1_NSS/I2S1_WS	I2S3_WS	USART2_CK		

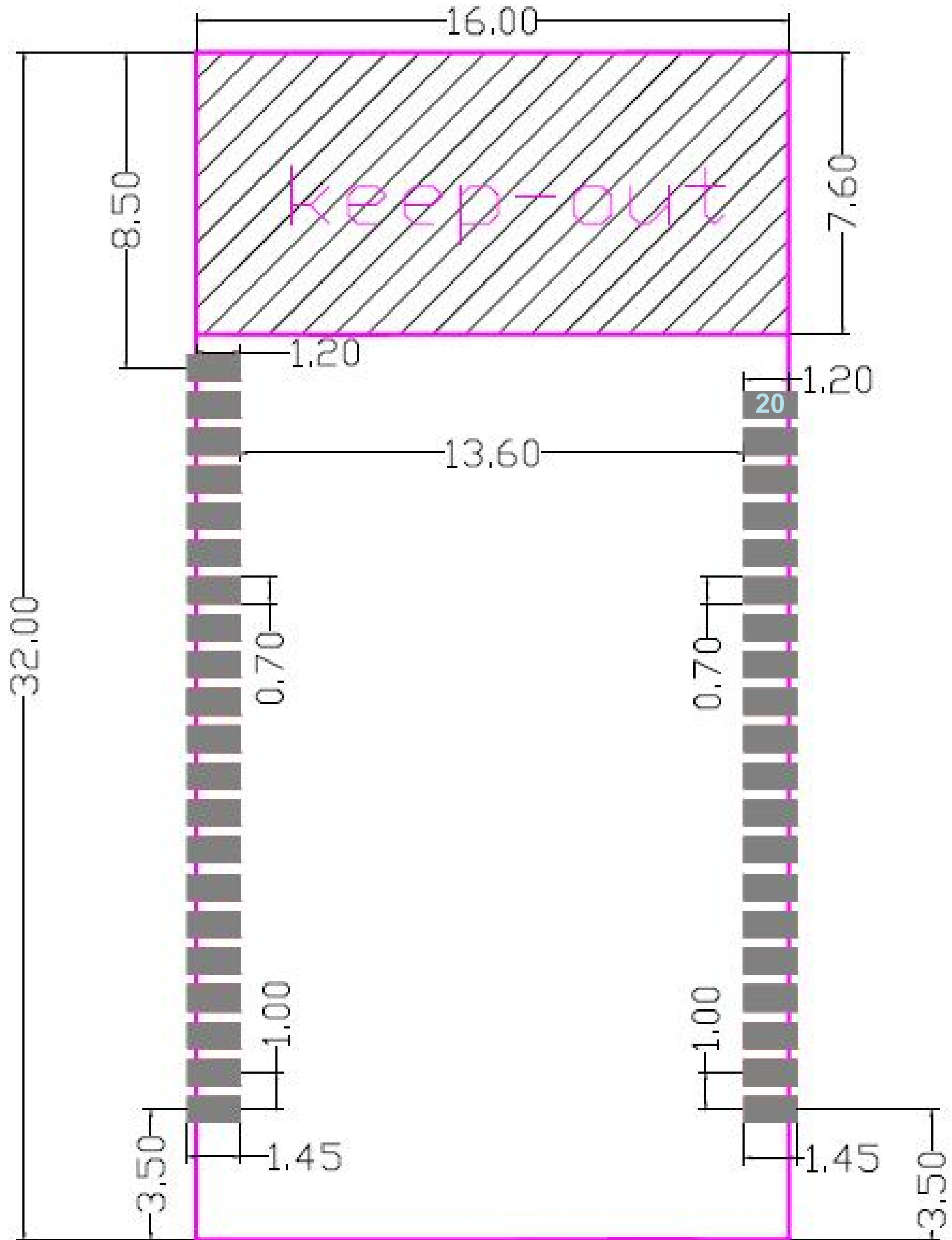
6.Dimensions

6.1 Physical Dimensions



6.2 Layout Recommendation

(TOP View) Unit:mm

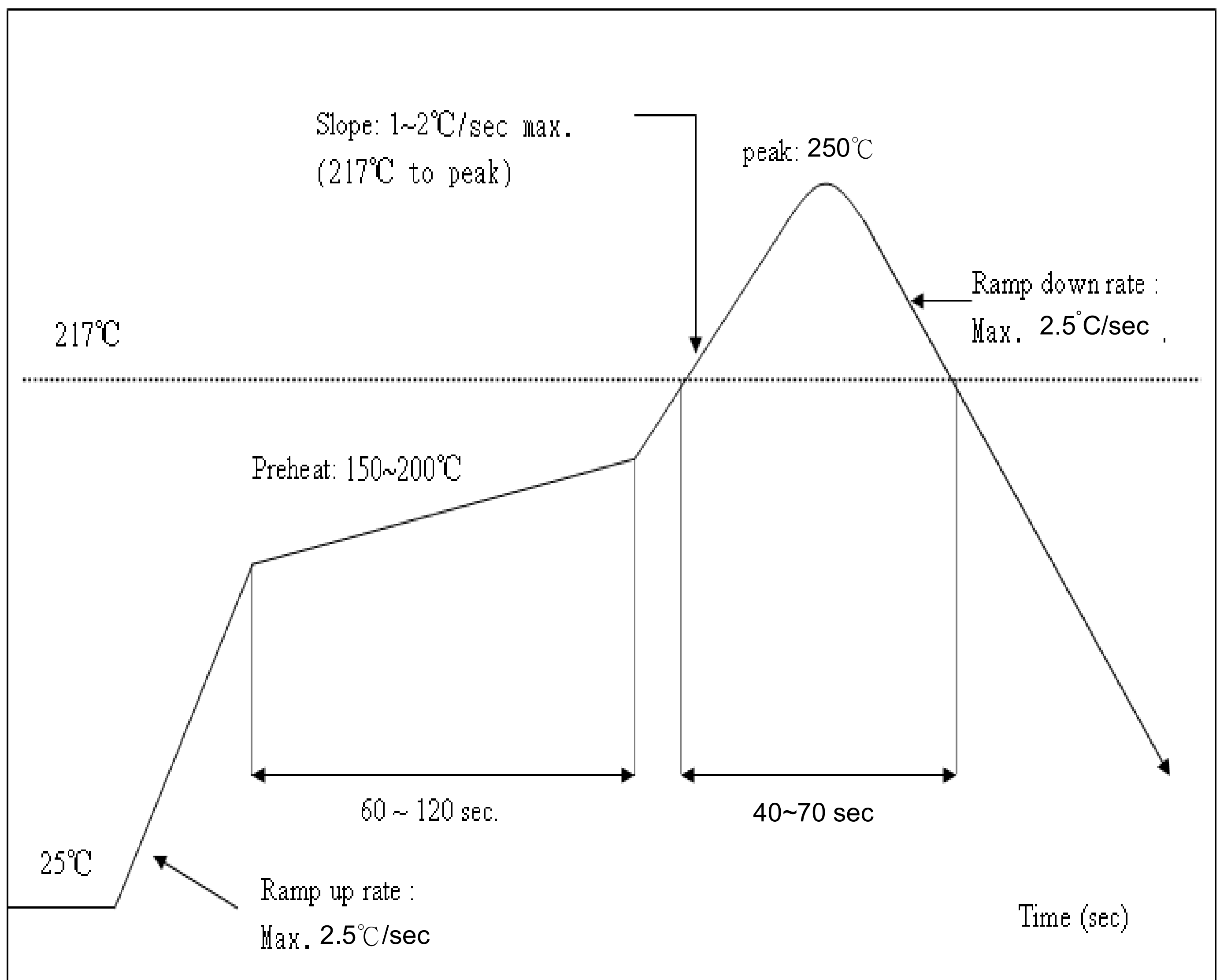


7.Recommended Reflow Profile

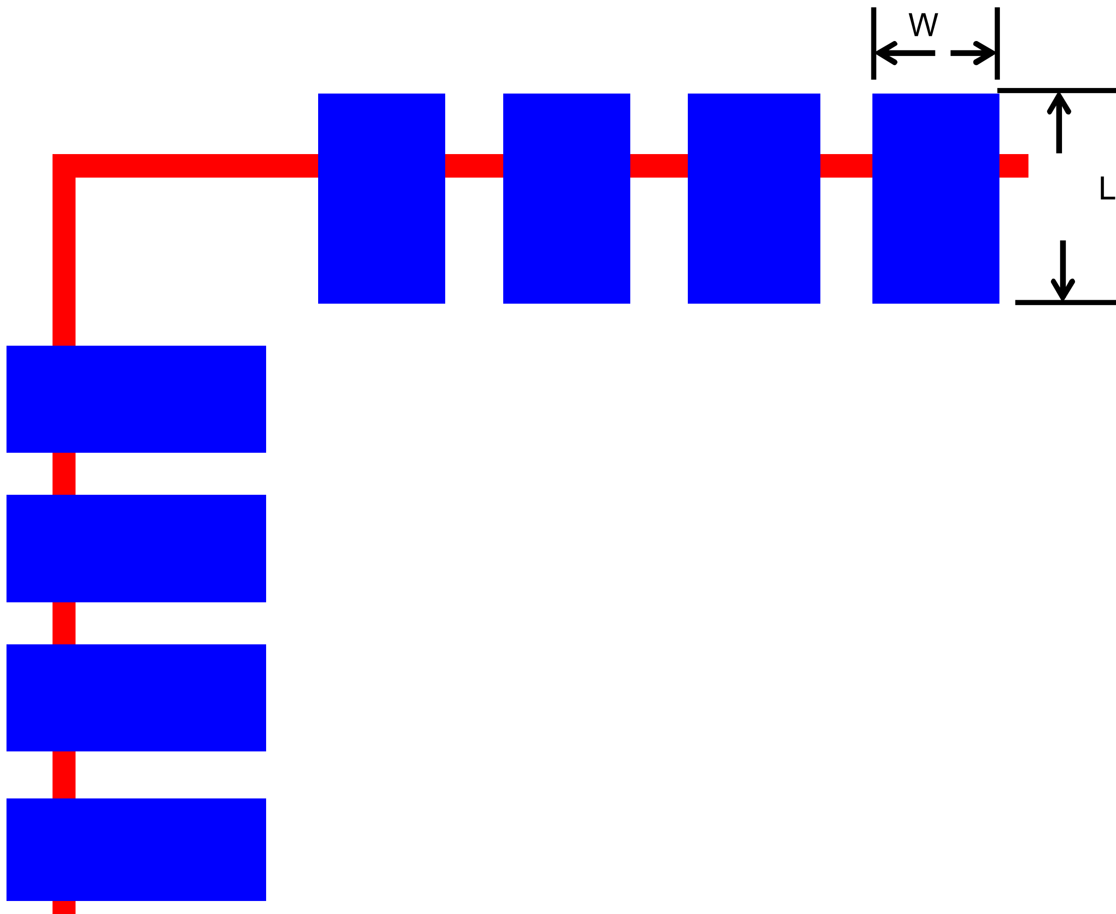
Referred to IPC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : ≤2 times

reflow 時需使用 N2, 含氧量建議 5000 ppm 以下 ，焊接可接受參考 IPC-610 的 Class2 規格

It must use N2 for reflow and suggest the concentration of oxygen less than 5000 ppm,
Soldering acceptability reference IPC-610 Class2 specification.



8. PCB pad design reference



- 模块规格 W 0.6mm *L 1.2mm Pitch 1mm
- PCB Pad 建议设计 W 0.7mm *L 1.45mm，且周边 1mm~1.5mm 区域考虑不放置零件以利外加锡量。
- 钢网建议厚度为 0.12mm~0.15mm，W 0.6~0.65mm * L 1.6~1.7mm
- 因为模块需要侧面爬锡，当钢网厚度越薄外加锡量需越多，需依实际生产状态评估，当使用钢网 0.08mm 或 0.1mm 且外加可能性低时则必须考虑局部加厚钢网的设计。
- 钢网设计主要以增加爬锡的焊锡膏量考。

- Module Specifications : W:0.6mm * L: 1.2mm pitch 1 mm
- The proposed design W:0.7 * L:1.45mm. Consider not place other parts in the peripheral area of 1 mm ~ 1.5 mm to facilitate additional amount of solder for PCB pad.
- We Suggest the thickness of Stencil between 0.12 mm ~0.15mm, the W between 0.6~0.65mm and the L between L1.6~1.7mm.
- If the thickness of the stencil is thinner, we suggest to adding more solder, to increase the wetting ability. Depends on different production situation, if the stencil thickness is 0.08~0.1mm, and the module nearby area is no more space for expending soldering area, we will suggest to increase the stencil thickness to increase the wetting ability.
- The major consideration parts of stencil design is to increase the solder paste wetting ability.

9.RF path setting and Antenna configuration

9.1 RF path setting

WSDB-750GN_A remains R14 the internal printed ANT. R14 is 0 ohm.

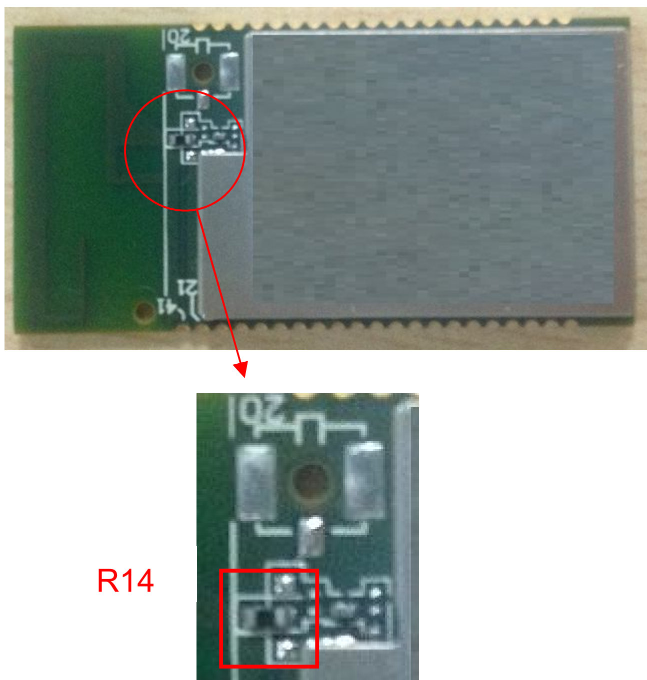
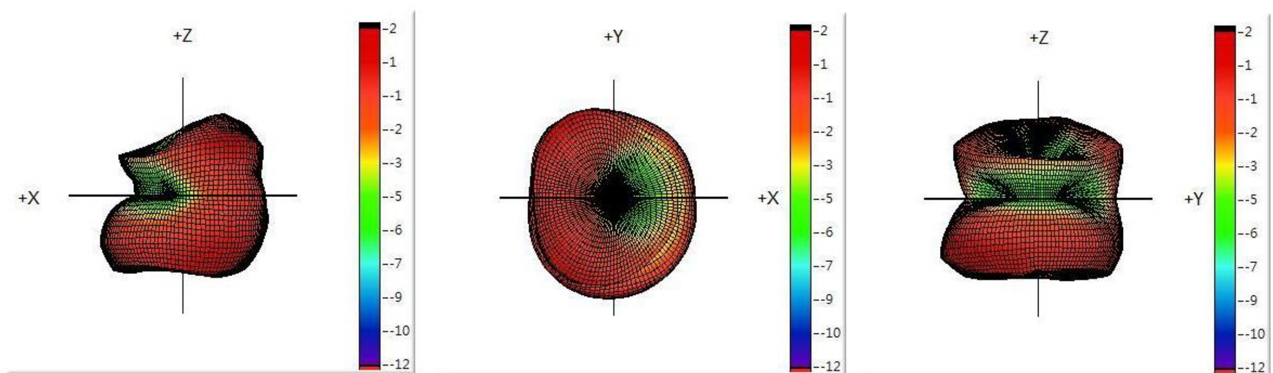


Figure2. R14 tie direction

9.2 Antenna configuration



3D Peak Gain: 2.0 dBi

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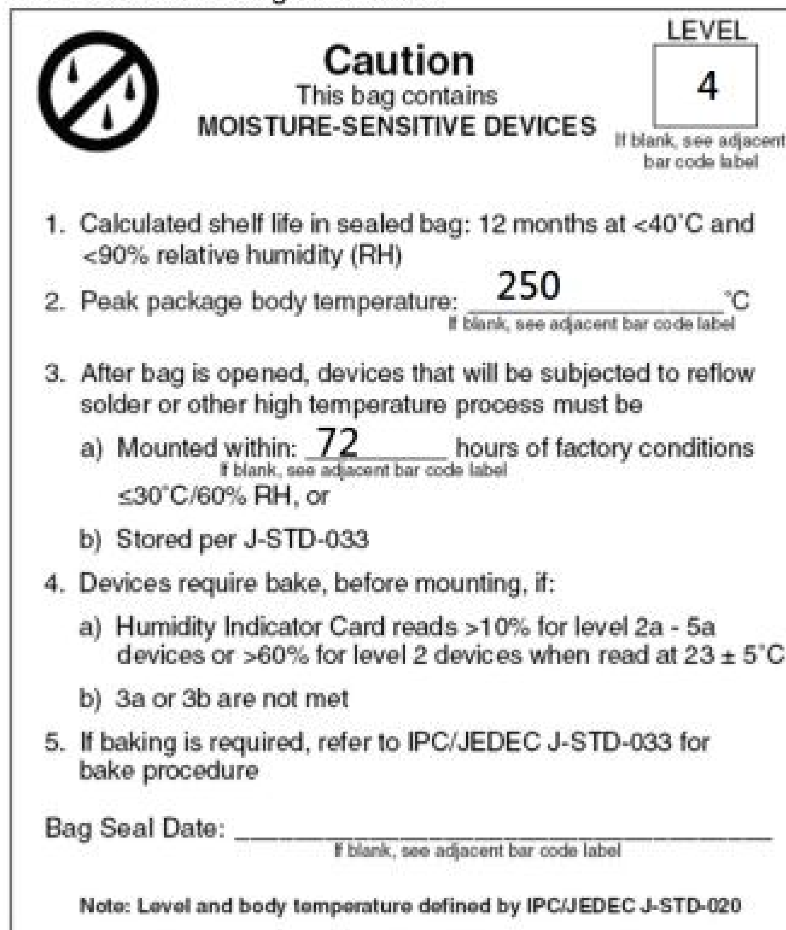
10. Package Information

1. Label

Label A→ Anti-static and humidity notice

Label B→ MSL caution / Storage Condition



Caution

This bag contains

MOISTURE-SENSITIVE DEVICES

LEVEL

4

If blank, see adjacent bar code label

1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
2. Peak package body temperature: 250 °C
   If blank, see adjacent bar code label
3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be
   a) Mounted within: 72 hours of factory conditions
   If blank, see adjacent bar code label
   ≤30°C/60% RH, or
   b) Stored per J-STD-033
4. Devices require bake, before mounting, if:
   a) Humidity Indicator Card reads >10% for level 2a - 5a devices or >60% for level 2 devices when read at 23 ± 5°C
   b) 3a or 3b are not met
5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure

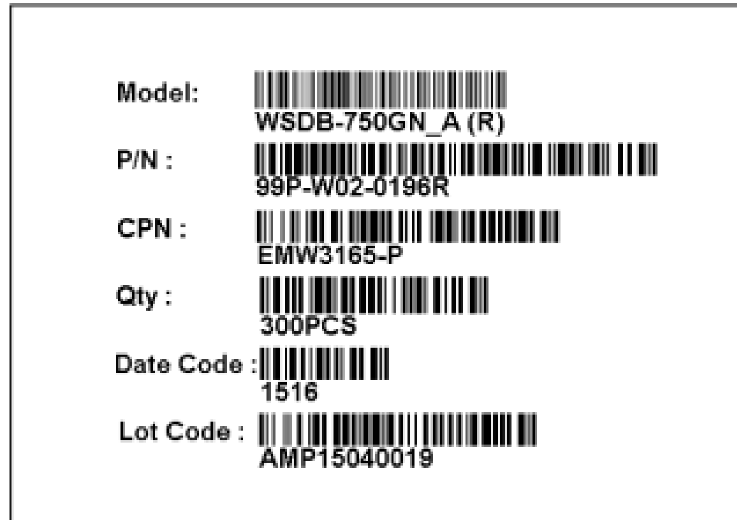
Bag Seal Date: ______________________

If blank, see adjacent bar code label

Note: Level and body temperature defined by IPC/JEDEC J-STD-020

※NOTE : Accumulated baking time should not exceed 8hrs

Label C→ Inner box label . Follow customer spec.



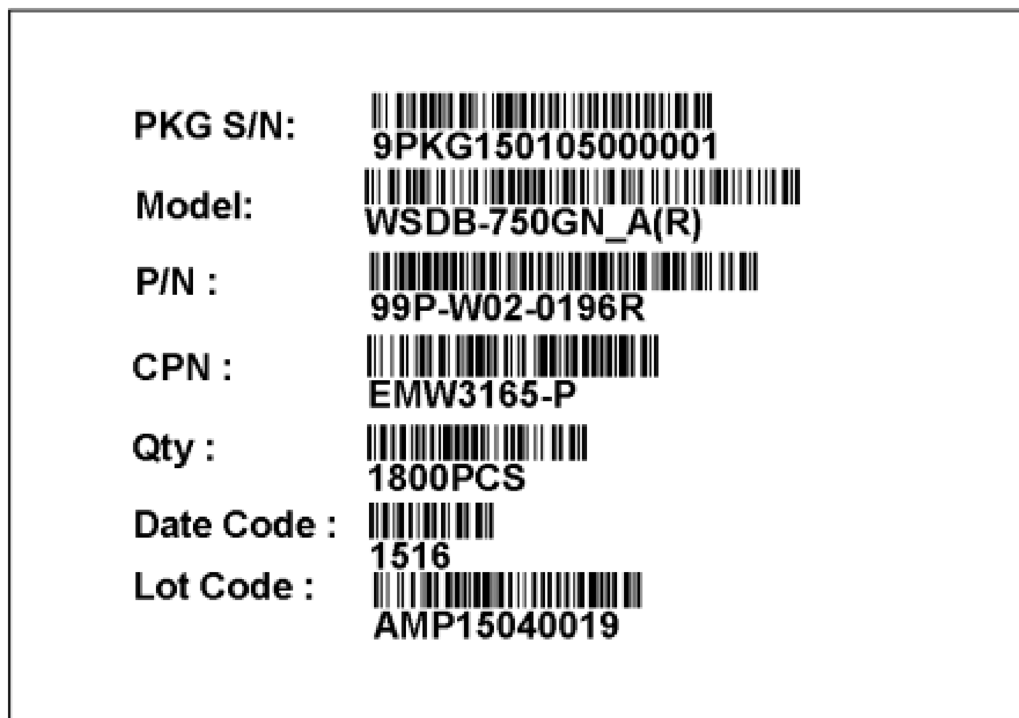
CPN: EMW3165 是客戶定義，-P 是 WSDB-750GN

Date code 依YYWW 編碼，YY=西元年後兩碼(00~ 99)，WW=WEEK(01~ 53)

ex.: 2014 年 W51 製作，以 1451 表示。

Lot Code: 客戶端無定義編碼原則，採用 99 階工單號碼為 Lot Code

Label D→ Carton box label . Follow customer spec



依客戶定義PKG S/N規則輸入

 # Ampak PKG S/N (15碼) naming rule:

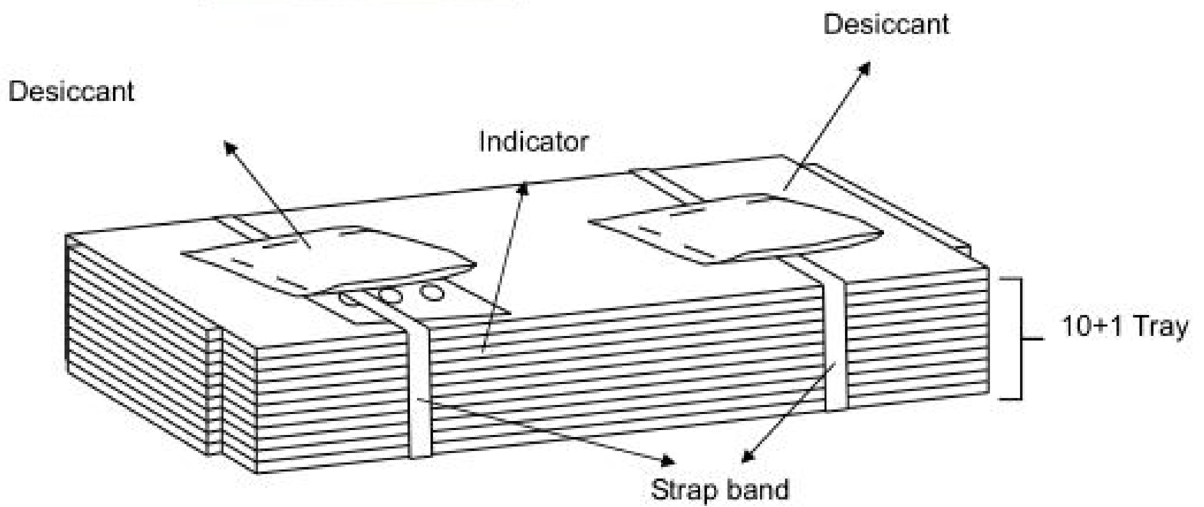
Format: 9PKGYYMMDDnnnnn

→9PKG= Fixed; 固定不變

→YYMMDD = packing date; 包裝日

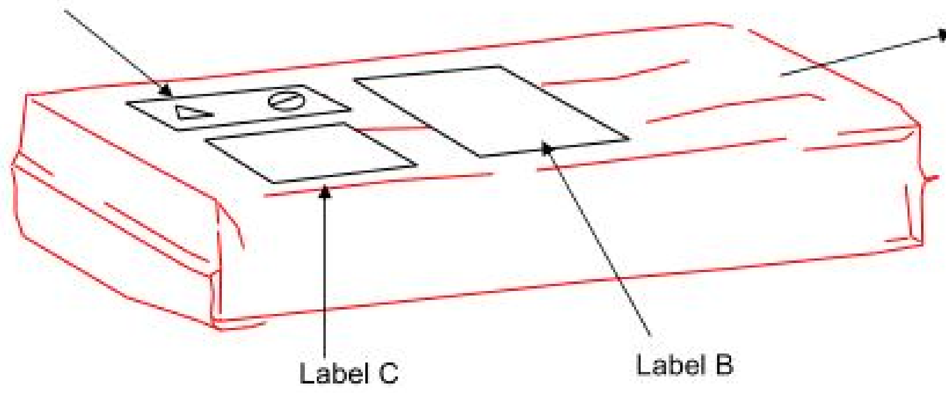
➔nnnnn=Serial no. (當日包裝第幾捲流水號;不重覆)

2. 包裝方法

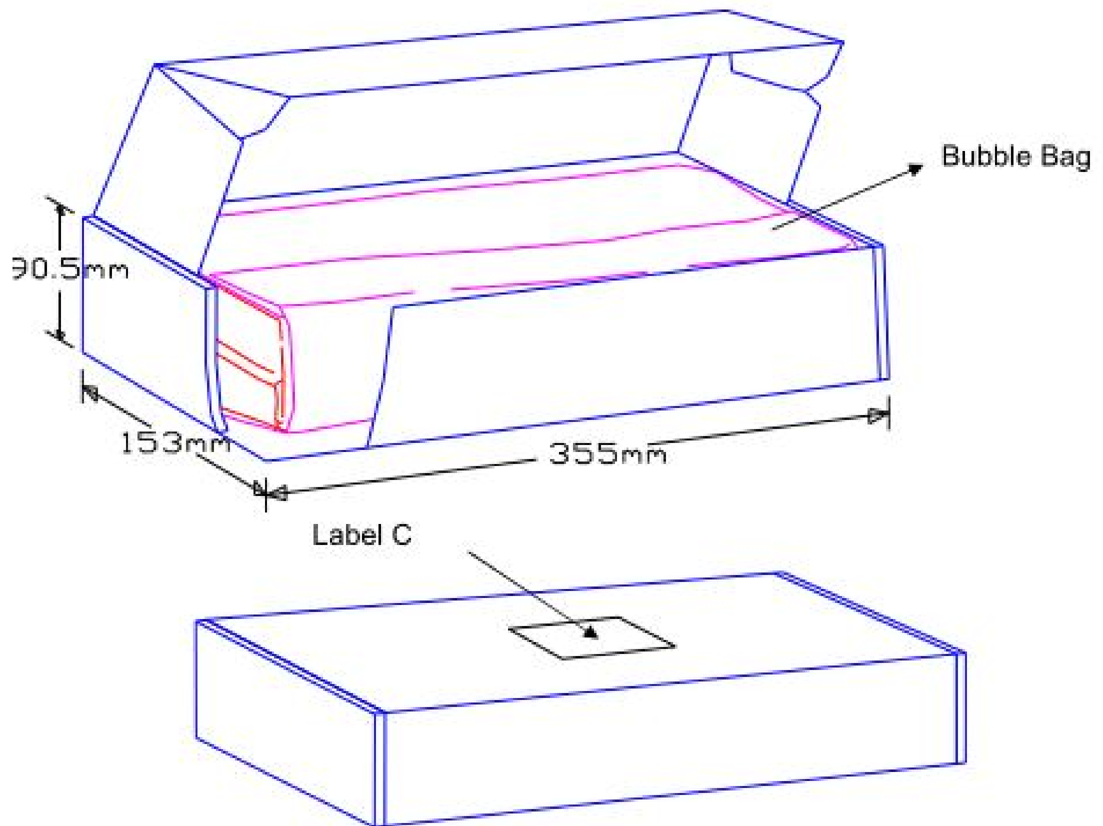


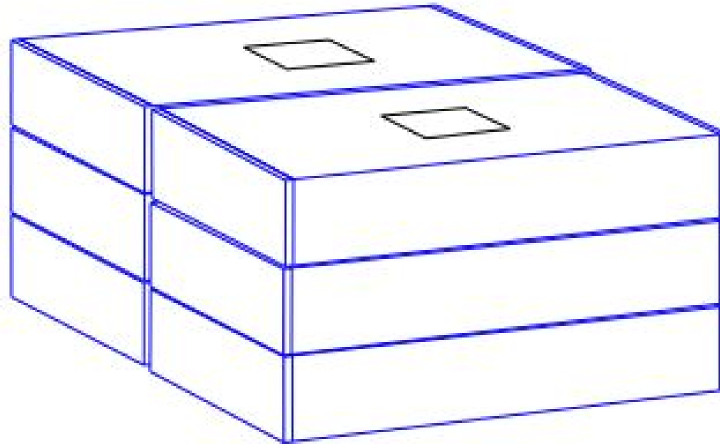
Label A

AL bag

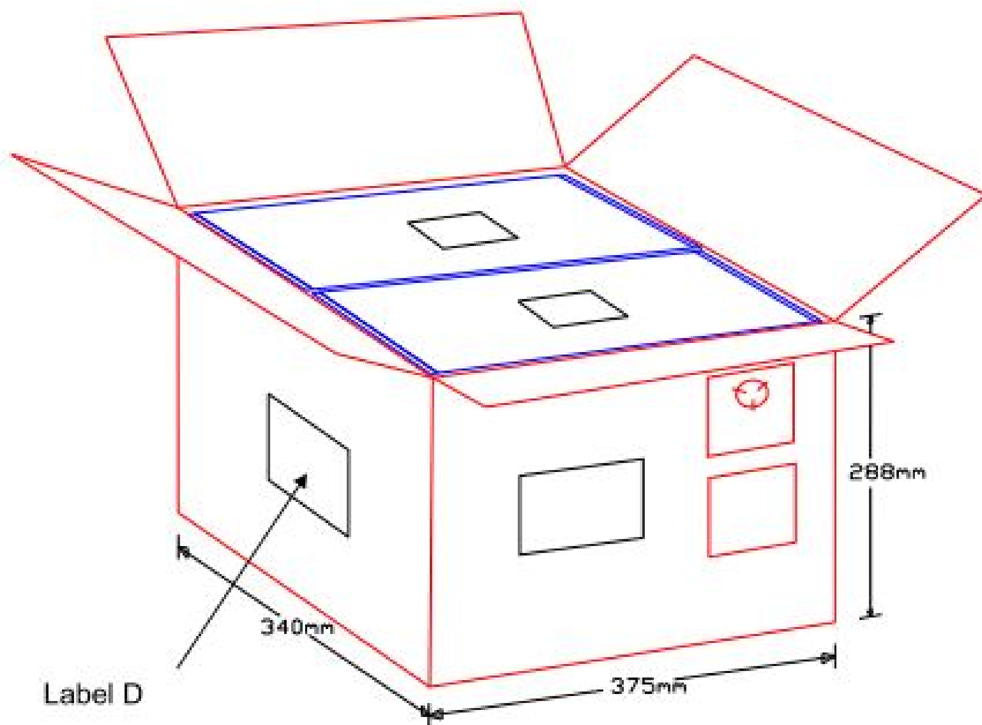


300 pcs max. in one pack





六小盒裝成一大箱，一大箱總數不超過 1800 pcs，空盒放置於上方，零數盒其次，滿箱放置於大箱的最下方。



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3. 使用包材

No	TITLE	P/N
1	Anti-static and humidity notice Label (A)	NA
2	MSL caution / Storage Condition Label (B)	NA
3	Strap band	N/A
4	Box Label (70mm*50mm) (C)	42P-200-0001R
5	Bubble Bag	N/A
6	Carton Label (100mm*70mm) (D)	42P-210-0001R
7	Tray	41P-140-0031R
8	Box (355*153*90.5mm)	41P-130-0001R
9	Carton (375*340*288mm)	41P-120-0002R
10	Al BAG (R)	41P-230-0003R
11	HIC	45P-900-0003R
12	Desiccant, SILICAGEL EXSICCATOR SK 30 HB	45P-900-0001R