



正基科技股份有限公司

SPECIFICATION

SPEC. NO. : _____ REV : 1.2

DATE : 1. 2. 2013

PRODUCT NAME : AP6210B

	APPROVED	CHECKED	PREPARED	DCC ISSUE
NAME				

AMPAK

AP6210B

BlueTooth 4.0 /BLE
Module Spec Sheet

Revision History

Date	Revision Content	Revised By	Version
2013/11/06	- Preliminary	Brian	1.0
2013/12/12	- Pin Out Definition Modification	Brian	1.1
2014/1/2	- Pin Out Definition/Block Diagram Modification	Brian	1.2

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1. Introduction

AMPAK Technology would like to announce a low-cost and low-power consumption module which has all of the Bluetooth functionalities. The highly integrated tiny module makes the possibilities of Bluetooth headsets and portable navigation applications.

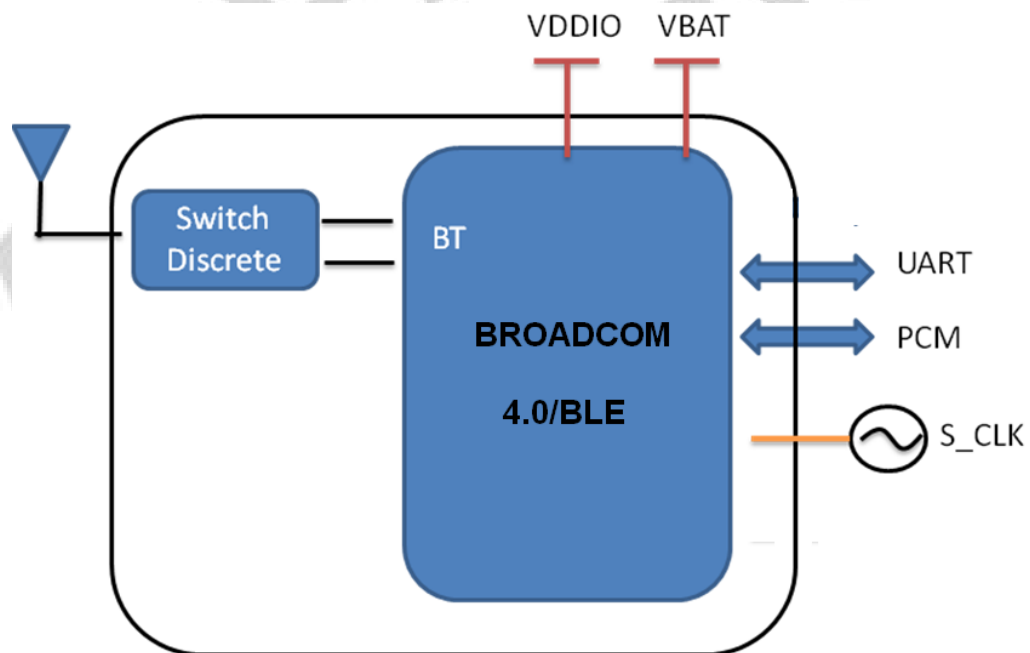
This compact module is a total solution for Bluetooth technologies. The module is specifically developed for Tablet, Smart phones and Portable devices. The integrated module provides UART for Bluetooth data line and PCM interface for Audio codec communication.

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2. Features

- Bluetooth V4.0 + V2.1EDR with integrated Class 1.5 PA Concurrent Bluetooth operation
- Support PCM interface for audio codec communication.
- BT host digital interface:
 - UART (up to 4 Mbps)

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



3. Deliverables

3.1 Deliverables

The following products and software will be part of the product.

- Module with packaging
- Evaluation Kits
- Software utility for integration, performance test.
- Product Datasheet.
- Agency certified pre-tested report with the adapter board.

3.2 Regulatory certifications

The product delivery is a pre-tested module, without the module level certification. For module approval, the platform's antennas are required for the certification.

4. General Specification

4.1 General Specification

Model Name	AP6210B
Product Description	Support Bluetooth4.0/BLE functionalities
Dimension	L x W x H: 12.0 x 12.0 x 1.5 (typical) mm
BT Interface	UART/ PCM
Operating temperature	-30°C to 85°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing

4.2 Voltages

4.2.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.5	5.5	V
VDDIO	Digital/Bluetooth/SDIO/SPI I/O Voltage	-0.5	3.6	V

4.2.2 Recommended Operating Rating

The module requires two power supplies: VBAT and VDDIO

	Min.	Typ.	Max.	Unit
Operating Temperature	-30	25	85	deg.C
VBAT	3.0	3.6	4.8	V
VDDIO	1.71	3.3	3.6	V

5. Bluetooth Specification

5.1 Bluetooth Specification

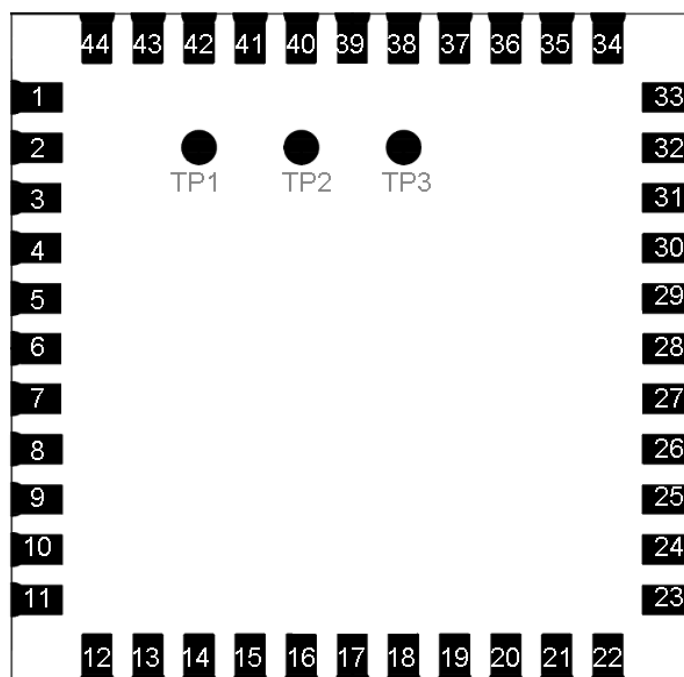
Conditions : VBAT=3.6V ; VDDIO=3.3V ; Temp:25°C

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V4.0 of 1, 2 and 3 Mbps.		
Host Interface	UART / PCM		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	FHSS, GFSK, DPSK, DQPSK		
RF Specification			
	Min.	Typical.	Max.
Output Power (Class 1.5)		9dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	$\pi/4$ -DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

6. Pin Assignments

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition

NO	Name	Type	Description
1	GND	—	Ground connections
2	BT_ANT	I/O	RF I/O port
3	GND	—	Ground connections
4	NC	—	Floating (Don't connected to ground)
5	NC	—	Floating (Don't connected to ground)
6	BT_WAKE	I	HOST wake-up Bluetooth device
7	BT_HOST_WAKE	O	Bluetooth device to wake-up HOST
8	NC	—	Floating (Don't connected to ground)
9	VBAT	P	Main power voltage source input
10	NC	—	Floating (Don't connected to ground)
11	NC	—	Floating (Don't connected to ground)
12	NC	—	Floating (Don't connected to ground)
13	NC	—	Floating (Don't connected to ground)
14	NC	—	Floating (Don't connected to ground)

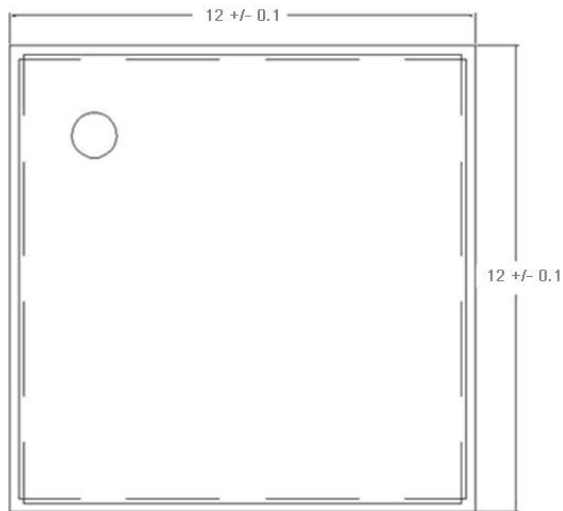
15	NC	—	Floating (Don't connected to ground)
16	NC	—	Floating (Don't connected to ground)
17	NC	—	Floating (Don't connected to ground)
18	NC	—	Floating (Don't connected to ground)
19	NC	—	Floating (Don't connected to ground)
20	GND	—	Ground connections
21	NC	—	Floating (Don't connected to ground)
22	VDDIO	P	I/O Voltage supply input
23	NC	—	Floating (Don't connected to ground)
24	LPO	I	External Low Power Clock input (32.768KHz)
25	PCM_OUT	O	PCM Data output
26	PCM_CLK	I/O	PCM Clock
27	PCM_IN	I	PCM data input
28	PCM_SYNC	I/O	PCM sync signal
29	NC	—	Floating (Don't connected to ground)
30	NC	—	Floating (Don't connected to ground)
31	GND	—	Ground connections
32	NC	—	Floating (Don't connected to ground)
33	GND	—	Ground connections
34	BT_RST_N	I	Low asserting reset for Bluetooth core
35	NC	—	Floating (Don't connected to ground)
36	GND	—	Ground connections
37	NC	—	Floating (Don't connected to ground)
38	NC	—	Floating (Don't connected to ground)
39	NC	—	Floating (Don't connected to ground)
40	NC	—	Floating (Don't connected to ground)
41	UART_RTS_N	O	Bluetooth UART interface
42	UART_TXD	O	Bluetooth UART interface
43	UART_RXD	I	Bluetooth UART interface
44	UART_CTS_N	I	Bluetooth UART interface
45	TP1 (NC)	—	Floating (Don't connected to ground)
46	TP2 (NC)	—	Floating (Don't connected to ground)
47	TP3 (NC)	—	Floating (Don't connected to ground)

7. Dimensions

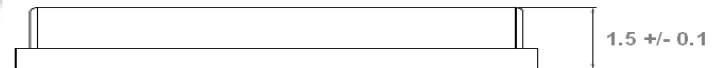
7.1 Physical Dimensions

(Unit: mm)

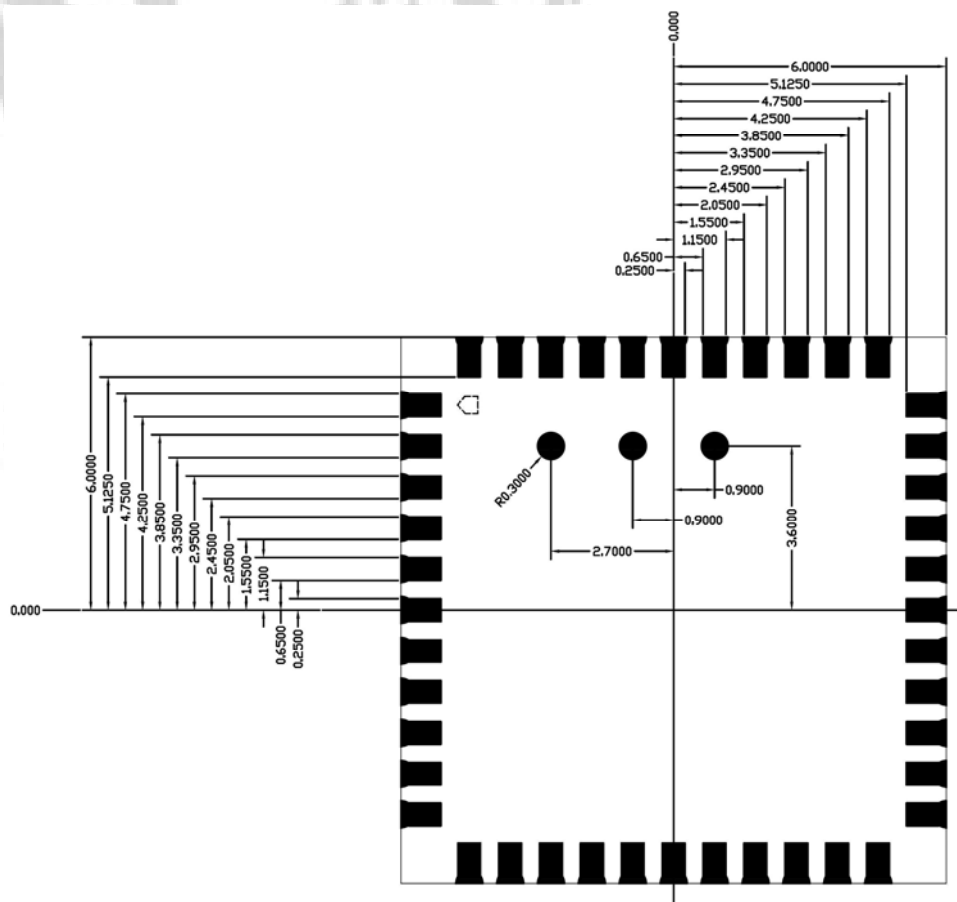
< TOP VIEW >



< Side View >



< TOP VIEW >



(Unit: mm)

Technical drawing of a rectangular building footprint, showing dimensions and internal layout. The drawing is oriented with the long side horizontal.

Overall Dimensions:

- Overall Width: 6.2500
- Overall Height: 6.0000

Internal Layout and Dimensions:

- Top Wall:** A series of vertical rectangular elements (possibly windows or doors) are spaced along the top wall. The spacing dimensions from left to right are: 0.2500, 0.6500, 1.1500, 1.5500, 2.0500, 2.4500, 2.9500, 3.3500, 3.8500, 4.2500, 4.7500, 5.1250, 6.0000, and 6.2500.
- Bottom Wall:** A series of vertical rectangular elements are spaced along the bottom wall. The spacing dimensions from left to right are: 0.2500, 0.6500, 1.1500, 1.5500, 2.0500, 2.4500, 2.9500, 3.3500, 3.8500, 4.2500, 4.7500, 5.1250, 6.0000, and 6.2500.
- Left Wall:** A series of vertical rectangular elements are spaced along the left wall. The spacing dimensions from top to bottom are: 0.2500, 0.6500, 1.1500, 1.5500, 2.0500, 2.4500, 2.9500, 3.3500, 3.8500, 4.2500, 4.7500, 5.1250, 6.0000, and 6.2500.
- Right Wall:** A series of vertical rectangular elements are spaced along the right wall. The spacing dimensions from top to bottom are: 0.2500, 0.6500, 1.1500, 1.5500, 2.0500, 2.4500, 2.9500, 3.3500, 3.8500, 4.2500, 4.7500, 5.1250, 6.0000, and 6.2500.
- Internal Features:**
 - Three circular features are located in the upper-left quadrant. The spacing between them is 0.9000.
 - A rectangular feature is located in the upper-right quadrant, with a width of 0.9000 and a height of 3.6000.
 - A rectangular feature is located in the lower-left quadrant, with a width of 2.7000 and a height of 0.9000.
 - A rectangular feature is located in the lower-right quadrant, with a width of 0.9000 and a height of 3.6000.

Orientation: The drawing includes a north arrow pointing towards the top-left corner.

8. External clock reference

External LPO signal characteristics

Parameter	Specification	Units
Nominal input frequency	32.768	kHz
Frequency accuracy	± 30	ppm
Duty cycle	30 - 70	%
Input signal amplitude	1600 to 3300	mV, p-p
Signal type	Square-wave or sine-wave	-
Input impedance	>100k	Ω
	<5	pF
Clock jitter (integrated over 300Hz – 15KHz)	<1	Hz
Output high voltage	0.7V _{io} - V _{io}	V

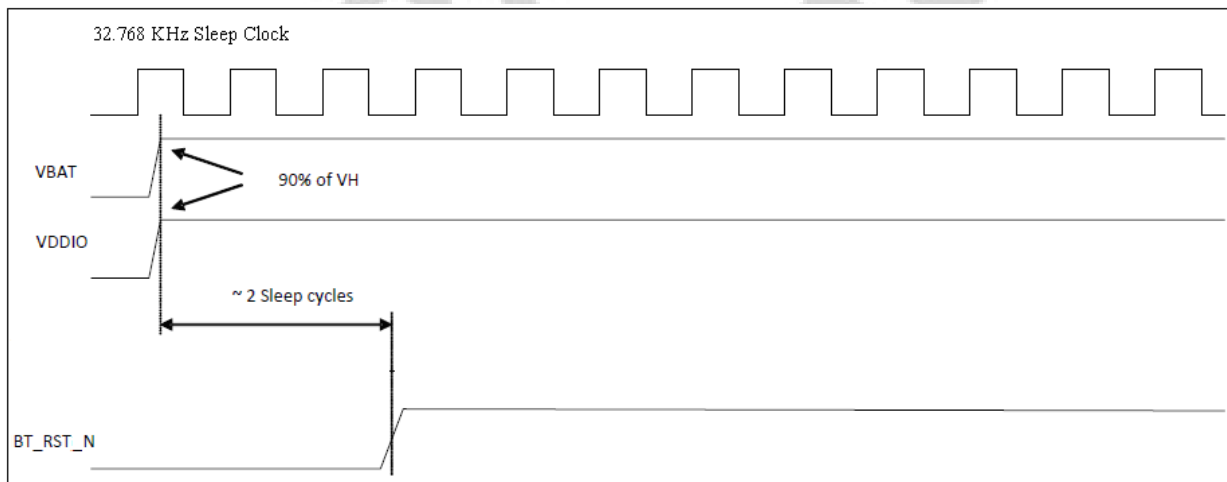
9. Host Interface Timing Diagram

9.1 Power-up Sequence Timing Diagram

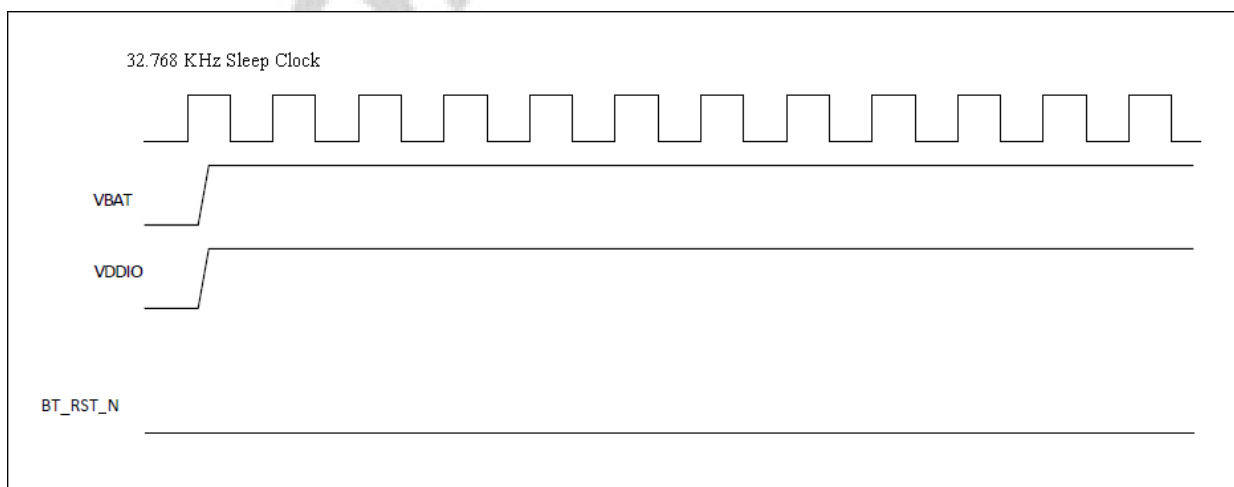
The module has a signal that allow the host to control power consumption by enabling or disabling the Bluetooth. These signals are described below.

Additionally, diagrams are provided to indicate proper sequencing of the signals for carious operating states. The timing value indicated are minimum required values: longer delays are also acceptable.

- ※ BT_RST_N: Used by the PMU to power up the internal Bluetooth regulators. If the BT_RST_N pins are low, the regulators are disabled.



Bluetooth =ON



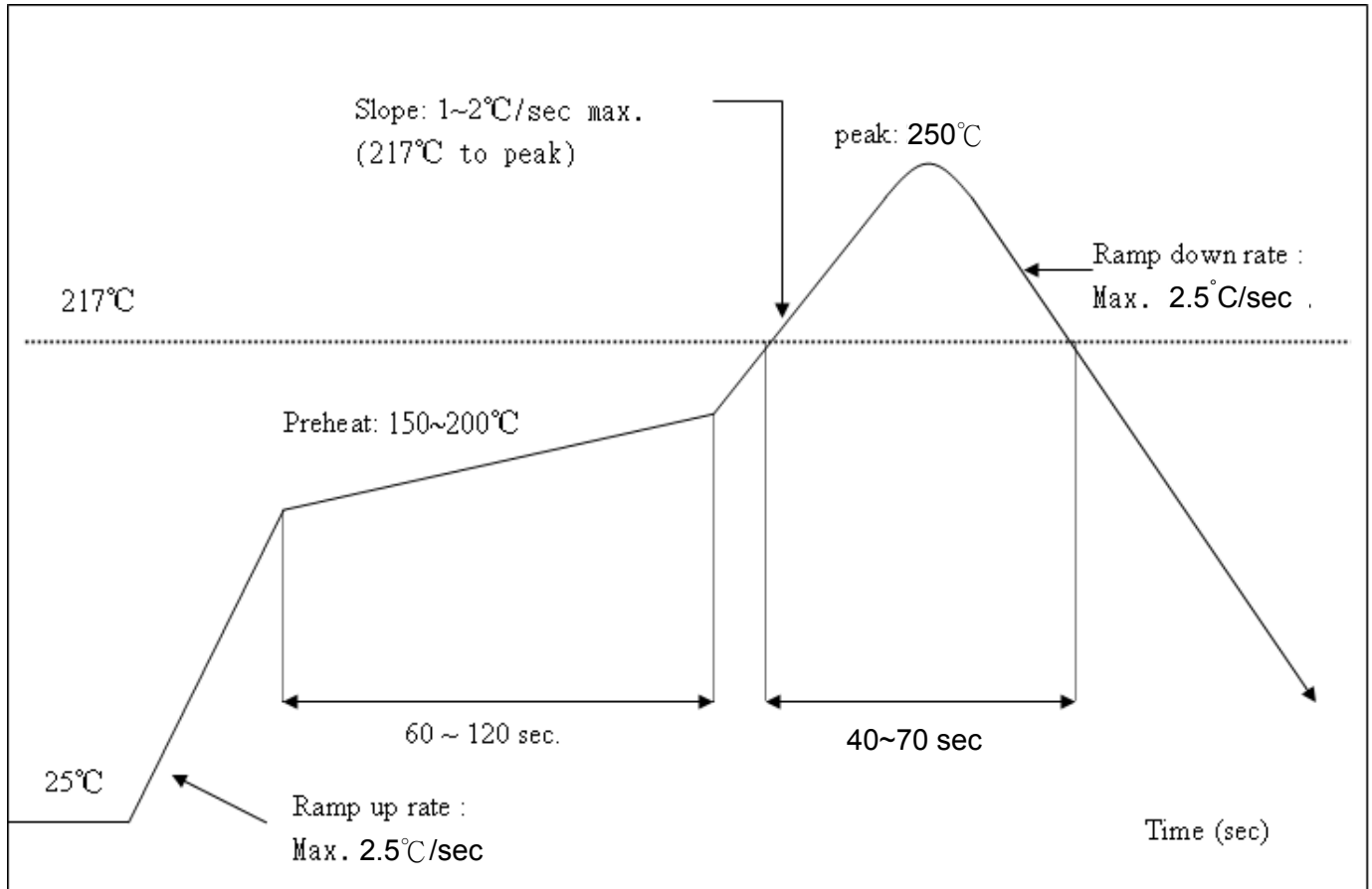
Bluetooth =OFF

10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times



11. Package Information

11.1 Label







Label A→ Anti-static and humidity notice






Label B→ MSL caution / Storage Condition

Caution		LEVEL
This bag contains MOISTURE-SENSITIVE DEVICES		<input type="checkbox"/>
		<small>If blank, see adjacent bar code label</small>
1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)		
2. Peak package body temperature: _____ °C <small>If blank, see adjacent bar code label</small>		
3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be		
a) Mounted within: _____ hours of factory conditions <small>If blank, see adjacent bar code label</small>		
≤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: _____ <small>If blank, see adjacent bar code label</small>		
<small>Note: Level and body temperature defined by IPC/JEDEC J-STD-020</small>		

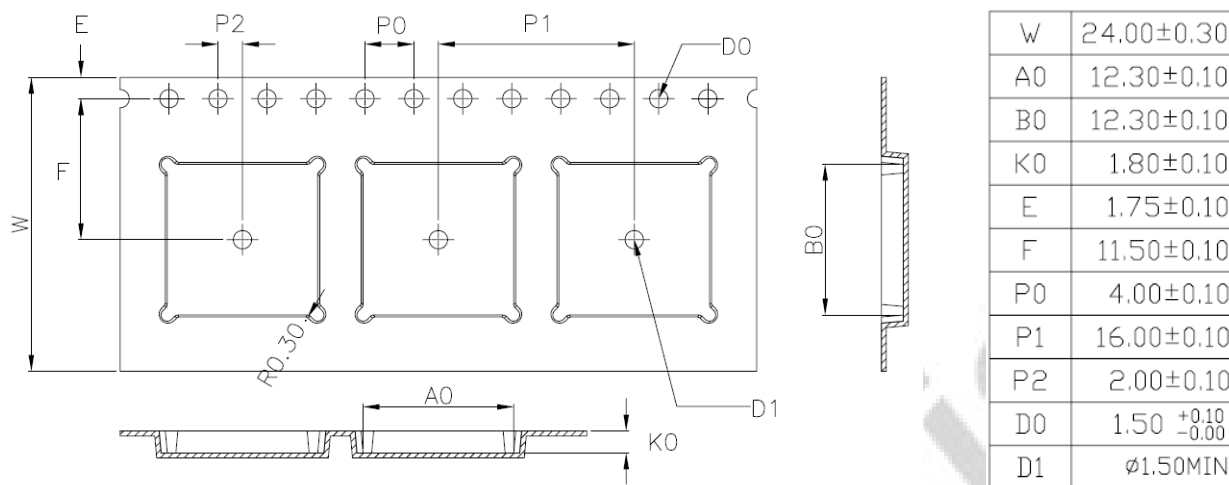
Label C→ Inner box label .

PKG S/N :	
	9PKG12013100001
Model:	
	XXXXXXXXXXXX
P/N :	
	99P-W01-0048R
Qty :	
	1500
Date Code :	
	1205
Lot Code :	
	T0C102B

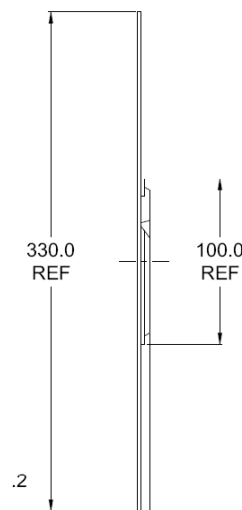
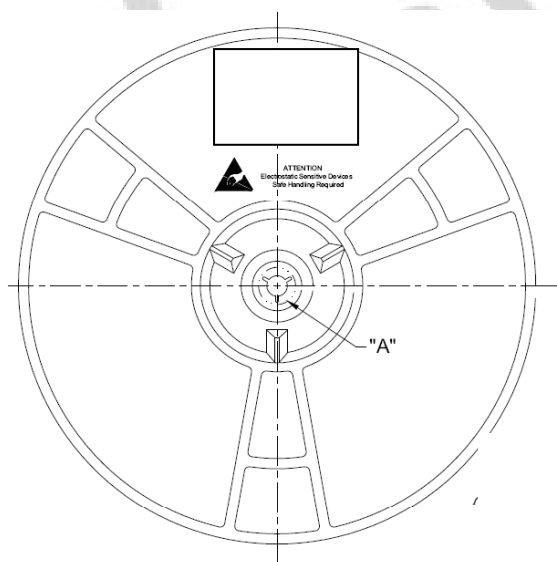
Label D→ Carton box label .

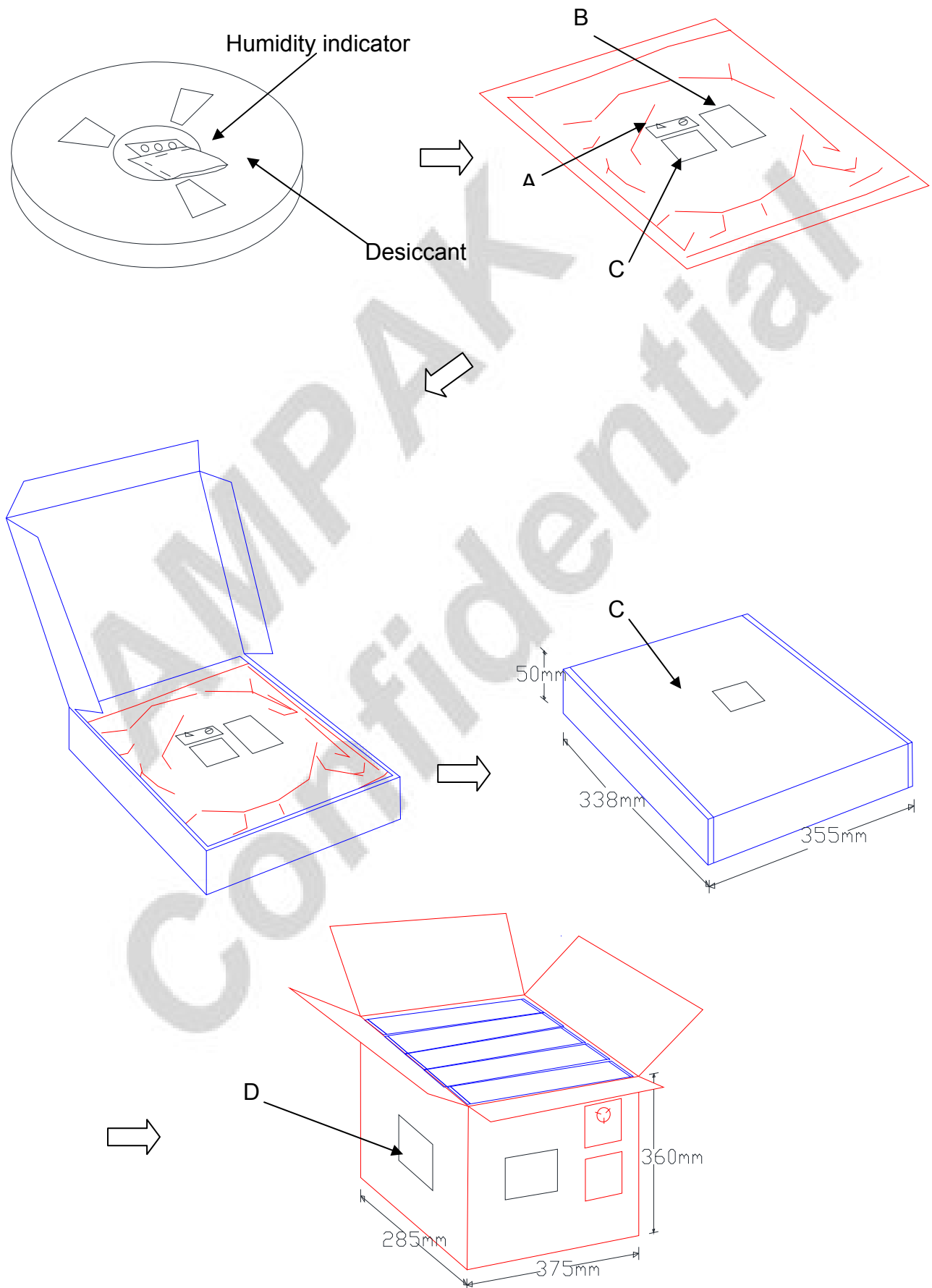
AMPAK Technology	
Model Name :	
	XXXXXXXXXXXX
Part No :	
	99P-W01-0048R
Quantity :	
	7500 ea
Lot D/C :	
	20081000033
Manufacture :	
	2012/02/22

11.2 Dimension



1. 10 sprocket hole pitch cumulative tolerance ± 0.20 .
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness : 0.30 ± 0.05 mm.
6. Packing length per 22" reel : 98.5 Meters.(1:3)
7. Component load per 13" reel : 1500 pcs.





11.3 MSL Level / Storage Condition

	<p>Caution</p> <p>This bag contains</p> <p>MOISTURE-SENSITIVE DEVICES</p> <p>Do not open except under controlled conditions</p> <p>1. Calculated shelf life in sealed bag: 12 months at < 40°C and < 90% relative humidity(RH)</p> <p>2. Peak package body temperature: 225°C 240°C 250°C 260°C</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </p> <p>3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must</p> <p style="padding-left: 20px;">a) Mounted within: 48 hours of factory conditions</p> <p style="padding-left: 40px;"><30°C/60% RH, OR</p> <p style="padding-left: 20px;">b) Stored at <10% RH</p> <p>4. Devices require bake, before mounting, if:</p> <p style="padding-left: 20px;">a) Humidity Indicator Card is >10% when read at 23±5°C</p> <p style="padding-left: 20px;">b) 3a or 3b not met</p> <p>5. If baking is required, devices may be baked for 24 hours at 125±5°C</p> <p style="padding-top: 20px;">Note : If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure</p> <p style="padding-top: 20px;">Bag Seal Date: _____ See-SEAL DATE LABEL _____</p> <p style="padding-top: 10px;">Note: Level and body temperature defined by IPC/JEDEC J-STD-020</p>	<p>LEVEL</p> <div style="border: 1px solid black; width: 60px; height: 60px; margin: 0 auto; display: flex; align-items: center; justify-content: center; font-size: 24px; font-weight: bold;">4</div>
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※NOTE : Accumulated baking time should not exceed 96hrs