iotTech

iTM1811-CU

IEEE 802.11 a/b/g/n/ac
2.4GHz/5GHz 1T1R WLAN with USB2.0 Host Interface Module Datasheet

Revision History

Date	Revision Content	Revised By	Version
2019/04/01	- Initial released	Issac Chen	0.1
2020/07/08	- Add power consumption	Issac Chen	0.2
2020/11/03	- Correct reference circuit and pin define	Issac Chen	0.3

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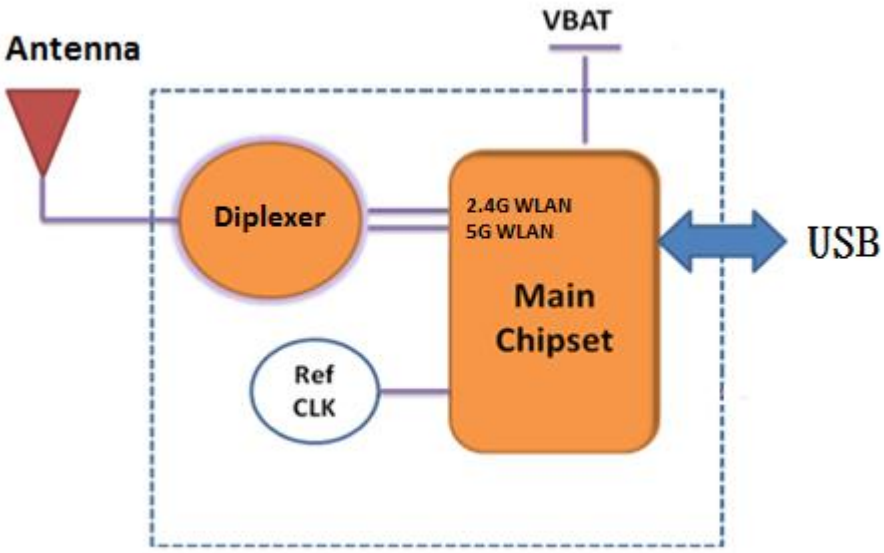
1. General Description

The iotTech iTM1811-CU is a small size and low profile of dual-band WiFi module, board size is 12.2mm*13.0mm with module thickness of 2mm. 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 to connect with host processor. The Wi-Fi throughput can go up to 433Mbps in theory by using 1x1 802.11ac MIMO technology.

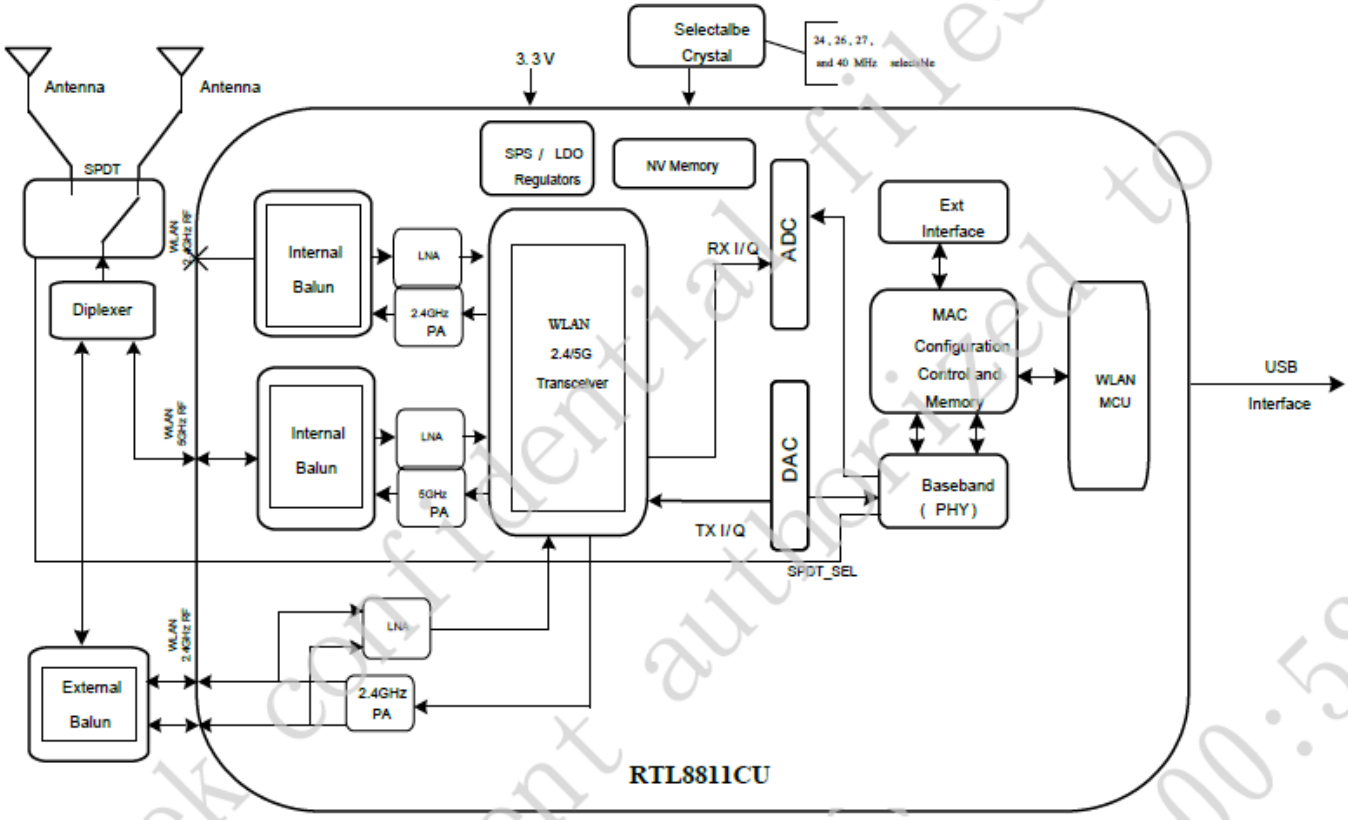
iTM1811-CU uses Realtek RTL8811CU, a highly integrated Wi-Fi single chip based on advanced COMS process. RTL8811CU integrates whole Wi-Fi function blocks into a chip, such as USB, MAC, BB, AFE, RFE, PA, EEPROM and LDO/SWR, except fewer passive components remained on PCB.



2. Features

- Operate at 2.4GHz+5GHz dual frequency bands
- USB2.0 host interface for Wi-Fi function
- IEEE standards support: IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11ac, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i, IEEE 802.11k
- Enterprise level security which can apply WPA/WPA2 certification for WiFi.
- Maximum data rate up to 433Mbps in 802.11ac

The general functional block diagram of RTL8811CU chipset is shown as below.



3. General Specification

3.1 Voltages

3.1.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.3	3.6	V

3.1.2 Recommended Operating Ratings

Test conditions: At room temperature				
Symbol	**Min.**	**Typ.**	**Max.**	**Unit**
VBAT	3.0	3.3	3.6	V

Test conditions: At operating temperature 0°C ~70°C				
Symbol	**Min.**	**Typ.**	**Max.**	**Unit**
VBAT	3.0	3.3	3.6	V

3.2 Wi-Fi RF Specification (RX)

2.4G WLAN

Parameters	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		2412		2484	MHz
RX Sensitivity 11b @ 8% PER	- 1Mbps		-91	-83	dBm
	- 2Mbps		-89	-80	dBm
	- 5.5Mbps		-87	-79	dBm
	- 11Mbps		-85	-76	dBm
RX Sensitivity 11g @ 10% PER	- 6Mbps		-87	-82	dBm
	- 9Mbps		-86	-81	dBm
	- 12Mbps		-84	-79	dBm
	- 18Mbps		-82	-77	dBm
	- 24Mbps		-79	-74	dBm
	- 36Mbps		-75	-70	dBm
	- 48Mbps		-71	-66	dBm
	- 54Mbps		-70	-65	dBm
Receive Sensitivity (11n,20MHz) @10% PER	- MCS0		-87	-82	dBm
	- MCS=1		-84	-79	dBm
	- MCS=2		-82	-77	dBm
	- MCS=3		-79	-74	dBm
	- MCS=4		-75	-70	dBm
	- MCS=5		-71	-66	dBm
	- MCS=6		-70	-65	dBm
	- MCS=7		-69	-64	dBm
Receive Sensitivity (11n,40MHz) @10% PER	- MCS0		-84	-79	dBm
	- MCS=1		-81	-76	dBm
	- MCS=2		-79	-74	dBm
	- MCS=3		-76	-71	dBm
	- MCS=4		-72	-67	dBm
	- MCS=5		-68	-63	dBm
	- MCS=6		-67	-62	dBm
	- MCS=7		-66	-61	dBm
Maximum Receive Level	802.11b	-20	0		dBm
	802.11g	-20	0		dBm
	802.11n	-20	0		dBm

5G WLAN

Parameters	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5150		5825	MHz

RX Sensitivity 11a @ 10% PER	- 6Mbps		-86	-82	dBm
	- 9Mbps		-84	-81	dBm
	- 12Mbps		-83	-79	dBm
	- 18Mbps		-81	-77	dBm
	- 24Mbps		-78	-74	dBm
	- 36Mbps		-74	-70	dBm
	- 48Mbps		-70	-66	dBm
	- 54Mbps		-69	-65	dBm
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0		-86	-82	dBm
	- MCS=1		-83	-79	dBm
	- MCS=2		-81	-77	dBm
	- MCS=3		-78	-74	dBm
	- MCS=4		-74	-70	dBm
	- MCS=5		-70	-66	dBm
	- MCS=6		-69	-65	dBm
	- MCS=7		-67	-64	dBm
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0		-84	-79	dBm
	- MCS=1		-80	-76	dBm
	- MCS=2		-78	-74	dBm
	- MCS=3		-75	-71	dBm
	- MCS=4		-72	-67	dBm
	- MCS=5		-67	-63	dBm
	- MCS=6		-66	-62	dBm
	- MCS=7		-64	-61	dBm
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0		-87	-82	dBm
	- MCS=1		-84	-79	dBm
	- MCS=2		-82	-77	dBm
	- MCS=3		-79	-74	dBm
	- MCS=4		-75	-70	dBm
	- MCS=5		-71	-66	dBm
	- MCS=6		-70	-65	dBm
	- MCS=7		-69	-64	dBm
	- MCS=8		-64	-59	dBm
	- MCS=9		-62	-57	dBm
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0		-84	-79	dBm
	- MCS=1		-81	-76	dBm
	- MCS=2		-79	-74	dBm
	- MCS=3		-76	-71	dBm
	- MCS=4		-72	-67	dBm
	- MCS=5		-68	-63	dBm

	- MCS=6		-67	-62	dBm
	- MCS=7		-66	-61	dBm
	- MCS=8		-61	-56	dBm
	- MCS=9		-59	-54	dBm
Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0		-81	-76	dBm
	- MCS=1		-78	-73	dBm
	- MCS=2		-76	-71	dBm
	- MCS=3		-73	-68	dBm
	- MCS=4		-69	-64	dBm
	- MCS=5		-65	-60	dBm
	- MCS=6		-64	-59	dBm
	- MCS=7		-63	-58	dBm
	- MCS=8		-58	-53	dBm
	- MCS=9		-56	-51	dBm

3.3 Wi-Fi RF Specification (TX)

Parameters	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		2412		2484	MHz
Output Power	802.11b	15	17	19	dBm
	802.11g	13	14	16	dBm
	802.11n	12	13	15	dBm
@EVM	802.11b / 11Mbps	--	-21	-10	dB
	802.11g / 54Mbps	--	-30	-25	dB
	802.11n / MCS7	--	-30	-28	dB

Parameters	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5150		5825	MHz
Output Power	802.11a	12	14	16	dBm
	802.11n	11	13	15	dBm
	802.11ac	9	11	13	dBm
@EVM	802.11a / 54Mbps	--	-29	-25	dB
	802.11n / MCS7	--	-32	-28	dB
	802.11ac / MCS9	--	-34	-32	dB

3.4 Power Consumption

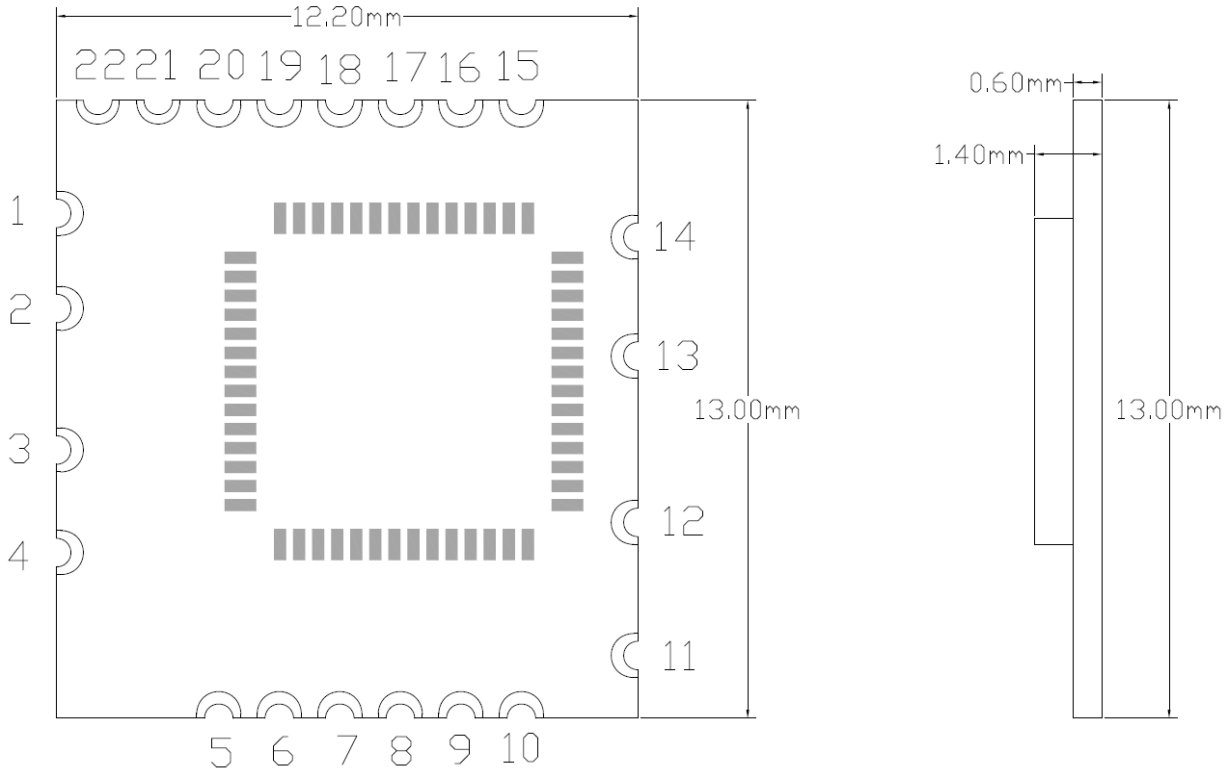
WLAN:

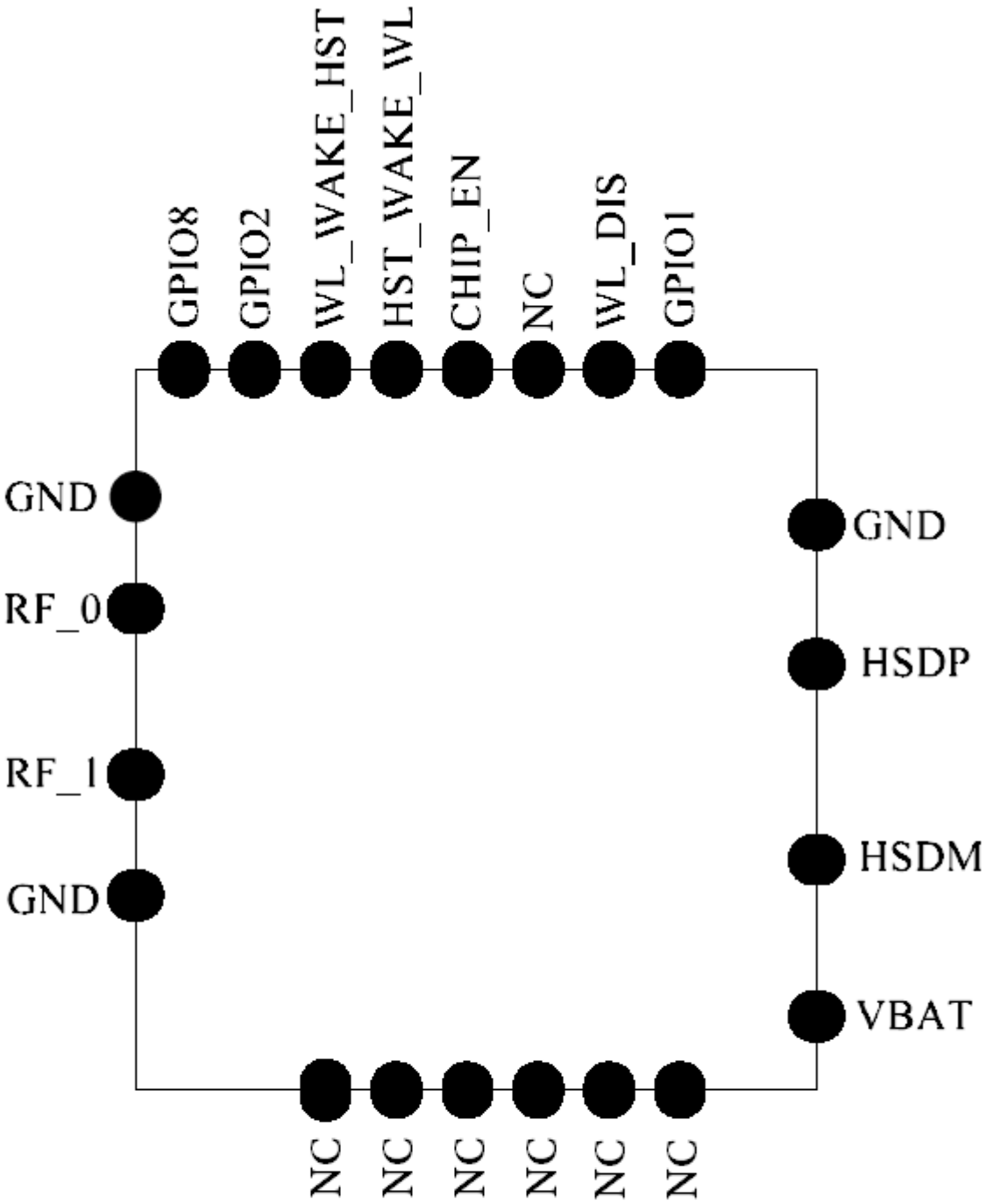
TX Mode: (Continuous mode)	240mA (2.4GHz/HT40/13dBm)
	220mA (5GHz/HT80/11dBm)
RX Mode: (Conituous mode)	115mA (2.4GHz/HT40)
	130mA (5GHz/HT80)
Associated Idle power saving with DTIM=3	2.1mA
Unassociated Idle:	0.1mA
RF disable Mode:	0.1mA

4. Pin Assignments

4.1 PCB Pin Outline

< TOP VIEW >




GPIO8
GPIO2
WL_WAKE_HST
HST_WAKE_WL
CHIP_EN
NC
WL_DIS
GPIO1
GND
RF_0
RF_1
GND
GND
HSDP
HSDM
VBAT
NC
NC
NC
NC
NC
NC

4.2 Pin Definition

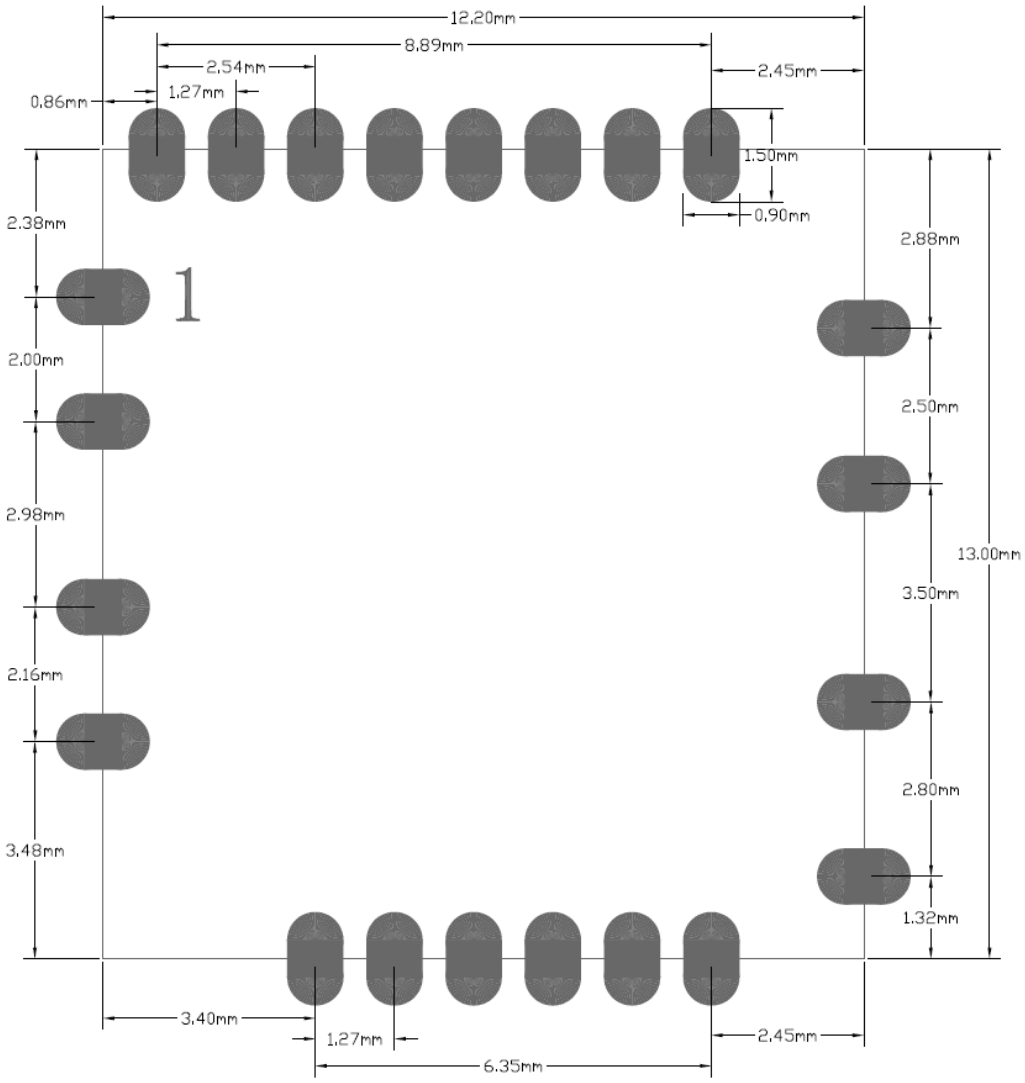
Pin #	Name	Description
1	GND	Ground
2	RF_0	WIFI 2.4GHz/5GHz signal pin
3	RF_1	Not Connected
4	GND	Ground
5	NC	Not Connected
6	NC	Not Connected
7	NC	Not Connected
8	NC	Not Connected
9	NC	Not Connected
10	NC	Not Connected
11	VBAT	Main power voltage source input 3.3V
12	HSDM	USB2.0 differential pair for WLAN function
13	HSDP	USB2.0 differential pair for WLAN fucntion
14	GND	Ground
15	GPIO1	GPIO1
16	WL_DIS	WLAN disable
17	NC	Not Connected
18	CHIP_EN	Module enable
19	HST_WAKE_WL	Host wake up WLAN device
20	WL_WAKE_HST	WLAN device wake up Host
21	GPIO2	GPIO2
22	GPIO8	GPIO8
Total	22PINS	13.0*12.2*2.0mm Package

5. Dimensions

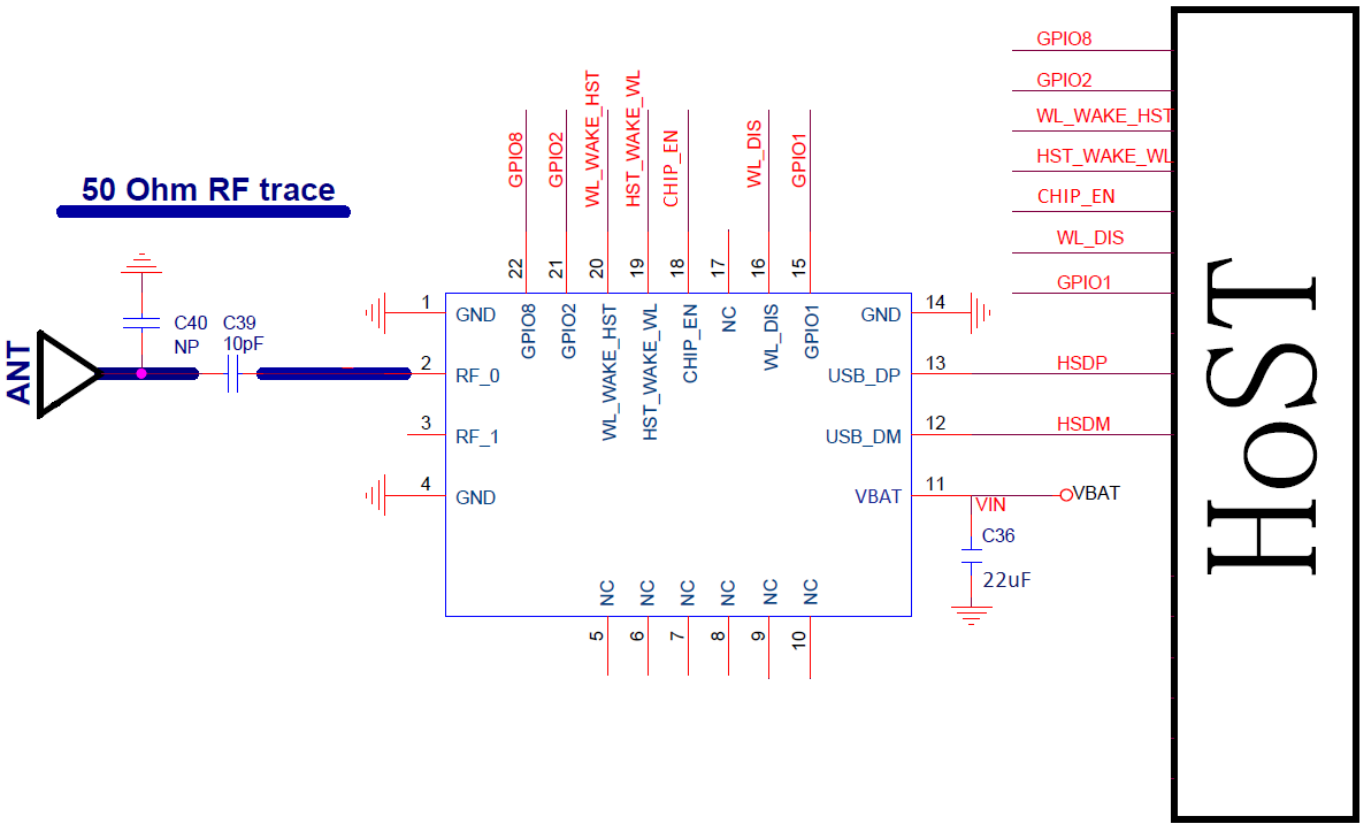
5.1 Layout Recommendation

(Unit: mm)

< TOP VIEW >

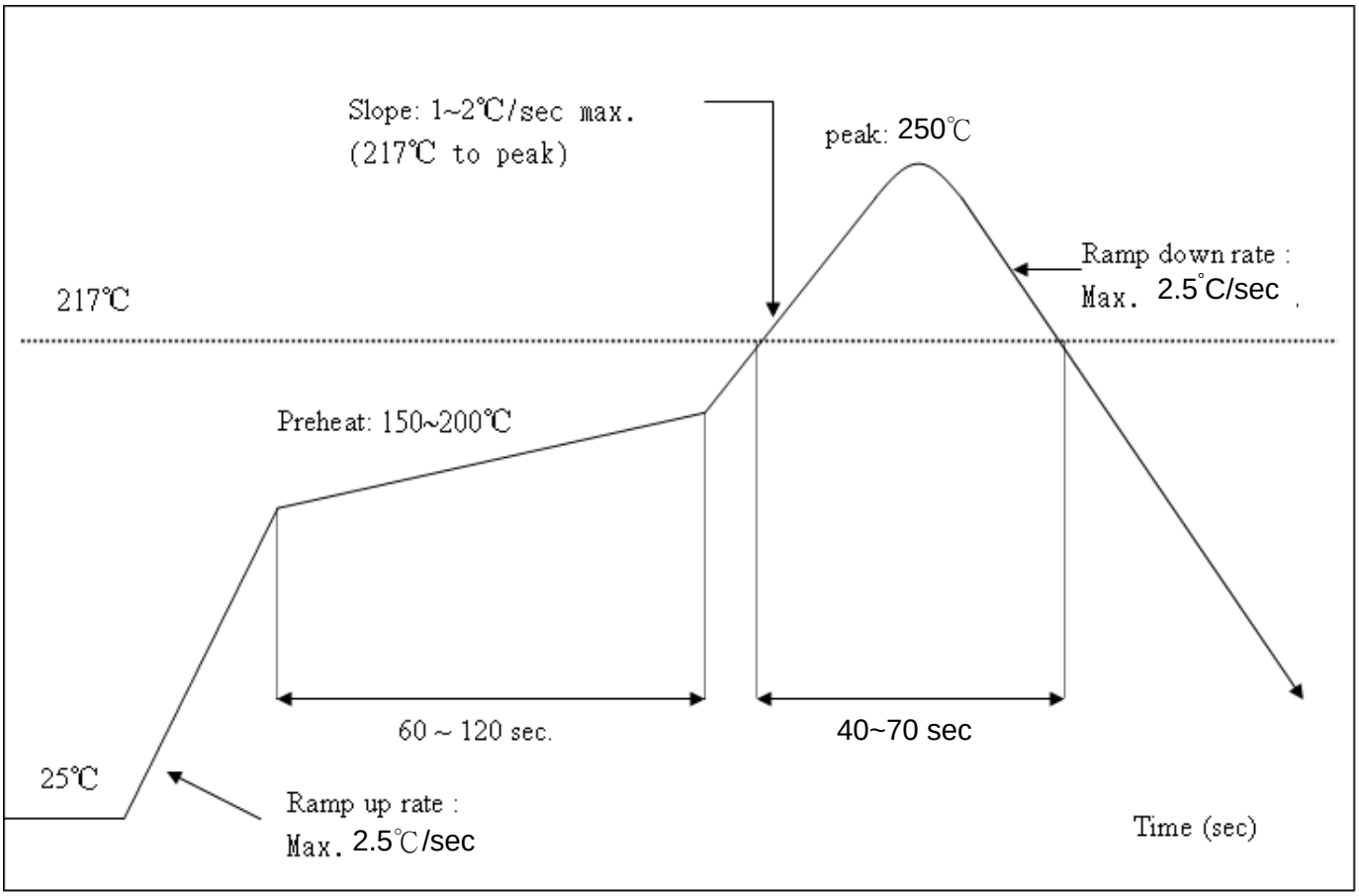


6. Reference Design



7. Recommended Reflow Profile

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

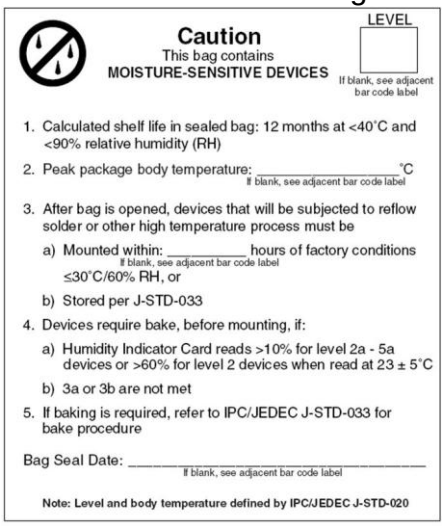


8. Packing Information

8.1 Label

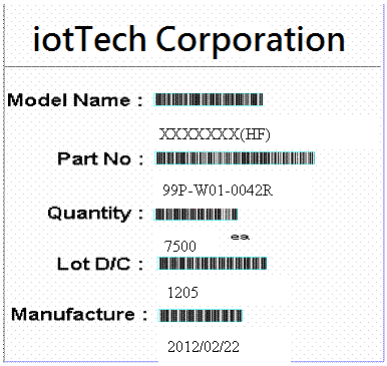
Label A → Anti-static and humidity notice

Label B → MSL caution / Storage Condition

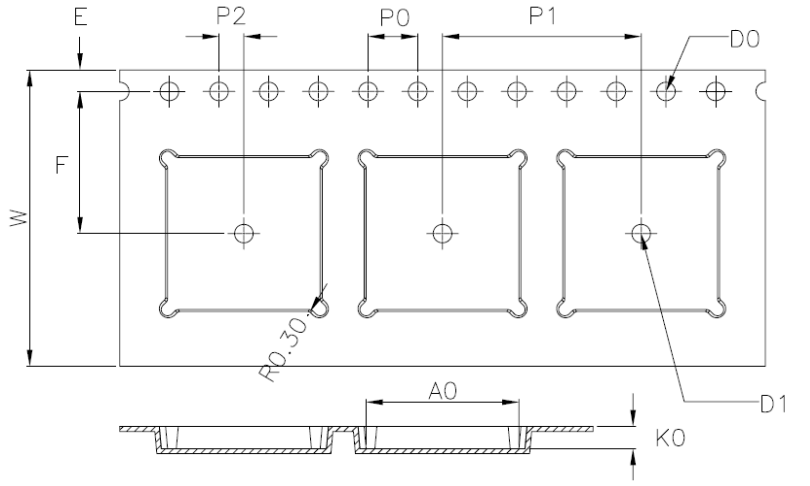


Label C → Inner box label .

Label D → Carton box label .

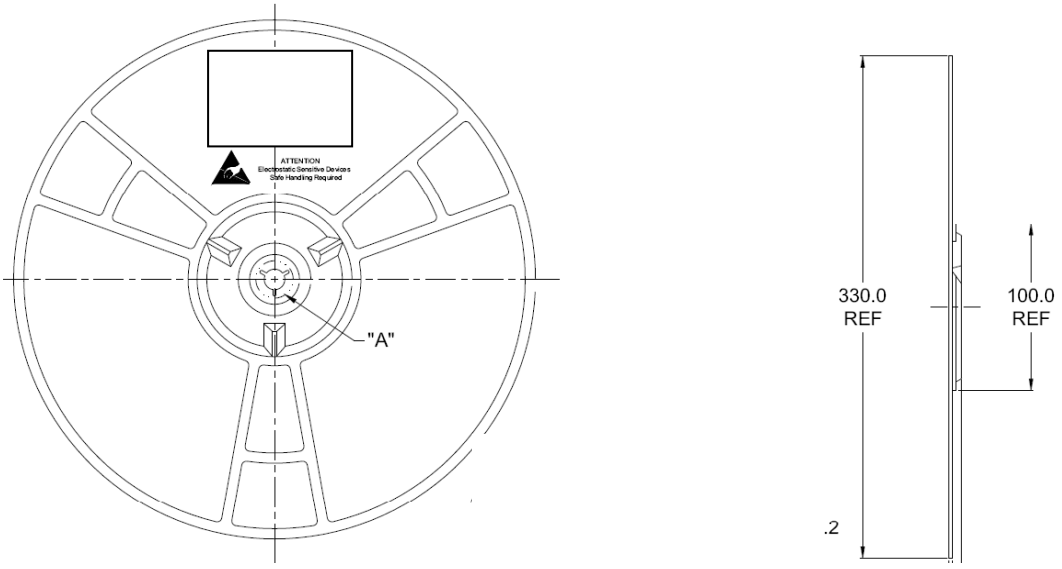


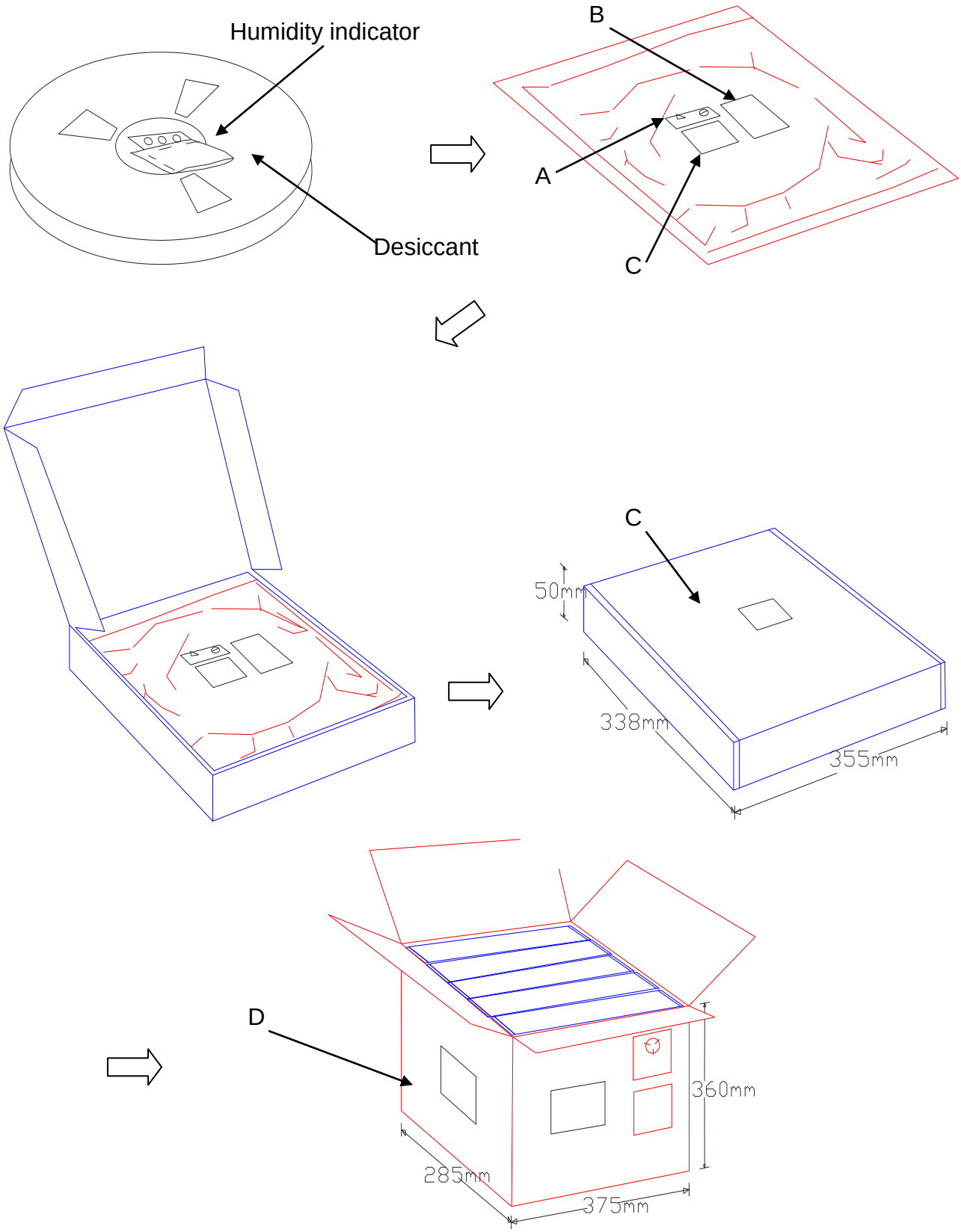
8.2 Dimension



W	24.00±0.30
A0	12.60±0.10
B0	13.30±0.10
K0	1.80±0.10
E	1.75±0.10
F	11.65±0.10
P0	4.00±0.10
P1	17.00±0.10
P2	2.00±0.10
D0	1.50±0.10
D1	ϕ1.50MIN

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±0.05mm.
6. Packing length per 22" reel : 98.5 Meters.(1:3)
7. Component load per 13" reel : 1500 pcs.




Humidity indicator
Desiccant
B
A
C
C
50mm
338mm
355mm
D
360mm
285mm
375mm