iotTech

ITM1723-DS

IEEE 802.11 b/g/n 2.4GHz 1T1R Wi-Fi with Bluetooth v2.1+EDR/Bluetooth 3.0/3.0+HS/4.2 Module Datasheet

Revision History

Date	Revision Content	Revised By	Version
2017/01/09	- Initial released	Ken Wu	1.0
2017/03/31	- Update reference design	Issac Chen	1.1
2017/04/18	- Update RF performance data	Issac Chen	1.2
2017/07/20	- Update Layout Recommendation	Ken Wu	1.3
2018/05/26	- Update Dimension Tolerance	Ken Wu	1.31

Contents

1. General Description

The iotTech iTM1723-DS is a small size and low profile of WiFi + BT Combo module with LGA (Land-Grid Array) footprint, board size is 12.0mm*12.0mm 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 SDIO interface for WiFi to connect with host processor and high speed UART interface for BT. It also has a PCM interface for audio data transmission with direct link to external audio codec via BT controller. The WiFi throughput can go up to 150 Mbps in theory by using 1x1 802.11n b/g/n MIMO technologies and Bluetooth can support BT2.1+EDR/BT3.0, and BT4.0/4.2

iTM1723-DS uses Realtek RTL8723DS, a highly integrated WiFi+BT single chip based on advanced COMS process. RTL8723DS integrates whole WiFi/BT function blocks into a chip, such as MAC, BB, AFE, RFE, PA/LNA/Balun/DPDT, EEPROM and LDO/SWR, except fewer passive components remained on PCB.

2. Features

- Operate at ISM frequency bands (2.4GHz)
- SDIO for WiFi and UART for Bluetooth
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i
- Fully Qualified for Bluetooth 2.1+EDR specification including both 2Mbps and 3Mbps modulation mode
- Fully qualified for Bluetooth 3.0
- Fully qualified for Bluetooth 4.0 Dual mode
- Complies with Bluetooth core specification v4.2
- Full–speed Bluetooth operation with Piconet and Scatternet support
- Enterprise level security which can apply WPA/WPA2 certification for WiFi.
- WiFi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

The general block diagram for ITM1723-DS module is shown as below.

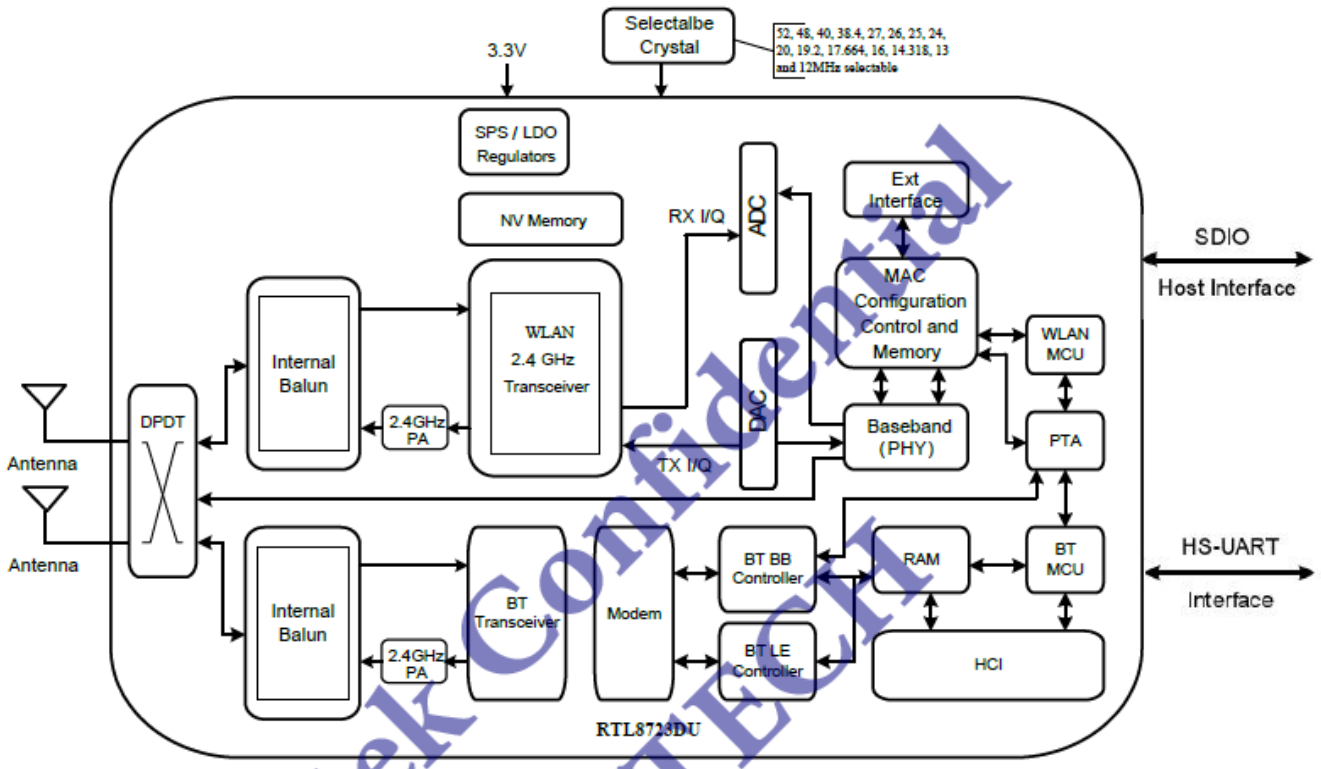


Figure 1. Single-Band 11n (1x1) and Integrated Bluetooth Controller Solution with Antenna Diversity

3. General Specification

Operating temperature	-10°C to 70°C
Storage temperature	-40°C to 85°C

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
VDDIO	3.0	3.3	3.6	V

Note: The I/O voltage of ITM1723 same as VBAT.

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)

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		-88	-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		-76	-70	dBm
	- MCS=5		-72	-66	dBm
	- MCS=6		-70	-65	dBm
	- MCS=7		-68	-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		-73	-67	dBm
	- MCS=5		-69	-63	dBm
	- MCS=6		-68	-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

3.3 Wi-Fi RF Specification (TX)

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2412		2484	MHz
Output Power	802.11b	15	16	18	dBm
	802.11g	12	14	16	dBm
	802.11n	11	13	15	dBm
@EVM	802.11b / 11Mbps	--	-20	-10	dB
	802.11g / 54Mbps	--	-29	-25	dB
	802.11n / MCS7	--	-30	-28	dB

3.4 Power Consumption

WiFi only:

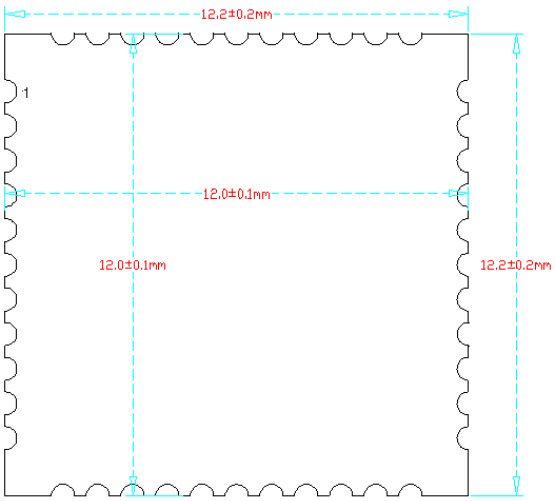
TX Mode: (Continuous mode)	170mA (MCS7/BW40/13dBm)
RX Mode: (Continuous mode)	130mA (MCS7/BW40/-60dBm)
Associated Idle power saving with DTIM=3	2.1mA
Unassociated Idle:	0.1mA
RF disable Mode:	0.1mA

BT: Inquiry & Page Scan:	0.9 mA
ACL no traffic:	7.5mA
SCO HV3:	15.0mA

4. Pin Assignments

4.1 PCB Pin Outline

< TOP VIEW >



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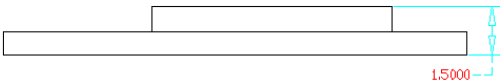

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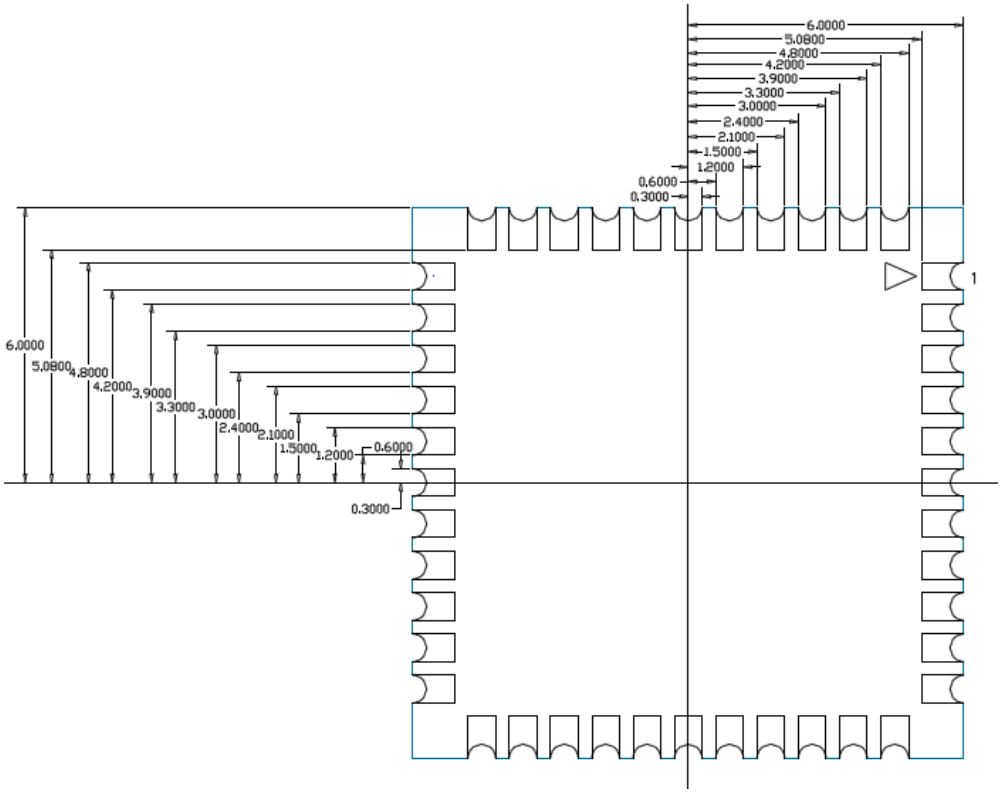


4.2 Pin Definition

Pin-Number	Pin-Define	Type	Description
1	GND	GND	Ground
2	ANT	I/O	Wlan adn Bluetooth RF I/O port
3	GND	GND	Ground
4	NC	NC	NC
5	NC	NC	NC
6	BT_WAKE	I	HOST wake-up Bluetooth device
7	BT_HOST_WAKE	O	Bluetooth device to wake-up HOST
8	NC	NC	NC
9	VBAT	Power	Main power voltage source input(3V~3.6V)
10	NC	NC	NC
11	NC	NC	NC
12	WL_REG_ON	I	Internal regulators power enable/disable
13	WL_HOST_WAKE	O	WLAN to wake-up HOST
14	SDIO_DATA_2	I/O	SDIO data line 2
15	SDIO_DATA_3	I/O	SDIO data line 3
16	SDIO_DATA_CMD	I/O	SDIO command line
17	SDIO_DATA_CLK	I/O	SDIO clock line
18	SDIO_DATA_0	I/O	SDIO data line 0
19	SDIO_DATA_1	I/O	SDIO data line 1
20	GND	GND	Ground
21	NC	NC	NC
22	VDDIO	Power	I/O Voltage supply input(3V~3.6V)
23	NC	NC	NC
24	RTC_CLK	I	External Low Power Clock input(32.768KHz)
25	PCM_OUT	I/O	PCM data output
26	PCM_CLK	I/O	PCM Clock
27	PCM_IN	I/O	PCM data input
28	PCM_SYNC	I/O	PCM sync signal
29	NC	NC	NC
30	NC	NC	NC
31	GND	GND	Ground
32	NC	NC	NC
33	GND	GND	Ground

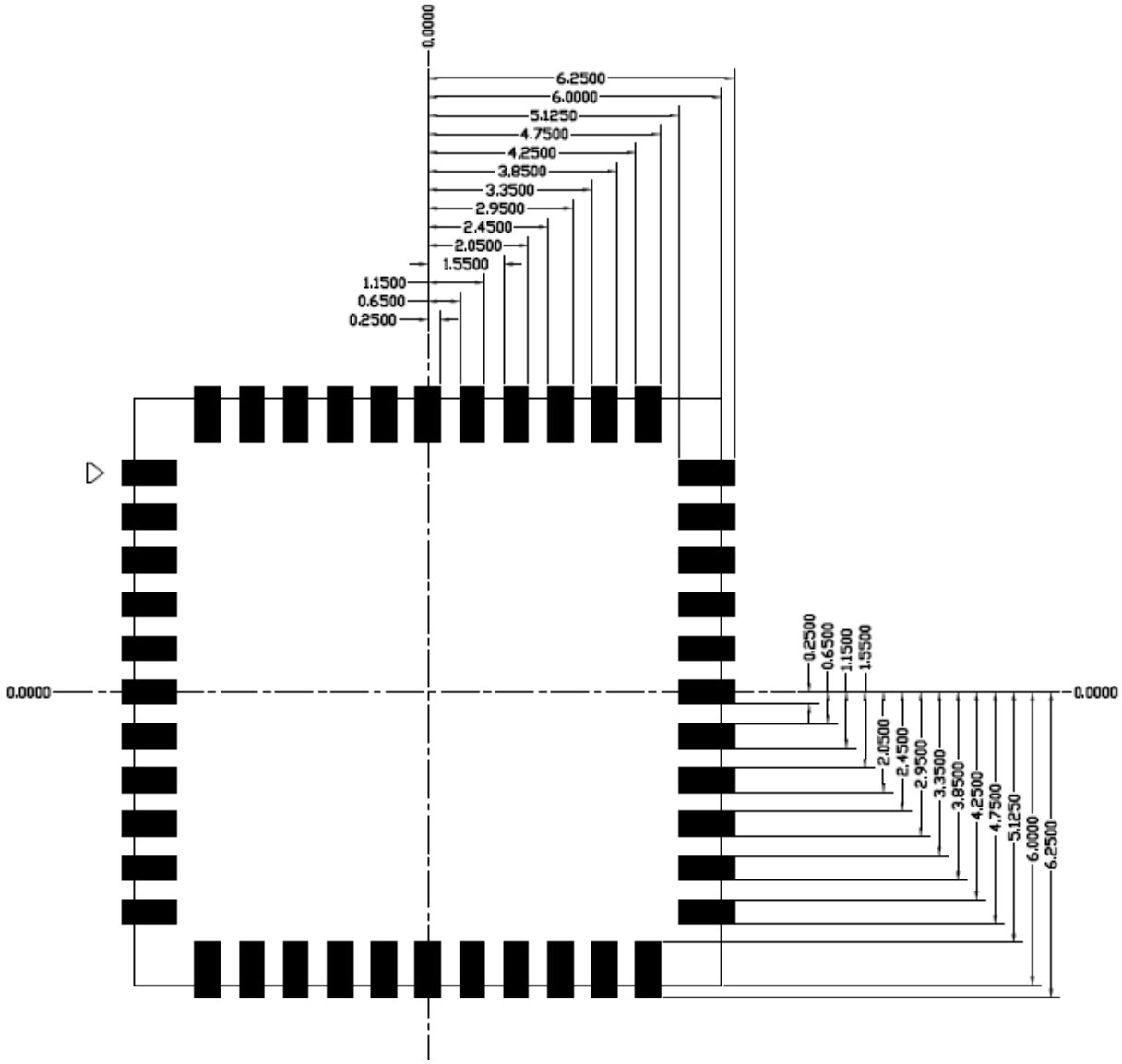
34	BT_RST_N	I	Low asserting reset for Bluetooth core
35	NC	NC	NC
36	GND	GND	Ground
37	NC	NC	NC
38	NC	NC	NC
39	NC	NC	NC
40	NC	NC	NC
41	NC	O	NC
42	UART_TXD	O	Bluetooth UART interface
43	UART_RXD	I	Bluetooth UART interface
44	UART_CTS_N	I	Bluetooth UART interface

5. Dimensions

5.1 Layout Recommendation

(Unit: mm)

< TOP VIEW >



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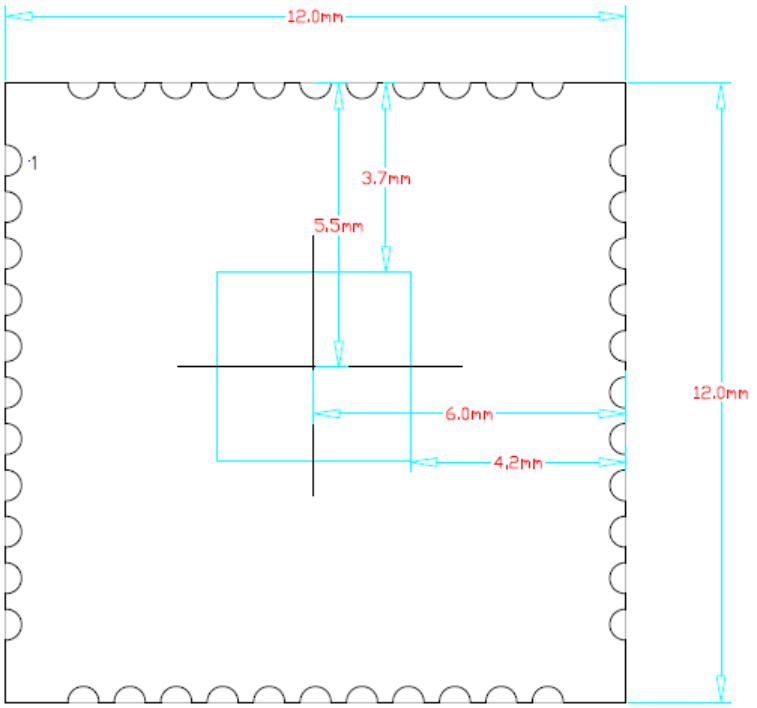

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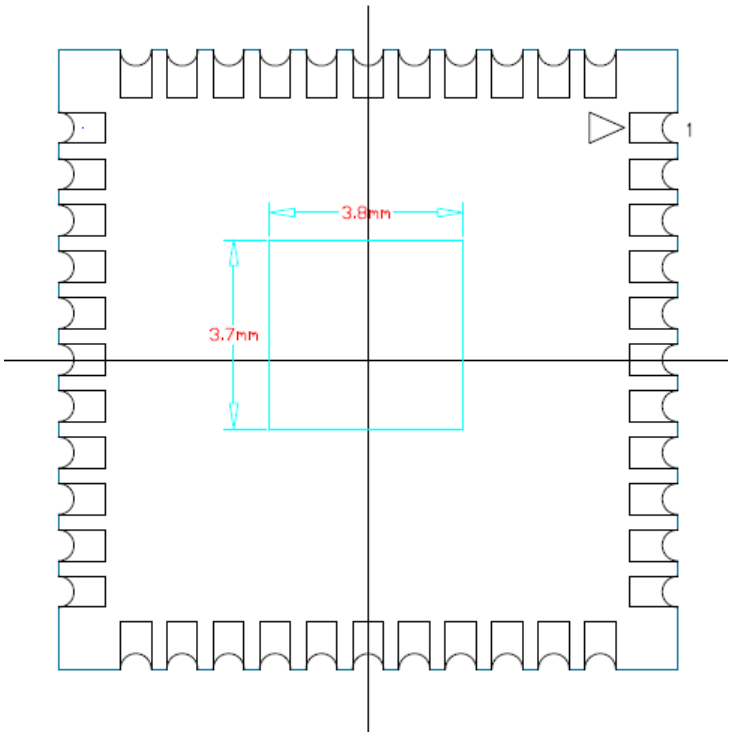
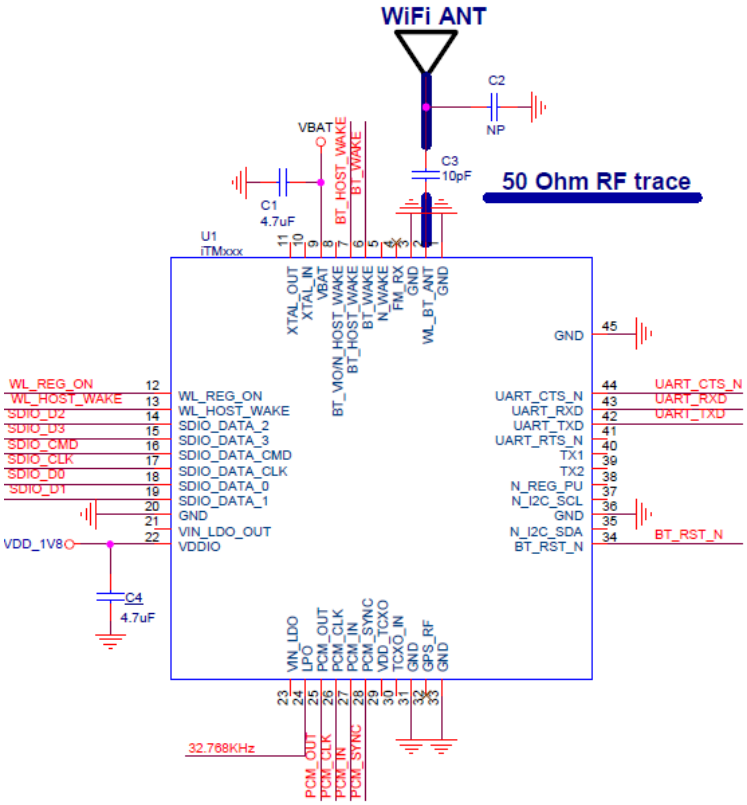
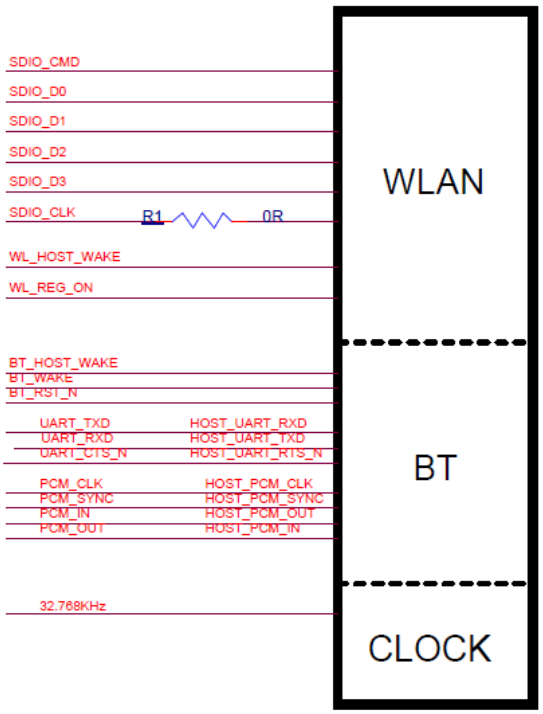


6. Reference Design



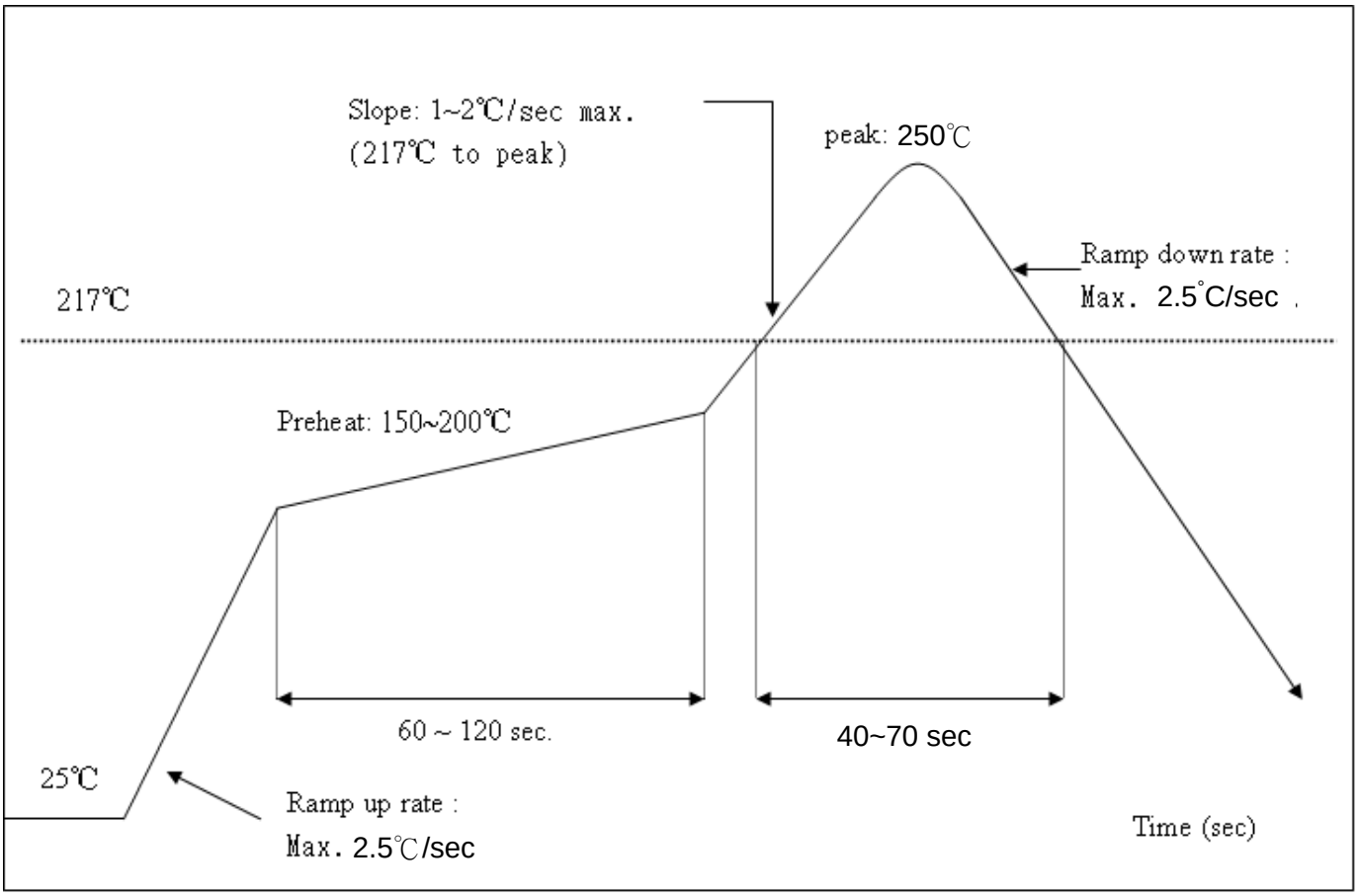


7. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times

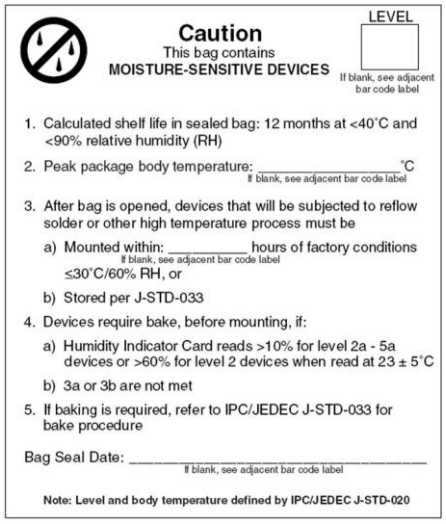


8. Packing Information

9.1 Label

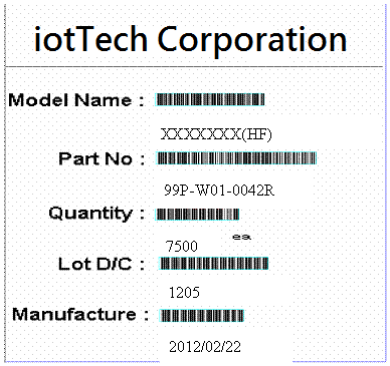
Label A → Anti-static and humidity notice

Label B → MSL caution / Storage Condition

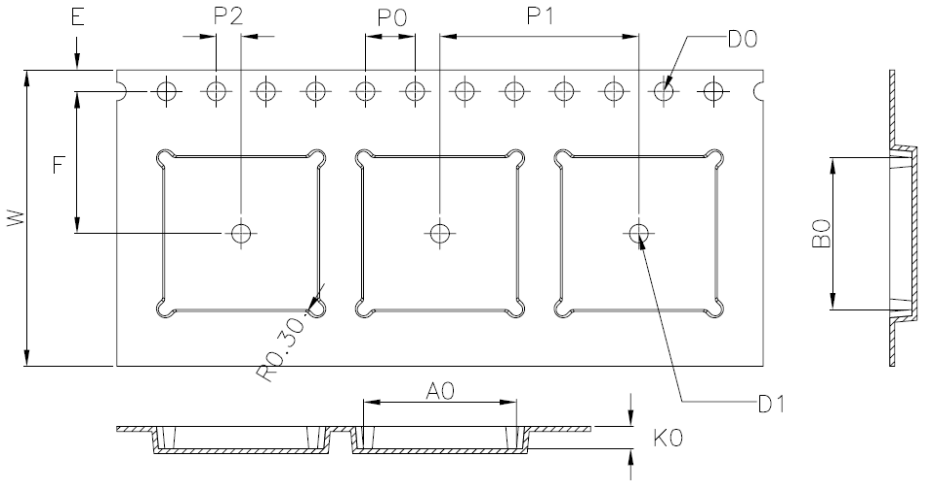


Label C → Inner box label .

Label D → Carton box label .

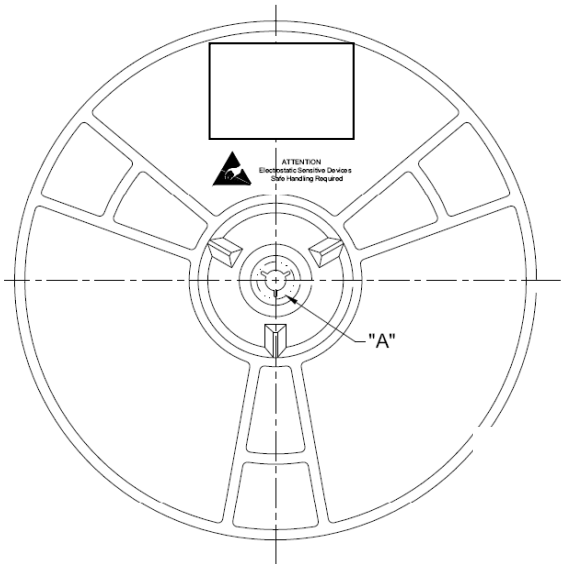


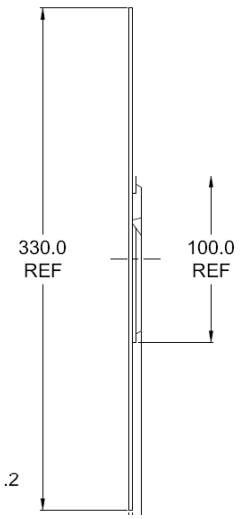
9.2 Dimension

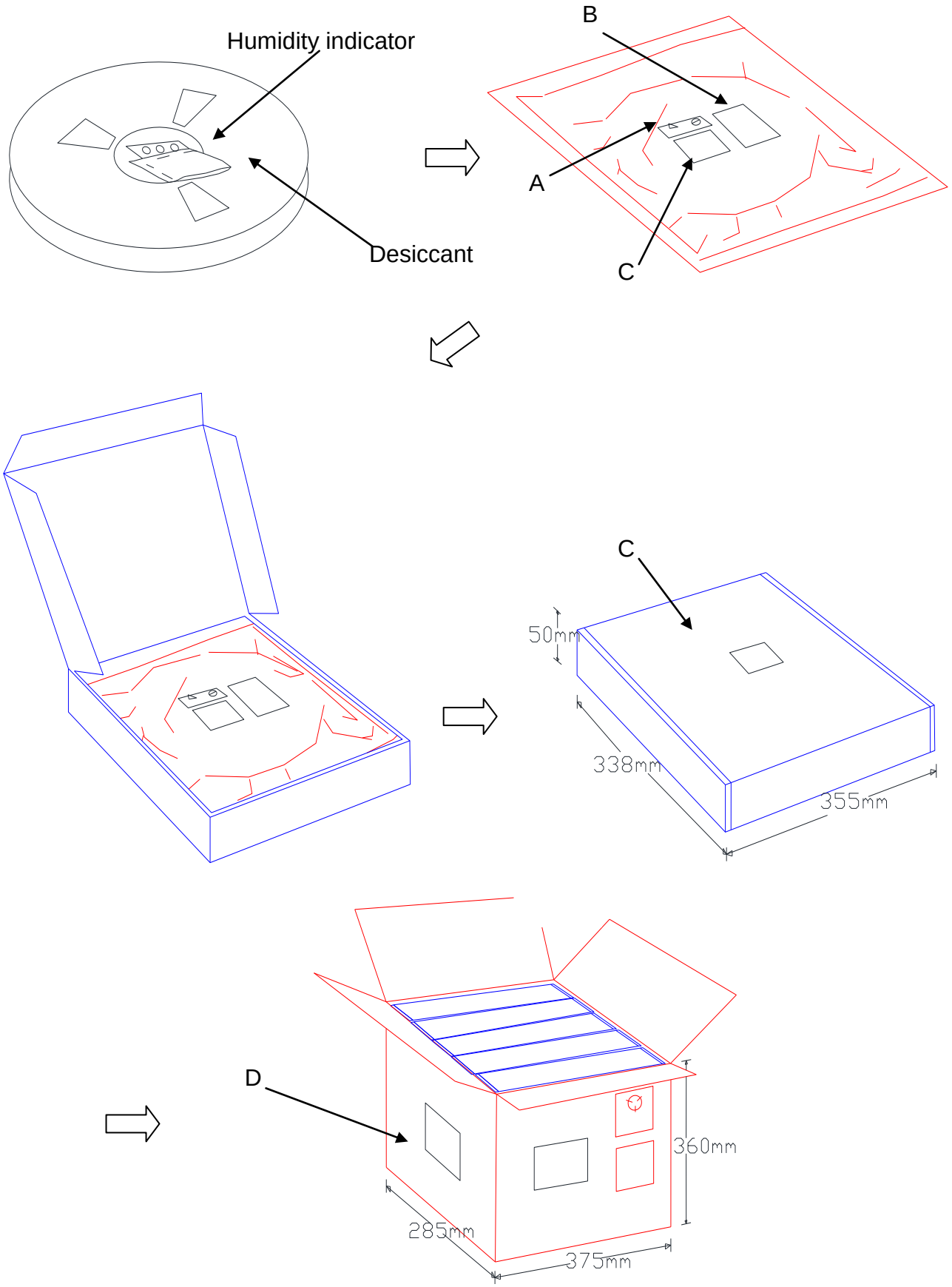


W	24.00±0.30
A0	12.30±0.10
B0	12.30±0.10
K0	1.80±0.10
E	1.75±0.10
F	11.50±0.10
P0	4.00±0.10
P1	16.00±0.10
P2	2.00±0.10
D0	1.50 $^{+0.10}_{-0.00}$
D1	ø1.50MIN

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