iotTech

iTM1822-BS

IEEE 802.11 a/b/g/n/ac 2T2R WLAN

with BT 2.1/3.0/4.1 Combo Module

2019-06-10

Revision History

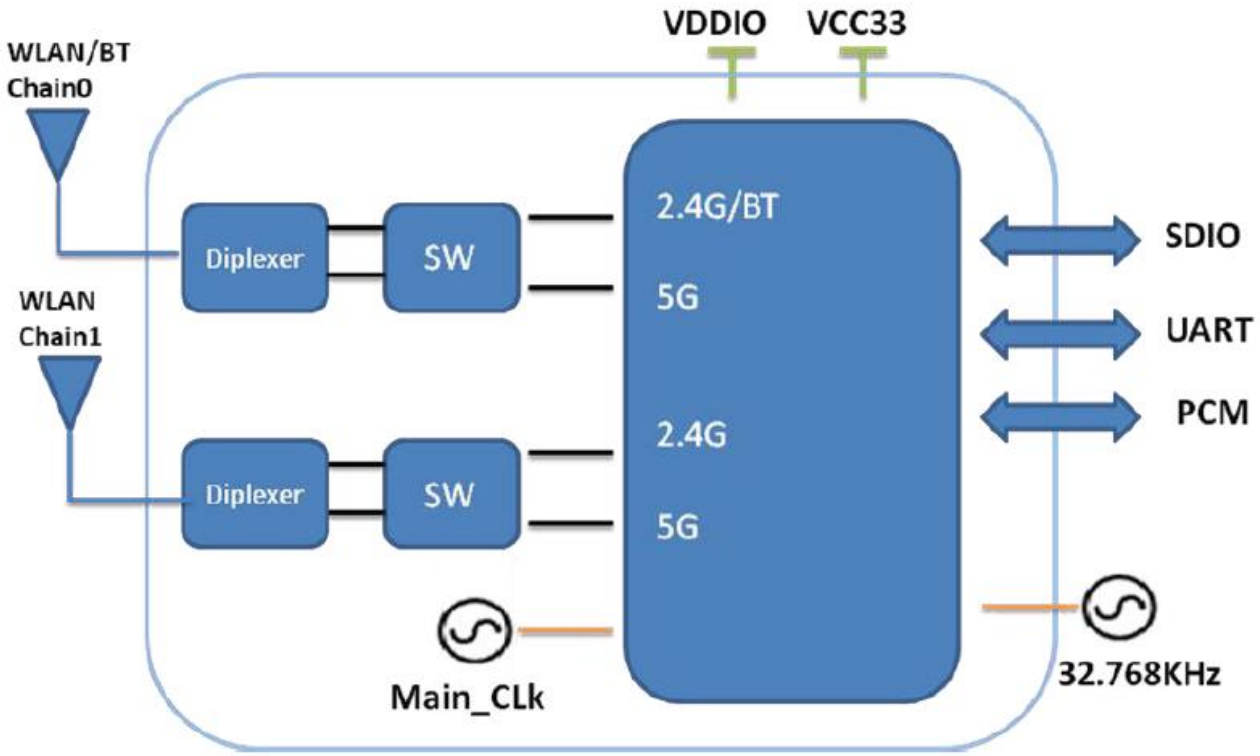
Date	Revision Content	Revised By	Version
2018/07/16	- Initial released	Issac Chen	0.10
2018/07/25	- Update description	Issac Chen	0.20
2018/07/27	- Update module dimension	Ken Wu	0.20a
2018/08/03	- Update pin description	Issac Chen	0.30
2019/02/11	- Update pin description	Issac Chen	0.40
2019/04/04	- Update module dimension info	Issac Chen	0.50
2019/04/17	- Update module dimension info	Issac Chen	0.60
2019/06/10	- Add positioning hole to prevent shielding case from detached when reflow	Issac Chen	0.70

Contents

1. General Description

The ITM1822-BS is a highly integrated module that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with integrated Bluetooth 2.1/3.0/4.1 controller, SDIO (SDIO 1.1/2.0/3.0) interface, and HS-UART mixed interface. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single module.
ITM1822-BS provides a complete solution for a high-performance integrated wireless and Bluetooth device.

The general hardware for the module is shown as below.

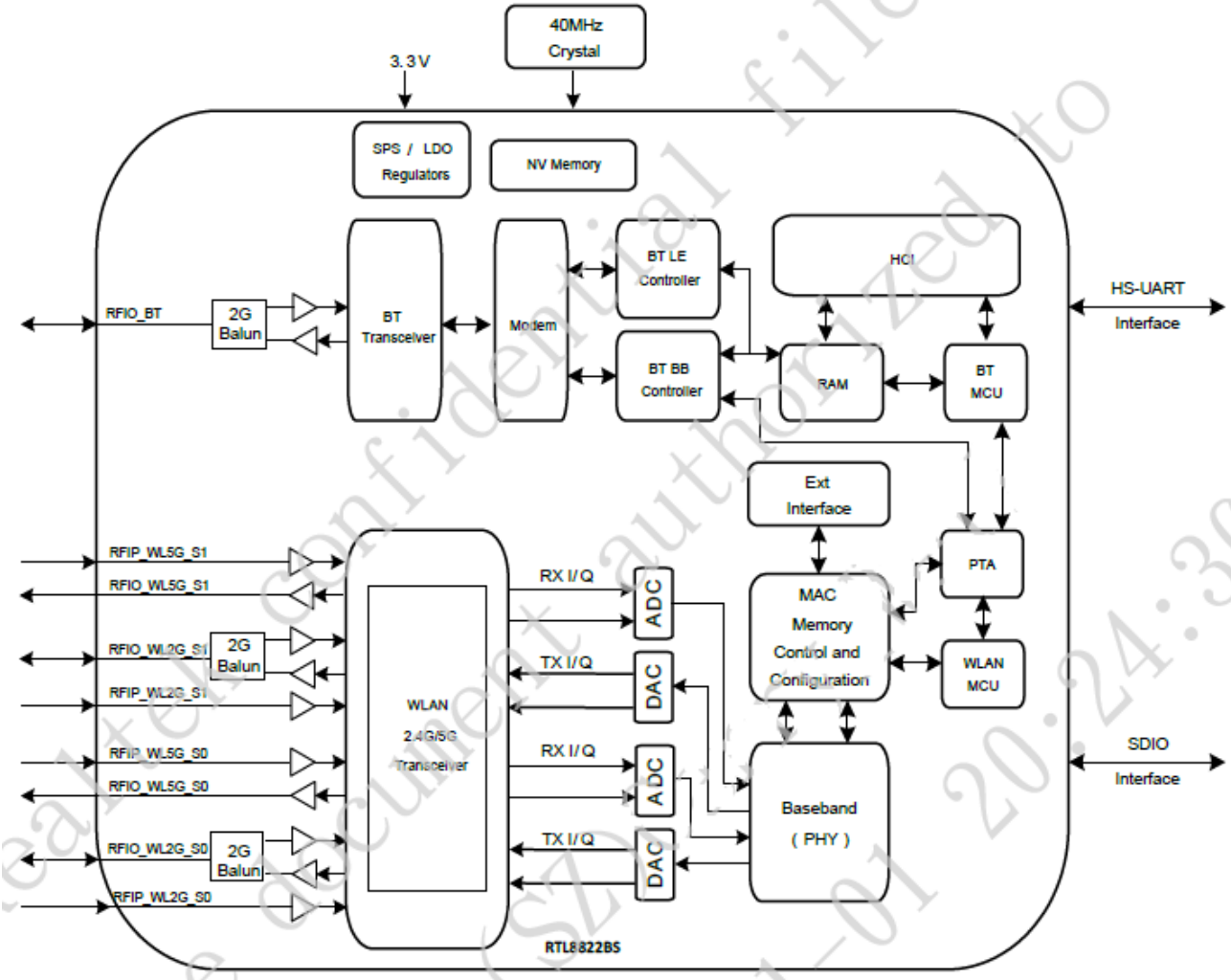


2. Features

- IEEE 802.11a/b/g/n/ac compliant
- 5MHz / 10MHz / 20MHz / 40MHz / 80MHz bandwidth transmission
- Complies with SDIO 1.1/2.0/3.0 for WLAN with clock rate up to 183MHz
- Dual-band 2T2R mode with data rate up to 866.7Mbps
- Support 802.11ac 2x2,Wave-2 compliant with MU-MIMO
- Complete 802.11n MIMO solution for 2.4GHz and 5Ghz band
- Maximum PHY data rate up to 173.3 Mbps using 20MHz bandwidth, 400Mbps using 40MHz bandwidth, and 866.7Mbps using 80MHz bandwidth

- DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble,
- OFDM with BPSK, QPSK, 16QAM,64QAM and 256QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4,and 5/6
- Support STBC and LDPC
- Build-in both 2.4GHz and 5GHz PA&LNA
- Compatible with Bluetooth v2.1 and v3.0 systems Support Bluetooth 4.1 features
- Support Bluetooth 4.2 LE Secure Connection by upper layer software upgrade
- HS-UART interface for Bluetooth data transmission compliant with H4 and H5 specification
- PCM interface for audio data transmission via Bluetooth controller
- Integrated internal Class 1, Class 2, and Class 3 PA
- Enhanced BT/WLAN Coexistence Control to improve transmission quality

The general functional block diagram of RTL8822BS chipset is shown as below.



3. General Specification

3.1 Voltages

3.1.1 Absolute Maximum Ratings

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

3.1.2 Recommended Operating Ratings

Test conditions: At room temperature				
Symbol	**Min.**	**Typ.**	**Max.**	**Unit**
VIN	3.15	3.3	3.45	V

Test conditions: At operating temperature -10°C ~70°C				
Symbol	**Min.**	**Typ.**	**Max.**	**Unit**
VIN	3.15	3.3	3.45	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		-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	- 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
Receive Sensitivity (11n,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
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	11	13	15	dBm
	802.11n	11	12	14	dBm
	802.11ac	9	10	12	dBm
@EVM	802.11a / 54Mbps	--	-29	-25	dB
	802.11n / MCS7	--	-31	-28	dB
	802.11ac / MCS9	--	-33	-32	dB

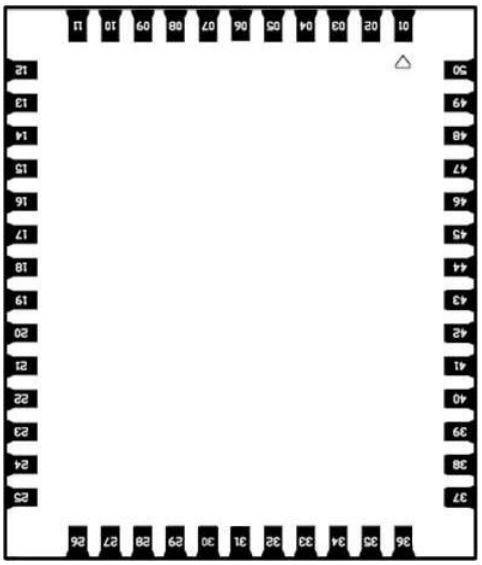
3.4 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V4.1 of 1, 2 and 3 Mbps.		
Host Interface	UART.		
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)		10dBm	
Output Power (Class 2)		2dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92dBm	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-92dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

4. Pin Assignments

4.1 Pin Outline

< TOP VIEW >



4.2 Pin Definition

NO	Name	Type	Description
1	GND	—	Ground connections
2	WL/BT_ANT0	I/O	RF I/O port0
3	GND	—	Ground connections
4	GND	—	Ground connections
5	GND	—	Ground connections
6	GND	—	Ground connections
7	GND	—	Ground connections
8	GND	—	Ground connections
9	WL_ANT1	I/O	RF I/O port1
10	GND	—	Ground connections
11	GND	—	Ground connections
12	NC	O	No Connect
13	NC	—	No Connect
14	NC	—	No Connect
15	WL_REG_ON	I	Enable pin for WLAN device ON: pull high ; OFF: pull low

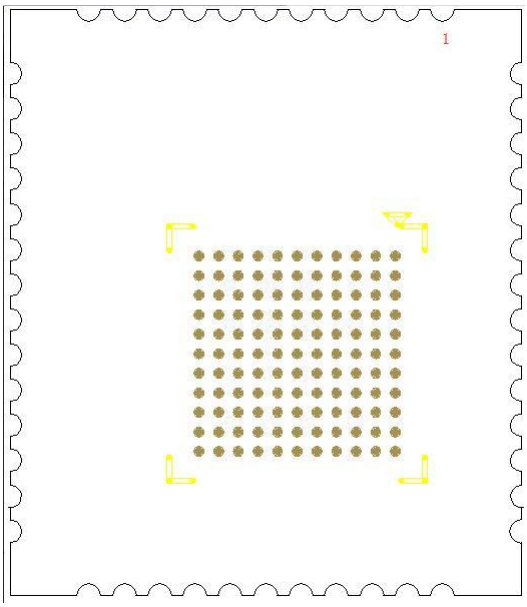
16	WL_HOST_WAKE	O	WLAN to wake-up HOST
17	SDIO_DATA_CMD	I/O	SDIO command line
18	SDIO_DATA_CLK	I/O	SDIO clock line
19	SDIO_DATA_3	I/O	SDIO data line 3
20	SDIO_DATA_2	I/O	SDIO data line 2
21	SDIO_DATA_0	I/O	SDIO data line 0
22	SDIO_DATA_1	I/O	SDIO data line 1
23	GND	—	Ground connections
24	OOB/GPIO4	I/O	Floating (For test mode selection)
25	NC	—	Floating (Don't connected to ground)
26	NC	—	Floating (Don't connected to ground)
27	PCM_SYNC	I/O	PCM sync signal
28	PCM_IN	I	PCM data input
29	PCM_OUT	O	PCM Data output
30	PCM_CLK	I/O	PCM clock
31	LPO	I	External Low Power Clock input (32.768KHz)
32	GND	—	Ground connections
33	NC	—	Floating (Don't connected to ground)
34	VDDIO	P	I/O Voltage supply input
35	NC	—	Floating (Don't connected to ground)
36	VBAT	P	Main power voltage source input
37	NC	—	No Connect
38	BT_REG_ON	I	Enable pin for Bluetooth device ON: pull high ; OFF: pull low
39	GND	—	Ground connections
40	UART_TXD	O	Bluetooth UART interface
41	UART_RXD	I	Bluetooth UART interface
42	UART_RTS_N	O	Bluetooth UART interface (internal GND)
43	UART_CTS_N	I	Bluetooth UART interface
44	SD_RESET	I	Shut down WLAN function when pulled low
45	NC	—	No Connect
46	NC	—	No Connect
47	NC	—	No Connect
48	NC	—	No Connect
49	HOST_WAKE_BT	I	HOST wake-up Bluetooth device
50	BT_ WAKE_HOST	O	Bluetooth device to wake-up HOST

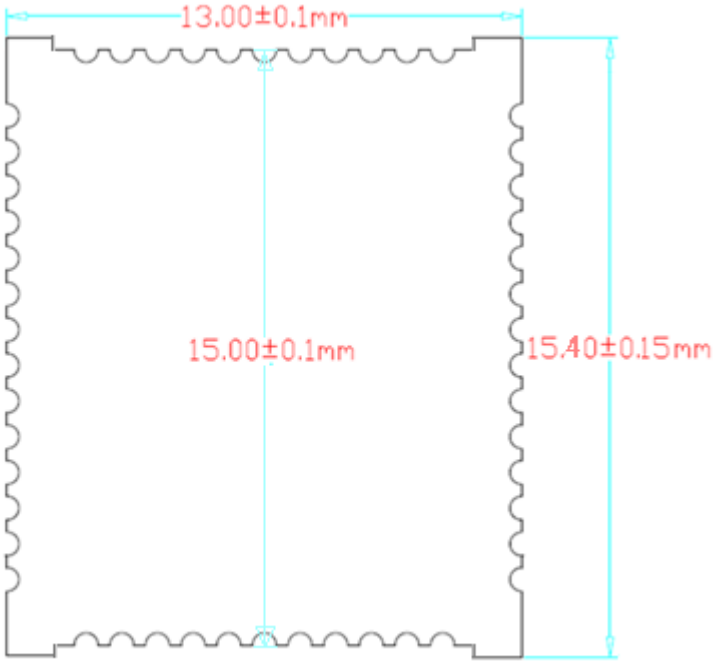
5. Dimensions

5.1 Physical Dimension (15mmx13mmx2.2mm)

(Unit: mm)

< TOP VIEW >

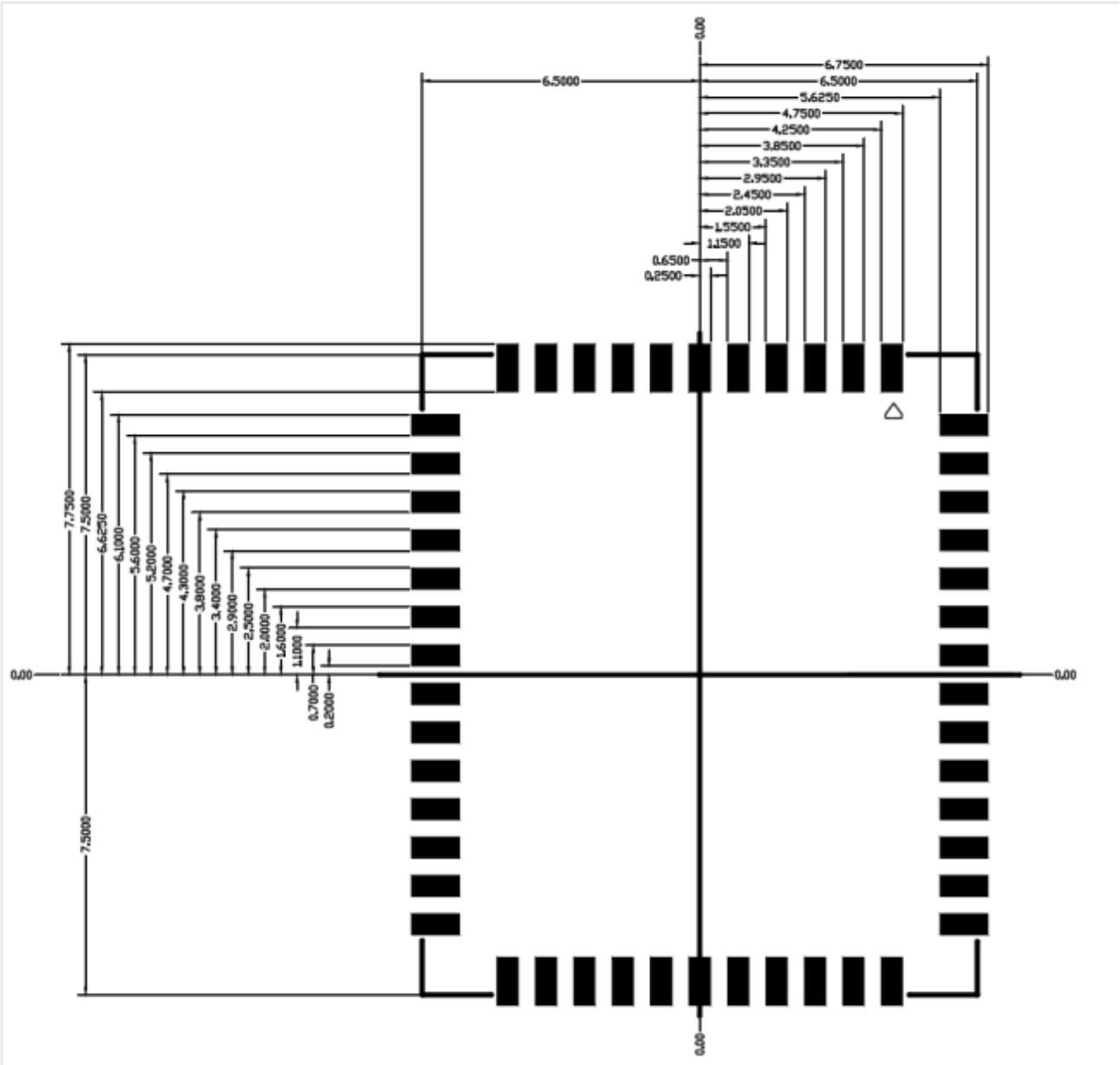




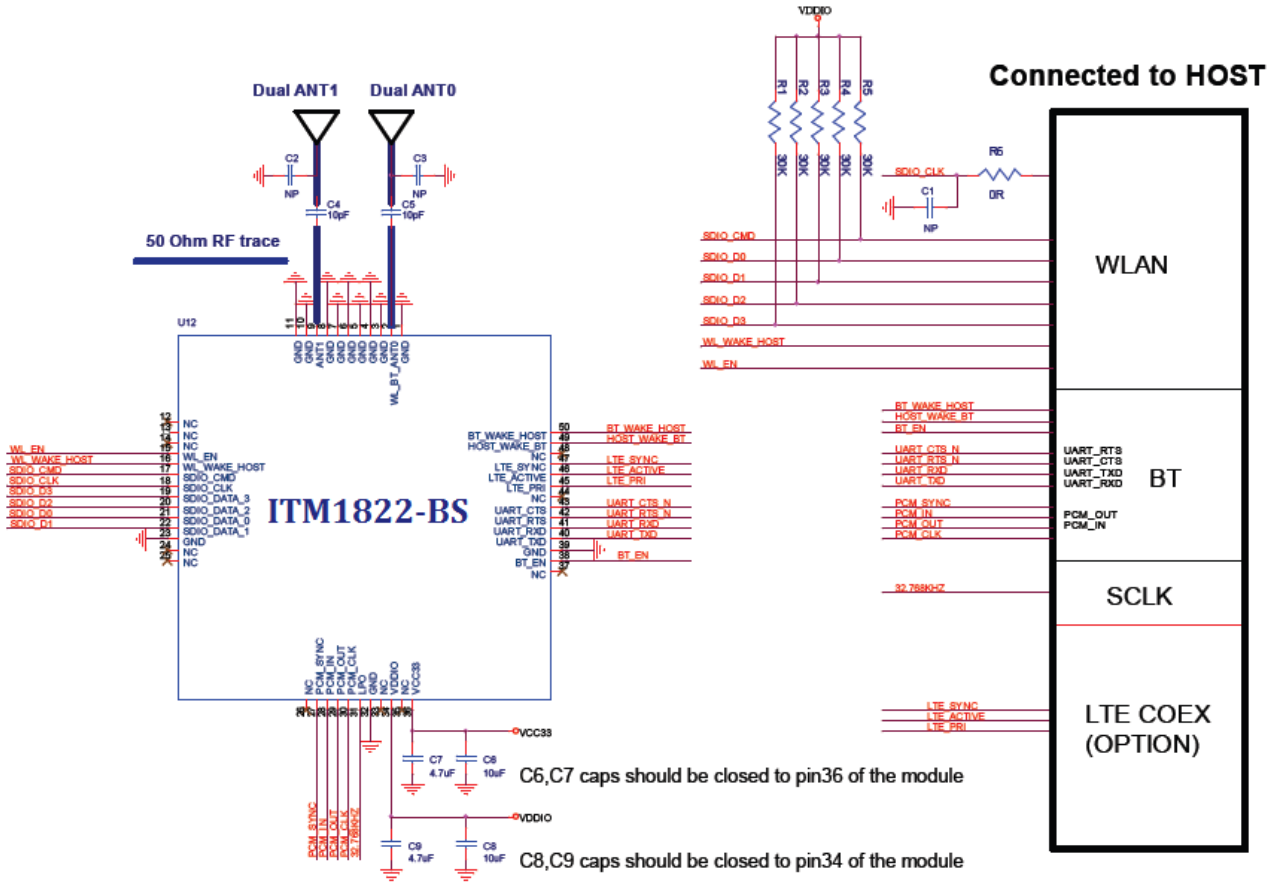
5.2 Layout Recommendation

(Unit: mm)

< TOP VIEW >



6. Reference Design

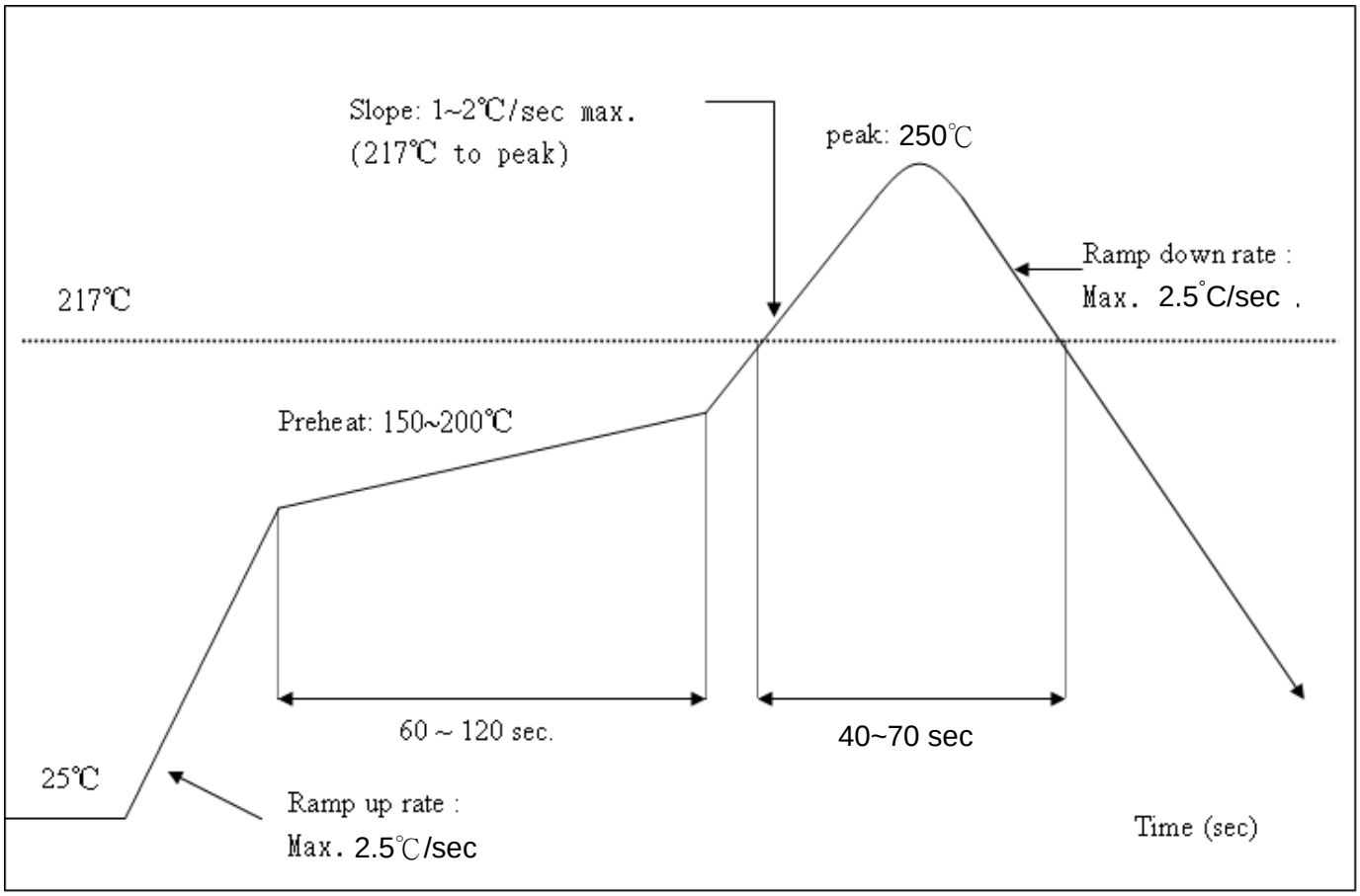


7. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

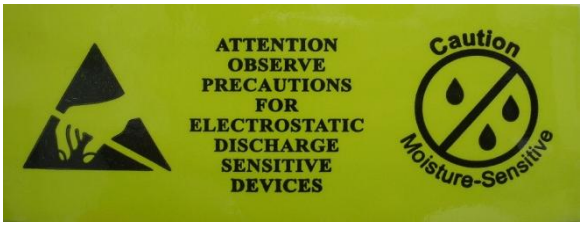
Number of Times : ≤2 times



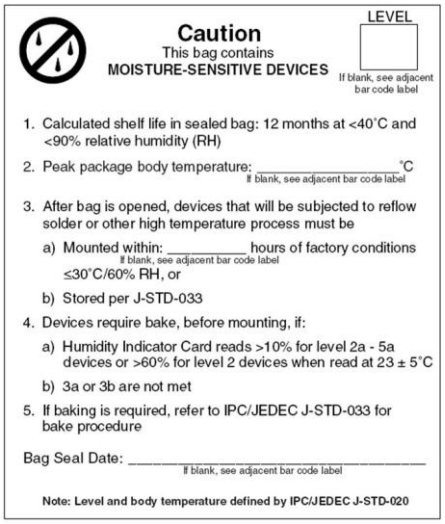
8. Packing Information

8.1 Label

Label A → Anti-static and humidity notice

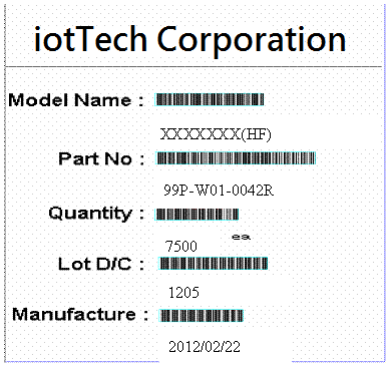


Label B → MSL caution / Storage Condition

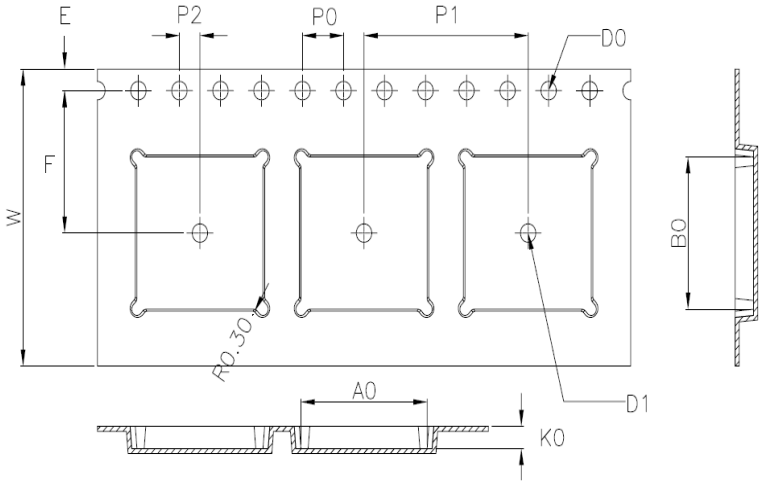


Label C → Inner box label .

Label D → Carton box label .

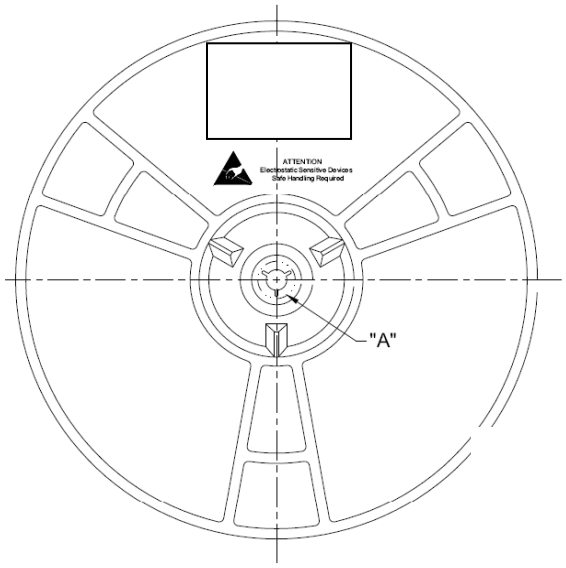


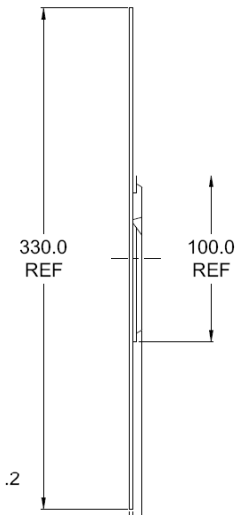
8.2 Packing Dimension

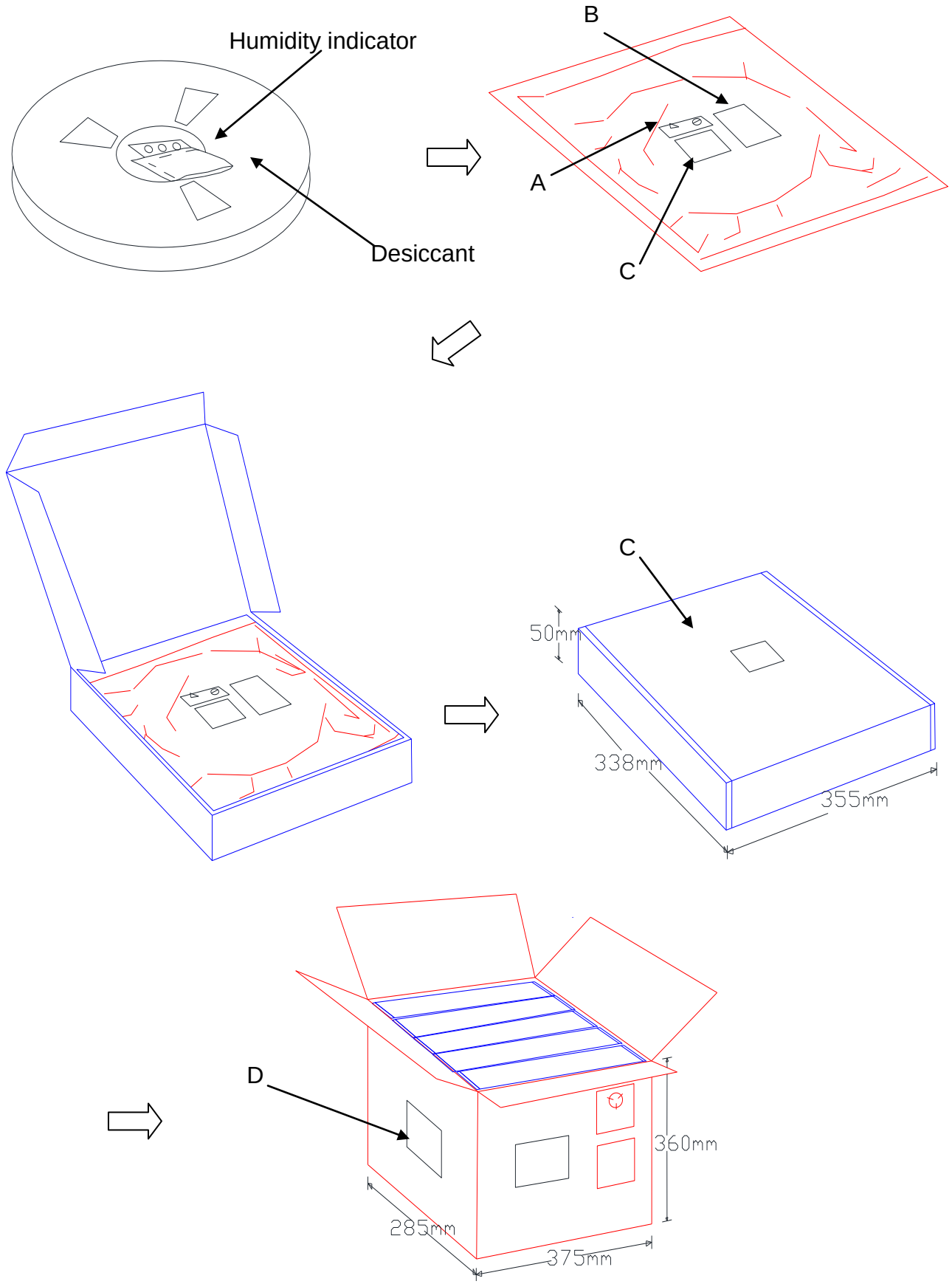


W	24.00±0.30
A0	13.30±0.10
B0	15.30±0.10
K0	1.95±0.10
E	1.75±0.10
F	130±0.10
P0	4.00±0.10
P1	16.50±0.10
P2	2.00±0.10
D0	1.50±0.05
D1	ø1.5MIN

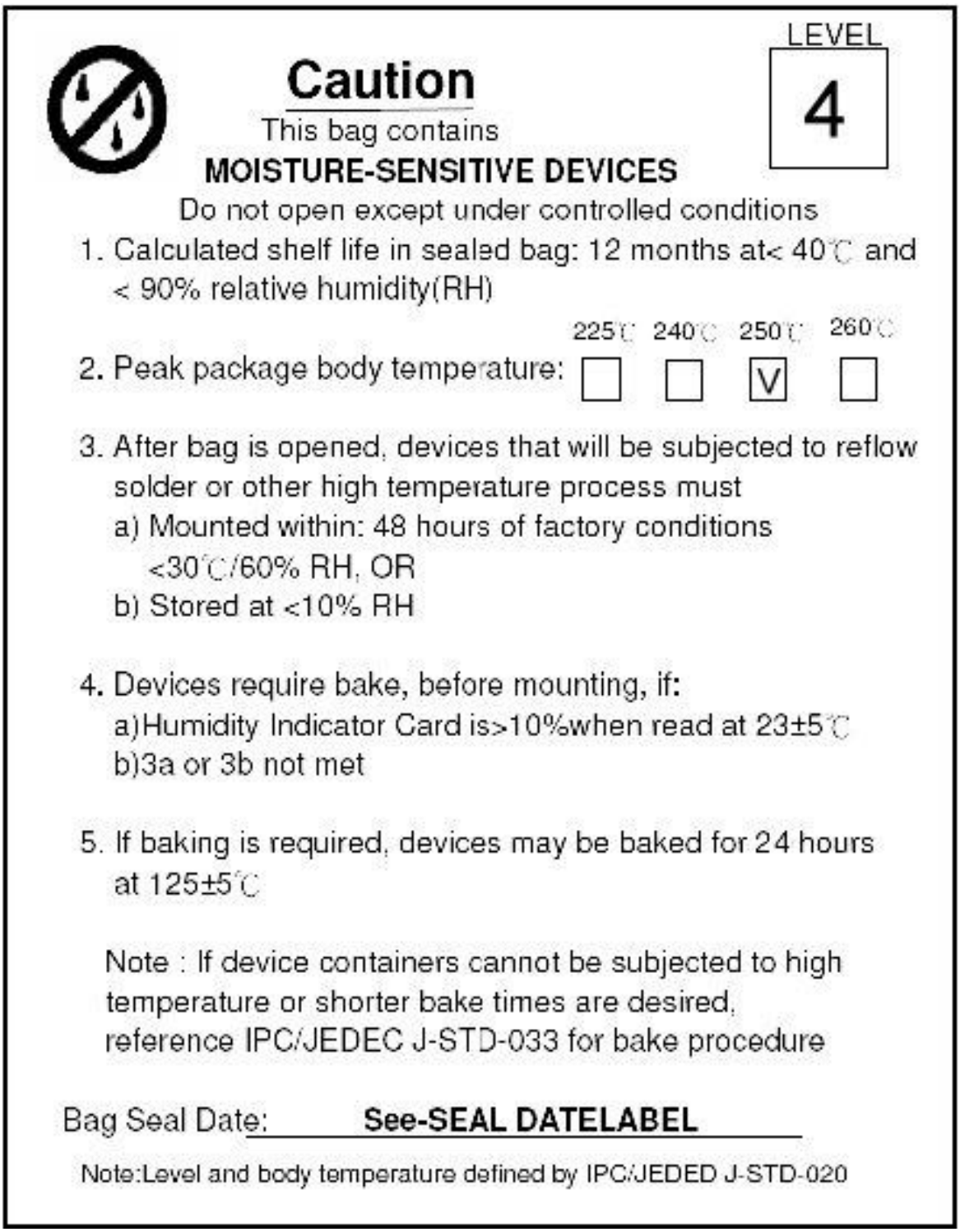
1. 10 sprocket hole pitch cumulative tolerance ±0.20.
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness : 0.30±0.05mm.
6. Packing length per 22" reel : 98.5 Meters.(1:3)
7. Component load per 13" reel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






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

8.3 MSL Level / Storage Condition



Caution

This bag contains

MOISTURE-SENSITIVE DEVICES

Do not open except under controlled conditions

LEVEL 4

1. Calculated shelf life in sealed bag: 12 months at< 40℃ and < 90% relative humidity(RH)
2. Peak package body temperature: 225℃ ☐ 240℃ ☐ 250℃ ☑ 260℃ ☐
3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must
   a) Mounted within: 48 hours of factory conditions <30℃/60% RH, OR
   b) Stored at <10% RH
4. Devices require bake, before mounting, if:
   a)Humidity Indicator Card is>10%when read at 23±5℃
   b)3a or 3b not met
5. If baking is required, devices may be baked for 24 hours at 125±5℃

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

Bag Seal Date: **See-SEAL DATELABEL**

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

※NOTE : Accumulated baking time should not exceed 96hrs