



iTM1058-C

IEEE 802.11b/g/n 1T1R WLAN Module Datasheet

Revision History

Date	Revision Content	Revised By	Version
2021/04/02	- Preliminary released	Jim Leng	1.0
2022/02/22	- Add module height information	Issac Chen	1.01
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1. General Description

The iotTech iTM1058-C is a low-cost and a highly integrated WLAN module which has all of the Wi-Fi functionalities. The highly integrated module makes the possibilities of web browsing, VoIP, headsets and other applications. With seamless roaming capabilities and advanced security, also could interact with all WIFI Access Points in the market.

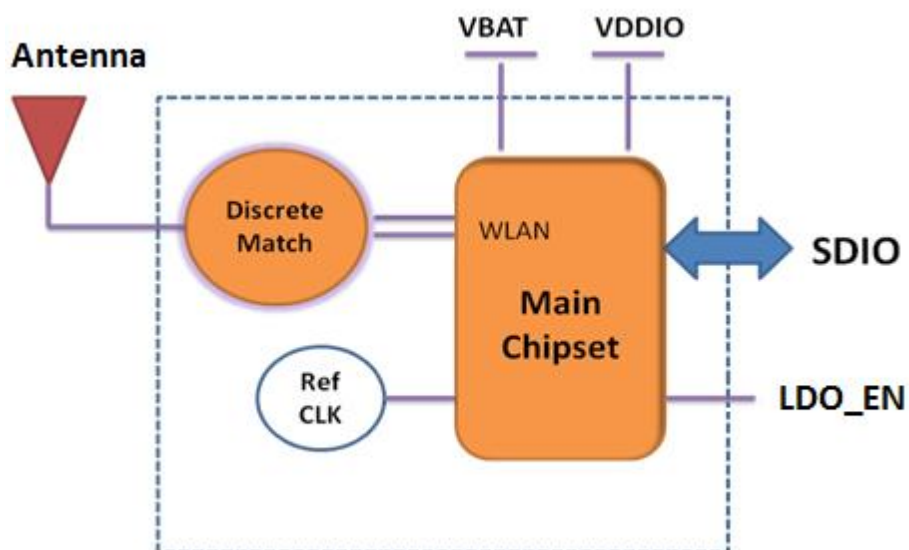
iTM1058-C is designed to support IEEE 802.11 b/g/n single stream with the state of-the-art design techniques and process technology to achieve low power consumption and high throughput performance to address the requirement of mobile and handheld devices. iTM1058-C low power function uses the innovative design techniques and the optimized architecture which best utilizes the advanced process technology to reduce active and idle power, and achieve extreme low power consumption at sleep state to extend the battery life.

This compact module iTM1058-C is a total solution for Wi-Fi technologies. It is specifically developed for portable devices, and can minimize the resource consumption of CPU and memory for enabling Wi-Fi communication. iTM1058-C provides SDIO host interface for external CPU.

2. Features

- Wi-Fi Chipset : iComm SV6158
- IEEE 802.11 b/g/n 1T1R
- Integrated 2.4GHz WLAN CMOS efficient power amplifier with internal power detector and closed loop power calibration
- Single stream 802.11n provides highest throughput and superior RF performance for embedded system.
- Security subsystem
 - AES/SHA/ECC HW crypto engine
 - 2304b e-fuse, TRNG
 - Wi-Fi Alliance WPA3 support
- Supports popular interfaces: SDIO 2.0 (50MHz, 4-bit and 1-bit) / SPI
- Low power feature
 - DTIM3: 210uA

The block diagram of iTM1058-C module is depicted in the figure 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
VDDIO	Digital IO/ SDIO 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	1.75	3.3	3.6	V

Note: The voltage of VDDIO is depended on system I/O voltage.

Test conditions: At operating temperature -20°C ~70°C				
Symbol	Min.	Typ.	Max.	Unit
VBAT	3.0	3.3	3.6	V
VDDIO	1.75	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		-95		dBm
	- 2Mbps		-93		dBm
	- 5.5Mbps		-91		dBm
	- 11Mbps		-88		dBm
RX Sensitivity 11g @ 10% PER	- 6Mbps		-91		dBm
	- 9Mbps		-90		dBm
	- 12Mbps		-88		dBm
	- 18Mbps		-86		dBm
	- 24Mbps		-82		dBm
	- 36Mbps		-79		dBm
	- 48Mbps		-74		dBm
	- 54Mbps		-73		dBm
Receive Sensitivity (11n,20MHz) @10% PER	- MCS0		-91		dBm
	- MCS=1		-88		dBm
	- MCS=2		-86		dBm
	- MCS=3		-81		dBm
	- MCS=4		-79		dBm
	- MCS=5		-74		dBm
	- MCS=6		-73		dBm
	- MCS=7		-72		dBm
Maximum Receive Level	802.11b		-10		dBm
	802.11g		-8		dBm
	802.11n		-8		dBm
Operating temperature	-30°C to 85°C				
Storage temperature	-40°C to 85°C				

3.3 Wi-Fi RF Specification (TX)

2.4G WLAN

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2412		2484	MHz
Output Power	802.11b	16.0	18.0		dBm
	802.11g	12.0	14.0		dBm
	802.11n	12.0	14.0		dBm
@EVM	802.11b		-30	-10	dB
	802.11g		-30	-25	dB
	802.11n		-30	-28	dB

3.4 Power Consumption

Table 14: Power Consumption at DCDC mode (DCDC buck convertor is enable)

WLAN Operational Modes	Typ. ^c	Unit
OFF ^a	<1	uA
Rx, CCK, 1 Mbps ^a	33	mA
Rx, OFDM, 54 Mbps ^a	33	mA
Rx, HT20, MCS7 ^a	33	mA
Rx, HT40, MCS7 ^a	33	mA
Tx, CCK, 1 Mbps@19dBm ^d	212	mA
Tx, OFDM, 54 Mbps@15dBm ^d	182	mA
Tx, HT20, MCS7@15dBm ^d	183	mA
Tx, HT40, MCS7@15dBm ^d	183	mA
Power-saving(MCU_off) ^b , DTIM1	0.43	mA
Power-saving(MCU_off) ^b , DTIM3	0.21	mA

Table 15: Power Consumption at LDO mode (DCDC buck convertor is disable)

WLAN Operational Modes	Typ. ^c	Unit
OFF ^a	<1	uA
Rx, CCK, 1 Mbps ^a	80	mA
Rx, OFDM, 54 Mbps ^a	80	mA
Rx, HT20, MCS7 ^a	80	mA
Rx, HT40, MCS7 ^a	80	mA
Tx, CCK, 1 Mbps@19dBm ^d	243	mA
Tx, OFDM, 54 Mbps@15dBm ^d	214	mA
Tx, HT20, MCS7@15dBm ^d	215	mA
Tx, HT40, MCS7@15dBm ^d	215	mA
Power-saving(MCU_off) ^b , DTIM1	1.20	mA
Power-saving(MCU_off) ^b , DTIM3	0.45	mA

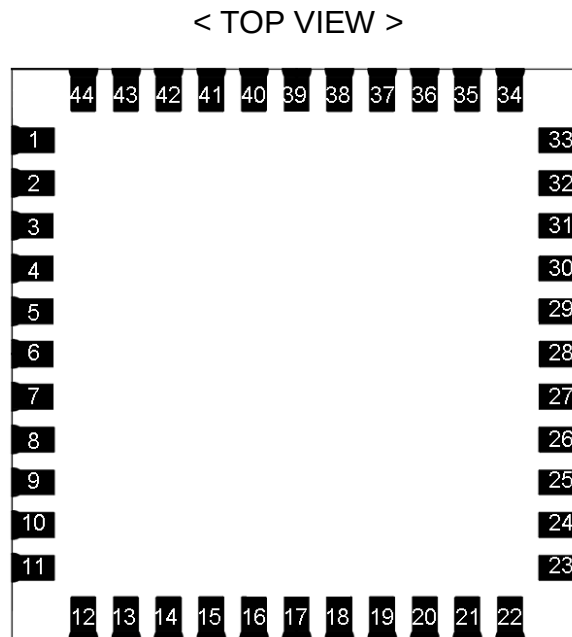
a. OFF mode test condition: VBAT=GND, RVDD33=GND, VDD=3.3V, LDO_EN=0V

b. Intra-beacon Sleep when MCU is turn off

c. Conditions: VBAT=GND, RVDD33=GND, VDD=3.3V

4. Pin Assignments

4.1 PCB Pin Outline (12mm x 12mm x 2.2mm)



4.2 Pin Definition

NO	Name	Type	Description
1	GND	G	Ground connections
2	RF_OUT	I/O	RF I/O port
3	GND	—	Ground connections
4	NC	—	Should not be connected
5	NC	—	Should not be connected
6	RESERVED	—	Should not be connected
7	RESERVED	—	Should not be connected
8	NC	—	Should not be connected
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	LDO_EN	I	WLAN device power enable/disable

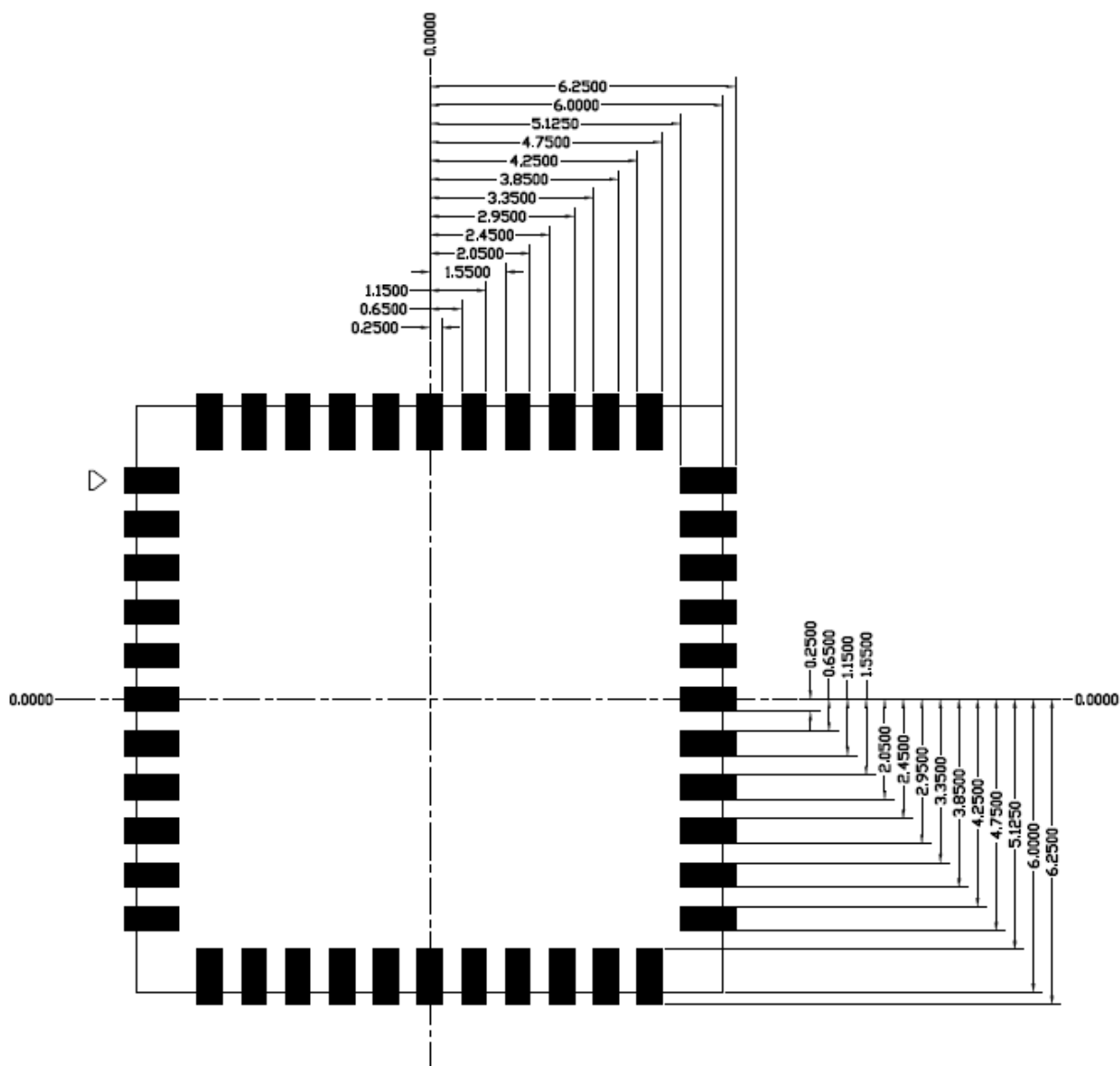
13	WL_HOST_WAKE	O	WLAN wake-up HOST
14	SDIO_DATA_2	I/O	SDIO data line 2
15	SDIO_DATA_3 / SPI_CSN	I/O	SDIO data line3 / SPI_CSN
16	SDIO_DATA_CMD / SPI_MOSI	I/O	SDIO command line / SPI_MOSI
17	SDIO_DATA_CLK / SPI_CLK	I/O	SDIO CLK line / SPI_CLK
18	SDIO_DATA_0 / SPI_MISO	I/O	SDIO data line 0 / SPI_MISO
19	SDIO_DATA_1	I/O	SDIO data line 1
20	GND	G	Ground connections
21	NC	—	Should not be connected
22	VDDIO	P	I/O Voltage supply input
23	NC	—	Should not be connected
24	NC	—	Should not be connected
25	NC	—	Should not be connected
26	NC	—	Should not be connected
27	NC	—	Should not be connected
28	NC	—	Should not be connected
29	NC	—	Should not be connected
30	NC	—	Should not be connected
31	GND	G	Ground connections
32	NC	—	Should not be connected
33	GND	G	Ground connections
34	MODE	I/O	Keep NC for SDIO mode (internal pulled LOW); External pulled HIGH by 10Kohm for SPI mode
35	NC	—	Should not be connected
36	GND	G	Ground connections
37	GPIO01 / LOG_TX	—	Should not be connected
38	GPIO00 / LOG_RX	—	Should not be connected
39	NC	—	Should not be connected
40	NC	—	Should not be connected
41	NC	—	Should not be connected
42	NC	—	Should not be connected
43	NC	—	Should not be connected
44	NC	—	Should not be connected

5. Dimensions

5.1 Layout Recommendation

(Unit: mm)

< TOP VIEW >

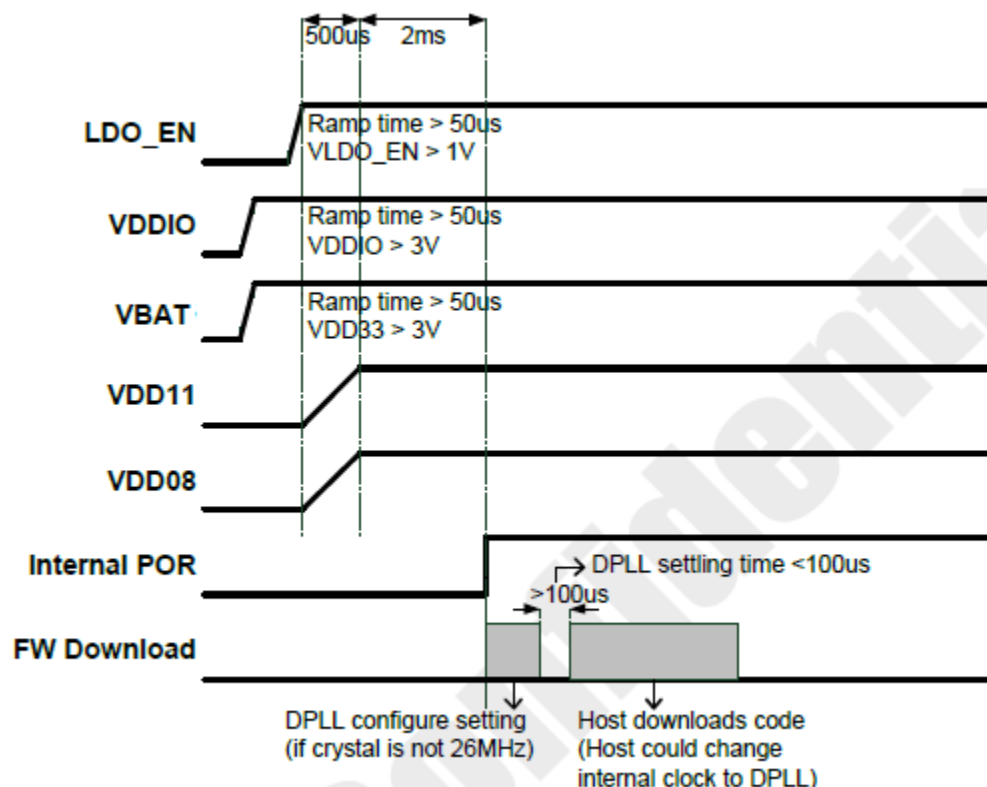


6. Host Interface Timing Diagram

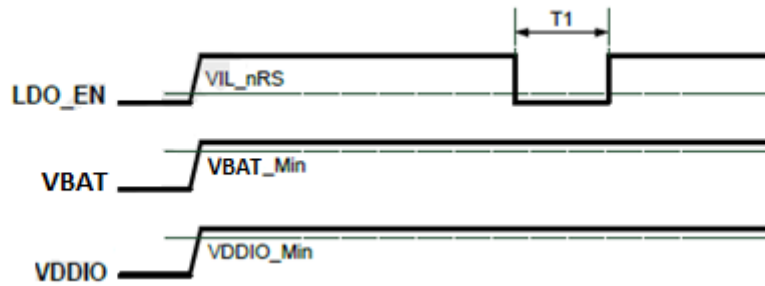
6.1 Power UP Sequence

Shows the below figure, the power-on sequence of the iTM1058-C from power-up to firmware download, including the initial device power-on reset evoked by LDO_EN signal. After initial power-on, the LDO_EN signal can be held low to turn off the iTM1058-C. After LDO_EN is assert and host starts the power-on sequence of the iTM1058-C. From that point, the typical power-on sequence is shown below:

1. Within $T1+2.5\text{ms}$, the internal power-on reset (POR) will be done. And host could download firmware code of DPLL setting if the crystal is not default setting, 26MHz. The internal running clock is crystal frequency.
2. After 100us of DPLL settling time, host could set internal clock to full speed and finish all the downloading of firmware code.



6.2 Reset Timing



Parameters	Description	Min.	Unit
T1	Duration of LDO_EN signal level < VIL_nRST(refer to its value in Table 9: Recommended Operating Conditions and DC Characteristics) to reset the chip	500	us

6.3 SDIO Characteristics

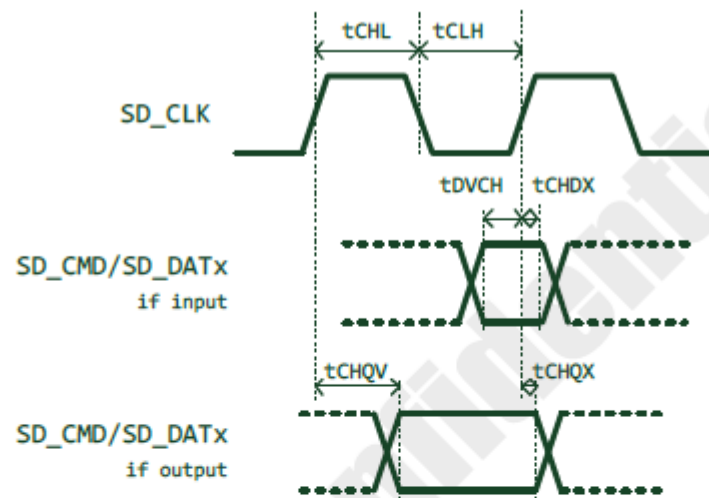
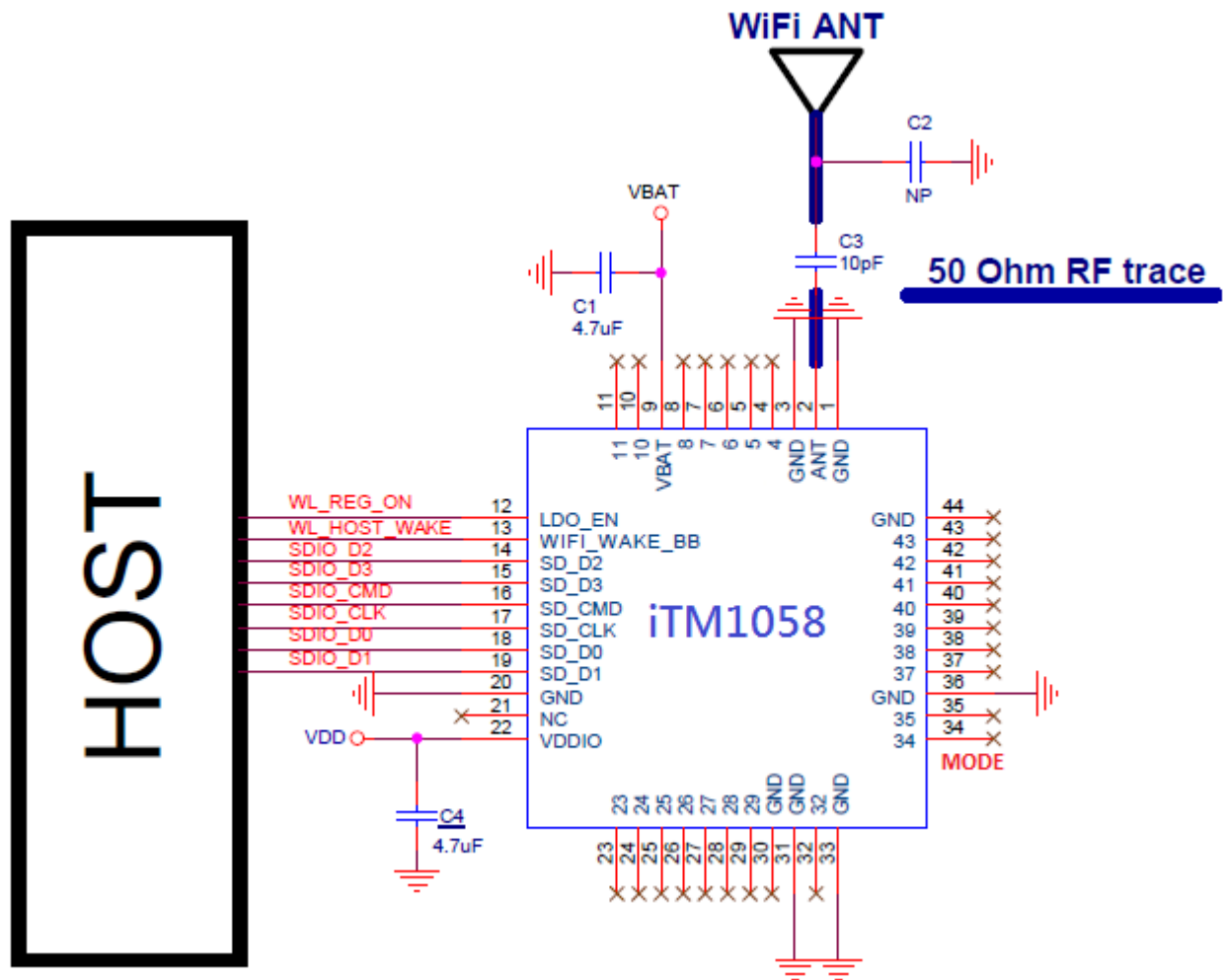


Figure 8: SDIO Timing

Table 3: SDIO Timing Specifications

Parameter	Condition/Notes	Min.	Typ.	Max.	Unit
SDIO clock frequency	—	(TBD)		50	Mhz
SDIO clock high time	tCHL	7	—	-	ns
SDIO clock low time	tCLH	7	-	-	ns
SDIO input setup time	tDVCH	6	-	-	ns
SDIO input hold time	tCHDX	2	-	-	ns
SDIO output delay	Min.: tCHQX, Max.: tCHQV	2.5	-	14	ns

7. Reference Design



CAUTION 1:

SDIO Mode: Pin34 should be NC or pulled-low when booting-up.

SPI Mode: Pin34 should be pulled-high when booting-up.

CAUTION 2:

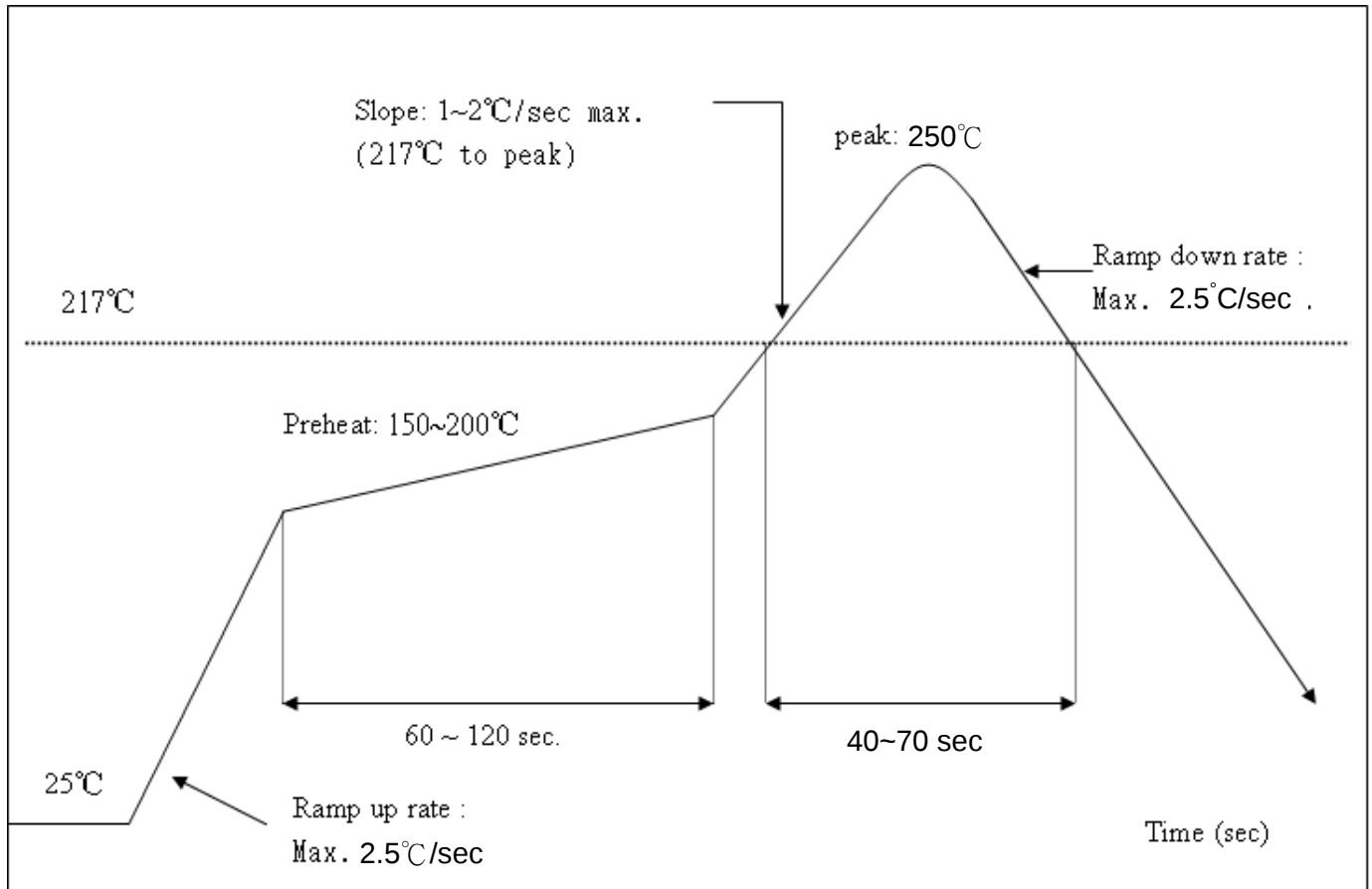
DO NOT connect any NC pin to external power, ground or signal.

8. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

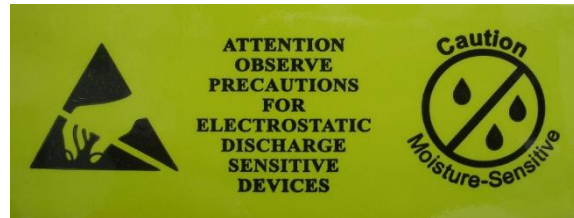
Number of Times : ≤ 2 times



9. Packing Information

9.1 Label

Label A → Anti-static and humidity notice



Label B → MSL caution / Storage Condition

	Caution	LEVEL
	This bag contains MOISTURE-SENSITIVE DEVICES	 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: _____ °C # 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: _____ hours of factory conditions # 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: _____ # blank, see adjacent bar code label Note: Level and body temperature defined by IPC/JEDEC J-STD-020		

Label C → Inner box label .

PKG S/N :	
Model:	
P/N :	
Qty :	
Date Code :	
Lot Code :	

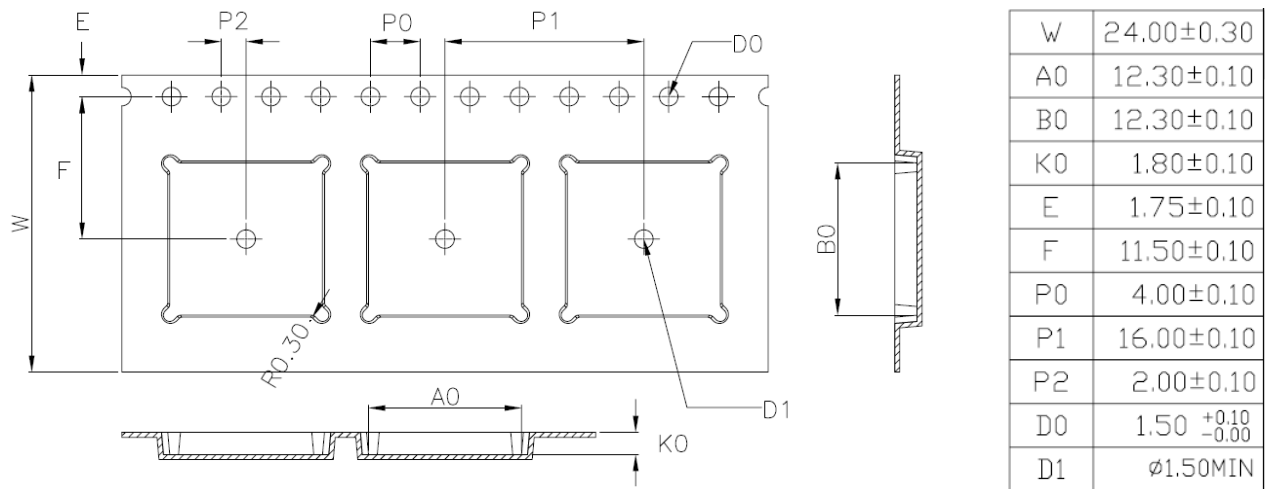
PKG S/N : 9PKG12013100001
 Model: XXXXXXXX(HF)
 P/N : 99P-W01-0042R
 Qty : 1500
 Date Code : 1205
 Lot Code : T0C102B

Label D → Carton box label .

iotTech Corporation	
Model Name :	
Part No :	
Quantity :	
Lot D/C :	
Manufacture :	

Model Name : XXXXXXXX(HF)
 Part No : 99P-W01-0042R
 Quantity : 7500
 Lot D/C : 1205
 Manufacture : 2012/02/22

9.2 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.

