K019-CW43-DW

EEE802.11a/b/g/n/ac Wireless LAN With Bluetooth 5.0

Combo Stamp Module

DATASHEET

REV: 1.6

DATA: 26.04.2020

This specification may be changed with the improvement of the product. Please refer to the latest version of the usermanual Keiiot reserves the right of final interpretation and modification of all contents of this specification.

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Revision History

Date	Revision Content	Revised By	Version
2018/05/13	- Preliminary	Bob	1.0
2018/05/23	- Pin Definition Modified	Bob	1.1
2018/06/26	- Add Process	Shawn	1.2
2019/07/10	- Changed BT4.2 to BT5.0	Shawn	1.3
2020/01/06	- Add QDID	Shawn	1.4
2020/04/15	- Changed PIN29 SDIO_VOLT_SEL	Shawn	1.5
2020/04/26	- Add power consumption	Shawn	1.6

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Federal Communication Commission Interference Statement

This K019-CW43-DW complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This K019-CW43-DW may not cause harmful interference, and (2) this module must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

This K019-CW43-DW meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

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Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum

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distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

Antenna Type	2.4~2.4835GHz: Dipole Antenna with 0~2 dBi peak gain 5180 ~5240MHz: Dipole Antenna with 5 dBi peak gain 5260 ~5320MHz: Dipole Antenna with 5 dBi peak gain 5500 ~5700MHz: Dipole Antenna with 5 dBi peak gain 5745 ~5825MHz: Dipole Antenna with 2 dBi peak gain
Antenna connector	R-SMA

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: "**Contains FCC ID: S4LFF50**". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule

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requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Manual Information To the End User:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

Industry Canada statement

This K019-CW43-DW complies with ISED's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Le présent appareil est conforme aux CNR d' ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

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1. Introduction

1.1 About KEIIOT

KERTONG Polytron Technologies Inc was established in Shenzhen in 2005. It is located in Xixiang, Shenzhen, Baoan. It is a high-tech enterprise specializing in the radio - related radio frequency series module application and the integrated solution platform of the products. At present, the product lines are: wireless network WIFI access module, wireless routing application module, wireless Bluetooth module, wireless Bluetooth box module, NFC communication module, GPS navigation module, Zigbee control module, wireless communication module and so on, as well as related module application solutions. The company has a complete set of 60 radio frequency integrated testers, 10 communication integrated testers, with a variety of wireless testing standards.

1.2 Product Overview

KERTONG to announce a low-cost and low-power consumption the combo module of K019-CW43-DW model which has all of the WiFi(IEEE802.11a/b/g/n/ac), Bluetooth (5.0) functionalities. And the highly integrated module makes the possibilities of web browsing Mini audio; Wireless projector; TV Box; Bluetooth POS.ect and other applications. With seamless roaming capabilities and advanced security, also could interact with different vendors' 802.11 a/b/g/n/ac Access Points in the wireless LAN.

This K019-CW43-DW module using the chipset from CYPRESS's the CYW43455 with IEEE 802.11ac mode, the WLAN operation supports rates of MCS0–MCS9 (up to 256 QAM) in 20 MHz, 40 MHz, and 80 MHz channels for data rates of up to 433.3 Mbps. All rates specified in the IEEE 802.11a/b/g/n are supported. Included on-chip are 2.4 GHz and 5 GHz transmit amplifiers and receive low-noise amplifiers. Optional external PAs and LNAs are also supported. WLAN section supports the following host interface options: an SDIO v3.0 interface that can operate in 4b or 1b mode, a highspeed 4-wire UART, and a PCIe Gen1 (3.0 compliant) interface. The Bluetooth section supports a high-speed 4-wire UART interface.

The K019-CW43-DW module complies with IEEE 802.11 a/b/g/n/ac standard and it can achieve up to a speed of 433.3Mbps with single stream in 802.11ac draft to connect to the wireless LAN. The integrated module provides SDIO interface for Wi-Fi, UART / PCM interface for Bluetooth.

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2. Features

2.1 WLAN

- IEEE 802.11a/b/g/n/ac dual-band radio with virtual-simultaneous dual-band operation
- Single-stream spatial multiplexing up to 433.3 Mbps data rate.
- Supports 20, 40, 80 MHz channels with optional SGI(256 QAM modulation)
- Low power consumption and high performance
- Supports standard SDIO v3.0 and backward compatible with SDIO v2.0 host interfaces. - SDIO v3.0(4-bit) — up to 208 MHz clock rate in SDR104 mode
- Fully speed operation with Piconet and Scatternet support
- Backward compatible with SDIO v2.0 host interfaces
- PCIe mode complies with PCI Express base specification revision 3.0 compliant Gen1 interface for ×1 lane and power management base specification.
- SZIE：12mm * 12mm * 1.5mm (L*W*H) LGA package

2.2 Bluetooth

- Complies with Bluetooth Core Specification Version 5.0 with provisions for supporting future specifications
- Simultaneous BT/WLAN reception with a single antenna
- Enhanced Data Rate(EDR) compliant for both 2Mbps and 3Mbps supported
- Interface support, host controller interface (HCI) using a highspeed UART interface and PCM for audio data.
- BT UART (up to 4 Mbps) host digital interface that can be used concurrently with the above WLAN host interfaces.
- Mesh Internet (many to many)

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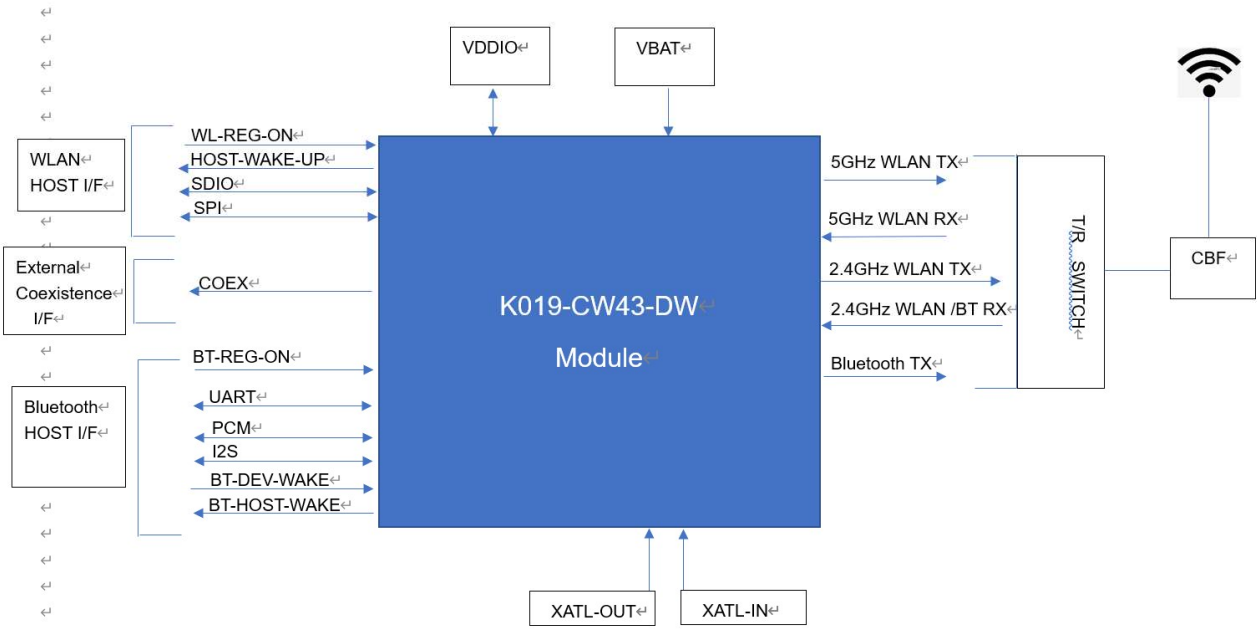
2.4 Block Diagram

A simplified block diagram of the K019-CW43-DW module is depicted in the figure below:



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3. Specification Table

3.1 General Specification

Major Chipset	Cypress CYW43455
Model Name	K019-CW43-DW
Product Description	Support WiFi/Bluetooth functionalities
Dimension	L x W x H: 12 x 12 x 1.5mm
WiFi Host Interface	Support SDIO v2.0/v3.0
BT Interface	UART / PCM
Operating	-30°C to 85°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing

3.2 Voltages (Absolute Maximum Ratings)

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.5	6	V
WL_VIO_SD	Digital/Bluetooth/SDIO/ I/O Voltage	-0.5	3.9	V

Results (2.4GHz)

Test Mode	DUT Status	Supply Voltage	Supply Voltage
		VBAT 3.3V	**VDDIO3.3.V**
802.11b 11Mbps	Continue TX	317.5mA	0.927mA
	Continue RX	57.8mA	0.879mA
802.11g 54Mbps	Continue TX	240.2mA	0.917mA
	Continue RX	57.8mA	0.879mA
802.11n MSC7	Continue TX HT20	231.9mA	0.903mA
	Continue RX HT20	57.8mA	0.879mA

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Results (5.8GHz)

Test Mode	DUT Status	Supply Voltage	Supply Voltage
		VBAT 3.3V	VDDIO3.3.V
802.11a 54ps	Continue TX	210.3mA	0.941A
	Continue RX	73.5mA	0.879mA
802.11n MCS7	Continue TX HT20	182.4mA	0.918mA
	Continue RX HT20	73.5mA	0.907mA
	Continue TX HT40	180.1mA	0.925mA
	Continue RX HT40	73.2mA	0.903mA
802.11ac MCS8	Continue TX HT20	180.1mA	0.926mA
	Continue RX HT20	83.1mA	0.9mA
	Continue TX HT40	177.5mA	0.928mA
	Continue RX HT40	83.2mA	0.912mA
	Continue TX HT80	195.6mA	0.93mA
	Continue RX HT80	112mA	0.912mA
802.11ac MCS9	Continue TX HT40	184.7mA	907.5uA
	Continue RX HT40	84.1mA	896uA
	Continue TX HT80	193.9mA	907.3uA
	Continue RX HT80	113mA	901uA

Requirement To measure the average current consumption in different working status.

Status		Supply Voltage	Supply Voltage
		VBAT 3.3V	VDDIO3.3.V
ITEM	All OFF	2.2uA	488.7uA
WiFi	WiFi on mode	4.2mA	843.8uA
	WiFi scan mode	4.2mA	843.8uA
	WiFi Link mode	4.6mA	847uA
	RX throughput test(HT20)	83.8mA	843uA
	TX throughput test(HT20)	305mA	1mA

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BT	BT ON	4.5mA	268.2uA
	BT scan mode	4.5mA	268.2uA
	BT pair with phone	4.5mA	268.2uA
	BT sleep mode	4.0uA	296.7uA
	FTP test	9.2mA	268.2uA

3.3 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-30	25	85	deg.C
VBAT	3.0	3.6	4.8	V
VDDIO	1.71	1.8	3.63	V

※NOTE: The K019-CW43-DW module requires two power supplies: VBAT and VDDIO

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3.4 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11b/g/n, WiFi compliant	
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)	
Channels	2.4GHz：Ch1 ~ Ch11 (by software to setting country code) default	
	2.4GHz：Ch1 ~ Ch13 (by software to setting country code)	
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK	
Output Power	802.11b /CCK: 16 dBm ± 1.5 dB @ EVM ≤ -9dB	
	802.11g //64-QAM(R=3/4) : 15 dBm ± 1.5 dB @ EVM ≤ -25dB	
	802.11n /802.11n /64-QAM(R=5/6) : 14 dBm ± 1.5 dB @ EVM ≤ -28dB	
(20MHz) **Receive Sensitivity (11n) @10% PER**	- MCS=0	PER @ -88 dBm, typical
	- MCS=1	PER @ -84 dBm, typical
	- MCS=2	PER @ -82 dBm, typical
	- MCS=3	PER @ -80 dBm, typical
	- MCS=4	PER @ -77 dBm, typical
	- MCS=5	PER @ -73 dBm, typical
	- MCS=6	PER @ -71 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
Receive Sensitivity (11g) @10% PER	- 6Mbps	PER @ -89 dBm, typical
	- 9Mbps	PER @ -87 dBm, typical
	- 12Mbps	PER @ -87 dBm, typical
	- 18Mbps	PER @ -85 dBm, typical
	- 24Mbps	PER @ -83 dBm, typical
	- 36Mbps	PER @ -79 dBm, typical
	- 48Mbps	PER @ -75 dBm, typical
	- 54Mbps	PER @ -72 dBm, typical
Receive Sensitivity (11b) @8% PER	- 1Mbps	PER @ -94 dBm, typical
	- 2Mbps	PER @ -89 dBm, typical
	- 5.5Mbps	PER @ -87 dBm, typical
	- 11Mbps	PER @ -85 dBm, typical
(40MHz) **Receive Sensitivity (11n)**	- MCS=0	PER @ -88 dBm, typical
	- MCS=1	PER @ -84 dBm, typical
	- MCS=2	PER @ -82 dBm, typical

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	- MCS=3	PER @ -80 dBm, typical
@10% PER	- MCS=4	PER @ -76 dBm, typical
	- MCS=5	PER @ -74 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -67 dBm, typical
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Type	2.4~2.4835GHz: Dipole Antenna with 0~2 dBi peak gain	

3.5 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11b/g/n, WiFi compliant	
Frequency Range	4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)	
Channels	5.15GHz~5.25GHz (5180, 5200,5220,5240,5260) 5.25GHz~5.35GHz (5280,5300,5320) 5.5GHz~5.7GHz (5520,5540,5560,5580,5600,5620,5640,5660,5680,5700) 5.725GHz~5.825GHz (5745,5765,5785,5805,5825)	
Modulation	802.11a/n : 64-QAM,16-QAM, QPSK, BPSK 802.11ac : 256-QAM, 64-QAM,16-QAM, QPSK, BPSK	
Output Power	802.11a /64-QAM(R=3/4) : 14 dBm ± 1.5 dB @ EVM ≤ -25dB	
	802.11n /64-QAM(R=5/6) : 13 dBm ± 1.5 dB @ EVM ≤ -28dB	
	802.11ac/256-QAM(R=3/4) : 12 dBm ± 1.5 dB @ EVM ≤ -30dB	
	802.11ac/256-QAM(R=5/6) : 10 dBm ± 1.5 dB @ EVM ≤ -32dB	
(20MHz) **Receive Sensitivity (11n) @10% PER**	- MCS=0	PER @ -90 dBm, typical
	- MCS=1	PER @ -88 dBm, typical
	- MCS=2	PER @ -86 dBm, typical
	- MCS=3	PER @ -83 dBm, typical
	- MCS=4	PER @ -77 dBm, typical
	- MCS=5	PER @ -73 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -69 dBm, typical
(20MHz)	- 6Mbps	PER @ -90dBm, typical
	- 9Mbps	PER @ -88 dBm, typical
	- 12Mbps	PER @ -86 dBm, typical

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Receive Sensitivity (11g) @10% PER	- 18Mbps	PER @ -85 dBm, typical
	- 24Mbps	PER @ -81 dBm, typical
	- 36Mbps	PER @ -79 dBm, typical
	- 48Mbps	PER @ -75 dBm, typical
	- 54Mbps	PER @ -72 dBm, typical
(40MHz) Receive Sensitivity (11n) @10% PER	- MCS=0	PER @ -87 dBm, typical
	- MCS=1	PER @ -85 dBm, typical
	- MCS=2	PER @ -83 dBm, typical
	- MCS=3	PER @ -78 dBm, typical
	- MCS=4	PER @ -76 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -69 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
（20MHz) Receive Sensitivity (11ac) @10% PER	- MCS=0	PER @ -89 dBm, typical
	- MCS=1	PER @ -87 dBm, typical
	- MCS=2	PER @ -84 dBm, typical
	- MCS=3	PER @ -81 dBm, typical
	- MCS=4	PER @ -79 dBm, typical
	- MCS=5	PER @ -76 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -71 dBm, typical
	- MCS=8	PER @ -68 dBm, typical
（40MHz) Receive Sensitivity (11ac) @10% PER	- MCS=0	PER @ -86 dBm, typical
	- MCS=1	PER @ -82 dBm, typical
	- MCS=2	PER @ -80 dBm, typical
	- MCS=3	PER @ -77 dBm, typical
	- MCS=4	PER @ -76 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -68 dBm, typical
	- MCS=7	PER @ -66 dBm, typical
	- MCS=8	PER @ -64 dBm, typical
	- MCS=9	PER @ -62 dBm, typical
（80MHz) Receive Sensitivity (11ac)	- MCS=0	PER @ -81 dBm, typical
	- MCS=1	PER @ -79 dBm, typical
	- MCS=2	PER @ -77 dBm, typical
	- MCS=3	PER @ -75 dBm, typical
	- MCS=4	PER @ -71 dBm, typical

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@10% PER	- MCS=5	PER @ -68 dBm, typical
	- MCS=6	PER @ -65 dBm, typical
	- MCS=7	PER @ -61 dBm, typical
	- MCS=8	PER @ -59 dBm, typical
	- MCS=9	PER @ -59 dBm, typical
Maximum Input Level	802.11a/n : -20 dBm	
	802.11ac : -30 dBm	
Antenna Type	5180 ~5240MHz: Dipole Antenna with 5 dBi peak gain	
	5260 ~5320MHz: Dipole Antenna with 5 dBi peak gain	
	5500 ~5700MHz: Dipole Antenna with 5 dBi peak gain	
	5745 ~5825MHz: Dipole Antenna with 2 dBi peak gain	

- WLAN 5GHz:

Operations in the 5.15-5.35GHz band are restricted to indoor usage only.

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3.6 Bluetooth Specification

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

Feature	Description		
Bluetooth Standard	Bluetooth V5. 0 and UP to 4 Mbps.		
QDID Number	121361		
Declaration ID	D040197		
	https://launchstudio.bluetooth.com/ListingDetails/72609		
Host Interface	UART		
Antenna Reference	Antennas with 0~2 dBi peak gain		
Frequency Band	2402MHz ~ 2480MHz		
Number of Channels	79 channels		
Modulation	FHSS, GFSK, DPSK, DQPSK		
	Min.	**Typical.**	**Max.**
Output Power (Class 1.5)		9 dBm	
Output Power (Class 2)		2 dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

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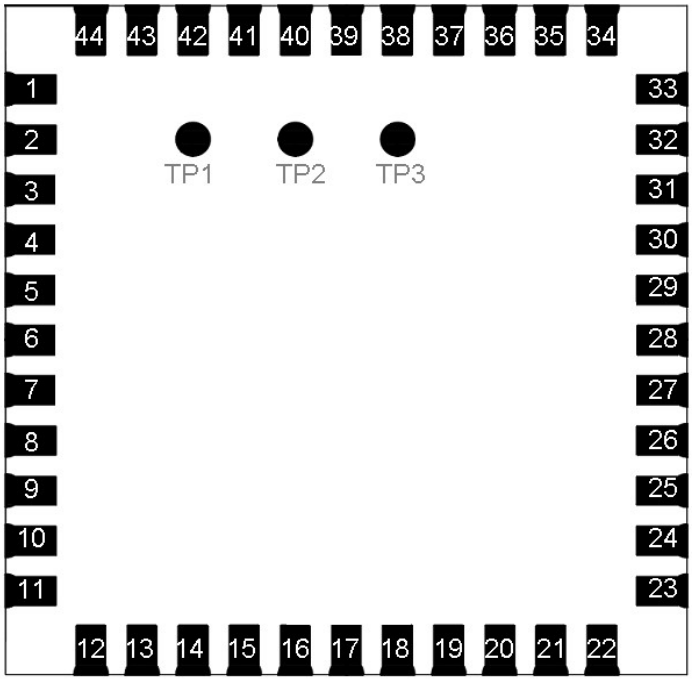
4. Pin Assignments

4.1 Pin Map

< TOP VIEW >



4.2 Pin Table

NO	Name	Type	Description
1	GND	—	Ground connections
2	WL_BT_ANT	I/O	WLAN/BT (RF->TX/RX) patch
3	GND	—	Ground
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	XTAL_IN	I	Crystal input
11	XTAL_OUT	O	Crystal output
12	WL_REG_ON	I	Internal regulators power up/down

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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	—	Ground connections
21	VIN_LDO_OUT	P	Internal Buck voltage generation pin
22	VDDIO	P	I/O Voltage supply input
23	VIN_LDO	P	Internal Buck voltage generation pin
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	WL_VDD_TCXO	I/O	SDIO_VOLT_SEL
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	GPIO4	I/O	WiFi Co-existence pin with LTE
38	GPIO3	I/O	WiFi Co-existence pin with LTE
39	GPIO2	I/O	WiFi Co-existence pin with LTE
40	GPIO1	I/O	WiFi Co-existence pin with LTE
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	O	Floating (Don't connected to ground)
46	TP2	O	Floating (Don't connected to ground)
47	TP3 (NC)	—	Floating (Don't connected to ground)

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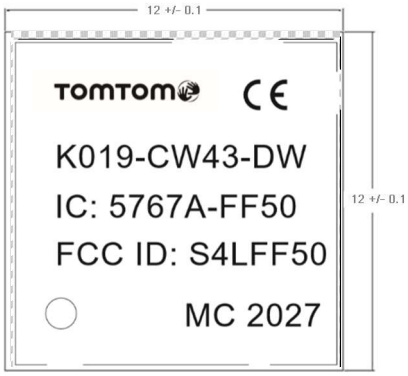
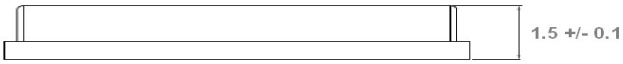
5. Mechanical and Layout Design

※NOTE (Unit:mm)

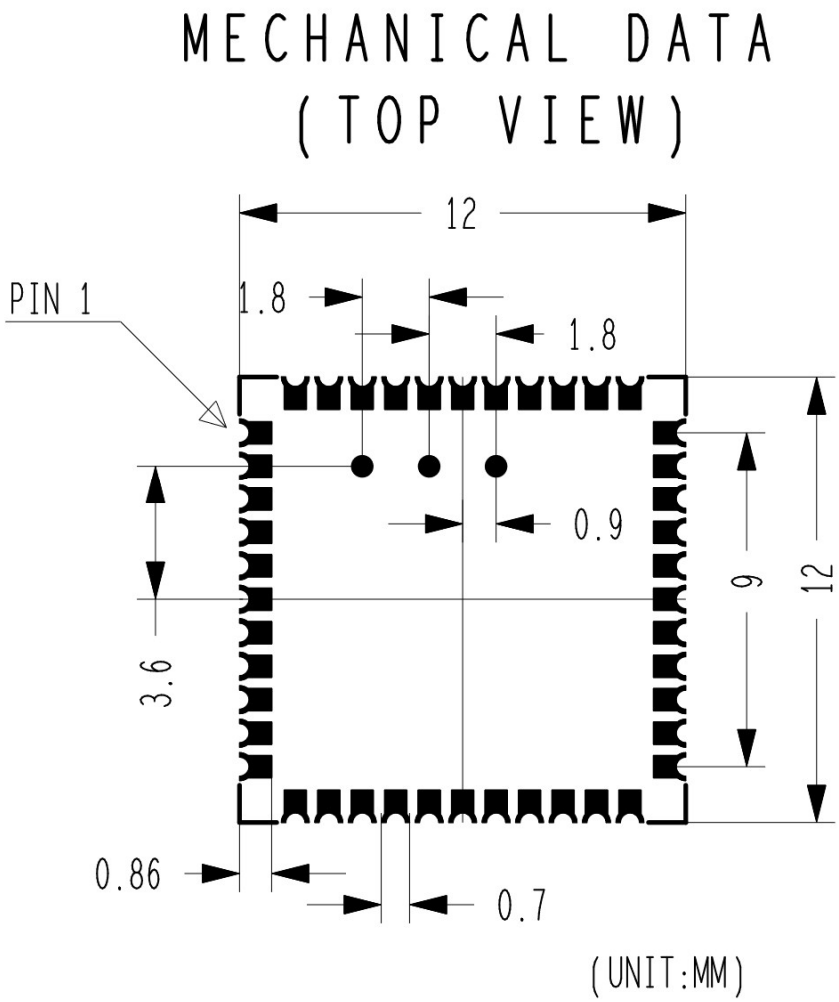
< TOP VIEW >



< Side View >



< TOP VIEW >



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6. Frequency References

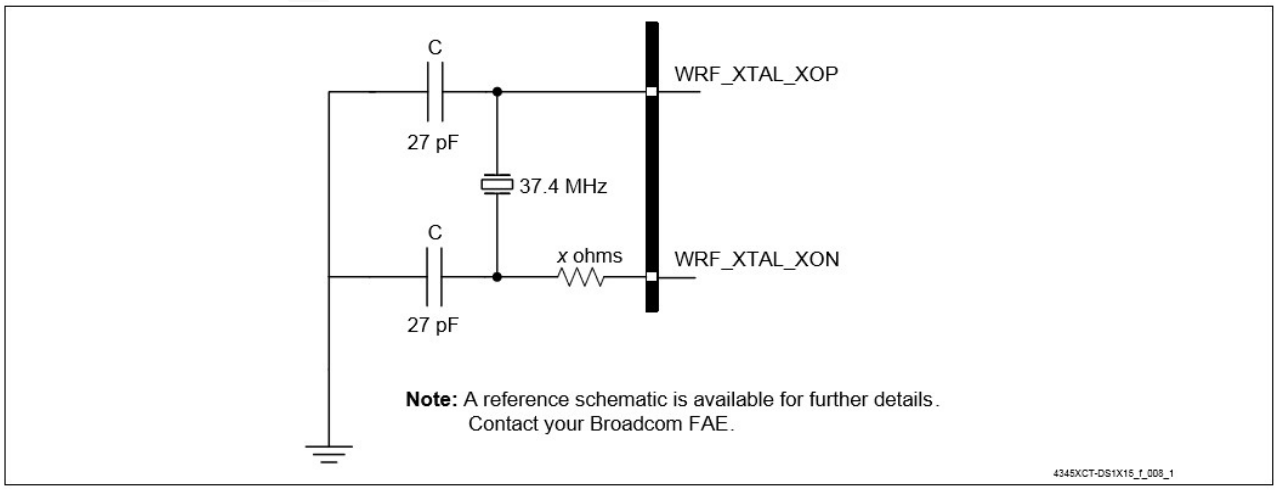
6.1 External Clock Reference

The module uses a secondary low-frequency sleep clock for low-power mode timing. Either the internal low-precision LPO or an external 32.768 kHz precision oscillator is required. The internal LPO frequency range is approximately 33 kHz ± 30% over process, voltage, and temperature, which is adequate for some applications. However, one trade-off caused by this wide LPO tolerance is a small current consumption increase during power save mode that is incurred by the need to wake up earlier to avoid missing beacons.

External LPO signal characteristics:

Parameter	Specification	Units
Nominal input frequency	32.768	kHz
Frequency accuracy	±20	ppm
Duty cycle	30 - 70	%
Input signal amplitude	400 to 1800	mV, p-p
Signal type	Square-wave or sine wave	-
Input impedance	>100k	Ω
	<5	pF
Clock jitter (integrated over 300Hz – 15KHz)	<10,000	ppm

External LPO signal characteristics:



A fractional-N synthesizer in the CYW43455 generates the radio frequencies, clocks, and data/packet timing, enabling it to operate using a wide selection of frequency references.

The recommended default frequency reference is a 37.4 MHz crystal. The signal characteristics for the crystal interface are listed in

6.2 SDIO v3.0 and SDIO v2.0

All three package options of the CYW43455 WLAN section provide support for SDIO version 3.0, including the new UHS-I modes:

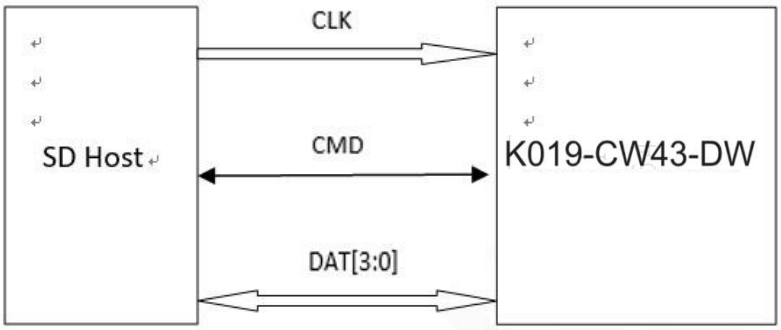
- DS: Default speed (DS) up to 25 MHz, including 1- and 4-bit modes (3.3 V signaling).
- HS: High speed up to 50 MHz (3.3 V signaling).
- SDR12: SDR up to 25 MHz (1.8 V signaling).
- SDR25: SDR up to 50 MHz (1.8 V signaling).
- SDR50: SDR up to 100 MHz (1.8 V signaling).
- SDR104: SDR up to 208 MHz (1.8 V signaling)
- DDR50: DDR up to 50 MHz (1.8 V signaling).

※**Note:** The K019-CW43-DW is backward compatible with SDIO v2.0 host interfaces.

SDIO PIN Descriptions

SD 4-Bit Mode	
DATA0	Data line 0
DATA1	Data line 1 or Interrupt
DATA2	Data line 2 or Read Wait
DATA3	Data line 3
CLK	Clock
CMD	Command line

Signal Connections to SDIO Host



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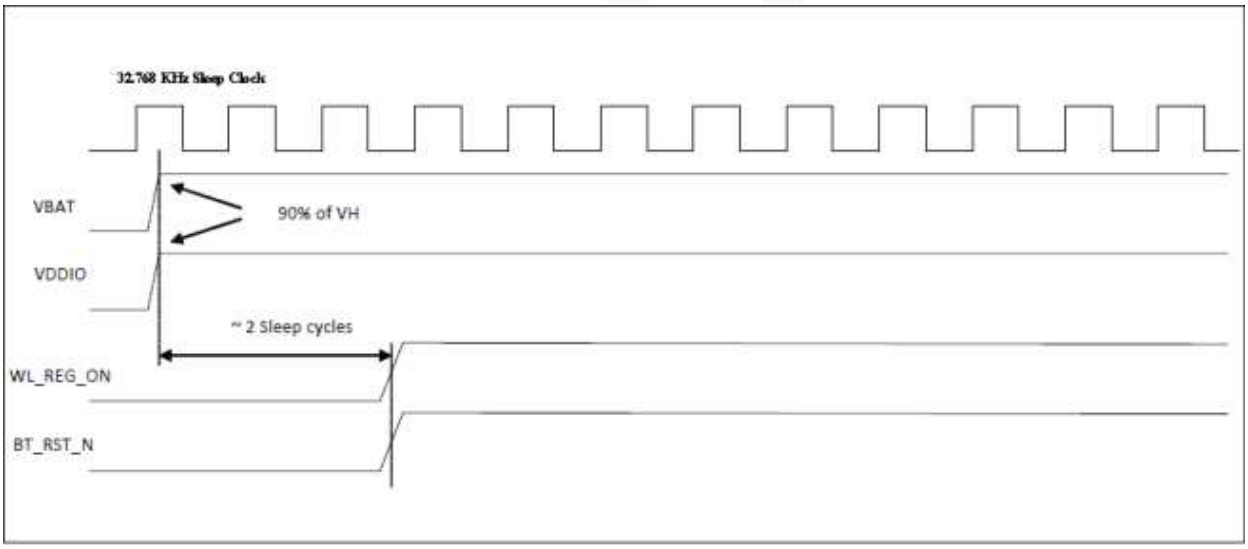
7. Interface Timing Diagram

7.1 Power-up Sequence Timing Diagram

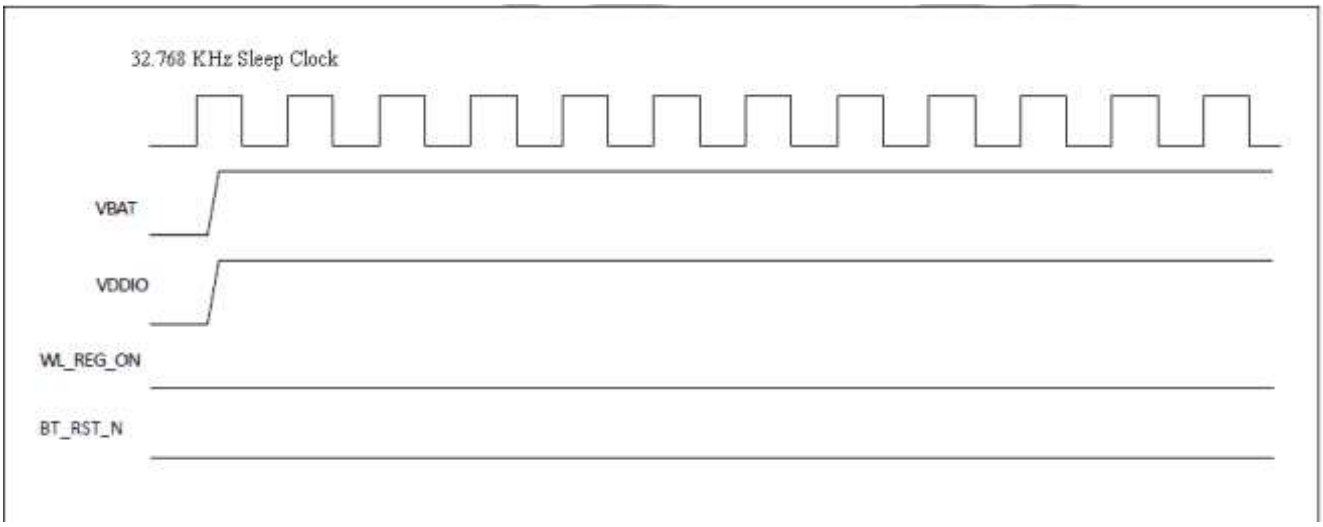
The module has signals that allow the host to control power consumption by enabling or disabling the Bluetooth, WLAN and internal regulator blocks. These signals are described below.Additionally, diagrams are provided to indicate proper sequencing of the signals for carious operating states. The timing value indicated are minimum required values: longer delays are also acceptable.

※ WL_REG_ON: Used by the PMU to power up the WLAN section. When this pin is high, the regulators are enabled and the WLAN section is out of reset. When this pin is low the WLAN section is in reset.

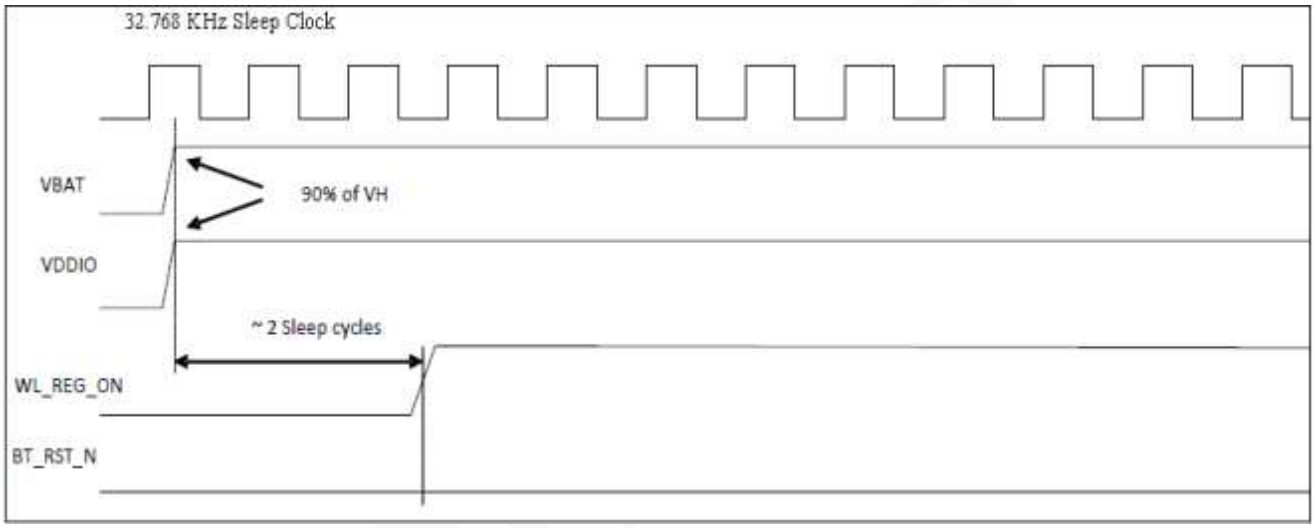
※ BT_RST_N: Low asserting reset for Bluetooth only. This pin has no effect on WLAN and does not control any PMU functions. This pin must be driven high or low (not left floating).



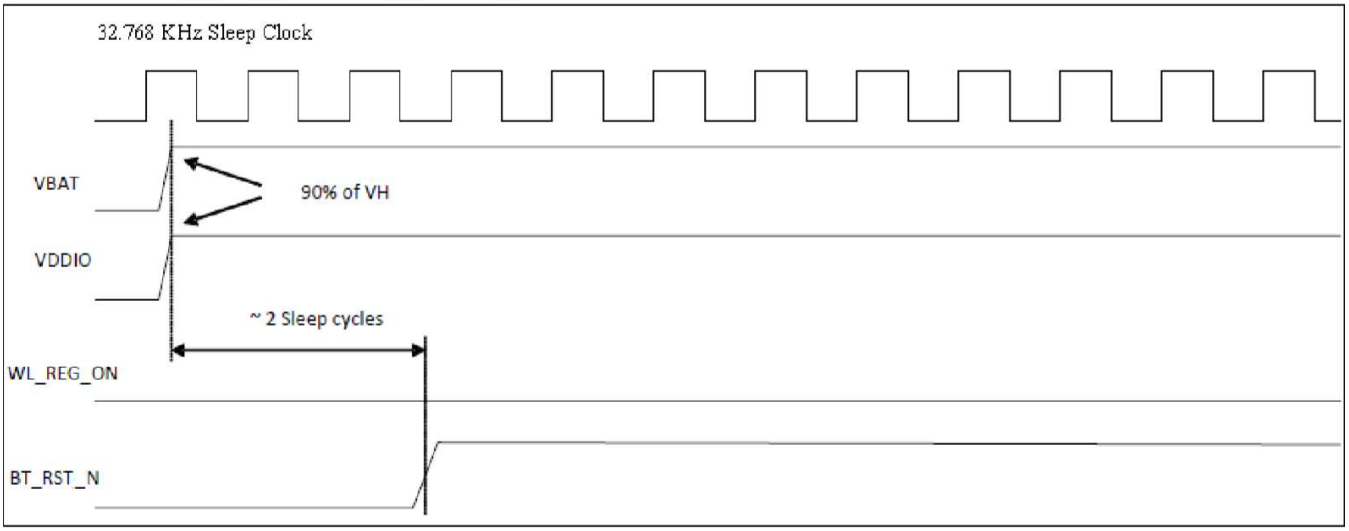
WLAN=ON, Bluetooth=ON



WLAN=OFF, Bluetooth=OFF



WLAN=ON, Bluetooth=OFF



WLAN=OFF, Bluetooth=ON

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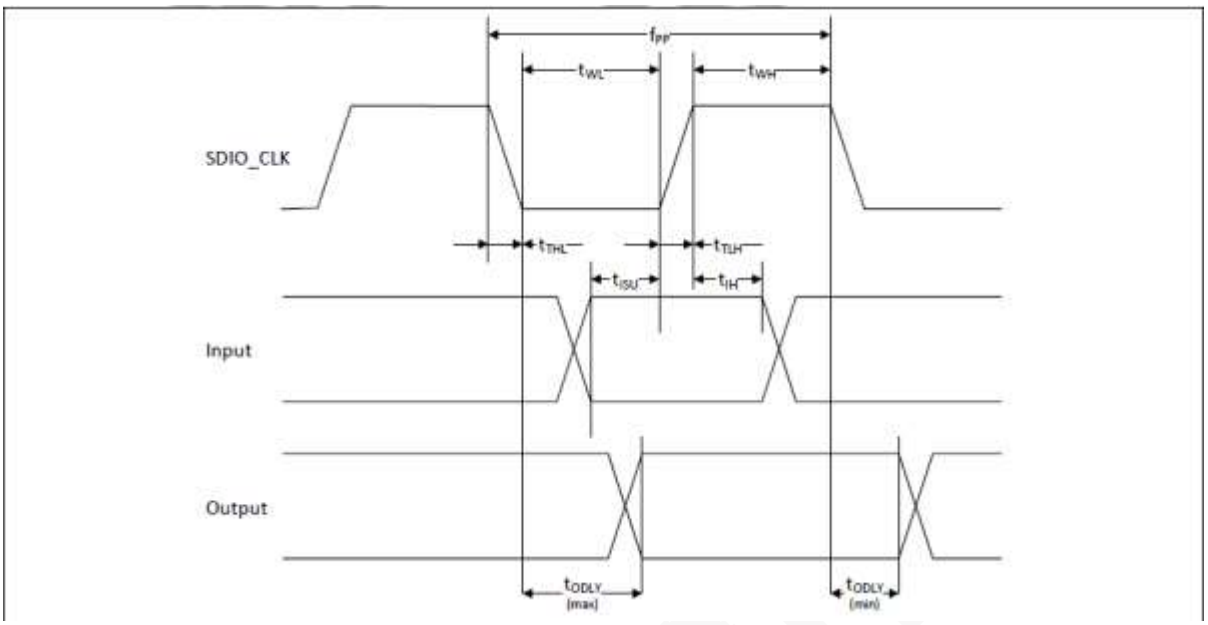
7.2 SDIO Default Mode Timing Diagram



Parameter	Symbol	Minimum	Typical	Maximum	Unit
SDIO CLK (All values are refferred to minimum VIH and maximum VIL[b])					
Frequency-Data Transfer mode	fPP	0	-	25	MHz
Frequency-Identification mode	fOD	0	-	400	kHz
Clock low time	tWL	10	-	-	ns
Clock high time	tWH	10	-	-	ns
Clock rise time	tTLH	-	-	10	ns
Clock low time	tTHL	-	-	10	ns
Inputs: CMD, DAT (referenced to CLK)					
Input setup time	tISU	5	-	-	ns
Input hold time	tIH	5	-	-	ns
Outputs: CMD, DAT (referenced to CLK)					
Output delay time – Data Transfer mode	tODLY	0	-	14	ns
Output delay time – Identification mode	tODLY	0	-	50	ns

a. Timing is based on CL ≤ 40pF load on CMD and Data.
b. min(Vih) = 0.7 x VDDIO and max(Vil) = 0.2 x VDDIO.

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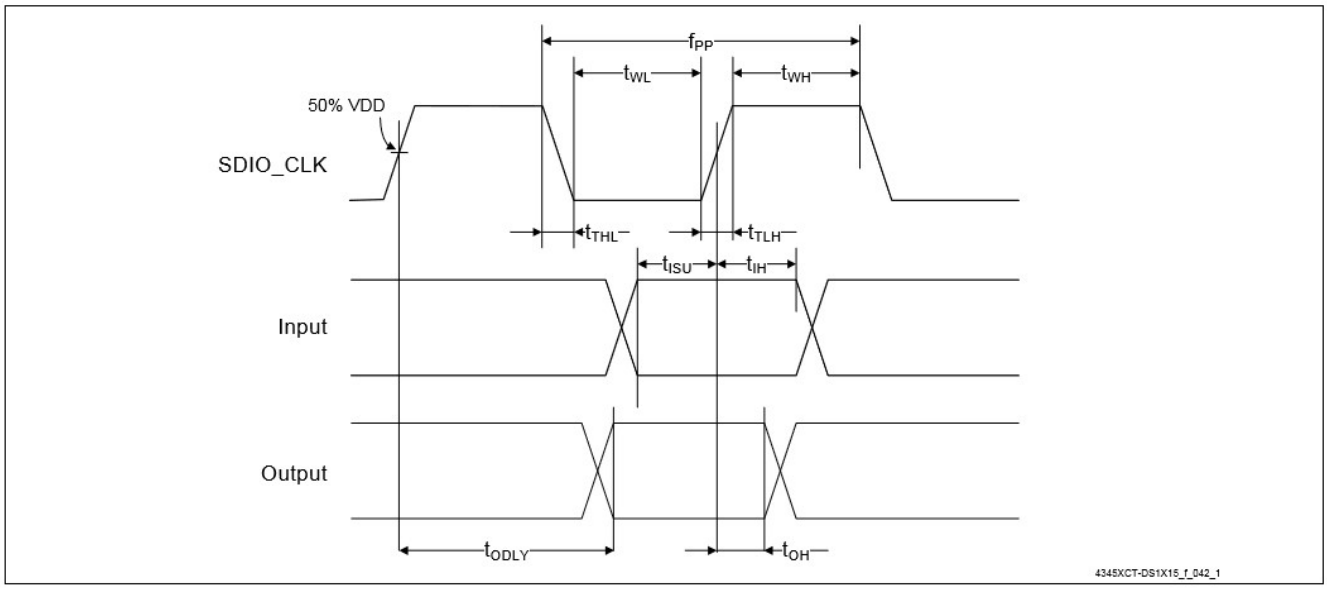
7.3 SDIO Bus Timing Specifications in SDR Modes



Parameter	Symbol	Minimum	Typical	Maximum	Unit
SDIO CLK (All values are referred to minimum VIH and maximum VIL[b])					
Frequency – Data Transfer mode	fPP	0	–	25	MHz
Frequency – Identification mode	fOD	0	–	400	kHz
Clock low time	tWL	10	–	–	ns
Clock high time	tWH	10	–	–	ns
Clock rise time	tTLH	–	–	10	ns
Clock low time	tTHL	–	–	10	ns
Inputs: CMD, DAT (referenced to CLK)					
Input setup time	tISU	5	–	–	ns
Input hold time	tIH	5	–	–	ns
Outputs: CMD, DAT (referenced to CLK)					
Output delay time – Data Transfer mode	tODLY	0	–	14	ns
Output delay time – Identification mode	tODLY	0	–	50	ns

a. Timing is based on CL ≤ 40pF load on CMD and Data.
b. min(Vih) = 0.7 × VDDIO and max(Vil) = 0.2 × VDDIO.

7.4 SDIO High Speed Mode Timing Diagram

Clock Timing

Figure 33. SDIO Clock Timing (SDR Modes)

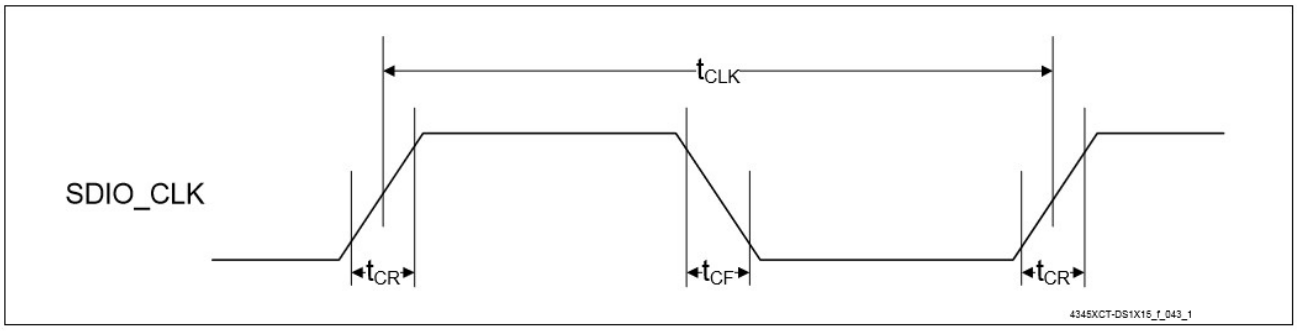


Table 53. SDIO Bus Clock Timing Parameters (SDR Modes)

Parameter	Symbol	Minimum	Maximum	Unit	Comments
–	t_{CLK}	40	–	ns	SDR12 mode
		20	–	ns	SDR25 mode
		10	–	ns	SDR50 mode
		4.8	–	ns	SDR104 mode
–	t_{CR}, t_{CF}	–	0.2 × t_{CLK}	ns	t_{CR}, t_{CF} < 2.00 ns (max) @ 100 MHz, C_{CARD} = 10 pF t_{CR}, t_{CF} < 0.96 ns (max) @ 208 MHz, C_{CARD} = 10 pF
Clock duty cycle	–	30	70	%	–

Card Input Timing

Figure 34. SDIO Bus Input Timing (SDR Modes)

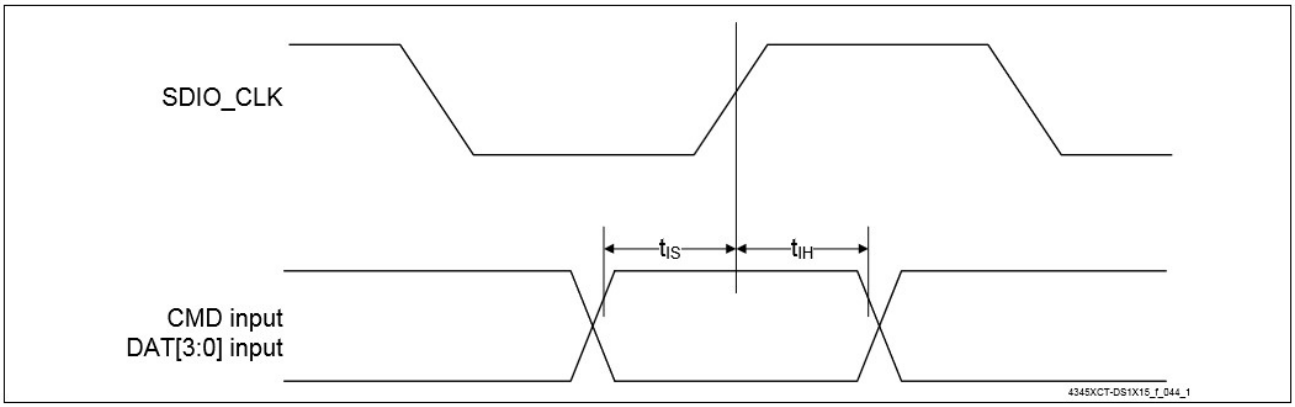


Table 54. SDIO Bus Input Timing Parameters (SDR Modes)

Symbol	Minimum	Maximum	Unit	Comments
SDR104 Mode				
t_{IS}	1.4	–	ns	C_{CARD} = 10 pF, VCT = 0.975V
t_{IH}	0.8	–	ns	C_{CARD} = 5 pF, VCT = 0.975V
SDR50 Mode				
t_{IS}	3.00	–	ns	C_{CARD} = 10 pF, VCT = 0.975V
t_{IH}	0.8	–	ns	C_{CARD} = 5 pF, VCT = 0.975V

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Card Output Timing

Figure 35. SDIO Bus Output Timing (SDR Modes up to 100 MHz)

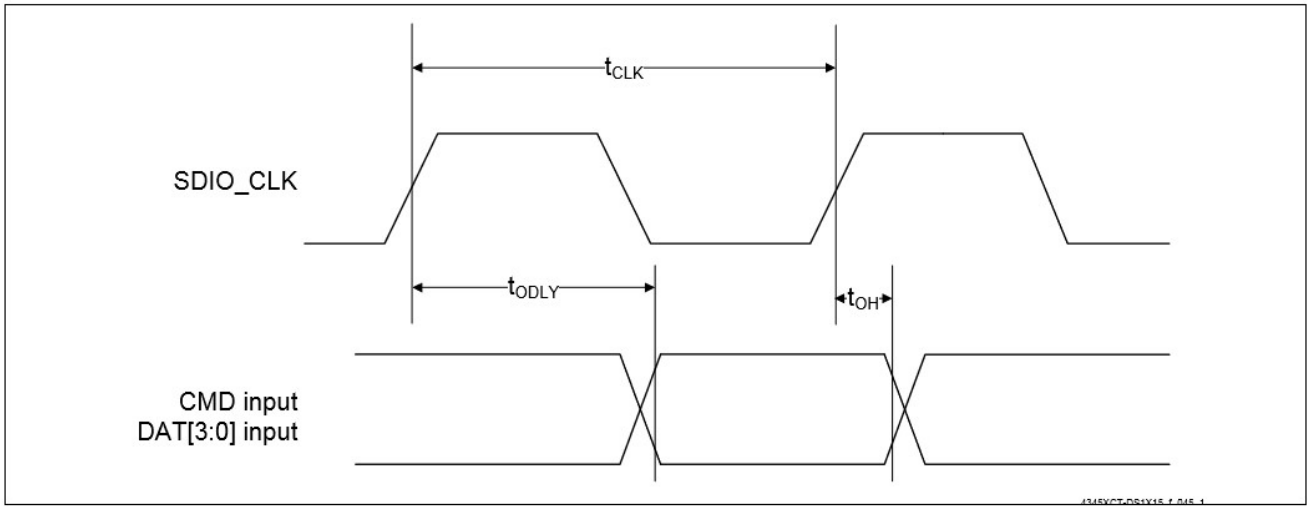


Table 55. SDIO Bus Output Timing Parameters (SDR Modes up to 100 MHz)

Symbol	Minimum	Maximum	Unit	Comments
t_{ODLY}	–	7.5	ns	$t_{CLK} \geq 10$ ns C_L= 30 pF using driver type B for SDR50
t_{ODLY}	–	14.0	ns	$t_{CLK} \geq 20$ ns C_L= 40 pF using for SDR12, SDR25
t_{OH}	1.5	–	ns	Hold time at the t_{ODLY} (min) C_L= 15 pF

Figure 36. SDIO Bus Output Timing (SDR Modes 100 MHz to 208 MHz)

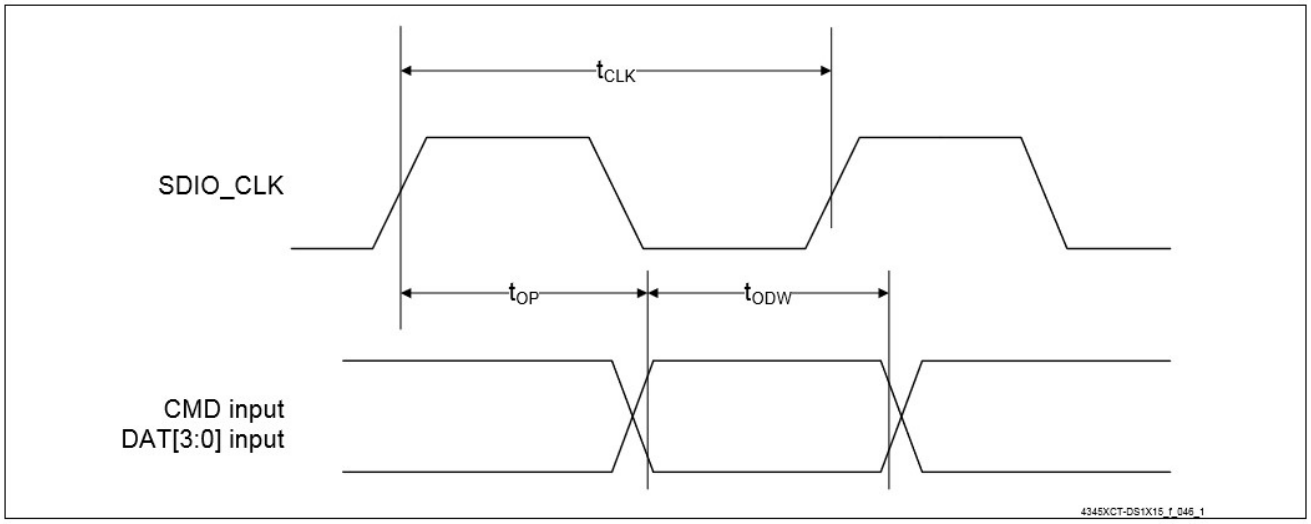
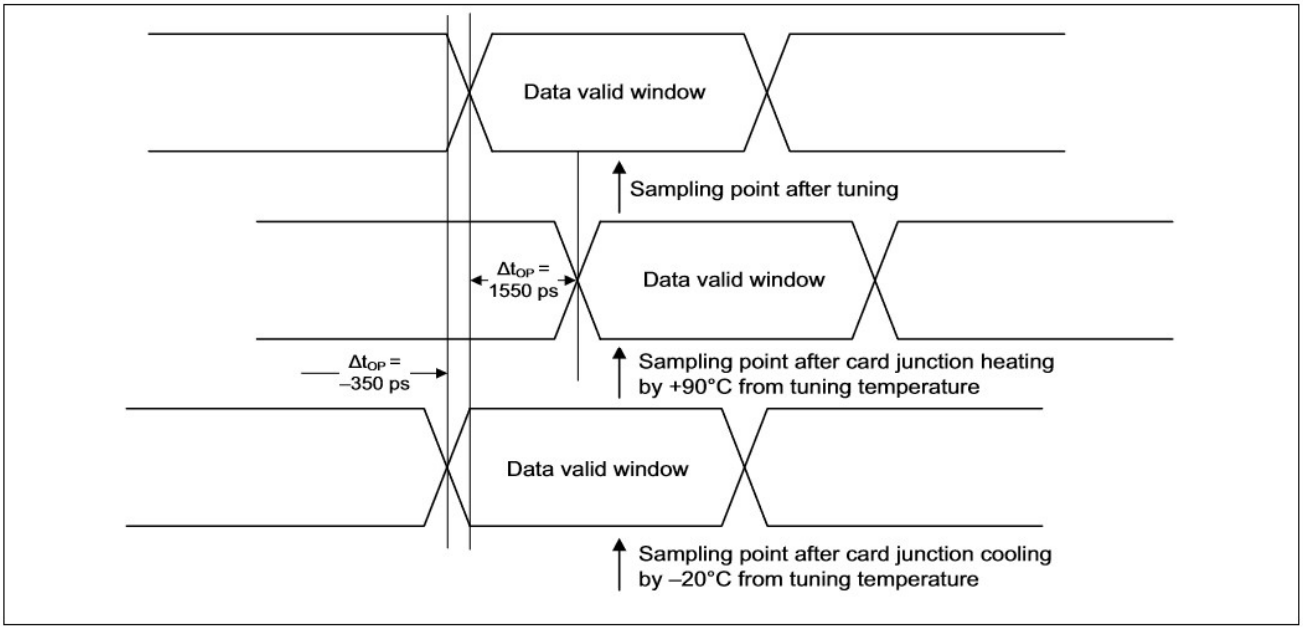


Table 56. SDIO Bus Output Timing Parameters (SDR Modes 100 MHz to 208 MHz)

Symbol	Minimum	Maximum	Unit	Comments
t_{OP}	0	2	UI	Card output phase
Δt_{OP}	–350	+1550	ps	Delay variation due to temp change after tuning
t_{ODW}	0.60	–	UI	t_{ODW} = 2.88 ns @ 208 MHz

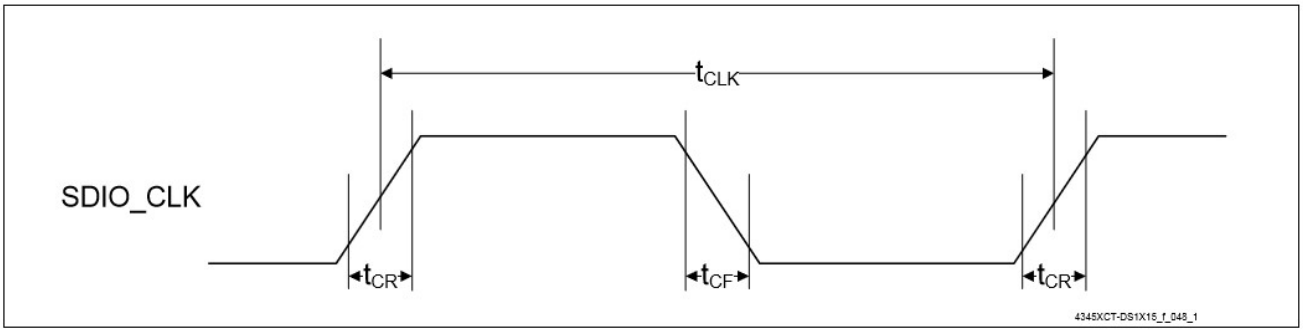
- Δt_{OP} = +1550 ps for junction temperature of Δt_{OP} = 90°C during operation.
- Δt_{OP} = –350 ps for junction temperature of Δt_{OP} = –20°C during operation.
- Δt_{OP} = +2600 ps for junction temperature of Δt_{OP} = –20°C to +125°C during operation.

Figure 37. Δt_{OP} Consideration for Variable Data Window (SDR 104 Mode)



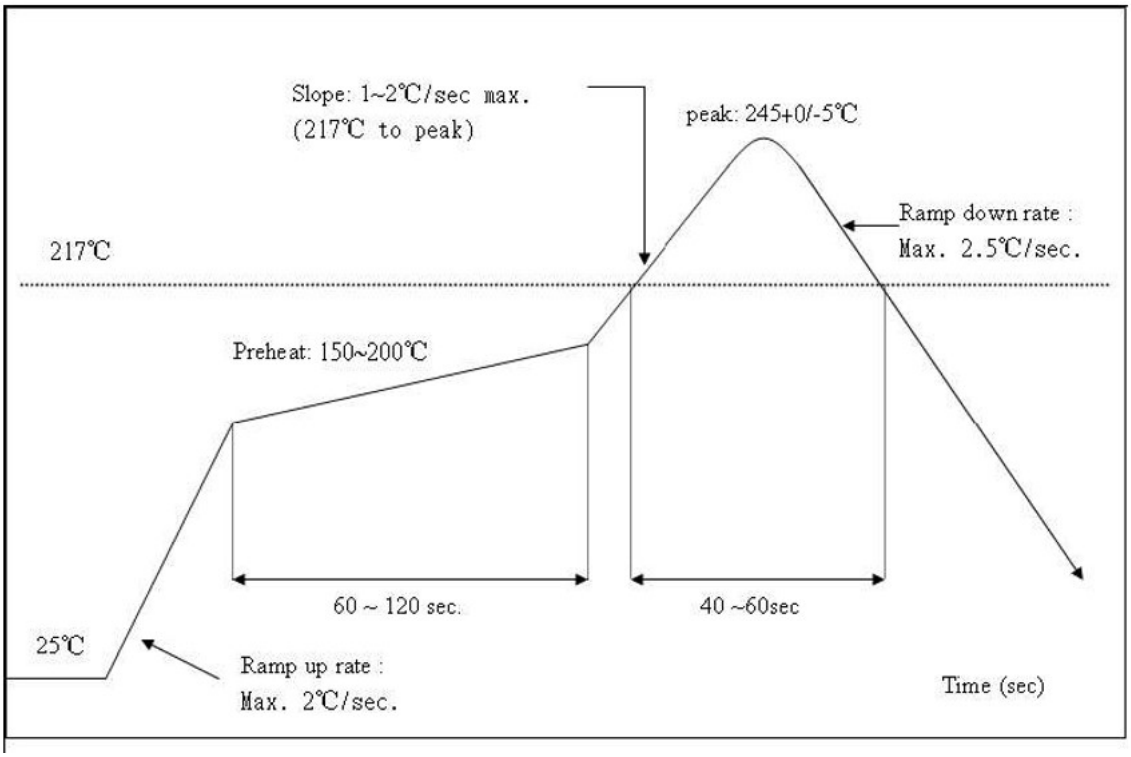
18.2.2 SDIO Bus Timing Specifications in DDR50 Mode

Figure 38. SDIO Clock Timing (DDR50 Mode)



8. Recommended Reflow Profile

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



ENVIRONMENTAL.

Operating :

※Operating Temperature: -10°C to +70 °C

※Relative Humidity: 5-90% (non-condensing)

Storage

※Temperature: -40°C to +80°C (non-operating)

※Relevant Humidity: 5-95% (non-condensing)

MTBF caculation

※Over 150,000hour

NOTE: it must use N2 for reflow and suggest the coneentration of oxygenless than 5000 ppm

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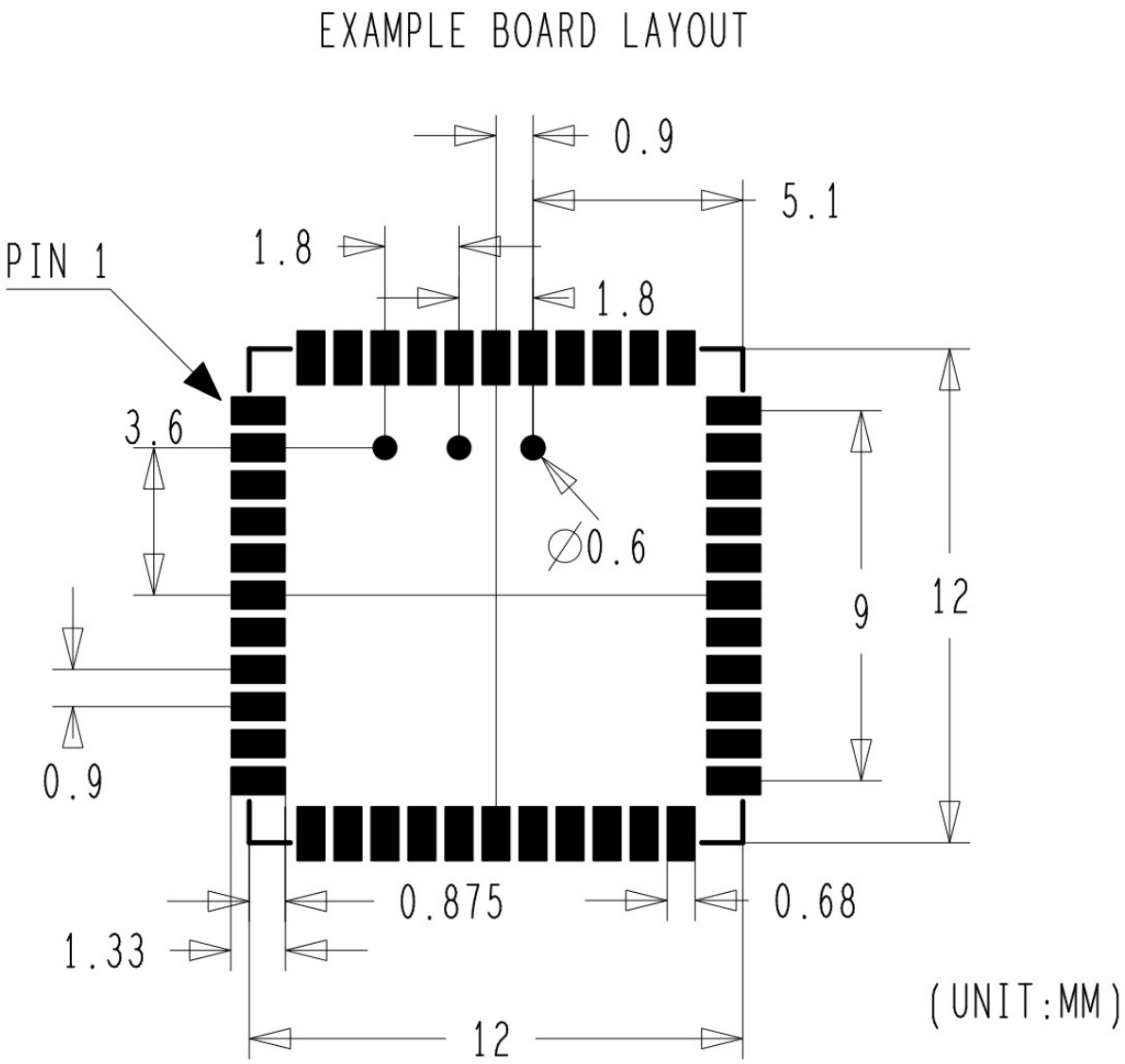
9. PCB Layout Solder Paste



- Module Specifications : W:0.65mm * L:0.95mm pitch 0.9 mm
- The proposed design W:0.65~0.75 mm * L:1.33mm. Consider not place other parts in the peripheral area of 1 mm ~ 1.5 mm to facilitate additional amount of solder for PCB pad.
- We Suggest the thickness of Stencil between 0.12 mm ~0.15mm, the W between 0.6~0.65mm and the L between L1.5~1.6mm.
- If the thickness of the stencil is thinner, we suggest to adding more solder, to increase the wetting ability. Depends on different production situation, if the stencil thickness is 0.08~0.1mm, and the module nearby area is no more space for expending soldering area, we will suggest to increase the stencil thickness to increase the wetting ability.
- The major consideration parts of stencil design is to increase the solder paste wetting ability.

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- Module Specifications L 0.7mm
- The design for PCB Pad : L:0.8mm
- We recommend the apertures for stencil L:0.5mm~0.6mm
- In order to avoid highness impact caused solder paste thickness, the stencil open size can be appropriately retracted

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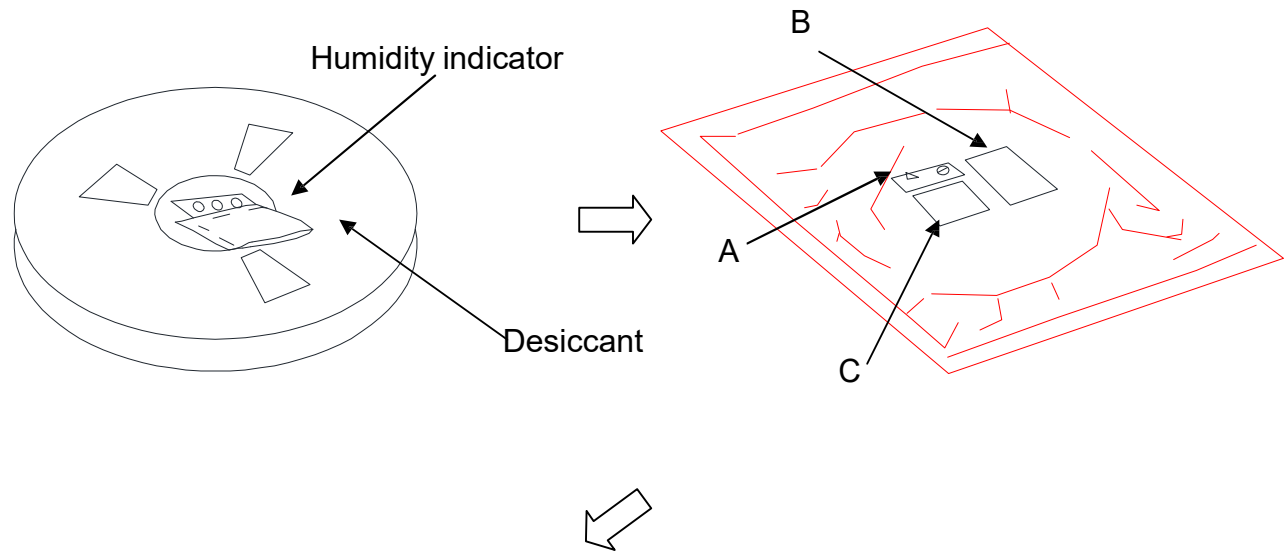
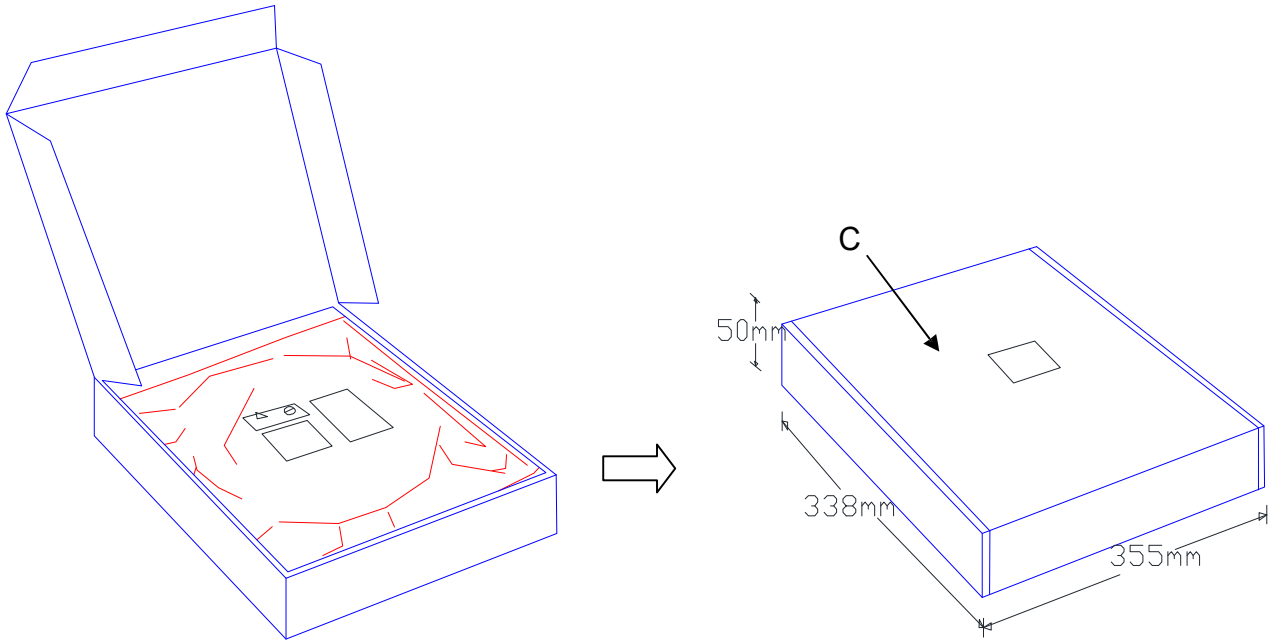
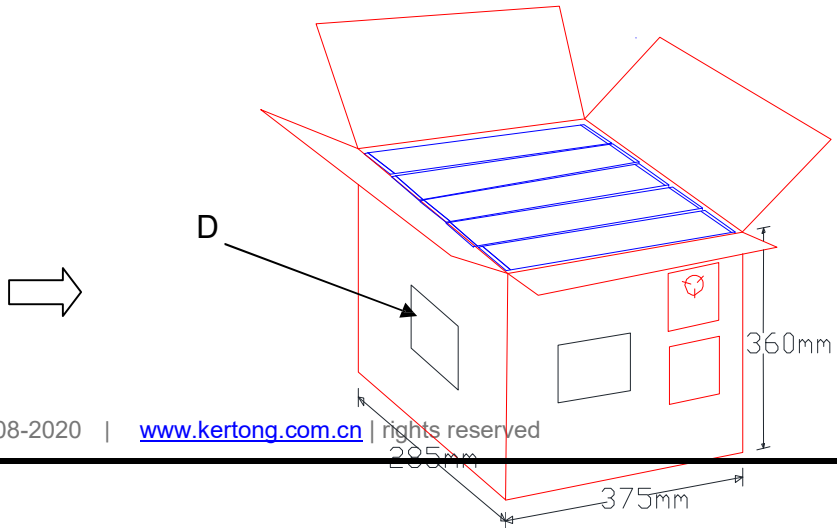
10. Package Information

1> 1500pcs of per disc

2> 1500pcs * 5 =7500pcs (one Cartoon)







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11. This product is RoHS compliance

Wireless module before the SMT Note:

When customers Open stencil must be sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.

① Can't get the wifi module bare hands when needs,must we wear the gloves and static ring.

The furnace temperature according to the size of the customer the mainboard ,generally like to stick on a tablet standard temperature of 250 + - 5,can do 260 + - 5. Storage and use Wifi module control should pay attention to the following matters:

① Module of the storage life of vacuum packaging：

1-1. Storage life： 12 months. Storage conditions:<40 . Relative ℃ humidity:<90%R.H.

1-2. 1-2.After this bag is opened , devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be

1-3. Check the humidity card :stored at ≦20%RH.If :30%~40%(pink)or greater than 40%(red).Labeling module has moisture absorption.

① Mounthed within 168 hours at factory conditions of: ≦ ℃t 30% ， ≦60%R.H.

② Once opened, the workshop the preservation of life for 168 hours.

1-4. If baking is required,devices may be baked for:

① Modules must be to remove module moisture problem.

② Baking temperature: 125 , 8 hours. ℃

③ After baking, put proper amount of desiccant to seal packages.

1-5. The actual number of module vacuum packing which is based on the actual number of packages to the customer requirements.

2. Module reel packaging items as follows.

2-1. Storage life： 12 months. Storage conditions:<40 . Relative ℃ humidity:<90%R.H.

2-2. Module apart packing after 168 hours， To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions： 125℃， 8hours.

2-3. The actual number of module reel packing which is based on the actual number of packages to the customer requirements.

3. Module pallet packaging items as follows：

3-1. Storage life： 3 months. Storage conditions:<40 . Relative ℃ humidity:<90%R.H.

3-2. Module if not used within 48 hours, before launch the need for baking, baking temperature: 125 , 8 hours. ℃

3-3. Pallet packaging each plate is 100 PCS.The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.

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12. MSL Level / Storage Condition

Caution
This bag contains
MOISTURE-SENSITIVE DEVICES

LEVEL
4
If blank, see adjacent bar code label

1. Calculated shelf life in sealed bag: 12 months at <40℃ and <90% relative humidity(RH)
2. Peak package body temperature: 250 ℃
   If 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: 48 hours of factory conditions
   If blank, see adjacent bar code label
   ≤30℃/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℃
   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: _____
If blank, see adjacent bar code label

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

※NOTE : Accumulated baking time should not exceed 96hrs

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