CDW-208723D-01

DATASHEET

Software：

客　　户 Customer	客户承认 Approve（请盖印章）	日 期 Date

拟制 Design	审核 Check	批准 Approve	版本 Version	日期 Date
			V1.5	2022.09.03

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更改记录：

Reversion History：

版本 Version	日期 Date	更改内容 Modification
1.0	2017.12.13	First release
1.1	2018.05.24	Model name change
1.2	2018.07.04	Change the shape tolerance
1.3	2018.12.22	Add module photos
1.4	2020.07.15	Add SDIO Power-on sequence
1.5	2022.09.03	Update package quantity

1. Overview

The 208723D is a highly integrated 802.11b/g/n 1T1R WLAN, and integrated Bluetooth 2.1/3/0/4.2 controller. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in s single chip. The 208723D provides a complete solution for a high throughput performance integrated wireless LAN and Bluetooth device.

2. Features

- IEEE 802.11b/g/n compatible WLAN802.11b/g/n 1T1R WLAN and Bluetooth single chip
- Complies with SDIO 1.1/2.0for WLAN
- Complies with HS-UART with configurable baud rate for Bluetooth
- Complete 802.11n solution for 2.4GHz band
- 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40M bandwidth
- Security support for WPA/WPA2. Open, shared key, and pair-wise key authentication services
- Compatible with Bluetooth v2.1+EDR and v4.2 Systems
- Supports Bluetooth 4.0 Low Energy(BLE)
- PCM interface for audio data transmission via Bluetooth controller
- Supports multiple Low Energy states
- HS-UART interface for Bluetooth data transmission compliant with H5 specification

4. General Specification

Model	CDW-208723D-01
Product Name	WLAN 11b/g/n 1T1R + BT4.2 module
Major Chipset	RTL8723DS
Standard	802.11b/g/n
Modulation Method	BPSK/ QPSK/ 16-QAM/64-QAM
Frequency Band	2.4GHz ISM Band
WiFi/BT Interface	Wifi：SDIO2.0　　BT：HS-UART
Operating Temperature	-20° C ~ 65° C
Storage Temperature	-40° C ~ 85°C
Humidity	5% to 90% maximum
Dimension	12x12 x1.7(LxW) ±0.2mm

5. RF Specification

5.1 wifi Specification

Feature	Description
WLAN Standard	IEEE 802.11b/g/nWiFi compliant
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)
Number of	2.4GHz：Ch1 ~ Ch14
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11b /11Mbps : 17dBm ± 2 dB @ EVM ≤ -15dB
	802.11g /54Mbps : 15 dBm ± 2 dB @ EVM ≤ -27dB
	802.11n /MCS7 : 14 dBm ± 2 dB @ EVM ≤ -29dB
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -91 dBm, typical
	- 2Mbps PER @ -89 dBm, typical
	- 5.5Mbps PER @ -87 dBm, typical
	- 11Mbps PER @ -85 dBm, typical
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -90 dBm, typical
	- 9Mbps PER @ -89 dBm, typical
	- 12Mbps PER @ -88 dBm, typical
	- 18Mbps PER @ -85 dBm, typical
	- 24Mbps PER @ -82 dBm, typical
	- 36Mbps PER @ -79 dBm, typical
	- 48Mbps PER @ -74 dBm, typical
	- 54Mbps PER @ -72 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -90 dBm, typical
	- MCS=1 PER @ -87 dBm, typical
	- MCS=2 PER @ -85 dBm, typical
	- MCS=3 PER @ -81 dBm, typical
	- MCS=4 PER @ -78 dBm, typical
	- MCS=5 PER @ -73 dBm, typical
	- MCS=6 PER @ -72 dBm, typical
	- MCS=7 PER @ -70 dBm, typical
Receive Sensitivity (11n,40MHz)	- MCS=0 PER @ -87 dBm, typical
	- MCS=1 PER @ -84 dBm, typical
	- MCS=2 PER @ -82 dBm, typical
	- MCS=3 PER @ -79 dBm, typical

@10% PER	- MCS=4	PER @ -75 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -69 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

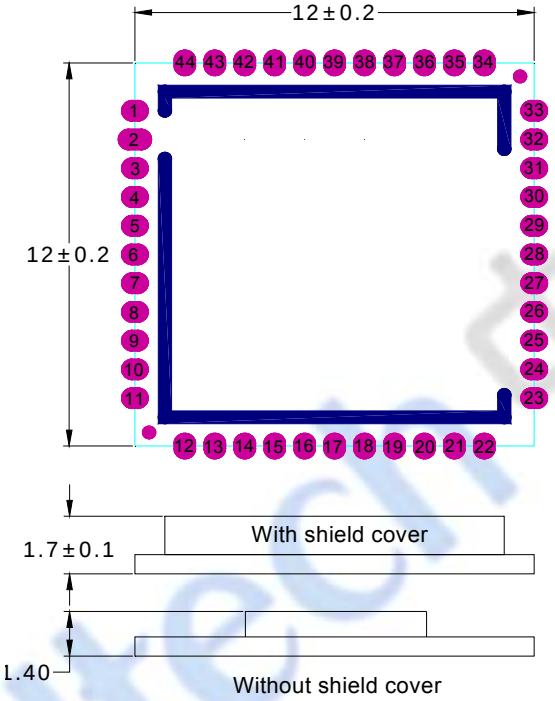
5.2 BT Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth 2.1/3.0/4.2		
Host Interface	HS-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)		7dBm	
Output Power (Class 2)		0 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		

6. Electrical Characteristics

symbol	Parameter	Minimum	Typical	Maximum	Units
VBAT/VDD	3.3V supply voltage	3.0	3.3	3.6	V
VDDIO	IO supply voltage	1.62	1.8 or 3.3	3.6	V
VBAT/VDD	current	--	--	1000	mA

7. Pin Description& Dimensions (unit: mm)



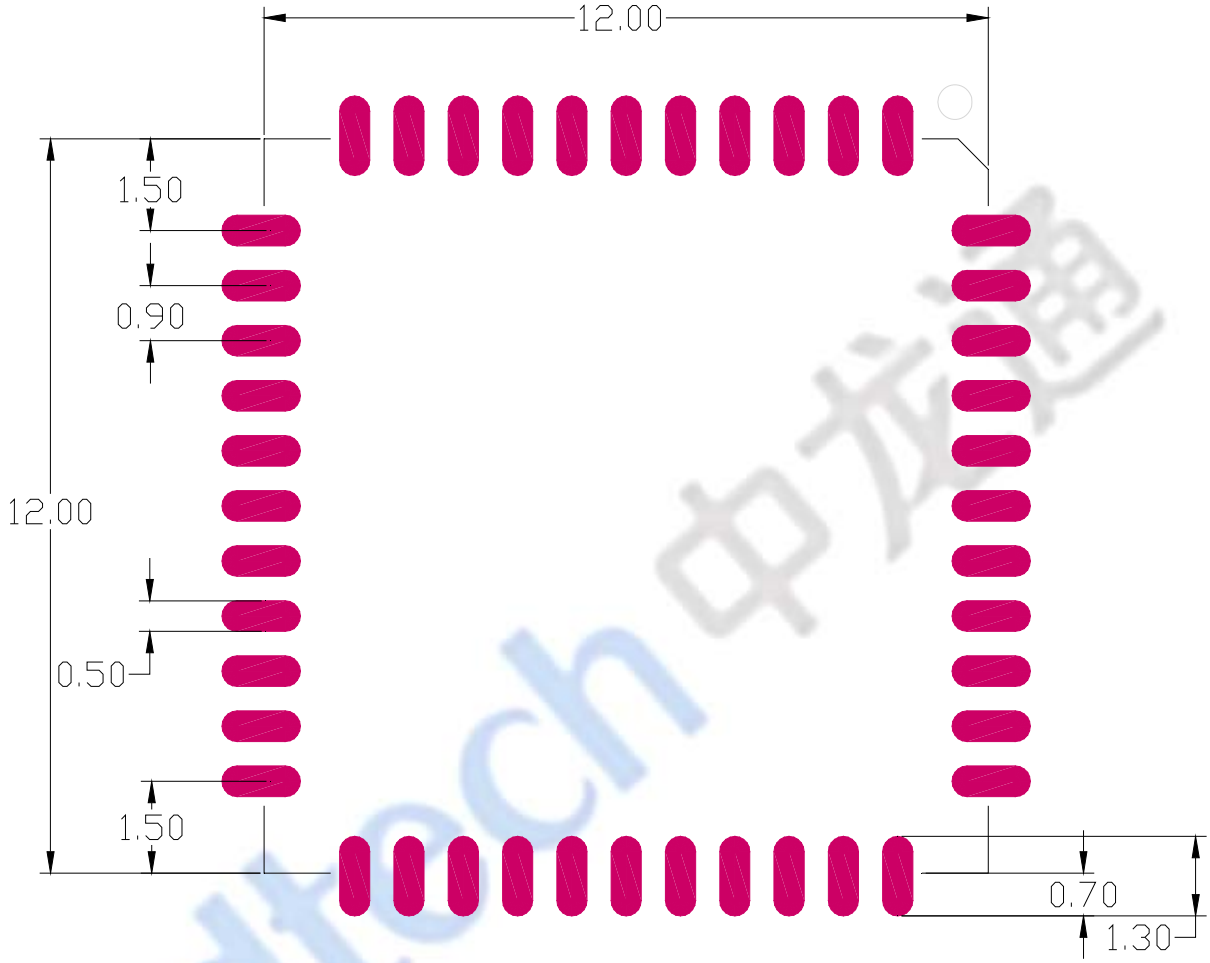
(Top view)

NO.	Name	Type	Description
1	GND	—	Ground connections
2	WL_BT_ANT	I/O	RF I/O port (2.4GHz)
3	GND	—	Ground connections
4	NC	—	No connect
5	NC	—	No connect
6	HOST_WAKE_BT	I	HOST wake up Bluetooth device
7	BT_WAKE_HOST	O	Bluetooth device to wake Host (This pin needs to be pulled down when the module is on

			power)
8	NC	—	No connect
9	VBAT/VDD	P	Default ： 3.3V INPUT
10	NC	—	No connect
11	NC	—	No connect
12	WLAN_EN	I	Enable pin for WLAN device
13	WL_HOST_WAKE	O	WL_WAKE_HOST
14	SD_DAT2	I/O	SDIO DATA2
15	SD_DAT3	I/O	SDIO DATA3
16	SD_CMD	I/O	SDIO command line
17	SD_CLK	I/O	SDIO CLK
18	SD_DAT0	I/O	SDIO DATA0
19	SD_DAT1	I/O	SDIO DATA1
20	GND	—	Ground connections
21	NC	—	No connect
22	VDDIO	P	I/O Voltage supply input 1.8V or 3.3V
23	NC	—	No connect
24	LPO	I	32.768KHz input
25	PCM_OUT	O	PCM data output
26	PCM_CLK	I/O	PCM CLK
27	PCM_IN	I	PCM data input
28	PCM_SYNC	I	PCM sync signal
29	NC	—	No connect
30	TCXO_IN	—	No connect
31	GND	—	Ground connections
32	NC	—	No connect
33	GND	—	Ground connections
34	BT_EN	I	Enable pin for Blutooth device
35	NC	—	No connect
36	GND	—	Ground connections
37	NC	—	No connect
38	NC	—	No connect
39	NC	—	No connect
40	NC	—	No connect
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

8. Footprint Dimensions

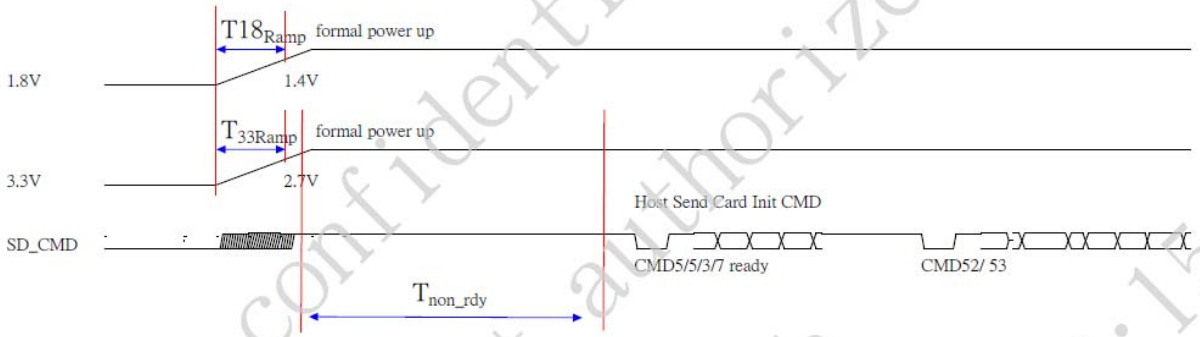
(Unit: mm)



（Top view）

10. SDIO Interface Power-On Sequence

After power-on, the SDIO interface is selected by the RTL8723DS automatically when a valid SDIO command is received. To attain better SDIO host compatibility, the following power-on sequence is recommended.



Symbol	Description
T_{33ramp}	The 3.3V main power ramp up duration.
T_{18ramp}	The 1.8V main power ramp up duration.
T_{non_rdy}	SDIO Not Ready Duration. In this state, the RTL8723DS may respond to commands without the ready bit being set. After the ready bit is set, the host will initiate complete card detection procedure.

We recommend that the card detection procedures are divided into two phases: A 3.3V power pre-charge phase and a formal power-up phase.

After main 3.3V ramp up and 1.8V ramp up, the power management unit is enabled by the power ready detection circuit. The power management unit enables the SDIO block. eFUSE is then autoloaded to SDIO circuits during the T_{non_rdy} duration. After CMD5/5/3/7 procedures, card detection is executed. When the driver has loaded, normal CMD52 and CMD53 are used.

	Min	Typical	Max	Unit
T33ramp	0.2	0.5	2.5	ms
T18ramp	0.2	0.5	2.5	ms
Tnon-rdy	1	2	10	ms

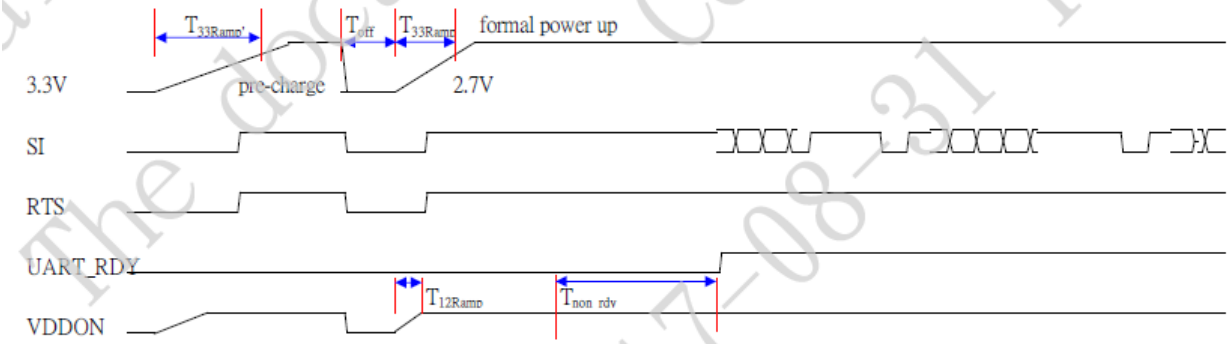
SDIO Interface Power-On Timing Parameters

11.UART Interface Power-On Sequence

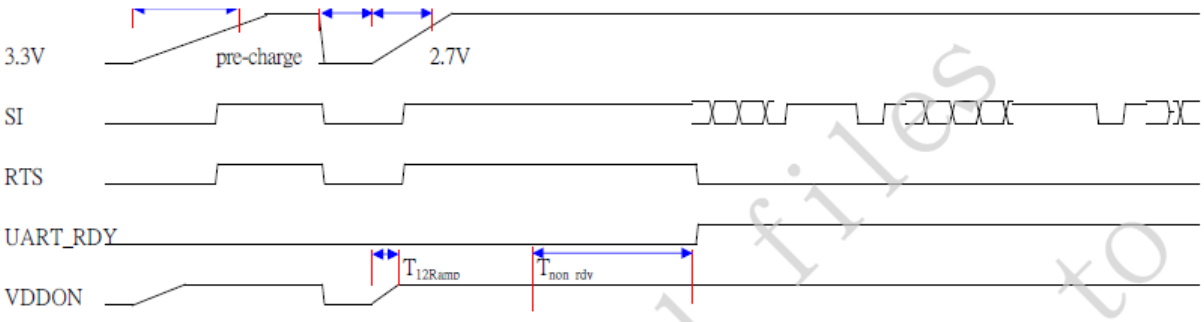
The UART signal level ranges from 1.8V to 3.3V. The host provides the power source with the targeted power level to the RTL8723DS UART interface via the VDIO_SDIO pin.

The UART interface power-on sequence differs depending on whether or not host flow control is supported.

UART Hardware Flow Control Not Supported



UART Hardware Flow Control Supported



Symbol	Description
T_{33ramp}	3.3V Power Pre-Charge Ramp Up Duration Before Formal Power Up. We recommend that a 3.3V power-on and then power-off sequence is executed by the host controller before the formal power on sequence. This procedure can eliminate host card detection issues when power ramp up duration is too long, or when a system warm reboot fails.
T_{off}	The duration 3.3V is cut off before formal power up.
T_{33ramp}	The 3.3V main power ramp up duration.
T_{12ramp}	The internal 1.2V ramp up duration.
T_{non_rdy}	UART Not Ready Duration. In this state, the RTL8723DS will not respond to any commands.

We recommend that the card detection procedures are divided into two phases: A 3.3V power pre-charge phase and a formal power-up phase.

During the 3.3V power pre-charge phase, the power ramp up duration is not limited. The 3.3V power is cut off and is turned on after the T_{off} period. The ramp up time is specified in the T_{33ramp} duration.

After main 3.3V ramp up and 1.2V ramp up, the power management unit is enabled by the power ready detection circuit. The power management unit enables the Bluetooth block. The Bluetooth firmware then initializes all circuits, included the UART. In addition to wait the T_{non_rdy} time, if the host supports UART hardware flow control it can detect RTS signals and follow the formal UART flow control handshake.

	Min	Typical	Max	Unit
T33ramp	0.2	-	No Limit	ms
Toff	250	500	1000	ms
T33ramp	0.2	0.5	2.5	ms
T12ramp	0.1	0.5	1.5	ms
Tnon-rdy	1	2	10	ms

UART Interface Power On Timing Parameters

12. Suplier

Secondary supplier list	
Material name	**Supplier brand**
Crystal	JWT/FK/TKD
Inductance	Sunlord/ DARFON/CHILISIN
Wifi IC	Realtek
Capacitance	SAMSUNG /EYANG/ Walsin
Resistance	UniOhm /YAGEO
PCB(12x12x0.6mm)	A,I,O,S

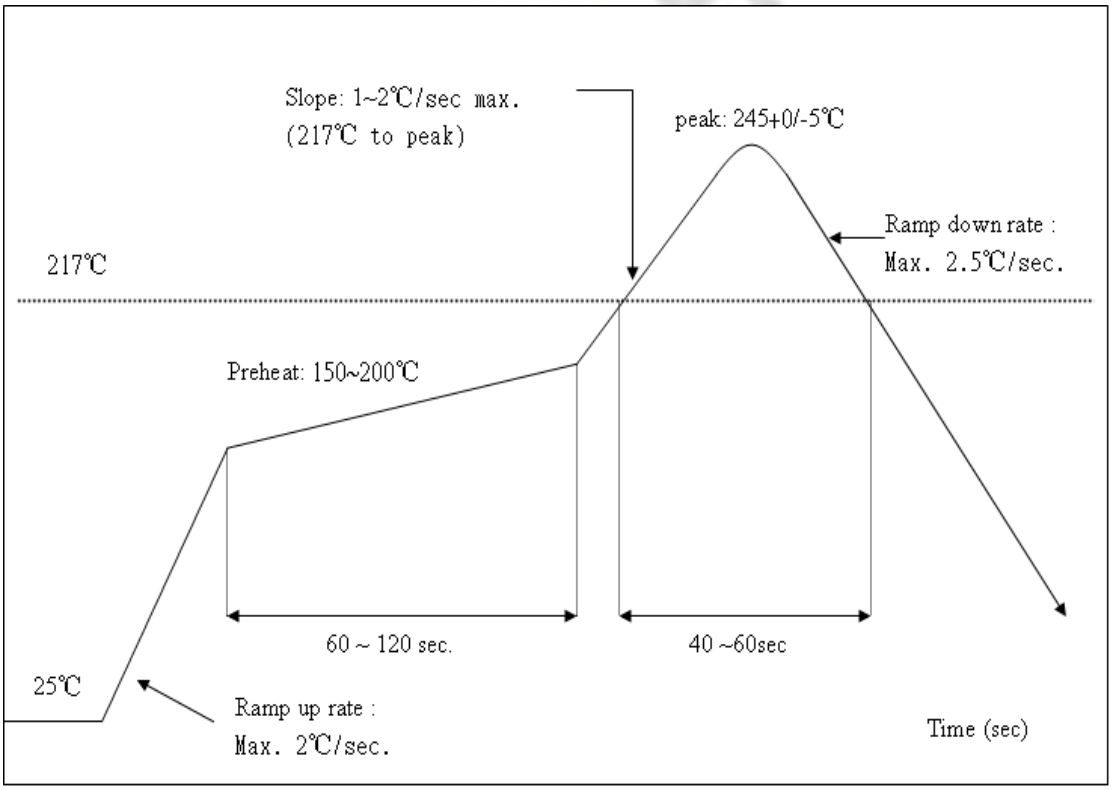
13. Physical photo

14. Recommended Reflow Profile

Referred IPC/JEDEC standard.

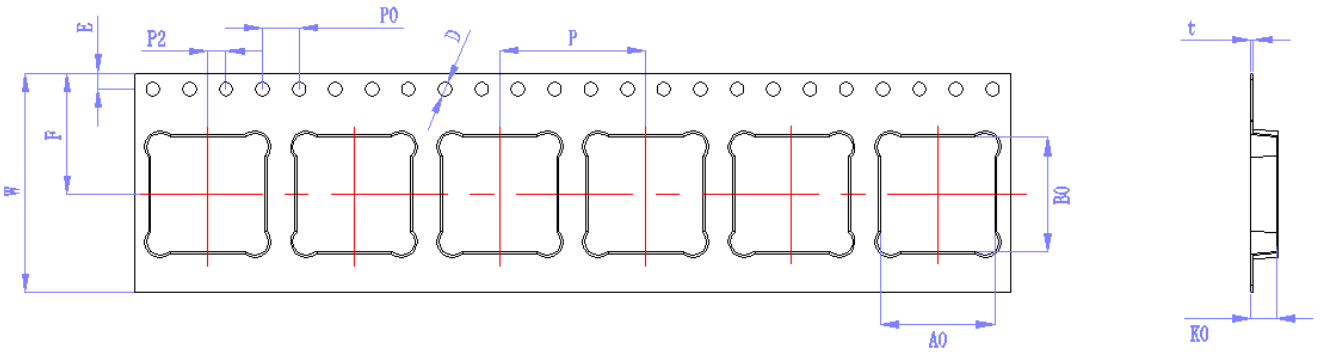
Peak Temperature : <250°C

Number of Times : 2 times



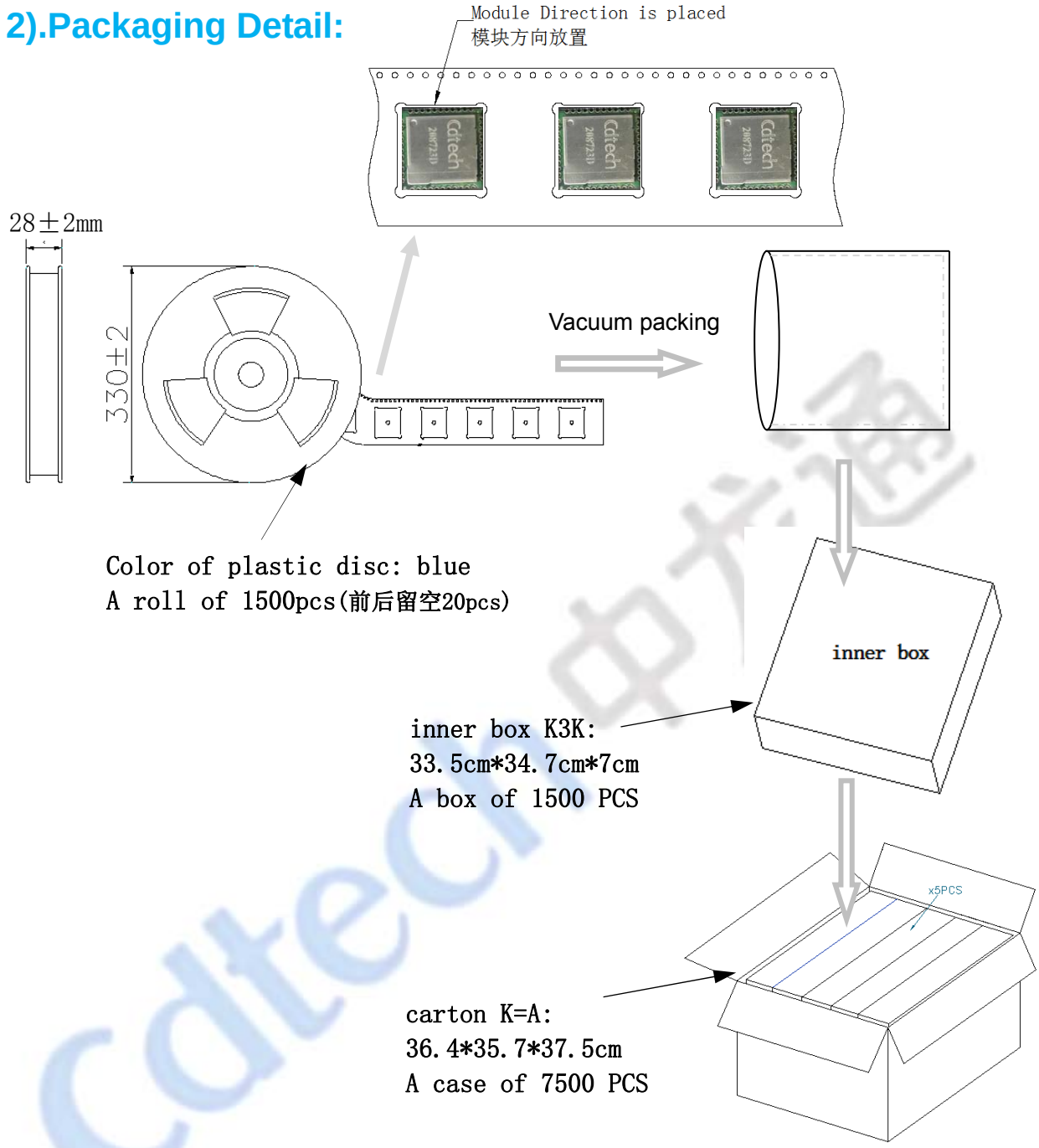
15. Packing information

1).Carrier size Detail:



ITEM	W	A0	B0	K0	P	F	E	D	P0	P2	T
DIM	24	12.5	12.5	2.8	16	13.25	1.75	1.50	4	2	0.3
TOLE	+0.30 −0.30	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.05 −0.05

2).Packaging Detail:



ESD CAUTION

The 208723D-01 is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although 208723D-01 is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

A、FCC Radiation Exposure Statement

This device complies with Part 15 of the FCC Rules. 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.
Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment
This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
Labelling instruction for Host Product integrator
Please notice that if the FCC identification number is not visible when the module is installed inside another device , then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2BN5S-2503U" any similar wording that expresses the same meaning may be used. Installation Notice to Host Product Manufacturer
The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.
Antenna configurations.
Antenna Change Notice to Host manufacturer
If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.
FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer
This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.
Note: 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 or more 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.

B、ISED Regulatory Compliance

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference.(2)This device must accept any interference, including interference that may cause undesired operation of the device.
L'émetteur/récepteur exempt de licence contenu dans le present appareil est conforme aux CNR d'lnnovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :(1)L'appareil ne doitpas produire de brouillage; (2)L'appareil doit accepter tout brouillage radioélectrique subi, même si lebrouillage est susceptible d'en compromettre le fonctionnement.
This equipment complies with lC RSS - 102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm betweenthe radiator and your body.
Cet éauipement est conforme aux limites d'exposition aux radiations lC CNR - 102 établies pour un environnement non contrólé, Cet équipement doit être installe et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.
Please notice that if the lC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 33667-2503U" any similar wording that expresses the same meaning may be used.
L'étiquette d'homologation d'un module d'lnnovation, Sciences et Développement économique Canadadevra être posée sur le produit hote à un endroit bien en vue, en tout temps. En l'absence d'étiquette.le produit hote doit porter une êtiquette sur laquelle figure le numéro d'homologation du module d'lnnovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le meme sens et qui va comme suit :
Contient IC: 33667-2503U est le numéro d'homologation du module.