

***Wireless LAN* Module**

IEEE802.11a/b/g/n

WYSBMVGX4

Data Report

WYSBMVGX4

TAIYO YUDEN

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Rev. record

21-May-2015 > Ver1.0 Released

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Control No. HD-AG-A091234	(1/2)	Control name General Items
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Scope

This specification ("Specification") applies to the hybrid IC for use Wireless LAN ("Product") manufacture by TAIYO YUDEN Co., Ltd. ("TAIYO YUDEN")

1. Part Number: WYSBMVGX4
2. Function: Radio frequency transfer Module. (**IEEE802.11abgn** standard conformity)
3. Application: Hand Held Device
4. Structure: Hybrid IC loaded with silicon monolithic and GaAs semiconductor
Ability of lead free mounting at customer's assembly (Heat resistance of this Product) : Yes
Containment of hazardous substance in this Product
*This product conforms to RoHS Directive.
5. Outline: 77-pin leadless chip carrier
6. Marking: Part Number, Lot Number
7. Features:
 - IEEE802.11abgn** standard conformity
 - Interface: SDIO
 - Embedded MPU for reducing loads on host processor
 - Built-in EEPROM (MAC address)
8. Security: WEP (64/128), TKIP, AES, WPA, WPA2, WAPI
9. Packing:
 - Packaging method: Tape and Reel
 - Packaging unit: 1500pcs/reel
 - Package Material: Conductive PS
10. Notes:
 - a. This Product is not designed for radiation durable and should not be used under the circumstance of radiation.
 - b. The operating conditions of this Product are as shown in this Specification. Please note that TAIYO YUDEN shall not be liable for a failure and/or abnormality which is caused by use under the conditions other than the operating conditions hereof.
 - c. This Product mentioned in this Specification is manufactured for use in consumer products. Before using this Product in any special equipment (such as medical equipment, space equipment, air craft, disaster prevention equipment), where higher safety and reliability are duly required, the applicability and suitability of this Product must be fully evaluated by the customer at its sole risk to ensure correct and safety operation of those special equipments. Also, evaluation of the safety function of this Product even for use in general electronics equipment shall be thoroughly made and when necessary, a protective circuit shall be added at design stage, all at the customer's sole risk.

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- d. i) You are requested to fully check and confirm by the start of mass production of this Product that (1) no bug, defect or other failure is included in firmware incorporated in this Product (“Incorporated Software”), (2) no bug defect or other failure is caused by installation of this Product with Incorporated Software into customer’s products, and that Incorporated Software fully meets customer’s intended use, although TAIYO YUDEN sufficiently inspects or verifies quality of Incorporated Software.
- ii) Please note that TAIYO YUDEN is not responsible for any failure arising out of bugs or defects in Incorporated Software.
- e. Communication between this Product and others might not be established nor maintained depending upon radio environment or operating conditions of this Product and other **ISM band** at 2.4GHz and 5GHz products.
- f. This Product operates in the unlicensed ISM band at 2.4GHz and 5GHz. In case this Product is used around the other wireless devices which operate in same frequency band of this Product, there is a possibility that interference occurs between this Product and such other devices. If such interference occurs, please stop the operation of other devices or relocate this Product before using this Product or do not use this Product around the other wireless devices.
- g. Please evaluate adequately our module incorporated to your products before mass production.
- h. Caution for Export Control
This Product may be subject to governmental approvals, consents, licenses, authorizations, declarations, filings, and registrations for export or re-export of the Product, required by *Japanese Foreign Exchange and Foreign Trade Law(including related laws and regulations)* and/or any other country’s applicable laws or regulations related to export control.
In case you will export or re-export this Product, you are strongly recommended to check and confirm, before exporting or re-exporting, necessary procedures for export or re-export of this Product which is required by applicable laws and regulations, and if necessary, you have to obtain necessary and appropriate approvals or licenses from governmental authority at your own risk and expense.

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Control No. HD-AM-A091234 (1/1)	Control name Absolute maximum ratings
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Absolute maximum ratings

Item	Symbol	Rating				Remark
		Min.	Typ.	Max.	Unit	
Supply voltage 1	VIO	-		4.0	V	
Supply voltage 2	VDD18	-		1.98	V	
Supply voltage 3	VBAT	-		5.6	V	
Storage temperature range	Tstg	-30		100	Degrees C	
Operation temperature range	Topr	-20	25	70	Degrees C	

Recommended operating range

Item	Symbol	Rating				Remark
		Min.	Typ.	Max.	Unit	
Supply voltage 1	VIO	1.62/2.97	1.8/3.3	1.98/3.63	V	
Supply voltage 2	VDD18	1.71	1.8	1.89	V	
Supply voltage 3	VBAT	3.2	3.3	4.3	V	

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Control No. HD-AE-A091234 (1/9)	Control name Electrical characteristics
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DC Specifications

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage

No.	Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
1	Peak Current1	VIO	Ip1	-		20	mA	
2	Peak Current2	VDD18	Ip2	-		250	mA	
3	Peak Current3	VBAT	Ip3	-		300	mA	
4	Power consumption1	Burst Tx (2G-11n/150Mbps)	Pc1		219		mW	Duty=2.6%
5	Power consumption2	Continuous Rx (2G-11n/150Mbps)	Pc2		242		mW	
6	Power consumption3	Burst Tx (2G-11n/72.2Mbps)	Pc3		228		mW	Duty=4.5%
7	Power consumption4	Continuous Rx (2G-11n/72.2Mbps)	Pc4		230		mW	
8	Power consumption5	Burst Tx (11g/54Mbps)	Pc5		320		mW	Duty=20%
9	Power consumption6	Continuous Rx (11g/54Mbps)	Pc6		229		mW	
10	Power consumption7	Burst Tx (11b/11Mbps)	Pc7		520		mW	Duty=45%
11	Power consumption8	Continuous Rx (11b/11Mbps)	Pc8		230		mW	
12	Power consumption9	Burst Tx (5G-11n /150Mbps)	Pc9		252		mW	Duty=2.6%
13	Power consumption10	Continuous Rx (5G-11n /150Mbps)	Pc10		281		mW	
14	Power consumption11	Burst Tx (5G-11n /72.2Mbps)	P11		261		mW	Duty=4.5%
15	Power consumption12	Continuous Rx (5G-11n /72.2Mbps)	P12		268		mW	
16	Power consumption13	Burst Tx (11a /54Mbps)	Pc13		328		mW	Duty=20%
17	Power consumption14	Continuous Rx (11a /54Mbps)	Pc14		268		mW	
18	Power consumption15	Power Save (DTIM=1, Beacon Interval=100mS)	Pc15		13		mW	VIO=3.3V
			Pc16		11		mW	VIO=1.8V
19	Power consumption16	Deep Sleep	Pc17		3.0		mW	VIO=3.3V
			Pc18		0.81		mW	VIO=1.8V
20	Power consumption17	Power Down	Pc19		0.35		mW	VIO=3.3V
			Pc20		0.11		mW	VIO=1.8V

Digital Pad Ratings

No.	Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
1	Input high voltage		VIH	0.8*VIO		VIO+0.3	V	
2	Input low voltage		VIL	-0.3		0.3*VIO	V	
3	Output high voltage		VOH	VIO-0.4		-	V	
4	Output low voltage		VOL	-		0.4	V	

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Control No. HD-AE-A091234	(2/9)	Control name Electrical characteristics
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AC Specifications

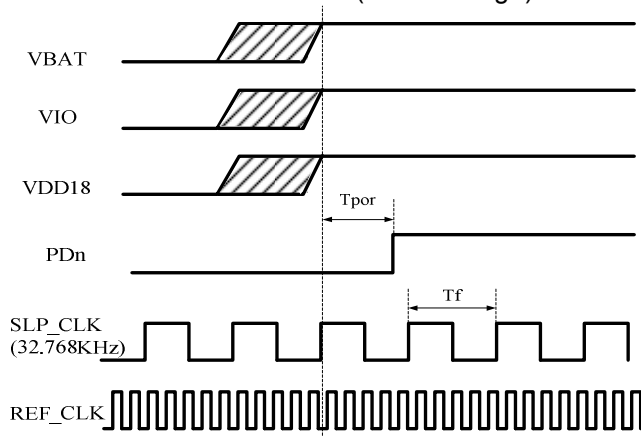
Power-on timing / External sleep clock

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Valid Power / Clock to PDn de-asserted		Tpor	100			ms	
2	Input SLP_CLK frequency		Tf		32.768		KHz	
3	Input SLP_CLK high voltage		V _{IH}	0.8	1.8	1.98	V	
4	Input SLP_CLK low voltage		V _{IL}	0.0		0.25	V	
5	Input SLP_CLK phase noise requirement		PN		-125		dBc/Hz	@100KHz
6	Input SLP_CLK slew rate limit (10-90%)		SR			100	ns	
7	Input SLP_CLK duty cycle tolerance		DC	20		80	%	

<Power-on sequence>

PDn must remain asserted for minimum of Tpor after VBAT, VIO, VDD18, REF_CLK and SLP_CLK are stable.

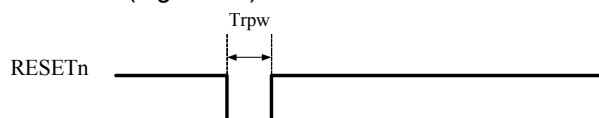
RESETn must be inactive value (asserted high) when PDn is de-asserted.



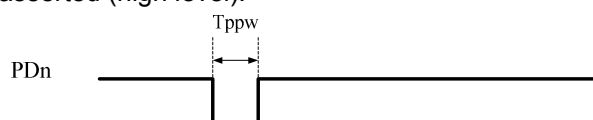
External reset(RESETn), power down(PDn)

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
11	RESETn pulse width		Trpw	1			ms	
12	PDn pulse width		Tppw	100			ms	

RESETn should be asserted while VBAT, VIO, VDD18, REF_CLK and SLP_CLK are stable and PDn is de-asserted (high level).



PDn should be asserted while VBAT, VIO, VDD18, REF_CLK and SLP_CLK are stable and RESETn is de-asserted (high level).



For lowest current consumption, apply all power rails to WYSBMVGX4 during the assertion of PDn pin.

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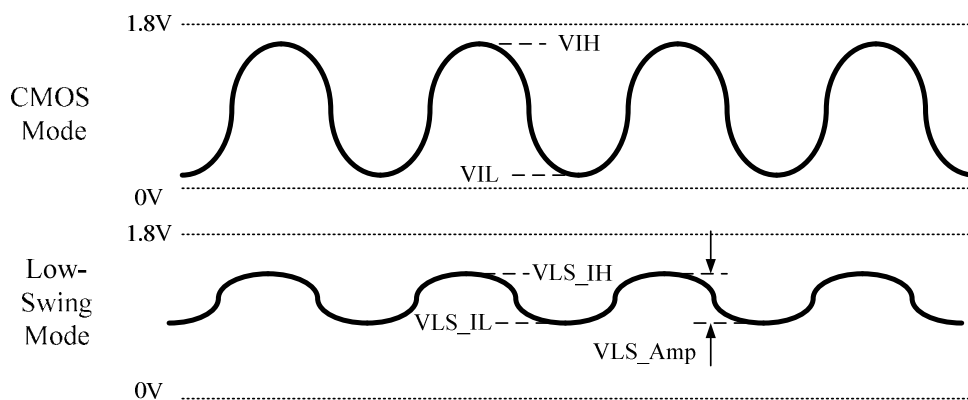
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Control No. HD-AE-A091234	(3/9)	Control name Electrical characteristics
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Input fast clock specifications (Clock frequency : f (MHz)= 26 / 38.4)

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Input REF_CLK high voltage		V_{IH}	VDD18-0.5	VDD18	VDD18+0.2	V	CMOS Mode
2	Input REF_CLK low voltage		V_{IL}	0	0	0.4	V	
3	Single-ended high-level voltage		VLS_IH	-	-	1.8	V	Low-Swing Mode
4	Single-ended low-level voltage		VLS_IL	0	-	-	V	
5	Low-swing clock amplitude(pk-pk)		VLS_Amp	0.5	-	-	V	
6	Low-swing mid-point slope		VLS_Slope	50	-	-	MV/s	
7	Duty cycle		Duty cycle	45	50	55	%	
8	REF_CLK Phase Noise 26MHz	Offset=1KHz	PN _{1K}	-	-	-130	dBc/Hz	
		Offset=10KHz	PN _{10K}	-	-	-150	dBc/Hz	
		Offset=100KHz	PN _{100K}	-	-	-156	dBc/Hz	
		Offset>1MHz	PN _{1M}	-	-	-156	dBc/Hz	
9	REF_CLK Phase Noise 38.4MHz	Offset=1KHz	PN _{1K}	-	-	-126	dBc/Hz	
		Offset=10KHz	PN _{10K}	-	-	-146	dBc/Hz	
		Offset=100KHz	PN _{100K}	-	-	-152	dBc/Hz	
		Offset>1MHz	PN _{1M}	-	-	-152	dBc/Hz	
10	REF_CLK period		T _{pxo}	1000/f -20ppm	1000/f	1000/f +20ppm	ns	



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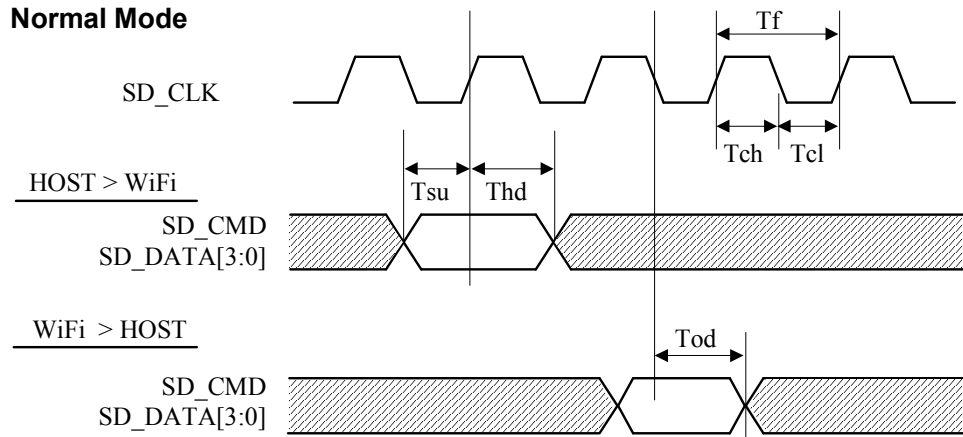
Control No. HD-AE-A091234	(4/9)	Control name Electrical characteristics
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SDIO Interface Specifications

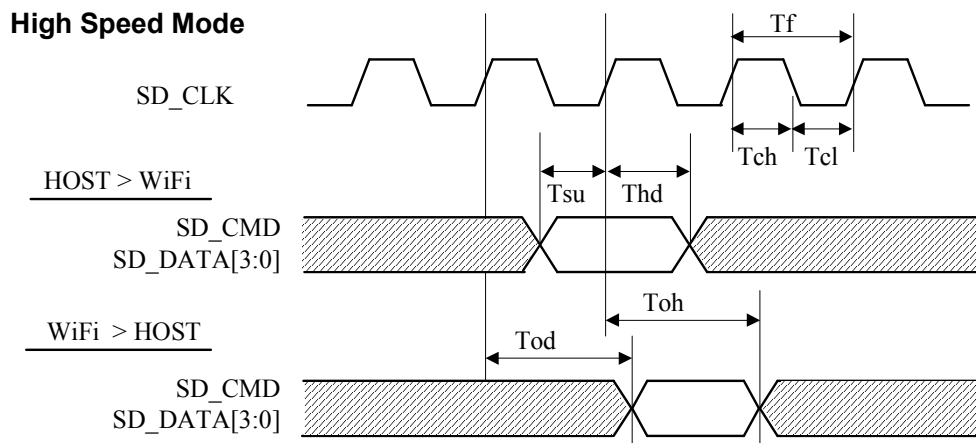
The Specification applies for Topr.= -20 to 70 degrees C , Supply voltage=Typical voltage

	Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
1	Input SDIO_CLK Frequency	Tf	Normal	0	-	25	MHz	
			High Speed	0	-	50		
2	Input SDIO_CLK High Time	Tch	Normal	10	-	-	ns	
			High Speed	7	-	-		
3	Input SDIO_CLK Low Time	Tcl	Normal	10	-	-	ns	
			High Speed	7	-	-		
4	Input SDIO_CMD, DATA[3:0] Setup time	Tsu	Normal	5	-	-	ns	
			High Speed	6	-	-		
5	Input SDIO_CMD, DATA[3:0] Hold time	Thd	Normal	5	-	-	ns	
			High Speed	2	-	-		
6	Output SDIO_CMD, DATA[3:0] Delay time	Tod	-	-	-	14	ns	
7	Output SDIO_CMD, DATA[3:0] Hold time	Toh	High Speed	2.5	-	-	ns	

Normal Mode



High Speed Mode



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Control No. HD-AE-A091234	(5/9)	Control name Electrical characteristics
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RF Specifications (WLAN 11b/11Mbps, CCK)

The Specification applies for Ta=25 degrees C, Supply voltage=Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2472	MHz	
2	TX Power		Po	14	16	18	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-30	dBc	
		2 nd Side Lobe	M2	-		-50	dBc	
4	Power up-down rump	Power up	TU	-		2	us	
		Power down	TD	-		2	us	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	Peak	EVM	-		35	%	
7	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	FER<8%	SEN	-	-87	-84	dBm	
11	Maximum Input Level	FER<8%	MIL	-10			dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

RF Specifications (WLAN 11g/54Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2472	MHz	
2	TX Power		Po	13	15	17	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-40	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	rms	EVM	-		-25	dB	
7	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-74	-71	dBm	
11	Maximum Input Level	PER<10%	MIL	-20		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
12	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

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Control No. HD-AE-A091234	(6/9)	Control name Electrical characteristics
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RF Specifications (WLAN 11n/MCS7, BW=20MHz, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2472	MHz	
2	TX Power		Po	12	14	16	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-71	-68	dBm	
11	Maximum Input Level	PER<10%	MIL	-20		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

RF Specifications (WLAN 11n/MCS7, BW=40MHz, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2422		2462	MHz	
2	TX Power		Po	12	14	16	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-67	-64	dBm	
11	Maximum Input Level	PER<10%	MIL	-20		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

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Control No. HD-AE-A091234	(7/9)	Control name Electrical characteristics
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RF Specifications (WLAN 11a/54Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5180		5825	MHz	
2	TX Power		Po	12	14	16	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-40	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-25	dB	
7	TX Out of band spurious1	30MHz to 47MHz, 74MHz to 87.5MHz, 118MHz to 174MHz, 230MHz to 470MHz, 862MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	47MHz to 74MHz, 87.5MHz to 118MHz, 174MHz to 230MHz, 470MHz to 862MHz	TOS2	-		-54	dBm	
9	TX Out of band spurious3	1GHz to 26GHz	TOS3			-30	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-75	-72	dBm	
11	Maximum Input Level	PER<10%	MIL	-30		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 26GHz	ROS2	-		-47	dBm	

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Control No. HD-AE-A091234	(8/9)	Control name Electrical characteristics
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RF Specifications (WLAN 11n/MCS7, BW=20MHz, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5180		5825	MHz	
2	TX Power		Po	11	13	15	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	TX Out of band spurious1	30MHz to 47MHz, 74MHz to 87.5MHz, 118MHz to 174MHz, 230MHz to 470MHz, 862MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	47MHz to 74MHz, 87.5MHz to 118MHz, 174MHz to 230MHz, 470MHz to 862MHz	TOS2	-		-54	dBm	
9	TX Out of band spurious3	1GHz to 26GHz	TOS3			-30	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-72	-69	dBm	
11	Maximum Input Level	PER<10%	MIL	-30		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 26GHz	ROS2	-		-47	dBm	

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Control No. HD-AE-A091234	(9/9)	Control name Electrical characteristics
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RF Specifications (WLAN 11n/MCS7, BW=40MHz, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5190		5815	MHz	
2	TX Power		Po	11	13	15	dBm	
3	Spectrum Mask	1 st Side Lobe	M1	-		-20	dBc	
		2 nd Side Lobe	M2	-		-28	dBc	
		3 rd Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	TX Out of band spurious1	30MHz to 47MHz, 74MHz to 87.5MHz, 118MHz to 174MHz, 230MHz to 470MHz, 862MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	47MHz to 74MHz, 87.5MHz to 118MHz, 174MHz to 230MHz, 470MHz to 862MHz	TOS2	-		-54	dBm	
9	TX Out of band spurious3	1GHz to 26GHz	TOS3			-30	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-70	-67	dBm	
11	Maximum Input Level	PER<10%	MIL	-30		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 26GHz	ROS2	-		-47	dBm	

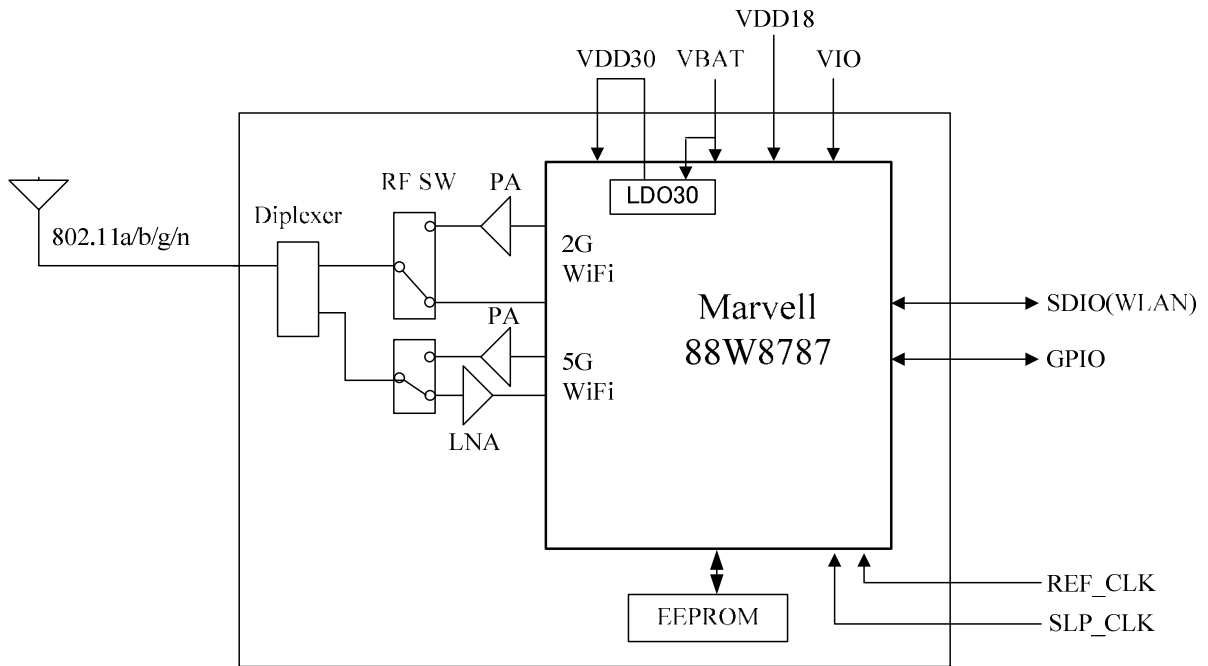
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Control No. HD-MC-A091234	(1/1)	Control name Circuit Schematic
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Block Diagram



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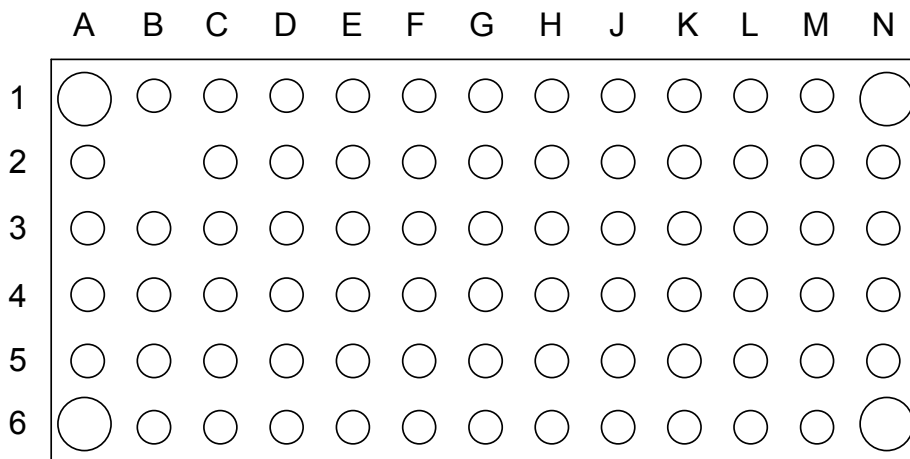
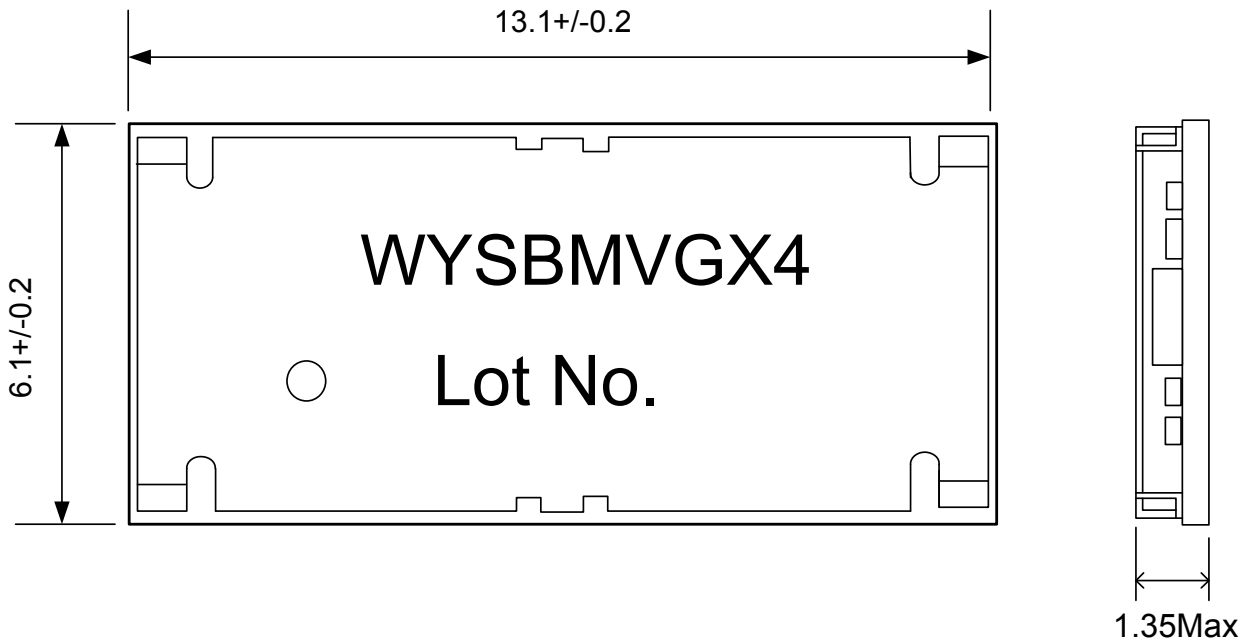
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Control No. HD-AD-A091234	(1/2)	Control name Outline/Appearance
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OUTLINE

Unit: mm



Bottom View

Note: Please check the next page for detailed pad sizes on module.

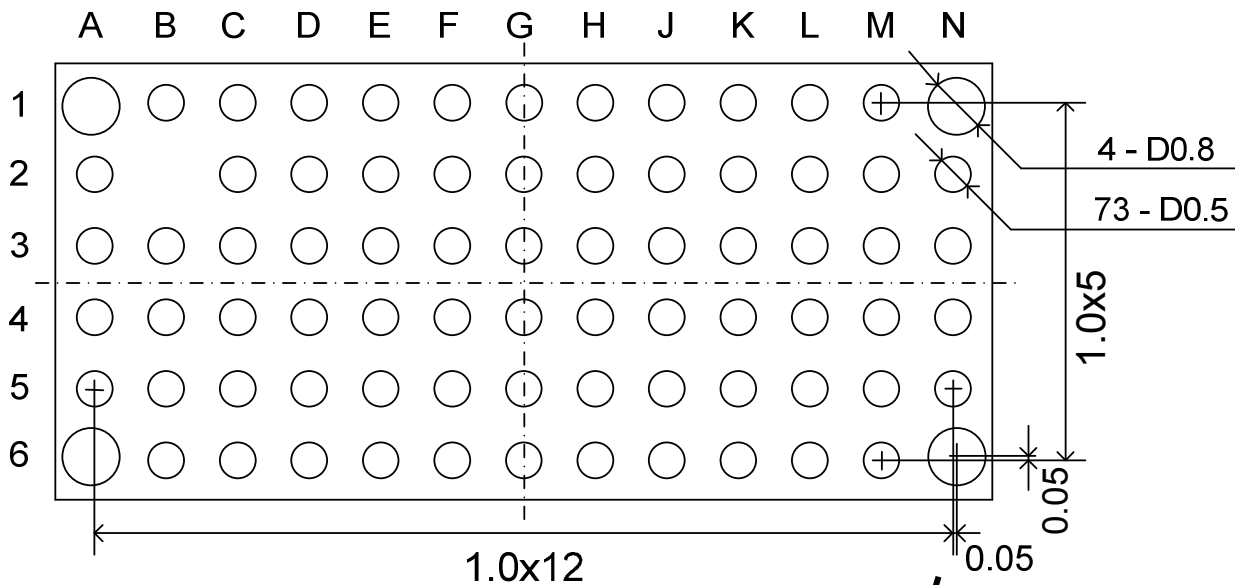
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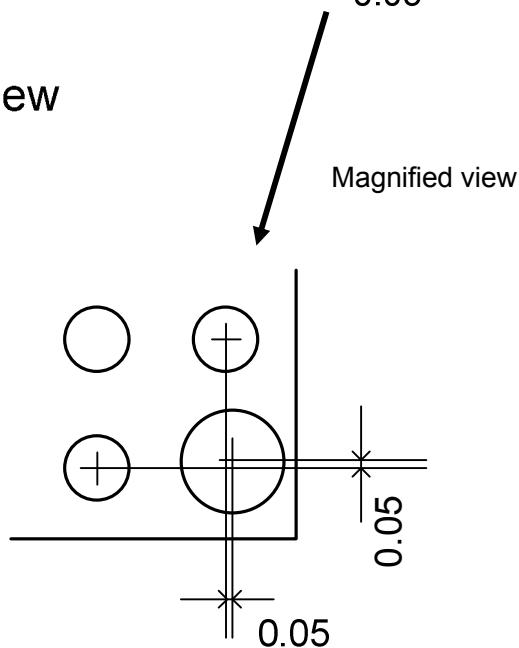
Control No. HD-AD-A091234	(2/2)	Control name Outline/Appearance
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Module Pad Dimension

Unit: mm



Bottom View



Recommended Land Pattern Dimension

We recommend that pad sizes on mother board and pad sizes on module should be the same.

Recommended Metal Mask (Solder Mask) Conditions

Thickness of the Metal Mask should be in the range 0.1 mm

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Control No. HD-BA-A091234	(1/3)	Control name Pin Layout
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Pin Descriptions

Loc.	Pin Name	I/O	Pwr Domain	Description	Function
A1	GND	-	-	ground	PWR
A2	GND	-	-	ground	PWR
A3	ANT	I/O	-	2G/5G RF (WiFi-11abgn) Antenna	RF
A4	GND	-	-	ground	PWR
A5	GND	-	-	ground	PWR
A6	GND	-	-	ground	PWR
B1	TDO	O	VIO	JTAG Test Data Output	JTAG
B3	GND	-	-	ground	PWR
B4	GND	-	-	ground	PWR
B5	GND	-	-	ground	PWR
B6	GND	-	-	ground	PWR
C1	TDI	I	VIO	JTAG Test Data Input	JTAG
C2	TCK	I	VIO	JTAG Test Clock Input	JTAG
C3	RES	-	-	(Reserved) Should be left open	-
C4	RES	-	-	(Reserved) Should be left open	-
C5	VBAT	I	VBAT	Battery power supply	PWR
C6	VBAT	I	VBAT	Battery power supply	PWR
D1	RESETn	I	VIO	Reset (0: Reset, 1: Normal Operation)	CTRL
D2	TMS	I	VIO	JTAG Controller Select	JTAG
D3	RES	-	-	(Reserved) Should be left open	-
D4	RES	-	-	(Reserved) Should be left open	-
D5	RES	-	-	(Reserved) Should be left open	-
D6	RES	-	-	(Reserved) Should be left open	-
E1	PDn	I	VIO	Power Down (no internal pull-up on this pin) (0: Full Power Down, 1: Normal Operation)	CTRL
E2	RES	-	-	(Reserved) Should be left open	-
E3	GND	-	-	Ground	PWR
E4	GND	-	-	Ground	PWR
E5	RES	-	-	(Reserved) Should be left open	-
E6	RES	-	-	(Reserved) Should be left open	-
F1	VDD18	I	VDD18	1.8V power supply	PWR
F2	VDD18	I	VDD18	1.8V power supply	PWR
F3	GND	-	-	Ground	PWR
F4	GND	-	-	Ground	PWR
F5	RES	-	-	(Reserved) Should be left open	-
F6	VDD18	I	VDD18	1.8V power supply	PWR

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Control No. HD-BA-A091234	(2/3)	Control name Pin Layout
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Loc.	Pin Name	I/O	Pwr Domain	Description	Function
G1	GND	-	-	Ground	PWR
G2	RES	-	-	(Reserved) Should be left open	-
G3	GND	-	-	Ground	PWR
G4	GND	-	-	Ground	PWR
G5	GPIO0	I/O	VIO	GPIO0	CTRL
G6	GND	-	-	Ground	PWR
H1	RES	-	-	(Reserved) Should be left open	-
H2	GPIO4	I/O	VIO	GPIO4	CTRL
H3	GND	-	-	Ground	PWR
H4	RES	-	-	(Reserved) Should be left open	-
H5	GND	-	-	Ground	PWR
H6	REF_CLK	I	VDD18	Crystal/Oscillator Input (26/38.4MHz)	CLOCK
J1	RES	-	-	(Reserved) Should be left open	-
J2	RES	-	-	(Reserved) Should be left open	-
J3	GND	-	-	Ground	PWR
J4	RES	-	-	(Reserved) Should be left open	-
J5	GND	-	-	Ground	PWR
J6	RES	-	-	(Reserved) Should be left open	-
K1	RES	-	-	(Reserved) Should be left open	-
K2	RES	-	-	(Reserved) Should be left open	-
K3	RES	-	-	(Reserved) Should be left open	-
K4	RES	-	-	(Reserved) Should be left open	-
K5	VBAT	I	VBAT	Battery power supply	PWR
K6	GND	-	-	Ground	PWR
L1	GND	-	-	Ground	PWR
L2	RES	-	-	(Reserved) Should be left open	-
L3	RES	-	-	(Reserved) Should be left open	-
L4	RES	-	-	(Reserved) Should be left open	-
L5	LDO30_OUT	O	LDO30	3.0V Voltage Output	PWR
L6	VDD30	I	VDD30	3.0/3.3V Digital IO Power Supply	PWR
M1	SLP_CLK	I	VDD18	Sleep Clock Input	CLOCK
M2	RES	-	-	(Reserved) Should be left open	-
M3	SD_CMD	I/O	VIO	SDIO Command	SDIO
M4	SD_DATA[0]	I/O	VIO	SDIO Data[0]	SDIO
M5	WL_HOST_WKUP	O	VIO	WLAN -> Host Wake up (GPIO16)	CTRL
M6	VIO	I	VIO	1.8V/3.3V Digital IO Power Supply	PWR

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TAIYO YUDEN

Control No. HD-BA-A091234	(3/3)	Control name Pin Layout
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Loc.	Pin Name	I/O	Pwr Domain	Description	Function
N1	GND	-	-	Ground	PWR
N2	SD_DATA[2]	I/O	VIO	SDIO Data[2]	SDIO
N3	SD_DATA[3]	I/O	VIO	SDIO Data[3]	SDIO
N4	SD_CLK	I	VIO	SDIO Clock	SDIO
N5	SD_DATA[1]	I/O	VIO	SDIO Data[1]	SDIO
N6	GND	-	-	Ground	PWR

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Control No. HQ-BA-523	(1/2)	Control name Handling Precaution
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This specification describes desire and conditions especially for mounting.

Desire/Conditions

- (1) Environment conditions for use and storage
 1. Store the components in an environment of < **40deg-C/90%RH** if they are in a moisture barrier bag packed by TAIYO YUDEN.
 2. Keep the factory ambient conditions at < **30deg-C/60%RH** .
 3. Store the components in an environment of < **25±5deg-C/10%RH** after the bag is opened.
(The condition is also applied to a stay in the manufacture process).
- (2) Conditions for handling of products

Make sure all of the moisture barrier bags have no holes, cracks or damages at receiving. If an abnormality is found on the bag, its moisture level must be checked in accordance with 2 in (2). Refer to the label on the bag.

1. All of the surface mounting process (reflow process) must be completed **in 12 months** from the bag sea date.
2. Make sure humidity in the bag is less than **10%RH** immediately after open, using a humidity indicator card sealed with the components.
3. **All** of the surface mounting process (reflow process including rework process) must be completed in **168 hours** after the bag is opened (inclusive of any other processes).
4. If any conditions in (1) or condition 2 and 3 in (2) are not met, bake the components in accordance with the conditions at **125deg-C 24hours**
5. As a rule, baking the components in accordance with conditions 4 in (2) shall be once.
6. Since semi-conductors are inside of the components, they must be free from static electricity while handled.(<100V) Use ESD protective floor mats, wrist straps, ESD protective footwear, air ionizers etc. , if necessary.
7. Please make sure that there are lessen mechanical vibration and shock for this module, and do not drop it.

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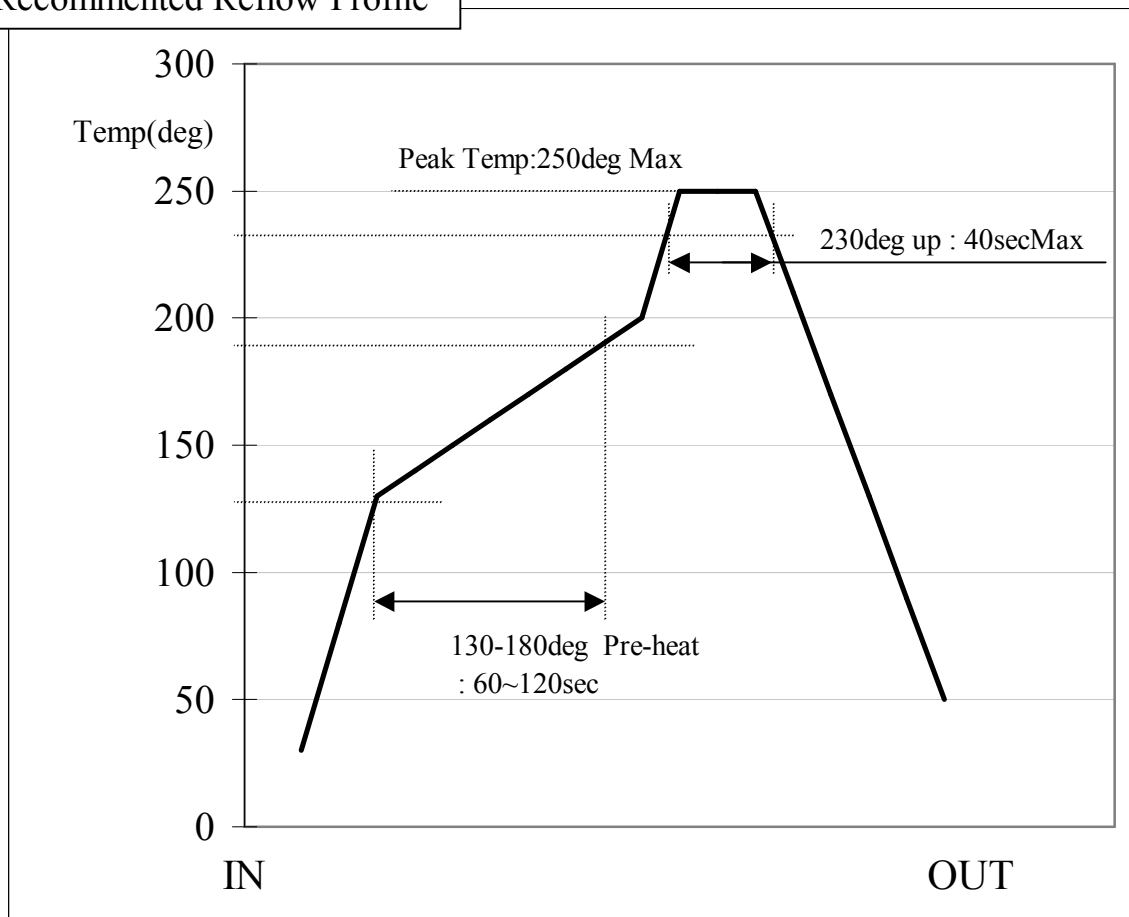
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Control No. HQ-BA-523	(2/2)	Control name Handling Precaution
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8. Please recognize pads of back side at surface mount.
9. Please do not wash this module.
10. Please perform temperature conditions of module at reflow within the limits of the following.

Please give the number of times of reflow as a maximum of 2 times.

Recommended Reflow Profile

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Control No. HD-BB-A091234 (1/3)	Control name Taping Specification
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Packaging Specification

(1) Packaging Material

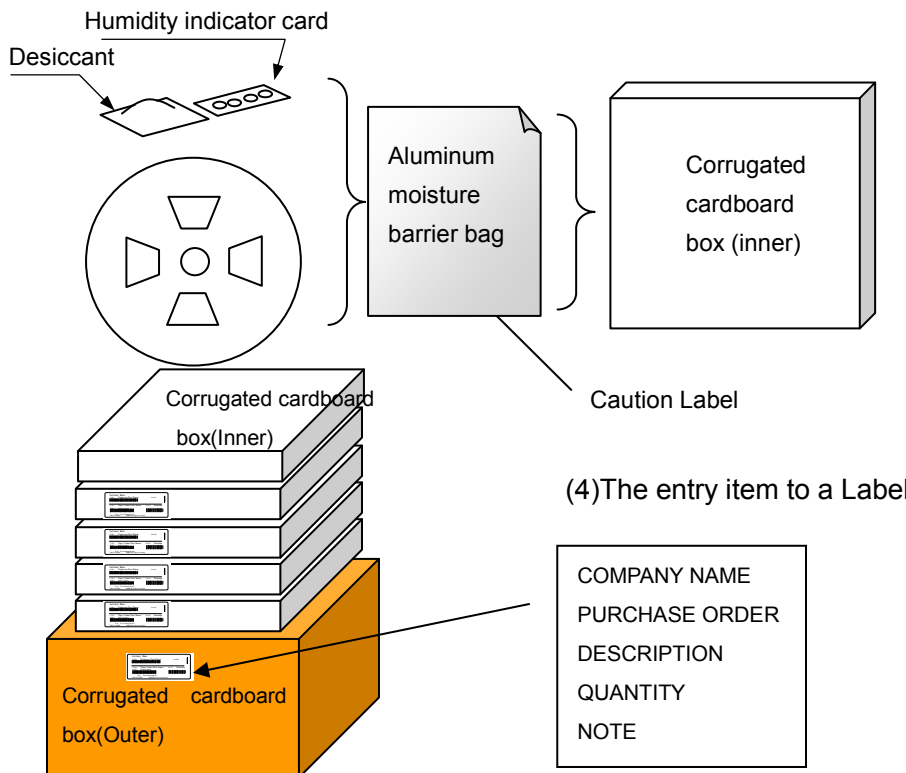
Name	Outline	Materials	Note
Emboss	24mm wide-12mmPitch	Conductive PS	
Cover Tape			
Reel	φ330mm	Conductive PS	
Desiccant	30g x 1		
Humidity indicator card			
Aluminum moisture barrier bag	420 x 460(mm)	(AS)Polyester/AL/Nylon /Polyethylene(AS)	
Label			
Corrugated cardboard Box(Inner)	376x 376 x52(mm)		
Corrugated cardboard Box(Outer)	400 x 390 x290(mm)		

(2) Packaging Unit

Max 1500 pieces/Reel

Max 7500 pieces/Box (Outer)

(3)Packaging Figure



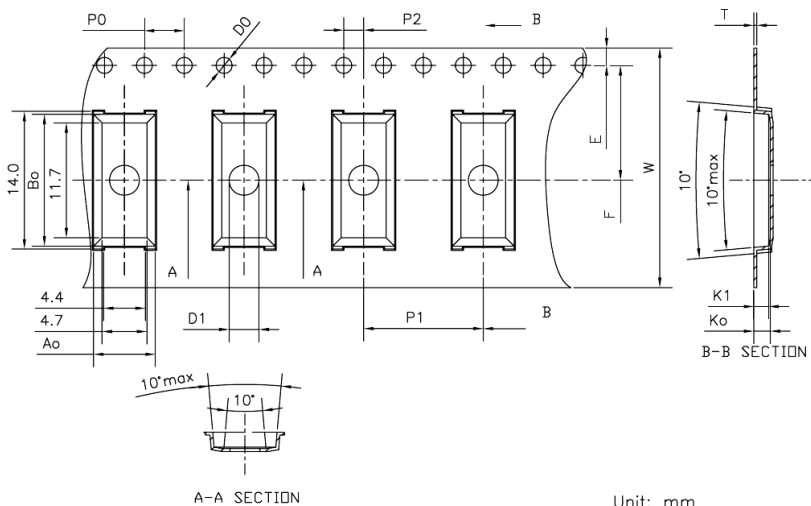
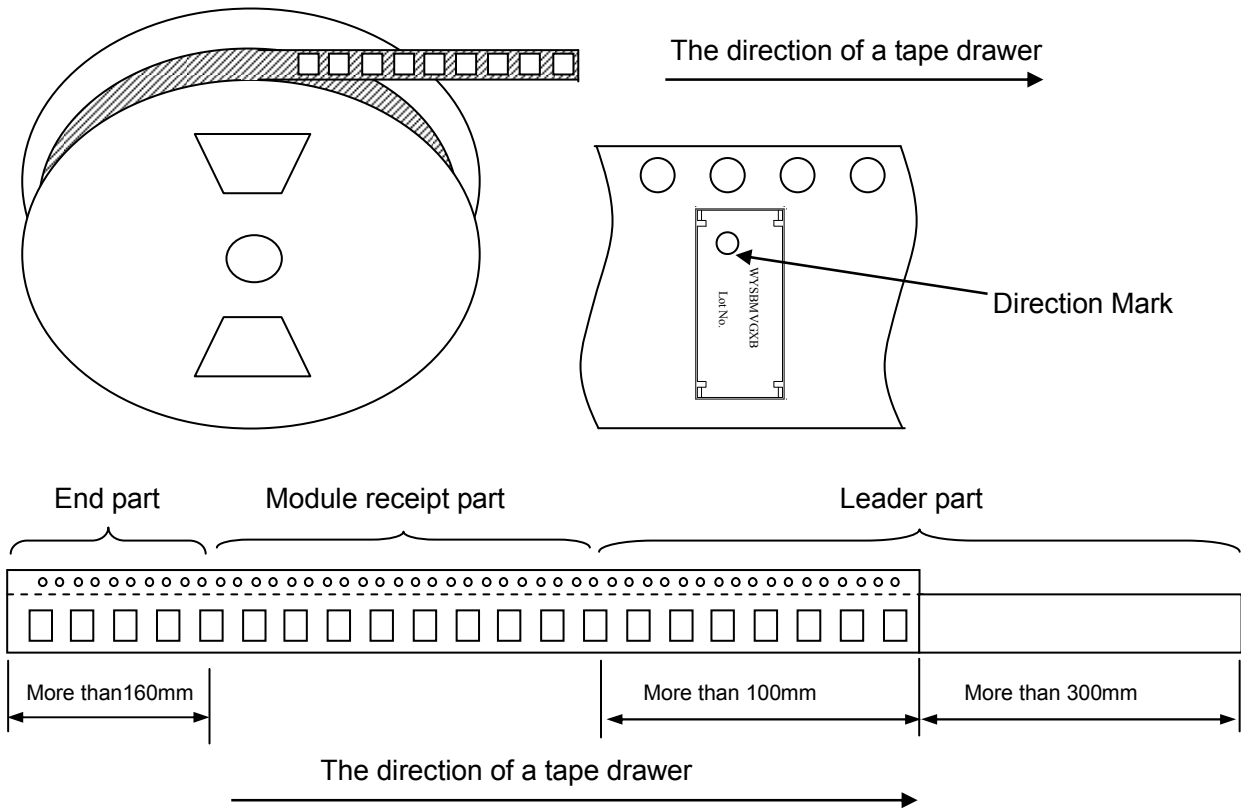
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Control No. HD-BB-A091234	(2/3)	Control name Taping Specification
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(5)Tape specification



Unit: mm

Symbol	Ao	Bo	Ko	K1	Po	P1	P2	T
Spec	6.4±0.10	13.4±0.10	1.95±0.10	1.8±0.10	4.0±0.10	12.0±0.10	2.0±0.1	0.30±0.05
Symbol	E	F	Do	D1	W	10Po		
Spec	1.75±0.10	11.5±0.1	1.50 ^{+0.1} ₀	3.0 ^{+0.1} ₀	24.0±0.3	40.0±0.20		

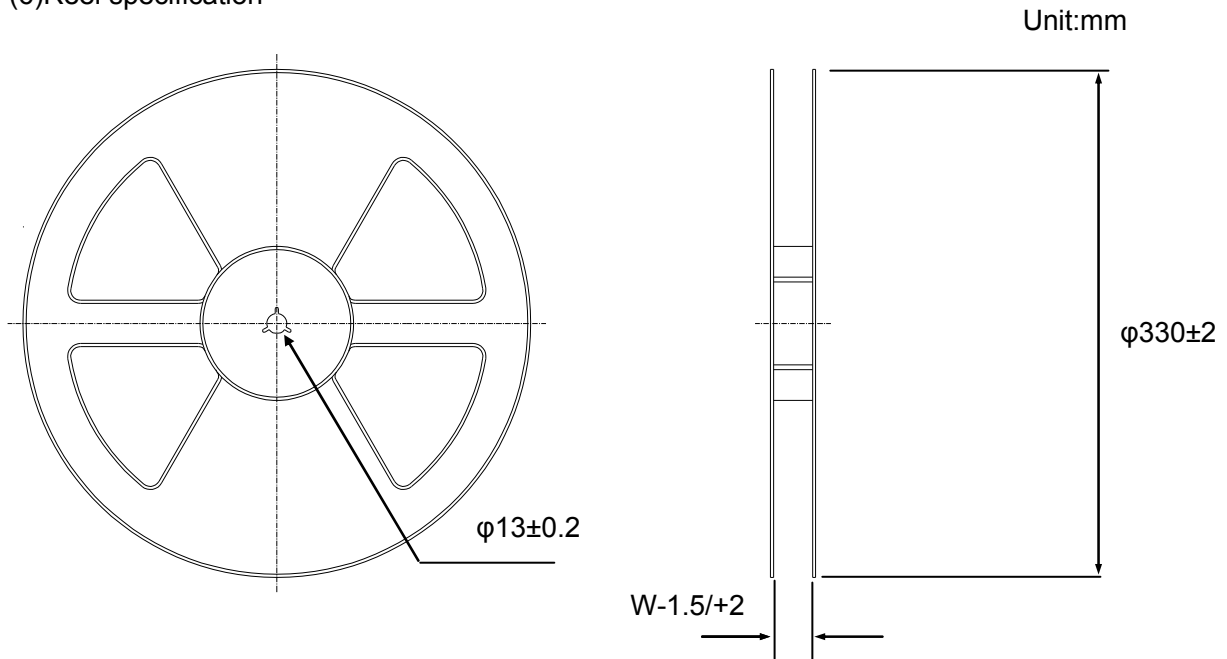
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Control No. HD-BB-A091234	(3/3)	Control name Taping Specification
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(6) Reel specification



Tape wide	8mm	12mm	16mm	24mm	32mm	44mm
W	9.4mm	13.4mm	17.4mm	25.4mm	33.4mm	45.4mm

(7) Taping performance

Both of an embossing tape top cover tape bear this, when the power of 10N is applied in the direction of a drawer.

The exfoliation adhesion of a top cover tape is the intensity of 0.1~1.3N.
(The angle to pull is 165~180 deg-C. The speed to pull is 300 mm/min.)

(8) Note

Lack of the parts in 1 reel is with two or less pieces.

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