AW-CM235NF

IEEE 802.11 a/b/g/n/ac Wireless LAN and Bluetooth M.2 Combo Module

Datasheet

Version 1.1

AzureWave Technologies, Inc.

Revision History

Revision	Date	Description	Initials	Approved
Version 0.1	2014/12/31	Initial release	Alex Yu	Chihhao Liao
Version 0.2	2015/2/10	Update pin map & pin definition & Specification	Stanley Wang	Chihhao Liao
Version 0.3	2015/4/15	Update Update Electrical Characteristics	Stanley Wang	Chihhao Liao
Version 0.4	2015/5/15	Modified Key Features Modified Recommended Operating Conditions Update Specification & power consumption	Steven Jian	Chihhao Liao
Version 0.5	2017/10/12	Changed document format Updated 1.4.4 Operating Conditions Updated 4.1 Mechanical Drawing Updated 3. Electrical Characteristics Updated 2.2 Pin Table	Steven Jian	Chihhao Liao
Version 0.6	2017/11/27	Updated 1.4.4 Operating Conditions	Steven Jian	Chihhao Liao
Version 0.7	2018/05/21	Updated 2.2 Pin Table	Steven Jian	Chihhao Liao
Version 0.8	2018/07/25	Modified pin10/pin28/pin46 in 2.2 Pin Table	Steven Jian	Chihhao Liao
Version 0.9	2018/09/20	Modified pin18 in 2.2 Pin Table Updated Title	Steven Jian	Chihhao Liao
Version 1.0	2018/12/24	Support BT 5.0 Core Std	Steven Jian	Chihhao Liao
Version 1.1	2019/07/11	Updated 1.4.2 Updated 2.1	Steven Jian	Chihhao Liao

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1. Introduction

1.1 Product Overview

AzureWave Technologies, Inc. introduces the advanced **IEEE 802.11 ac/a/b/g/n 2x2 MIMO WLAN and Bluetooth M.2 combo** module - **AW-CM235NF.** The module is targeted to mobile and embedded devices which need small footprint package, low power consumption, and multiple OS support. The module supports **2.4GHz and 5GHz bands** IEEE 802.11ac MAC/baseband/radio and Bluetooth 5.0 + EDR. It also features an integrated Power Management Unit (PMU), Power Amplifiers (PAs), and a Low Noise Amplifier (LNA) to address the needs of mobile devices that require minimal power consumption and compact size. By using AW-CM235NF, the customers can easily enable the Wi-Fi and BT embedded applications with the benefits of **high design flexibility, short development cycle, and quick time-to-market.**

For the WLAN operation, the AW-CM235NF uses DSSS, OFDM, DBPSK, DQPSK, CCK and QAM baseband modulation technologies. In 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 up to 867 Mbps. A high level of integration and full implementation of the power management functions specified in the IEEE 802.11 standard minimize the system power requirements by using AW-CM235NF. In addition to the support of **WPA/WPA2 (personal)** and **WEP** encryption, the AW-CM235NF also supports the IEEE 802.11i security standard through **AES** and **TKIP** acceleration hardware for faster data encryption. For the video, voice and multimedia applications the AW-CM235NF support 802.11e Quality of Service (QoS).

For Bluetooth operation, the AW-CM235NF is **Bluetooth 5.0**. The Bluetooth transmitter also features a Class 1 power amplifier with Class 2 capability. The AW-CM235NF supports **extended Synchronous Connections (eSCO)**, for enhanced voice quality by allowing for retransmission of dropped packets, and **Adaptive Frequency Hopping (AFH)** for reducing radio frequency interference. It incorporates all Bluetooth 5.0 features.

1.2 Features

- Integrates CYPRESS solutions of CYW4354 Wi-Fi /BT Single Chip
- Concurrent Bluetooth and WLAN operation
- ECI—enhanced coexistence support, ability to coordinate BT SCO transmissions around WLAN receives
- Multiple power saving modes for low power consumption
- Lead-free /Halogen Free Design
- 12 mm(L) x 16mm(W) x 1.5mm(H) 132 pin LGA package

1.2.1 WLAN

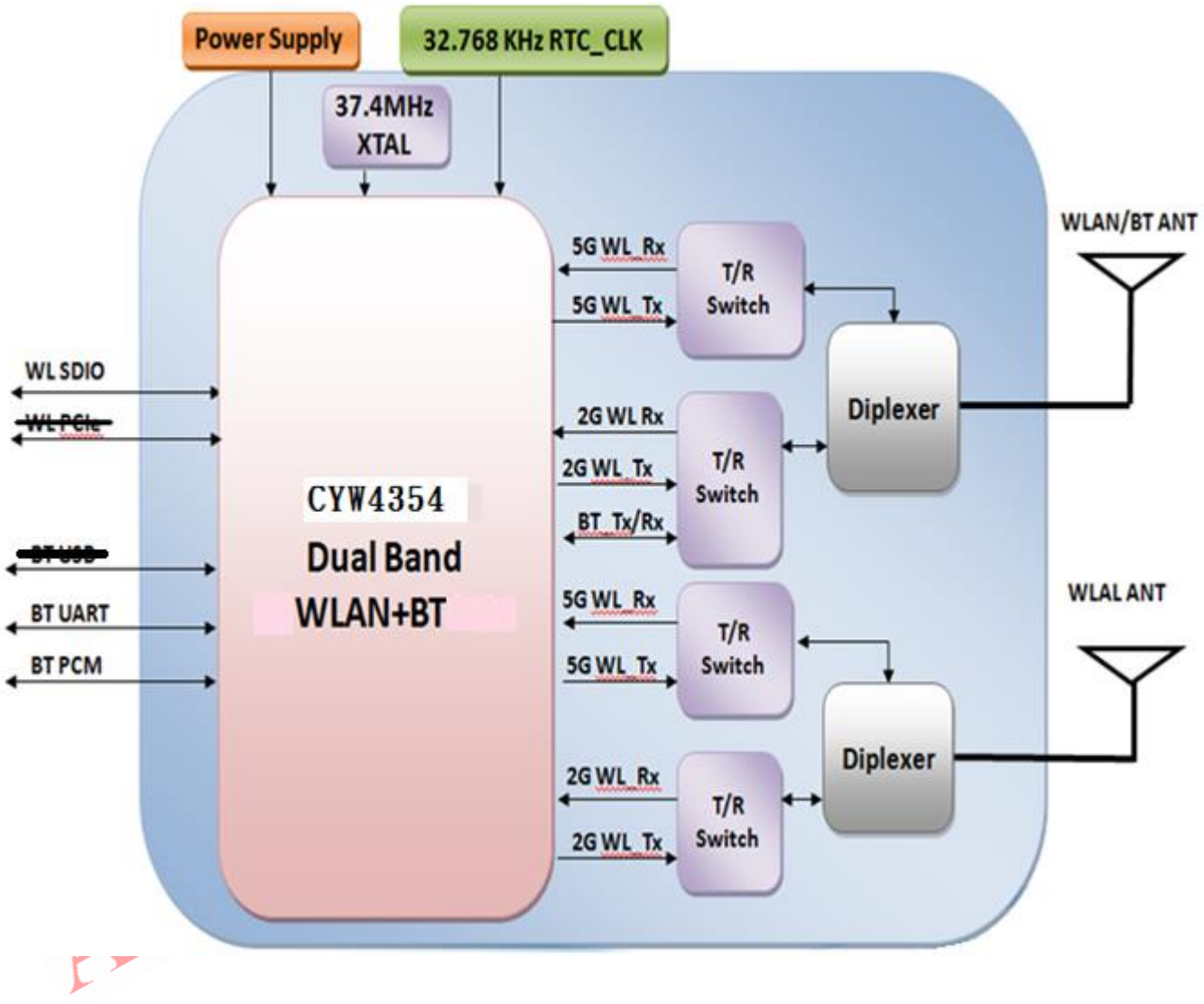
- IEEE 802.11ac Draft compliant
- Full IEEE 802.11a/b/g/n legacy compatibility with enhanced performance
- IEEE 802.11a/b/g/n/ac dual-band radio with virtual-simultaneous dual-band operation
- IEEE 802.11ac 2x2 MIMO supports for 20, 40, and 80 MHz channels with optional SGI (256 QAM modulation) provides data rates up to 866.7 Mbps.
- Tx and Rx low-density parity check (LDPC) support for improved range and power efficiency.
- Supports IEEE 802.15.2 external coexistence interface to optimize bandwidth utilization with other co-located wireless technologies such as LTE, GPS, or WiMAX
- Supports IEEE 802.11d, e, h, i, r, k, w
- WLAN host interface options
  - SDIO
- Security–WEP, WPA/WPA2 (personal), AES (HW), TKIP (HW), CKIP (SW).
- WMM/WMM-PS/WMM-SA
- Proprietary protocol –CCXv2/CCXv3/CCXv4/CCXv5
- Integrated CPU with on-chip memory for a complete WLAN subsystem minimizing the need to wake up the applications processor

1.2.2 Bluetooth

- Bluetooth Class 1 or Class 2 transmitter operation
- Supports key features of upcoming Bluetooth standards
- Fully supports Bluetooth Core Specification version 5.0 + (Enhanced Data Rate) EDR features:
  - Adaptive Frequency Hopping (AFH)
  - Quality of Service (QoS)
  - Extended Synchronous Connections (eSCO) — Voice Connections
  - Fast Connect (interlaced page and inquiry scans)
  - Secure Simple Pairing (SSP)
  - Sniff Subrating (SSR)
  - Encryption Pause Resume (EPR)
  - Extended Inquiry Response (EIR)
  - Link Supervision T imeout (LST)
- Multipoint operation with up to seven active slaves
  - Maximum of seven simultaneous active ACL links
  - Maximum of three simultaneous active SCO and eSCO connections with scatternet support
- Full support for power savings modes
  - Bluetooth clock request
  - Bluetooth standard sniff
  - Deep-sleep modes and software regulator shutdown
- Wideband speech support (16 bits linear data, MSB first, left justified at 4K samples/s for transparent air coding, both through I2S and PCM interface)
- Multiple simultaneous A2DP audio stream

1.3 Block Diagram

A simplified block diagram of the AW-CM235NF module is depicted in the figure below.



1.4 Specifications Table

1.4.1 General

Features	Description
Product Description	IEEE 802.11 a/b/g/n/ac Wireless LAN and Bluetooth M.2 Combo Module
Major Chipset	CYPRESS CYW4354
Host Interface	WLAN: SDIO V 3.0 Bluetooth: UART
Dimension	16mm(L) 12xmm(W) x 1.5mm(H)
Package	M.2 1216 Solder down
Antenna	I-PEX MHF4 Connector Receptacle (20449) Ant 1: WiFi/BT Main Ant 2: WIFI AUX
Weight	0.6g

1.4.2 WLAN

Features	Description
WLAN Standard	IEEE 802.11a/b/g/n/ac, Wi-Fi compliant
WLAN VID/PID	n/a
WLAN SVID/SPID	n/a
Frequency Rage	WLAN: 2.4 GHz / 5GHz Band
Modulation	DSSS DBPSK(1Mbps), DQPSK(2Mbps), CCK(11/5.5Mbps) OFDM BPSK(9/6Mbps/MCS0), QPSK(18/12Mbps/MCS1~2), 16-QAM(36/24Mbps/MCS3~4), 64-QAM(72.2/54/48Mbps/MCS5~7), 256-QAM(MCS8~9)
Number of Channels	802.11b: USA, Canada and Taiwan – 1 ~ 11 Most European Countries – 1 ~ 13 Japan – 1 ~ 13 802.11g: USA and Canada – 1 ~ 11 Most European Countries – 1 ~ 13 802.11n:

<table>
<tr><td></td><td>USA and Canada – 1 ~ 11
Most European Countries – 1 ~ 13
802.11a:
USA – 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153, 157, 161, 165</td></tr>
<tr><td>Output Power
(Board Level Limit)*</td><td>2.4G
<table>
<tr><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>11b (11Mbps)
@EVM<35%</td><td>14</td><td>16</td><td>18</td><td>dBm</td></tr>
<tr><td>11g (54Mbps)
@EVM≦-25 dB</td><td>12</td><td>14</td><td>16</td><td>dBm</td></tr>
<tr><td>11n (HT20 MCS7)
@EVM≦-27 dB</td><td>11</td><td>13</td><td>15</td><td>dBm</td></tr>
<tr><td>11n (HT40 MCS7)
@EVM≦-27 dB</td><td>9</td><td>11</td><td>13</td><td>dBm</td></tr>
</table>
5G
<table>
<tr><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>11a (54Mbps)
@EVM≦-25 dB</td><td>11</td><td>13</td><td>15</td><td>dBm</td></tr>
<tr><td>11n (HT20 MCS7)
@EVM≦-27 dB</td><td>10</td><td>12</td><td>14</td><td>dBm</td></tr>
<tr><td>11n (HT40 MCS7)
@EVM≦-27 dB</td><td>8</td><td>10</td><td>12</td><td>dBm</td></tr>
<tr><td>11ac (VHT80 MCS9)
@EVM≦-32 dB</td><td>6</td><td>8</td><td>10</td><td>dBm</td></tr>
</table></td></tr>
<tr><td>Receiver Sensitivity</td><td>2.4G
<table>
<tr><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>11b (11Mbps)</td><td></td><td>-88</td><td>-78</td><td>dBm</td></tr>
<tr><td>11g (54Mbps)</td><td></td><td>-74</td><td>-65</td><td>dBm</td></tr>
<tr><td>11n (HT20 MCS7)</td><td></td><td>-71</td><td>-64</td><td>dBm</td></tr>
<tr><td>11n (HT40 MCS7)</td><td></td><td>-68</td><td>-61</td><td>dBm</td></tr>
</table>
5G
<table>
<tr><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>11a (54Mbps)</td><td></td><td>-73</td><td>-65</td><td>dBm</td></tr>
<tr><td>11n (HT20 MCS7)</td><td></td><td>-70</td><td>-64</td><td>dBm</td></tr>
<tr><td>11n (HT40 MCS7)</td><td></td><td>-67</td><td>-61</td><td>dBm</td></tr>
<tr><td>11ac (VHT80 MCS9)</td><td></td><td>-59</td><td>-51</td><td>dBm</td></tr>
</table></td></tr>
<tr><td>Data Rate</td><td>802.11b: 1, 2, 5.5, 11Mbps
802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
802.11n: MCS0~7 HT20/HT40
802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps
802.11ac: MCS0~8 VHT20</td></tr>
</table>

	802.11ac: MCS0~9 VHT40/VHT80
Security	◆ WPA™- and WPA2™- (Personal) support for powerful encryption and authentication ◆ AES and TKIP acceleration hardware for faster data encryption and 802.11i compatibility ◆ Secure Easy Setup™ for simple Wi-Fi® setup and WPA2/WPA security configuration ◆ Wi-Fi Protected Setup (WPS) ◆ WEP ◆ WMM / WMM-SA ◆ CKIP(Software)

* If you have any certification questions about output power please contact FAE directly.

1.4.3 Bluetooth

Features	Description
Bluetooth Standard	Bluetooth 2.1+Enhanced Data Rate (EDR) / BT5.0
Bluetooth VID/PID	n/a
Frequency Rage	2350~2483.5MHz
Modulation	GFSK (1Mbps), Π/4DQPSK (2Mbps) and 8DPSK (3Mbps)
Output Power	Class 2
Receiver Sensitivity	

	Min	Typ	Max	Unit
DH5		-92	-82	dBm
2DH5		-94	-84	dBm
3DH5		-88	-78	dBm

1.4.4 Operating Conditions

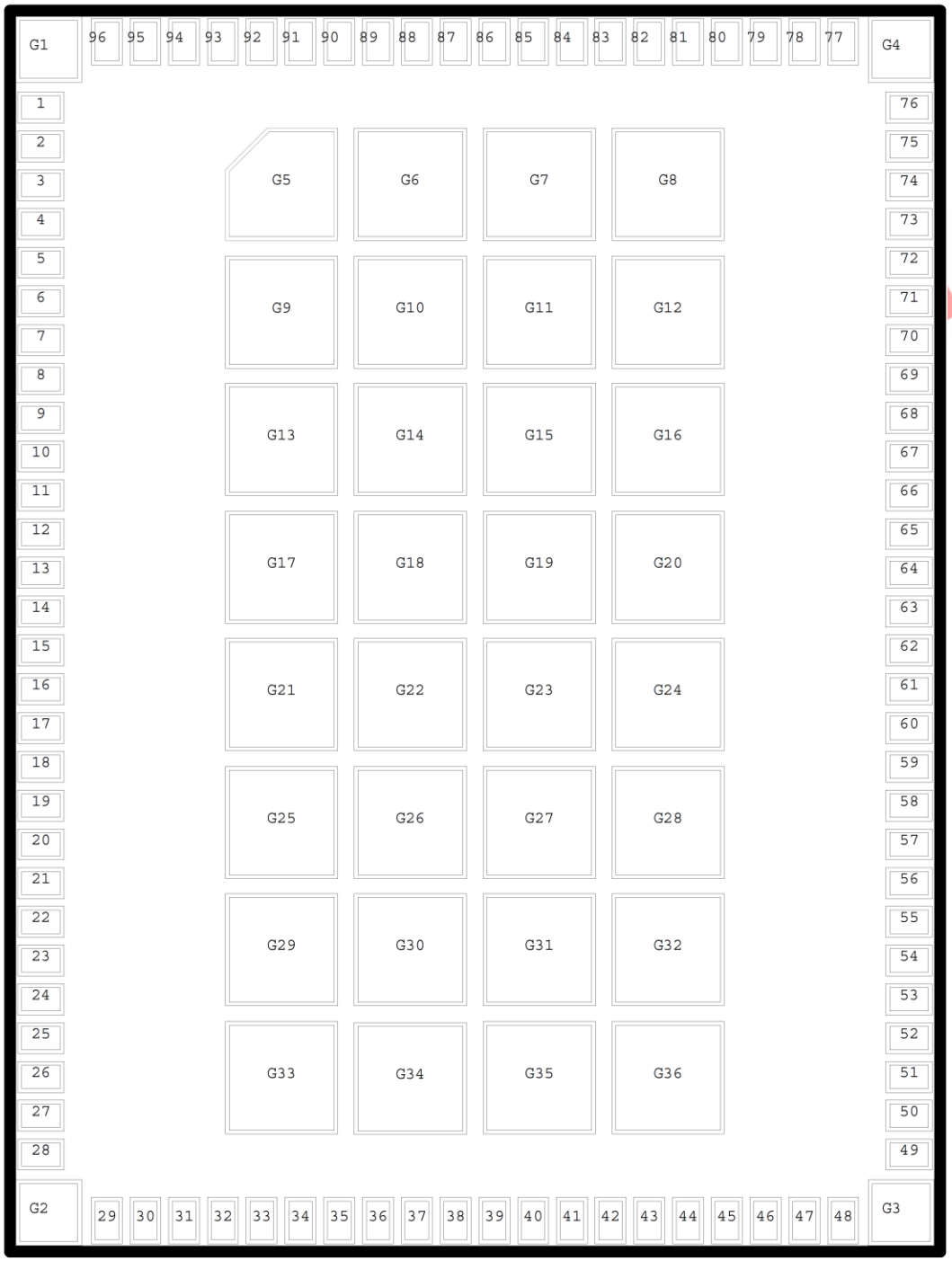
Features	Description
Operating Conditions	
Voltage	power supply for host:3.3V+-5%
Operating Temperature	-30~85°C (Functionality is guaranteed. Optimal RF operating is 0~55°C)
Operating Humidity	<85%
Storage Temperature	-40~85°C
Storage Humidity	<60 %

ESD Protection	
Human Body Model	>1kV
Changed Device Model	>300V

2. Pin Definition

2.1 Pin Map

AW-CM235NF Top View Pin Map



2.2 Pin Table

Pin No	Definition	Basic Description	Voltage	Type
1	NC	No Connect		
2	JTAG_SEL	JTAG test on/off(pull high to enable JTAG)	VIO	I
3	NC	No Connect		
4	3.3V	3.3V Power Supply	3.3V	I
5	3.3V	3.3V Power supply input	3.3V	I
6	GND	System Ground Pin		
7	JTAG_TDO_GPIO_5	GPIO_5 (input/output)	VIO	O
8	GPIO_8	Strapping option(please pull down with 10k resistor)	VIO	I
9	GPIO_9	Strapping option(please pull down with 10k resistor)	VIO	I
10	JTAG_TDI_GPIO_4	0: SPROM is absent (default). *Please reserve pull-down resistor	VIO	I
11	JTAG_TMS_COEX2_GPIO_3	GPIO_3 (input/output)	VIO	I/O
12	JTAG_TCK_COEX1_GPIO_2	GPIO_2 (input/output)	VIO	I/O
13	JTAG_TRST_N_COEX0_GPIO_6	GPIO_6 (input/output)	VIO	I/O
14	NC	No Connect		
15	NC	No Connect		
16	NC	No Connect		
17	GND	System Ground Pin		
18	NC	No Connect		
19	NC	No Connect		
20	GND	System Ground Pin		
21	NC	No Connect		
22	NC	No Connect		
23	GND	System Ground Pin		
24	BT_DEV_WAKE	Bluetooth DEV_WAKE.	VIO	I
25	NC	No Connect		
26	GND	System Ground Pin		
27	SLPCLK	External sleep clock input (32.768 kHz).	0.2~3.3Vp-p	I
28	WL_RFDISABLE_L_GPIO1	WL_DEV_WAKE/GPIO1	VIO	I

29	PCIE_WAKEn	Reserved		
30	PCIE_CLKREQn	Reserved		
31	PCIE_PERSTn	Reserved		
32	GND	System Ground Pin		
33	PCIE_RCLK_N	Reserved		
34	PCIE_RCLK_P	Reserved		
35	GND	System Ground Pin		
36	PCIE_TX_N	Reserved		O
37	PCIE_TX_P	Reserved		O
38	GND	System Ground Pin		
39	PCIE_RX_N	Reserved		I
40	PCIE_RX_P	Reserved		I
41	GND	System Ground Pin		
42	NC	No Connect		
43	NC	No Connect		
44	VIO_SD	1.8V/3.3V Digital I/O SDIO Power Supply	VIO	I
45	WL_REG_ON	Used by PMU to power up or power down the internal module regulators used by the WLAN section. Also, when deasserted, this pin holds the WLAN section in reset.	VIO	I
46	SDIO_WAKE_L_GPIO_0	WL_HOST_WAKE	VIO	O
47	SDIO DAT3	SDIO Data line Bit[3]	VIO	I/O
48	SDIO DAT2	SDIO Data line Bit[2]	VIO	I/O
49	SDIO DAT1	SDIO Data line Bit[1]	VIO	I/O
50	SDIO DAT0	SDIO Data line Bit[0]	VIO	I/O
51	SDIO CMD	SDIO Command/response (input/output)	VIO	I/O
52	SDIO CLK	SDIO Clock input	VIO	I
53	BT_HOST_WAKE	Bluetooth HOST_WAKE.	VIO	O
54	UART CTSn	UART_CTSn (input)	VIO	I
55	UART SOUT	UART_TXD (output)	VIO	O
56	UART SIN	UART_RXD (input)	VIO	I
57	UART RTSn	UART_RTSn (output)	VIO	O

58	PCM_SYNC	PCM sync; can be master (output) or slave (input).	VIO	I/O
59	PCM_IN	PCM data input	VIO	I
60	PCM_OUT	PCM data output	VIO	O
61	PCM_CLK	PCM bus clock; can be master (output) or slave (input)	VIO	I/O
62	GND	System Ground Pin		
63	BT_REG_ON	Used by PMU to power up or power down the internal module regulators used by the Bluetooth section. Also, when deasserted, this pin holds the Bluetooth section in reset.	VIO	I
64	WL_LED_GPIO_7	It can be used as WL_LED.	VIO	O
65	BT_I2S_DO_BT_LED_L	It can be used as BT_LED.	VIO	O
66	NC	No Connect		
67	NC	No Connect		
68	GND	System Ground Pin		
69	USB_D-	No Connect		
70	USB_D+	No Connect		
71	GND	System Ground Pin		
72	3.3V	3.3V Power Supply	3.3V	I
73	VIO	Digital I/O Power Supply	VIO	I
74	GND	System Ground Pin		
75	GND	System Ground Pin		
76	GND	System Ground Pin		
77	GND	System Ground Pin		
78	GND	System Ground Pin		
79	GND	System Ground Pin		
80	GND	System Ground Pin		
81	GND	System Ground Pin		
82	GND	System Ground Pin		
83	GND	System Ground Pin		
84	GND	System Ground Pin		
85	GND	System Ground Pin		

86	GND	System Ground Pin		
87	GND	System Ground Pin		
88	GND	System Ground Pin		
89	GND	System Ground Pin		
90	GND	System Ground Pin		
91	GND	System Ground Pin		
92	GND	System Ground Pin		
93	GND	System Ground Pin		
94	GND	System Ground Pin		
95	GND	System Ground Pin		
96	GND	System Ground Pin		
G1	GND	System Ground Pin		
G2	GND	System Ground Pin		
G3	GND	System Ground Pin		
G4	GND	System Ground Pin		
G5	GND	System Ground Pin		
G6	GND	System Ground Pin		
G7	GND	System Ground Pin		
G8	GND	System Ground Pin		
G9	GND	System Ground Pin		
G10	GND	System Ground Pin		
G11	GND	System Ground Pin		
G12	GND	System Ground Pin		
G13	GND	System Ground Pin		
G14	GND	System Ground Pin		
G15	GND	System Ground Pin		
G16	GND	System Ground Pin		
G17	GND	System Ground Pin		
G18	GND	System Ground Pin		
G19	GND	System Ground Pin		

G20	GND	System Ground Pin		
G21	GND	System Ground Pin		
G22	GND	System Ground Pin		
G23	GND	System Ground Pin		
G24	GND	System Ground Pin		
G25	GND	System Ground Pin		
G26	GND	System Ground Pin		
G27	GND	System Ground Pin		
G28	GND	System Ground Pin		
G29	GND	System Ground Pin		
G30	GND	System Ground Pin		
G31	GND	System Ground Pin		
G32	GND	System Ground Pin		
G33	GND	System Ground Pin		
G34	GND	System Ground Pin		
G35	GND	System Ground Pin		
G36	GND	System Ground Pin		

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Units
3.3V	Power supply for Internal Regulators	-0.3	5.5	V
VIO	DC supply voltage for digital I/O	-0.5	3.9	V

3.2 Recommended Operating Conditions

Symbol	Parameter	Type	Min	Typ	Max	Units
3.3V	Power supply for Internal Regulators	Input	3.13	-	3.46	V

3.3 Digital IO Pin DC Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
SDIO Interface I/O pins						
V_{IH}	Input high voltage (V_{DDIO})	VDDIO=1.8V	1.27	-	-	V
V_{IL}	Input low voltage (V_{DDIO})	VDDIO=1.8V	-	-	0.58	V
V_{OH}	Output High Voltage @ 2mA	VDDIO=1.8V	1.4	-	-	V
V_{OL}	Output Low Voltage @ 2mA	VDDIO=1.8V	-	-	0.45	V
V_{IH}	Input high voltage (V_{DDIO})	VDDIO=3.3V	0.625xVDDIO	-	-	V
V_{IL}	Input low voltage (V_{DDIO})	VDDIO=3.3V	-	-	0.25xVDDIO	V
V_{OH}	Output High Voltage @ 2mA	VDDIO=3.3V	0.75xVDDIO	-	-	V
V_{OL}	Output Low Voltage @ 2mA	VDDIO=3.3V	-	-	0.125xVDDIO	V
Other Digital I/O pins						
V_{IH}	Input high voltage (V_{DDIO})	VDDIO=1.8V	0.65xVDDIO	-	-	V
V_{IL}	Input low voltage (V_{DDIO})	VDDIO=1.8V	-	-	0.35xVDDIO	V
V_{OH}	Output High Voltage @ 2mA	VDDIO=1.8V	VDDIO-0.45	-	-	V
V_{OL}	Output Low Voltage @ 2mA	VDDIO=1.8V	-	-	0.45	V
V_{IH}	Input high voltage (V_{DDIO})	VDDIO=3.3V	2.0	-	-	V
V_{IL}	Input low voltage (V_{DDIO})	VDDIO=3.3V	-	-	0.8	V
V_{OH}	Output High Voltage @ 2mA	VDDIO=3.3V	VDDIO-0.4	-	-	V
V_{OL}	Output Low Voltage @ 2mA	VDDIO=3.3V	-	-	0.4	V

3.4 Power up Timing Sequence

3.4.1 Sequencing of Reset and Regulator Control Signals

The AW-CM235NF has three 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 various operational states. The timing values indicated are minimum required values; longer delays are also acceptable.

Note:

- For both the WL_REG_ON and BT_REG_ON pins, there should be at least a 10 ms time delay between consecutive toggles (where both signals have been driven low). This is to allow time for the CBUCK regulator to discharge. If this delay is not followed, then there may be a VDDIO in-rush current on the order of 36 mA during the next PMU cold start.
- VBAT should not rise 10%–90% faster than 40 microseconds. VBAT should be up before or at the same time as VDDIO. VDDIO should NOT be present first or be held high before VBAT is high.

3.4.2 Description of Control Signals

The AW-CM235NF has two signals that enable or disable the Bluetooth and WLAN circuits and the internal regulator blocks, allowing the host to control power consumption.

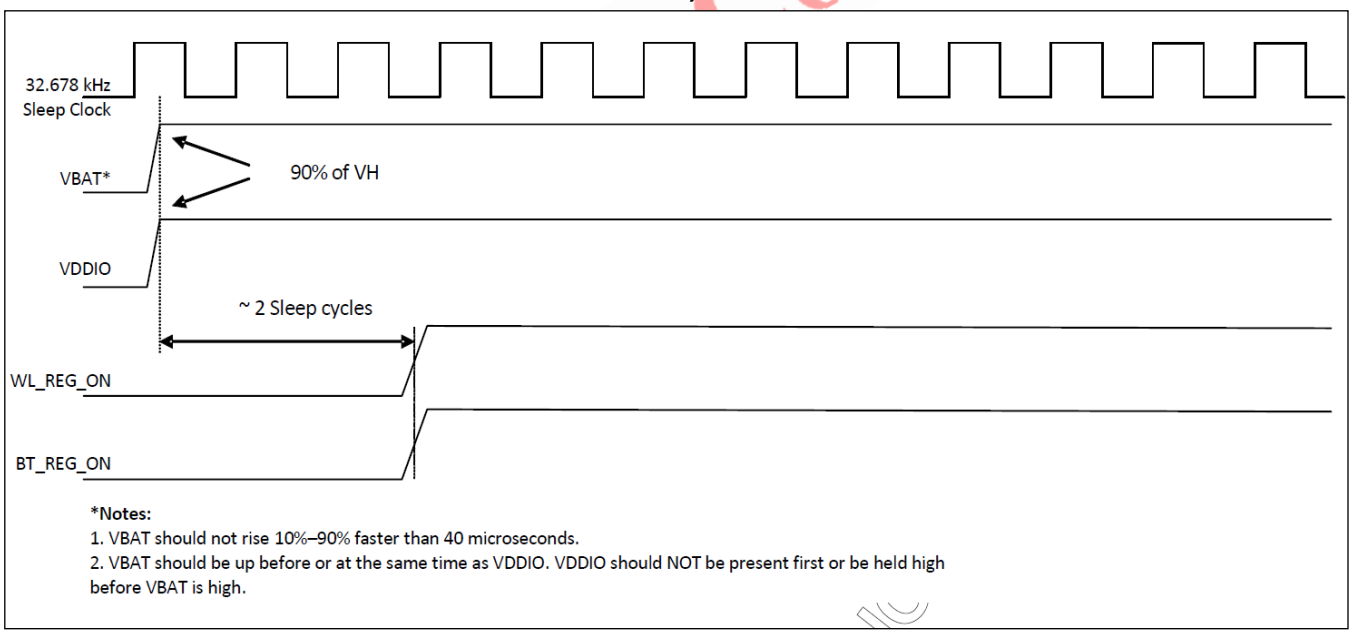
PIN No.	Name	Description	Type
45	WL_REG_ON	Used by PMU to power up or power down the internal AW-CM235NF regulators used by the WLAN section. Also, when deasserted, this pin holds the WLAN section in reset. This pin has an internal 200 kΩ pull-down resistor that is enabled by default. It can be disabled through programming.	I
63	BT_REG_ON	Used by PMU to power up or power down the internal AW-CM235NF regulators used by the Bluetooth section. Also, when deasserted, this pin holds the Bluetooth section in reset. This pin has an internal 200 kΩ pull-down resistor that is enabled by default. It can be disabled through programming.	I

Power-Up/Power-Down/Reset Control Signals

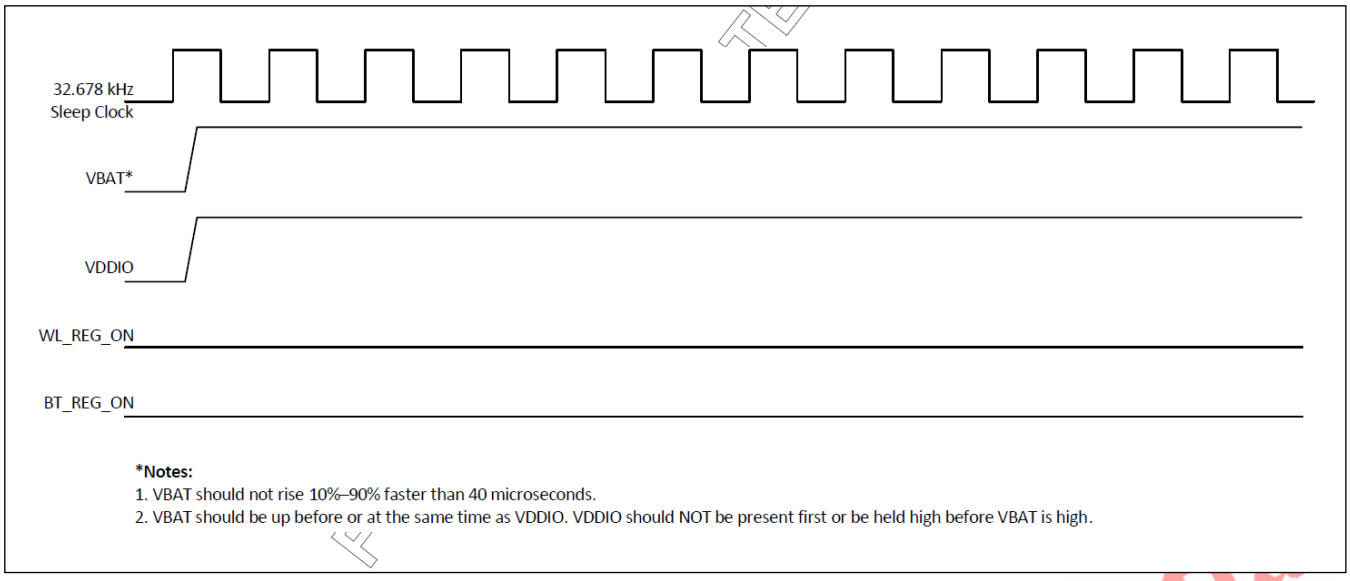
Signal	*Description*
WL_REG_ON	This signal is used by the PMU (with BT_REG_ON) to power up the WLAN section. It is also ORgated with the BT_REG_ON input to control the internal AW-CM235NF regulators. When this pin is high, the regulators are enabled and the WLAN section is out of reset. When this pin is low, the WLAN section is in reset. If BT_REG_ON and WL_REG_ON are both low, the regulators are disabled. This pin has an internal 200 kΩ pull-down resistor that is enabled by default. It can be disabled through programming.
BT_REG_ON	This signal is used by the PMU (with WL_REG_ON) to decide whether or not to power down the internal AW-CM235NF regulators. If both BT_REG_ON and WL_REG_ON are low, the regulators will be disabled. When this pin is low and WL_REG_ON is high, the BT section is in reset. This pin has an internal 200 kΩ pull-down resistor that is enabled by default. It can be disabled through programming.

3.4.3 Control Signal Timing Diagrams

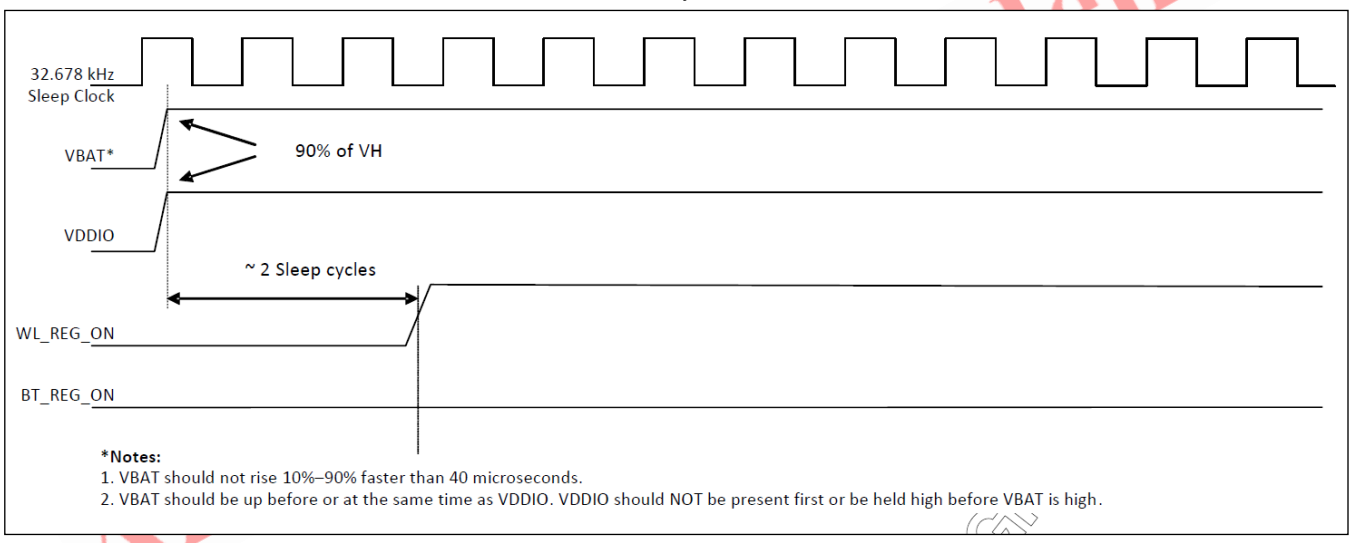
WLAN = ON, Bluetooth = ON



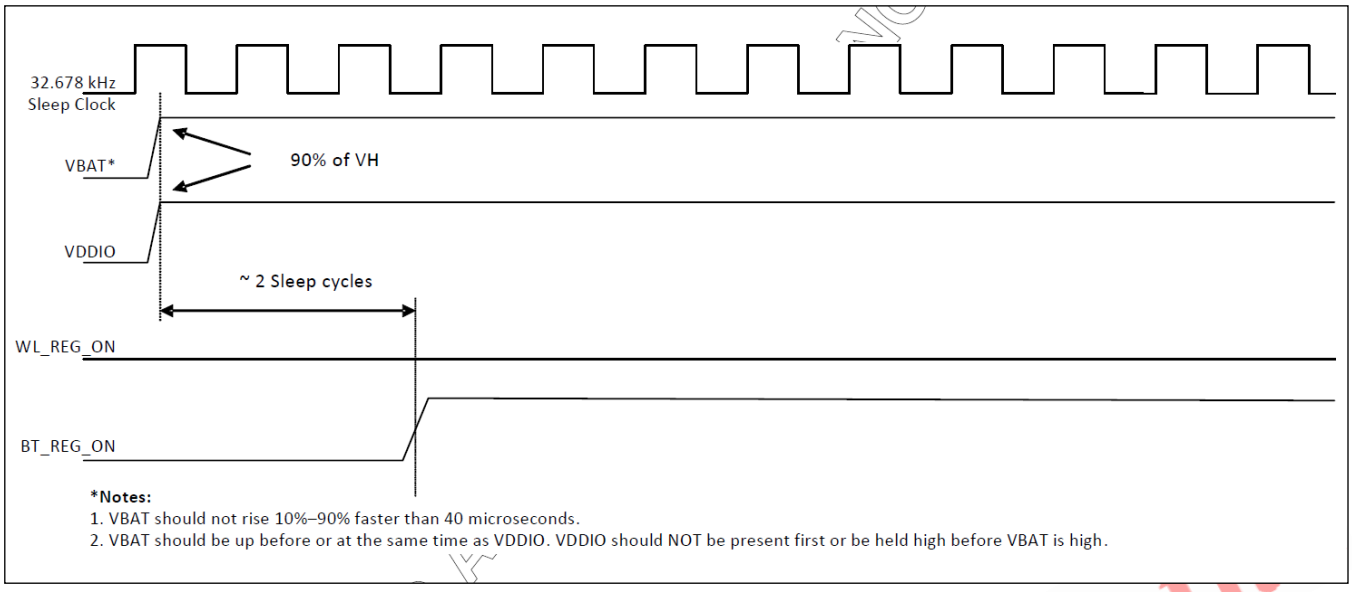
WLAN = OFF, Bluetooth = OFF



WLAN = ON, Bluetooth = OFF



WLAN = OFF, Bluetooth = ON



3.5 Power Consumption*

3.5.1 WLAN

Band (GHz)	Mode	BW (MHz)	RF Power (dBm)	Transmit			Receive	
				Max.	Avg.	Duty. (%)	Max.	Avg.
2.4	11b@1Mbps	20	16	316.4mA	291.9mA	98.9%	69.4 mA	68.1 mA
	11g@54Mbps	20	14	333.1mA	212.1mA	64.8%	68.0 mA	67.6 mA
	11n@MCS7	20	13	309.7mA	210.6mA	63.3%	73.4 mA	67.5mA
	11n@MCS7	40	11	306.9mA	200 mA	57.9%	81.8mA	81.5mA
	11n@MCS15	40	11	530.8mA	308 mA	50%	114.4mA	114.2mA
5	11a@54Mbps	20	13	297.1mA	212.2mA	87.6%	83.0mA	82.8mA
	11n@MCS7	20	12	284.5mA	227.5mA	78.2%	84.6mA	82.7mA
	11n@MCS7	40	10	290.8mA	200.2mA	51.2%	98.6mA	98.4mA
	11ac@MCS9 NSS1	80	8	320.6mA	237.8mA	47.8%	125.0mA	124.9mA
	11ac@MCS9 NSS2	80	8	564.3mA	347.1mA	47.1%	184.9mA	184.7mA

3.5.2 Bluetooth

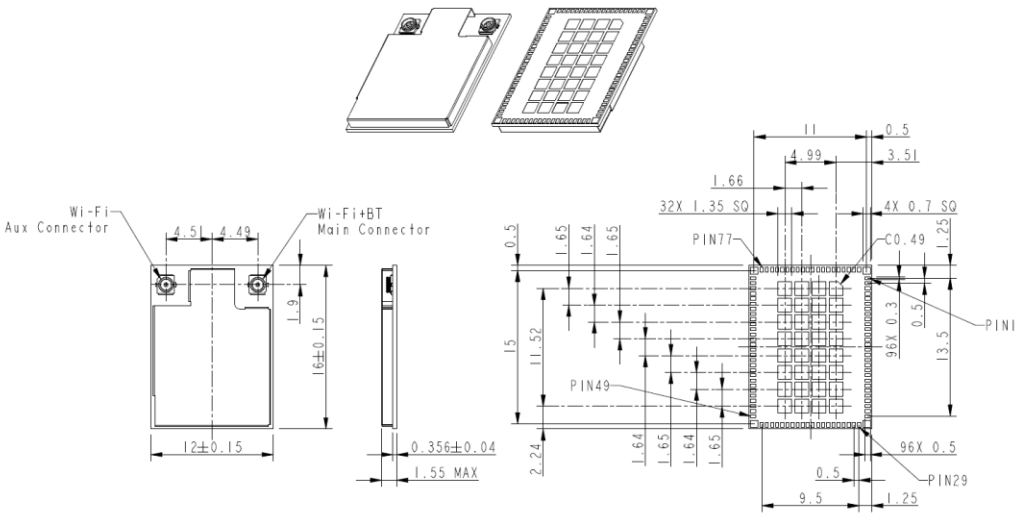
No.	Mode	Packet Type	VBAT_IN=3.3 V	
			Max.	Avg.
1	Sleep	n/a		5.29 uA
2	Page scan	n/a	10.9mA	158.2uA

3	Transmit *(4)	DH5	23.5 mA	22.6 mA
4	Receive	3-DH5	15.6 mA	15.3 mA

* The power consumption is based on Azurewave test environment, these data for reference only.

4. Mechanical Information

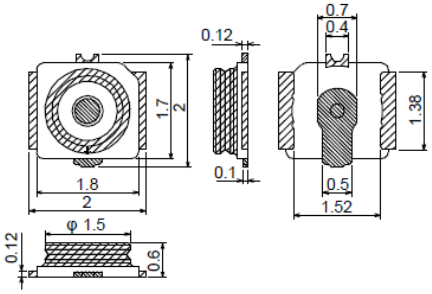
4.1 Mechanical Drawing

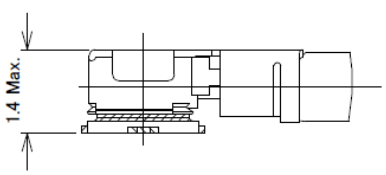


TOLERANCES UNLESS OTHERWISE SPECIFIED : ±0.15mm

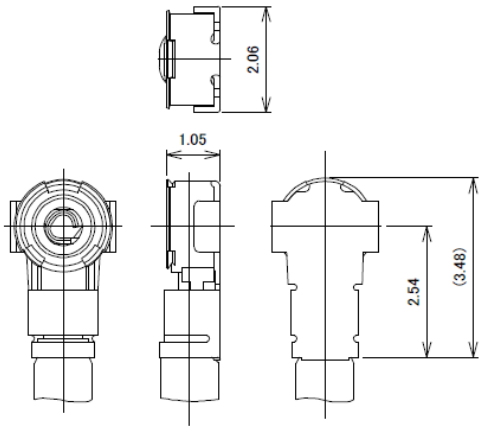
			AzureWave				SCALE 2/1	DESCRIPTION PCB ASSEMBLY		MODEL NO: 2235NF	APPROVAL	
							Q'TY 1 PCS	MATERIAL	FINISH	DWG NO: 2235NF-COD-001	DESIGNED STEVE CHANG	
			DIM.	0~80	80~180	180~315	315~800	UNIT MM	REV A	PART NO:	DATE 2017/10/11	
ITEM	DESCRIPTION	DATE	TOL.	0.1	0.15	0.20	0.25					

HSC Receptacle
P/N : MM4829-2702RB0





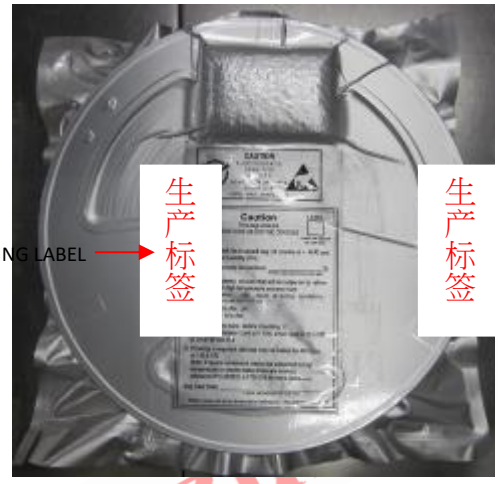
HSC Cable
P/N : MXHG_ _ _ _ _ _ _ _ _



5. Packaging Information

5.1

5.2



5.3

5.4

5.5

1 Carton= 5 Boxes

5.6