

# AW-NB057H

**IEEE 802.11b/g/n Wi-Fi with Bluetooth 3.0 with High  
speed class II Combo Half Mini Card**

**<Control Pin 5 /20 separate>**

**Datasheet**

**Version 0.7**

## Revision History

| Document Release | Date       | Modification   | Initials | Approved    |
|------------------|------------|--|----------|-------------|
| Version 0.1      | 2010/3/9   | 1. First release   | Benson   | Eric Lee    |
| Version 0.2      | 2010/4/9   | 1. Remove PCIE bus interface<br>2. Update Pin definition description | Benson   | Eric Lee    |
| Version 0.3      | 2010/7/19  | 1. Update LED behavior   | Benson   | Antonio     |
| Version 0.4      | 2010/8/19  | 1. Update tech. information  | Benson   | Antonio     |
| Version 0.5      | 2010/9/14  | 1. Update Pin definition   | Benson   | Anotonio    |
| Version 0.6      | 2011/10/05 | Add Sub-system ID  | Emily    | Ray Lee     |
| Version 0.7      | 2012/04/11 | Add Module Photo   | Emily    | Kavin Chang |

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## 1. Introduction

**AzureWave Technologies, Inc.** introduces the pioneer of the IEEE 802.11b/g/n WiFi with Bluetooth 3.0 with High speed (BT3.0+HS) class II combo half mini card module ---**AW-NB057H**. The AW-NB057H IEEE 802.11 b/g/n PCIE WIFI with Bluetooth 3.0 + HS class II combo module is a highly integrated wireless local area network (WLAN) solution to let users enjoy the digital content through the latest wireless technology without using the extra cables and cords. It combines with Bluetooth 3.0 + HS class II and provides a complete 2.4GHz Bluetooth system which is fully compliant to Bluetooth v3.0 HS and v2.1 that supports EDR of 2Mbps and 3Mbps for data and audio communications. It enables a **high performance, cost effective, low power, compact solution** that easily fits onto two sides of the PCI Express and USB Combo half mini Card.

Compliant with the IEEE 802.11b/g/n standard, AW-NB057H uses Direct Sequence Spread Spectrum (**DSSS**), Orthogonal Frequency Division Multiplexing (**OFDM**), **BPSK**, **QPSK**, **CCK** and **QAM** baseband modulation technologies.

Compare to 802.11g technology, 802.11n standard makes big improvement on speed and range.

**Faster Speed:** WLAN up to 150Mbps data rate.

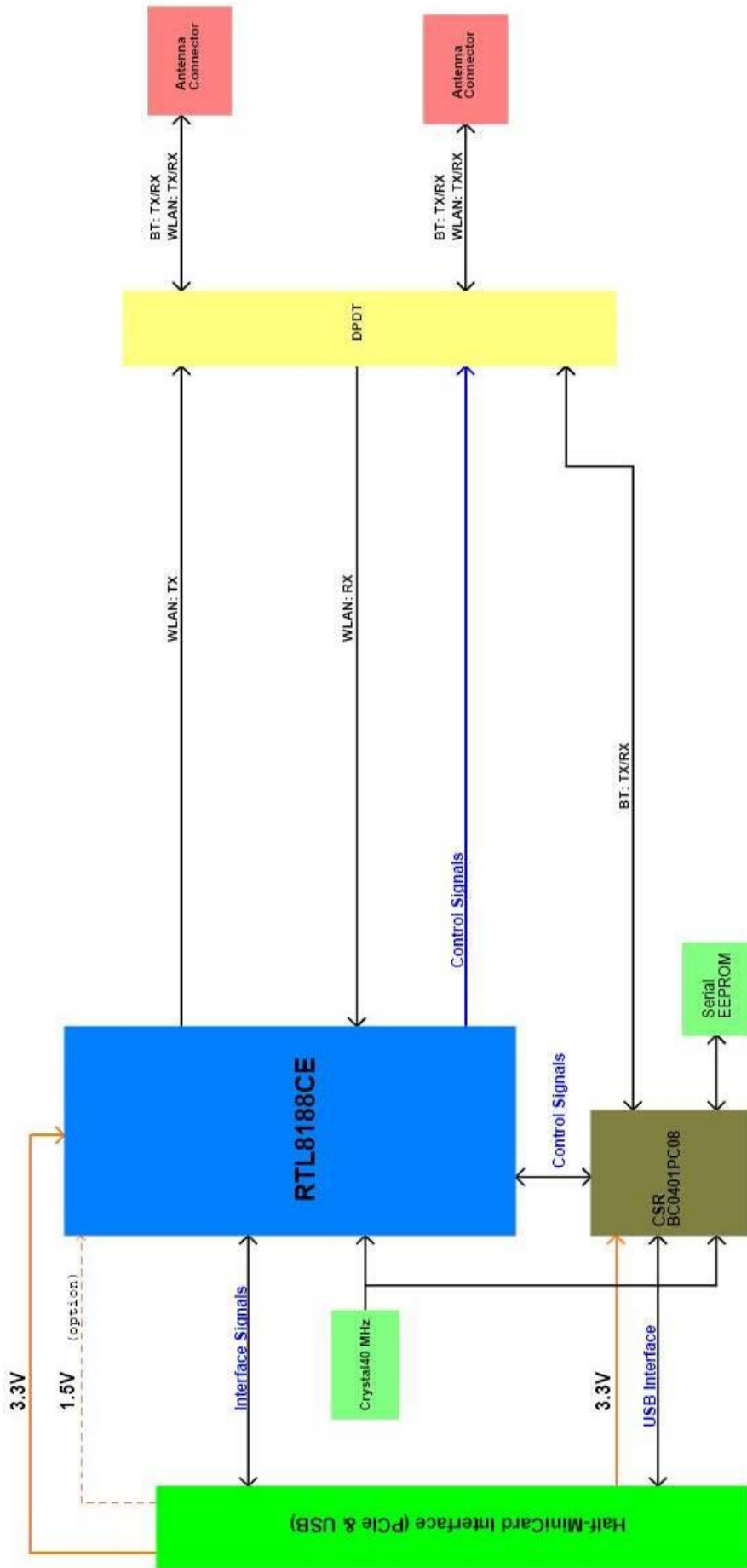
AW-NB057H module adopts Realtek **RTL8188CE** and CSR **BC04** solution. The module design is based on the Realtek RTL8188CE and CSR BC04 solution

## 2. Features

- ◆ High speed wireless connection up to 150 Mbps for Wi-Fi
- ◆ 2 antennas to support 1(Transmit) × 1(Receive) technology and Bluetooth
- ◆ Support WLAN TX/RX diversity function
- ◆ WCS(Wireless Coexistence System)
- ◆ Low power consumption and high performance
- ◆ Enhanced wireless security
- ◆ Fully qualified Bluetooth v 3.0+ High speed system
- ◆ Enhanced Data Rate(EDR) compliant for both 2Mbps and 3Mbps supported
- ◆ Fully speed operation with Piconet and Scatternet support
- ◆ Electrical compliant to USB1.1&2.0

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### 3. Block Diagram



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## 4. General Specifications

|                                  |  |
|----------------------------------|--|
| <b>Model Name</b>                | AW-NB057H  |
| <b>Product Description</b>       | IEEE 802.11 b/g/n Wi-Fi with Bluetooth 3.0 + HS class II Combo half mini card Module   |
| <b>BlueTooth Standard</b>        | IEEE 802.11b/g/n, Wi-Fi compliant / Bluetooth v3.0+HS Standard   |
| <b>Host Interface</b>            | Wi-Fi : PCI-E , BT : USB   |
| <b>Major Chipset</b>             | Realtek RTL8188CE + CSR BC04   |
| <b>Dimension</b>                 | 26.65 mm X 29.85 mm x 3.67 mm  |
| <b>Weight</b>                    | 4g   |
| <b>Antenna</b>                   | Hirose* U.FL-R-SMT<br>1: Ant1 : Wi-Fi Tx/RX+ BT<br>2: Ant2 : Wi-Fi Tx/RX + BT  |
| <b>WiFi VID/PID</b>              | VID:1A3B / PID:2057  |
| <b>Bluetooth VID/PID</b>         | VID:13D3 / PID:3331  |
| <b>Operating Conditions</b>      |  |
| <b>Voltage</b>                   | 3.3V +/- 5%  |
| <b>Temperature</b>               | 0~80 °C  |
| <b>Storage temperature</b>       | -40~85 °C  |
| <b>Electrical Specifications</b> |  |
| <b>Frequency Range</b>           | Wi-Fi: 2.4 GHz ISM Bands 2.412-2.472 GHz, 2.484 GHz /<br>BT: 2402MHz~2483MHz   |
| <b>Modulation</b>                | Wi-Fi:<br>802.11g/n: OFDM<br>802.11b: CCK(11, 5.5Mbps), DQPSK(2Mbps), BPSK(1Mbps)<br>BT:<br>Header GFSK<br>Payload 2M: 4-DQPSK<br>Payload 3M: 8DPSK  |
| <b>Output Power</b>              | Wi-Fi:<br>802.11b: 17 dBm +/-1.5dBm (11Mbps)<br>802.11g: 15 dBm +/-1.5dBm (54Mbps)<br>802.11n: 13 dBm +/-1.5dBm (HT20 MCS7)<br>BT: -6 ≤ Output Power ≤ +4 dBm (Conductive)                                   |
| <b>Receive Sensitivity</b>       | Wi-Fi:<br>802.11b: less than -80 dBm (11Mbps)<br>802.11g: less than -68 dBm (54Mbps)<br>802.11n: less than -61 dBm at HT40 MCS7<br>less than -64 dBm at HT20 MCS7<br>BT: BER < 0.1% (Anritsu 8852B Tx -70Bm) |

|                        |  |
|------------------------|--|
| <b>Operating Range</b> | Wi-Fi: Open Space: TBD / Indoor: TBD                           |
|                        | (The transmission speed may vary according to the environment) |
| <b>Regulatory</b>      | BT: TBD  |
|                        | FCC, CE...   |

#### 4-1. Absolute Maximum Ratings

| Symbol      | Parameter                                    | Max. Rating | Unit        |
|-------------|--|-------------|-------------|
| $V_{dd33}$  | Maximum I/O supply voltage                   | 3.6         | V           |
| $RF_{in}$   | Maximum RF input (reference to 50 $\Omega$ ) | 0           | dBm         |
| $T_{store}$ | Storage temperature                          | -40~90      | $^{\circ}C$ |

#### 4-2. Recommended Operating Conditions

| Symbol     | Parameter   | Rating      | Unit |
|------------|-------------|-------------|------|
| $V_{dd33}$ | I/O voltage | 3.135~3.465 | V    |

#### PCI Express Bus Interface Characteristics

| Signal Name   | Mini PCI-E PIN | Type | Driver                       | PU/PD Resistance |
|---------------|----------------|------|------------------------------|------------------|
| PCIE_CLKREQ_L | 7              | OD   | 4 mA (default)<br>8 mA (max) | ---              |

**OD:** A digital output signal with open drain

### 4-3. GPIO Interface Characteristics

| Signal Name(To chip GPIO PIN) | Mini PCI-E PIN | Type | Driver                       | PU/PD Resistance |
|-------------------------------|----------------|------|------------------------------|------------------|
| WLAN_LED                      | 44             | O    | 4 mA (default)<br>8 mA (max) | ---              |
| WLAN_DISABLE                  | 20             | I    | 4 mA (default)<br>8 mA (max) | ---              |

### 4-4 Logic Level Characteristics

Vcc=+3.3V +/- 10%

VIH (min)= 2.0V (v)

VIL (max)= 0.8V (v)

VIH = Voltage input high

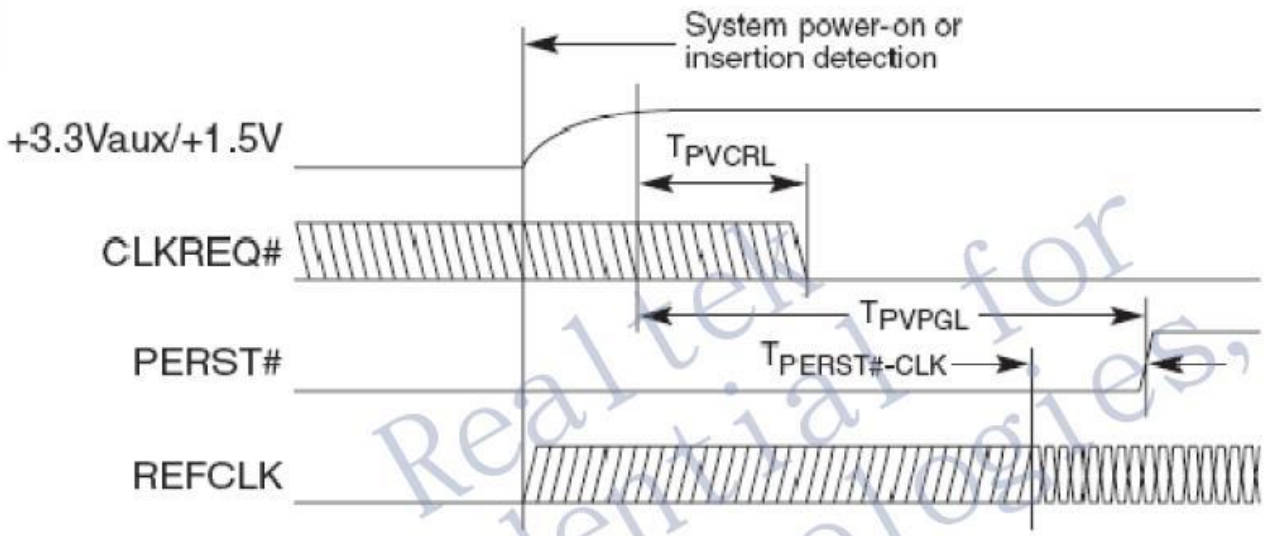
VIL= Voltage input low

### 4-5 LED mode behavior

| State | Definition                    | Interpretation  |
|-------|-------------------------------|---|
| OFF   | The LED is emitting no light. | Radio is incapable of transmitting.<br>This state is indicated when the card is not powered, the W_DISABLE# signal is asserted to disable the radio, or when the radio is disabled by software.   |
| ON    | The LED is emitting light.    | Radio is capable of transmitting.<br>The LED should remain ON even if the radio is not actually transmitting. For example, the LED remains ON during temporary radio disablements performed by the Mini Card of its own volition to do scanning, switching radios/bands, power-management, etc.<br><br>If the card is in a state wherein it is possible that radio can begin transmitting without the system user performing any action, this LED should remain ON. |



### 4-6. Power UP Sequencing



Note:  $T_{PVCRL}$  is measured from the later rising edge of either 3.3V or 1.5V.

| Symbol            | Parameter                               | Min | Max | Units   |
|-------------------|---|-----|-----|---------|
| $T_{PVCRL}$       | Power Valid to CLKREQ#<br>Output active |     | 100 | $\mu$ s |
| $T_{PVPGI}$       | Power Valid to PERST#<br>Input inactive | 1   |     | ms      |
| $T_{PERST\#-CLK}$ | REFCLK stable before<br>PERST# inactive | 100 |     | $\mu$ s |

### 4-7. Power Consumption

| States                   | States  | Current(mA)/3.3V |
|--------------------------|---------|------------------|
| Max TX power Consumption | Cont Tx | 185              |
| Max RX power Consumption | Cont Rx | 168              |

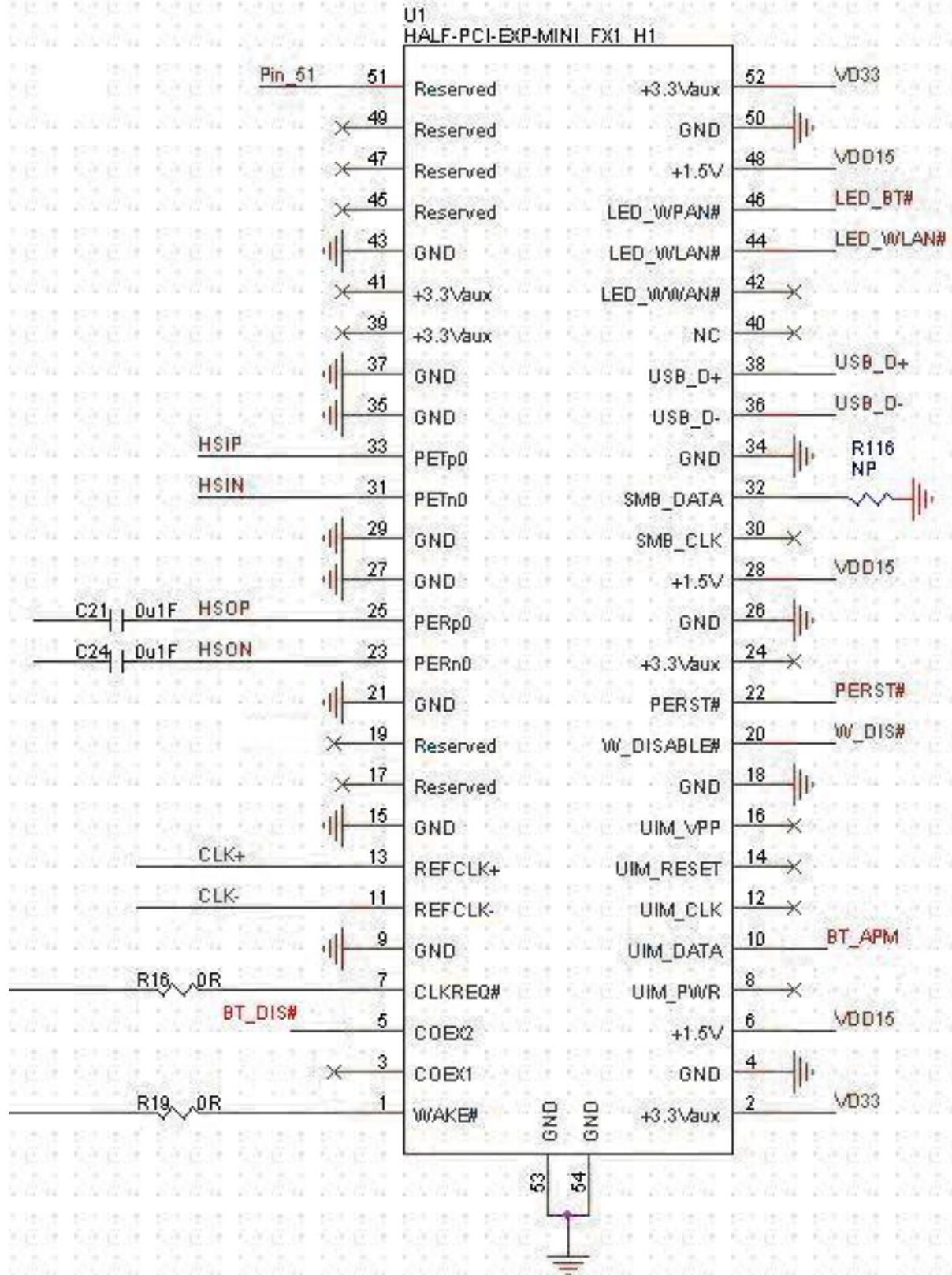
## 5. Connector Pin-out Definitions

| Pin No. | Definition           | Basic Description  | Type   |
|---------|----------------------|--|--------|
| 1       | WAKE#                | Power management event : open drain,active low<br>Use to reactivate the PCI Express slot's main power rails and reference clocks.  | O/D    |
| 2       | 3.3V                 | 3.3V power supply  | VCC    |
| 3       | Reserve              | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 4       | GND                  | Ground   | GND    |
| 5       | BT_DISABLE_L (COEX2) | BT disable control (Module default pull high, Module Internal 10K Resister Pull-High )   | Input  |
| 6       | 1.5V                 | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 1.5V. not connected internally to RTL8188CE  | VCC    |
| 7       | CLKREQ_L             | Reference clock request signal.this signal is use by the RTL8188CE to request starting of the PCI Express reference clock.   | Output |
| 8       | UIM_PWR              | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 9       | GND                  | Ground   | GND    |
| 10      | UIM_DATA             | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 11      | REFCLK-              | Differential reference clock (100 MHz)   | Input  |
| 12      | UIM_CLK              | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 13      | REFCLK+              | Differential reference clock (100 MHz)   | Input  |
| 14      | UIM_RESET            | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 15      | GND                  | Ground   | GND    |
| 16      | UIM_VPP              | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 17      | RESERVED             | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 18      | GND                  | Ground   | GND    |
| 19      | RESERVED             | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 20      | WLAN_DISABLE#        | WLAN disable control. (Module default pull high, Module Internal 10K Resister Pull-High )  | Input  |
| 21      | GND                  | Ground   | GND    |
| 22      | PERST#               | PCI express reset signal : active low<br>When the PERSTB is asserted at power-on state, the RTL8188CE returns to a pre-defined reset state and is ready for initialization and configuration after the de-assertion of the PERSTB. | Input  |
| 23      | PERn0                | Differential transmit  | Output |
| 24      | 3.3VAUX              | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 3.3V AUX. not connected internally to RTL8188CE  | VCC    |
| 25      | PERp0                | Differential transmit  | Output |
| 26      | GND                  | Ground   | GND    |
| 27      | GND                  | Ground   | GND    |
| 28      | 1.5V                 | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 1.5V. not connected internally to RTL8188CE  | VCC    |
| 29      | GND                  | Ground   | GND    |
| 30      | SMB_CLK              | No connect. Should be left open. not connected internally to RTL8188CE   | N/C    |
| 31      | PETn0                | Differential receive   | Input  |

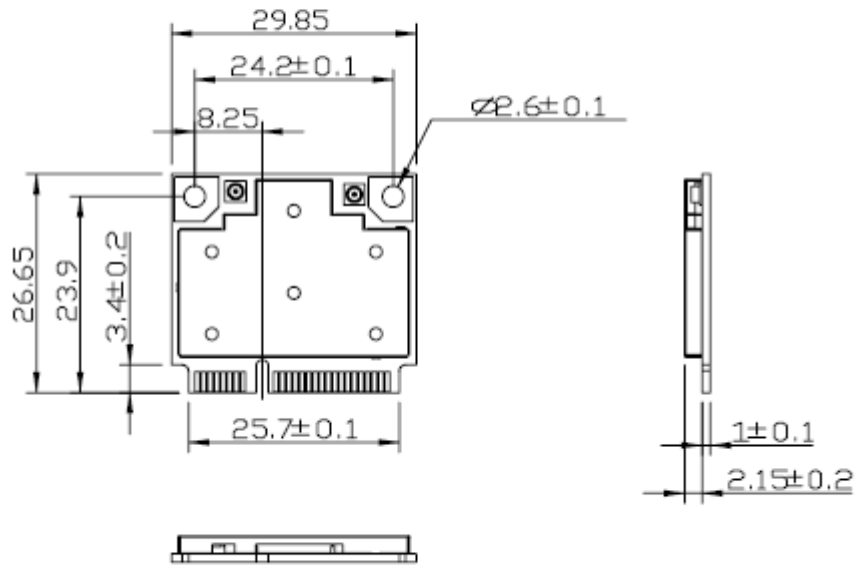
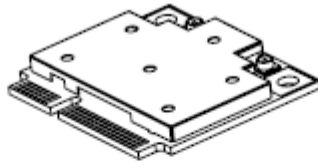
|    |            |   |              |
|----|------------|---|--------------|
| 32 | SMB_DATA   | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 33 | PETp0      | Differential receive  | Input        |
| 34 | GND        | Ground  | GND          |
| 35 | GND        | Ground  | GND          |
| 36 | USB_D-     | USB Differential signal   | Output/Input |
| 37 | GND        | Ground  | GND          |
| 38 | USB_D+     | USB Differential signal   | Output/Input |
| 39 | 3.3VAUX    | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 3.3V AUX. not connected internally to RTL8188CE | VCC          |
| 40 | NC         | No connect. Should be left open.  | N/C          |
| 41 | 3.3VAUX    | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 3.3V AUX. not connected internally to RTL8188CE | VCC          |
| 42 | LED_WWAN#  | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 43 | GND        | Ground  | GND          |
| 44 | LED_WLAN_L | Active low signal. The signal is used to provide status indicators via LED.   | Output       |
| 45 | RESERVED   | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 46 | LED_BT_L   | Active low signal. The signal is used to provide status indicators via LED.   | Output       |
| 47 | RESERVED   | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 48 | 1.5V       | The pin is defined according to PCI-E standard.<br>(Note) this module does not use power source 1.5V. not connected internally to RTL8188CE     | VCC          |
| 49 | RESERVED   | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 50 | GND        | Ground  | GND          |
| 51 | RESERVED   | No connect. Should be left open. not connected internally to RTL8188CE  | N/C          |
| 52 | 3.3V       | 3.3V power supply   | VCC          |

O/D : open drain

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## 6. Mechanical Dimensions



Tolerances unless otherwise specified :  $\pm 0.15\text{mm}$

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## 7. Module Photo



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