

# AIROC™ Wi-Fi Cloud Connectivity Manager (CCM) module

## Turnkey, secure solution for IoT applications

The AIROC™ IFW56810-00 Wi-Fi 4 Cloud Connectivity Manager (CCM) module is a ready-to-use hardware and firmware solution that contains all the necessary expertise in wireless, networking, cloud, and security. This module is designed to simplify the process of implementing IoT projects and ensure their success. The hardware is built using Infineon's industry-leading security technology, which includes a pre-provisioned and secure MCU along with the most reliable Wi-Fi technology used in the IoT industry.

The AIROC™ Wi-Fi 4 CCM module is effortless to use and does not require any programming or software development using an SDK. It comes pre-programmed with tested and secure Infineon firmware, which is signed and verified. The module can be kept up-to-date with future connectivity and security enhancements using over-the-air (OTA) firmware updates. The firmware shortens the time-to-market and eliminates the learning curve associated with IoT projects by providing a configurable, ready-to-use networking and cloud management solution that can be easily integrated into customer systems using a simple command set.

## Features

- Cloud management
  - Powered by AWS IoT ExpressLink
  - AWS over-the-air update support
  - AWS host over-the-air update (HOTA) support
- Networking
  - Full network stack offload from host: TCP/IP, TLS, DNS, HTTP, and MQTT
  - Fully documented
  - Command set for simple configuration from host processor
- Wireless
  - Built on industry-leading Infineon Wi-Fi for long range, robust connectivity
  - Wi-Fi 4 (802.11n)
  - Up to 65 Mbps PHY Data Rate
  - Integrated antenna
  - Soft AP or Bluetooth® LE onboarding to Wi-Fi access point
- Security
  - WPA3, WPA/WPA2 (personal)
  - TLS 1.2
  - Arm® platform security architecture level 2 certified
    - Secure enclave and secure boot
  - Only operates with Infineon signed firmware
  - Unique device ID, Certificate for safe, convenient provisioning
  - Ongoing security updates
- Module
  - Certified for US, Canada, EU only
  - 36.0 mm (L) x 18 mm (W) x 2.8 mm (H)
  - LGA module, 145p
- General features
  - Turnkey solution requiring no development on module
  - UART host interface
  - -30°C to +85°C operating temperature

### Features

- Applications
  - Internet of Things (IoT)
  - Telematics
  - Point-of-sales
  - Medical and industrial networks
  - Home/building automation applications
  - Wireless gateways

**Note:** While all the communication between the IFW56810-00 modules and the AWS cloud is encrypted during transmission (using TLS 1.2 protocol) and at rest, the serial interface (UART) between the host processor and the module is not encrypted. If sensitive data needs to be transmitted to and from the IFW56810-00 module, and an unauthorized person can be assumed to gain physical control of the device, Infineon recommends the host processor and the corresponding cloud application implement a suitable additional end-to-end message encryption scheme.

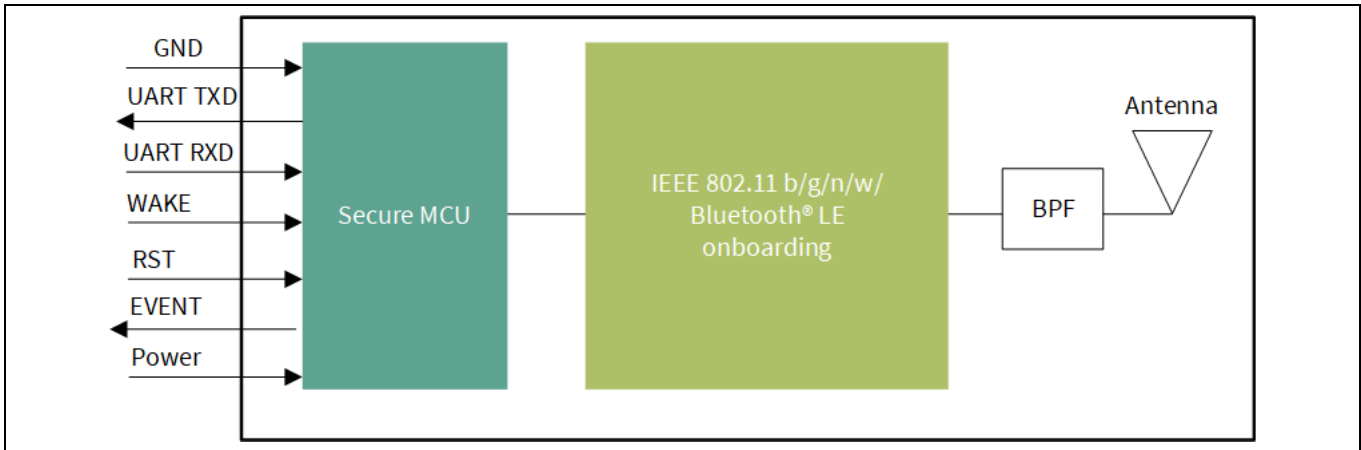
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# 1 Overview

## 1.1 Functional block diagram

The AIROC™ IFW56810-00 module, which has an integrated antenna, has all the necessary components to connect a host processor to the cloud. It has been approved for use in the US, Canada, and the EU only. An external flash must be connected via QSPI, but no additional RF or clocking circuitry is needed. Connecting to a host is simple and can be accomplished using an industry-standard UART, requiring only five host interface signals (UART TXD, UART RXD, EVENT (MSG), WAKE (INT), and RST), as well as power and ground. Infineon's IEEE 802.11n single band 2.4-GHz Wi-Fi technology, widely used in the IoT, is used to achieve Wi-Fi performance, and Bluetooth® LE is also supported for onboarding to Wi-Fi networks.



**Figure 1** IFW56810-00 module showing host interface signals

### 1.1.1 General features

**Table 1** Module features

| Features            | Description                                              |
|---------------------|----------------------------------------------------------|
| Product description | IEEE 802.11 b/g/n wireless LAN and Bluetooth® IoT module |
| Host interface      | UART                                                     |
| Dimension           | 36.0 mm (L) x 18 mm (W) x 2.8 mm (H)                     |
| Form factor         | LGA module, 145p                                         |
| Antenna             | Internal PCB antenna                                     |
| Weight              | 2.3 g                                                    |

## 1.1.2 Wi-Fi features

**Table 2 Wi-Fi specification**

| Features                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                           | Min  | Typ  | Max  | Unit |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| WLAN standard                        | IEEE 802.11b/g/n, Wi-Fi complaintt                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |
| Frequency range                      | WLAN: 2.4-GHz band                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |
| Modulation                           | DSSS<br>DBPSK(1 Mbps), DQPSK(2 Mbps), CCK(11/5.5 Mbps) OFDM<br>BPSK(9/6 Mbps), QPSK(18/12 Mbps), DBPSK(1 Mbps), DQPSK(2 Mbps),<br>CCK(11/5.5 Mbps), 16-QAM(36/24 Mbps), 64-QAM (72.2/54/48 Mbps)                                                                                                                                                                                                                                                      |      |      |      |      |
| Output power<br>(Board level limit)* | 2.4G<br>11b (11 Mbps) @EVM< 35%                                                                                                                                                                                                                                                                                                                                                                                                                       | 17   | 19   | 21   | dBm  |
|                                      | 11g (54 Mbps) @EVM< -25 dB                                                                                                                                                                                                                                                                                                                                                                                                                            | 16   | 18   | 20   | dBm  |
|                                      | 11n (HT20 MCS7) @EVM< -27 dB                                                                                                                                                                                                                                                                                                                                                                                                                          | 15.5 | 17.5 | 19.5 | dBm  |
| Receiver sensitivity                 | 2.4G<br>11b (1 Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                  | –    | –97  | –93  | dBm  |
|                                      | 11g (6 Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                          | –    | –91  | –87  | dBm  |
|                                      | 11b (11 Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                         | –    | –89  | –85  | dBm  |
|                                      | 11g (54 Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                         | –    | –76  | –72  | dBm  |
|                                      | 11n (HT20 MCS0)                                                                                                                                                                                                                                                                                                                                                                                                                                       | –    | –91  | –87  | dBm  |
|                                      | 11n (HT20 MCS7)                                                                                                                                                                                                                                                                                                                                                                                                                                       | –    | –73  | –69  | dBm  |
| Data rate                            | 802.11b: 1, 2, 5.5, 11 Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11n: MCS0~7 HT20 65 Mbps                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |
| Security                             | <ul style="list-style-type: none"> <li>• WPA and WPA2- (Personal) support for powerful encryption and authentication</li> <li>• WPA3</li> <li>• AES and TKIP acceleration hardware for faster data encryption and 802.11i compatibility</li> <li>• Cisco compatible extension- (CCX, CCX 2.0, CCX 3.0, CCX 4.0, CCX5.0) certified</li> <li>• Wi-Fi Protected Setup (WPS)</li> <li>• WEP</li> <li>• WMM / WMM-SA</li> <li>• CKIP (software)</li> </ul> |      |      |      |      |

### 1.1.3 Bluetooth® features

**Table 3 Bluetooth® specification**

| Features             | Description                  | Min | Typ | Max | Unit |
|----------------------|------------------------------|-----|-----|-----|------|
| Bluetooth® standard  | Bluetooth® LE 5.2            | –   | –   | –   | –    |
| Frequency range      | 2400~2483.5 MHz              | –   | –   | –   | –    |
| Modulation           | GFSK                         | –   | –   | –   | –    |
| Output power         | 8 dBm+/-3 dBm (max settings) | –   | –   | –   | –    |
| Receiver sensitivity | GFSK                         | –   | –91 | –76 | dBm  |

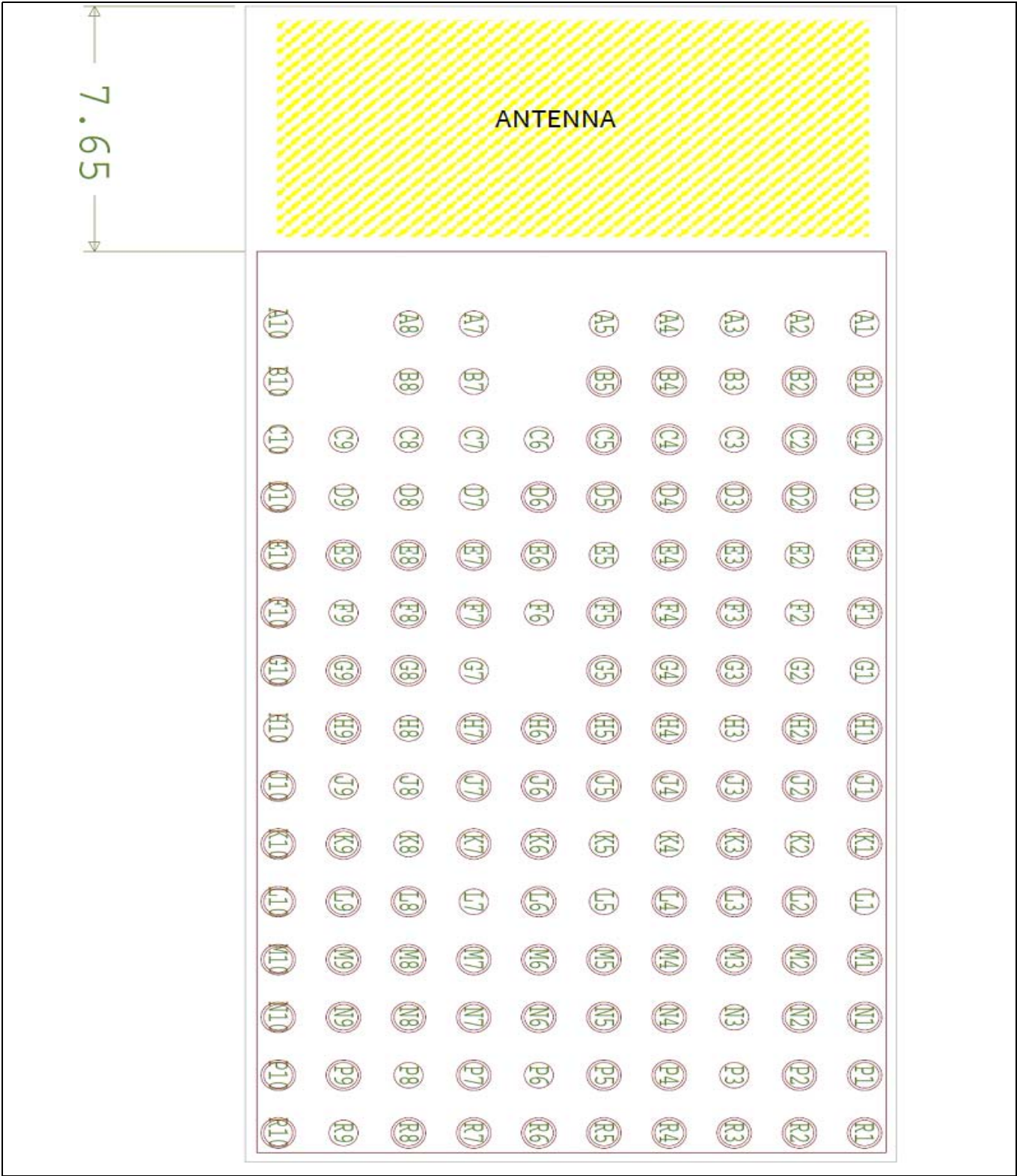
### 1.1.4 Operating conditions

**Table 4 Operating specification**

| Features                    | Description                                                    |
|-----------------------------|----------------------------------------------------------------|
| <b>Operating conditions</b> |                                                                |
| Voltage                     | VBAT: 3.2 V~4.8 V (3.6 V typical) VDD: 1.7 V~3.6 V             |
| Operating temperature       | –30°C to 85°C (optimal RF performance guarantee –30°C to 80°C) |
| Operating humidity          | less than 85% RH                                               |
| Storage temperature         | –40°C to 90°C                                                  |
| Storage humidity            | less than 60% RH                                               |
| <b>ESD protection</b>       |                                                                |
| Human body model            | ±1 kV per MIL-STD-883H method 3015.8                           |
| Charged device model        | ±300 V per JEDEC EIA/JESD22-C101E                              |

## 2 Pin information

### 2.1 Pin map



**Figure 2** Top view pin map

## 2.2 Pin table

**Table 5 Pin table**

| Pin No. | Definition | Basic description           | Voltage  | Type |
|---------|------------|-----------------------------|----------|------|
| G3      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| D3      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| E3      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| F3      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| D5      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| B1      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| D2      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| C2      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| B2      | Reserved   | Reserved for debug use only | VDDIO_WL | I/O  |
| N5      | Reserved   | Reserved for debug use only | –        | I/O  |
| N4      | Reserved   | Reserved for debug use only | –        | I/O  |
| A1      | GND_A1     | Power                       | –        | GND  |
| A10     | GND_A10    | Power                       | –        | GND  |
| A2      | GND_A2     | Power                       | –        | GND  |
| A3      | GND_A3     | Power                       | –        | GND  |
| A4      | GND_A4     | Power                       | –        | GND  |
| A5      | GND_A5     | Power                       | –        | GND  |
| A7      | GND_A7     | Power                       | –        | GND  |
| A8      | GND_A8     | Power                       | –        | GND  |
| B10     | GND_B10    | Power                       | –        | GND  |
| B3      | GND_B3     | Power                       | –        | GND  |
| B7      | GND_B7     | Power                       | –        | GND  |
| B8      | GND_B8     | Power                       | –        | GND  |
| C10     | GND_C10    | Power                       | –        | GND  |
| C3      | GND_C3     | Power                       | –        | GND  |
| C6      | GND_C6     | Power                       | –        | GND  |
| C7      | GND_C7     | Power                       | –        | GND  |
| C8      | GND_C8     | Power                       | –        | GND  |
| C9      | GND_C9     | Power                       | –        | GND  |
| D1      | GND_D1     | Power                       | –        | GND  |
| D7      | GND_D7     | Power                       | –        | GND  |
| D8      | GND_D8     | Power                       | –        | GND  |
| D9      | GND_D9     | Power                       | –        | GND  |
| E2      | GND_E2     | Power                       | –        | GND  |
| E5      | GND_E5     | Power                       | –        | GND  |
| F2      | GND_F2     | Power                       | –        | GND  |
| F6      | GND_F6     | Power                       | –        | GND  |
| F9      | GND_F9     | Power                       | –        | GND  |



Pin information

**Table 5** Pin table (continued)

| Pin No. | Definition | Basic description           | Voltage | Type   |
|---------|------------|-----------------------------|---------|--------|
| G1      | GND_G1     | Power                       | –       | GND    |
| G2      | GND_G2     | Power                       | –       | GND    |
| G7      | GND_G7     | Power                       | –       | GND    |
| H10     | GND_H10    | Power                       | –       | GND    |
| H3      | GND_H3     | Power                       | –       | GND    |
| H8      | GND_H8     | Power                       | –       | GND    |
| J8      | GND_J8     | Power                       | –       | GND    |
| J9      | GND_J9     | Power                       | –       | GND    |
| K2      | GND_K2     | Power                       | –       | GND    |
| K4      | GND_K4     | Power                       | –       | GND    |
| K5      | GND_K5     | Power                       | –       | GND    |
| K8      | GND_K8     | Power                       | –       | GND    |
| L1      | GND_L1     | Power                       | –       | GND    |
| L5      | GND_L5     | Power                       | –       | GND    |
| L7      | GND_L7     | Power                       | –       | GND    |
| N3      | GND_N3     | Power                       | –       | GND    |
| P3      | GND_P3     | Power                       | –       | GND    |
| P6      | GND_P6     | Power                       | –       | GND    |
| P8      | GND_P8     | Power                       | –       | GND    |
| R9      | GND_R9     | Power                       | –       | GND    |
| K6      | P0_2       | UART_RX                     | VBACKUP | Input  |
| J7      | P0_3       | UART_TX                     | VBACKUP | Output |
| K7      | Reserved   | Reserved for debug use only | VBACKUP | I/O    |
| J6      | P0_5       | Reserved for debug use only | VBACKUP | I/O    |
| M2      | P1_0       | EVENT (MSG)                 | VDDD    | Output |
| M3      | P1_1       | WAKE (INT)                  | VDDD    | Input  |
| K3      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L3      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L2      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| J3      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| R7      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| R6      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| P7      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| L6      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| N7      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| M7      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| M6      | Reserved   | Reserved for debug use only | VDDA    | I/O    |
| R4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| R5      | P11_2      | QSPI_CS - chip select       | VDDD    | Output |

Pin information

**Table 5** Pin table (continued)

| Pin No. | Definition | Basic description           | Voltage | Type   |
|---------|------------|-----------------------------|---------|--------|
| N6      | P11_3      | QSPI_IO3 - data line 3      | VDDD    | I/O    |
| M4      | P11_4      | QSPI_IO2 - data line 2      | VDDD    | I/O    |
| P4      | P11_5      | QSPI_IO1 - data line 1      | VDDD    | I/O    |
| P5      | P11_6      | QSPI_IO0 - data line 0      | VDDD    | I/O    |
| M5      | P11_7      | QSPI_SCK - clock            | VDDD    | Output |
| R2      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| R1      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| N1      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| P1      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| P2      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| N2      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| C4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| F4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| E4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| F5      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| D4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| B5      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| B4      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| C5      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| F7      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| E7      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| E8      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| G8      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| F8      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| E9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| E10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| D10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| F10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| H9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| G9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| G10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| J10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| K9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L8      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| K10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| M8      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| L10     | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| M9      | Reserved   | Reserved for debug use only | VDDD    | I/O    |
| P9      | Reserved   | Reserved for debug use only | VDDA    | I/O    |

Pin information

**Table 5** Pin table (continued)

| Pin No. | Definition | Basic description                                                                                                                                                                                                                                                                                                                                                                                                       | Voltage   | Type  |
|---------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| N9      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| M10     | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| N8      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| P10     | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| N10     | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| R10     | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDA      | I/O   |
| H4      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| G5      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| H5      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| G4      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| H7      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| H6      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | –         | I/O   |
| J4      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | 3.3 V     | I/O   |
| J5      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | 3.3 V     | I/O   |
| M1      | VBACKUP    | VBACKUP is the supply to the backup domain. The backup domain includes the 32-kHz WCO, RTC, and backup registers. It can generate a wake-up interrupt to the chip via the RTC timers or an external input. It can also generate an output to wakeup external circuitry. It is connected to VDDD when not used as a separate battery backup domain. VBACKUP provides the supply for port 0. min. is 1.4 V in backup mode | –         | PWR   |
| K1      | VDD_NS     | Power supply for PSoC™ 64 Buck regulator                                                                                                                                                                                                                                                                                                                                                                                | VDDD      | PWR   |
| H2      | VDD_USB    | Power supply for PSoC™ 64 USB                                                                                                                                                                                                                                                                                                                                                                                           | 3.3 V     | PWR   |
| R8      | VDDA       | Power supply for PSoC™ 64 P9, P10 (analog peripherals)                                                                                                                                                                                                                                                                                                                                                                  | 1.7~3.6 V | PWR   |
| R3      | VDDD       | Power supply for PSoC™ 64 P1, P5, P6, P7, P8, P11, P12, XRES.                                                                                                                                                                                                                                                                                                                                                           | 1.7~3.6 V | PWR   |
| H1      | VDDIO_WL   | Power supply for CYW43439 digital I/O. Connect it to VDDIOR.                                                                                                                                                                                                                                                                                                                                                            | VDDIOR    | PWR   |
| J1      | VDDIOR     | Power supply for PSoC™ 64 P2, P3, P4. Connect it to VDDIO_WL                                                                                                                                                                                                                                                                                                                                                            | 1.8 V     | PWR   |
| D6      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDIO_WL  | I/O   |
| E6      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDIO_WL  | I/O   |
| C1      | Reserved   | Reserved for debug use only                                                                                                                                                                                                                                                                                                                                                                                             | VDDIO_WL  | I/O   |
| F1      | WLAN_VBAT  | Main power supply for CYW43439                                                                                                                                                                                                                                                                                                                                                                                          | 3.2~4.8 V | PWR   |
| E1      | WLAN_VBAT  | Main power supply for CYW43439                                                                                                                                                                                                                                                                                                                                                                                          | 3.2~4.8 V | PWR   |
| J2      | XRES_L     | External reset I/O pin (pulled up by a 4.7 kΩ resistor internally)                                                                                                                                                                                                                                                                                                                                                      | VDDD      | Input |

**Note**

1. “Reserved for debug use only” can be left floating.

## 3 Electrical characteristics

### 3.1 Absolute maximum ratings

**Table 6 Absolute maximum ratings**

| Symbol                                       | Parameter                             | Min  | Max | Unit |
|----------------------------------------------|---------------------------------------|------|-----|------|
| WLAN_VBAT                                    | Power supply for CYW43439 PMU         | -0.5 | 6   | V    |
| VDDD, VDDIOR, VDD_NS, VDDA, VDD_USB, VBACKUP | Power supply for PSoC™ 64             | -0.5 | 4   | V    |
| VDDIO_WL                                     | Power supply for CYW43439 digital I/O | -0.5 | 3.9 | V    |

### 3.2 Recommended operating condition

**Table 7 Recommended operating condition**

| Symbol                             | Parameter                                                  | Min | Typ | Max | Unit |
|------------------------------------|------------------------------------------------------------|-----|-----|-----|------|
| WLAN_VBAT                          | Power supply for CYW43439 PMU                              | 3.2 | 3.6 | 4.8 | V    |
| VDDD <sup>[2]</sup> , VDD_NS, VDDA | Power Supply for PSoC™ 64                                  | 1.7 | 3.3 | 3.6 | V    |
| VDDIO_WL, VDDIOR                   | IO Voltage for WLAN/Bluetooth® and PSoC™ 64 <sup>[3]</sup> | 1.7 | 1.8 | 1.9 | V    |
| VBACKUP                            | Power supply to the PSoC™ 64 backup domain                 | 1.4 | 3.3 | 3.6 | V    |

#### Notes

2. To program the eFuse, VDDD must be at  $2.5\text{ V} \pm 5\%$ , at 14 mA.
3. Performance not guarantee if VDDIO\_WL, VDDIOR > 1.9 V.

### 3.3 GPIO DC characteristics

**Table 8 GPIO DC characteristics**

| Symbol          | Parameter           | Condition                | Min              | Max              | Unit |
|-----------------|---------------------|--------------------------|------------------|------------------|------|
| V <sub>IH</sub> | Input HIGH voltage  | CMOS Input               | $0.7 \times VDD$ | –                | V    |
| V <sub>IL</sub> | Input LOW voltage   | CMOS Input               | –                | $0.3 \times VDD$ | V    |
| V <sub>IH</sub> | Input HIGH voltage  | LVTTL input, VDD < 2.7 V | $0.7 \times VDD$ | –                | V    |
| V <sub>IL</sub> | Input LOW voltage   | LVTTL input, VDD < 2.7 V | –                | $0.3 \times VDD$ | V    |
| V <sub>IH</sub> | Input HIGH voltage  | LVTTL input, VDD ≥ 2.7 V | 2                | –                | V    |
| V <sub>IL</sub> | Input LOW voltage   | LVTTL input, VDD ≥ 2.7 V | –                | 0.8              | V    |
| V <sub>OH</sub> | Output HIGH voltage | IOH = 8 mA               | VDD-0.5          | –                | V    |
| V <sub>OL</sub> | Output LOW voltage  | IOL = 8 mA               | –                | 0.4              | V    |

For more details, see [32-bit PSoC™ 6 Arm® Cortex®-M4 / M0+](#)

## 4 Power measurement

**Table 9** Power measurement

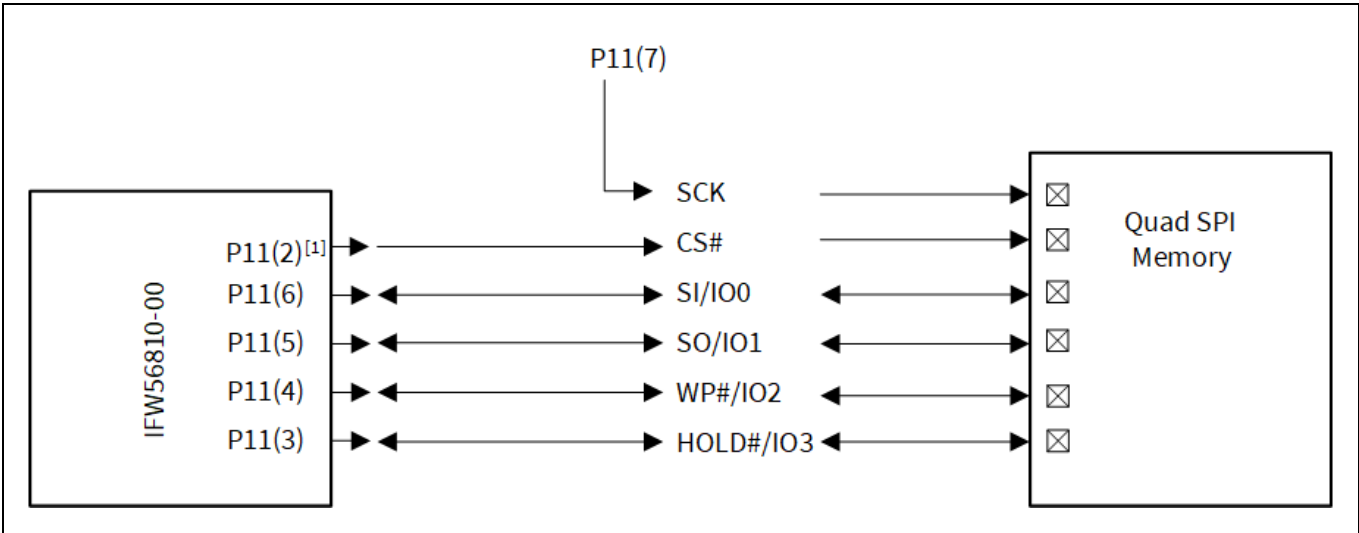
| Symbol                             | Parameter                                                  | Mode       | Operating voltage | Max    | Avg    |
|------------------------------------|------------------------------------------------------------|------------|-------------------|--------|--------|
| WLAN_VBAT                          | Power supply for CYW43439 PMU                              | Active     | 3.6               | 40 mA  | 13 mA  |
|                                    |                                                            | Sleep      |                   | TBD    | TBD    |
|                                    |                                                            | Deep Sleep |                   | TBD    | TBD    |
| VDDD <sup>[4]</sup> , VDD_NS, VDDA | Power supply for PSoC™ 64                                  | Active     | 3.3               | 14 mA  | 14 mA  |
|                                    |                                                            | Sleep      |                   | TBD    | TBD    |
|                                    |                                                            | Deep Sleep |                   | TBD    | TBD    |
| VDDIO_WL, VDDIOR                   | IO voltage for WLAN/Bluetooth® and PSoC™ 64 <sup>[5]</sup> | Active     | 1.8               | 746 µA | 745 µA |
|                                    |                                                            | Sleep      |                   | TBD    | TBD    |
|                                    |                                                            | Deep Sleep |                   | TBD    | TBD    |
| VBACKUP                            | Power supply to the PSoC™ 64 backup domain                 | Active     | 3.3               | 19 nA  | 44 nA  |
|                                    |                                                            | Sleep      |                   | TBD    | TBD    |
|                                    |                                                            | Deep Sleep |                   | TBD    | TBD    |

### Notes

4. All results are run to take three minutes then record the test average and maximum value.
5. DUT in CCM.

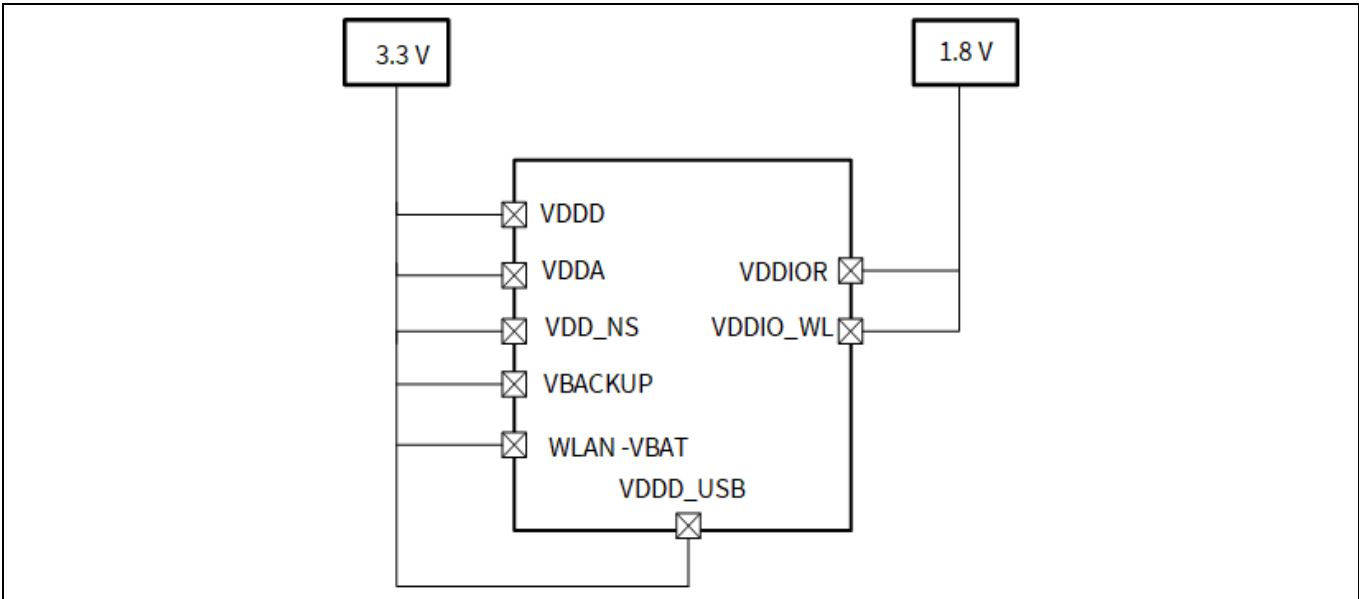
## 5 Connection diagram

### 5.1 QSPI External flash connection to module diagram



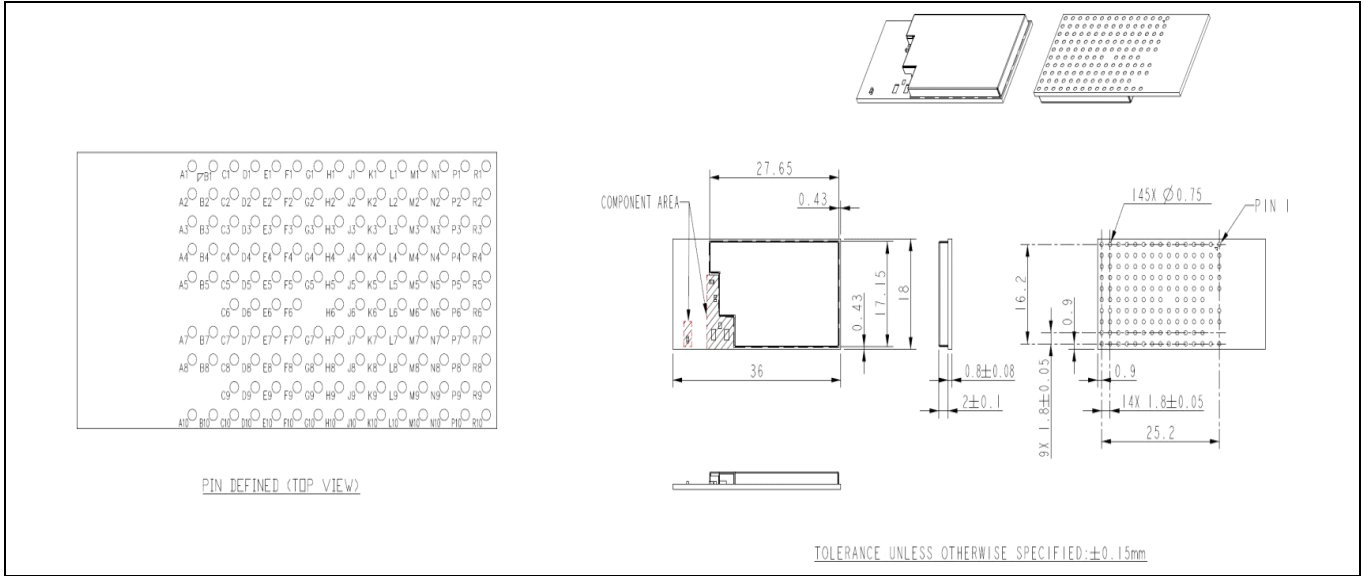
**Figure 3** QSPI external flash connection to module diagram

### 5.2 Power connection diagram



**Figure 4** Power connection diagram

## 6 Mechanical information



**Figure 5** CCM top view PCB layout footprint (unit in mm, diameter = 0.75 mm solder mask defined)

### Note

6. Keep out distance of the antenna is > 10 mm for non-conductive materials and 20 mm for conductive.

## 7 Surface-mount technology (SMT) process suggestion

### 7.1 Production rule

#### 7.1.1 Footprint and stencil aperture recommendation

Footprint: The footprint shares the same center as pin pad land. Following are the rules to define the size.

- Rectangle type:
  - Outermost layer:
    - Footprint length =  $1 \times (\text{pin pad land length})$
    - Footprint width =  $1 \times (\text{pin pad land width})$
  - Others: the same size as the pin pad
- Round type:
  - Outermost layer: Increase the pin pad size by about 10% in diameter
    - Footprint diameter =  $1.1 \times (\text{pin pad land diameter})$
  - Others: the same size as the pin pad
- Stamp hole:
  - Outermost layer: Increase the pin pad size by about 10% in length & width
    - Footprint length =  $2 \times (\text{pin pad land length})$
    - Footprint width =  $1 \times (\text{pin pad land width})$
  - Others: the same size as the pin pad
- Stencil aperture suggestion
- The Pad is the same size as the footprint
- Stencil thickness suggestion:
  - Normal type product thickness: 0.1 mm~0.12 mm
  - Maximum warpage: 0.1 mm
  - SOM type product thickness: 0.12 mm~0.15 mm (use step-up / step-down stencil)

### 7.2 Reflow soldering profile

**Table 10 SnPb Eutectic process - Classification temperature ( $T_C$ )**

| Package thickness | Volume mm <sup>3</sup><br>< 350 | Volume mm <sup>3</sup><br>≥ 350 |
|-------------------|---------------------------------|---------------------------------|
| < 2.5 mm          | 240 + 0/-5°C                    | 225 + 0/-5°C                    |
| ≥ 2.5 mm          | 225 + 0/-5°C                    | 225 + 0/-5°C                    |

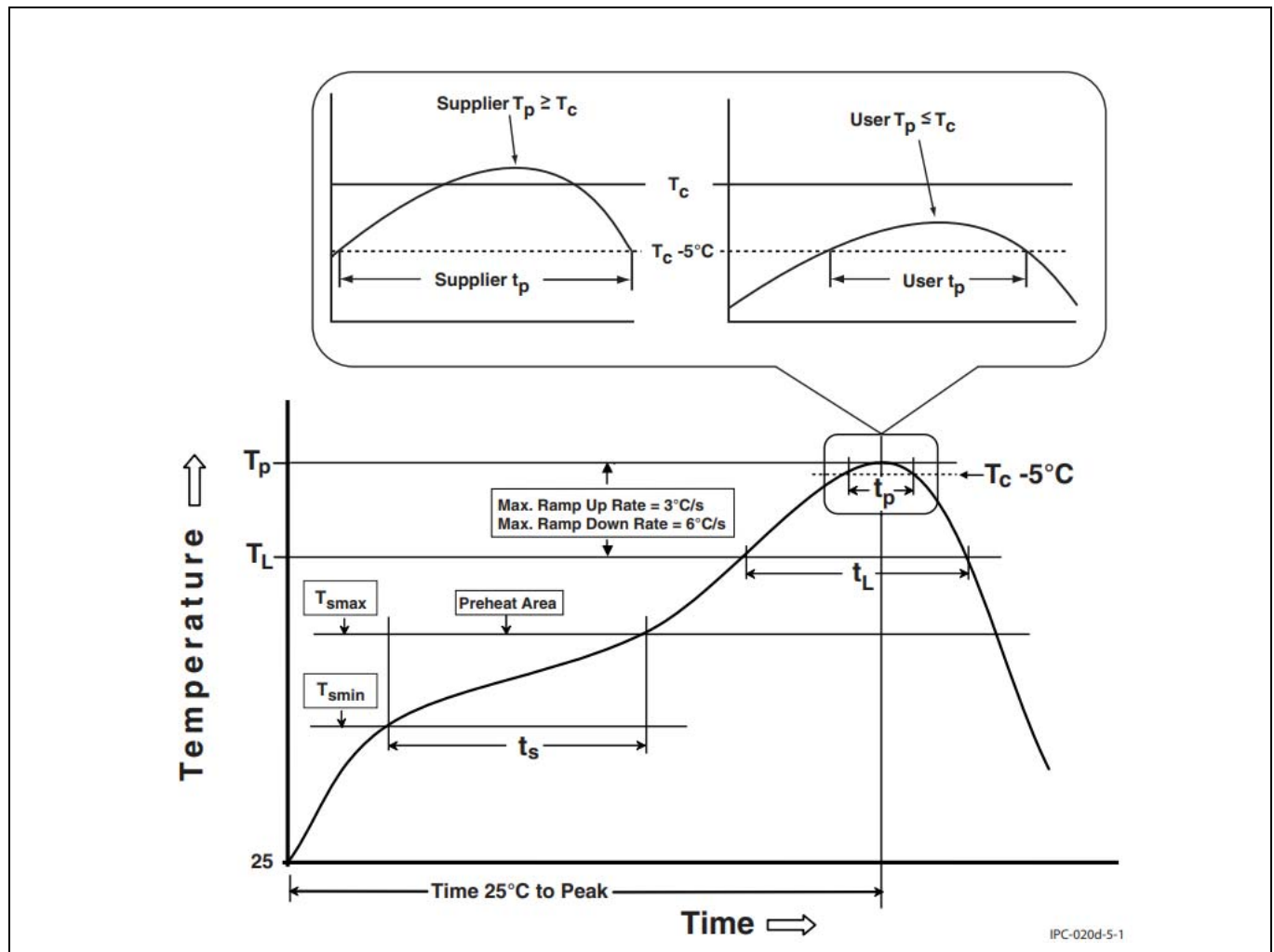
**Table 11 PB-Free process - Classification temperature ( $T_C$ )**

| Package thickness | Volume mm <sup>3</sup><br>< 350 | Volume mm <sup>3</sup><br>350 - 2000 | Volume mm <sup>3</sup><br>>2000 |
|-------------------|---------------------------------|--------------------------------------|---------------------------------|
| < 1.6 mm          | 260°C <sup>[7]</sup>            | 260°C <sup>[7]</sup>                 | 260°C <sup>[7]</sup>            |
| 1.6 mm - 2.5 mm   | 260°C <sup>[7]</sup>            | 250°C <sup>[7]</sup>                 | 245°C <sup>[7]</sup>            |
| >2.5 mm           | 250°C <sup>[7]</sup>            | 245°C <sup>[7]</sup>                 | 245°C <sup>[7]</sup>            |

**Note**

7. Tolerance: The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature at the rated MSL level 3.





**Figure 6** Reflow soldering profile

**Table 12** Classification reflow profile

| Profile feature                                                                                                                                                              | Sn-Pb Eutectic assembly | Pb-Free assembly    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|
| Preheat/Soak                                                                                                                                                                 |                         |                     |
| Temperature Min (T <sub>smin</sub> )                                                                                                                                         | 100°C                   | 150°C               |
| Temperature Max (T <sub>smax</sub> )                                                                                                                                         | 150°C                   | 200°C               |
| Time (t <sub>s</sub> ) from T <sub>smin</sub> to T <sub>smax</sub>                                                                                                           | 60-120 s                | 60-120 s            |
| Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )                                                                                                                             | 3/s max.                | 3/s max.            |
| Liquidous temperature (T <sub>L</sub> )                                                                                                                                      | 183°C                   | 217°C               |
| Time (t <sub>L</sub> ) maintained above T <sub>L</sub>                                                                                                                       | 60-150 s                | 60-150 s            |
| Time (t <sub>p</sub> ) <sup>[8]</sup> within 5°C of the specified classification temperature (T <sub>c</sub> ) <sup>[8]</sup> , see <a href="#">Reflow soldering profile</a> | 20 <sup>[8]</sup> s     | 30 <sup>[8]</sup> s |
| Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )                                                                                                                           | 6°C/s max.              | 6°C/s max.          |
| Time 25°C to peak temperature                                                                                                                                                | 6 minutes max.          | 8 minutes max.      |

**Note**

8. Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.

### 7.3 Solder down module USE

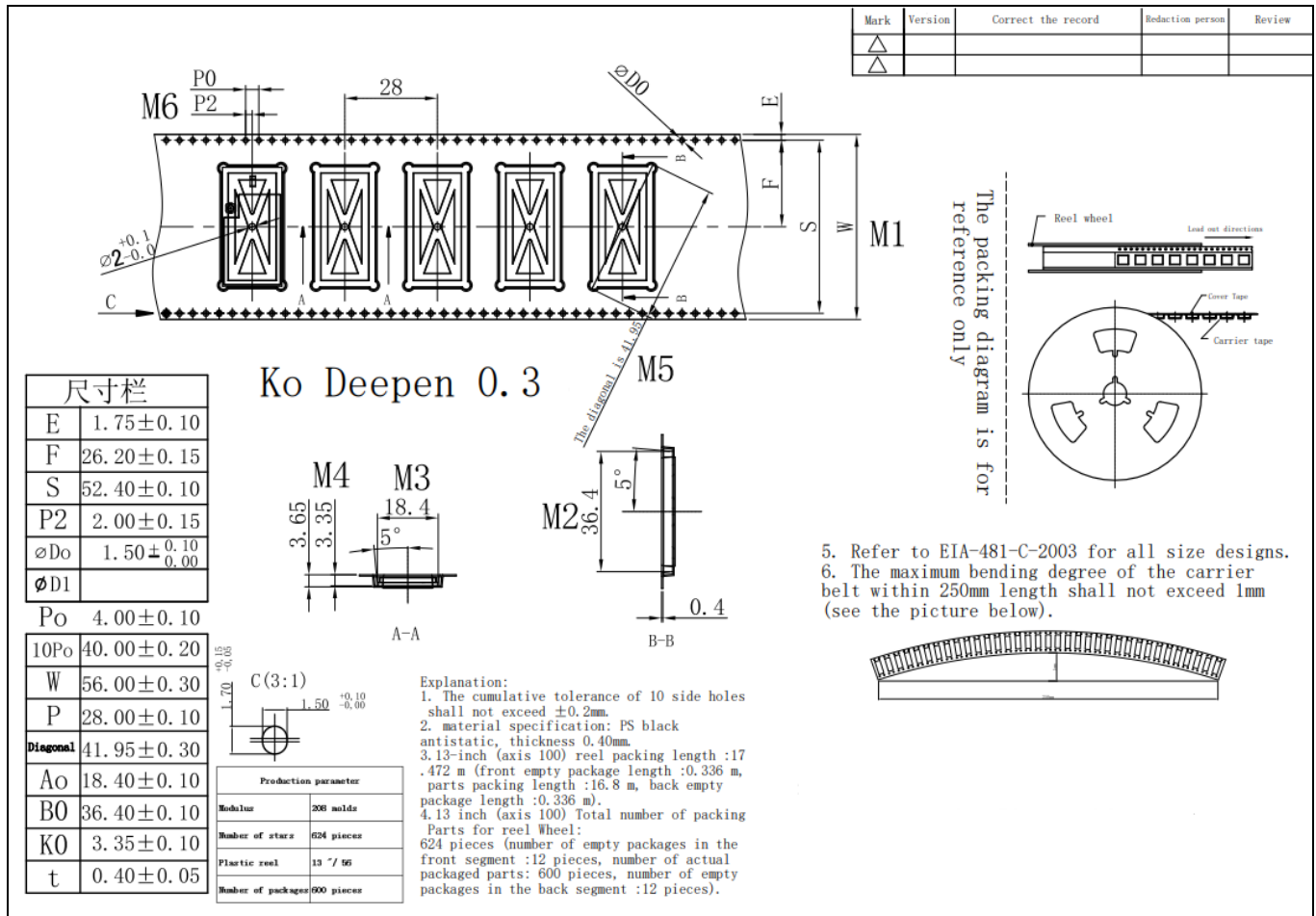
- Shelf life in a Moisture Barrier Bag (MBB): 12 months at <30°C and <60% relative humidity (RH)
- Opened MBB: After the dry pack (MBB) is opened, all soldered-down modules within that bag must complete solder reflow processing, including rework, prior to the floor life (168 hours); if not, they need dry baking to reset the floor life
- General consideration for baking: The oven used for baking shall be vented and capable of maintaining the required temperatures at less than 5% RH
  - High temperature carriers (Tray): Solder down module shipped in high temperature carriers can be baked in the carriers at 125°C
  - Low temperature carriers (Tape and Reel): Solder down module shipped in low temperature carriers may not be baked at any temperature higher than 60°C
- Baking condition:
  - High temperature carriers
    - Exceeding floor life >72 hours: bake at 125°C for 8 hours
    - Exceeding floor life ≤72 hours: bake at 125°C for 6 hours
  - Low temperature carriers
    - Exceeding floor life >72 hours: bake at 60°C ≤5% RH for 72 hours or 65°C ≤5% RH for 48 hours
    - Exceeding floor life ≤72 hours: bake at 60°C ≤5% RH for 48 hours
    - If a higher bake temperature is required, the soldered-down module must be removed from the low temperature carriers, transferred to thermally safe carriers, baked, and then returned to the low temperature carriers
- Recommend to baking oven with N2 supplied
- Recommend to reflow oven with N2 supplied
- Baked required with 24 hours at 125 +/-5°C before rework process for two modules, one is new module and two is board with module
- Store at ≤10% RH with vacuum packing
- If the SMT process needs twice the amount of reflow:
  - Process flow: (1) Bottom side SMT and reflow and (2) Top side SMT and reflow
    - Case 1: Solder down module mounted on the top side. When the bottom side processes for more than 72 hours, baking is required
    - Case 2: Solder down the module mounted on the bottom side and follow the normal bake rule before processing

**Note:** Window time: from last bake end to next reflow start that has 168 hours space.

## **7.4 Repair**

- Tool and material:
  - Soldering station
  - Soldering braid
  - Iron
  - Stencil fixture for module
  - Soldering paste
- Stencil opening size:
  - Stencil thickness: 0.1 mm (100 µm)
  - Stencil pad size opening: Footprint 100%
- Repair steps:
  - Before repair, the product needs to be baked for 2 hours (at 125°C)
  - Use soldering station to de-mount the module
  - Use soldering braid and Iron to clean solder of pads
  - Use stencil fixture and soldering paste to paste on the pads
  - Put the module on the main board
  - Use soldering station to mount the module
  - Retest the product

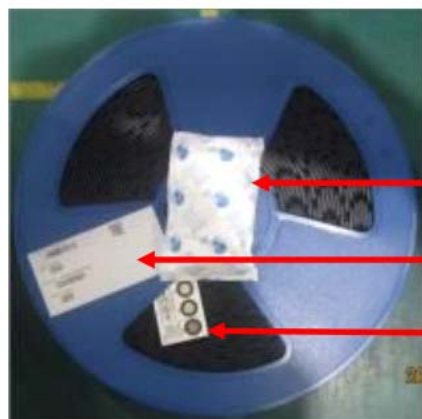
## 8 Tape and reel information



**Figure 7 Tape and reel information**

## 9 Packing information

1. One reel can pack 600 pieces modules, 1800 pieces/carton.
2. One production label is pasted on the reel, one desiccant, and one humidity indicator card are put on the reel.



One desiccant

One production label

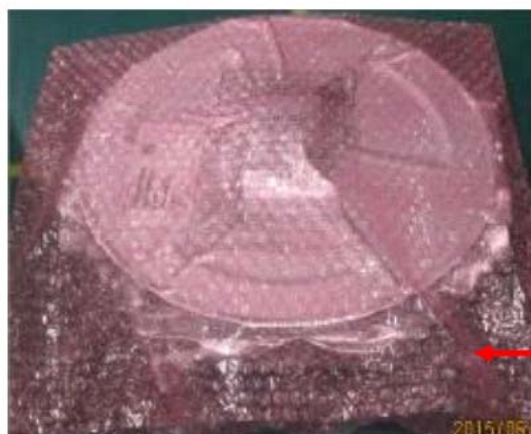
One humidity indicator card

3. One reel is put into the anti-static moisture barrier bag, and then one label is pasted on the bag.



One production label

4. A bag is put into the anti-static pink bubble wrap.



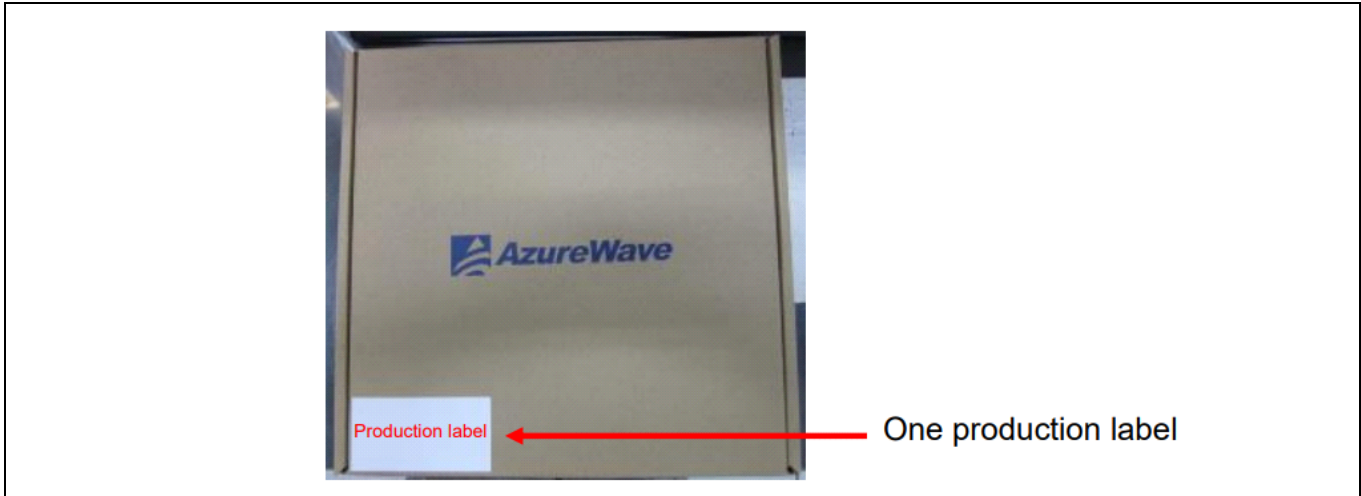
One anti-static pink bubble wrap

**AIROC™ Wi-Fi Cloud Connectivity Manager (CCM) module**  
**Turnkey, secure solution for IoT applications**



Packing information

5. A bubble wrap is put into the inner box and then one label is pasted on the inner box.



6. 1 carton = 3 boxes.



7. Sealing the carton.



## 10 Ordering information

**Table 13**      **Ordering information**

| Part number | Package                  | Description    |
|-------------|--------------------------|----------------|
| IFW56810-00 | 36.0 mm x 18 mm x 2.8 mm | Wi-Fi 4 module |

**Note:** Contact [Infineon support](#) for the part number availability.

## References

- [1] [AIROC™ CCM kit webpage](#)
- [2] [AN234322 - Getting started with AIROC™ IFW56810-00 Single-band Wi-Fi 4 Cloud Connectivity Manager](#)



## Revision history

| Document revision | Date       | Description of changes                                                                                                                                                                                                                                                                                          |
|-------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **                | 2022-09-19 | Initial release                                                                                                                                                                                                                                                                                                 |
| *A                | 2023-05-22 | Updated sections <b>Overview</b> , <b>Pin information</b> , <b>Electrical characteristics</b> , <b>Mechanical information</b> and <b>Ordering information</b> .<br>Added sections <b>Connection diagram</b> , <b>Surface-mount technology (SMT) process suggestion</b> , and <b>Tape and reel information</b> . |

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