



佳邦科技股份有限公司  
INPAQ TECHNOLOGY CO., LTD.

**MGCB1-U110-00**

# Specification

|             |                      |
|-------------|----------------------|
| Part Series | GNSS Receiver Module |
| Part Number | MGCB1-U110-00        |
| Version     | V0.1                 |

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# 1. Overall

The MGCB1-U110 series is compact, dual band, multi-constellation GNSS receiver module. The module support L1 and L5 band GNSS. The dual band and multi-system GNSS receiver provides the high precision, visible satellite and fast acquisition time. These key features provide excellent performance on position application.

The MGCB1-U110 series provide fast TTFF time, acquisition time and up to 135 satellite channel. The module integrates low noise amplifier and high rejection filter. These designs will provide high receiver sensitivity and reduce noise interface.

The MGCB1-U110 series is excellent and easy to use in navigation and position application. The package with stamp hole and compact, that is easy to mount on system board.

# 2. Feature

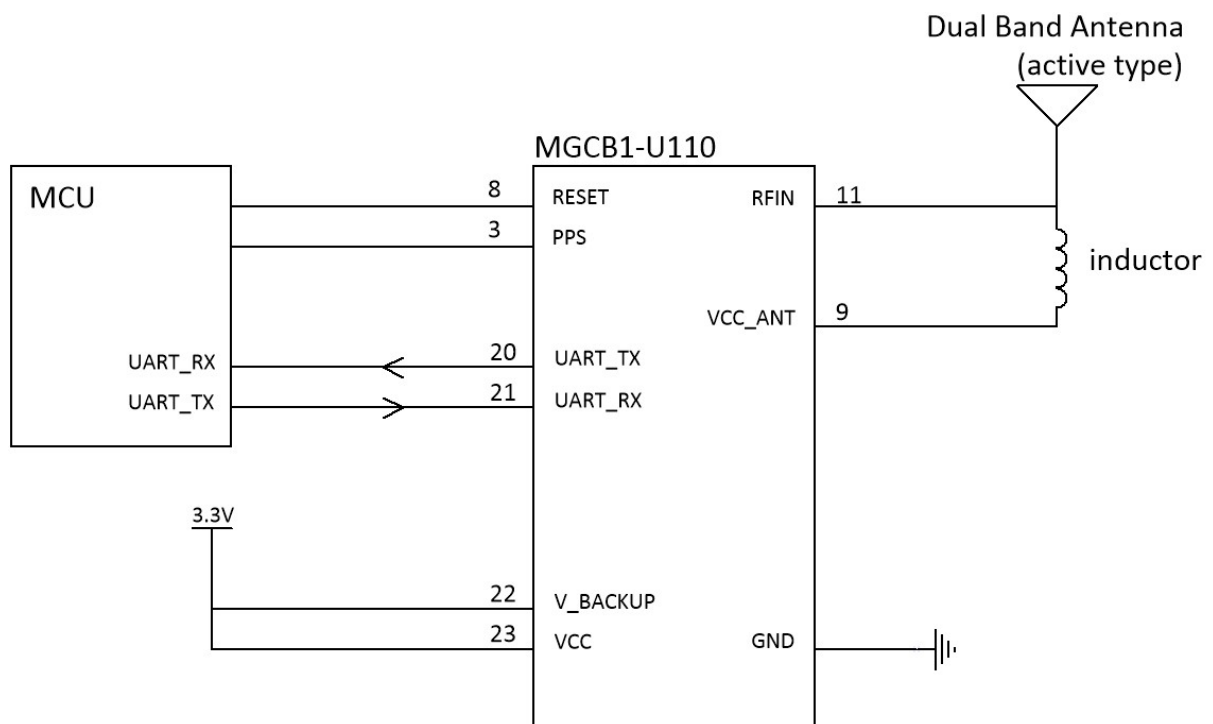
- L1 and L5 band GNSS receiver
- Support GPS, GLONASS, Galileo, BeiDou, QZSS
- Support Max. 135 channel (L1 75 + L5 60)
- Time to First Fixed (TTFF)
- Max 10Hz update rate
- Integrate low noise amplifier
- Integrate high rejection filter
- Integrate DC blocking in RFin
- Signal voltage supply
- UART interface
- low power consumption
- ESD protection
- Small and Standard module package (1612)
- Support SMD process
- RoSH/REACH Compliance



### 3. Application

- Personal position and navigation
- IoT
- Smart city
- Base station location and alignment

Simplified Schematic and application



## 4. Pin Configuration and Function

### 4.1 Pin Configuration (Top View)

|          |    |    |         |
|----------|----|----|---------|
| GND      | 13 | 12 | GND     |
| NC       | 14 | 11 | RFIN    |
| NC       | 15 | 10 | GND     |
| NC       | 16 | 9  | VCC_ANT |
| NC       | 17 | 8  | RESET   |
| NC       | 18 | 7  | NC      |
| NC       | 19 | 6  | NC      |
| UART_TX  | 20 | 5  | NC      |
| UART_RX  | 21 | 4  | NC      |
| V_BACKUP | 22 | 3  | PPS     |
| VCC      | 23 | 2  | NOTIFY  |
| GND      | 24 | 1  | WAKE_UP |

### 4.2 Pin Function

| PIN                                      |          | Type | Description                                                                                                                 |
|------------------------------------------|----------|------|-----------------------------------------------------------------------------------------------------------------------------|
| Number                                   | Name     |      |                                                                                                                             |
| 1                                        | WAKEUP   | I    | Host wakeup GNSS module. Wake-up module from stand-by mode. Low active. Open this pin, if no uses this function. 1.8V level |
| 2                                        | NOTIFY   | O    | GNSS module notify host. High active. Open this pin, if no uses this function. 1.8V level                                   |
| 3                                        | PPS      | O    | 1PPS signal, 1.8V level                                                                                                     |
| 8                                        | RESET    | O    | Reset, internal pull-high. Low active, 1.8V level                                                                           |
| 9                                        | VCC_ANT  | P    | Voltage Supply for external active antenna                                                                                  |
| 11                                       | RFIN     | I    | RF input, internal DC block                                                                                                 |
| 20                                       | UART_TX  | O    | UART transmit, 1.8V level                                                                                                   |
| 21                                       | UART_RX  | I    | UART receive, 1.8V level                                                                                                    |
| 22                                       | V_BACKUP | P    | Backup Voltage supply                                                                                                       |
| 23                                       | VCC      | P    | Voltage supply                                                                                                              |
| 10, 12, 13, 24                           | GND      | GND  | Ground pin. Connect to system ground                                                                                        |
| 4, 5, 6, 7,<br>14, 15, 16,<br>17, 18, 19 | NC       | NC   | No connect to internal circuit. Can be float.                                                                               |

## 5. Performance

### 5.1 RF performance

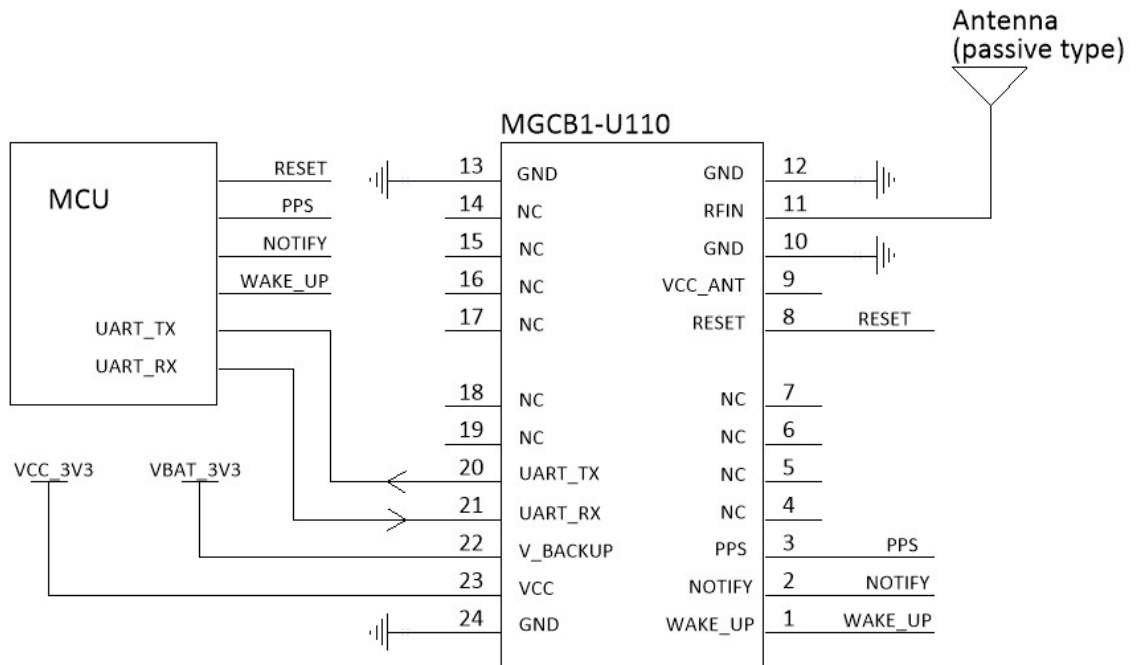
| Parameter                | Specifications                                                                                                       |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|
| L1<br>Frequency (MHz)    | GPS: L1 C/A, 1575.42<br>GLONASS: L1, 16023.5625<br>Galileo: E1, 1575.42<br>BeiDou: B1, 1561.098<br>QZSS: L1, 1575.42 |
| L5<br>Frequency (MHz)    | GPS: L5, 1176.45<br>Galileo: E5, 1176.45<br>BeiDou: B2, 1176.45<br>QZSS: L5, 1176.45                                 |
| L1 Channel               | 75                                                                                                                   |
| L5 Channel               | 60                                                                                                                   |
| Timing Accuracy          | 1pps, +/-10ns                                                                                                        |
| Update rate              | 1Hz                                                                                                                  |
| Sensitivity              | Tracking: -162 dBm<br>Acquisition: -145 dBm                                                                          |
| TTFF                     | Host start: 1 sec<br>Cold start: 25 sec                                                                              |
| Position Precision (CEP) | 1 m                                                                                                                  |
| Max input level          | -40dBm                                                                                                               |

### 5.2 Digital performance

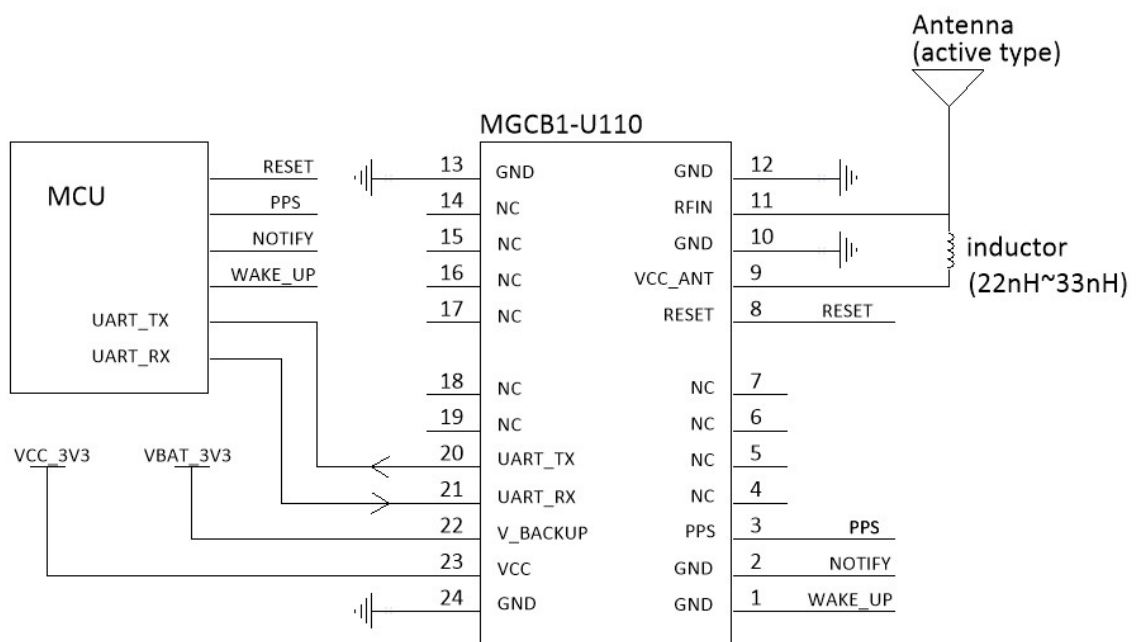
| Parameter   | Specifications |
|-------------|----------------|
| Update rate | 1Hz            |
| UART        | 9600 bps       |
| Protocols   | NMEA 0183      |

## 6. Application

### 6.1 with passive antenna



### 6.2 with active antenna



## 7. Electrical Specification

### 7.1 Absolution Rating

| Parameter | Description          | Min | Max | Unit |
|-----------|----------------------|-----|-----|------|
| VCC       | Voltage input        |     | 5.5 | V    |
| V_BACKUP  | Backup voltage input |     | 5.5 | V    |
| RF_IN     | Max RF input level   |     | -40 | dBm  |

### 7.2 ESD Rating

| Mode                | JEDEC Specification | Min   | Max  | Unit |
|---------------------|---------------------|-------|------|------|
| Human body model    | JESD22-A114-F       | -2000 | 2000 | V    |
| Charge device model | JESD22-C101-D       | -500  | 500  | V    |

### 7.3 Recommended Operation Conditions

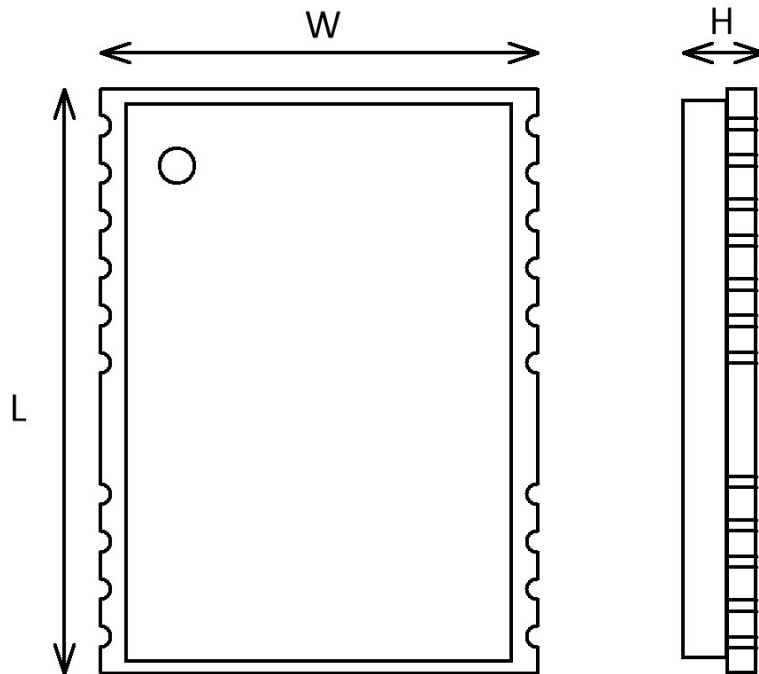
| Parameter | Description           | Min  | Max  | Unit |
|-----------|-----------------------|------|------|------|
| VCC       | Voltage input         | 3    | 5    | V    |
| V_BACKUP  | Backup voltage input  | 3    | 5    | V    |
| V-IH      | IO, UART              | 1.2  | 2.1  | V    |
| V-IL      | IO, UART              | -0.3 | 0.6  | V    |
| V-OH      | IO, UART              | 1.4  |      | V    |
| V-OL      | IO, UART              |      | 0.4  | V    |
| Temp-op   | Operation temperature | -40  | +85  | °C   |
| Temp-st   | Storage temperature   | -40  | +105 | °C   |

### 7.4 Power consumption

| Parameter | Description       | typical | Unit |
|-----------|-------------------|---------|------|
| Pcon      | Power consumption | 180     | mW   |

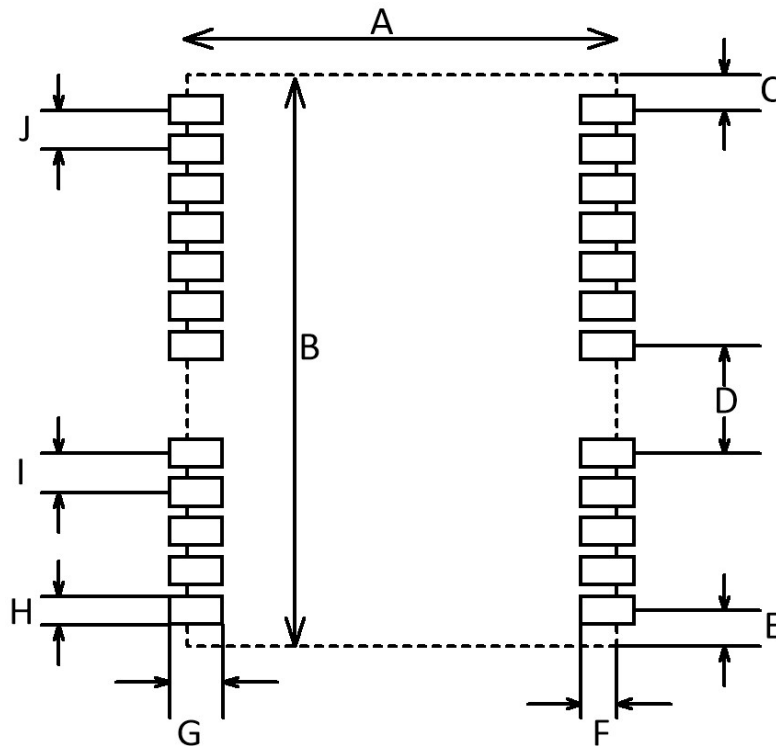
## 8. Mechanical Specification

### 8.1 Outline Dimensions



| Symbol | Min (mm) | Normal (mm) | Max (mm) |
|--------|----------|-------------|----------|
| W      | 12.0     | 12.2        | 12.4     |
| L      | 15.8     | 16.0        | 16.2     |
| H      | 2.3      | 2.5         | 2.7      |

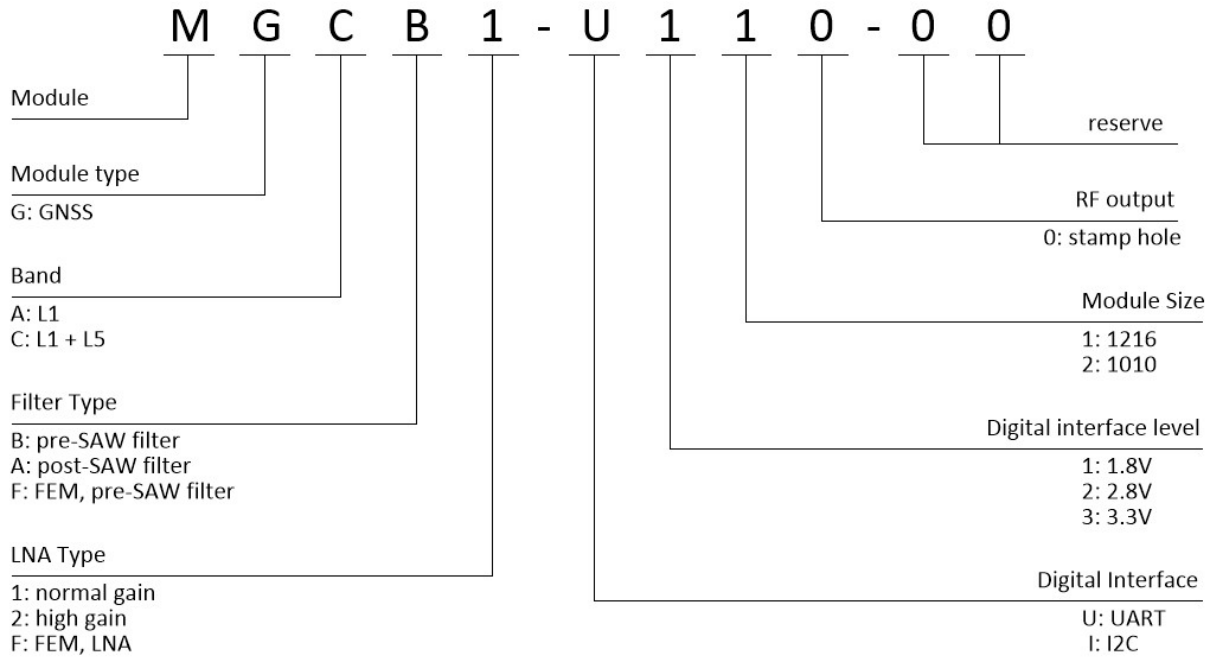
## 8.2 PCB land pattern dimensions



| Symbol | Min (mm) | Normal (mm) | Max (mm) |
|--------|----------|-------------|----------|
| A      | 12.0     | 12.2        | 12.4     |
| B      | 15.8     | 16.0        | 16.2     |
| C      | 0.9      | 1.0         | 1.1      |
| D      | 2.9      | 3.0         | 3.1      |
| E      | 0.9      | 1.0         | 1.1      |
| F      | 0.5      | 0.6         | 0.7      |
| G      | 0.7      | 0.8         | 0.9      |
| H      | 0.7      | 0.8         | 0.9      |
| I      | 1.0      | 1.1         | 1.2      |
| J      | 1.0      | 1.1         | 1.2      |

## 9. Ordering Information

### 9.1 Ordering Information



| Part Number   | Description          |
|---------------|----------------------|
| MGCB1-U110-00 | 1612 SMD type module |
| MGCB1-U110-EV | Evaluation Board     |

## 10. INPAQ relative and peripheral product

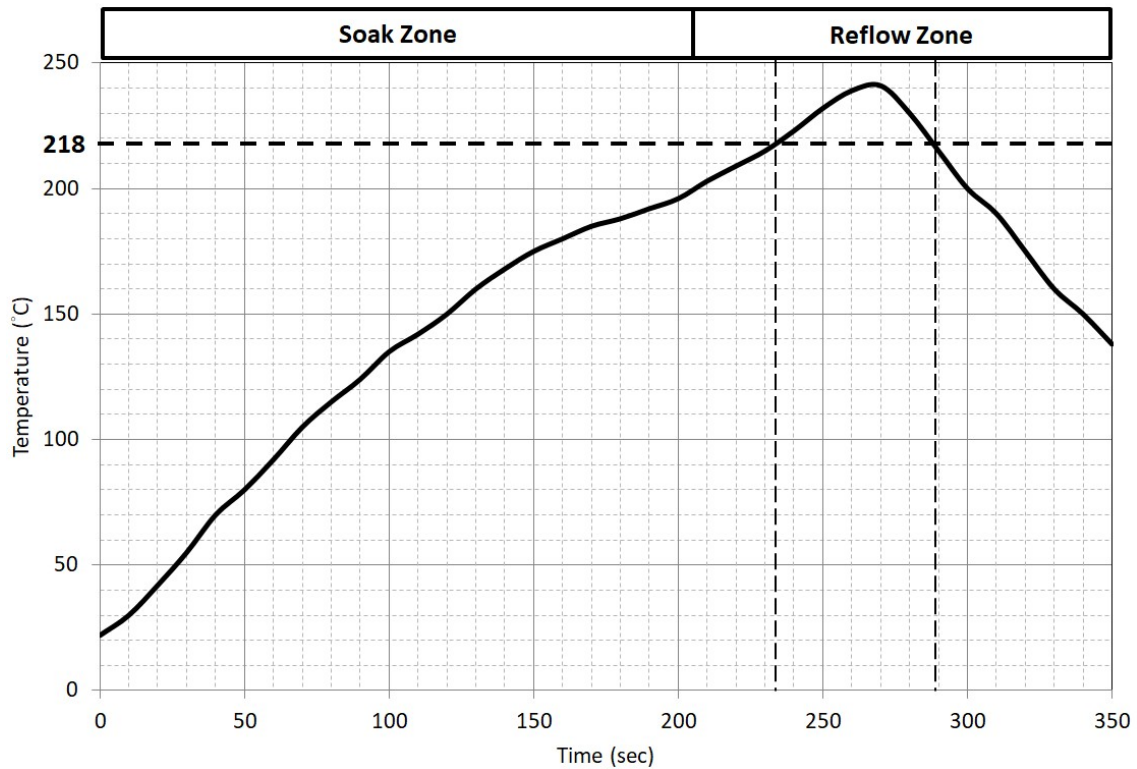
| Series               | Part Number   | Description                      |
|----------------------|---------------|----------------------------------|
| GNSS receiver module | MGCB1-U110-00 | normal gain GNSS receiver module |
| GNSS patch antenna   | *             | Active patch antenna             |
| GNSS patch antenna   | *             | Passive patch antenna            |

Note:

\* connect with INPAQ sales for more detail product information

# 11. Manufacturing

## 11.1 Reflow Soldering Thermal Profile



## 11.2 Thermal profile parameter

| Zone         | Factor                    | Description          |
|--------------|---------------------------|----------------------|
| Soak Zone    | Max slope                 | 3°C/sec              |
|              | Soak time (150°C ~ 200°C) | 60 sec ~120 sec      |
| Reflow Zone  | Max slope                 | 2°C/sec              |
|              | Soak time (over 220°C)    | 40 sec ~60 sec       |
|              | Max temperature           | 245°C                |
|              | Cooling down slope        | -1°C/sec to -3°C/sec |
| Reflow cycle | Max reflow cycle          | 1                    |

## 12. Version

| Version | Date       | Description     |
|---------|------------|-----------------|
| V0.1    | 2024.02.26 | Initial release |
|         |            |                 |
|         |            |                 |