FN-LINK欧智通

PRODUCT SPECIFICATION

# H2355E-U

## Wi-Fi Single-band 1x1 802.11b/g/n/ax +BLE 5.0

## Module Datasheet

**Version:v1.3**

# H2355E-U Module Datasheet

| | Part NO. | Description |
|---|---|---|
| **Ordering Information** | FGH2355EUX-00 | SV6355/2.4G/802.11b/g/n/ax+BLE5.0 1T1R,USB,12.2*13 |
| | FGH2355EUX-01 | SV6355/2.4G/802.11b/g/n/ax BLE5.0 1T1R,USB,12.2*13,带天线座版本 |

**Customer:** _____

**Customer P/N:** _____

**Signature:** _____

**Date:** _____

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# Revision History

| Version | Date | Contents of Revision Change | Draft | Checked | Approved |
|---|---|---|---|---|---|
| V1.0 | 2022/04/27 | New version | FC | TZQ | QJP |
| V1.1 | 2022/06/14 | Add Module Picture | FC | TZQ | QJP |
| V1.2 | 2022/07/22 | Add bluetooth BLE description | TZQ | TZQ | QJP |
| V1.3 | 2022/04/13 | Add version 01 | TZQ | TZQ | QJP |
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# 1. General Description

## 1.1 Introduction

The H2355E-U is a fully integrated SoC with 2.4GHz band 1T1R 11b/g/n/ax+BLE Wi-Fi, Bluetooth Low Energy 5.0, and MCU.support Single-chip IEEE 802.11b/g/n/ax WLAN with USB Interface.
The H2355E-U WLAN SoC is designed to support IEEE 802.11 b/g/n/ax single spatial stream It is designed with the state of-the-art techniques and process technology to achieve low power consumption and high throughput performance to address the requirement of mobile and handheld devices.

## 1.2 Description

| | |
|---|---|
| Model Name | H2355E-U |
| Product Description | Support Wi-Fi functionalities |
| Dimension | L x W x H: 12.2 x 13 x1.62 mm |
| BT Interface | USB |
| OS supported | Android /Linux/ Win CE /iOS /XP/WIN7/WIN10 |
| Operating temperature | 0°C to 70°C |
| Storage temperature | -40°C to 85°C |

# 2. Features

## General Features

- IEEE 802.11 b/g/n/ax+BLE5.0 compliant
- Support 802.11n 20/40MHz up to MCS7 150Mbps
- Support 802.11ax 20/40MHz up to MCS9 229Mbps
- Concurrent AP + STA supported
- including Wi-Fi WPA3, the SV6355 builds strong secure system products for smart home applications.

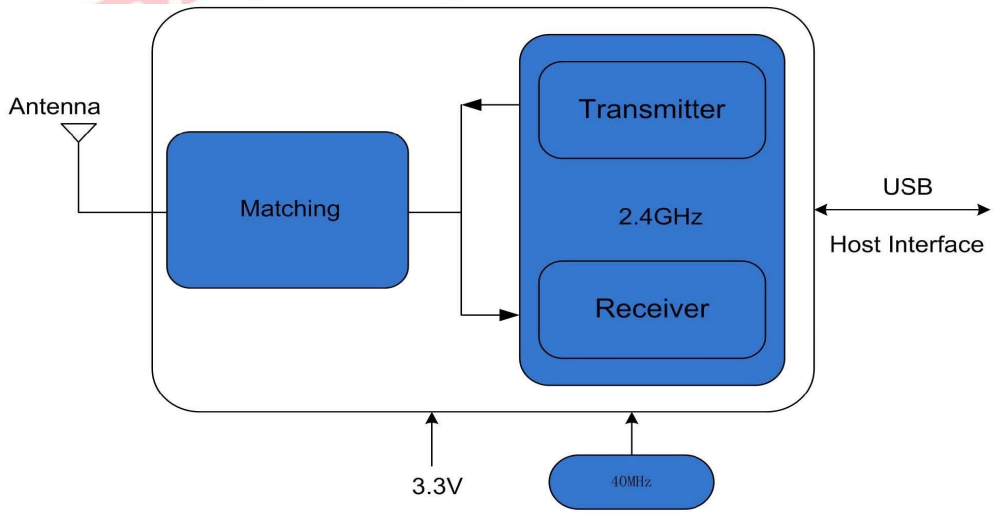
## WLAN Interface

- WiFi Support USB Interface

## Bluetooth Features

- The SV6355 supports BLE Master, Slave, Advertiser, Scanner roles. It supports standard HCI in BLE side.
- Bluetooth 5.0 Low Energy
- SIG Mesh v1.01 supported

# 3. Block Diagram



# 4. General Specification

## 4.1 WI-FI Specification

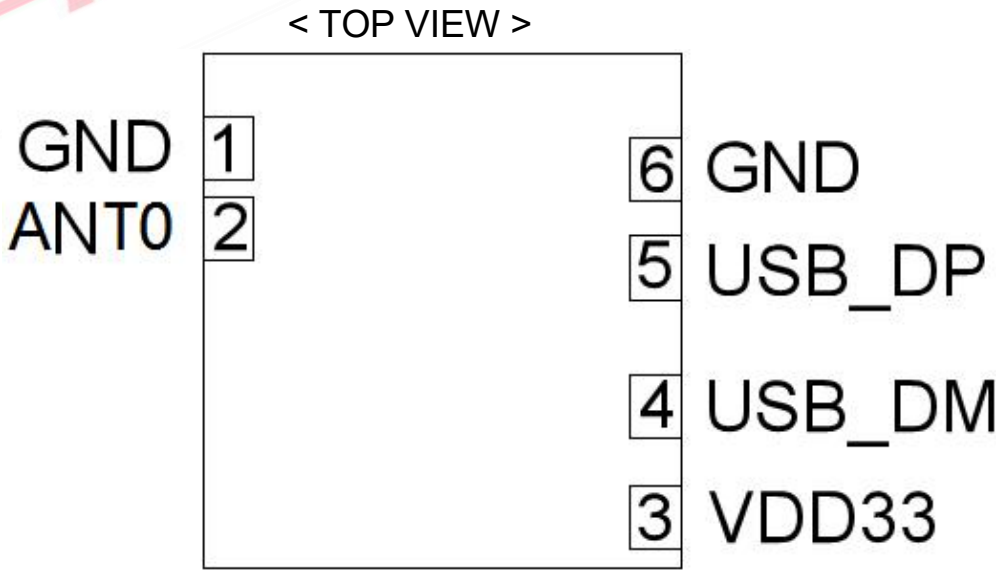
| Feature | Description | |
|---|---|---|
| WLAN Standard | IEEE 802.11 b/g/n/ax+BLE5.0 Wi-Fi compliant | |
| Frequency Range | 2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band) | |
| Number of Channels | 2.4GHz：Ch1 ~ Ch14 | |
| **Test Items** | **Typical Value** | **EVM** |
| Output Power | 802.11b /11Mbps : 17dBm ± 2 dB | EVM ≤ -9dB |
| | 802.11g /54Mbps : 15dBm ± 2 dB | EVM ≤ -25dB |
| | 802.11n HT40/MCS7 : 14dBm ± 2 dB | EVM ≤ -28dB |
| | 802.11n HT20/MCS7 : 14dBm ± 2 dB | EVM ≤ -28dB |
| | 802.11ax HE20 MCS7 : 14dBm ± 2 dB | EVM ≤ -28dB |
| | 802.11ax HE40 MCS7 : 14dBm ± 2 dB | EVM ≤ -28dB |
| | 802.11ax HE20 MCS9 : 12dBm ± 2 dB | EVM ≤ -32dB |
| | 802.11ax HE40 MCS9 : 12dBm ± 2 dB | EVM ≤ -32dB |
| Spectrum Mask | Meet with IEEE standard | |
| Freq. Tolerance | ±20ppm | |
| **Test Items** | **TYP Test Value** | **Standard Value** |
| Receive Sensitivity (11b,20MHz) @8% PER | - 1Mbps PER @ -92 dBm, typical | ≤-85 |
| | - 11Mbps PER @ -85 dBm, typical | ≤-76 |
| Receive Sensitivity (11g,20MHz) @10% PER | - 6Mbps PER @ -89 dBm, typical | ≤-85 |
| | - 54Mbps PER @ -71 dBm, typical | ≤-68 |
| Receive Sensitivity (11n,20MHz) @10% PER | - MCS=0 PER @ -89 dBm, typical | ≤-85 |
| | - MCS=7 PER @ -69 dBm, typical | ≤-67 |
| Receive Sensitivity (11n,40MHz) @10% PER | - MCS=0 PER @ -87 dBm, typical | ≤-82 |
| | - MCS=7 PER @ -67 dBm, typical | ≤-64 |
| Receive Sensitivity (11ax,20MHz) @10% PER | - MCS=0 PER @ -82 dBm, typical | ≤-78 |
| | - MCS=9 PER @ -65 dBm, typical | ≤-57 |
| Receive Sensitivity (11ax,40MHz) @10% PER | - MCS=0 PER @ -81 dBm, typical | ≤-78 |
| | - MCS=9 PER @ -62 dBm, typical | ≤-54 |
| Maximum Input Level | 802.11b : -10 dBm | |
| | 802.11g/n : -20 dBm | |
| | 802.11ax: -20 dBm | |
| Antenna Reference | Small antennas with 0~2 dBi peak gain | |

## 4.2 Bluetooth Specification

| Feature | Description | | |
|---|---|---|---|
| **General Specification** | | | |
| Bluetooth Standard | BLE 5.0 | | |
| Host Interface | USB | | |
| Antenna Reference | Small antennas with 0~2 dBi peak gain | | |
| Frequency Band | 2400 MHz ~ 2483.5 MHz | | |
| Number of Channels | 39 channels | | |
| **RF Specification** | | | |
| | **Min**(dBm) | **Typical**(dBm) | **Max**(dBm) |
| Output Power (Class 1) | 2 | 5 | 8 |
| Sensitivity @ BER=30.8% | | -90 | -70 |
| Maximum Input Level | GFSK (1Mbps): -20dBm，π/4-DQPSK (2Mbps) :-20dBm | | |

# 5. Pin Definition

## 5.1 Pin Outline



## 5.2 Pin Definition details

| NO. | Name | Type | Description | Voltage |
|---|---|---|---|---|
| 1 | GND | — | Ground connections | |
| 2 | ANT0 | I/O | RF I/O port/version 01 NC | |
| 3 | VDD33 | — | Main power voltage source input 3.3V | 3.3V |
| 4 | USB_DM | I/O | USB2.0 D- for WLAN | |
| 5 | USB_DP | I/O | USB2.0 D+ for WLAN | |
| 6 | GND | — | Ground connections | |

P:POWER I:INPUT O:OUTPUT

# 6. Electrical Specifications

## 6.1 Power Supply DC Characteristics

| | MIN | TYP | MAX | Unit |
|---|---|---|---|---|
| Operating Temperature | 0 | 25 | 70 | deg.C |
| VCC33 | 2.1 | 3.3 | 3.46 | V |

## 6.2 Power Consumption

| | |
|---|---|
| Power Consumption (Typical by using SWR) | Wi-Fi only: **TBD** |

## 6.3 Power-on sequence

Figure 3 shows the power-on sequence of from power-up to firmware download, including the initial device power-on reset evoked by internal LDO_EN signal. After initial power-on, the LDO_EN signal can be held low to turn off or pulsed low to induce a subsequent reset.

After LDO_EN is asserted, the host starts the power-on sequence. From that point, the typical power-on sequence is shown below:

1. Within T1+2.5ms, the internal power-on reset (POR) will be done. And host could download firmware code of DPLL setting if the crystal is not default setting, 26MHz. The internal running clock is crystal frequency.
2. After 100us of DPLL settling time, host could set internal clock to full speed and finish all the downloading of firmware code.

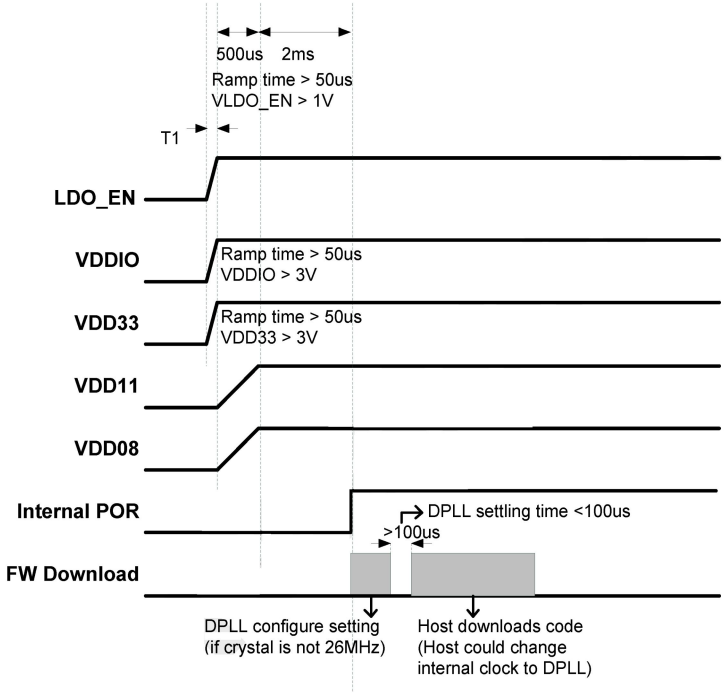



Figure 3: Power-on sequence with typical power

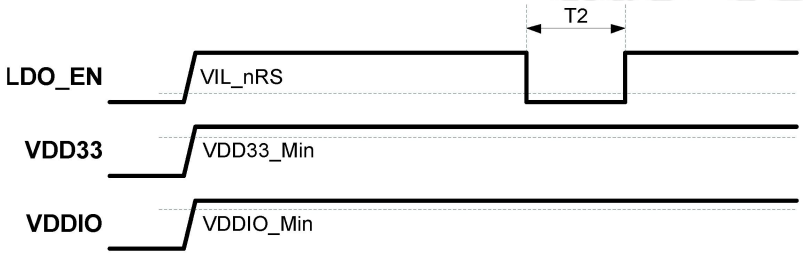



Figure 4: Reset Timing with typical power

Table 1: Reset Timing Parameters

| Parameters | Description | Min. | Unit |
|---|---|---|---|
| $T_2$ | Duration of LDO_EN signal level < VIL_Nrst(refer to its value in Table 11: Recommended Operating Conditions and DC Characteristics) to reset the chip | 500 | us |

## 6.4 Interface Circuit time series

### 6.4.1 USB CHARACTERISTICS

Table 3 : USB High-Speed Source Electrical Characteristics

| Symbol | Description | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **Driver characteristics** | | | | | | |
| tHSRLEW | Slew rate of rising edge | - | - | - | 1600 | V/usec |
| tHSRLEW | Slew rate of falling edge | - | - | - | 1600 | V/usec |
| Driver waveform | - | Specified by eye pattern template in USB2.0 spec | - | - | - | - |
| **Clock Timings** | | | | | | |
| THSRDRATE | High-speed data rate | - | 479.76 | - | 480.24 | Mbps |
| **High-Speed Data Timings** | | | | | | |
| TJ | Data source jitter | Source and receiver jitter specified by the eye pattern template defined in USB2.0 spec | | | | |
| RXJT | Receiver jitter tolerance | | | | | |

Table 4: USB Full-Speed Source Electrical Characteristics

| Symbol | Description | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Driver characteristics** | | | | | | |
| tFR | Rise time | CL = 50 pF<br>10% ~ 90% of \|VOH – VOL\| | 4 | - | 20 | ns |
| tHSFLEW | Fall time | CL = 50 pF<br>90% ~ 10% of \|VOH – VOL\| | 4 | - | 20 | ns |
| tFRMA | Differential rise/fall time matching (tFR/tFF) | Specified by eye pattern template in USB2.0 spec | 90 | - | 110 | % |
| **Clock Timings** | | | | | | |
| TFSTXDRATE | Full-speed TX data rate | | 11.994 | - | 12.006 | Mbps |
| TFSRXDRATE | Full-speed RX data rate | | 11.97 | - | 12.03 | Mbps |
| **High-Speed Data Timings** | | | | | | |
| TFDEOP | Source jitter for differential transition to SE0 transition | - | -2 | | 5 | ns |
| TJR1 | Receiver jitter | To next transition | -18.5 | | 18.5 | ns |
| TJR2 | Receiver jitter | For paired transition | -9 | | 9 | ns |
| TFEOPT | Source SE0 interval of EOP | - | 160 | | 175 | ns |
| TFEOPR | Receiver SE0 interval of EOP | - | 82 | | - | ns |
| TFST | Width of SE0 interval during differential transition | - | - | - | 14 | ns |

Table 5 : USB Low-Speed Source Electrical Characteristics

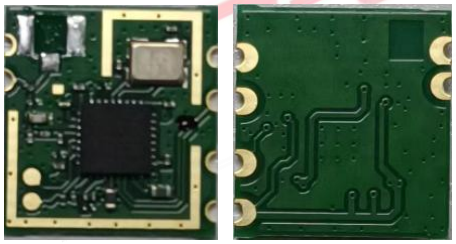
| Symbol | Description | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Driver characteristics** | | | | | | |
| tFR | Rise time | CL = 200 pF~ 600 pF 10% ~ 90% of \|VOH–VOL\| | 75 | - | 300 | ns |
| tHSFLEW | Fall time | CL = 200pF ~ 600pF 90% ~ 10% of \|VOH–VOL\| | 75 | - | 300 | ns |
| tFRMA | Differential rise/fall time matching (tFR/tFF) | Specified by eye pattern template in USB2.0 spec. | 80 | - | 125 | % |
| **Clock Timings** | | | | | | |
| TFSTXDRATE | Low-speed TX data rate | | 1.49925 | - | 1.50075 | Mbps |
| TFSRXDRATE | Low-speed RX data rate | | 1.49925 | - | 1.50075 | Mbps |
| **Low-Speed Data Timings** | | | | | | |
| TFDEOP | Source jitter for differential transition to SE0 transition | - | -40 | - | 100 | ns |
| TJR1 | Receiver jitter | To next transition | -75 | - | 75 | ns |
| TJR2 | Receiver jitter | For paired transition | -45 | - | 45 | ns |
| TFEOPT | Source SE0 interval of EOP | - | 1.25 | - | 1.5 | ns |
| TFEOPR | Receiver SE0 interval of EOP | - | 670 | - | - | ns |
| TFST | Width of SE0 interval during differential transition | - | - | - | 210 | ns |

# 7. Size reference

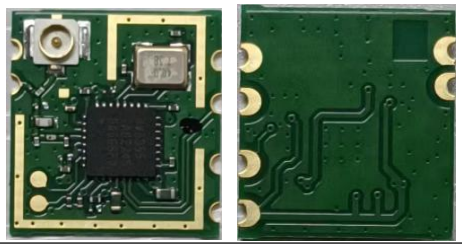
## 7.1 Module Picture

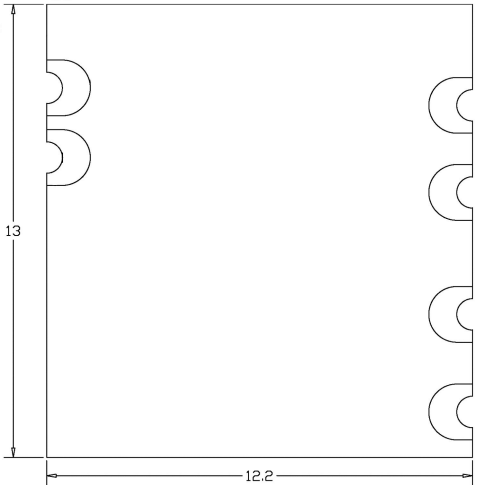
**L x W : 12.2 x 13 (+0.3/-0.1) mm**

FGH2355EUX-00

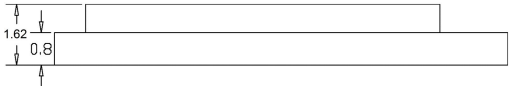


FGH2355EUX-01





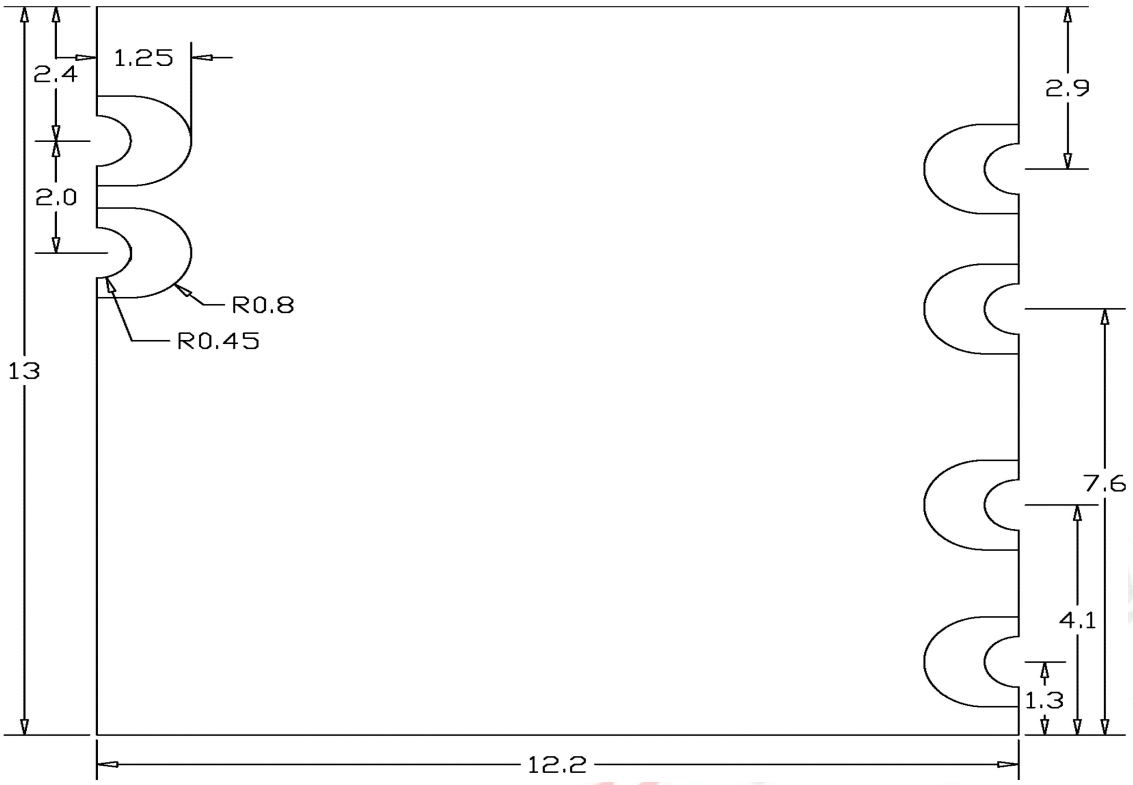

H: 1.62 (±0.2) mm



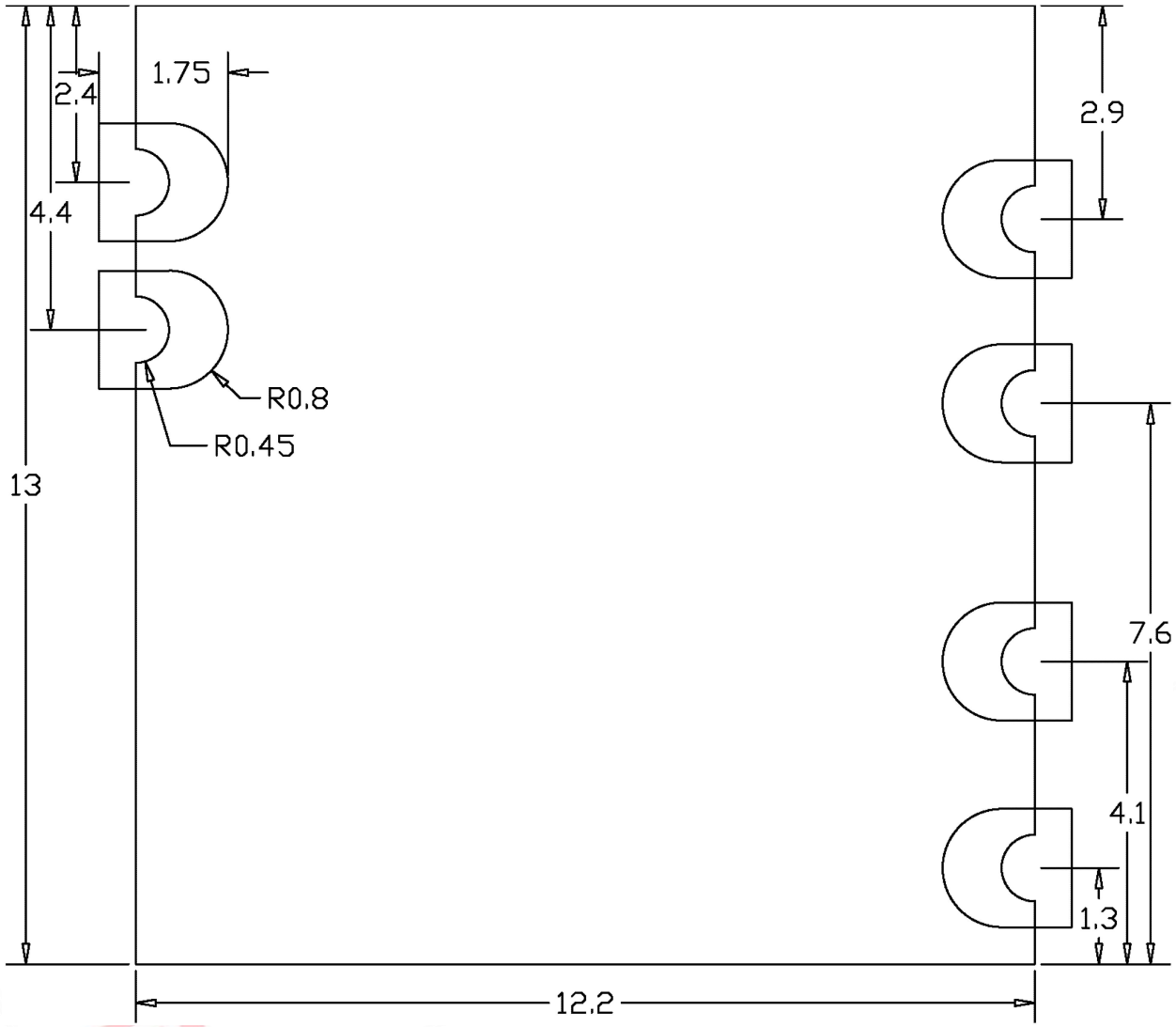

| **Weight** | 0.42g |
|---|---|

## 7.2 Physical Dimensions

<TOP View>



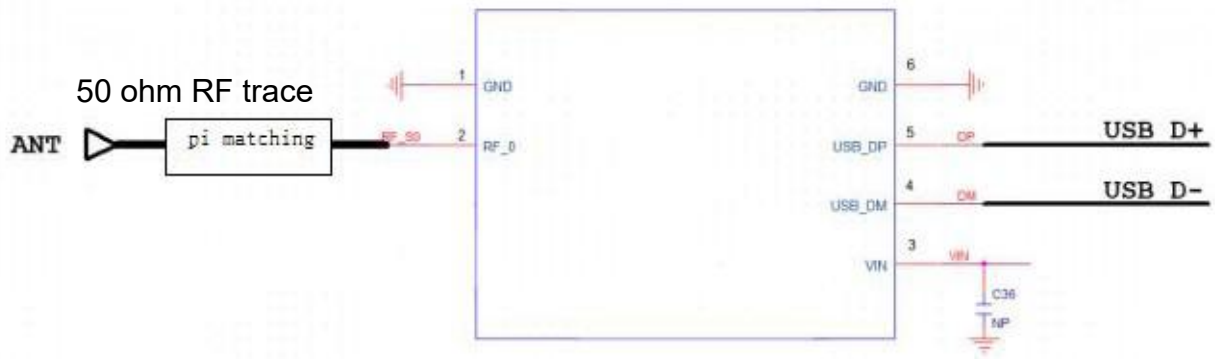
### 7.3 Layout Recommendation



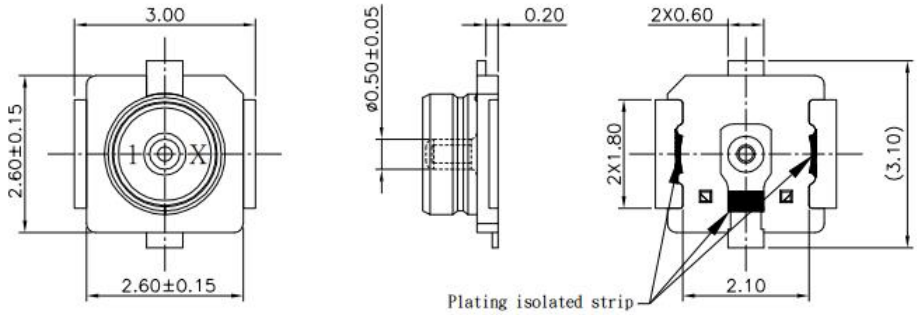

## 8. The Key Material List

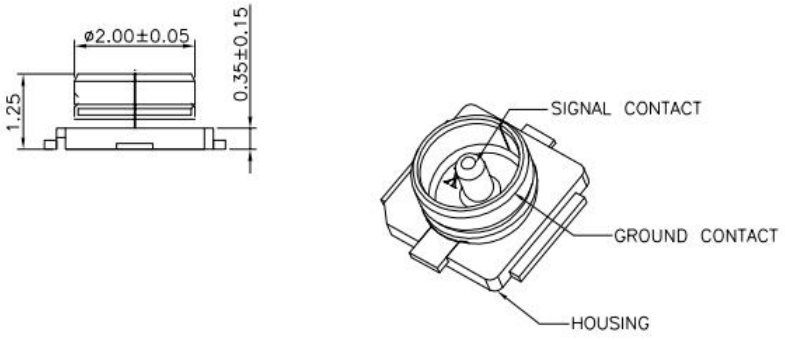
| Item | Part Name | Description | Manufacturer |
|---|---|---|---|
| 1 | PCB | H2355E-U 绿色,4L,FR4,,13x12.2x0.8mm | XY-PCB, GDKX, Sunlord, SLPCB，TRULY |
| 2 | Crystal | 3225 40MHz,9pF,±10ppm | ECEC, Hosonic, TKD, JWT |
| 3 | Chipset | SV6355,iComm,QFN32L | 南方硅谷 |

# 9. Reference Design




天线座版规格



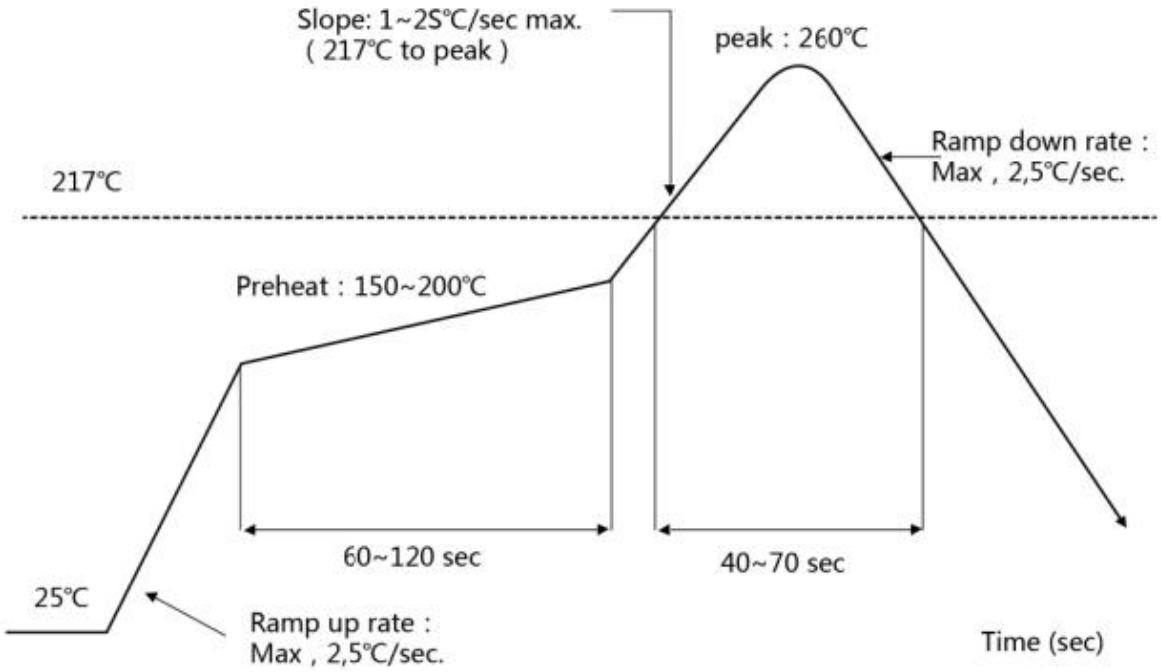



# 10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

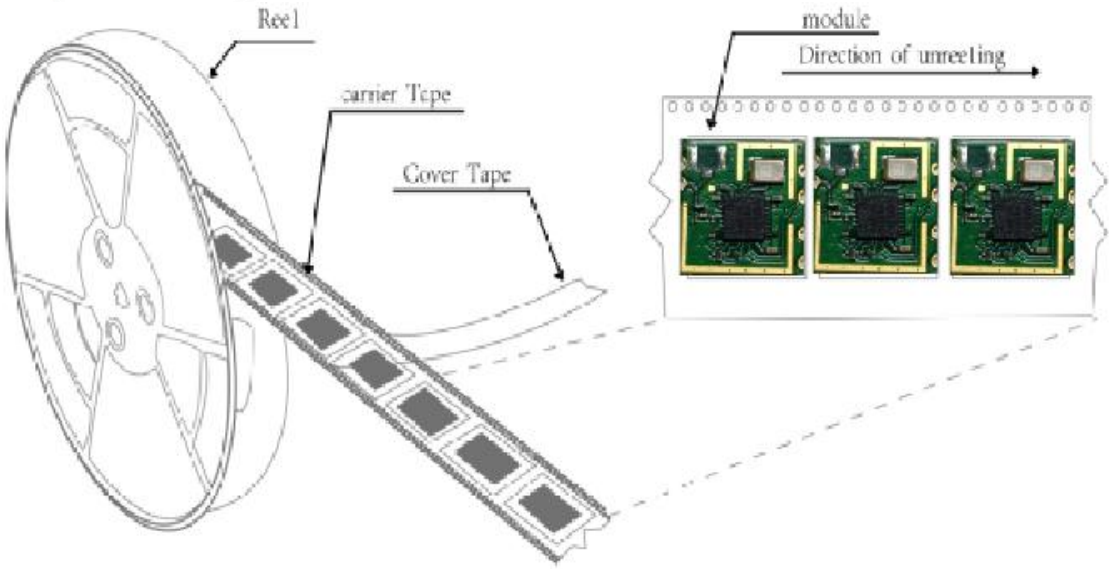
Number of Times : ≤2 times




# 11. Package

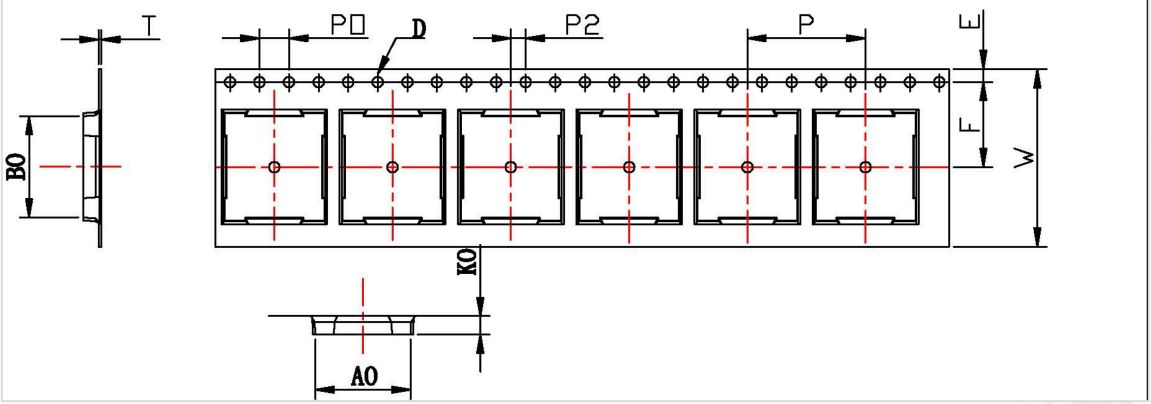
## 11.1 Reel

A roll of 1500pcs



## 11.2 Carrier Tape Detail

| ITEM | W | A0 | B0 | D | F | E | K0 | P0 | P2 | P | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DIM | 24 | 12.50 | 13.35 | 1.50 | 11.5 | 1.75 | 2.5 | 4.0 | 2.0 | 16.0 | 0.30 |
| TOLE | +0.3 -0.3 | ±0.15 | ±0.15 | +0.1 -0.0 | +0.1 -0.1 | ±0.1 | ±0.10 | ±0.1 | ±0.1 | ±0.1 | ±0.05 |




## 11.3 Packaging Detail

the take-up package

Using self-adhesive tape

Size of black tape: 24mm*24.4m the cover tape :21.3mm*32.6m

Color of plastic disc: blue

NY bag size:450mm*415mm

size ： 350*350*35mm


The packing case size:360*210*370mmg

## 12. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)

b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5

c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition

d) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected

e) Baking is required if conditions b) or c) are not respected

f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more