

# 3.2 x 1.6 x 1.3 (mm) WiFi / Bluetooth Chip Antenna (CW324S)

## Engineering Specification

### 1. Product Number

H 2 U 3 8 D 1 E 1 B 0 1 0 0



### 2. Features

- \*Stable and reliable in performances
- \*Low profile, compact size
- \*RoHS 2.0 compliance
- \*SMT processes compatible
- \*AEC-Q200 compliant

### 3. Applications

- \*ISM 2.4 GHz applications
- \*ZigBee/BLE applications
- \*Bluetooth earphone systems
- \*Hand-held devices when WiFi / Bluetooth functions are needed, e.g., Smartphones
- \*IEEE802.11 b/g/n
- \*Wireless PCMCIA cards or USB dongles

### 4. Description

Unictron's CW324S chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500 MHz. Fabricated with proprietary design and processes, CW324S shows excellent performance and is fully compatible with SMT processes, which can decrease the assembly cost and improve the device's quality and consistency.

2020-07-14

Document  
Control Center



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna  
(CW324S) Engineering Specification

DOCUMENT  
NO.

H2U38D1E1B0100

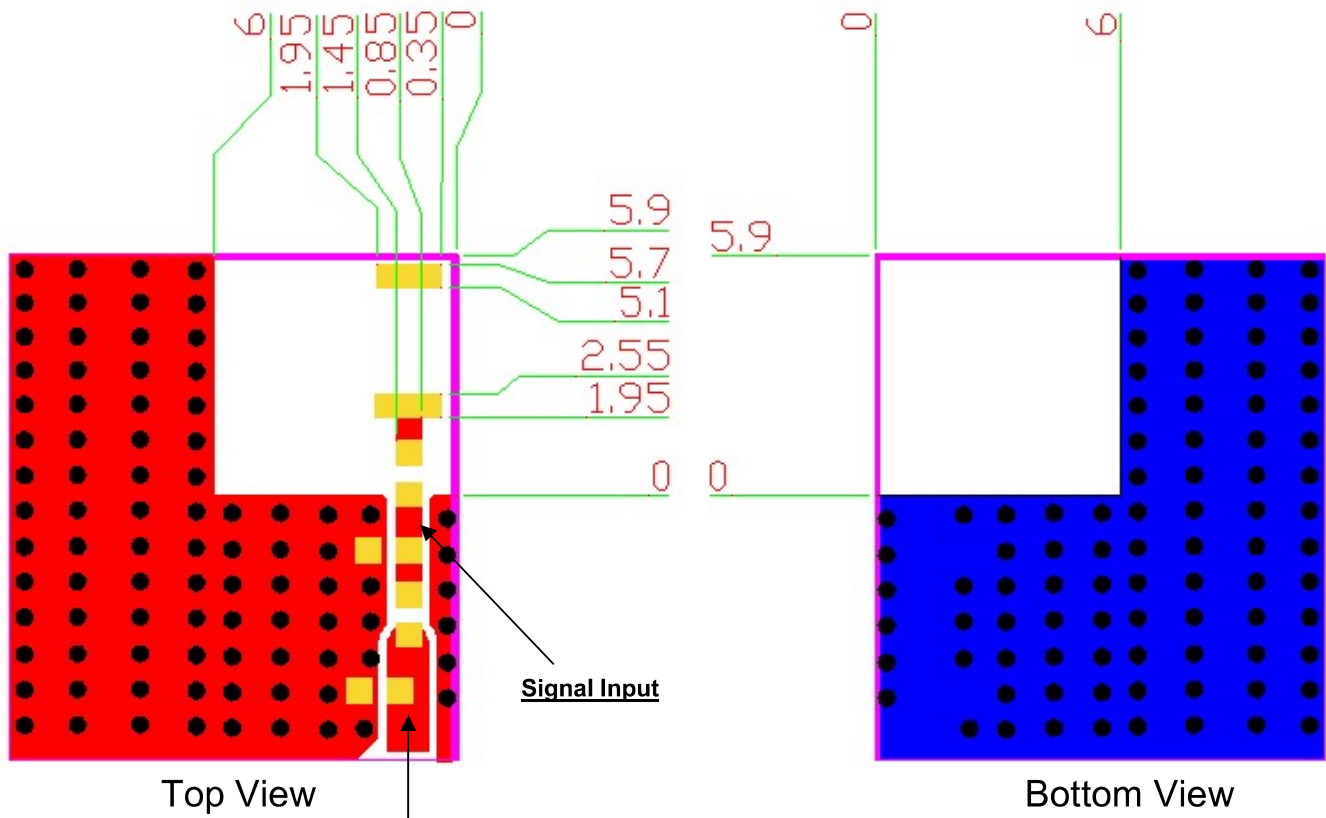
REV.  
C

## 5. Layout Guide & Electrical Specifications

## 5-1. Layout Guide (unit : mm)

Solder Land Pattern:

The solder land pattern (gold marking areas) is shown below. Recommendation on matching circuit will be provided according to the customer's installation conditions.



### Transmission Line with 50Ω Impedance Characteristic



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: [www.unictron.com](http://www.unictron.com)

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : **Ken**

Checked by : **Mike**

Approved by : **Herbert**

**TITLE: 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna  
(CW324S) Engineering Specification**

DOCUMENT  
NO.

**H2U38D1E1B0100**

REV.  
C

## 5-2. Electrical Specifications (Evaluation Board Dimensions: 40 x 40 mm<sup>2</sup>)

### 5-2-1. Electrical Table

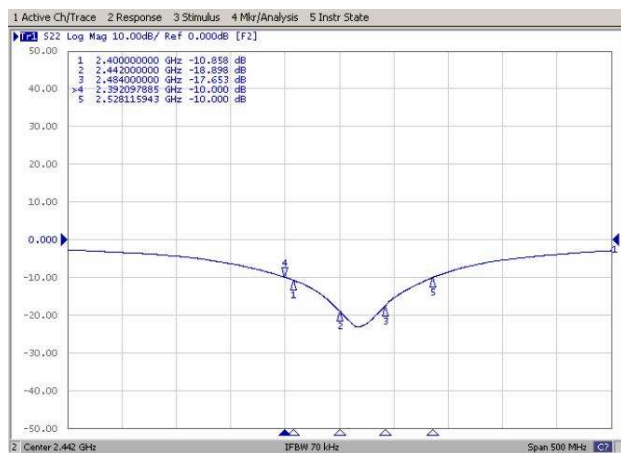
Characteristics		Specifications	Unit
Outline Dimensions		3.2 x 1.6 x 1.3	mm
Working Frequency		2400 ~ 2500	MHz
VSWR(@ center frequency)*		2 Max.	
Characteristic Impedance		50	$\Omega$
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	1.5 (typical**)	dBi
Efficiency		56.3 (typical**)	%

\*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.

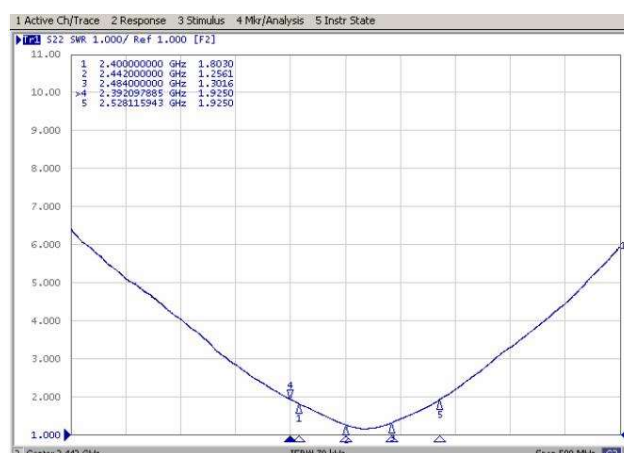
\*\*A typical value is for reference only, not guaranteed.

### 5-2-2. Return Loss & VSWR

Return Loss (S<sub>11</sub>)



VSWR (S<sub>11</sub>)



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification**

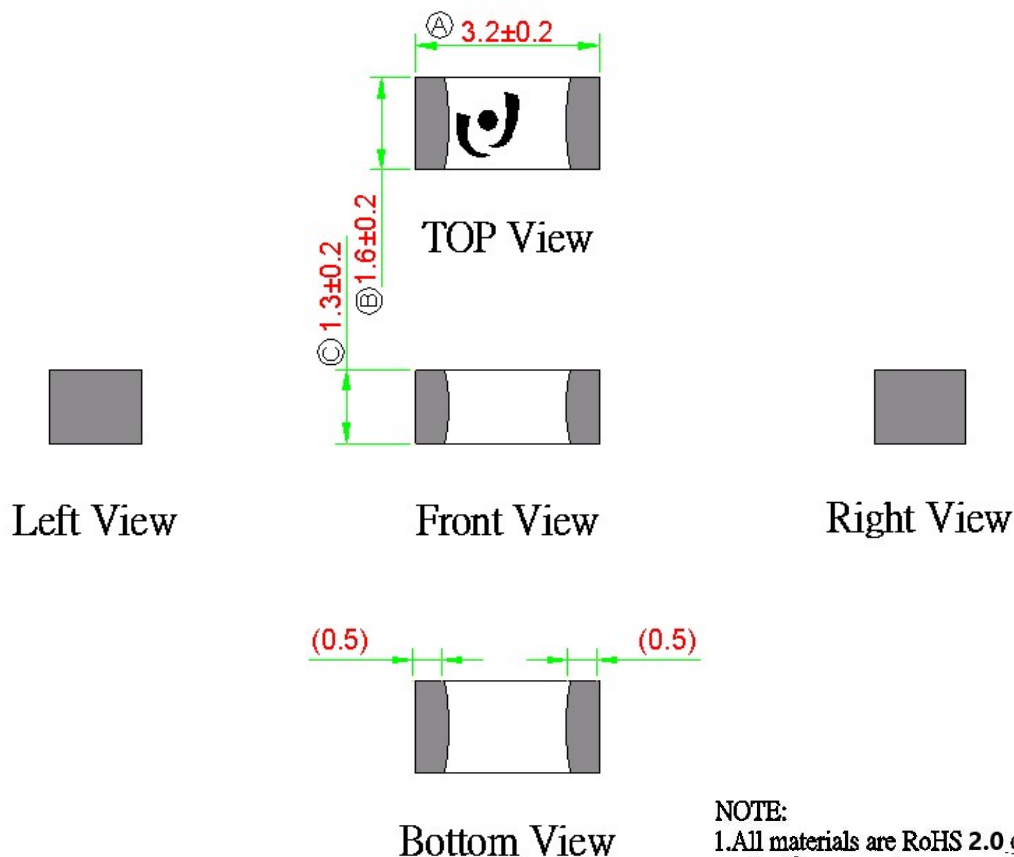
**DOCUMENT NO.**

**H2U38D1E1B0100**

**REV. C**

## 6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

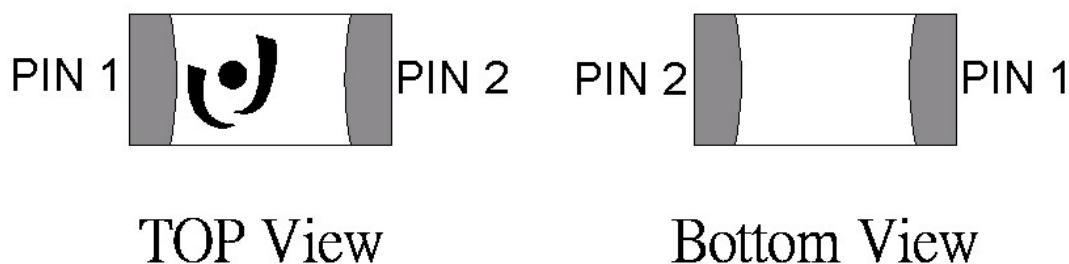
### 6-1. Antenna Dimensions



#### NOTE:

1. All materials are RoHS 2.0 compliant.
2. "A~C" Critical Dimensions.
3. "( )" Reference Dimensions.

### PIN Definitions



PIN	1	2
Soldering PAD	Signal	N/C



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

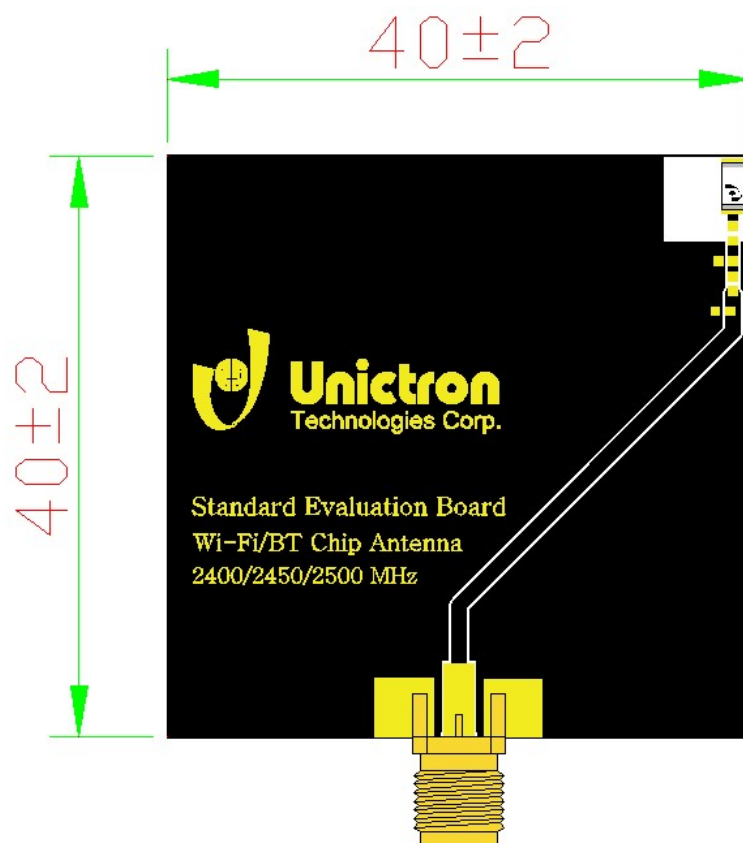
TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification

DOCUMENT NO.

H2U38D1E1B0100

REV.  
C

## 6-2. Evaluation Board with Antenna



Unit: mm



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification**

**DOCUMENT NO.**

**H2U38D1E1B0100**

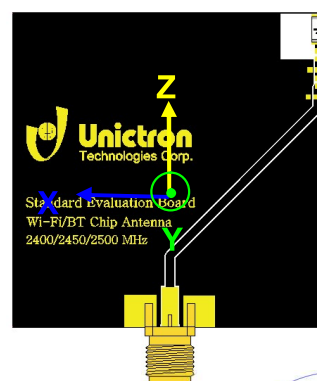
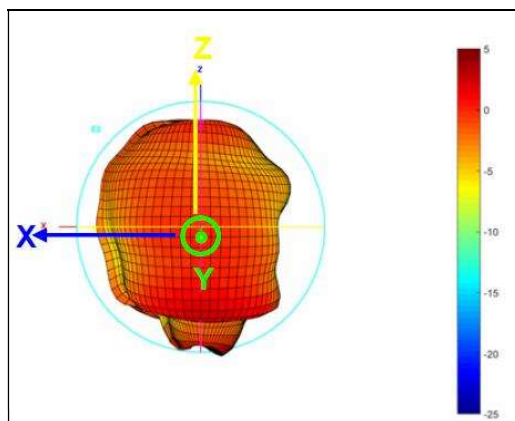
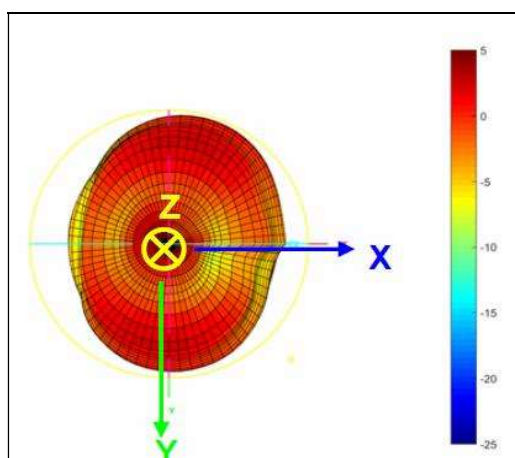
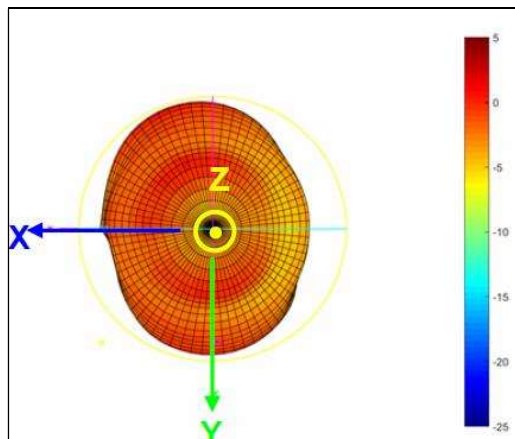
**REV.**

**C**



## 7. Radiation Pattern (with 40 x 40 mm<sup>2</sup> Evaluation Board)

### 7-1. 3D Gain Radiation Pattern @ 2442 MHz (unit: dBi)



Unictron  
Technologies Corp.  
2020-07-14  
Document  
Control Center



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE :** 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification

**DOCUMENT NO.**

**H2U38D1E1B0100**

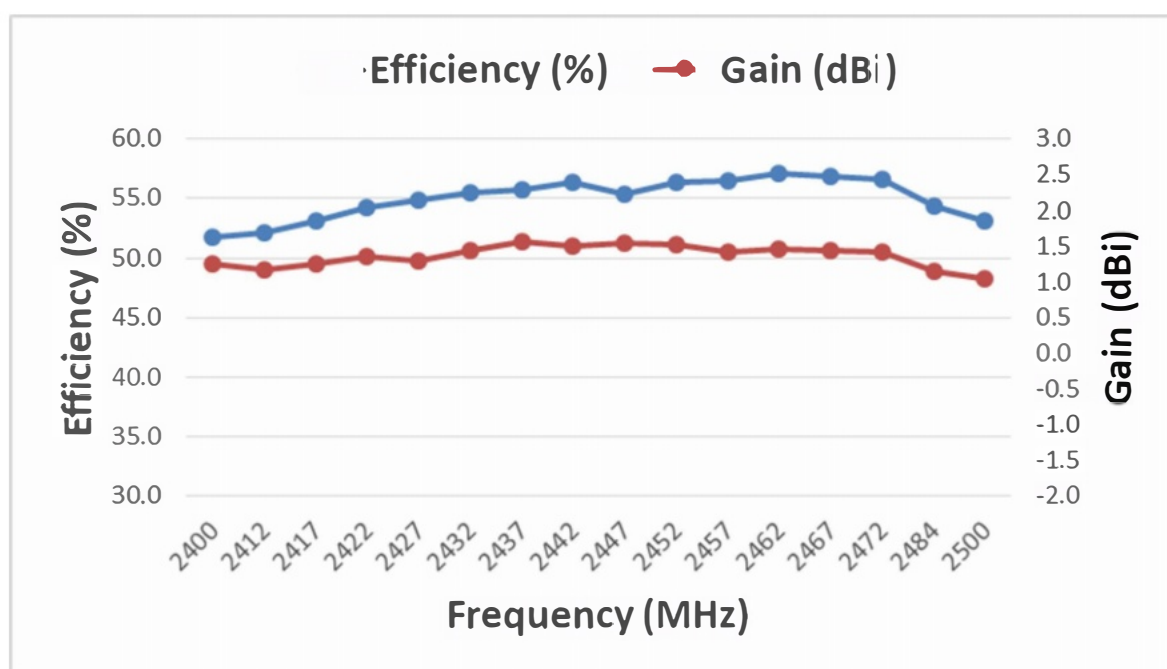
REV.

**C**

## 7-2. 3D Efficiency Table

Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-2.9	-2.8	-2.7	-2.7	-2.6	-2.6	-2.5	-2.5	-2.6	-2.5	-2.5	-2.4	-2.5	-2.5	-2.6	-2.7
Efficiency(%)	51.8	52.1	53.1	54.3	54.9	55.5	55.7	56.3	55.4	56.4	56.5	57.1	56.8	56.6	54.4	53.1
Peak Gain(dBi)	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.4	1.5	1.4	1.4	1.2	1.1

## 7-3. 3D Efficiency vs. Frequency



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification

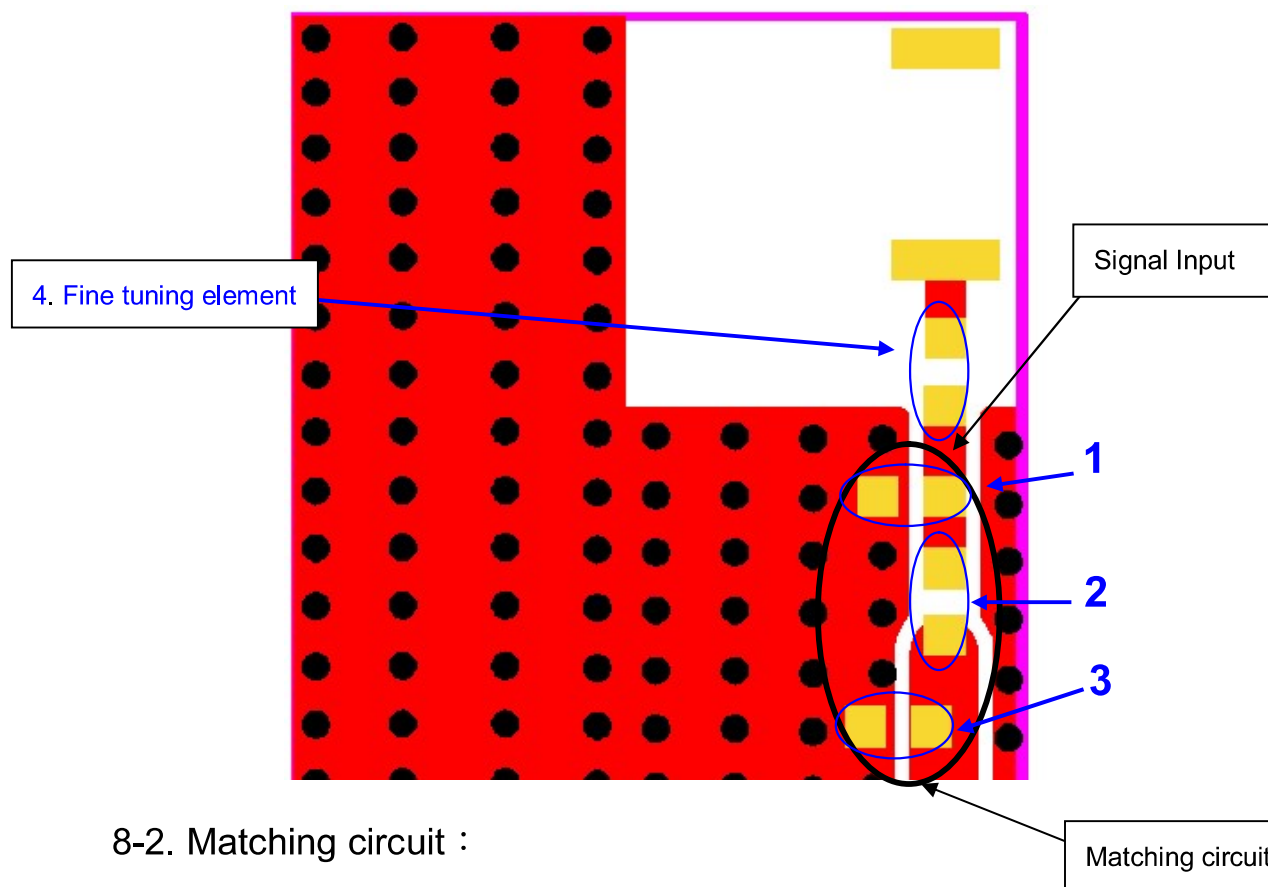
DOCUMENT NO.

H2U38D1E1B0100

REV.  
C

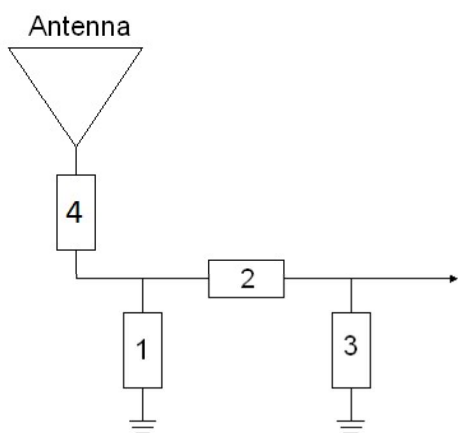
## 8. Frequency tuning and Matching circuit

### 8-1. Chip antenna tuning scenario :



### 8-2. Matching circuit :

With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz at our standard 40 x 40 mm<sup>2</sup> evaluation board. However, these are typical reference values that may need to be changed when circuit boards or part vendors are different.



System Matching Circuit Component			
Location	Description	Vendor	Tolerance
1	N/A	-	-
2	1.6nH, (0402)	MURATA	±0.1nH
3	0.7pF, (0402)	MURATA	±0.05pF
4	Fine-tuning element	MURATA	±2%

2020-07-14



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

TITLE : 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna  
(CW324S) Engineering Specification

DOCUMENT  
NO.

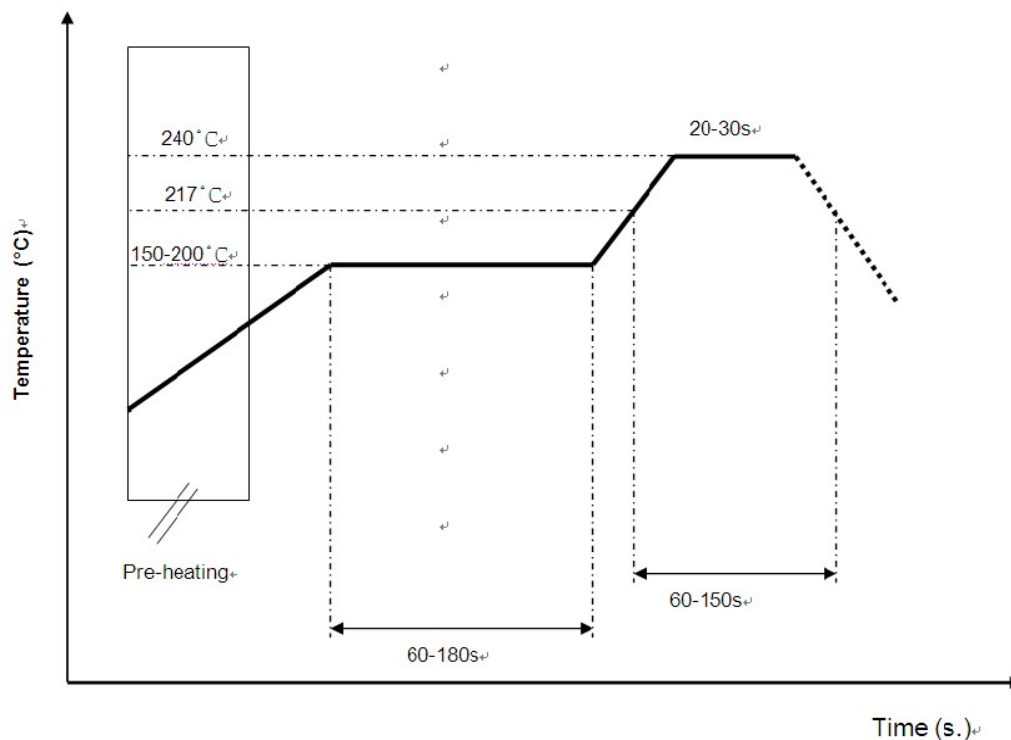
H2U38D1E1B0100

REV.  
C



## 9. Soldering Conditions

### Typical Soldering Profile for Lead-free Process



\*Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead Free solder paste.



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE :** 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification

**DOCUMENT NO.**

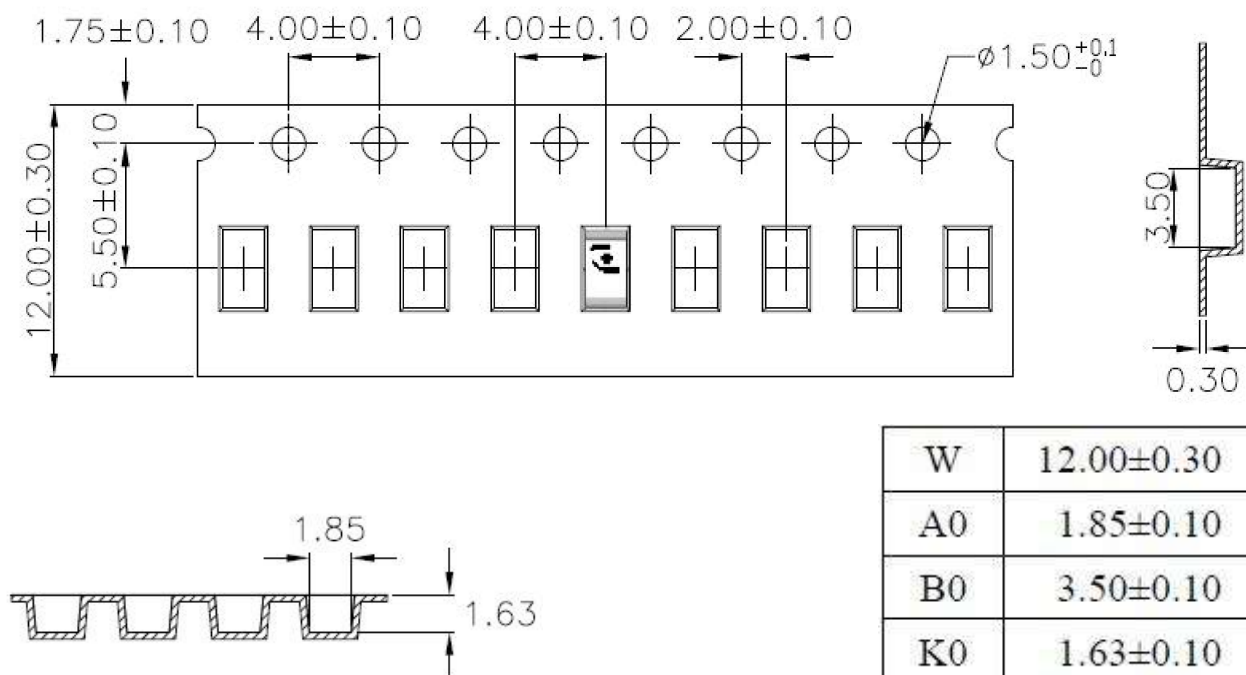
**H2U38D1E1B0100**

**REV.**  
**C**

## 10. Packing

- (1) Quantity/Reel: 2000pcs/Reel
- (2) Plastic tape: Black Conductive Polystyrene.

### a. Tape Drawing & Tape Dimensions (unit: mm)



## 11. Operating & Storage Conditions

### 11-1. Operating

- (1) Maximum Input Power: 2 W
- (2) Operating Temperature: -40°C to 85°C
- (3) Relative Humidity: 10% to 70%

### 11-2. Storage (sealed)

- (1) Storage Temperature: -5°C to 40°C
- (2) Relative Humidity: 20% to 70%
- (3) Shelf Life: 1 year

### 11-3. Storage (unsealed)

Meet the criteria of J-STD-033 MSL2a



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE :** 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna (CW324S) Engineering Specification

**DOCUMENT NO.**

**H2U38D1E1B0100**

**REV.**  
**C**

#### 11-4. Storage (After mounted on customer's PCB with SMT process)

(1) Storage Temperature: -40°C to 85°C

(2) Relative Humidity: 10% to 70%

## 12. Notice

(1) Installation Guide:

Please refer to Unictron's application note "General guidelines for the installation of Unictron's chip antennas" for further information.

(2) All specifications are subject to change without notice.

Address: Room 609, Building B, Minqi Science and Technology Park, Taoyuan Street, Xili Town, Nanshan District, Shenzhen City, Guangdong Province



詠業科技股份有限公司  
Unictron Technologies Corporation  
Website: www.unictron.com

THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF UNICTRON TECHNOLOGIES CORPORATION AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION

Prepared by : Jane

Designed by : Ken

Checked by : Mike

Approved by : Herbert

**TITLE :** 3.2 x 1.6 x 1.3 WiFi / Bluetooth Chip Antenna  
(CW324S) Engineering Specification

**DOCUMENT  
NO.**

**H2U38D1E1B0100**

**REV.  
C**