

# 5.0 x 2.2 x 1.6 (mm) WiFi / Bluetooth Chip Antenna (AA029)

## Engineering Specification

### 1. Product Number

H 2 U 2 6 2 G K B A 0 1 0 0



### 2. Features

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

### 3. Applications

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

### 4. Description

Unictron's AA029 chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500MHz. Fabricated with proprietary design and processes, AA029 shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device's quality and consistency.



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Designed by : **Peter**

Checked by : **Mike**

Approved by : **Herbert**

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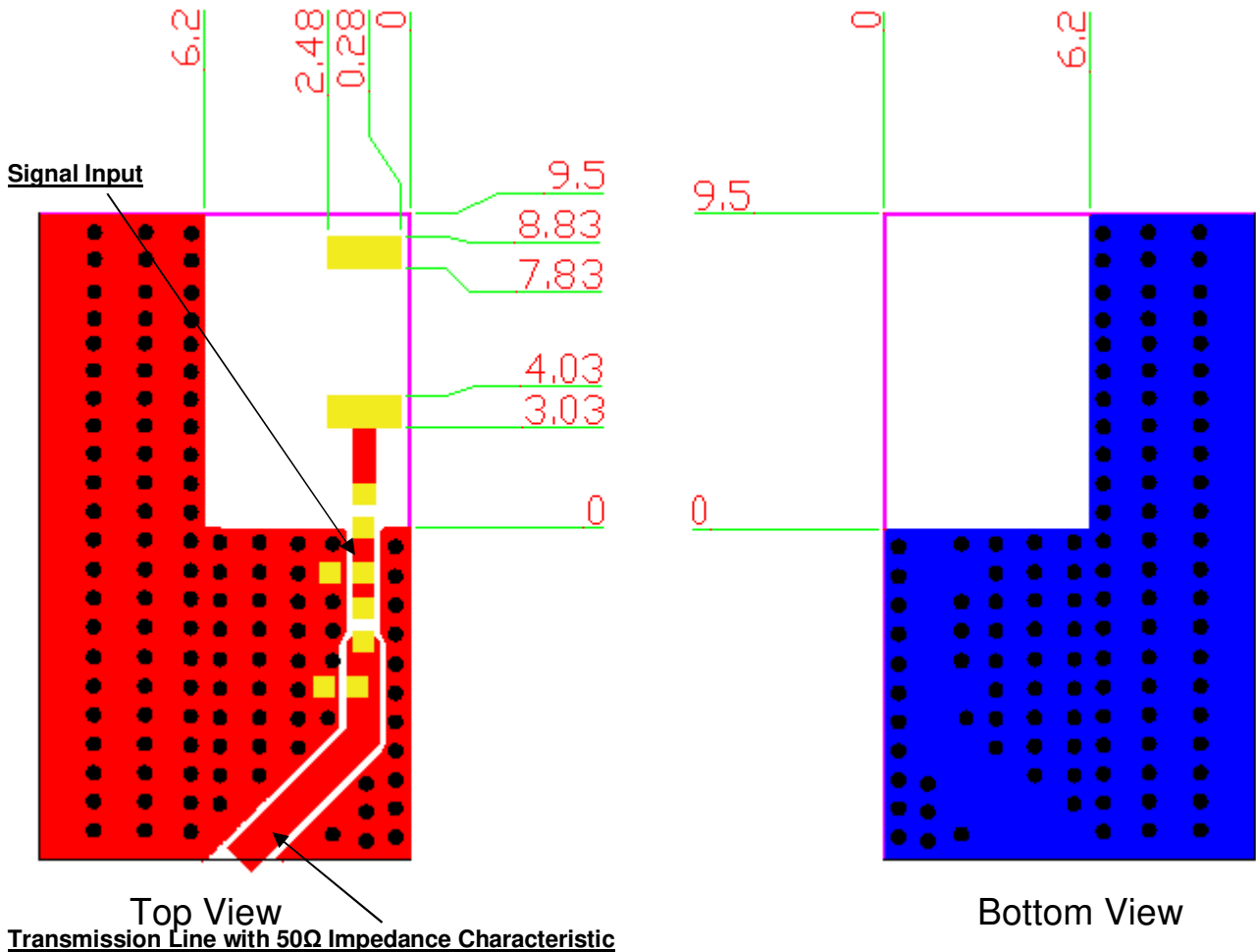
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## 5. Layout Guide & Electrical Specifications

### 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 customer's installation conditions.



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

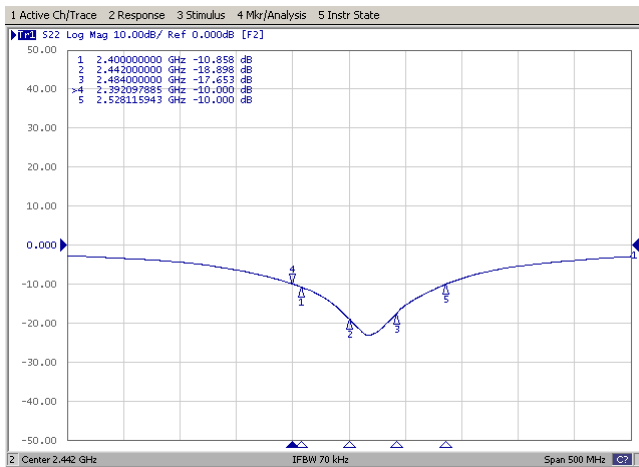
### 5-2-1. Electrical Table

| Characteristics           |             | Specifications      | Unit     |
|---------------------------|-------------|---------------------|----------|
| Outline Dimensions        |             | 5.0 x 2.2 x 1.6     | mm       |
| Working Frequency         |             | 2400 ~ 2500         | MHz      |
| VSWR(@ center frequency)* |             | 2 Max.              |          |
| Characteristic Impedance  |             | 50                  | $\Omega$ |
| Polarization              |             | Linear Polarization |          |
| Peak Gain                 | (@2442 MHz) | 2.2 (typical)       | dBi      |
| Efficiency                |             | 66 (typical)        | %        |

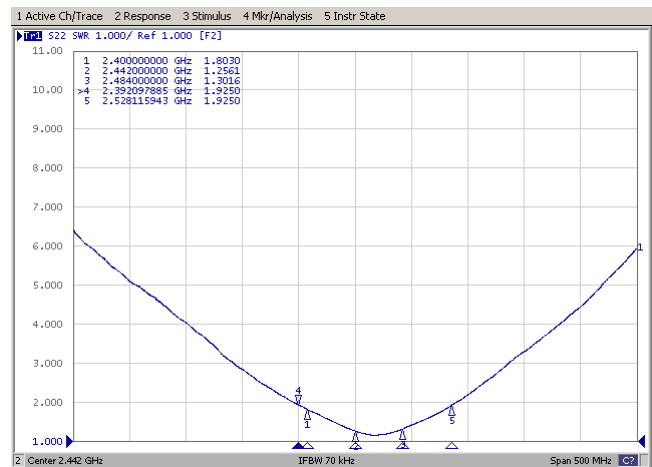
\*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.

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

Return Loss ( $S_{11}$ )



VSWR ( $S_{11}$ )



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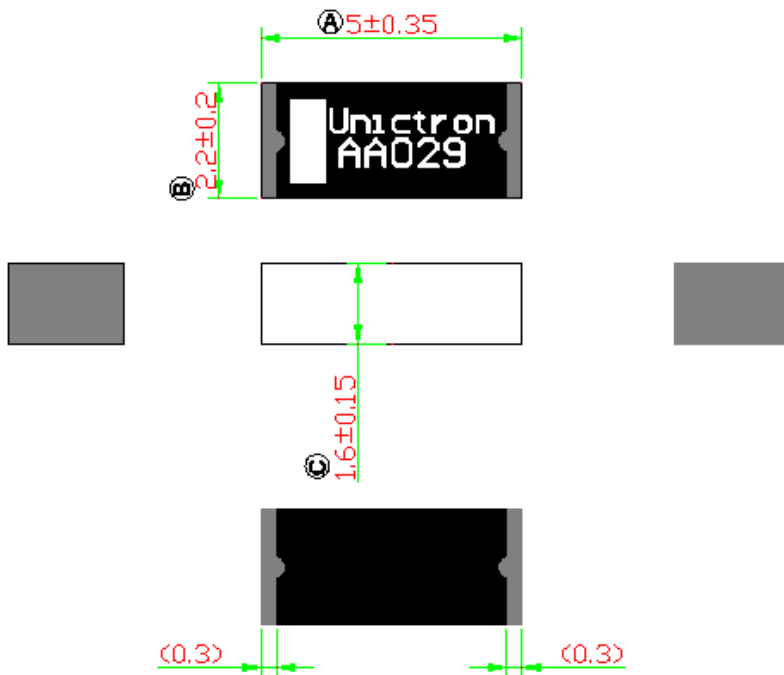
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## 6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

### 6-1. Antenna Dimensions



**NOTE:**

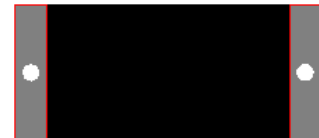
1. All materials are RoHS compliant.
2. "A"~"C" Critical Dimensions.
3. "( )" Reference Dimensions.

### PIN Definitions

**PIN1**



**PIN2**



**Top View**

**Bottom View**

| PIN           | 1      | 2   |
|---------------|--------|-----|
| Soldering PAD | Signal | N/C |



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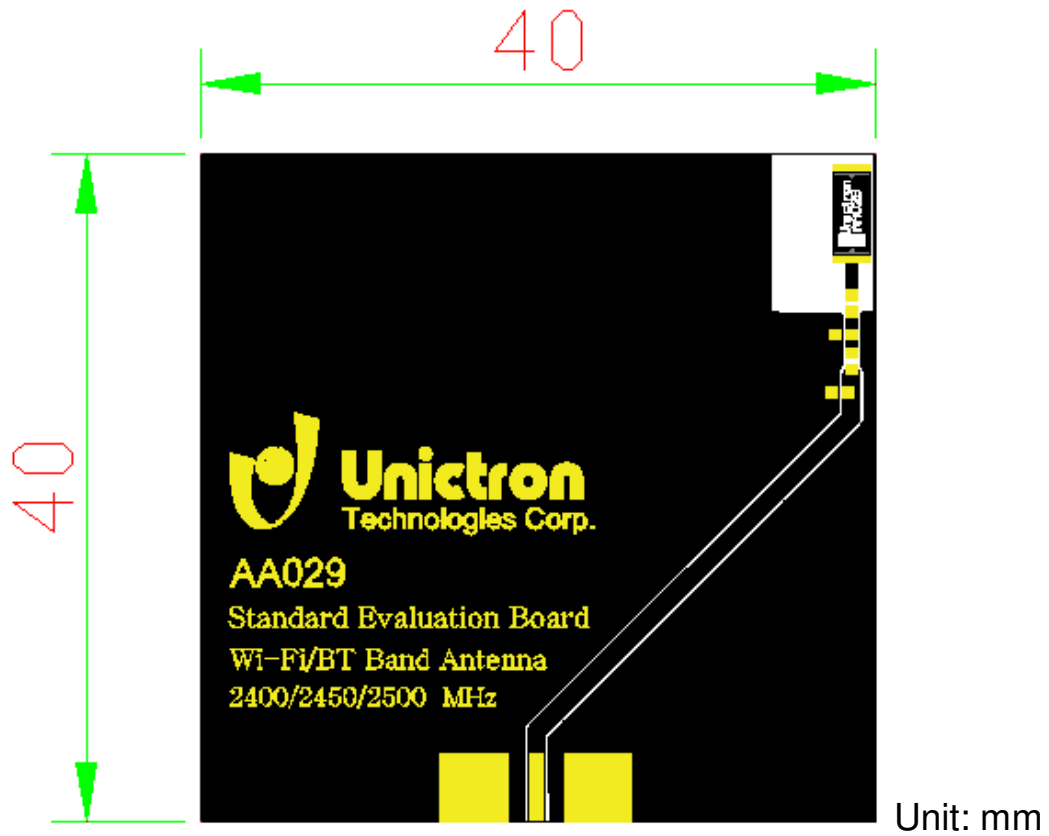
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6-2. Evaluation Board with Antenna



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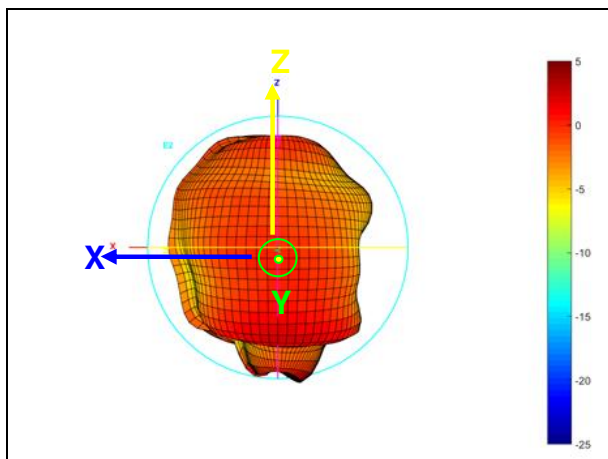
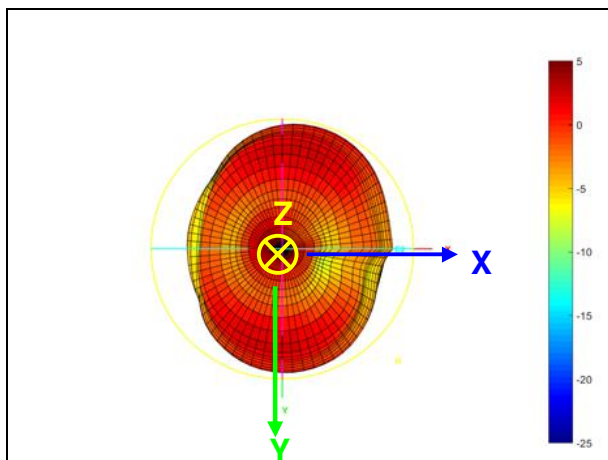
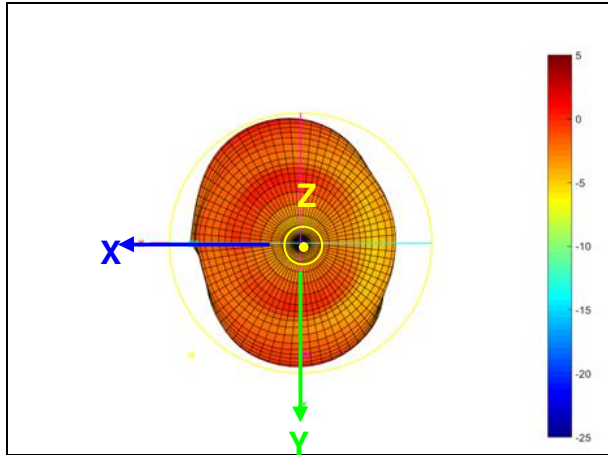
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## 7. Radiation Pattern (with 40 x 40 mm<sup>2</sup> Evaluation Board)

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



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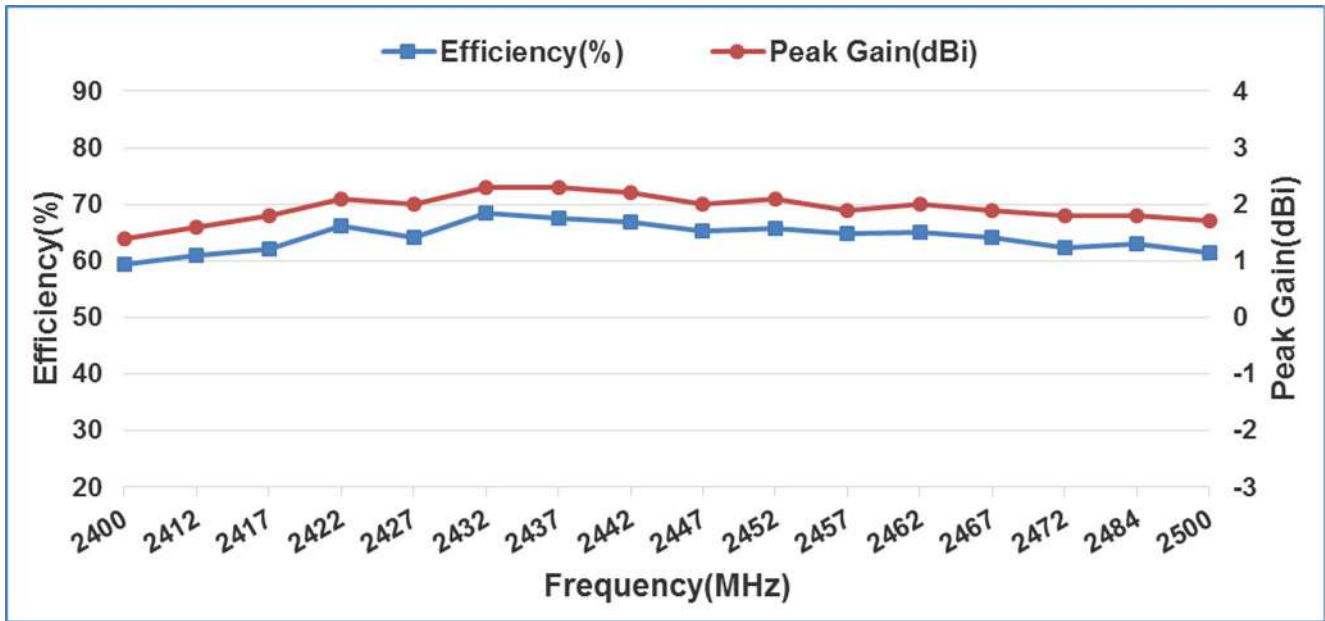
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### 7-2. 3D Efficiency Table

| Frequency(MHz) | 2400 | 2412 | 2417 | 2422 | 2427 | 2432 | 2437 | 2442 | 2447 | 2452 | 2457 | 2462 | 2467 | 2472 | 2484 | 2500 |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Efficiency(dB) | -2.3 | -2.2 | -2.1 | -1.8 | -1.9 | -1.6 | -1.7 | -1.8 | -1.9 | -1.8 | -1.9 | -1.9 | -1.9 | -2.0 | -2.0 | -2.1 |
| Efficiency(%)  | 59.3 | 60.9 | 62.2 | 66.1 | 64.2 | 68.4 | 67.5 | 66.8 | 65.2 | 65.8 | 64.8 | 65.1 | 64.0 | 62.4 | 63.0 | 61.5 |
| Peak Gain(dBi) | 1.4  | 1.6  | 1.8  | 2.1  | 2.0  | 2.3  | 2.3  | 2.2  | 2.0  | 2.1  | 1.9  | 2.0  | 1.9  | 1.8  | 1.8  | 1.7  |

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



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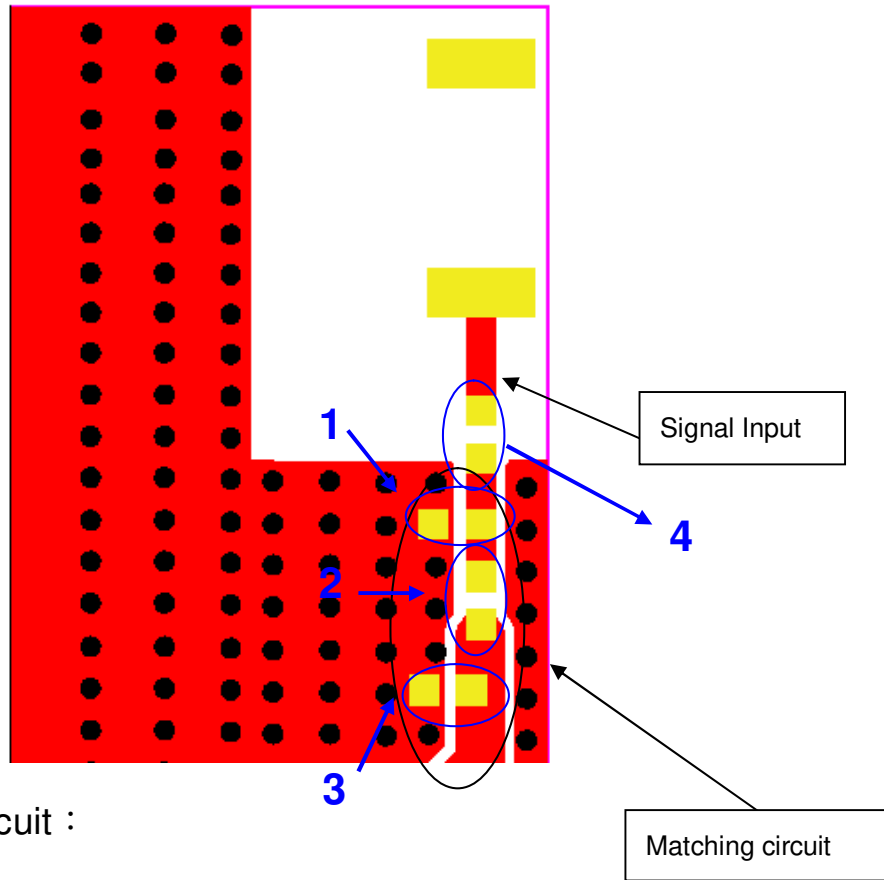
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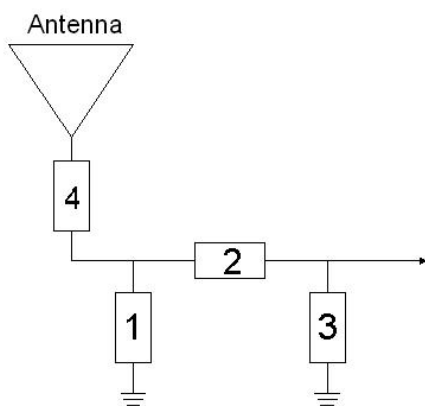
## 8. Frequency tuning and Matching circuit

### 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 which 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                                 | 2.7nH, (0402) | DARFON | ±0.1nH    |
| 3                                 | 1pF, (0402)   | DARFON | ±0.1pF    |
| 4                                 | 0Ω, (0402)    | -      | -         |

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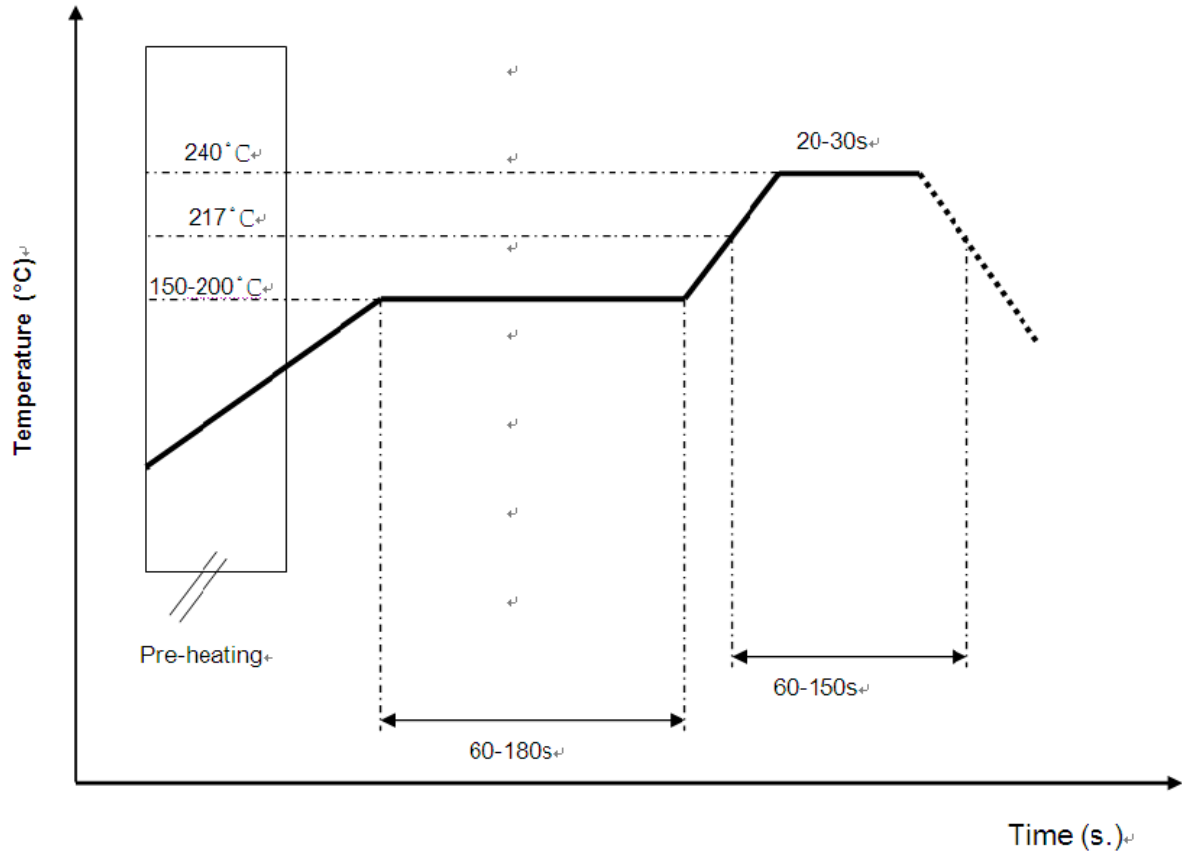
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## 9. Soldering Conditions

### 9-1. Typical Soldering Profile for Lead-free Process



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



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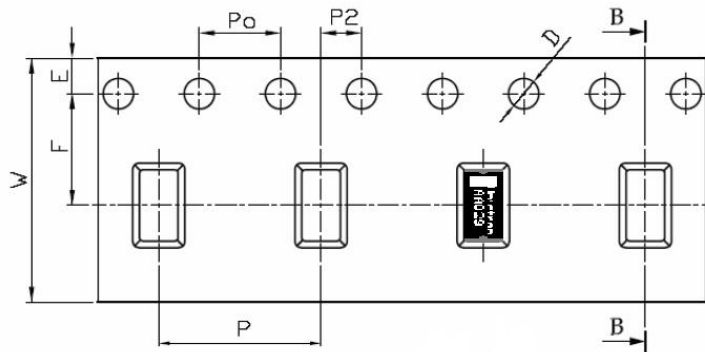
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## 10. Packing

(1) Quantity/Reel: 3000pcs/Reel

(2) Plastic tape:

a. Tape Drawing



b. Tape Dimensions (unit: mm)

| Feature | Specifications | Tolerances     |
|---------|----------------|----------------|
| W       | 12.00          | ±0.30          |
| P       | 8.00           | ±0.10          |
| E       | 1.75           | ±0.10          |
| F       | 5.50           | ±0.10          |
| P2      | 2.00           | ±0.10          |
| D       | 1.50           | +0.10<br>-0.00 |
| P0      | 4.00           | ±0.10          |
| 10P0    | 40.00          | ±0.20          |

## 11. Operating & Storage Conditions

### 11-1. Operating

(1) Maximum Input Power: 2 W

(2) Operating Temperature: -40°C to 85°C

### 11-2. Storage

(1) Storage Temperature: -5°C to 40°C

(2) Relative Humidity: 20% to 70%

(3) Shelf Life: 1 year

## 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.



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