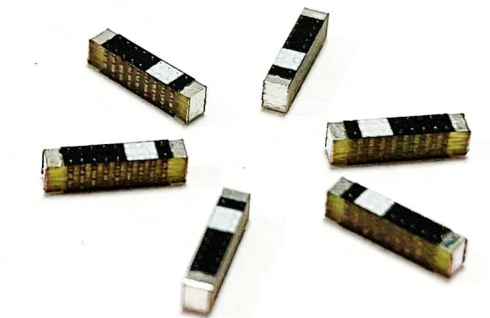


# 5.0 x 1.0 x 1.3 (mm) WiFi / Bluetooth Chip Antenna (CW504)

## Engineering Specification

### 1. Product Number

H 2 U 3 6 F 1 K 1 B 0 1 0 0



### 2. Features

- \*Stable and reliable in performances
- \*Low profile, compact size
- \*RoHS 2.0 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 CW504 chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500 MHz. Fabricated with proprietary design and processes, CW504 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 : George Hung

Checked by : Mike

Approved by : Herbert

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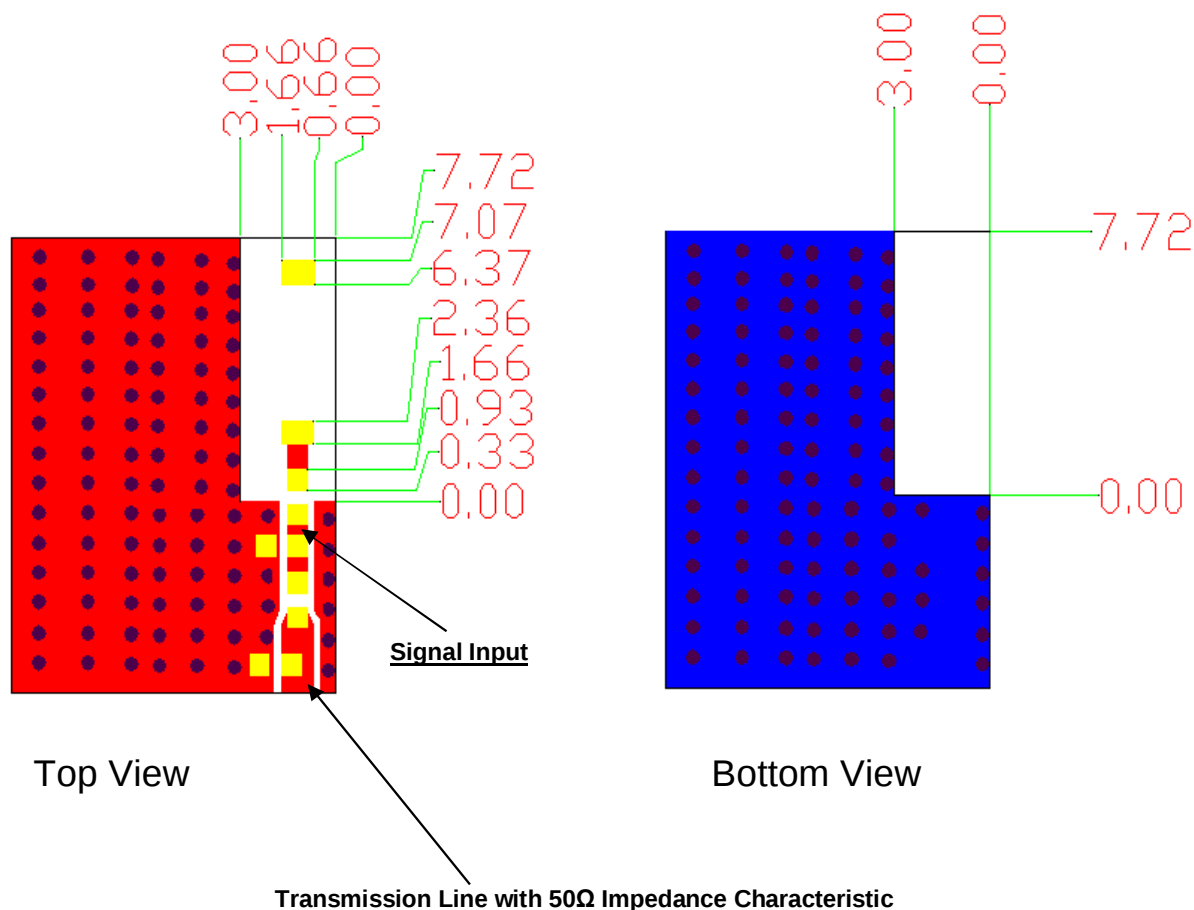
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## 5. Layout Guide & Electrical Specifications

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

Solder Land Pattern:

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



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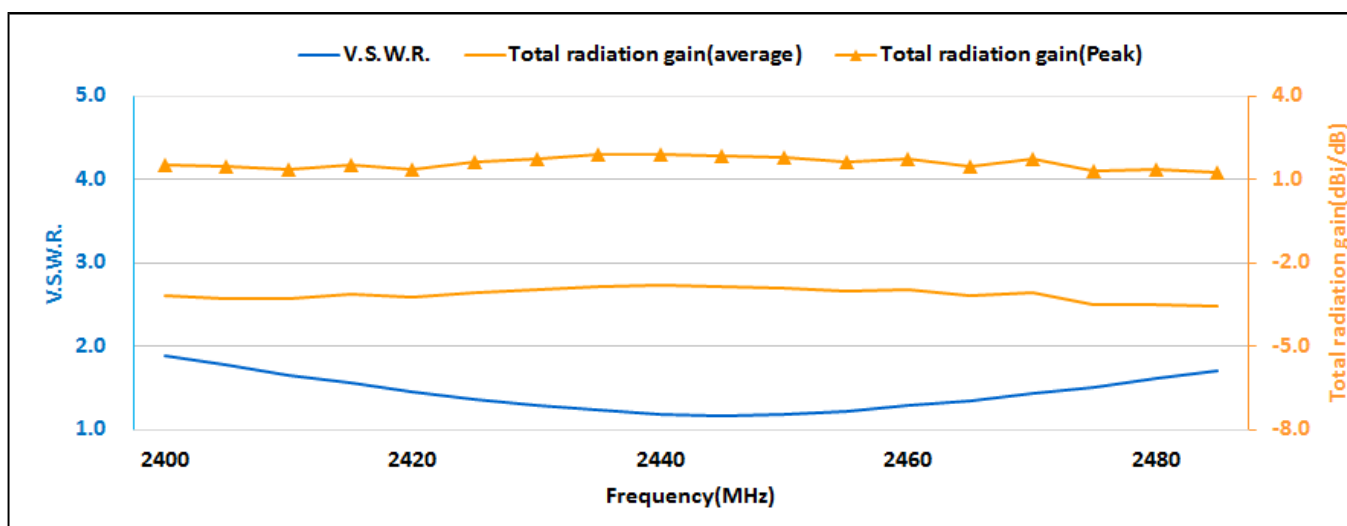
## 5-2. Electrical Specifications (Evaluation Board Dimensions: 40 x 40mm<sup>2</sup>)

### 5-2-1. Electrical Table

| Characteristics            |             | Specifications      | Unit |
|----------------------------|-------------|---------------------|------|
| Outline Dimensions         |             | 5.0 x 1.0 x 1.3     | mm   |
| Ground Plane Dimensions    |             | 40 x 40             | mm   |
| Working Frequency          |             | 2400~ 2500          | MHz  |
| VSWR (@ center frequency)* |             | 2 Max               |      |
| Characteristic Impedance   |             | 50                  | Ω    |
| Polarization               |             | Linear Polarization |      |
| Peak Gain                  | (@2442 MHz) | 1.9 (typical**)     | dBi  |
| Efficiency                 |             | 52.1 (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.



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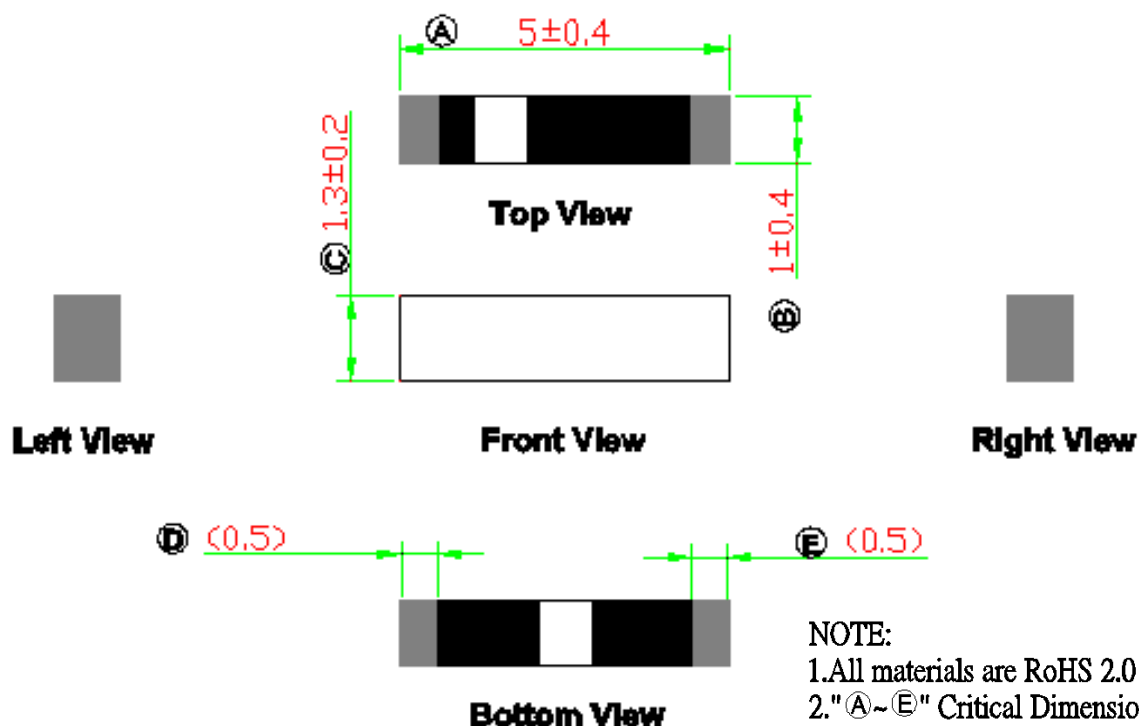
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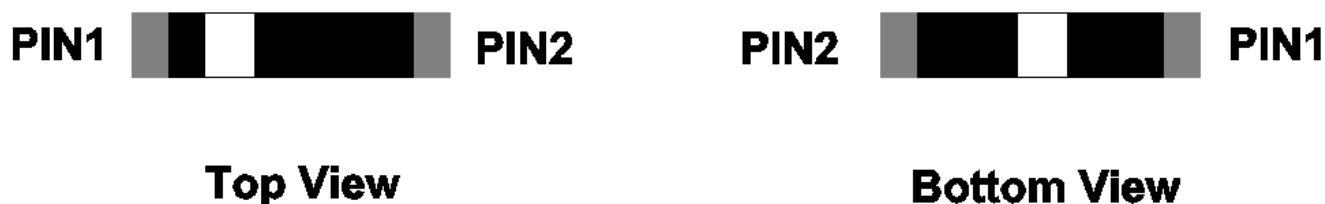
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## 6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

### 6-1. Antenna Dimensions



### PIN Definition



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



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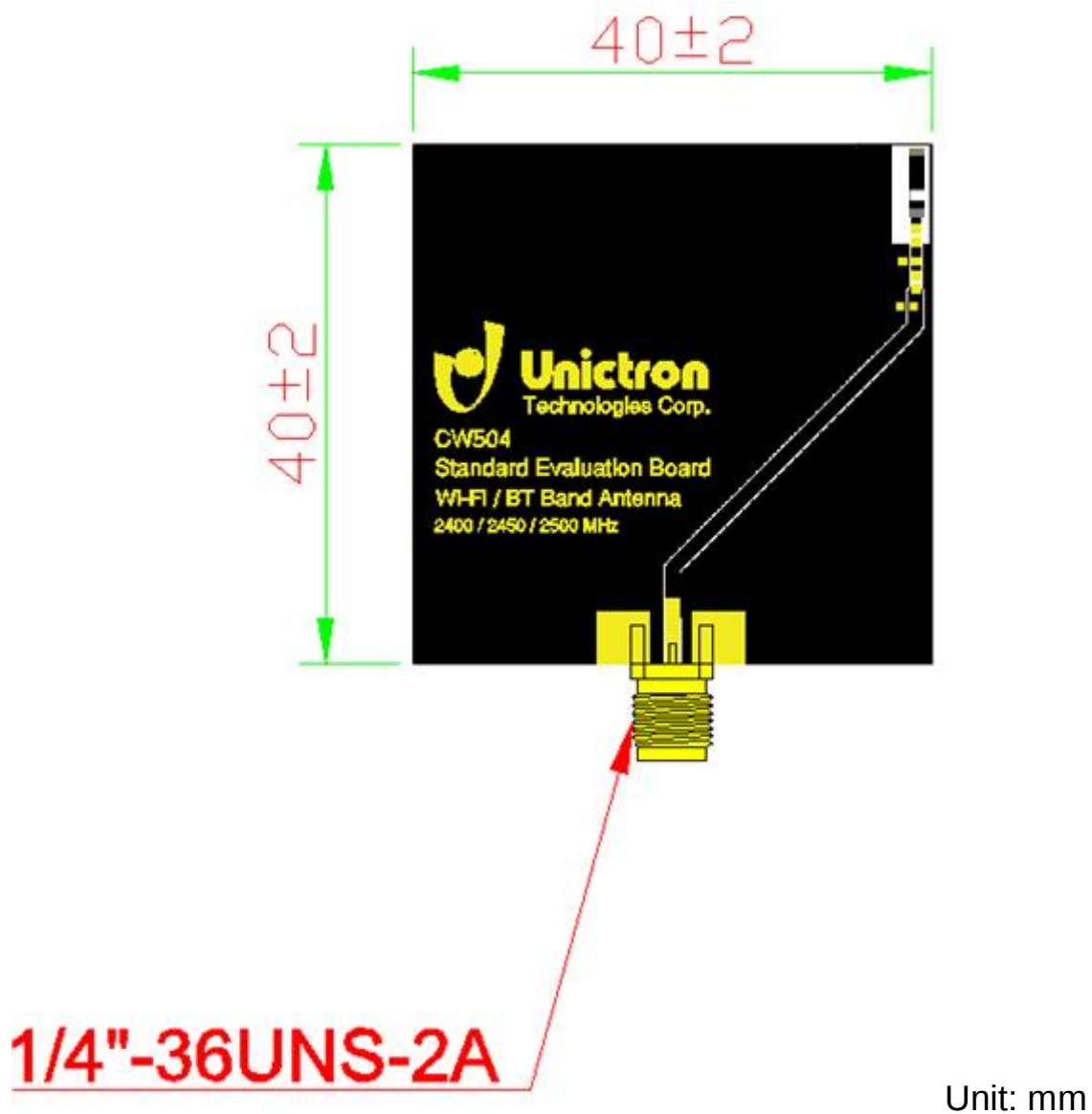
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6-2. Evaluation Board with Antenna



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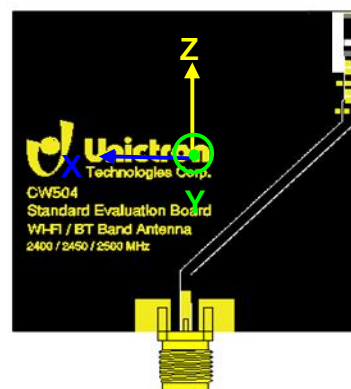
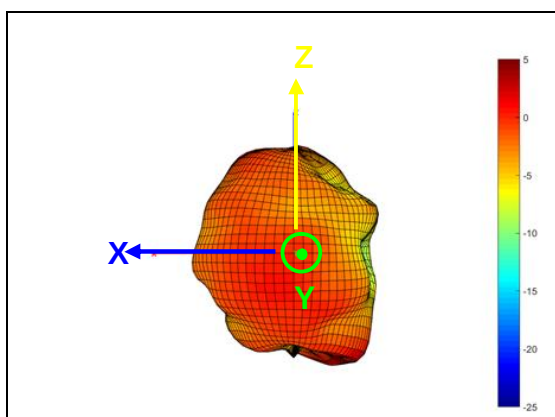
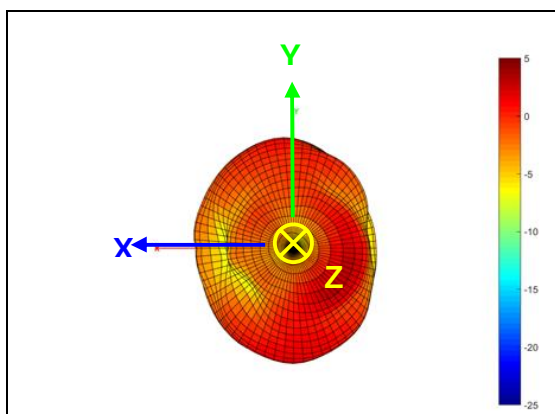
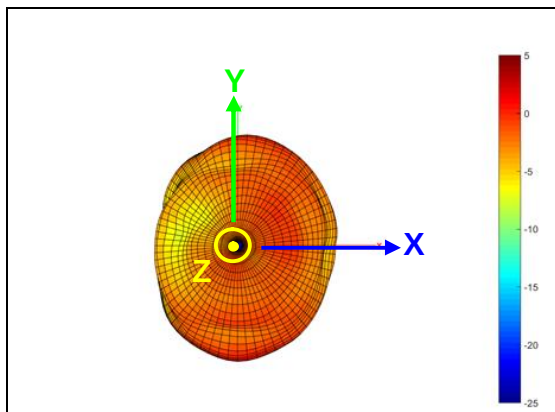
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## 7. 3D Radiation Gain Pattern (with 40 x 40 mm<sup>2</sup> Evaluation Board)

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



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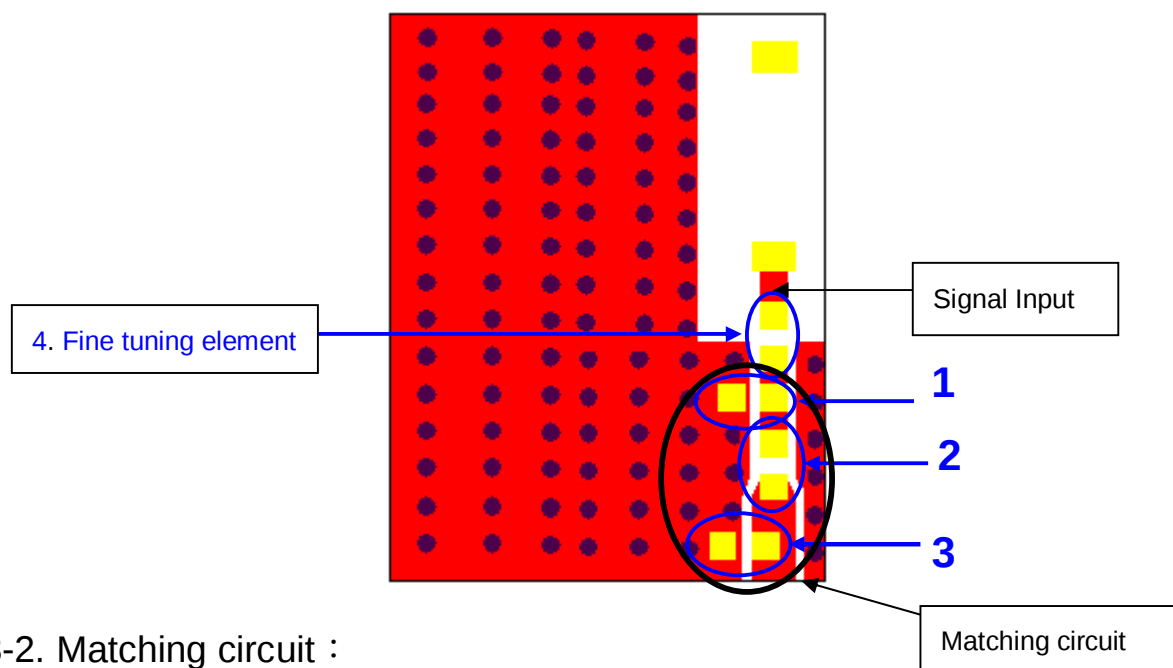
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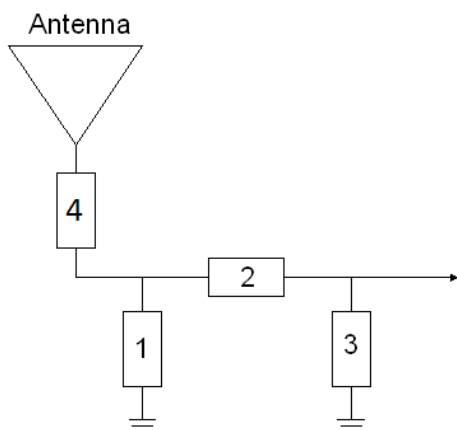
## 8. Frequency tuning and Matching circuit

### 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                                 | 1.2nH, (0402) | MURATA | ±0.1nH    |
| 3                                 | 1.2pF, (0402) | MURATA | ±0.05pF   |
| 4<br>Fine tuning element          | 3.9nH, (0402) | MURATA | ±0.1nH    |



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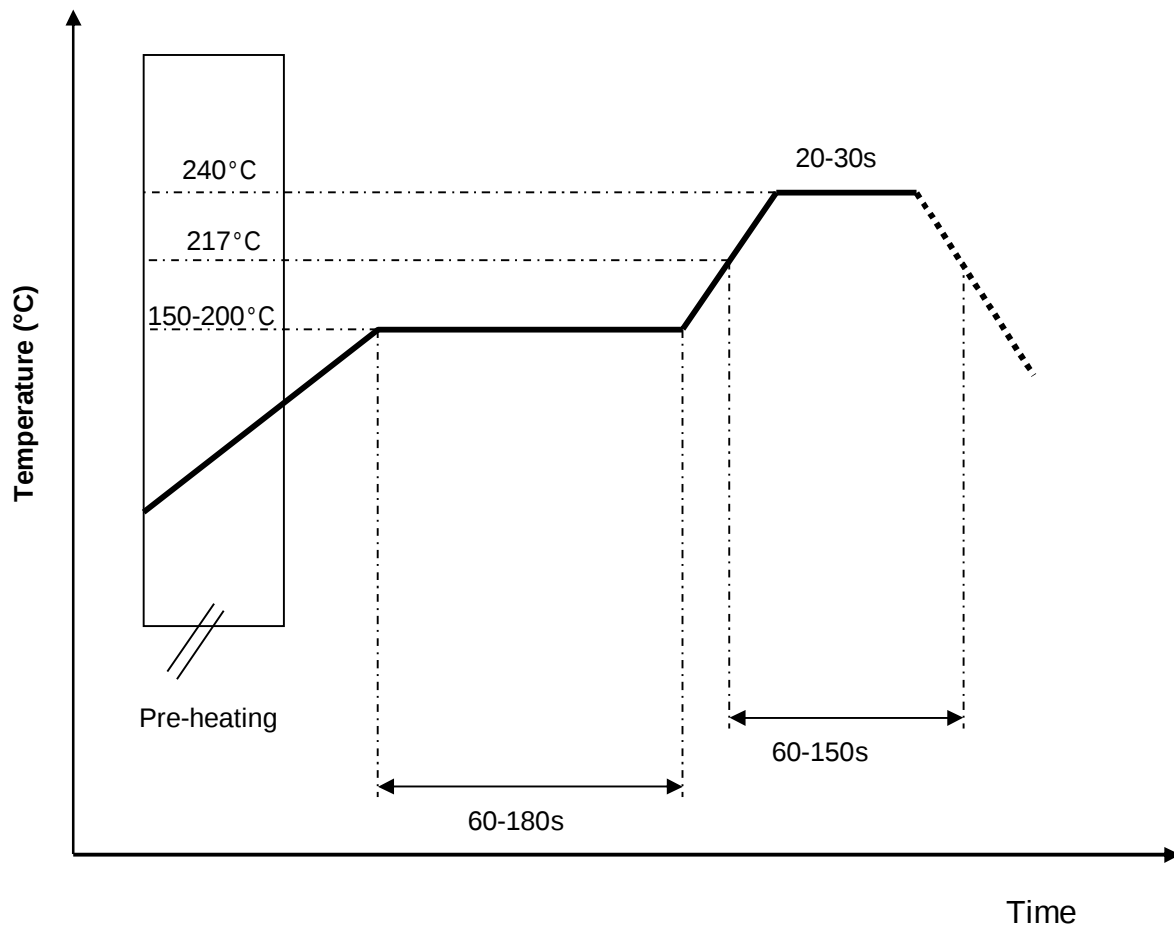
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## 9. Soldering Conditions

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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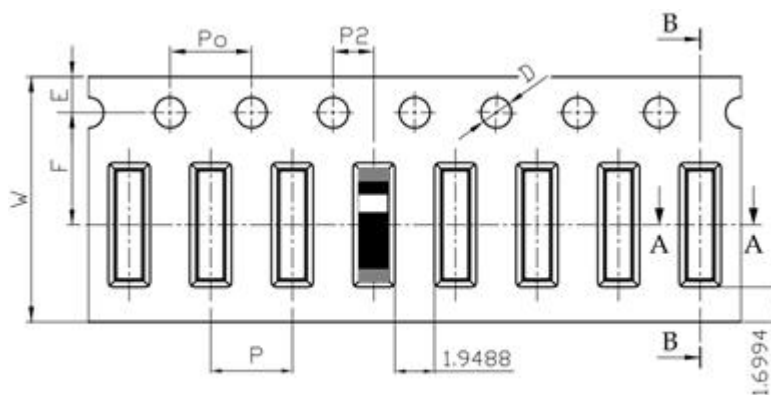
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## 11. Packing

- (1) Quantity/Reel: 2500 pcs/Reel
- (2) Plastic tape: Black conductive polystyrene

a. Tape Drawing



b. Tape Dimensions (unit: mm)

| Feature | Specifications | Tolerances     |
|---------|----------------|----------------|
| W       | 12.00          | ±0.30          |
| P       | 4.00           | ±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          |

## 12. Operating & Storage Conditions

### 12-1. Operating

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

### 12-2. Storage (sealed)

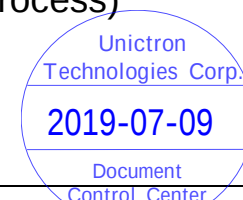
- (1) Storage Temperature: -5°C to 40°C
- (2) Relative Humidity: 20% to 70%
- (3) Shelf Life: 1 year

### 12-3. Storage (unsealed)

Meet the criteria of J-STD-033 MSL2a

### 12-4. Storage (After mounted on customer's PCB with SMT process)

- (1) Storage Temperature: -40°C to 85°C
- (2) Relative Humidity: 10% to 70%



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### 13. 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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