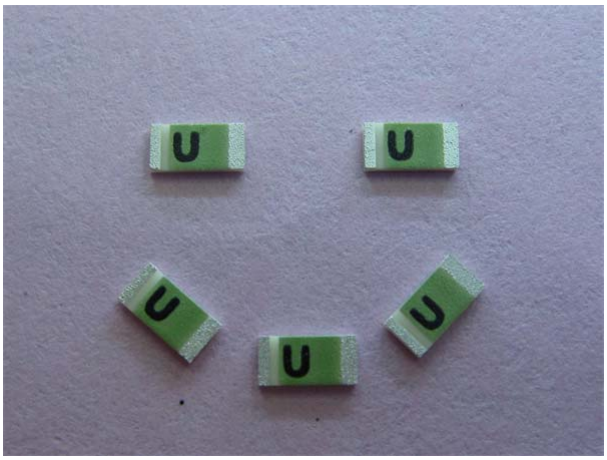
# 3.2 x 1.6 x 0.5 (mm) GPS Ceramic Chip Antenna (AA088)

# Engineering Specification

## 1. Product Number

| H | 2 | U | 1 | 4 | W | 1 | H | 1 | A | 0 | 1 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|




## 2. Features

*Stable and reliable in performances
*Low temperature coefficient of frequency
*Low profile, compact size
*RoHS compliance
*SMT processes compatible

## 3. Applications

*Navigation systems or position tracking systems
*Hand-held devices when GPS function is needed, e.g., PDA, Smart phone, PND.

## 4. Description

Unictron's chip antenna series are specially designed for GPS applications. Based on Unictron's proprietary design and processes, this chip antenna has excellent stability and sensitivity to consistently provide high signal reception efficiency.

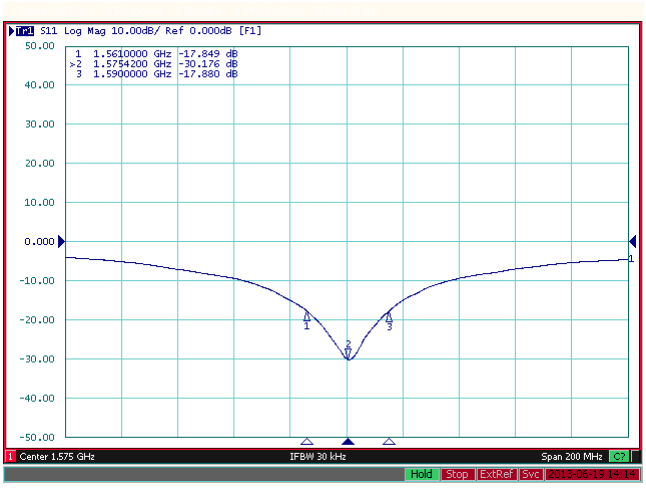
# 5. Electrical Specifications (80 x 40 mm$^2$ ground plane)

## 5-1. Electrical Table

| Characteristics | | Specifications | Unit |
|---|---|---|---|
| Outline Dimensions | | 3.2x1.6x0.5 | mm |
| Working Frequency | | 1575.42 | MHz |
| VSWR | | 2 Max. | |
| Impedance | | 50 | Ω |
| Polarization | | Linear Polarization | |
| Gain | Peak | 3.2 (typical) | dBi |
| | Efficiency | 83 (typical) | % |

## 5-2. Return Loss & VSWR

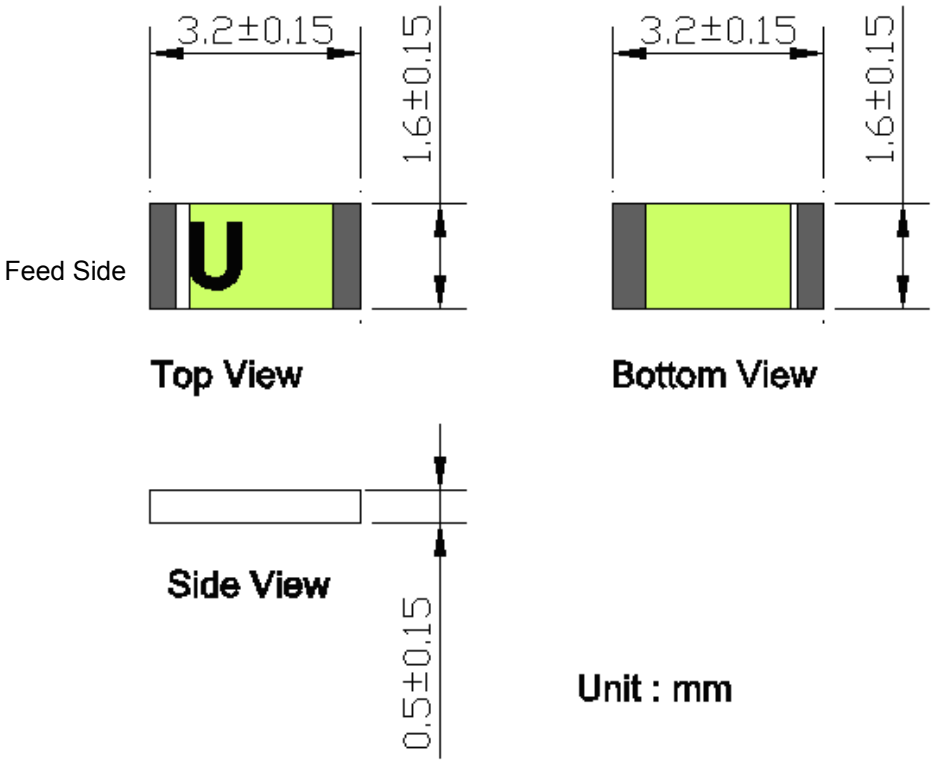
Return Loss ($S_{11}$)



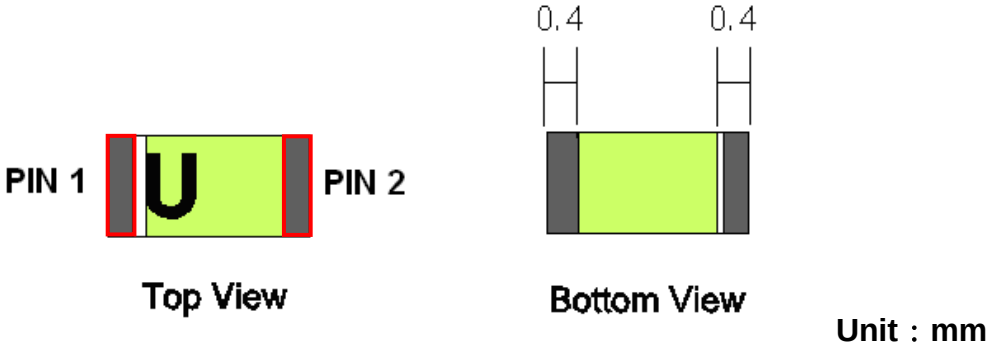

VSWR ($S_{11}$)

# 6. Antenna Dimensions & Test Board (unit: mm)

a. Antenna Dimensions

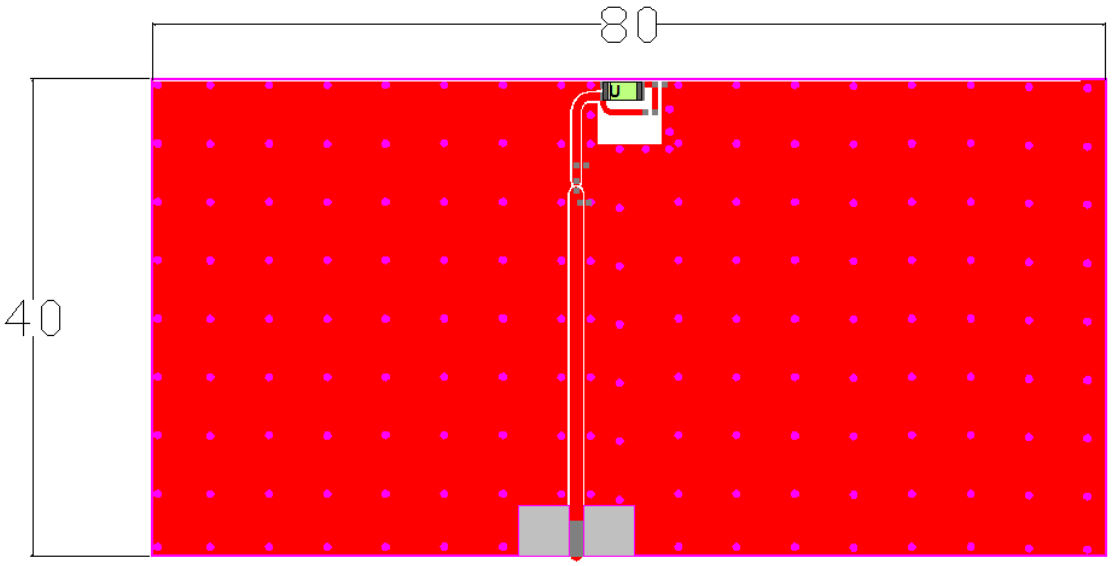



## PIN Definitions




| PIN 1 | PIN 2 |
|---|---|
| Signal Input | Tuning / Signal Output |

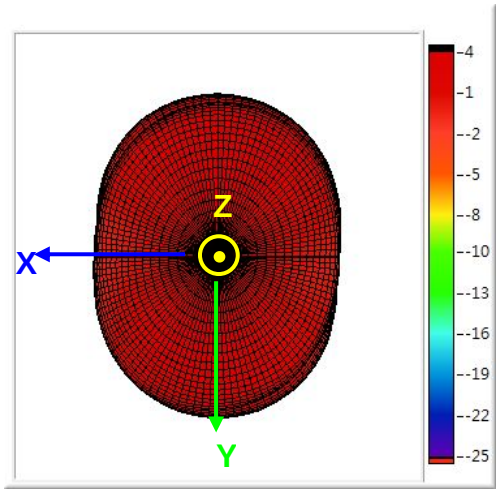
b. Test Board with Antenna

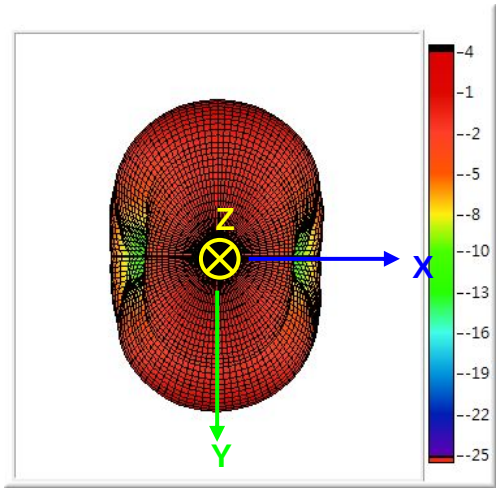


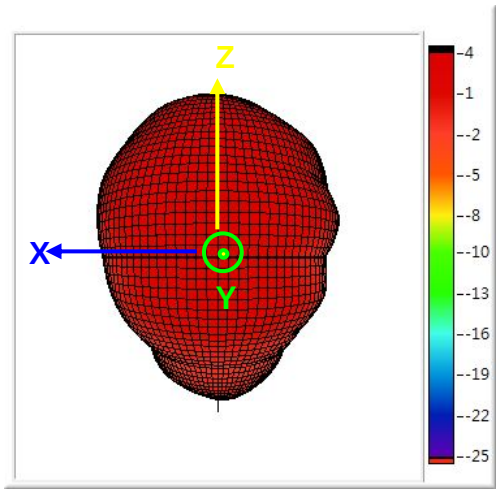

**Unit : mm**

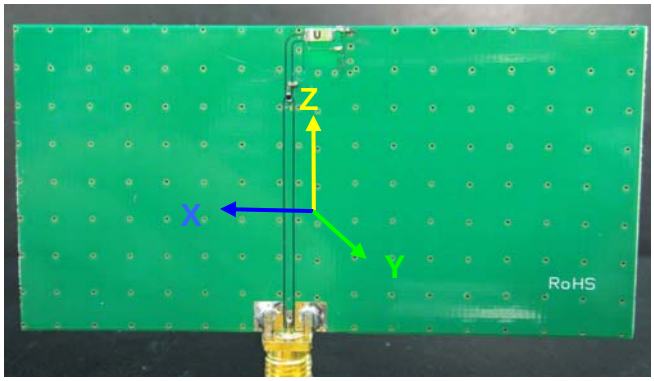
# 7. Radiation Pattern (80 x 40 mm$^2$ ground plane)

## 7-1. 3D Gain Pattern @ 1575.42 MHz



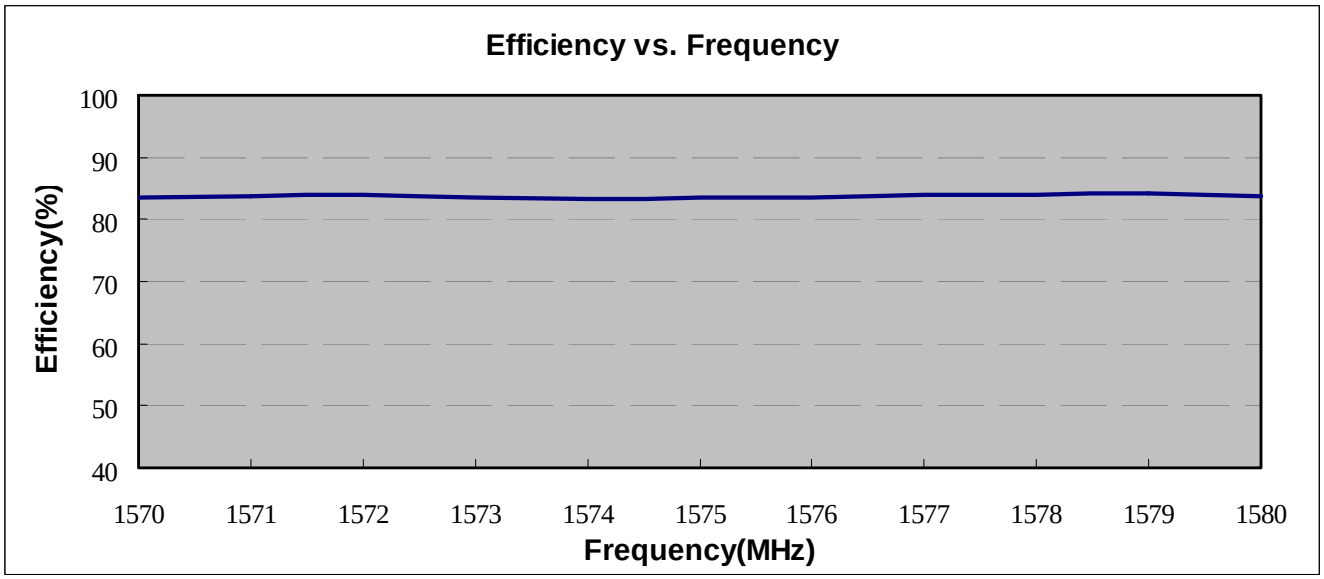



## 7-2. 3D Efficiency Table

| Frequency (MHz) | 1570 | 1571 | 1572 | 1573 | 1574 | 1575 | 1576 | 1577 | 1578 | 1579 | 1580 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Efficiency (dB) | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 | -0.8 |
| Efficiency (%) | 83.4 | 83.8 | 84.0 | 83.6 | 83.4 | 83.4 | 83.6 | 84.0 | 84.0 | 84.2 | 83.8 |
| Gain (dBi) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |

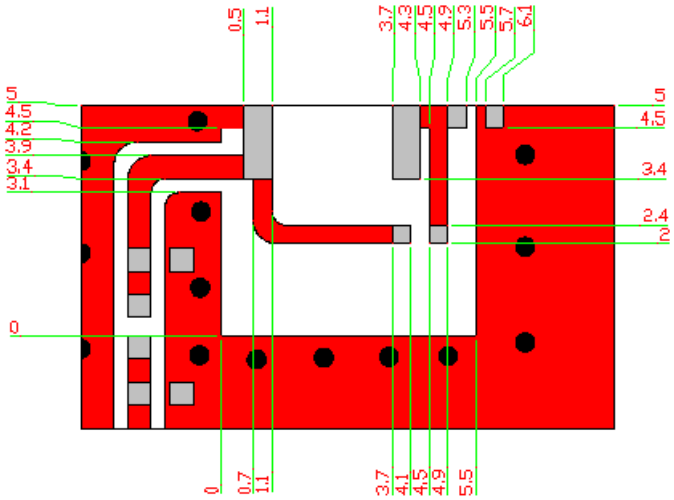
## 7-3. 3D Efficiency vs. Frequency



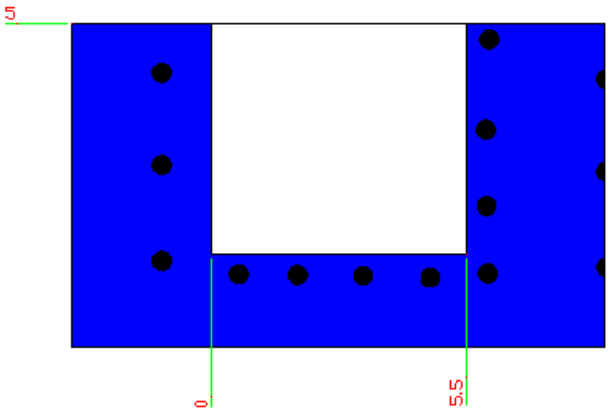
# 8. Layout Guide

a. Solder Land Pattern:

Land pattern for soldering (gray marking areas) is as shown below. Depending on Customer's requirement, matching circuit as shown below is also recommended .




Top View

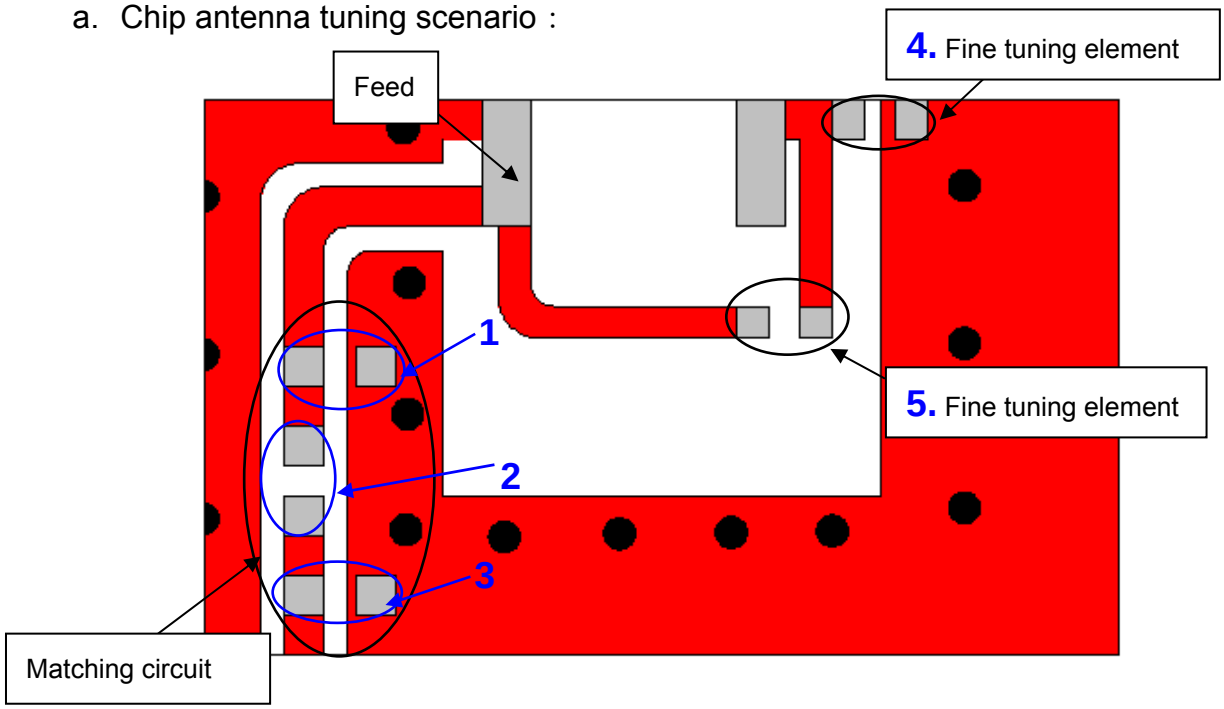



Bottom View

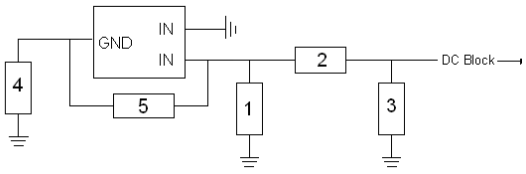
**Unit : mm**

# 9. Frequency tuning

a. Chip antenna tuning scenario :



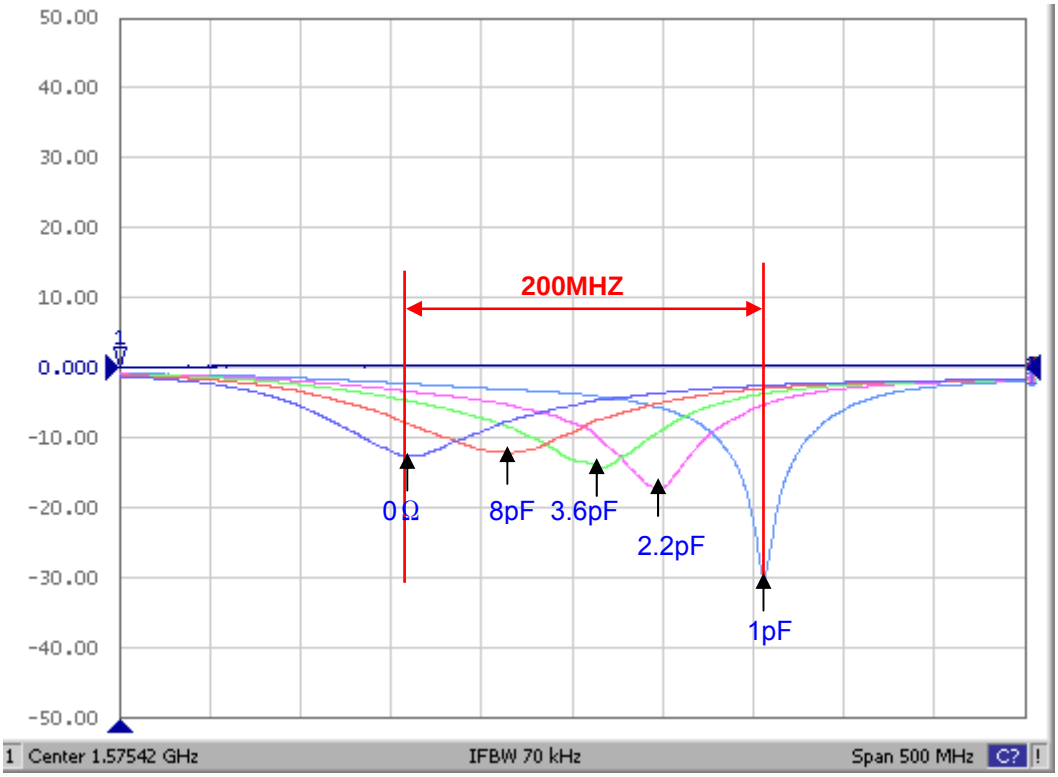
b. Matching circuit：(Center frequency is about 1575.42MHz @ 80 x 40 $mm^2$ ground plane)




| System Matching Circuit Component | | | |
|---|---|---|---|
| Location | Description | Vendor | Tolerance |
| 1 | 2.5 pF* | DARFON(0402) | ±0.1pF |
| 2 | 0 Ω* | (0402) | - |
| 3 | N/A* | N/A | N/A |
| Fine tuning element 4 | 4.7 pF* | DARFON(0402) | ±0.1pF |
| Fine tuning element 5 | 1 pF* | DARFON(0402) | ±0.1pF |

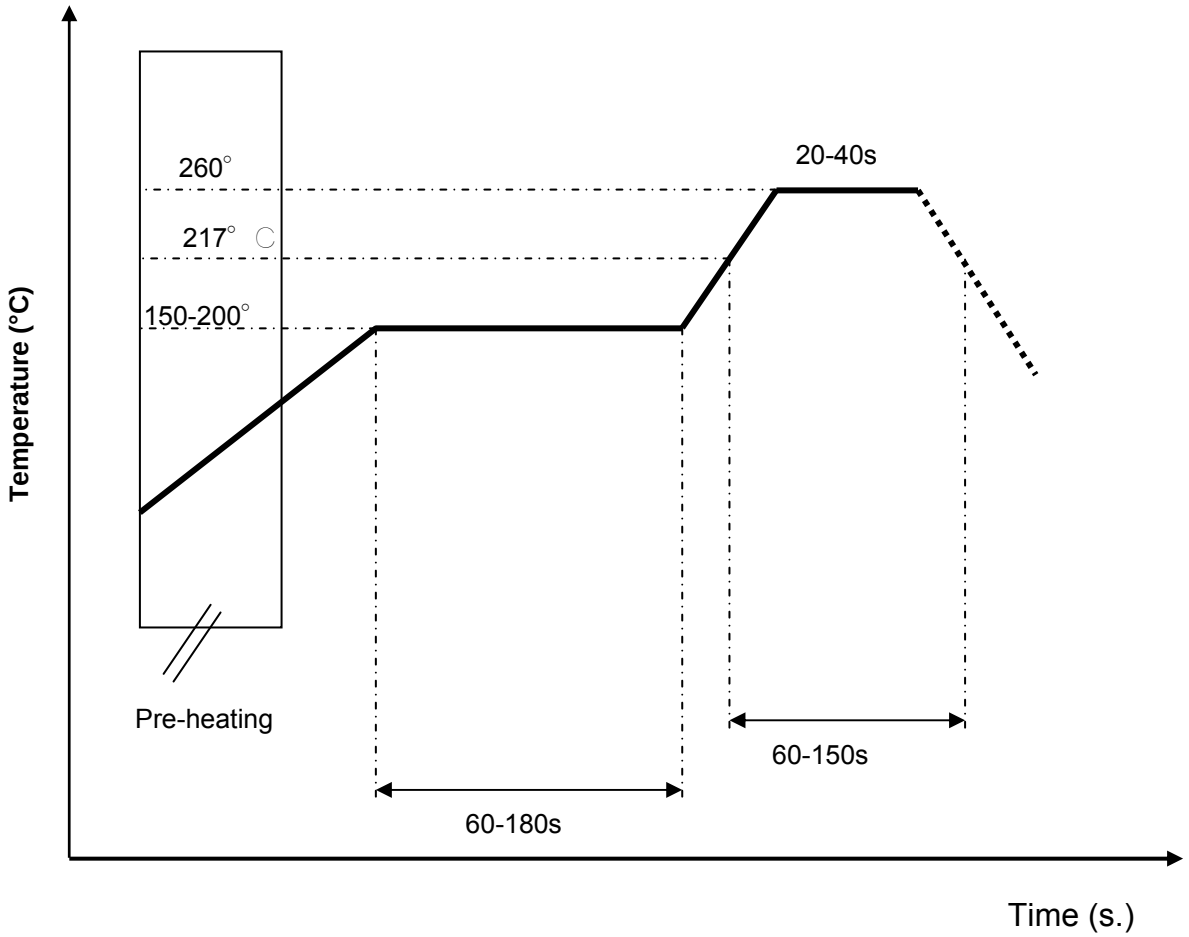
*Typical reference values which may need to be changed when circuit boards or part vendors are different.

c. Fine tuning element vs. Center frequency



## 10. Soldering Conditions

a. Typical Soldering Profile for Lead-free Process




## 11. Notifications for Assembly

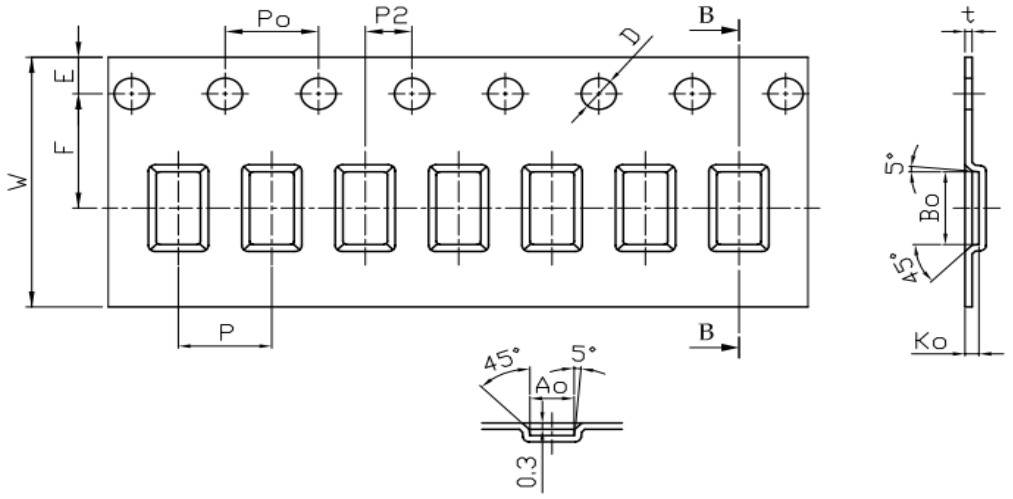
**We recommend the notifications as following:**

a. Do NOT touch or push the chip antenna after SMT process.
b. Do NOT bend PCB after SMT process.
c. Do NOT place the cutting point between PCB and frame near the chip antenna.
d. Do NOT use ultrasonic welding process or vibration process to avoid the cracking of the soldering of the chip antenna.

## 12. Packing

(1) Quantity/Reel: 5000 pcs/Reel

(2) Plastic tape:




1. Cumulative tolerance of 10 sprocket hole pitch: ±0.20mm
2. Carrier camber not to exceed 1mm in 250mm
3. Ao and Bo measured on a plane above the inside bottom of the pocket.
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
5. All dimensions meet EIA-481-B requirements.
6. Material: □ Clear Non Anti-Static Polystyrene.
   ■ Black Conductive Polystyrene.

2.1 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 |
| Po | 4.00 | ±0.10 |
| 10Po | 40.00 | ±0.20 |

2.2 Pocket Dimensions(unit: mm)

| Feature | Specifications | Tolerances |
|---|---|---|
| Ao | 1.90 | +0.20 |
| Bo | 3.50 | -0.10 |
| Ko | 0.60 | ±0.10 |
| t | 0.30 | ±0.05 |

## 13. Storage Conditions

(1) Temperature: -25℃ to 85℃

(2) Relative Humidity: 20% to 70%

(3) Shelf Life :1 year