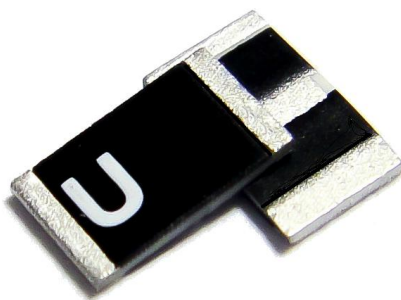


5.0 x 3.0 x 0.5 (mm) ISM 868 MHz Ceramic Chip Antenna (AA701)

Engineering Specification

1. Product Number

H 2 U 6 4 U 1 H 2 B 0 2 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

- *Short Range Devices (SRD)
- *IoT applications
- *Alarm system

4. Description

Unictron's AA701 ceramic chip antenna is designed for ISM 868MHz band applications, covering frequencies 863~870 MHz. Fabricated with proprietary design and processes, AA701 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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Checked by : Mike

Approved by : Herbert

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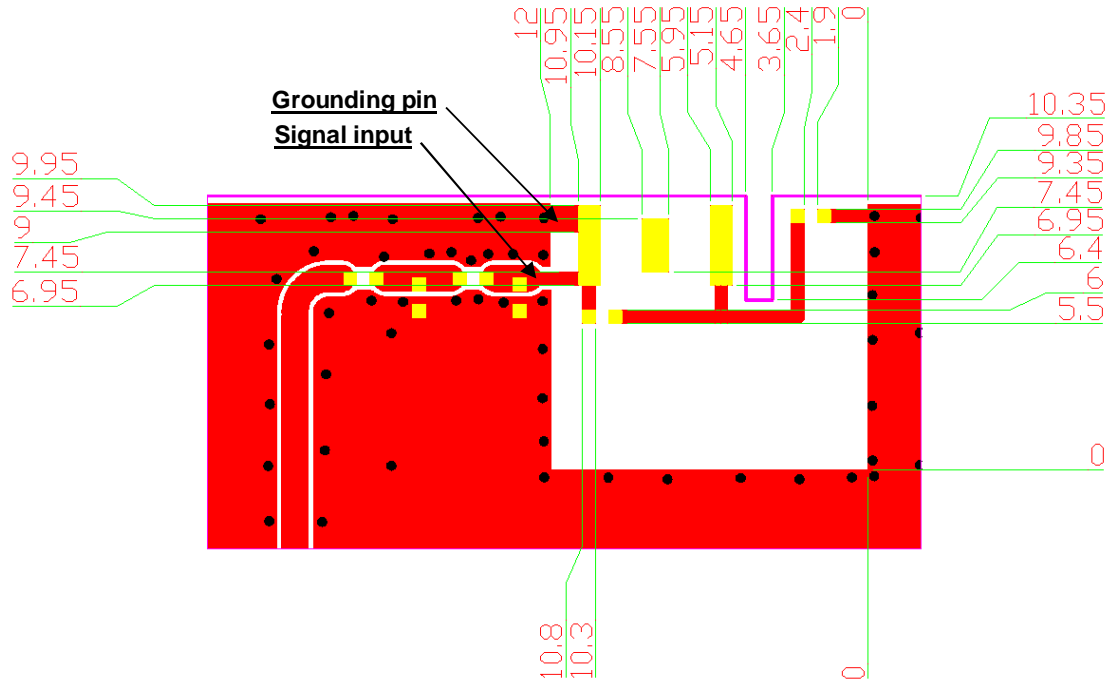
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5. Layout Guide & Electrical Specifications

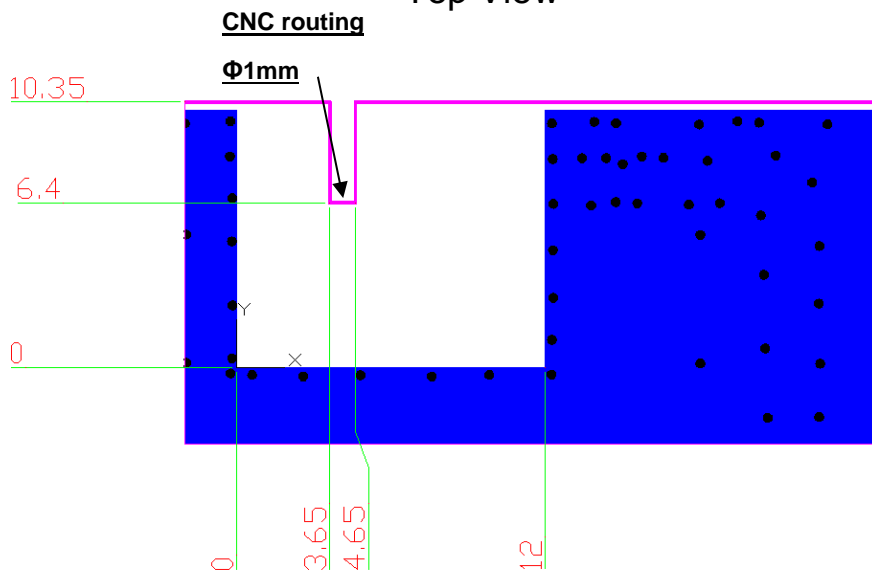
5-1. Layout Guide (unit : mm)

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.



Top View



Bottom View



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5-2. Electrical Specifications (Evaluation Board Dimensions: 80 x 40 mm²)

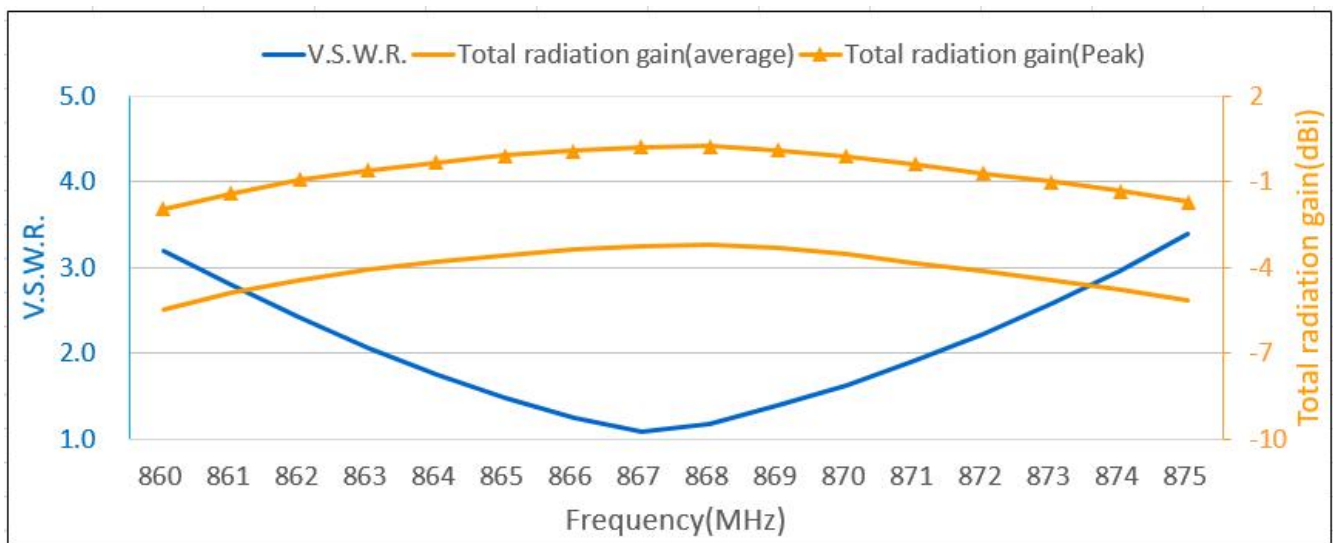
5-2-1. Electrical Table

| Characteristics | | Specifications | Unit |
|----------------------------|------------|---------------------|------|
| Outline Dimensions | | 5.0 x 3.0 x 0.5 | mm |
| Ground Plane Dimensions | | 80 x 40 | mm |
| Working Frequency | | 863~870 | MHz |
| VSWR (@ center frequency)* | | 2 Max. | |
| Characteristic Impedance | | 50 | Ω |
| Polarization | | Linear Polarization | |
| Peak Gain | (@868 MHz) | 0 (typical) | dBi |
| Efficiency | | 47 (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. Frequency vs. V.S.W.R. and Total Radiation Gain



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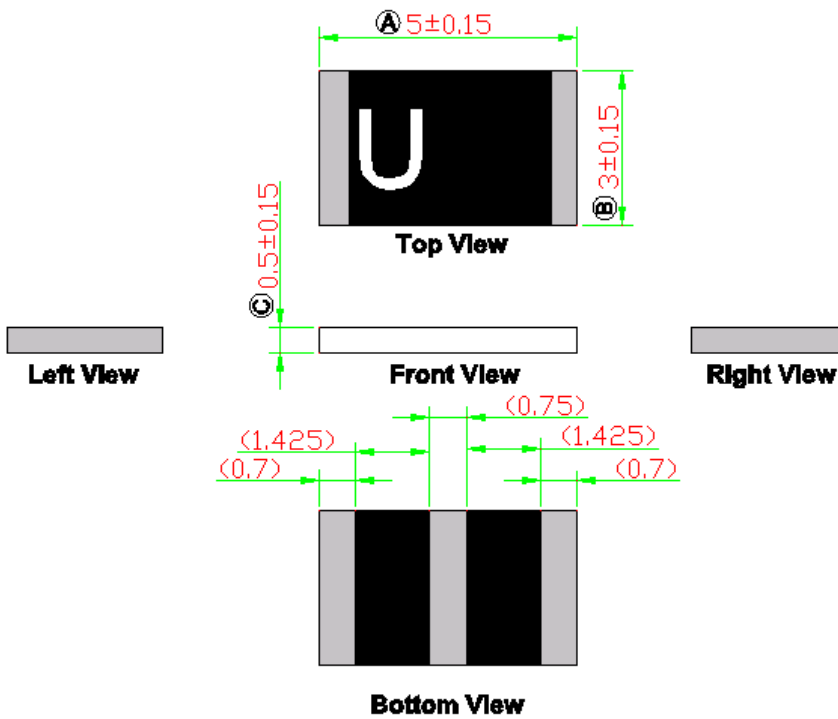
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6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

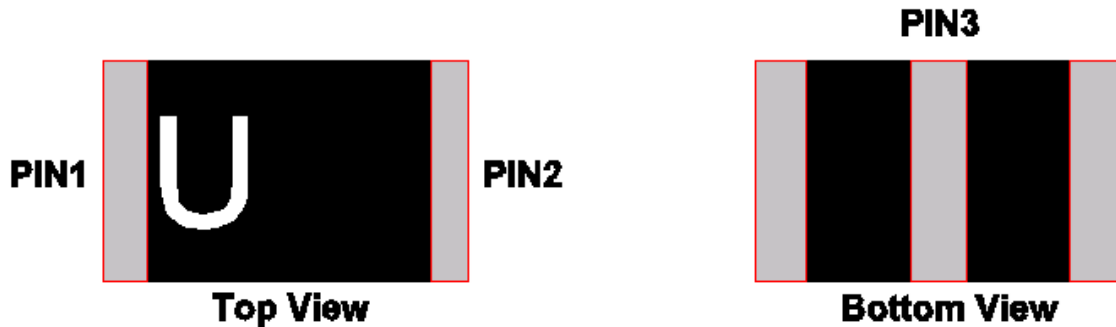
6-1. Antenna Dimensions



NOTE:

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

PIN Definitions



| PIN | 1 | 2 | 3 |
|---------------|--------|-----------------|-----|
| Soldering Pad | Signal | Tuning / Ground | N/C |

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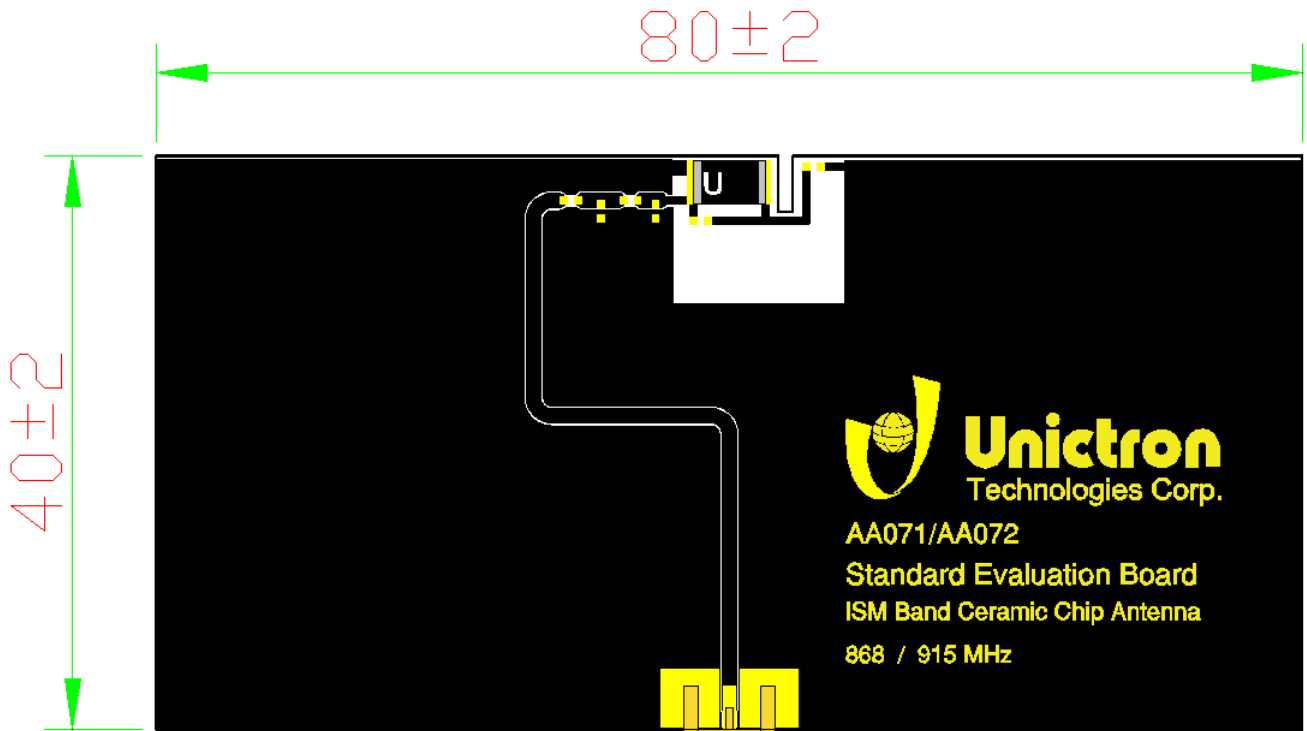
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| | | | |
|--|--------------|----------------|------|
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6-2. Evaluation Board with Antenna



SMA female
1/4"-36UNS-2A

Unit: mm



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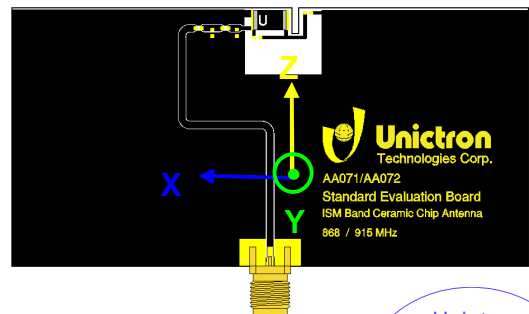
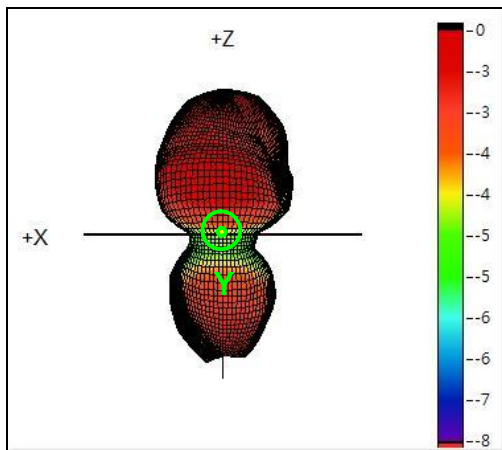
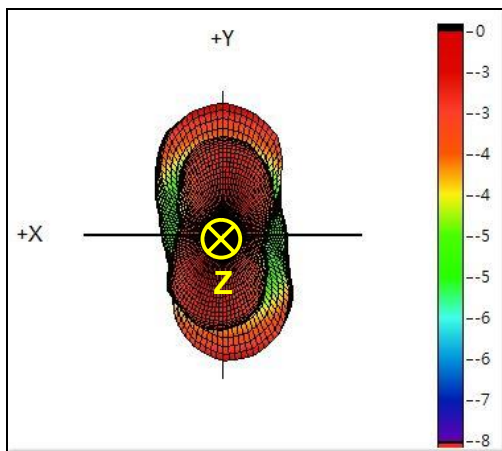
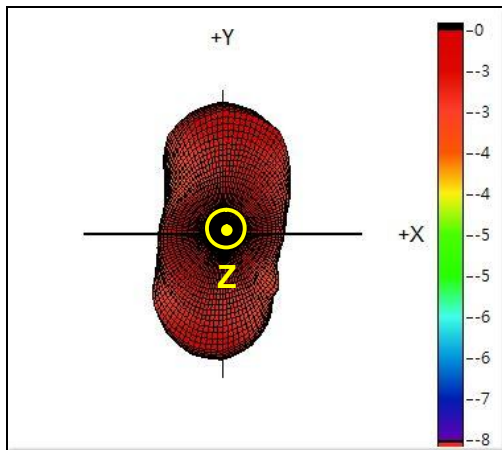
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| | | | |
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7. Radiation Pattern (with 80 x 40 mm² Evaluation Board)

3D Gain Pattern @ 868 MHz (unit: dBi)



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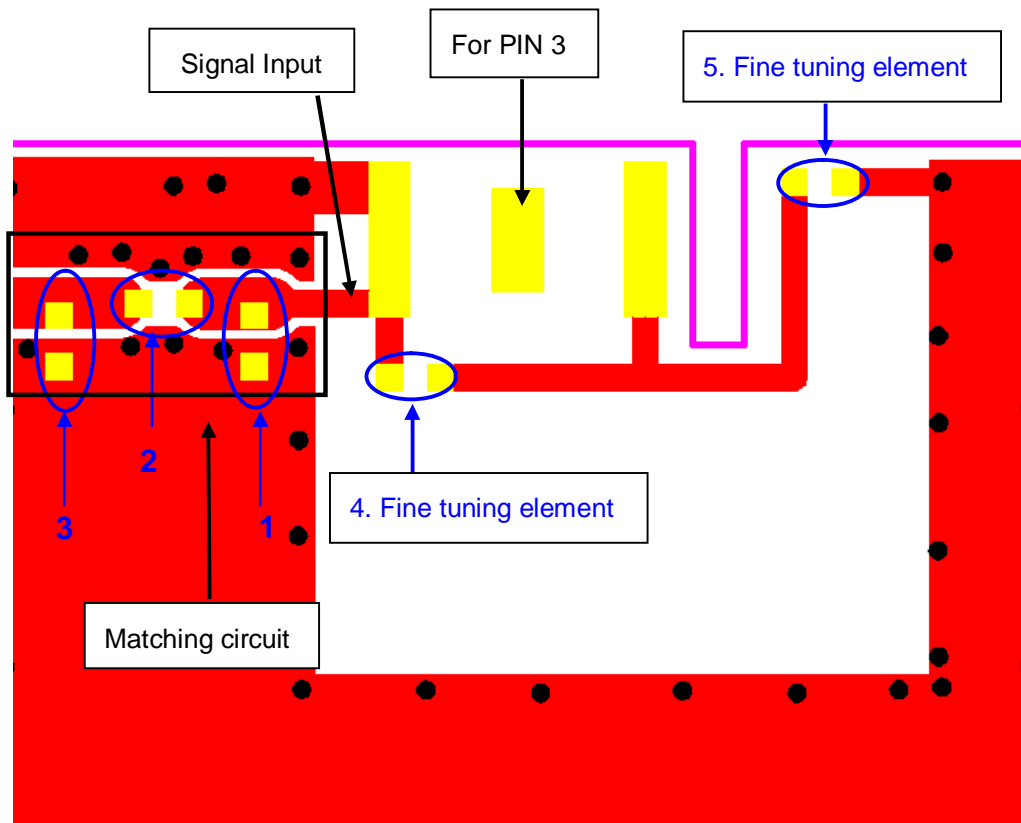
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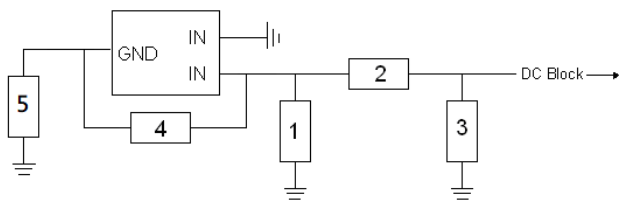
8. Frequency Tuning and Matching Circuit

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 868 MHz at our standard 80x40 mm² 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 | 0Ω, (0402) | - | - |
| 3 | 12 nH,(0402) | Murata | 5% |
| 4.Fine tuning element | 2.7 pF,(0402) | Murata | ±0.05pF Unictron Technologies Corp. |
| 5.Fine tuning element | 2.7 pF,(0402) | Murata | ±0.05pF |



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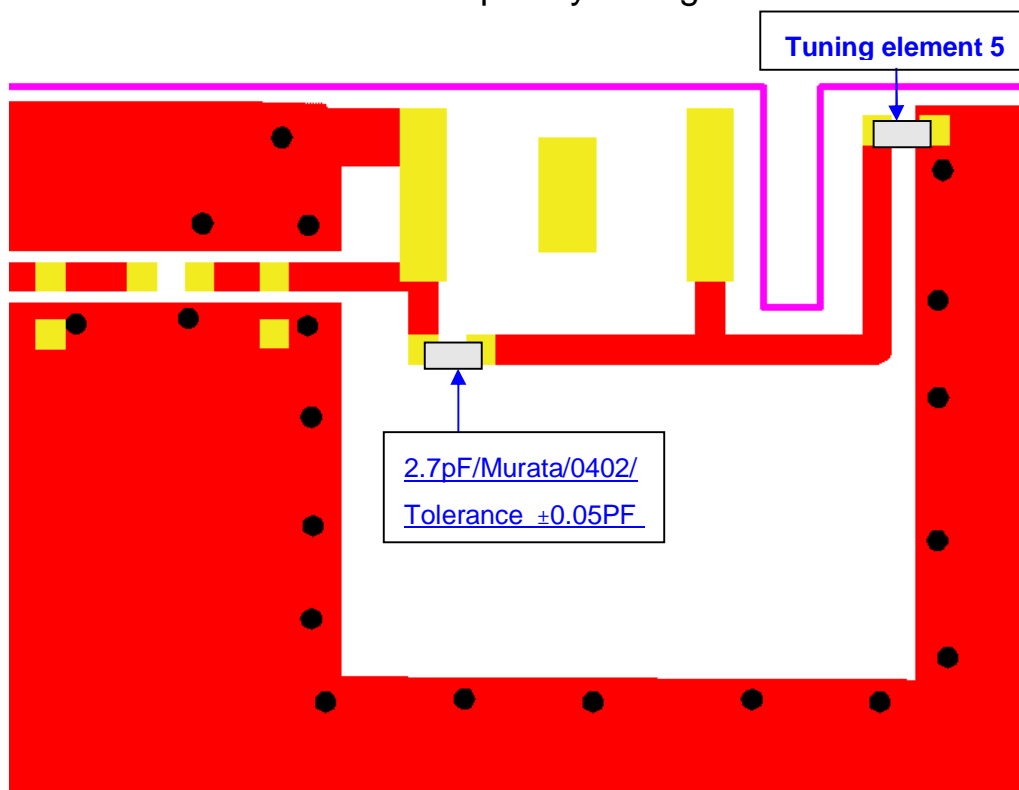
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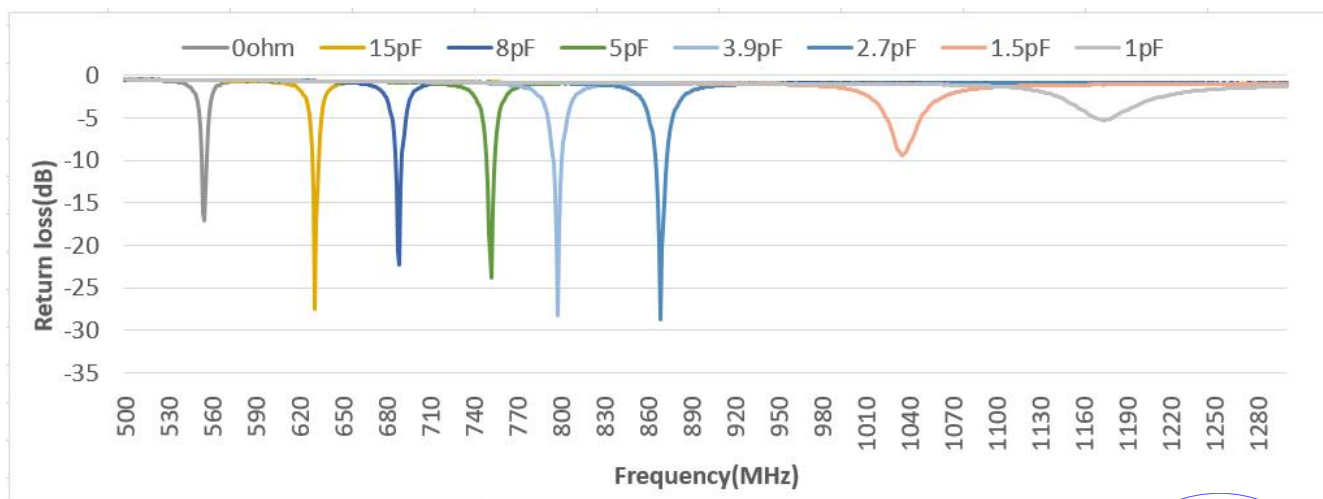
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8-3. Reference for use of the frequency tuning element



Frequencies vs. capacitance of tuning element 5



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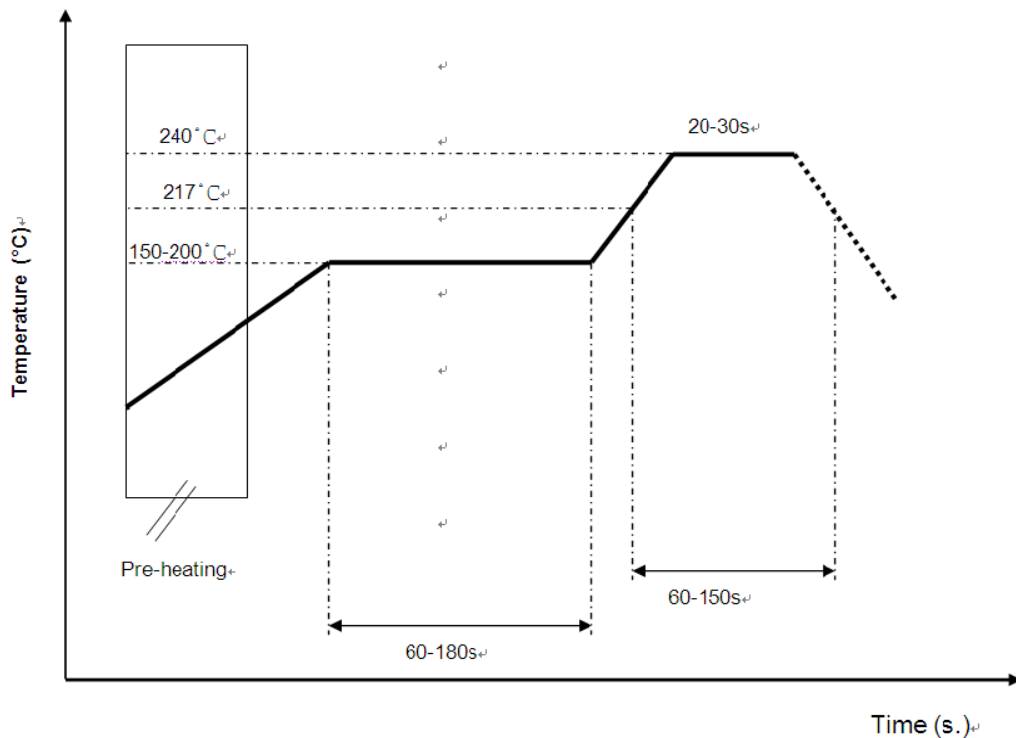
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9. Soldering Conditions

Solder paste alloy: SAC305 (Sn96.5/Ag3/Cu0.5) Lead Free solder paste



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

10. Reminders for users of Unictron's AA701 ceramic chip antennas

- 10-1. This chip antenna is made of ceramic materials which is relatively more rigid and brittle compared to circuit board materials. Furthermore, the length of this antenna is quite long. Bending of circuit board at the locations where chip antenna is mounted may cause the cracking of solder joints or antenna itself.
- 10-2. Punching/cutting of the break-off tab of PCB panel may cause severe bending of the circuit board which may result in cracking of solder joints or chip antenna itself. Therefore break-off tab shall be located away from the installation site of chip antenna.
- 10-3. Be cautious when ultrasonic welding process needs to be used near the locations where chip antennas are installed. Strong ultrasonic vibration may cause the cracking of chip antenna solder joints.



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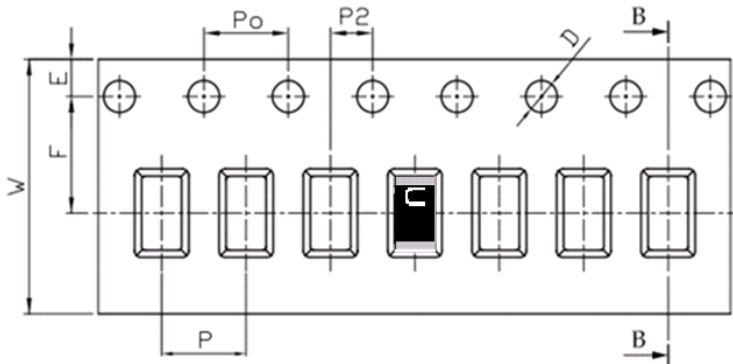
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11. Packing

- (1) Quantity/Reel: 6000 pcs/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 -0.00 |
| Po | 4.00 | ±0.10 |
| 10Po | 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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