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

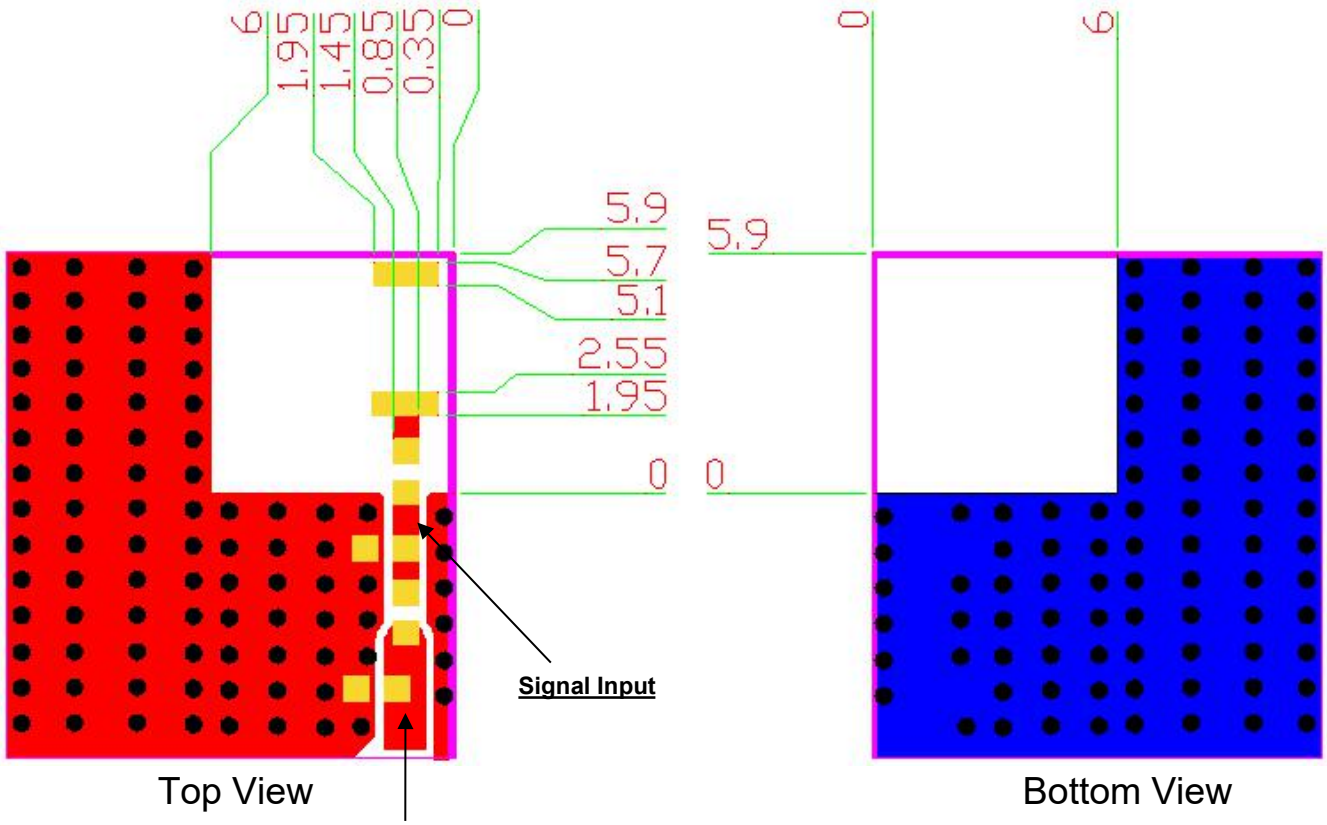
Unictron's CW324S chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500 MHz. Fabricated with proprietary design and processes, CW324S shows excellent performance and is fully compatible with SMT processes, which can decrease the assembly cost and improve the device's quality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

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

5-2. Electrical Specifications (Evaluation Board Dimensions: 40 x 40 mm^2)

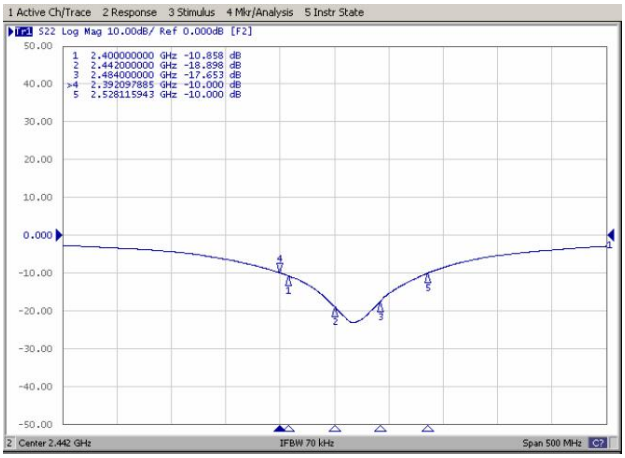
5-2-1. Electrical Table

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	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	1.5 (typical**)	dBi
Efficiency		56.3 (typical**)	%

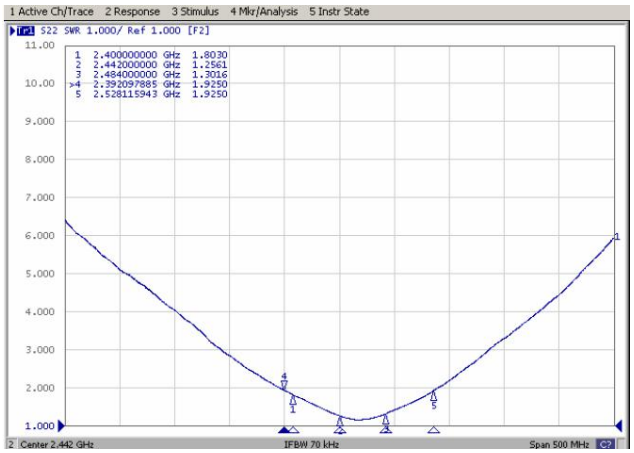
*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.
**A typical value is for reference only, not guaranteed.

5-2-2. Return Loss & VSWR

Return Loss (S_{11})

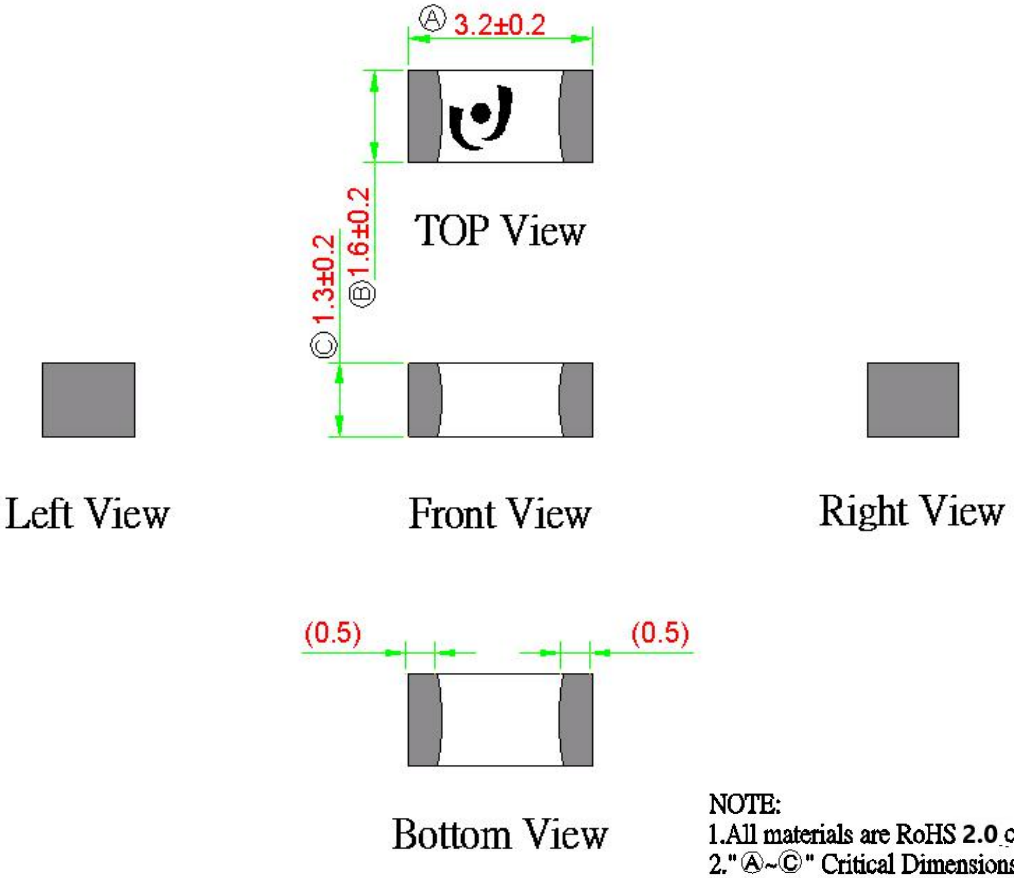


VSWR (S_{11})



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

6-1. Antenna Dimensions

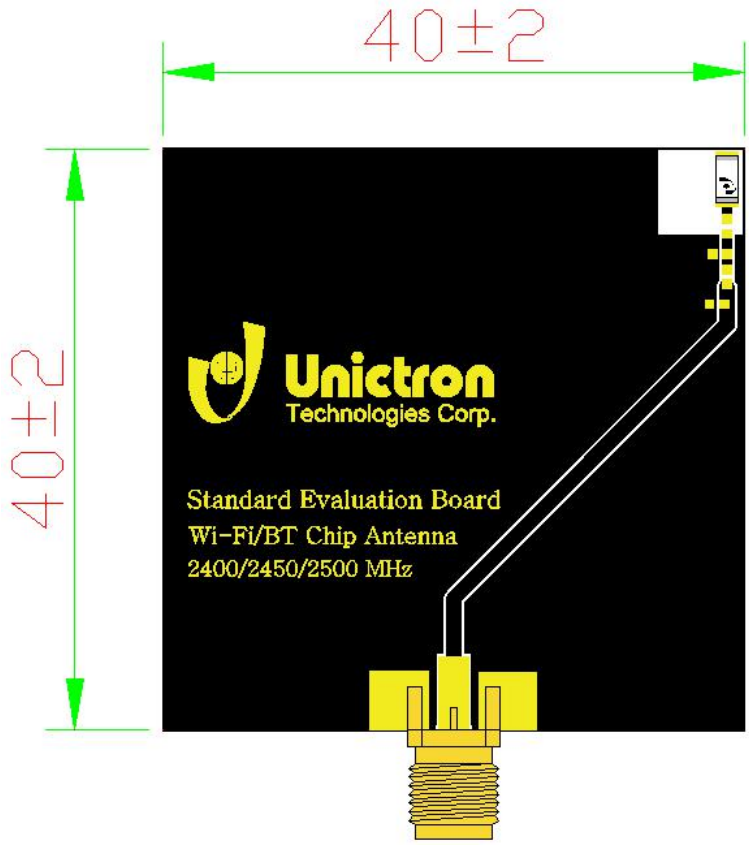


NOTE:
1.All materials are RoHS 2.0 compliant.
2."Ⓐ~Ⓒ" Critical Dimensions.
3."( )" Reference Dimensions.

PIN Definitions

PIN	1	2
Soldering PAD	Signal	N/C

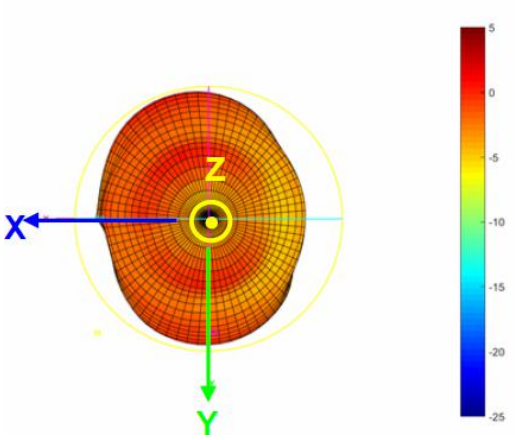
6-2. Evaluation Board with Antenna

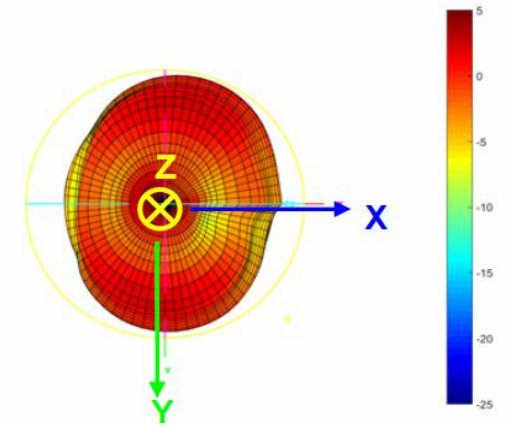


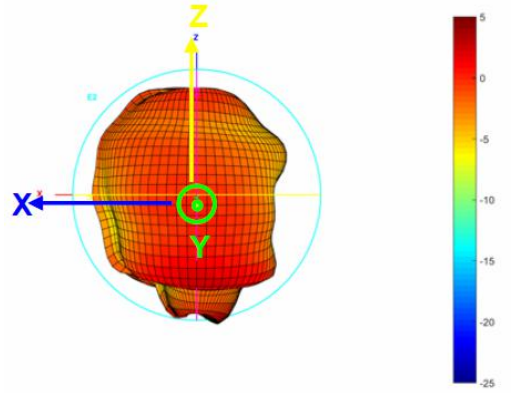
Unit: mm

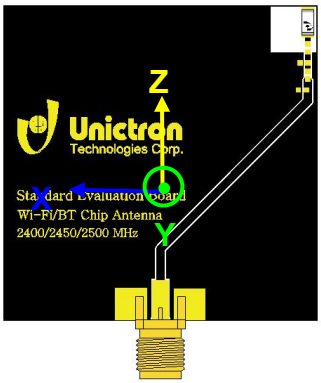
7. Radiation Pattern (with 40 x 40 mm² Evaluation Board)

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





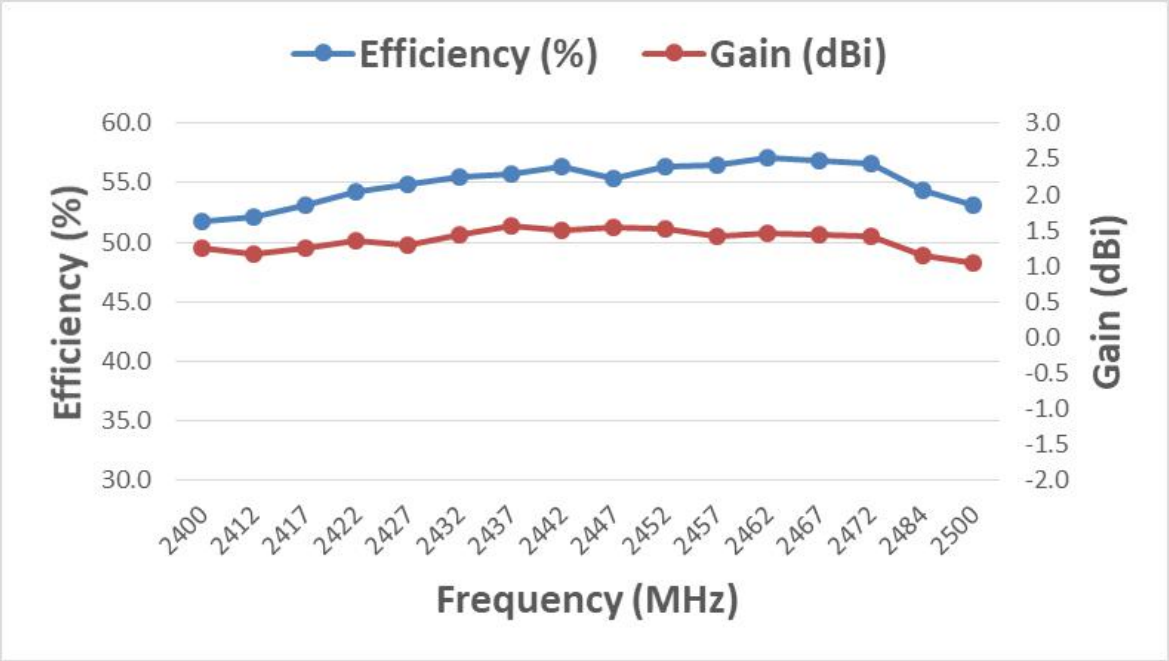




7-2. 3D Efficiency Table

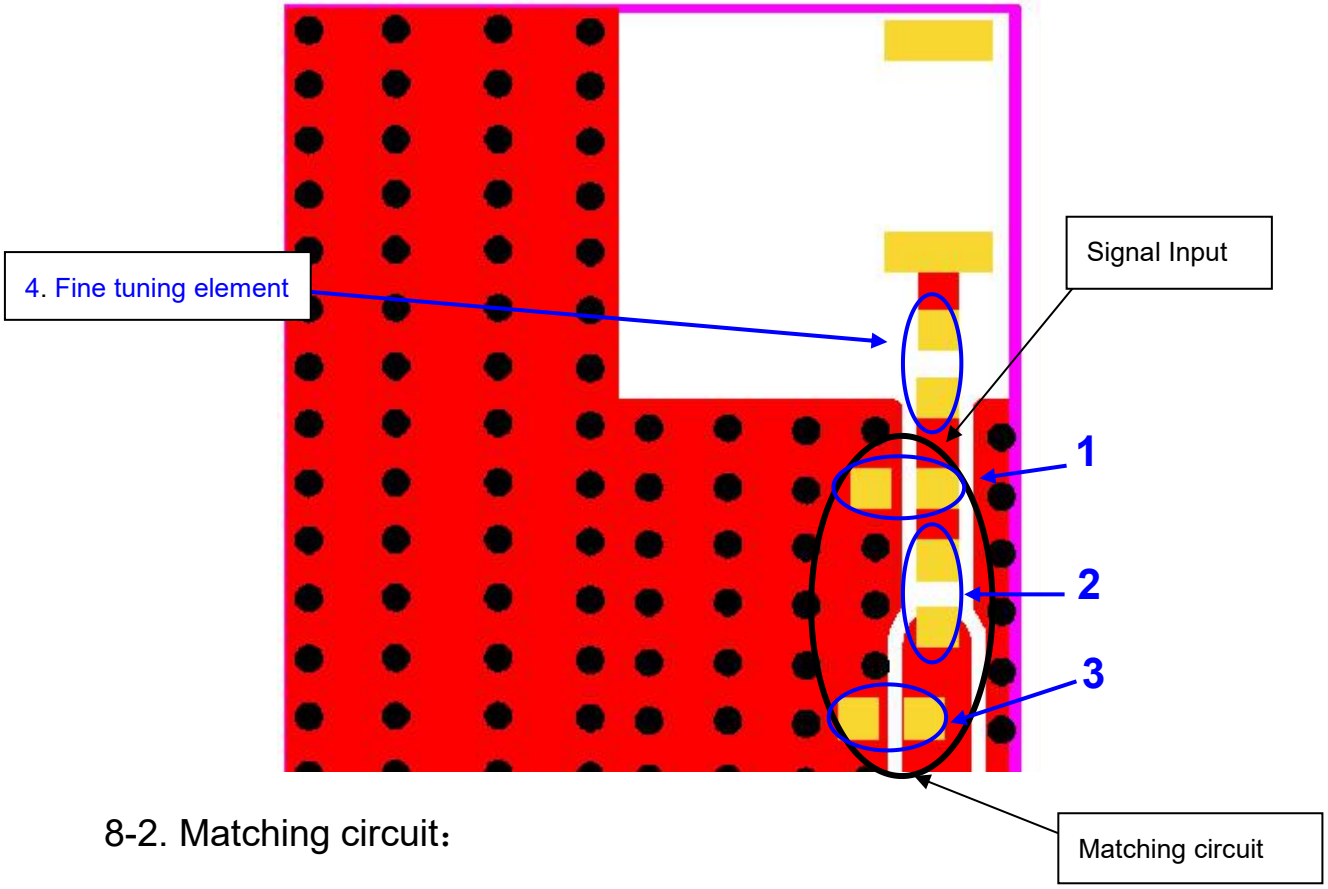
Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-2.9	-2.8	-2.7	-2.7	-2.6	-2.6	-2.5	-2.5	-2.6	-2.5	-2.5	-2.4	-2.5	-2.5	-2.6	-2.7
Efficiency(%)	51.8	52.1	53.1	54.3	54.9	55.5	55.7	56.3	55.4	56.4	56.5	57.1	56.8	56.6	54.4	53.1
Peak Gain(dBi)	1.2	1.2	1.3	1.3	1.3	1.4	1.6	1.5	1.5	1.5	1.4	1.5	1.4	1.4	1.2	1.1

7-3. 3D Efficiency vs. Frequency



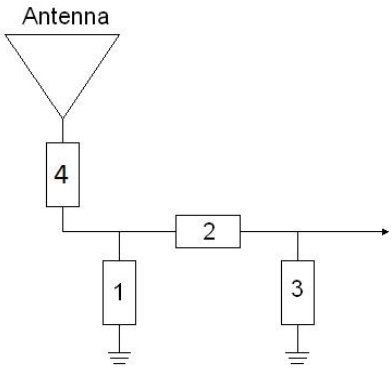
8. Frequency tuning and Matching circuit

8-1. Chip antenna tuning scenario：



8-2. Matching circuit：

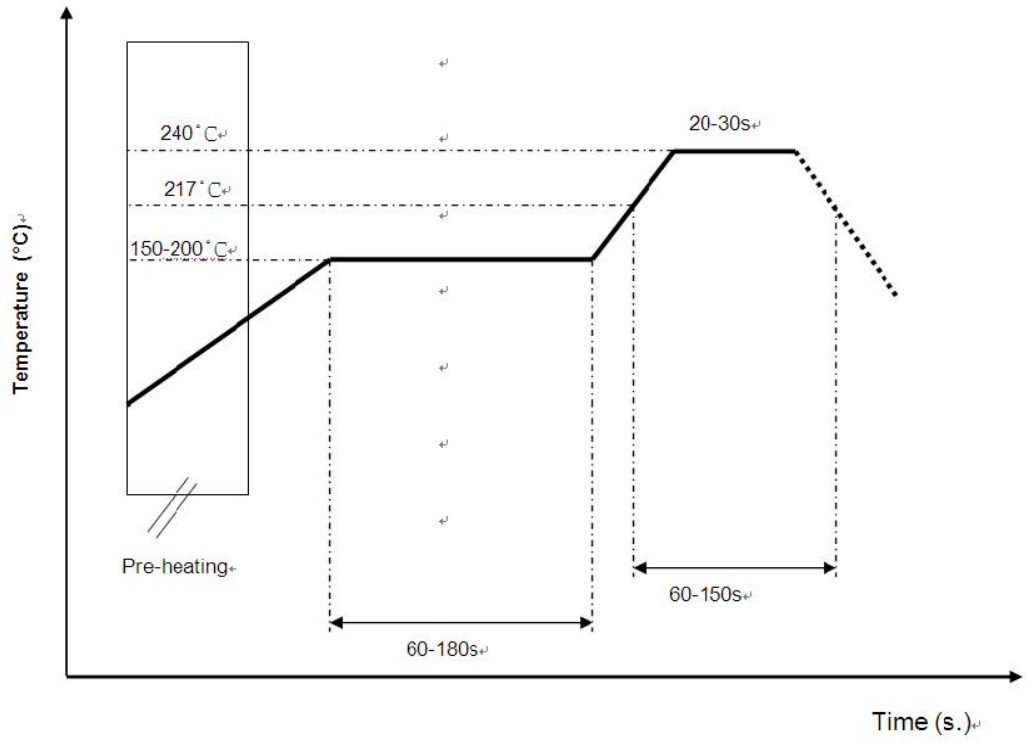
With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz at our standard 40 x 40 mm^2 evaluation board. However, these are typical reference values that may need to be changed when circuit boards or part vendors are different.



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	8.2nH, (0402)	MURATA	±2%

9. Soldering Conditions

Typical Soldering Profile for Lead-free Process



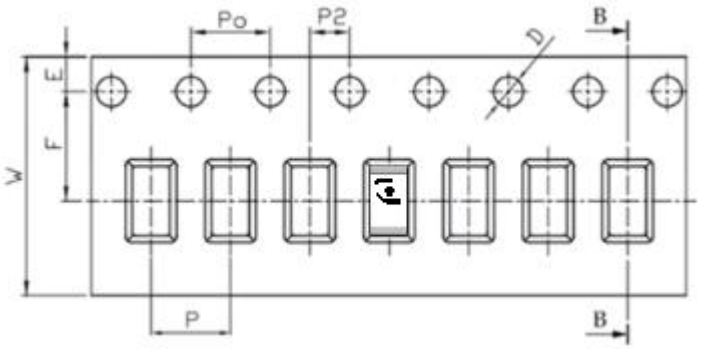
*Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead Free solder paste

10. Packing

(1) Quantity/Reel: 2000pcs/Reel

(2) Plastic tape: Black Conductive Polystyrene.

a. Tape Drawing



b. Tape Dimensions (unit: mm)

Feature	Specifications	Tolerances
W	8.00	±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 -0.00
Po	4.00	±0.10
10Po	40.00	±0.20

11. Operating & Storage Conditions

11-1. Operating

(1) Maximum Input Power: 2 W

(2) Operating Temperature: -40℃ to 85℃

(3) Relative Humidity: 10% to 70%

11-2. Storage (sealed)

(1) Storage Temperature: -5℃ to 40℃

(2) Relative Humidity: 20% to 70%

(3) Shelf Life: 1 year

11-3. Storage (unsealed)

Meet the criteria of J-STD-033 MSL2a

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

(1) Storage Temperature: -40℃ to 85℃

(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.