

5.0 x 2.2 x 1.0 (mm) WiFi / Bluetooth Chip Antenna (CW503)

Engineering Specification

1. Product Number

H 2 U 3 6 F 1 K 1 B 0 3 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 CW503 chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500MHz. Fabricated with proprietary design and processes, CW503 shows excellent performance and is fully compatible with SMT processes



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Designed by : **Peter**

Checked by : **Mike**

Approved by : **Herbert**

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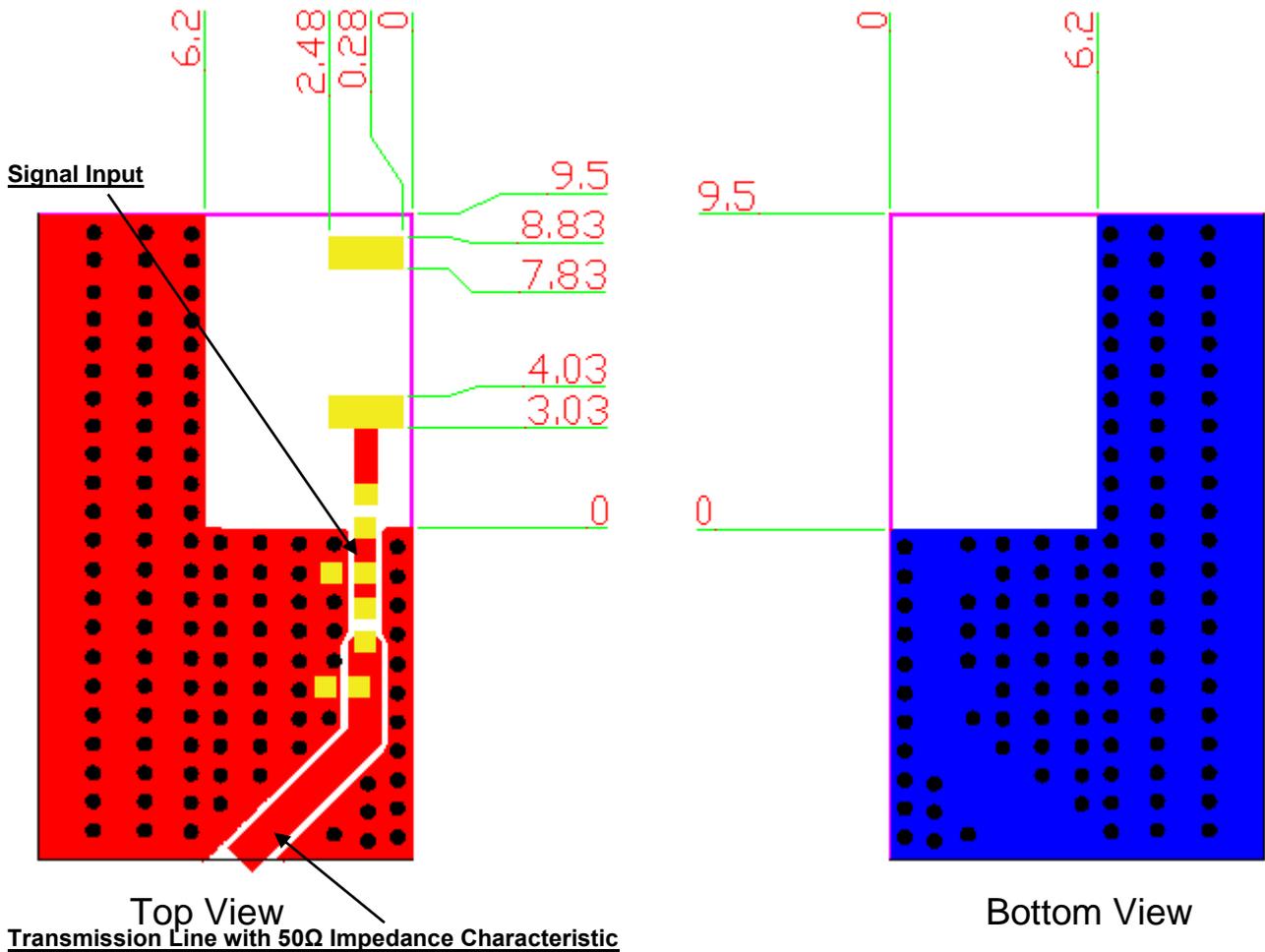
which can decrease the assembly cost and improve device's quality and consistency.

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 customer's installation conditions.



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

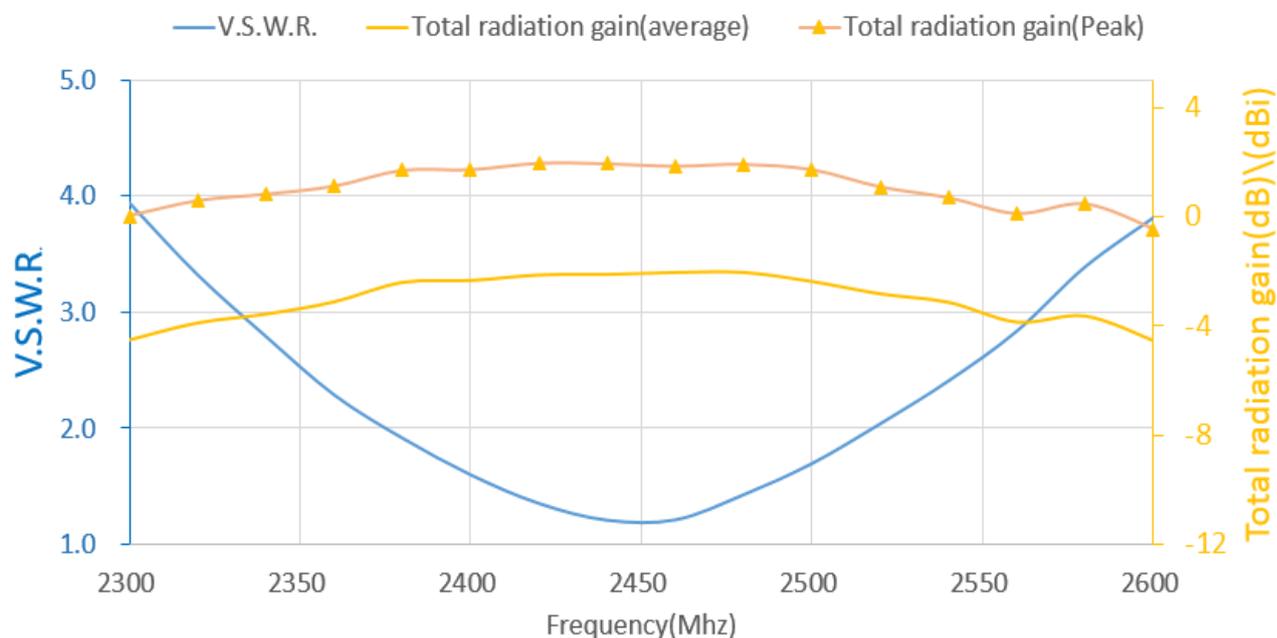
5-2-1. Electrical Table (2400~2500 MHz Band)

Characteristics		Specifications	Unit
Outline Dimensions		5.0 x 2.2 x 1.0	mm
Ground Plane Dimensions		40 x 40	mm
Working Frequency		2400~ 2500	MHz
VSWR (@ center frequency)*		1.2Max	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	1.9(typical**)	dBi
Efficiency		62.3(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. Frequency vs. V.S.W.R. and Total Radiation Gain



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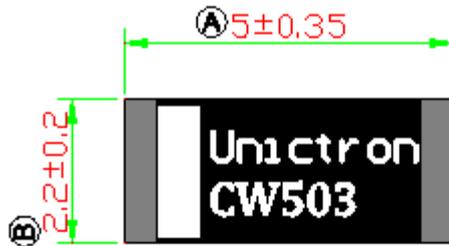
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6. Outline Dimensions of Antenna & Evaluation Board (unit: mm)

6-1. Antenna Dimensions



Top View



Left View



Front View



Right View



Bottom View

NOTE:

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

PIN Definition



Top View



Bottom View



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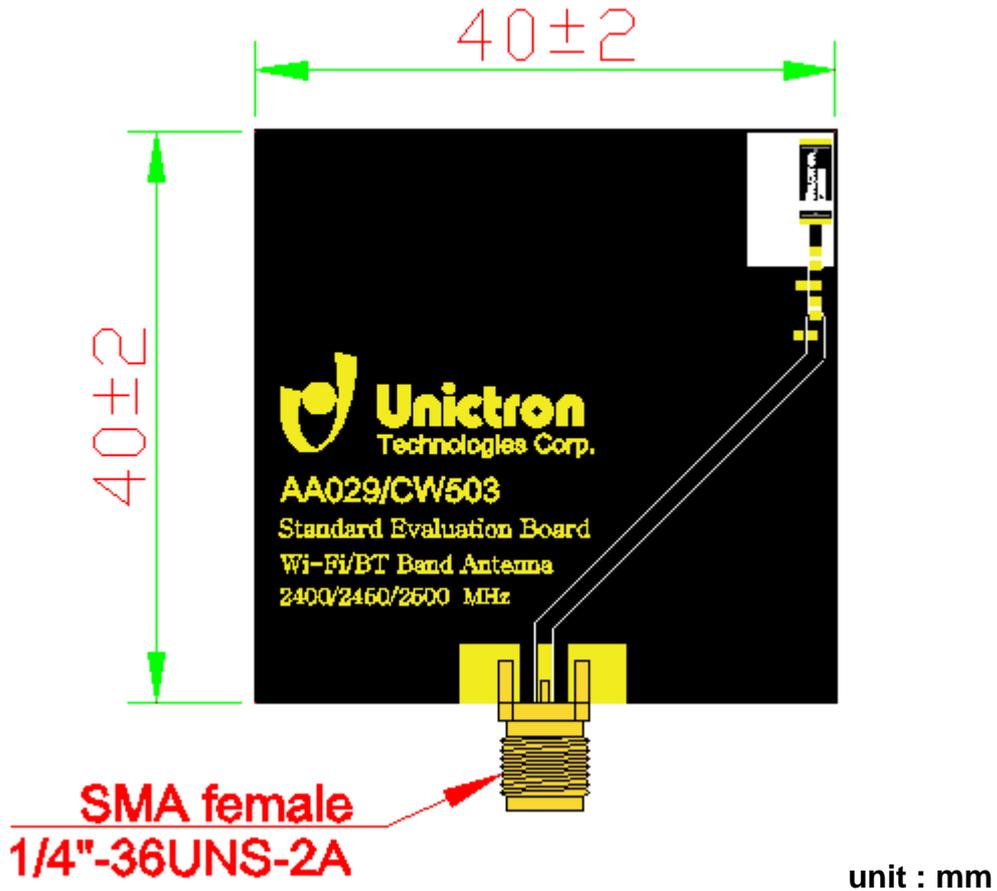
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PIN	1	2
Soldering PAD	Signal	N/C

6-2.

Evaluation Board with Antenna



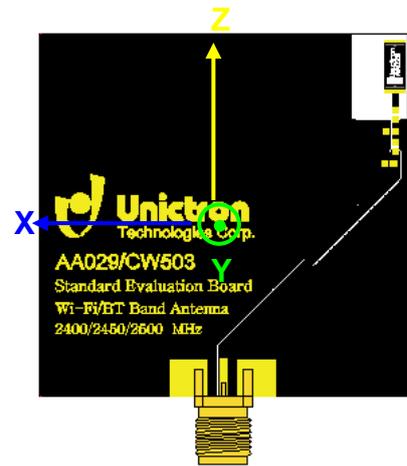
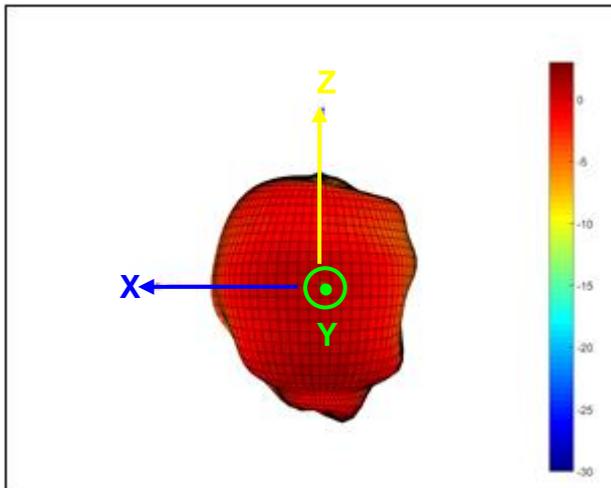
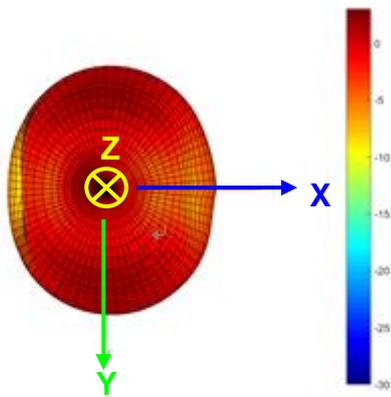
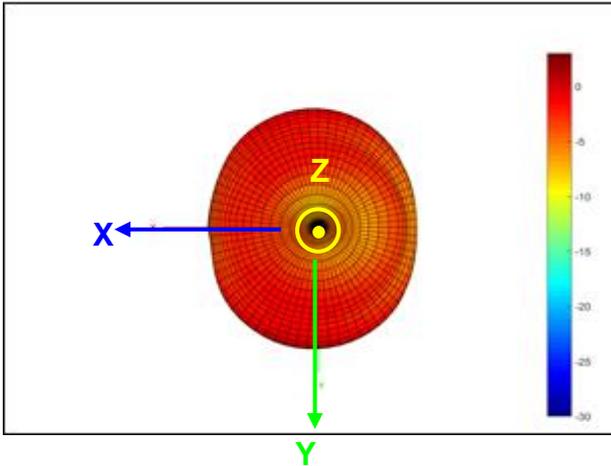
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7. 3D Radiation Gain Pattern (with 40 x 40 mm² Evaluation Board)
 3D Radiation Gain Pattern @ 2450 MHz (unit: dBi)



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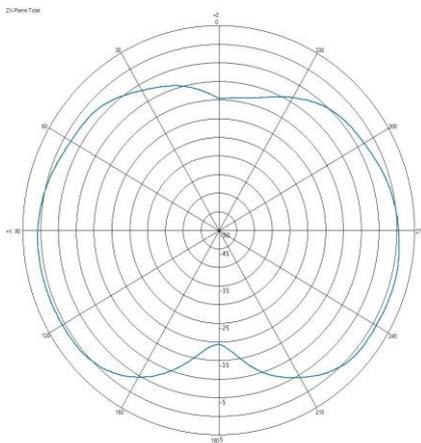
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7-2. 3D Efficiency Table

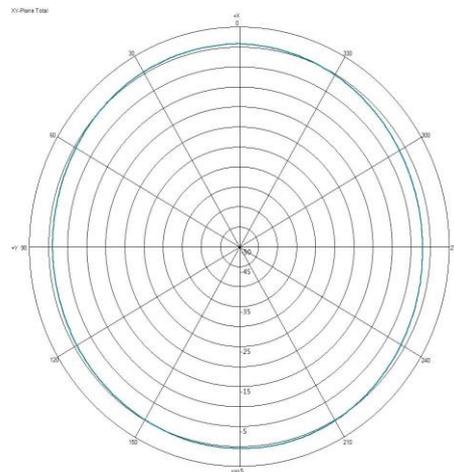
Frequency(MHz)	2400	2410	2420	2430	2442	2450	2460	2470	2480	2490	2500
Efficiency (dB)	-1.4	-1.0	-0.9	-0.7	-0.7	-0.8	-0.9	-1.1	-1.2	-1.3	-1.4
Efficiency (%)	58.8	59.7	60.3	61.4	61.5	62.0	61.0	60.6	60.1	58.6	57.5
Gain (dBi)	1.4	1.5	1.6	1.7	1.8	1.9	1.8	1.7	1.6	1.5	1.4

7-3. 3D Efficiency vs. Frequency

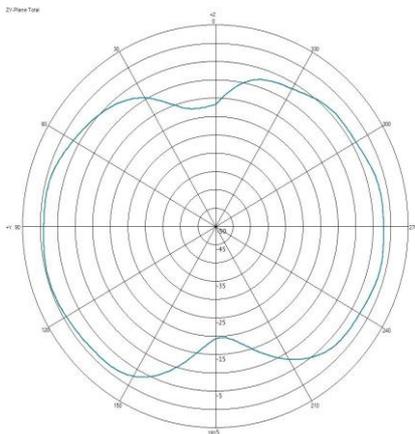
Channel(MHz) 2450 ZX-Plane Theta Max.(dB)



Channel(MHz) 2450 XY-Plane Theta Max.(dB)



Channel(MHz) 2450 ZY-Plane Theta Max.(dB)



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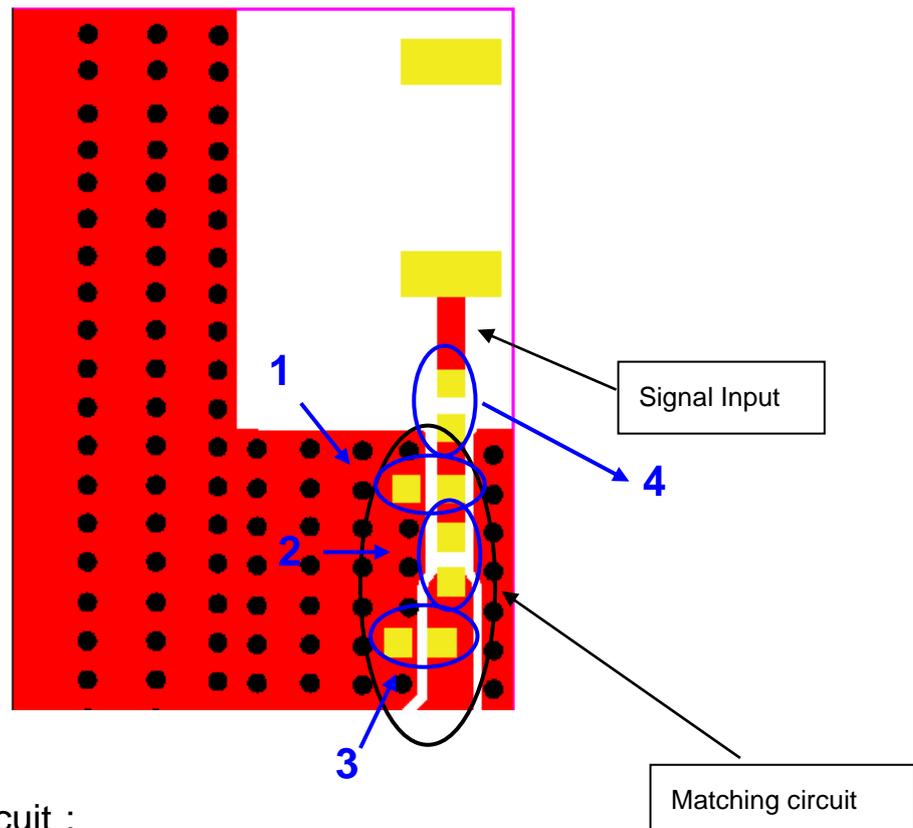
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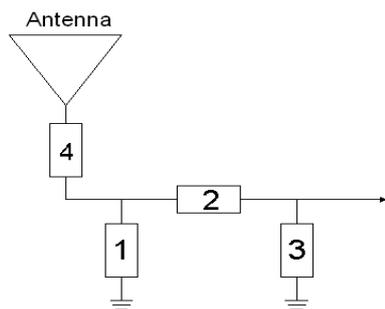
8. Frequency tuning and Matching circuit

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 2450 MHz at our standard 40x40 mm² evaluation board. However, these are reference values, may need to be changed when the circuit boards or part vendors are different.



System Matching Circuit Component			
Location	Description	Vendor	Tolerance
1	N/A*	-	-
2	3.3nH, (0402)	DARFON	±0.1nH
3	1.5pF, (0402)	MURATA	±0.1pF
4	0Ω, (0402)	-	-



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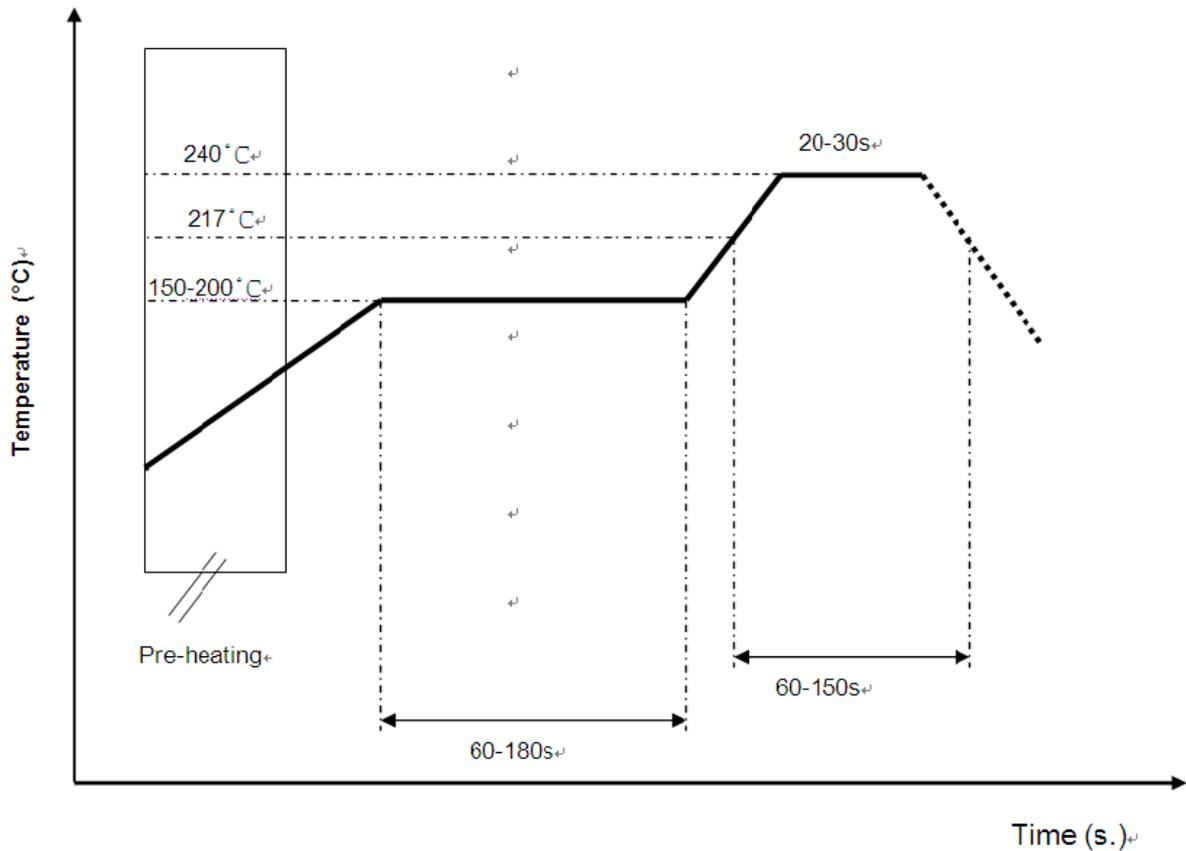
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9. Soldering Conditions

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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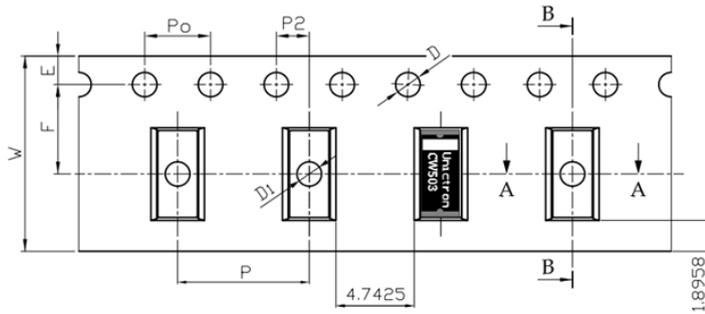
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10. Packing

- (1) Quantity/Reel: 5000 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	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
D1	1.50	±0.10
10Po	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
- (3) Relative Humidity: 10% to 70%

11-2. Storage (sealed)

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

11-3. Storage (unsealed)

Meet the criteria of J-STD-033 MSL2a



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

(1) Storage Temperature: -40°C to 85°C

(2) Relative Humidity: 10% to 70%

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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