

|             |                         |
|-------------|-------------------------|
| Document    | Datasheet               |
| Type        | Dielectric Chip Antenna |
| Application | 2.4GHz                  |
| Part No.    | AMAN301512ST01          |
| Revision    | 2.2                     |

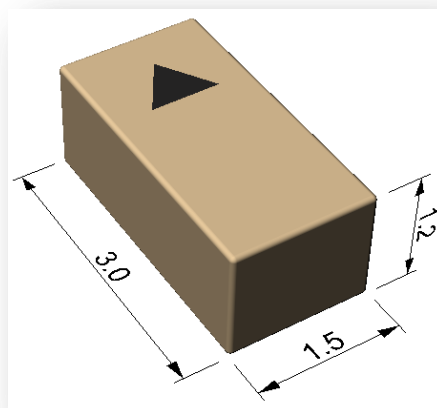
# DATASHEET

## Application

Bluetooth  
Zigbee  
WLAN (IEEE 802.11 b/g)  
ISM 2.4GHz Wireless Devices

## Features

PIFA Structure  
Small Size ( $3.0 \times 1.5 \times 1.2 \text{mm}^3$ )  
Easy Optimizing  
with external lumped matching components  
SMT Available under Pb-free Condition  
RoHS Compliant



**AMOTECH**

### Notes

*The contents of this datasheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.*

## Revision History

| Rev. No | Date     | Title  | Contents                                   | Page  |
|---------|----------|--------|--------------------------------------------|-------|
| 0       | 08.09.30 |        | New published                              |       |
| 1       | 09.03.24 | Data   | Added Efficiency data                      | 8     |
|         |          |        | Changed carrier tape width (W16mm → W12mm) | 12    |
| 1.1     | 09.04.07 | Format | Changed document format                    |       |
| 1.2     | 14.08.06 |        | Corrected the miswritten values            | 3     |
| 2       | 14.09.26 | Data   | Changed Antenna Specification & Parameter  | 3,5,6 |
| 2.1     | 15.08.01 | Data   | Added Peak gain                            | 3, 6  |
| 2.2     | 15.12.23 | Data   | Added Cautions (Recommendations)           | 7     |

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## 1. Specifications

### 1.1 Electrical Specifications

| No | Item                   | Spec.        | Remark |
|----|------------------------|--------------|--------|
| 1  | Frequency Range [MHz]  | 2400 ~ 2485  |        |
| 2  | VSWR                   | Max 3.0:1    |        |
| 3  | Avg. Gain [dBi]        | Typical -2.6 |        |
| 4  | Peak Gain [dBi]        | Typical 0.5  |        |
| 5  | Efficiency [%]         | Typical 55   |        |
| 6  | Polarization           | Linear       |        |
| 7  | Impedance [ $\Omega$ ] | Nominal 50   |        |

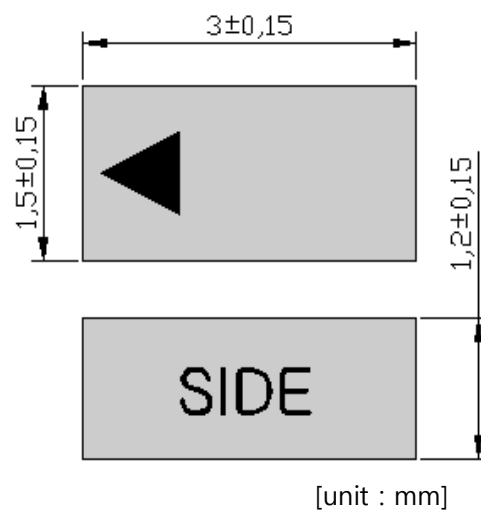
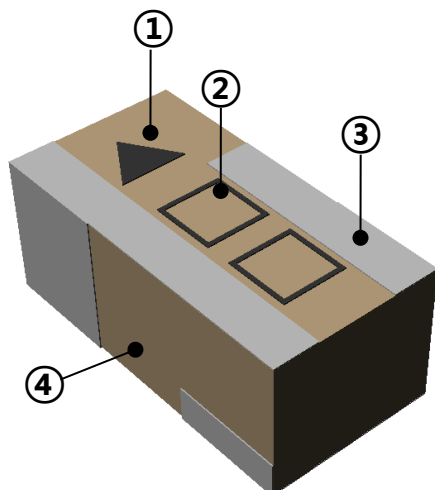
- ✓ The results are measured on the 50x50mm<sup>2</sup> evaluation board(EVB).
- ✓ See Page 6. for more detail gain parameter

### 1.2 Mechanical Specifications

| No | Item                  | Spec.                       | Remark |
|----|-----------------------|-----------------------------|--------|
| 1  | Dimensions (LxWxH)    | 3.0x1.5x1.2 mm <sup>3</sup> |        |
| 2  | Unit Weight           | typ. 20 mg                  |        |
| 3  | Operating Temperature | -40 ~ +85 °C                |        |

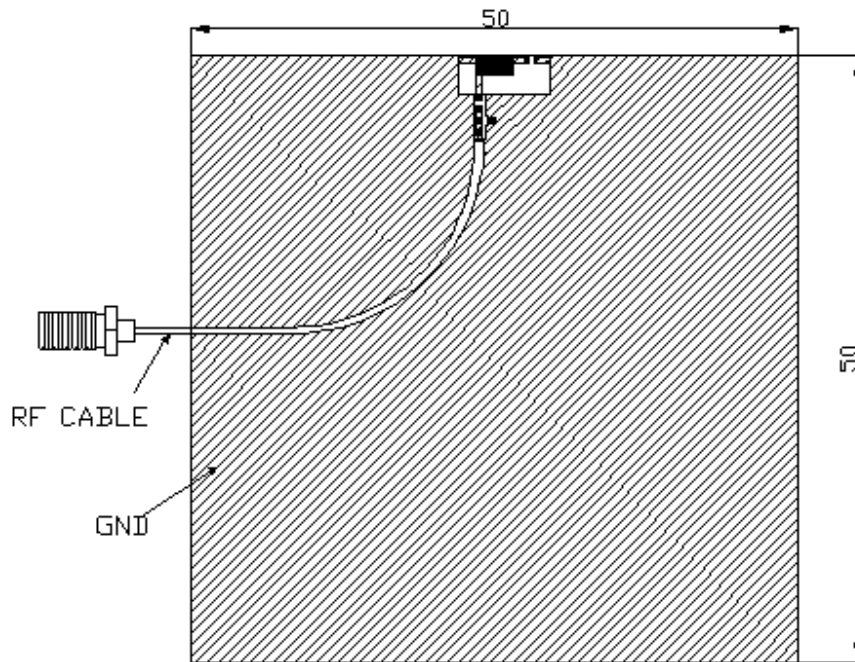
### 1.3 Appearance & Material

| No | Item         | Function          | Material |
|----|--------------|-------------------|----------|
| ①  | Marking      | Feeding Index     | Ink      |
| ②  | Marking      | Week number       | Ink      |
| ③  | Electrode    | Radiation Element | Ag       |
| ④  | Ceramic Body | -                 | Ceramic  |



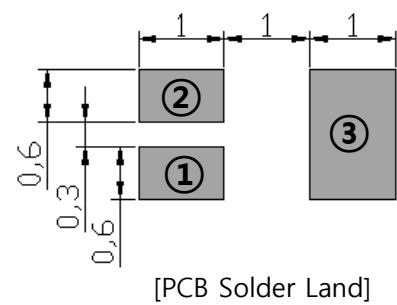
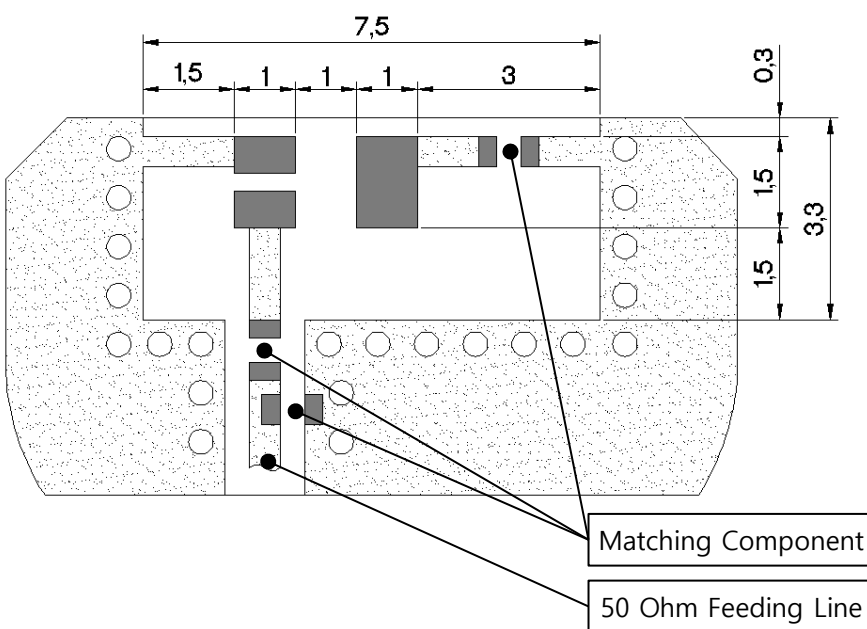
## 2. PCB Design for Test

### 2.1 Evaluation Board Dimension



- ✓ Evaluation board size ~ 50x50
- ✓ Fill Cut Area (GND Clearance) ~ 7.5x3.3

### 2.2 PCB Design Guide

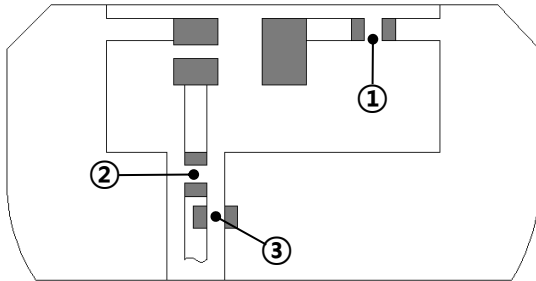


| No | Pin Assignment |
|----|----------------|
| ①  | Feeding        |
| ②  | GND            |
| ③  | GND            |

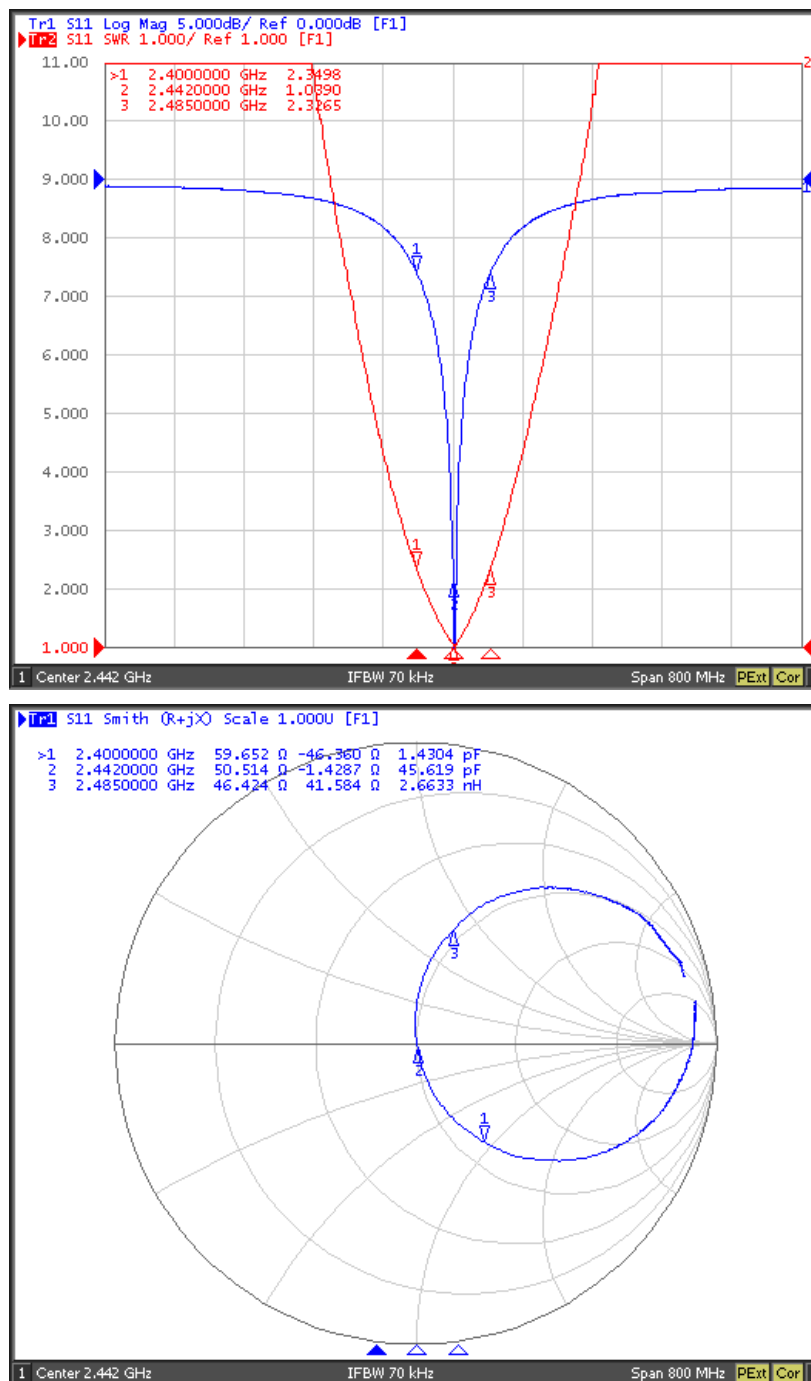
[unit : mm]

### 3. Measurement Result

#### 3.1 Typical Measurement Result (VSWR/RL, Smithchart)



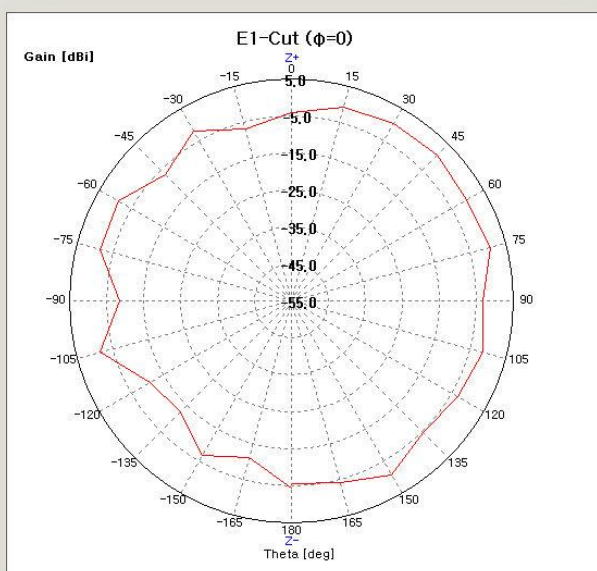
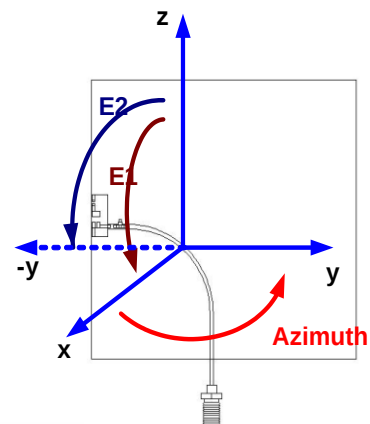
| No | Matching Value |
|----|----------------|
| ①  | 1.0 nH         |
| ②  | 4.7 nH         |
| ③  | 1.2 pF         |



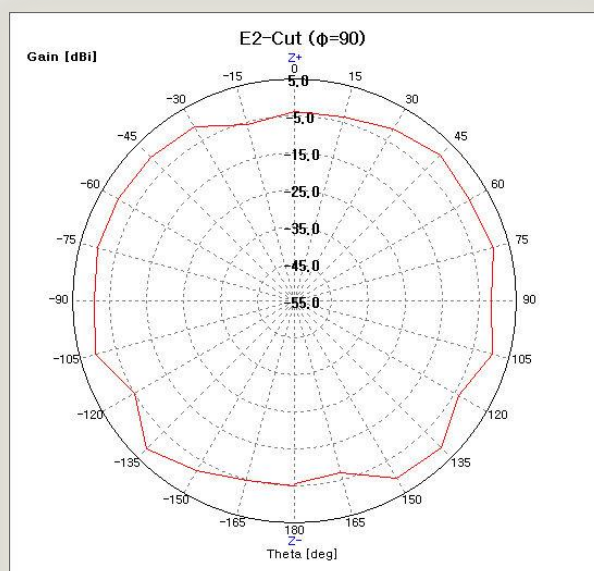
✓ The results are measured on the 50x50mm<sup>2</sup> evaluation board(EVB).

### 3.2 Typical Measurement Result (Gain, Radiation Pattern)

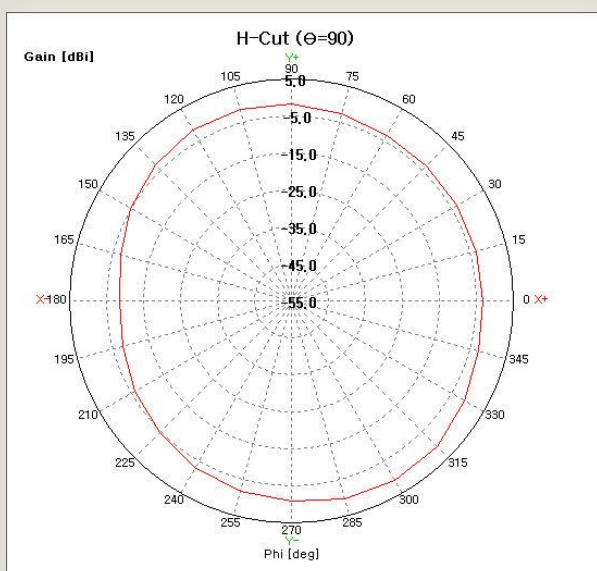
| Freq. [MHz] | Efficiency (%) | Avg. Gain (dBi) | Peak Gain (dBi) |
|-------------|----------------|-----------------|-----------------|
| 2400        | 54.2           | -2.7            | 1.0             |
| 2442        | 71.5           | -1.5            | 1.8             |
| 2485        | 56.5           | -2.5            | 0.5             |



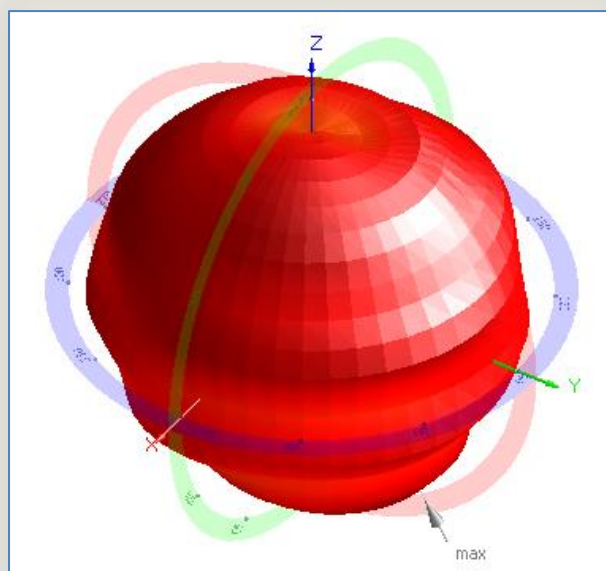
[Elevation1 plane @2.442GHz ]



[Elevation2 plane @2.442GHz ]

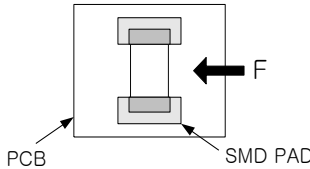


[Azimuth plane @2.442GHz ]



[3D Radiation Pattern]

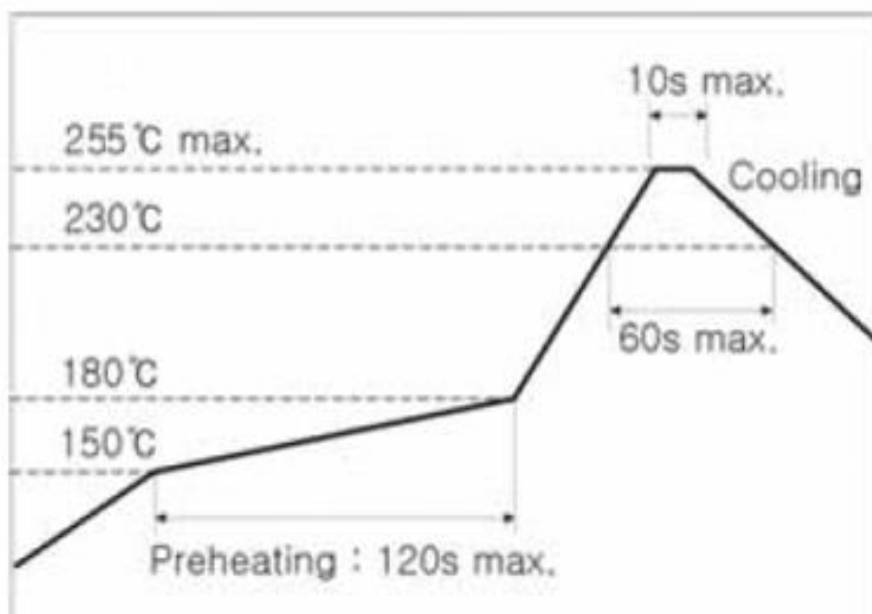
#### 4. Reliability

| No | Item                             | Test Condition                                                                                                                                  | Test Requirements                                                   |
|----|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1  | Adhesive Strength of Termination | 1. Applied force on SMT chip till detached point from PCB.<br> | 1. No mechanical damage by applied force<br>2. Strength (F) > 3 kgf |
| 2  | Thermal Shock (Cycle)            | 1. Step 1 : $-40 \pm 3^{\circ}\text{C}$ , 30 min<br>Step 2 : $+125 \pm 3^{\circ}\text{C}$ , 30 min<br>2. Number of cycle : 30                   | 1. No visual damage<br>2. Within electric spec (VSWR)               |
| 3  | High Temperature Resistance      | 1. Temperature : $+125 \pm 5^{\circ}\text{C}$<br>2. Time : $1000 \pm 24$ hrs                                                                    | 1. No visual damage<br>2. Within electric spec (VSWR)               |
| 4  | Low Temperature Resistance       | 1. Temperature : $-40 \pm 5^{\circ}\text{C}$<br>2. Time : $1000 \pm 24$ hrs                                                                     | 1. No visual damage<br>2. Within electric spec (VSWR)               |
| 5  | Humidity                         | 1. Humidity : 85 % RH<br>Temperature : $+85 \pm 3^{\circ}\text{C}$<br>2. Time : $1000 \pm 24$ hrs                                               | 1. No visual damage<br>2. Within electric spec (VSWR)               |

#### 5. Cautions (Recommendations )

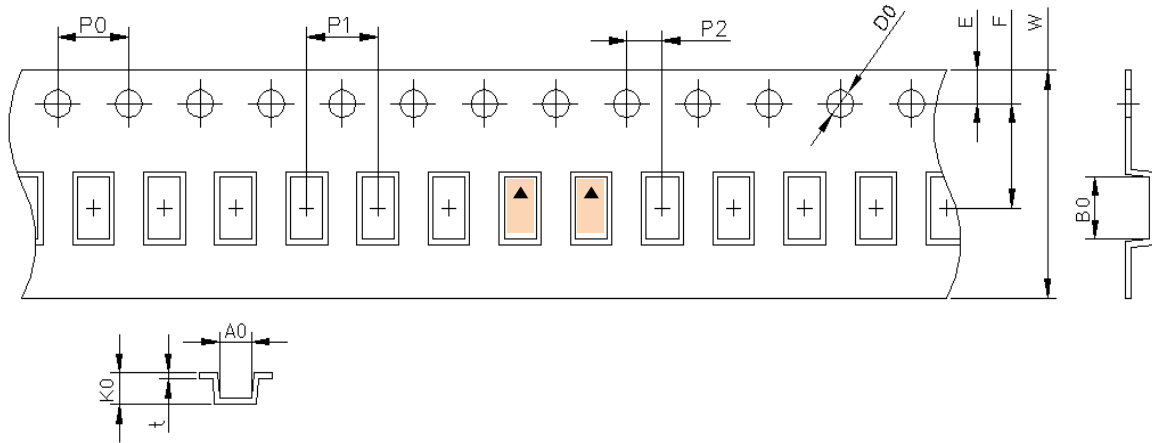
- ✓ Storage environment of parts must be at ambient temperatures of 5 to  $40^{\circ}\text{C}$  and maximum 60%RH humidity
- ✓ The parts should be used within 6 months from the time of delivery. If stored for over 6 months, check for solder ability before use.

#### 6. Soldering Reflow Profile



## 7. Packaging

### 7.1 Carrier Tape Dimension



| Item | Spec.      | Item | Spec.      | Item | Spec.       |
|------|------------|------|------------|------|-------------|
| A0   | 1.80 ±0.10 | P0   | 4.00 ±0.10 | E    | 1.75 ±0.10  |
| B0   | 3.30 ±0.10 | P1   | 4.00 ±0.10 | F    | 5.50 ±0.10  |
| K0   | 1.35 ±0.10 | P2   | 2.00 ±0.10 | W    | 12.00 ±0.30 |
| D0   | 1.55 ±0.05 | -    | -          | t    | 0.30 ±0.05  |

### 7.2 Packaging Quantity

| Item       | Quantity                  | Dimension                          |
|------------|---------------------------|------------------------------------|
| Reel       | 2,500ea                   | Φ7" * 12mm                         |
| Inner Box  | 7,500 ea (3 reel)         | 185 * 185 * 68 (mm <sup>3</sup> )  |
| Outer Box1 | 37,500 ea (5 Inner Box)   | 365 * 200 * 200 (mm <sup>3</sup> ) |
| Outer Box2 | 105,000 ea (14 Inner Box) | 390 * 390 * 280 (mm <sup>3</sup> ) |

### 7.3 Packaging Label

**AMOTECH Co., Ltd.**

5BL-1Lot, 617, Namchon-Dong, Namdong-Gu, Incheon, Korea

**Dielectric Chip Antenna**

P/N : AMAN301512ST01

Lot No :

Quantity : 2,500 pcs    Date : 2009/04/09