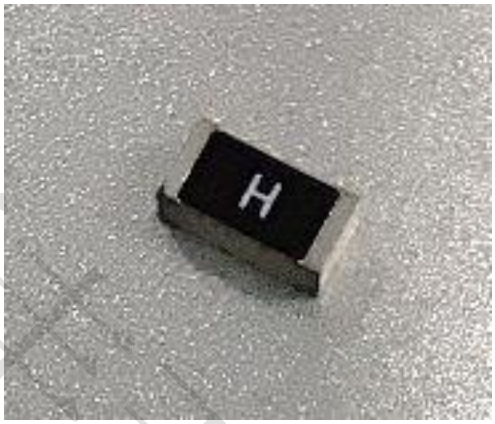
# 3.2X1.6X1.0 (mm) WiFi/Bluetooth Ceramic Chip Antenna

## Antenna data sheet

## 1. Product Number

| YF | 3216 | H3 | X | 2G45 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |




| | |
|---|---|
| (1)Product Type | Chip Antenna |
| (2)Size Code | 3.2x1.6x1.0mm |
| (3)Type Code | H3 |
| (4)Packing | Plastic Packaging |
| (5)Frequency | 2.45GHz |


Manufacturer： SHEN ZHEN YINGFENG ANTENNA TECHNOLOYCO.,LTD

Address： 412, Building 7, Phase II, Nanshan Yungu Pioneer Park, No. 2, Pingshan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen

## 2. Features

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

## 3. Applications

*Bluetooth earphone systems
*Hand-held devices when WiFi /Bluetooth functions are needed, e.g., Smart phone.
*IEEE802.11 b/g/n
*ZigBee
*Wireless PCMCIA cards or USB dongle

## 4. Description

Yingfeng chip antenna series are specially designed for WiFi/Bluetooth applications. Based on yingfeng proprietary design and processes, this chip antenna has excellent stability and sensitivity to consistently provide high signal reception efficiency.

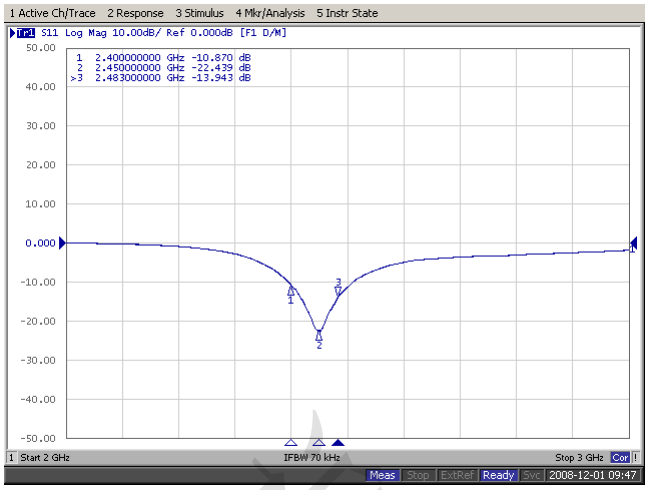
## 5. Electrical Specifications (80 x 40 mm$^2$ ground plane)

5-1. Electrical Table

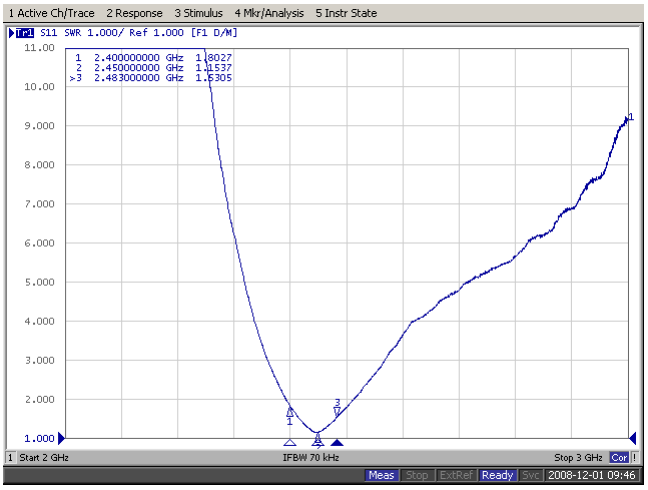
| Characteristics | | Specifications | Unit |
|---|---|---|---|
| Outline Dimensions | | 3.2x1.6x1.0 | mm |
| Working Frequency | | 2400~2500 | MHz |
| VSWR | | 2 Max. | |
| Impedance | | 50 | Ω |
| Polarization | | Linear Polarization | |
| Gain | Peak | 2.5(typical) | dBi |
| | Efficiency | 80 (typical) | % |

## 5-2. Return Loss & VSWR

Return Loss ($S_{11}$)



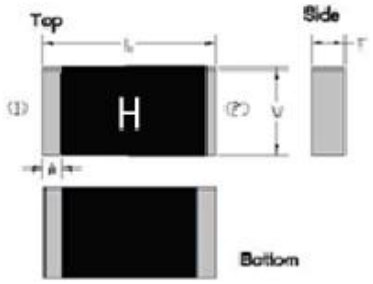

VSWR($S_{11}$)




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

a. Antenna Dimensions

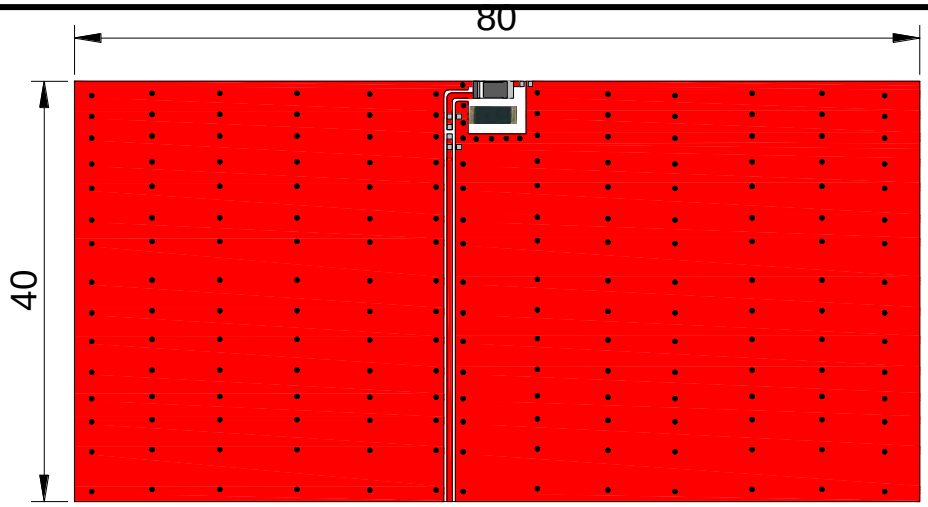
**Dimension and Terminal Configuration**




| Dimension (mm) | |
|---|---|
| L | 3.15+-0.15 |
| W | 1.55+-0.15 |
| T | 1.0+-0.10 |
| A | 0.35+-0.10 |

| No. | Terminal Name |
|---|---|
| 1 | Feeding point |
| 2 | GND |

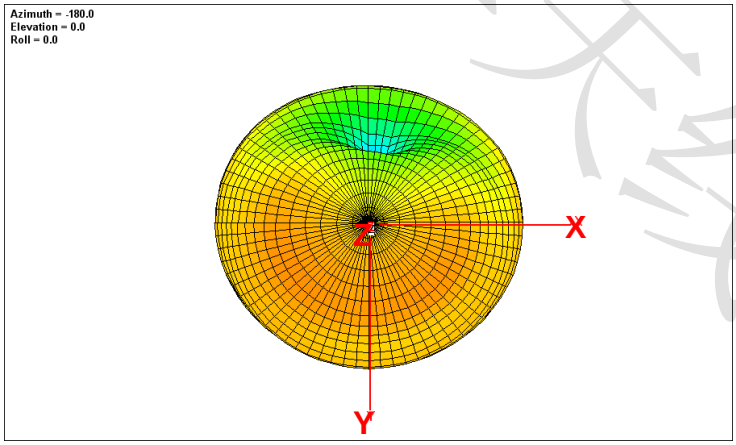
b. Test Board with Antenna

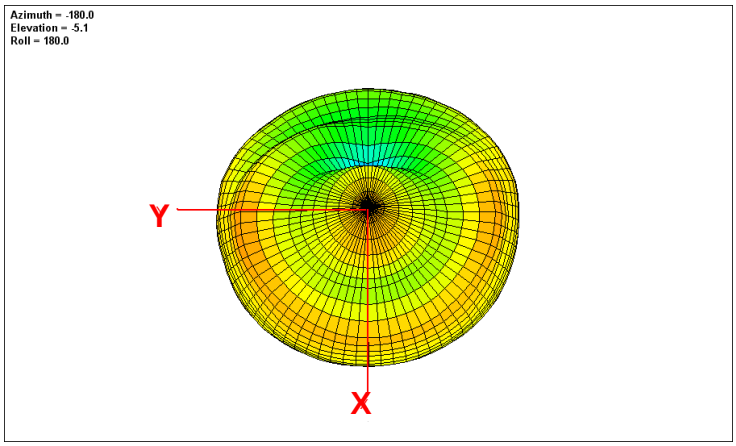


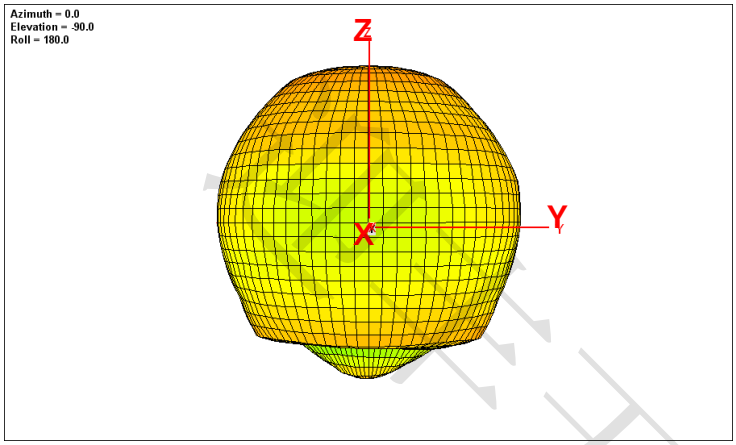

**Unit: mm**

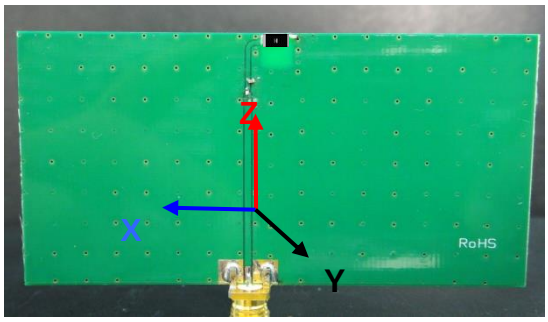
## 7. Radiation Pattern (80 x 40 mm² ground plane)

7-1. 3D Gain Pattern @ 2442 MHz





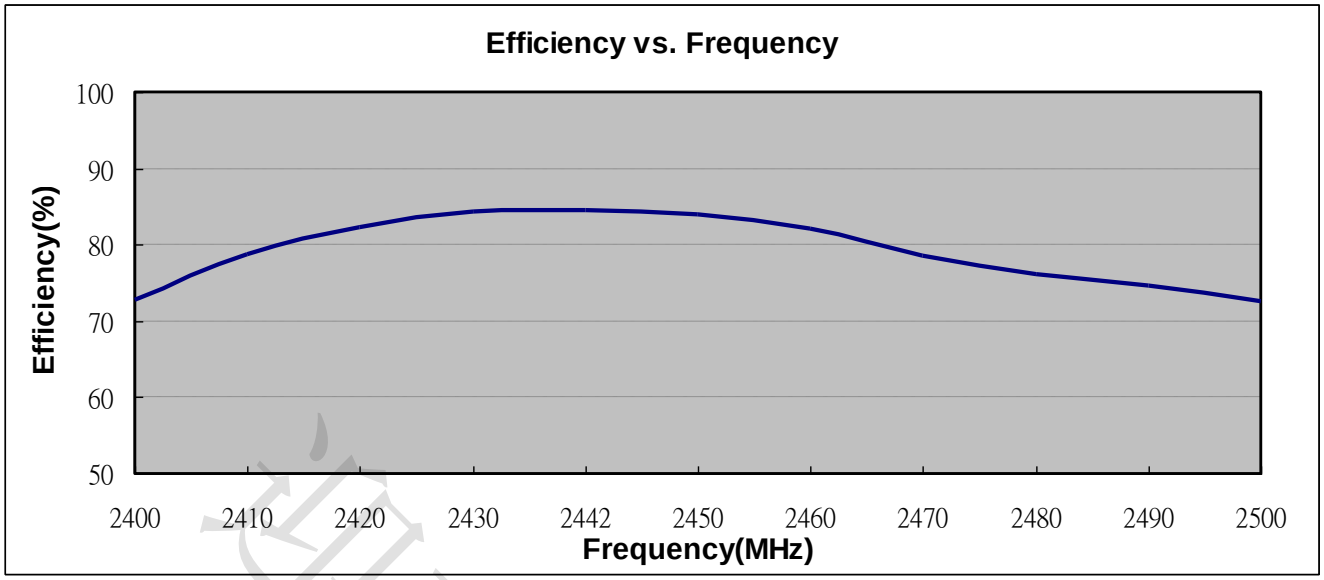




## 7-2. 3D Efficiency Table

| 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 (%) | 72.8 | 73.7 | 74.3 | 74.4 | 75.5 | 75.0 | 74.0 | 73.6 | 73.1 | 72.6 | 71.5 |
| Gain (dBi) | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 2.5 | 2.4 | 1.8 | 1.7 | 1.6 | 1.4 |

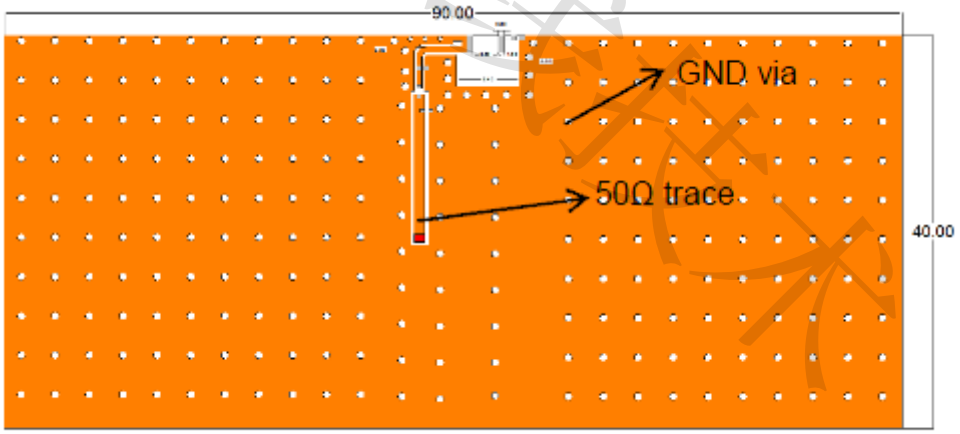
7-3. 3D Efficiency vs. Frequency



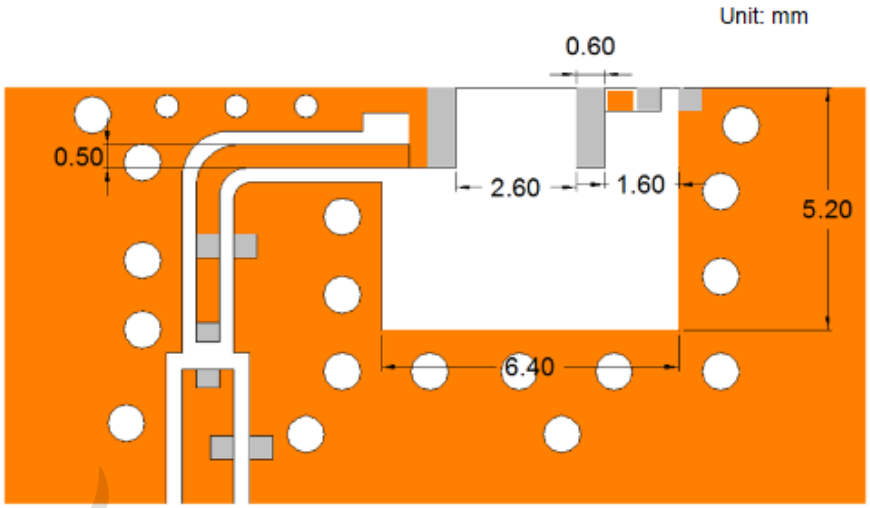

# 8. Layout Guide

a. Solder Land Pattern:

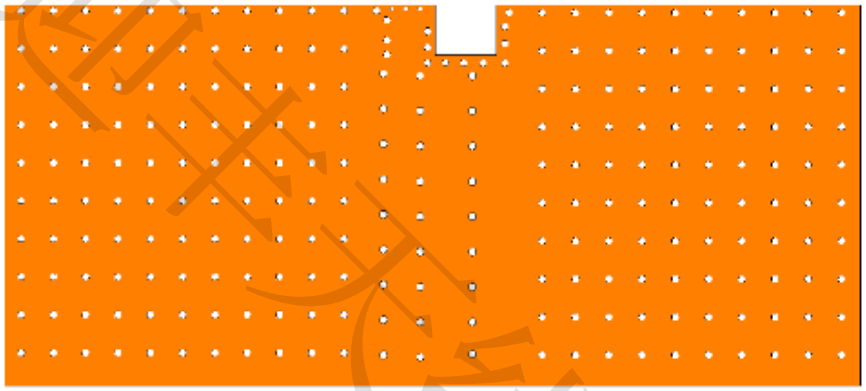
Land pattern for soldering (gray marking areas) is as shown below. Depending on Customer's requirement, matching circuit as shown below is also recommended.




Top view



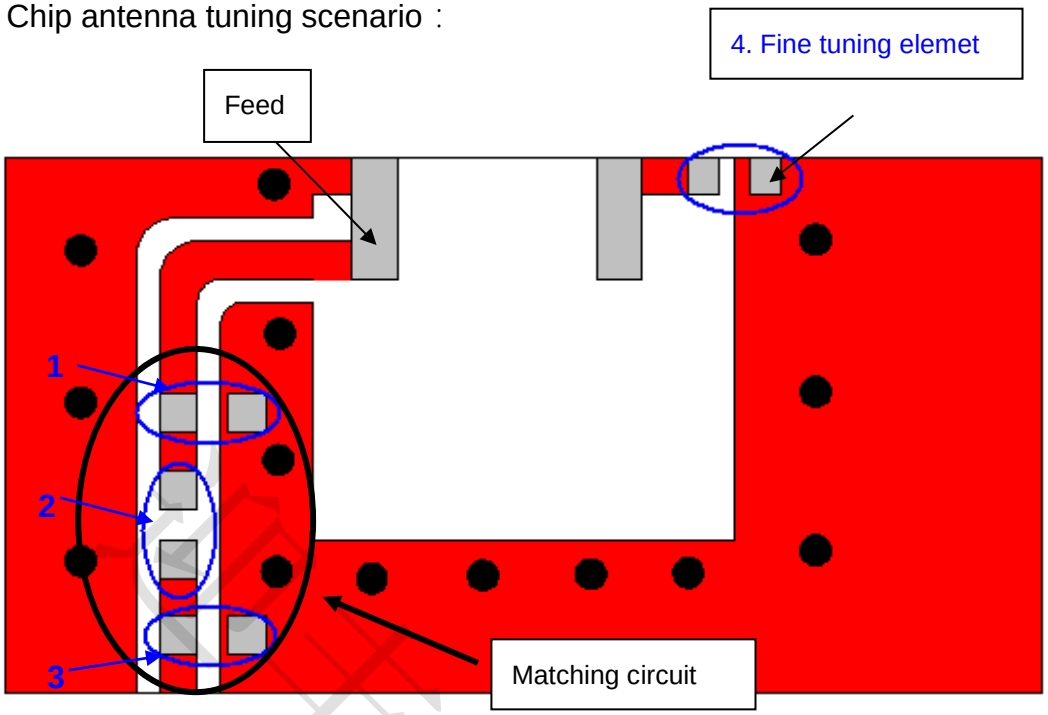

Detail view



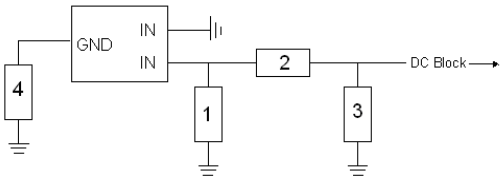
Bottom view

# 9. Frequency tuning

a. Chip antenna tuning scenario：



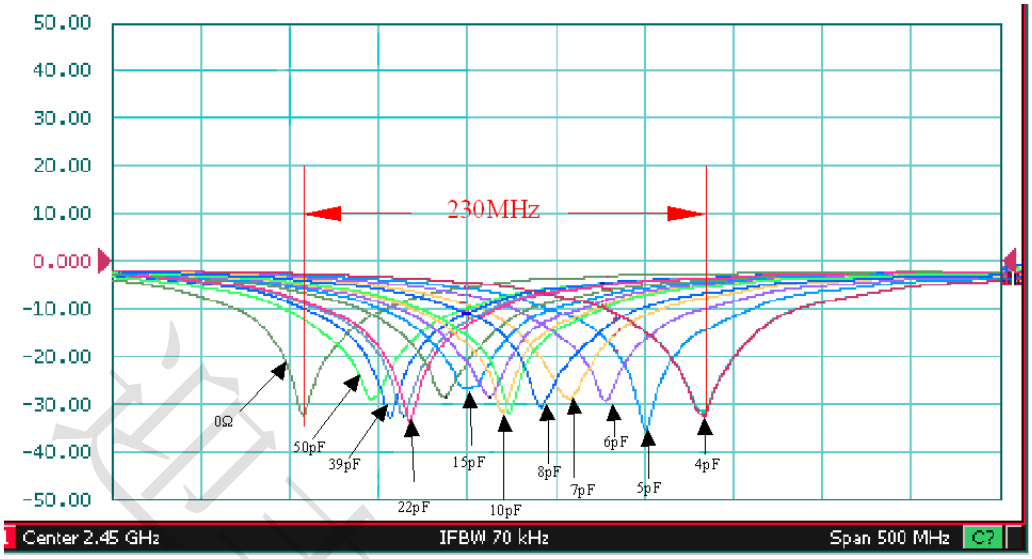

b. Matching circuit：(Center frequency is about 2442 MHz @ 80 x 40 mm$^2$ ground plane)




| System Matching Circuit Component | | | |
|---|---|---|---|
| Location | Description | Vendor | Tolerance |
| 1 | 1.2 pF* | Murata (0402) | ±0.1 pF |
| 2 | 10PF* | Murata(0402) | ±0.5 PF |
| 3 | N/A* | - | - |
| Fine tuning element 4 | 1.5 pF* | Murata (0402) | ±0.1 pF |

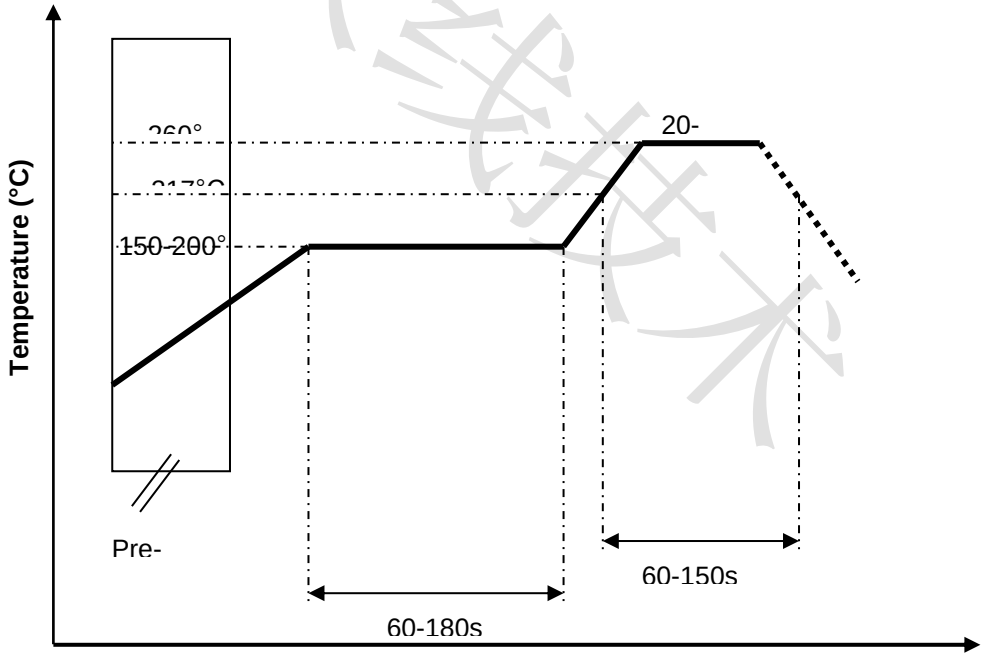
*Typical reference values which may need to be changed when circuit boards or part vendors are different.

c. Fine tuning element vs. Center frequency




## 10. Soldering Conditions

a. Typical Soldering Profile for Lead-free Process

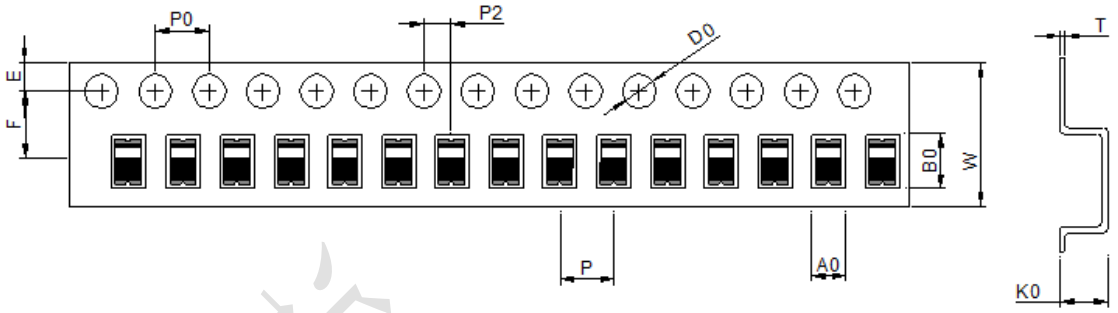


# 11. Packing

(1) Quantity/Reel: 3000 pcs/Reel:

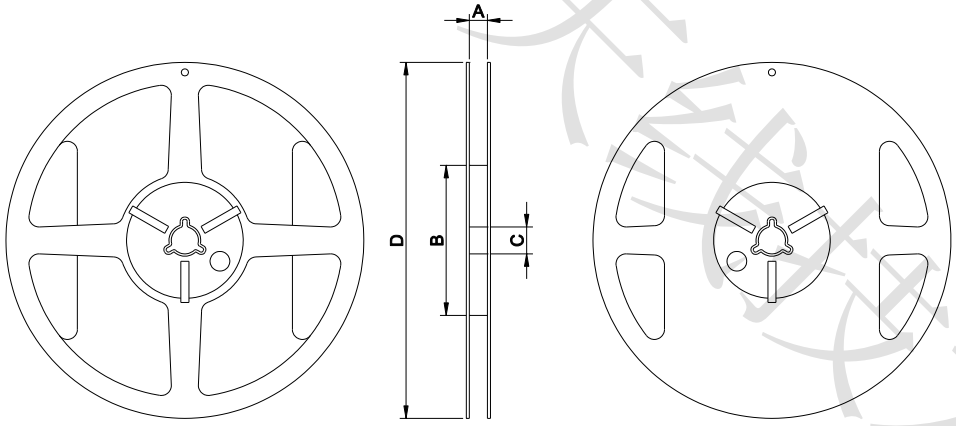
## Packaging Information

◆ **Tape Specification:**



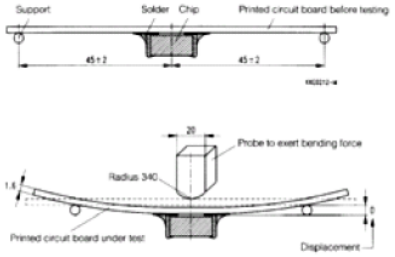
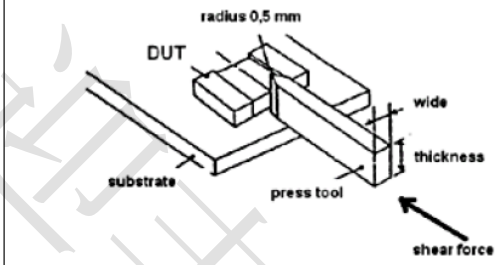

| W | Ao | Bo | Ko | P | F | E | D | D1 | Po | P2 | t |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.0 ±0.30 | 1.80 ±0.05 | 3.51 ±0.10 | 1.59 ±0.10 | 4.00 ±0.05 | 3.50 ±0.05 | 1.75 ±0.10 | 1.50 ±0.10 | 0.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 0.25 ±0.05 |

◆ **Reel Specification: (7'', Φ180 mm)**




7" x 8 mm

| Tape Width(mm) | A(mm) | B(mm) | C(mm) | D(mm) | Chip/Reel(pcs) |
|---|---|---|---|---|---|
| 8 | 9.0±0.5 | 60±2 | 13.5±0.5 | 178±2 | 3000 |

| | | | |
|---|---|---|---|
| **Board Flex (SMD)** | 1. Mounting method:<br>IR-Reflow. PCB Size (L:100 × W:40 × T:1.6mm)<br>2. Apply the load in direction of the arrow until bending reaches 2 mm.<br>  | No Visible Damage. | AEC-Q200<br>005 |
| **Adhesion** | Force of 1.8Kg for 60 seconds.<br>  | No Visible Damage<br>Magnification of 20X or greater may be employed for inspection of the mechanical integrity of the device body terminals and body/terminal junction. | AEC-Q200<br>006 |
| **Physical Dimension** | Any applicable method using x10 magnification, micrometers, calipers, gauges, contour projectors, or other measuring equipment, capable of determining the actual specimen dimensions. | In accordance with specification. | JESD22<br>JB100 |
| **Vibration** | 5g's for 20 min., 12 cycles each of 3 orientations<br>Note: Use 8"X5" PCB .031" thick 7 secure points on, one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz. | No Visible Damage. | MIL-STD-202<br>Method 204 |
| **Mechanical Shock** | Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks)<br>Peak value: 1,500g's<br>Duration: 0.5ms<br>Velocity change: 15.4 ft/s<br>Waveform: Half-sine | No Visible Damage. | MIL-STD-202<br>Method 213 |
| **Humidity Bias** | 1. Humidity: 85% R.H., Temperature: 85 ± 2 °C.<br>2. Time: 500 ± 24 hours.<br>3. Measurement at 24 ± 2hrs after test condition. | No Visible Damage.<br>Fulfill the electrical specification. | MIL-STD-202<br>Method 106 |

## Reliability Table

| Test Item | Procedure | Requirements Ceramic Type | Remark (Reference) |
|---|---|---|---|
| **Electrical Characterization** | | Fulfill the electrical specification | User Spec. |
| **Thermal Shock** | 1. Preconditioning:<br>50 ± 10℃ / 1 hr , then keep for 24 ± 1 hrs at room temp.<br>2. Initial measure: Spec: refer Initial spec.<br>3. Rapid change of temperature test:<br>-30℃ to +85℃; 100 cycles;<br>15 minutes at Lower category temperature;<br>15 minutes at Upper category temperature. | No Visible Damage.<br>Fulfill the electrical specification. | MIL-STD-202<br>107 |
| **Temperature Cycling** | 1. Initial measure: Spec: refer Initial spec.<br>2. 100 Cycles (-30℃ to +85℃), Soak Mode=1 (2 Cycle/hours).<br>3. Measurement at 24 ± 2Hours after test condition. | No Visible Damage.<br>Fulfill the electrical specification. | JESD22<br>JA104 |
| **High Temperature Exposure** | 1. Initial measure: Spec: refer Initial spec.<br>2. Unpowered; 500hours @ T=+85℃.<br>3. Measurement at 24 ± 2 hours after test. | No Visible Damage.<br>Fulfill the electrical specification. | MIL-STD-202<br>108 |
| **Low Temperature Storage** | 1. Initial measure: Spec: refer Initial spec.<br>2. Unpowered: 500hours @ T= -30℃.<br>3. Measurement at 24 ± 2 hours after test. | No Visible Damage.<br>Fulfill the electrical specification. | MIL-STD-202<br>108 |
| **Solderability (SMD Bottom Side)** | Dipping method:<br>a. Temperature: 235 ± 5°C<br>b. Dipping time: 3 ± 0.5s | The solder should cover over 95% of the critical area of bottom side. | IEC 60384-21/22<br>4.10 |
| **Soldering Heat Resistance (RSH)** | Preheating temperature: 150 ± 10°C.<br>Preheating time: 1~2 min.<br>Solder temperature: 260 ± 5°C.<br>Dipping time: 5 ± 0.5s | No Visible Damage. | IEC 60384-21/22<br>4.10 |