

3.2X1.6X0.5 (mm) WiFi/Bluetooth Ceramic Chip Antenna Engineering Specification

1. Product Number

YF 3216 H1 X 2G45
1 2 3 4 5



| | |
|-----------------|-------------------|
| (1)Product Type | Chip Antenna |
| (2)Size Code | 3.2x1.6x0.5mm |
| (3)Type Code | H1 |
| (4)Packing | Plastic Packaging |
| (5)Frequency | 2.45GHz |

SHEN ZHEN YINGFENG ANTENNA TECHNOLOYCO.,LTD

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Designed by : Jason

Checked by : Jason

Approved by : MR.FANG

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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 mm² ground plane)

5-1. Electrical Table

| Characteristics | | Specifications | Unit |
|--------------------|------------|---------------------|------|
| Outline Dimensions | | 3.2x1.6x0.5 | mm |
| Working Frequency | | 2400~2500 | MHz |
| VSWR | | 2 Max. | |
| Impedance | | 50 | Ω |
| Polarization | | Linear Polarization | |
| Gain | Peak | 2.5 (typical) | dBi |
| | Efficiency | 75 (typical) | % |



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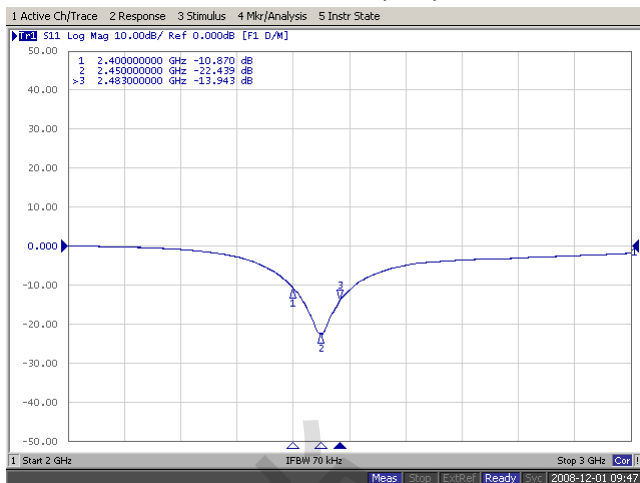
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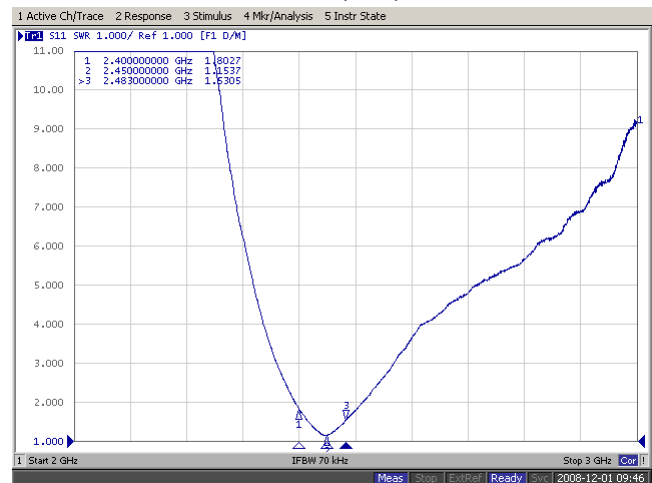
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5-2. Return Loss & VSWR

Return Loss (S₁₁)



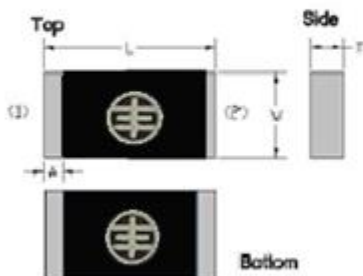
VSWR(S₁₁)



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 | 0.50±0.10 |
| A | 0.35±0.10 |

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

b. Test Board with Antenna



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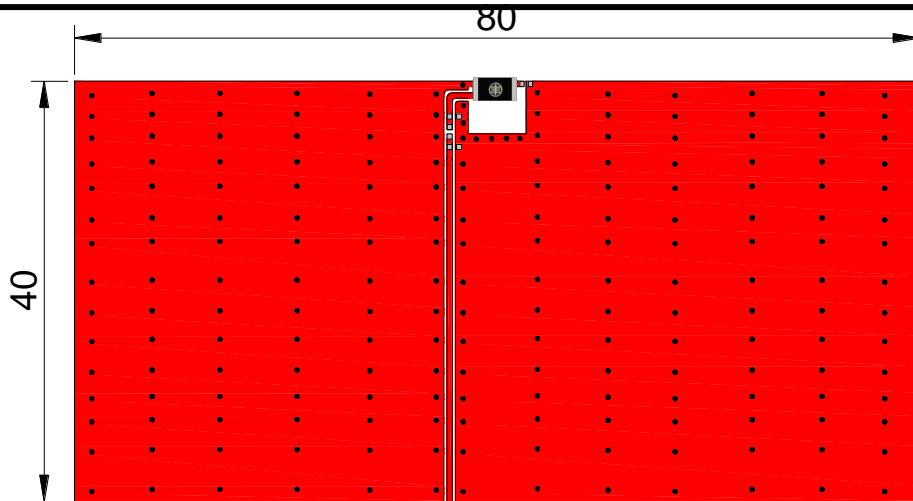
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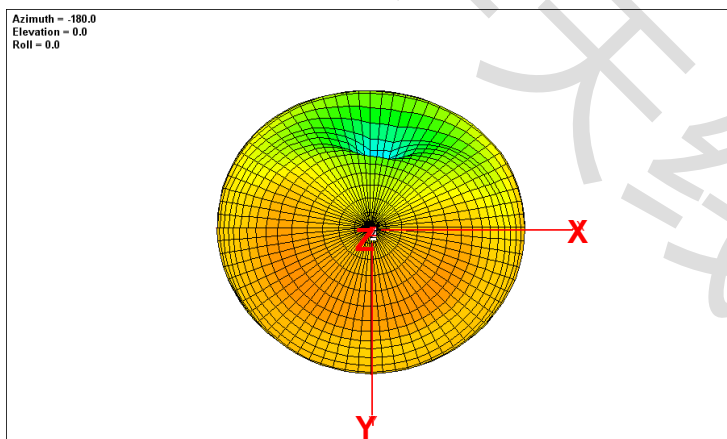
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Unit: mm

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

7-1. 3D Gain Pattern @ 2442 MHz



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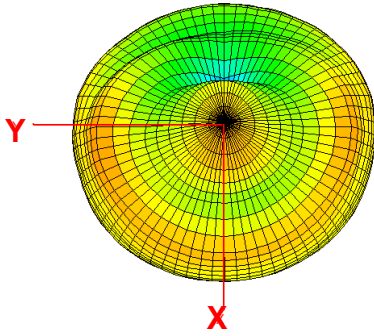
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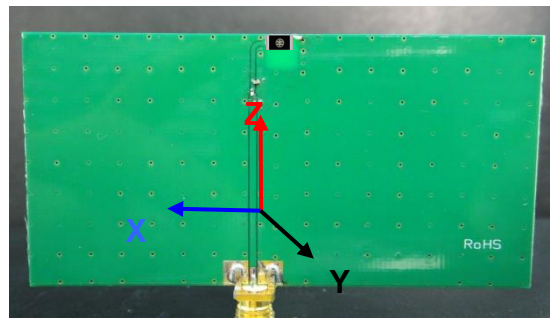
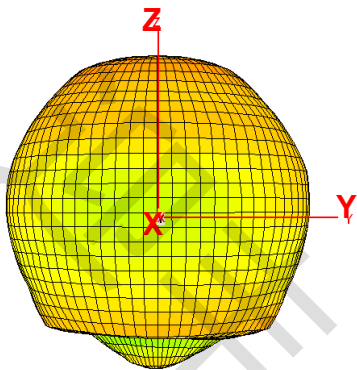
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Azimuth - 180.0
Elevation - 5.1
Roll - 180.0



Azimuth - 0.0
Elevation - 50.0
Roll - 180.0



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 |



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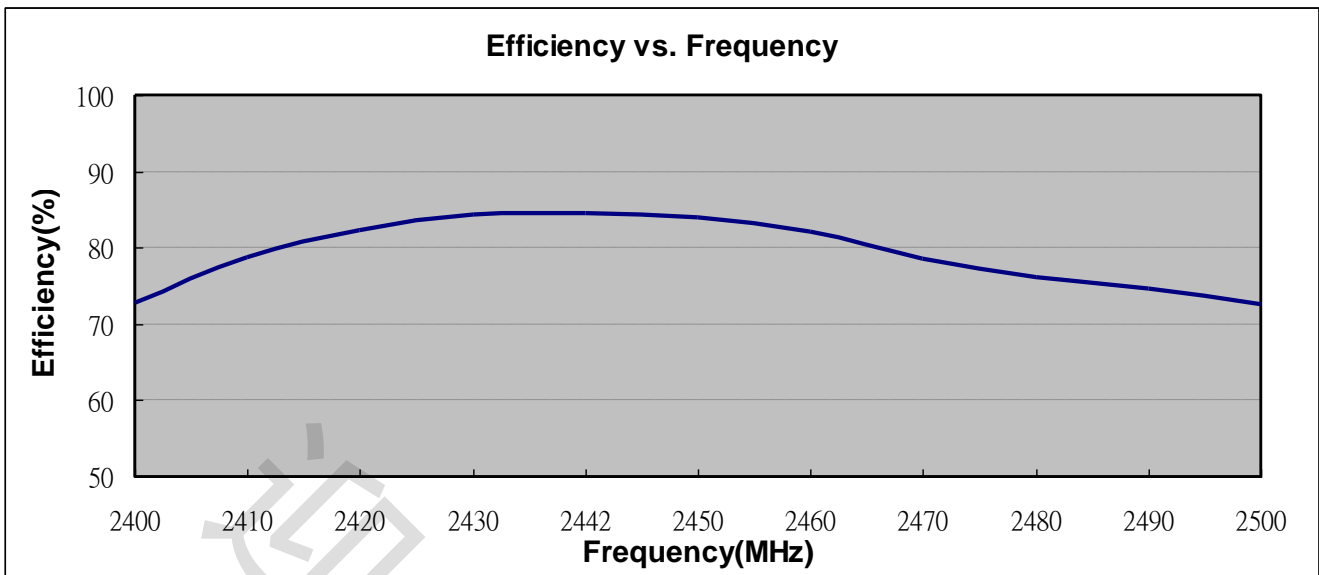
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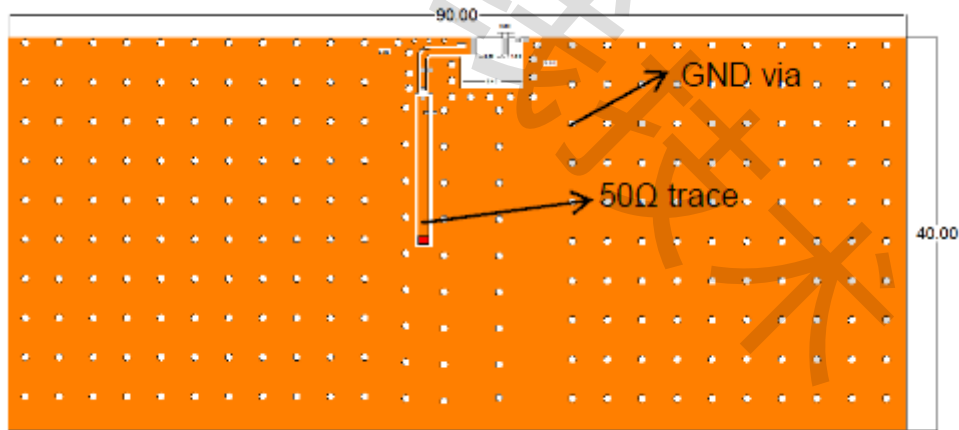
7-3. 3D Efficiency vs. Frequency



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



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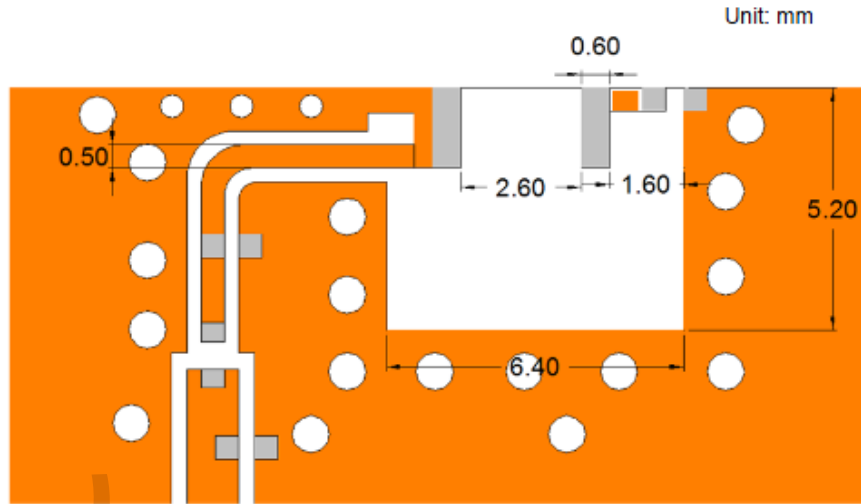
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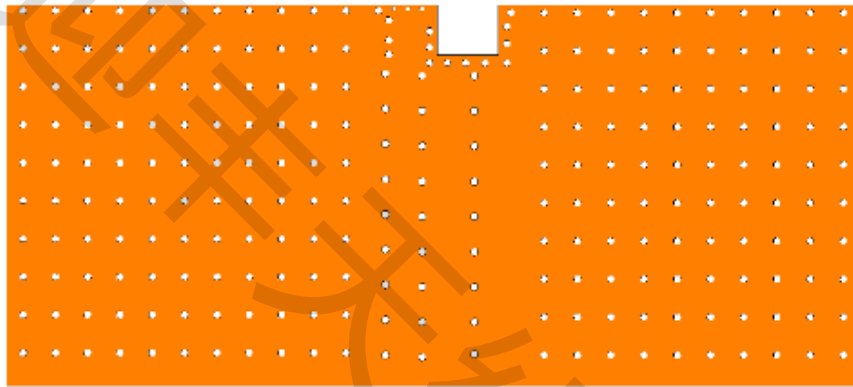
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Detail view



Bottom view



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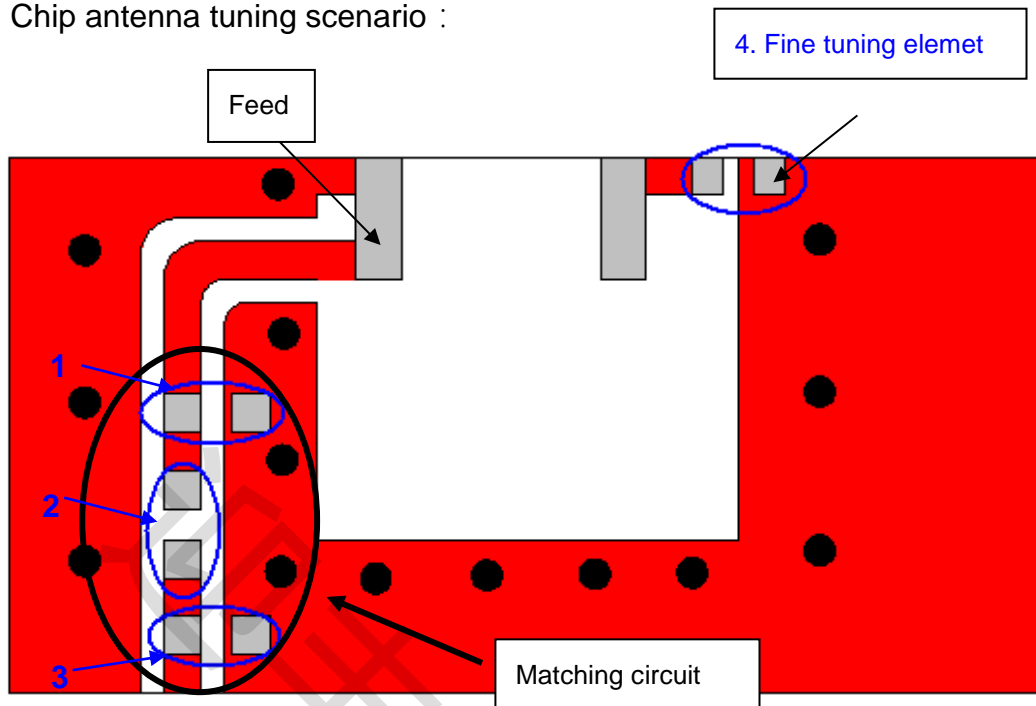
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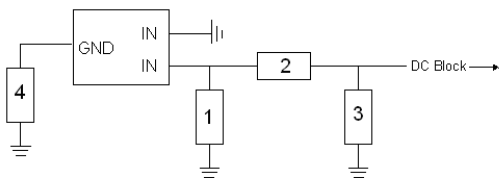
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9. Frequency tuning

a. Chip antenna tuning scenario :



b. Matching circuit : (Center frequency is about 2442 MHz @ 80 x 40 mm² 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.



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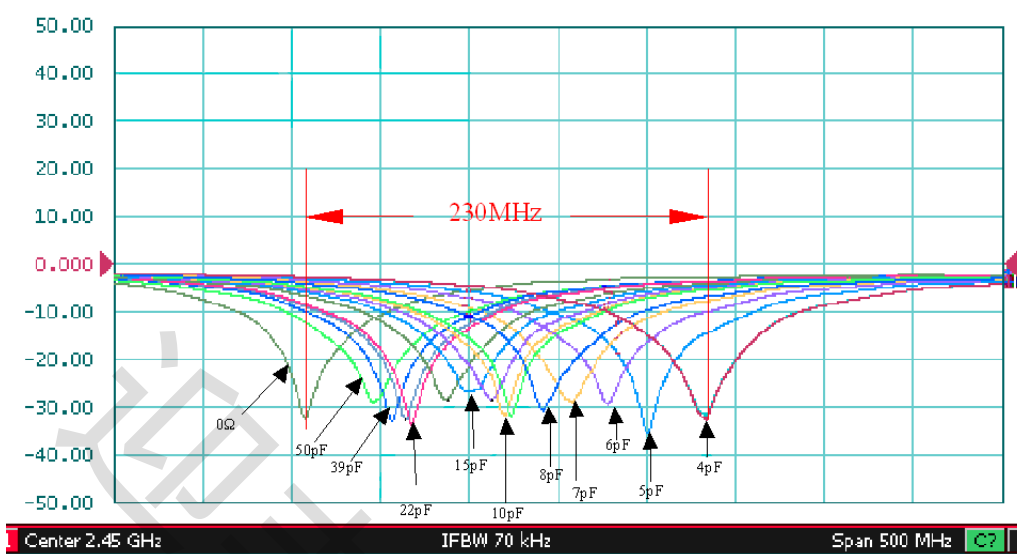
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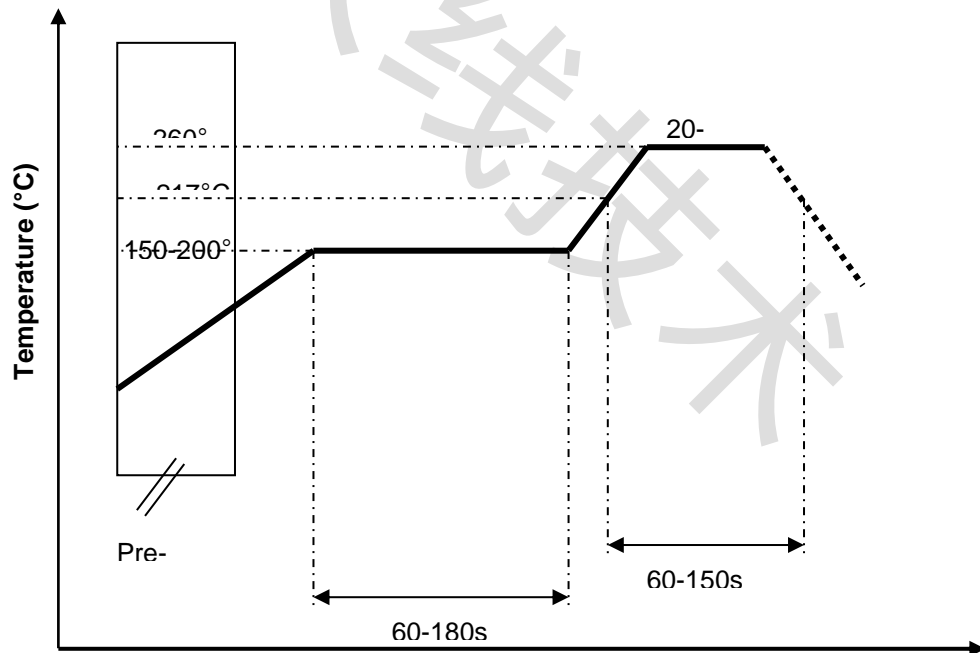
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c. Fine tuning element vs. Center frequency



10. Soldering Conditions

a. Typical Soldering Profile for Lead-free Process



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Time

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11. Packing

(1) Quantity/Reel: 5000 pcs/Reel:

Reel and Taping Specification

Reel Specification

| TYPE | SIZE | A | φ B | φ C | φ D | W | φ M |
|------|------------|---------|----------|--------|--------|----------|---------|
| 3216 | 7" 5K/Reel | 2.0±0.5 | 13.5±1.0 | 21±1.0 | 60±1.0 | 11.5±2.0 | 178±2.0 |

Tapping Specification

| Packaging | Type | A | B | W | E | F | G | H | T | φ D | P |
|------------|------|-----------|-----------|----------|-----------|----------|----------|----------|-----------|---------------------|---------|
| Paper Type | 3216 | 1.90±0.20 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.5±0.05 | 4.0±0.10 | 2.0±0.05 | 0.75±0.10 | 1.50 +0.10 -0 | 4.0±0.1 |



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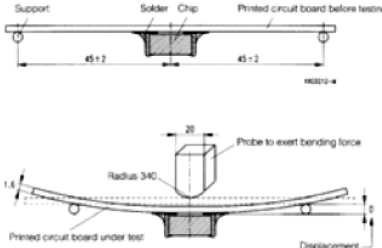
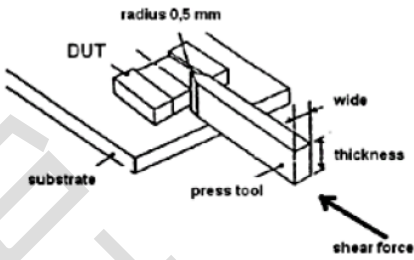
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| | | | |
|---------------------------|--|--|------------------------|
| Board Flex (SMD) | <p>1. Mounting method: IR-Reflow. PCB Size (L:100 × W:40 × T:1.6mm)</p> <p>2. Apply the load in direction of the arrow until bending reaches 2 mm.</p>  | No Visible Damage. | AEC-Q200 005 |
| Adhesion | <p>Force of 1.8Kg for 60 seconds.</p>  | No Visible Damage 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 006 |
| Physical Dimension | <p>Any applicable method using x10 magnification, micrometers, calipers, gauges, contour projectors, or other measuring equipment, capable of determining the actual specimen dimensions.</p> | In accordance with specification. | JESD22 JB100 |
| Vibration | <p>5g's for 20 min., 12 cycles each of 3 orientations 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.</p> | No Visible Damage. | MIL-STD-202 Method 204 |
| Mechanical Shock | <p>Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks) Peak value: 1,500g's Duration: 0.5ms Velocity change: 15.4 ft/s Waveform: Half-sine</p> | No Visible Damage. | MIL-STD-202 Method 213 |
| Humidity Bias | <p>1. Humidity: 85% R.H., Temperature: 85 ± 2 °C. 2. Time: 500 ± 24 hours. 3. Measurement at 24 ± 2hrs after test condition.</p> | No Visible Damage. Fulfill the electrical specification. | MIL-STD-202 Method 106 |



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Reliability Table

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



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