

# 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



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SHEN ZHEN YINGFENG ANTENNA TECHNOLOGYCO.,LTD

Prepared by : JIEXI

Designed by : Jason

Checked by : Jason

Approved by : MR.FANG

TITLE : 3.2 x 1.6 x 0.5(mm) WiFi/Bluetooth Ceramic Chip  
Antenna (YF3216H1) Engineering Specification

DOCUMENT  
NO.

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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 mm<sup>2</sup> 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	0.9 (typical)	dBi
	Efficiency	78 (typical)	%



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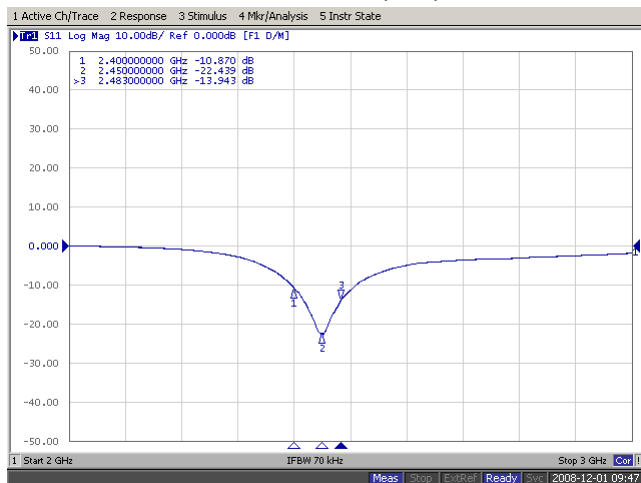
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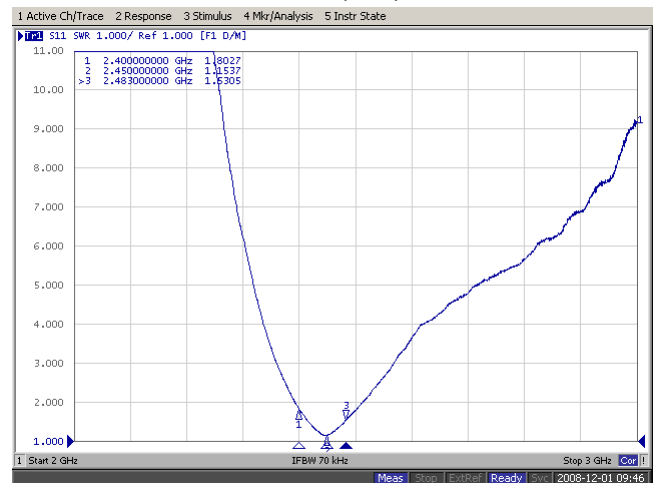
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## 5-2. Return Loss & VSWR

Return Loss ( $S_{11}$ )



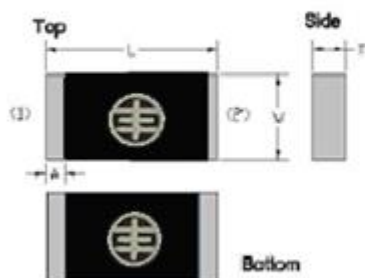
VSWR( $S_{11}$ )



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

### a. Antenna Dimensions

#### Dimension and Terminal Configuration



Dimension (mm)	
L	3.15 $\pm$ 0.15
W	1.55 $\pm$ 0.15
T	0.50 $\pm$ 0.10
A	0.35 $\pm$ 0.10

No.	Terminal Name
1	Feeding point
2	GND

### b. Test Board with Antenna



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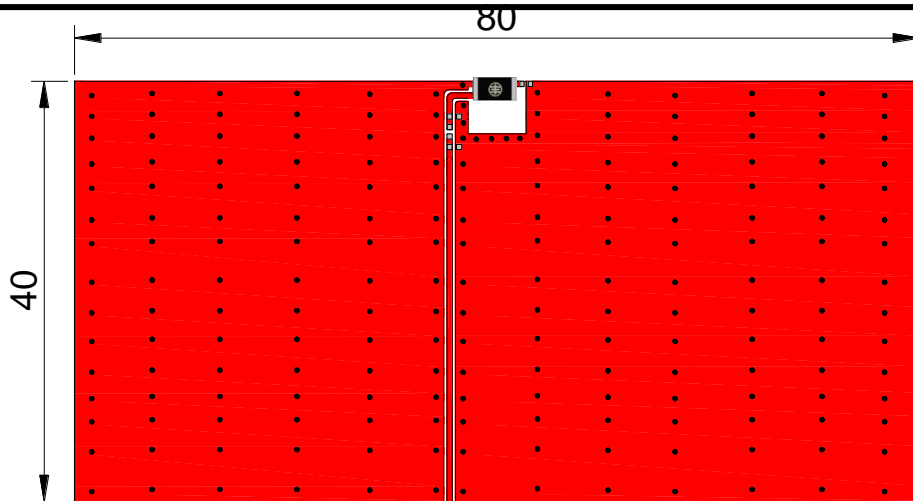
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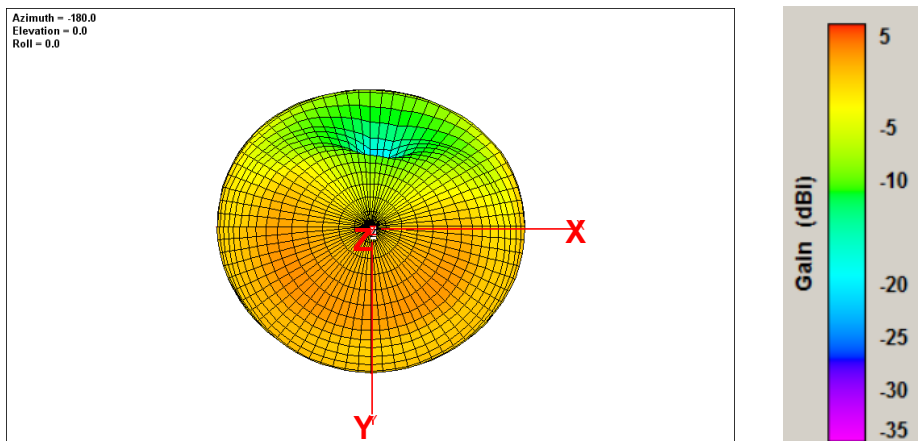
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Unit: mm

## 7. Radiation Pattern (80 x 40 mm<sup>2</sup> ground plane)

### 7-1. 3D Gain Pattern @ 2442 MHz



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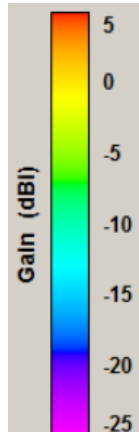
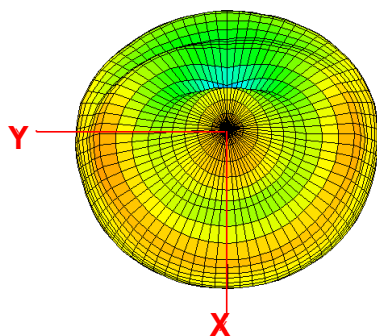
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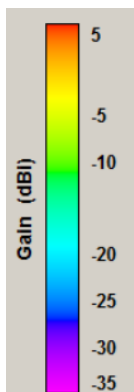
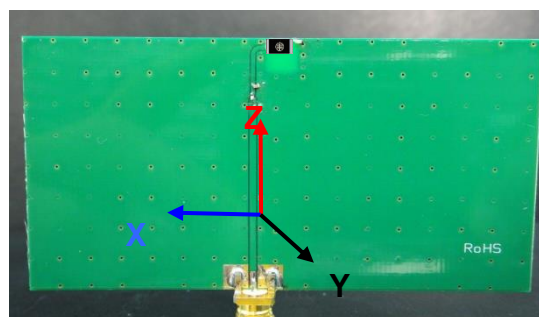
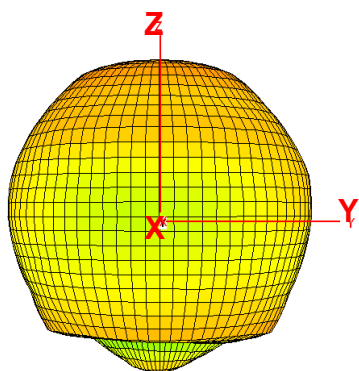
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Azimuth = -180.0  
 Elevation = -5.1  
 Roll = 180.0



Azimuth = 0.0  
 Elevation = -90.0  
 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)	0.1	0.2	0.3	0.5	0.7	0.9	0.8	0.6	0.4	0.3	0.2



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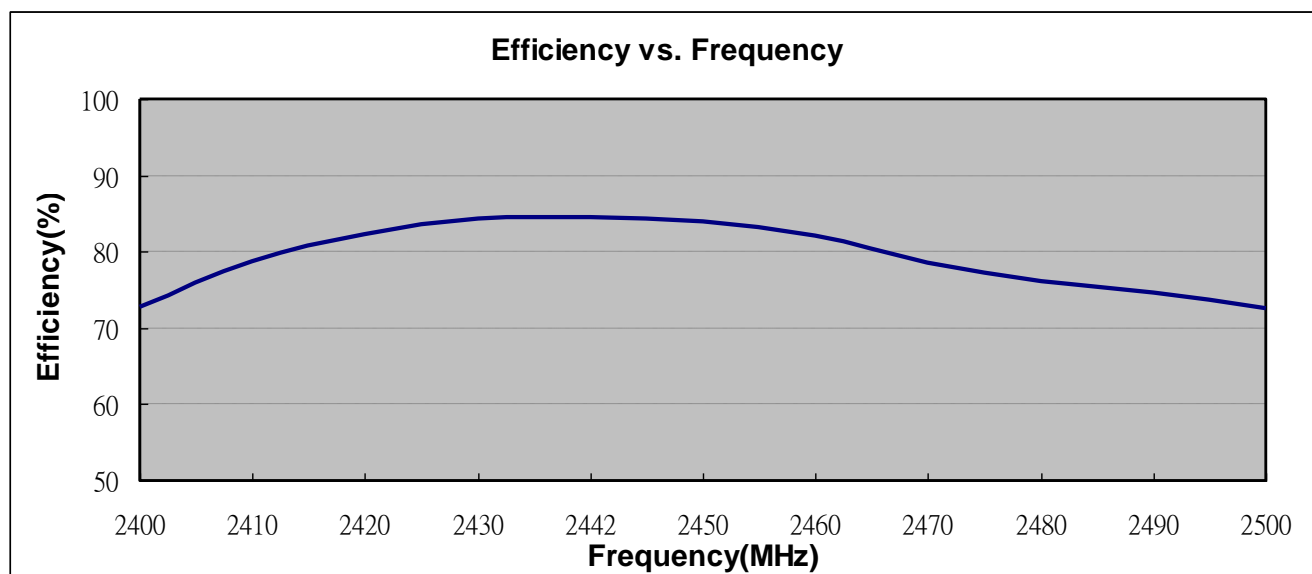
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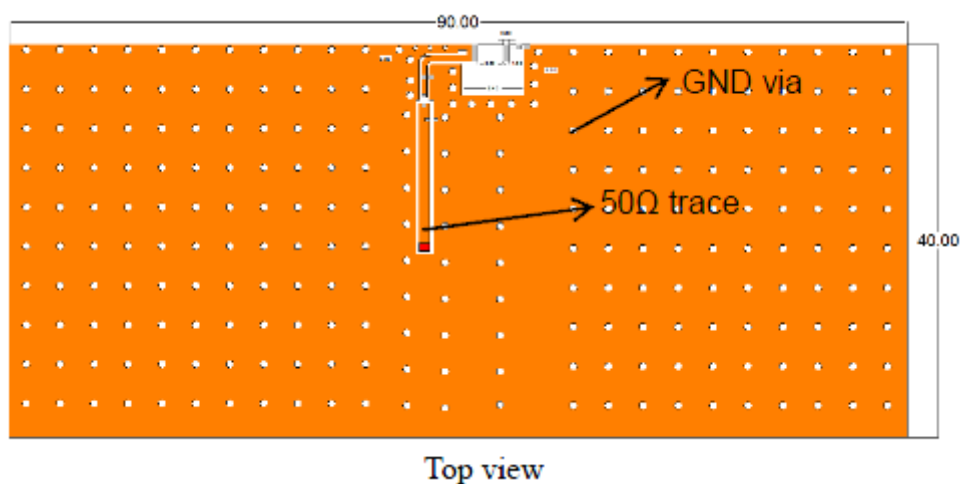
### 7-3. 3D Efficiency vs. Frequency



## 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.



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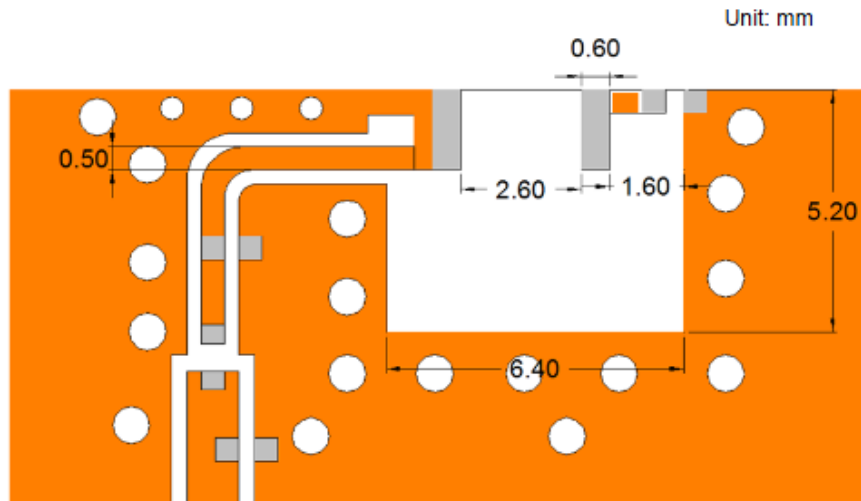
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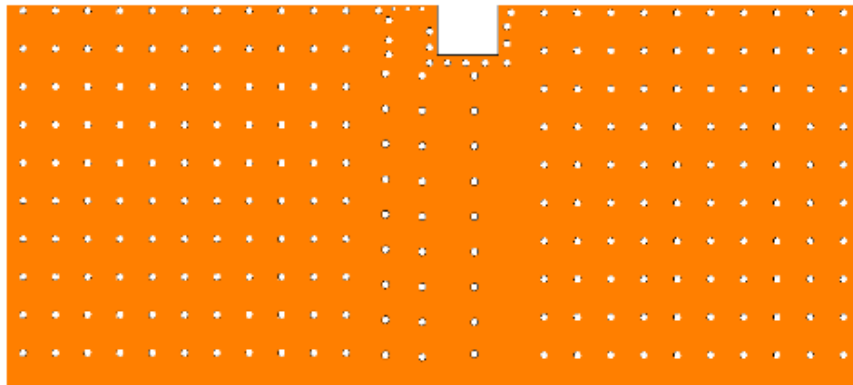
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Detail view



Bottom view



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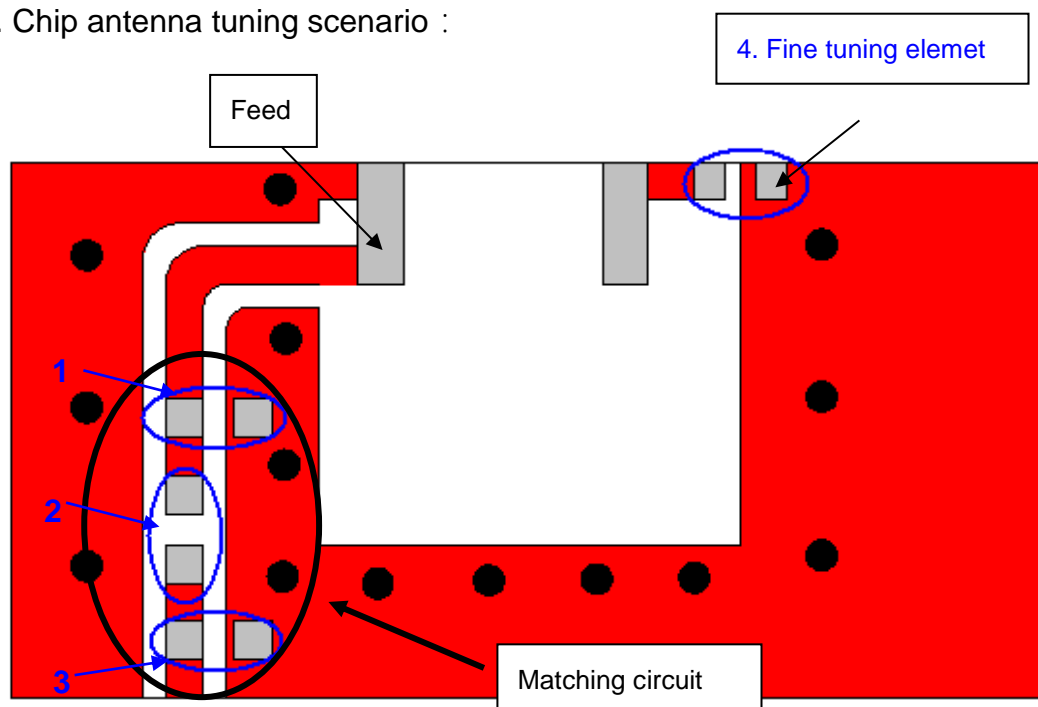
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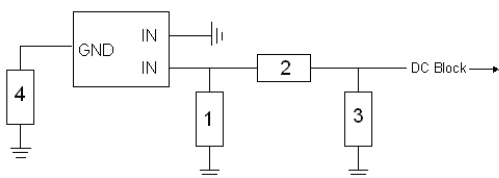
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## 9. Frequency tuning

a. Chip antenna tuning scenario :



b. Matching circuit : (Center frequency is about 2442 MHz @ 80 x 40 mm<sup>2</sup> 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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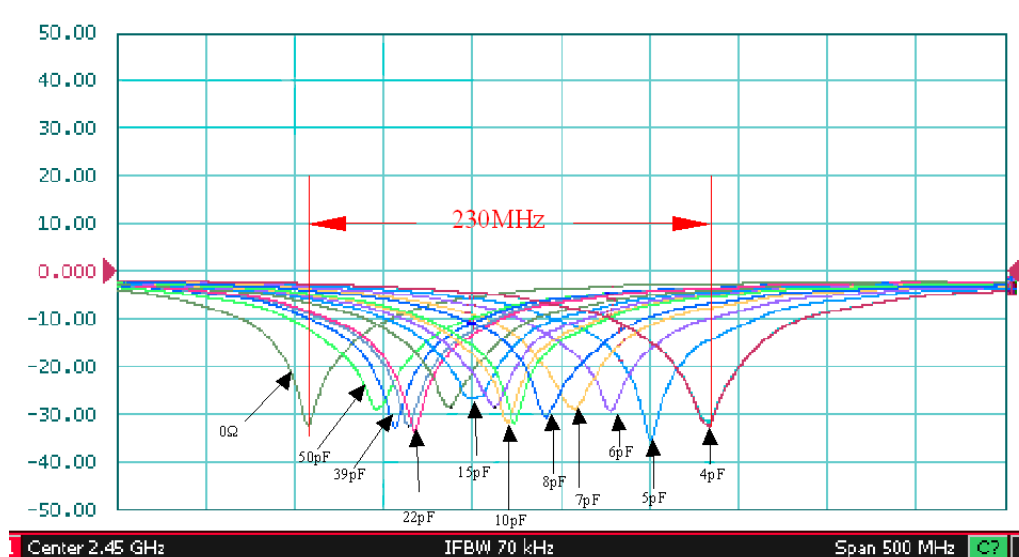
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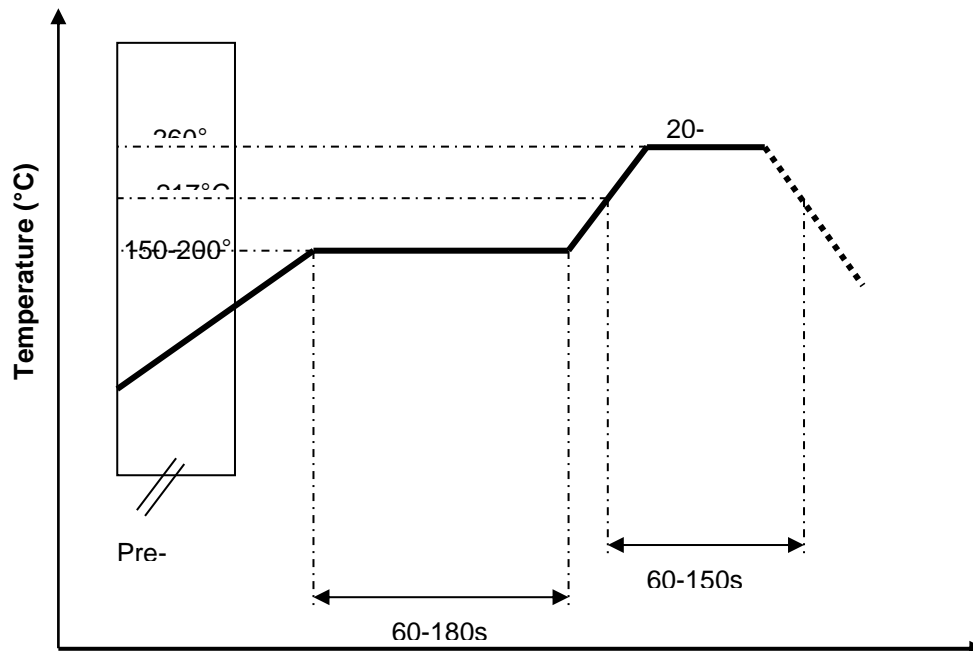


### c. Fine tuning element vs. Center frequency



## 10. Soldering Conditions

### a. Typical Soldering Profile for Lead-free Process



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# 11. Packing

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

## Reel and Taping Specification

### Reel Specification

The diagram shows a top view and a side view of a reel. The top view is a circle with a central hub and four spokes. Dimensions are labeled: A (radius from center to outer edge), B (outer diameter), C (inner diameter of the hub), D (hole diameter in the hub), M (width of the reel), and W (thickness of the reel).

TYPE	SIZE		A	$\phi$ B	$\phi$ C	$\phi$ D	W	$\phi$ M
3216	7"	5K/Reel	2.0 $\pm$ 0.5	13.5 $\pm$ 1.0	21 $\pm$ 1.0	60 $\pm$ 1.0	11.5 $\pm$ 2.0	178 $\pm$ 2.0

### Tapping Specification

The diagram shows a side view of a carrier tape with five components. Dimensions are labeled: A (pitch between components), B (width of the tape), P (pitch between components), D (hole diameter), H (height of the component), G (width of the component), E (width of the component), F (width of the component), W (width of the tape), and I (height of the component). A label 'Paper Carrier' points to the tape.

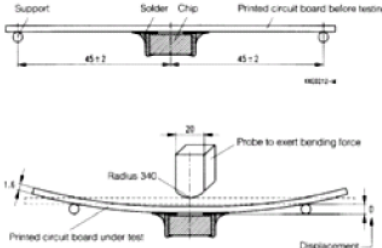
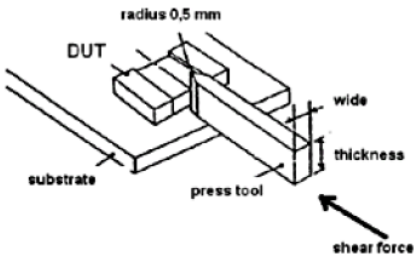
Packaging	Type	A	B	W	E	F	G	H	T	$\phi$ D	P
Paper Type	3216	1.90 $\pm$ 0.20	3.50 $\pm$ 0.20	8.0 $\pm$ 0.20	1.75 $\pm$ 0.10	3.5 $\pm$ 0.05	4.0 $\pm$ 0.10	2.0 $\pm$ 0.05	0.75 $\pm$ 0.10	1.50 <sup>+0.10</sup> <sub>-0</sub>	4.0 $\pm$ 0.1



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<b>Board Flex (SMD)</b>	<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
<b>Adhesion</b>	<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
<b>Physical Dimension</b>	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 JB100
<b>Vibration</b>	<p>5g's for 20 min., 12 cycles each of 3 orientations</p> <p>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
<b>Mechanical Shock</b>	<p>Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks)</p> <p>Peak value: 1,500g's</p> <p>Duration: 0.5ms</p> <p>Velocity change: 15.4 ft/s</p> <p>Waveform: Half-sine</p>	No Visible Damage.	MIL-STD-202 Method 213
<b>Humidity Bias</b>	<p>1. Humidity: 85% R.H., Temperature: 85 ± 2 °C.</p> <p>2. Time: 500 ± 24 hours.</p> <p>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 ± 10°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°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°C), Soak Mode=1 (2 Cycle/hours). 3. Measurement at 24 ± 2Hours 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°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°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 ± 5°C b. Dipping time: 3 ± 0.5s	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 ± 10°C. Preheating time: 1~2 min. Solder temperature: 260 ± 5°C. Dipping time: 5 ± 0.5s	No Visible Damage.	IEC 60384-21/22 4.10



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