

# UWB (3 GHz ~ 6 GHz) - Chip Antenna

ACR1004U

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10.0 x 4.0 x 1.5 mm  
RoHS/RoHS II Compliant  
MSL Level = N/A

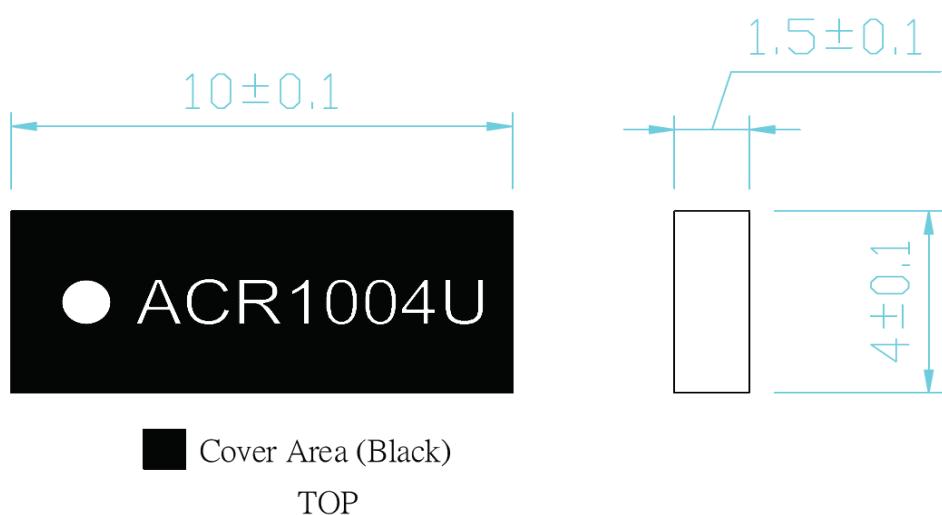
## Features

- UWB 3 GHz ~ 6 GHz
- Compact Profile
- Omni-directional Pattern
- Efficiency > 60%
- Surface Mount (SMD)

## Applications

- Ultra-wideband
- IoT
- M2M
- PDA/Wearables
- Smart Home/Building
- Precision Positioning and Tracking
- Industrial/Medical/Automotive Sensors

## Antenna Dimensions



Unit : mm

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## Electrical Specifications

Parameter	Specification			Unit
	Min	Typ	Max	
Operating Frequency	3		6	GHz
Peak Gain*		5.79		dBi
Efficiency	60			%
Impedance		50		Ω
Polarization		Linear		
Radiation Pattern		Omni-directional		

\*All test measurements were conducted with antennas on an evaluation board of dimensions 45 x 18 mm.

## Mechanical Specifications

Parameter	Specification
Antenna Dimension	10 x 4 x 1.5 mm
Material	Ceramic
Mounting Type*	Surface Mount (SMD)

\*Do not mount the antenna on a metal surface.

## Environmental Specifications

Parameter	Specification
Operating Temperature	-30°C to +85 °C
Storage Temperature	
Relative Humidity	0~95%
RoHS Compliance	Yes
Pb-Free	Yes



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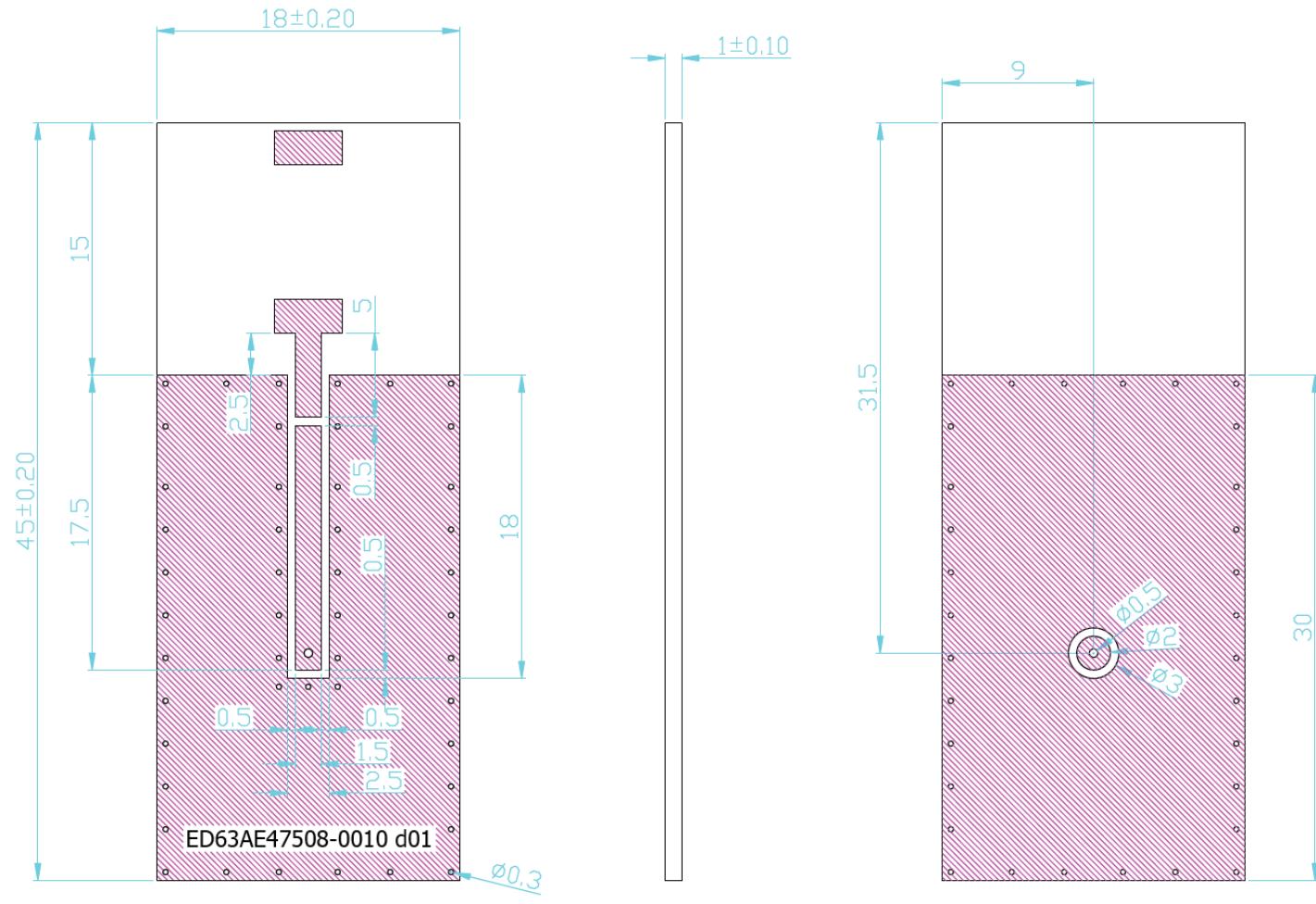


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## Layout Dimensions on Evaluation Board



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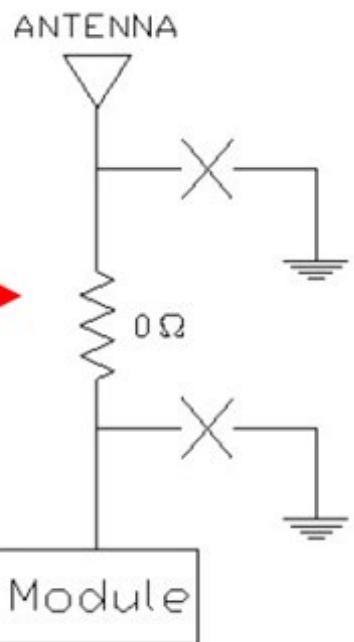
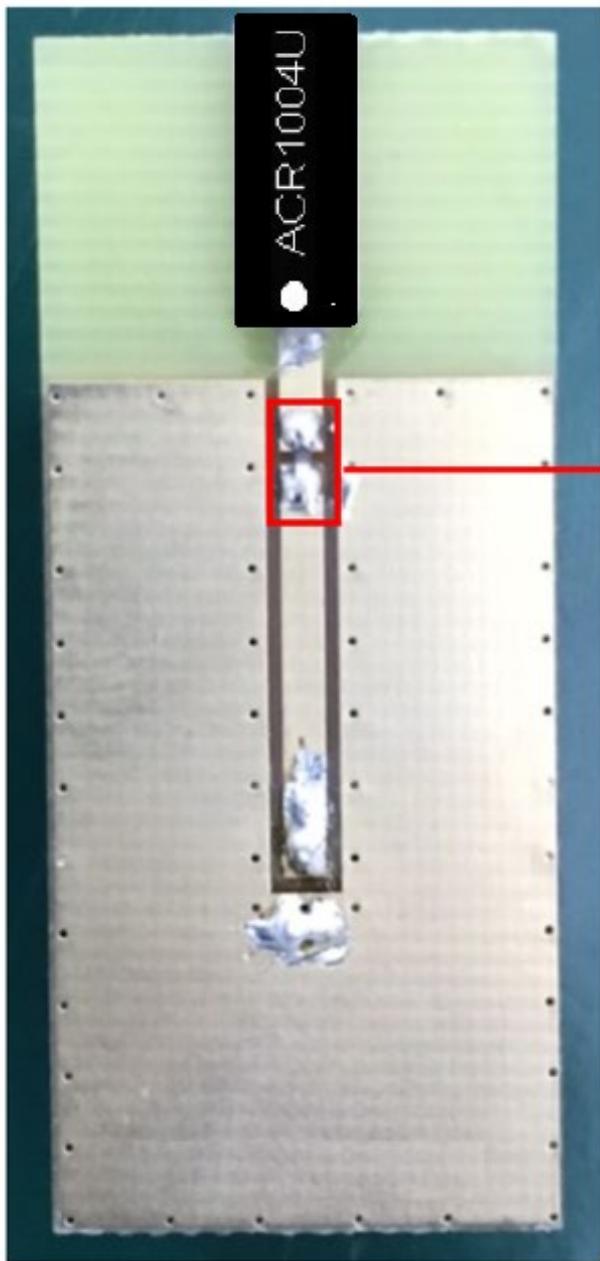


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## Evaluation Board with Matching Circuit



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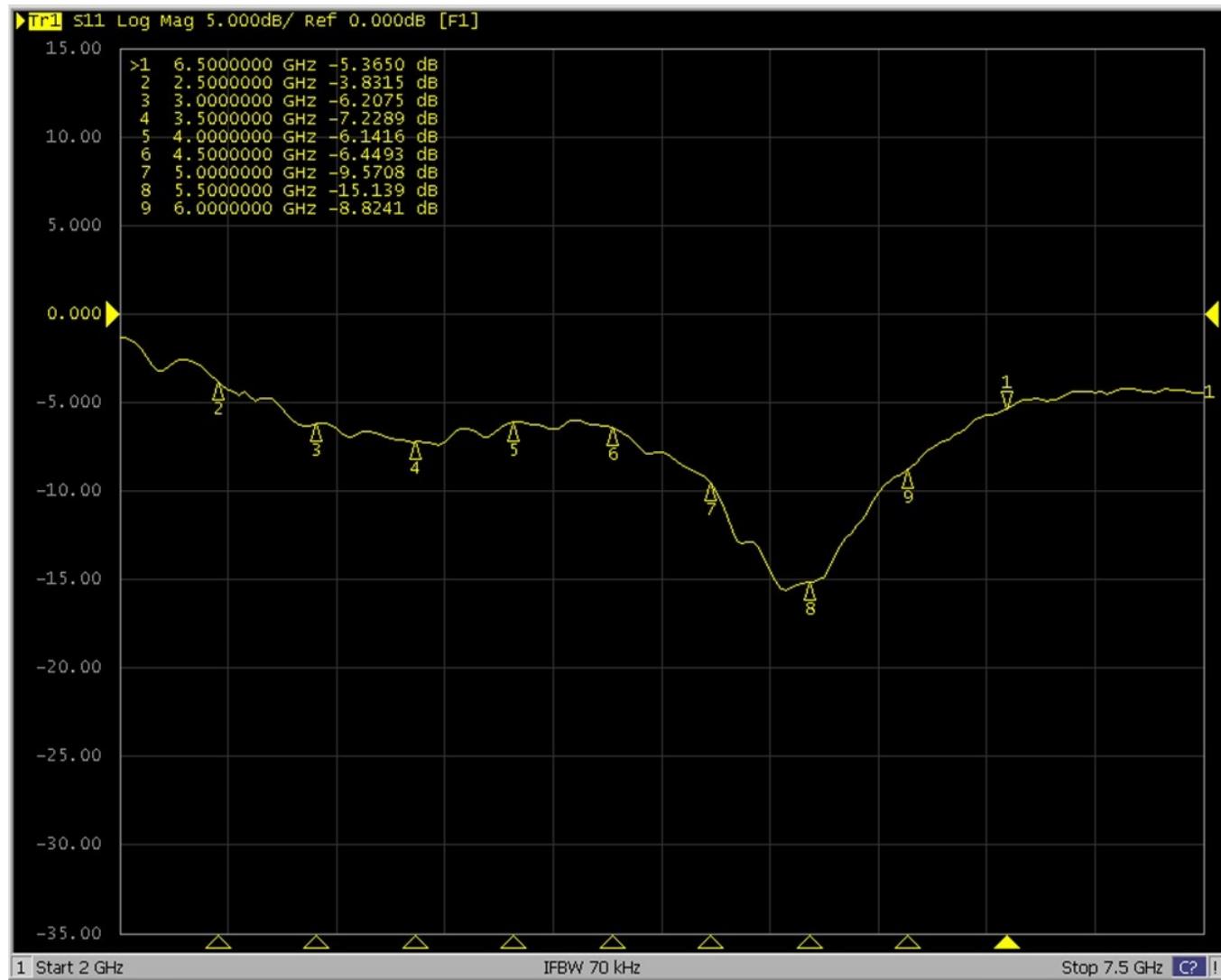


10.0 x 4.0 x 1.5 mm

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## Test Measurement – Return Loss



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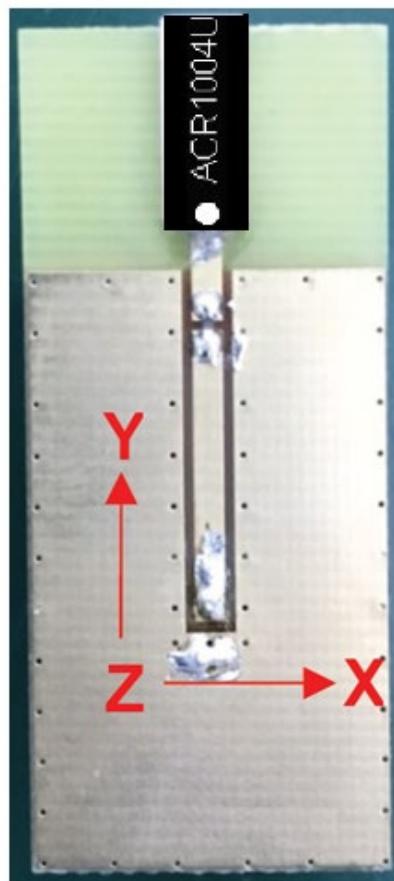


10.0 x 4.0 x 1.5 mm

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## Radiation Measurement - Set-up



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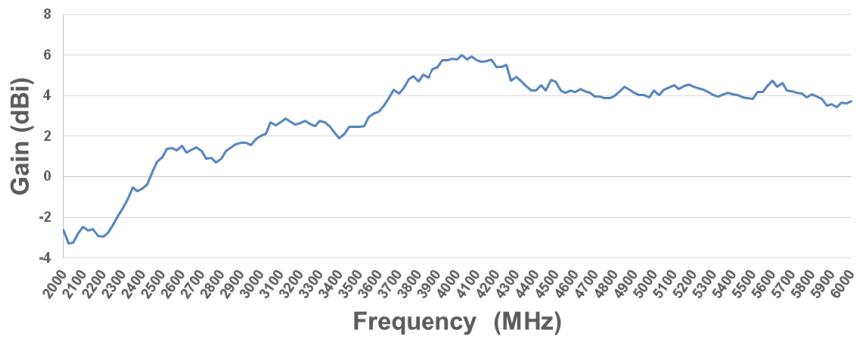


Check Inventory

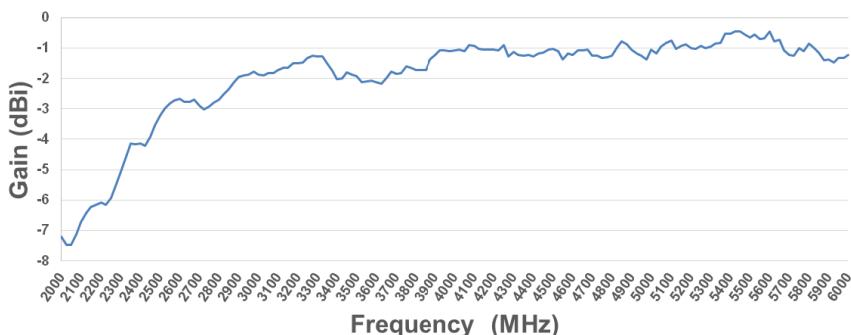


10.0 x 4.0 x 1.5 mm  
RoHS/RoHS II Compliant  
MSL Level = N/A

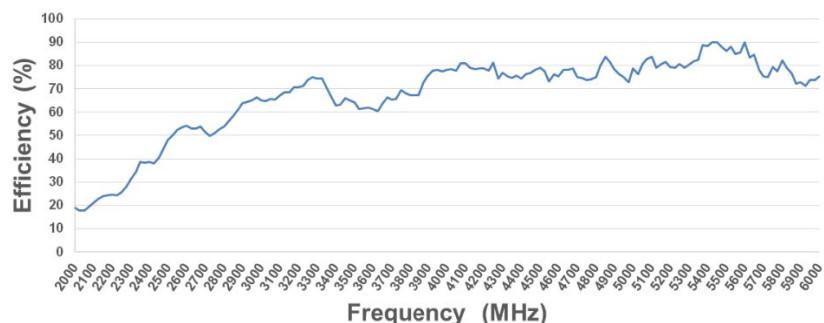
## Peak Gain



## Average Gain



## Efficiency



Frequency (GHz)	3	3.5	4	4.5	5	5.5	6
Efficiency (%)	65.03	64.11	78.21	79.03	78.62	86.07	75.20
Peak Gain (dBi)	-1.86	-1.93	-1.06	-1.02	-1.04	-0.65	-1.23
Average Gain (dBi)	2.01	2.48	5.79	4.70	4.24	3.83	3.72

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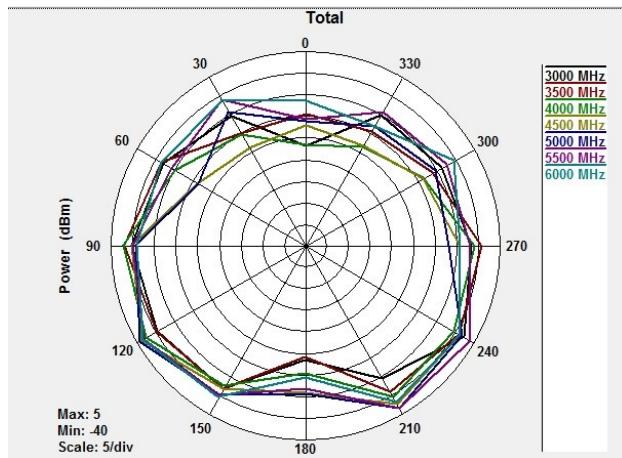
10.0 x 4.0 x 1.5 mm

RoHS/RoHS II Compliant

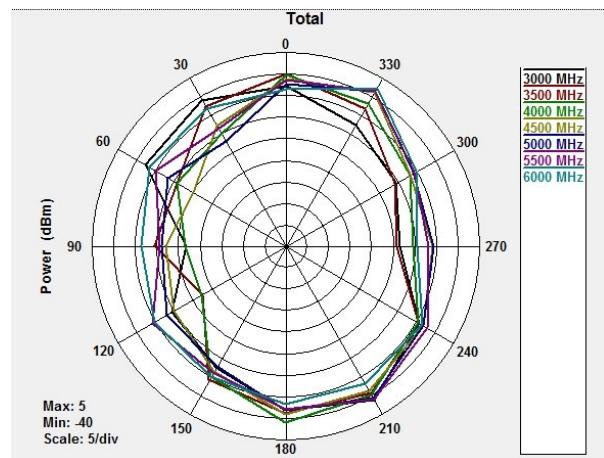
MSL Level = N/A

## Radiation Characteristics – 2D Pattern

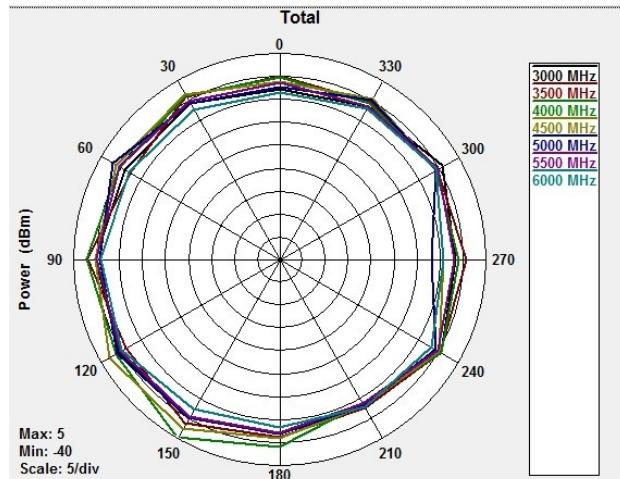
XY - Plane



XZ - Plane



YZ - Plane



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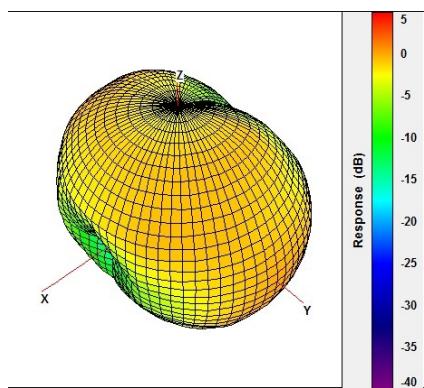
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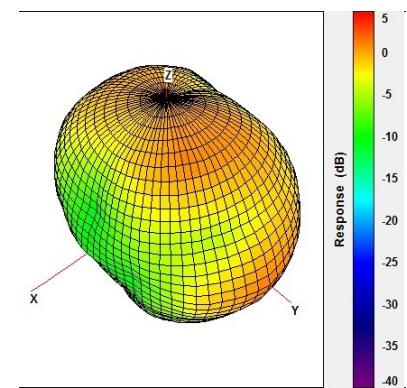
10.0 x 4.0 x 1.5 mm  
RoHS/RoHS II Compliant  
MSL Level = N/A

## Radiation Characteristics – 3D Pattern

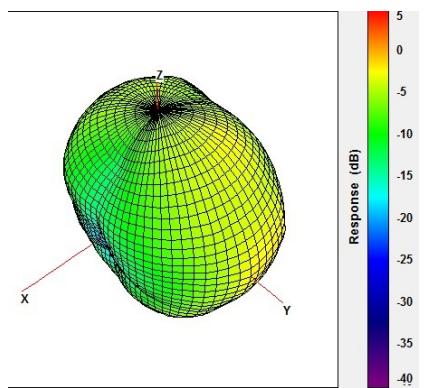
3 GHz



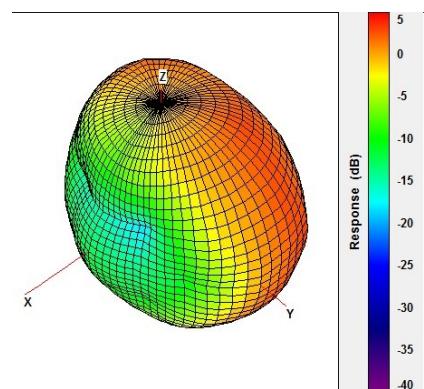
3.5 GHz



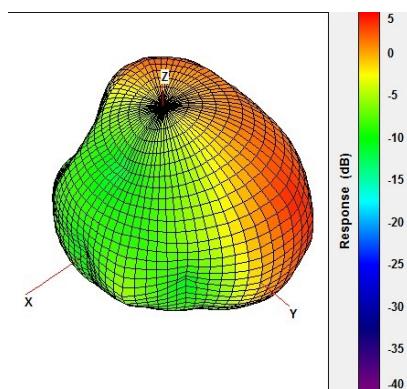
4 GHz



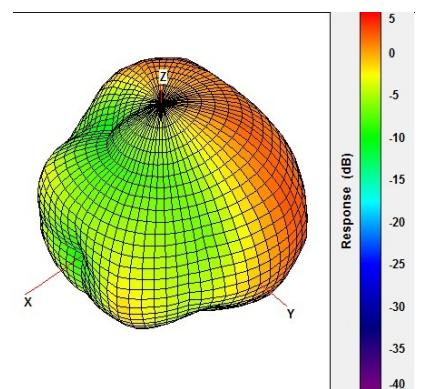
4.5 GHz



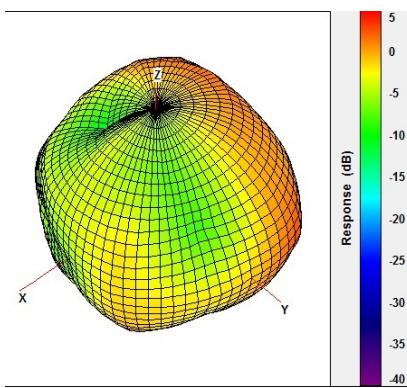
5 GHz



5.5 GHz



6 GHz



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## Reliability Test Conditions

Items	Test Method	Standard
Sinusoidal Vibration Test	<ol style="list-style-type: none"> <li>1. Vibration Frequency: 5-200-5 Hz</li> <li>2. Peak:4.5G (2 mm amplitude)</li> <li>3. Sweep Direction: X (2H), Y (2H), Z (4H)</li> <li>4. Sweep Duration : 10 min/axis</li> <li>5. Examine the appearance and functions after the test.</li> </ol>	<ol style="list-style-type: none"> <li>1. Specimens shall be free of any traffic discontinuities during the test.</li> <li>2. The appearance of the product, and electrical properties to meet the requirements.</li> </ol>
Vibration Test in Packaged Condition	<ol style="list-style-type: none"> <li>1. Vibration Frequency: 15-60-15 Hz</li> <li>2. Peak:4G (2 mm amplitude)</li> <li>3. Sweep Direction: X (2H), Y (2H), Z (4H)</li> <li>4. Sweep Duration : 6 min/axis</li> <li>5. Examine the appearance and functions after the test.</li> </ol>	
Thermal Shock	<ol style="list-style-type: none"> <li>1. Low temperature: -30°C</li> <li>2. High temperature: +85°C</li> <li>3. Cycle time: 30 min each temperature</li> <li>4. Number of Cycles: 5</li> <li>5. Expose to normal temperature/humidity for 24H or more.</li> </ol>	
Free Fall Test in Packaged Condition	<ol style="list-style-type: none"> <li>1. Drop the object onto a concrete surface from a height of 90 cm.</li> <li>2. Test once for one corner, three edges and six faces : 10 times in total.</li> <li>3. Examine the appearance and functions after the test.</li> </ol>	
High Temperature	<ol style="list-style-type: none"> <li>1. Temperature: 85°C</li> <li>2. Time: 16H</li> <li>3. Examine the appearance and functions after taken out at room temperature for 24H.</li> </ol>	
Low Temperature	<ol style="list-style-type: none"> <li>1. Temperature: -30°C</li> <li>2. Time: 16H</li> <li>3. Examine the appearance and functions after taken out at room temperature for 24H.</li> </ol>	The appearance of the product, and electrical properties to meet the requirements.
Solder Heat Resistance	<ol style="list-style-type: none"> <li>1. Lead pins of the unit are soaked in solder bath. Temperature: 270±5°C, Time: 10±0.5s.</li> <li>2. Examine the appearance and functions after the test.</li> </ol>	
High-Temperature / High-Humidity	<ol style="list-style-type: none"> <li>1. Temperature range: 85°C</li> <li>2. Humidity Range: 90%~95% R.H.</li> <li>3. Cycle times: 96H</li> <li>4. Examine the appearance and functions after taken out at room temperature for 24H.</li> </ol>	
Adhesion Test	<ol style="list-style-type: none"> <li>1. Subject the soldered device on test PCB.</li> <li>2. Then apply 0.5Kg(5N) of force for 10±1 sec in the direction of parallel to the substrate.</li> </ol> <p>(The soldering should be done by reflow and be conducted with care so that the soldering is uniform and free of defect by stress such as heat shock).</p>	



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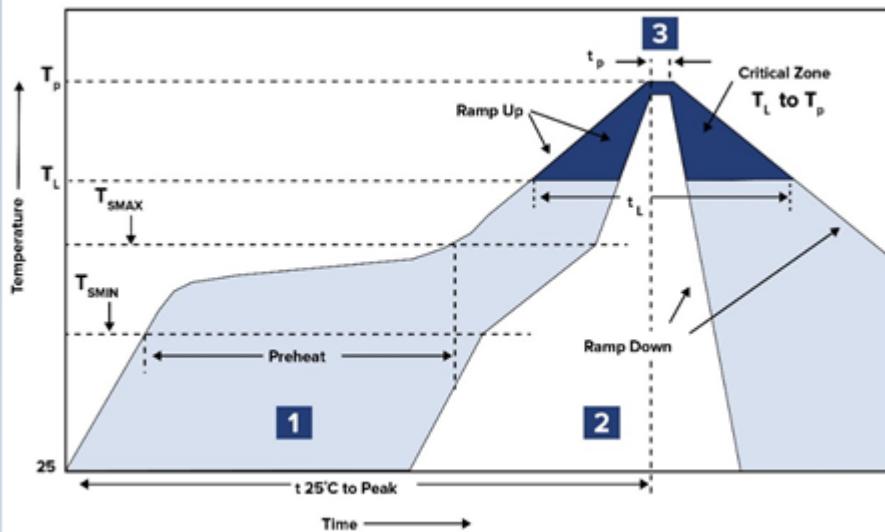
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## Reflow Profile

The chip antenna can be assembled using the following Pb-free assembly. According to the standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follows :



Zone	Description	Temperature	Times
1	Preheat	T <sub>SMIN</sub> ~ T <sub>SMAX</sub> 150°C ~ 200°C	60 ~ 120 sec
2	Ramp-Up	T <sub>SMAX</sub> ~ T <sub>p</sub> : 3 °C/s	
3	Reflow	T <sub>L</sub> 217°C	30 ~ 100 sec
	Peak heat	T <sub>p</sub> 260°C	5 sec (max)
Ramp-Down		6 °C/s	
Time from 25°C to Peak Temperature		8 minutes (max)	
Composition of solder paste		96.5Sn/3Ag/0.5Cu	
Solder Paste Model		SHENMAO PF606-P26	

## Soldering with Iron

- Soldering Iron Temperature : 270±10 °C
- Apply pre-heating at 120 °C for 2~3 min.
- Complete soldering for each terminal within 3 s .
  - If the soldering iron temperature exceeds 270±10 °C or 3 seconds, it can damage the component.

**Note:** All temperature measurement points are on top surface of the component. If the temperature goes over the recommend, it will cause surface peeling or damage to the component.

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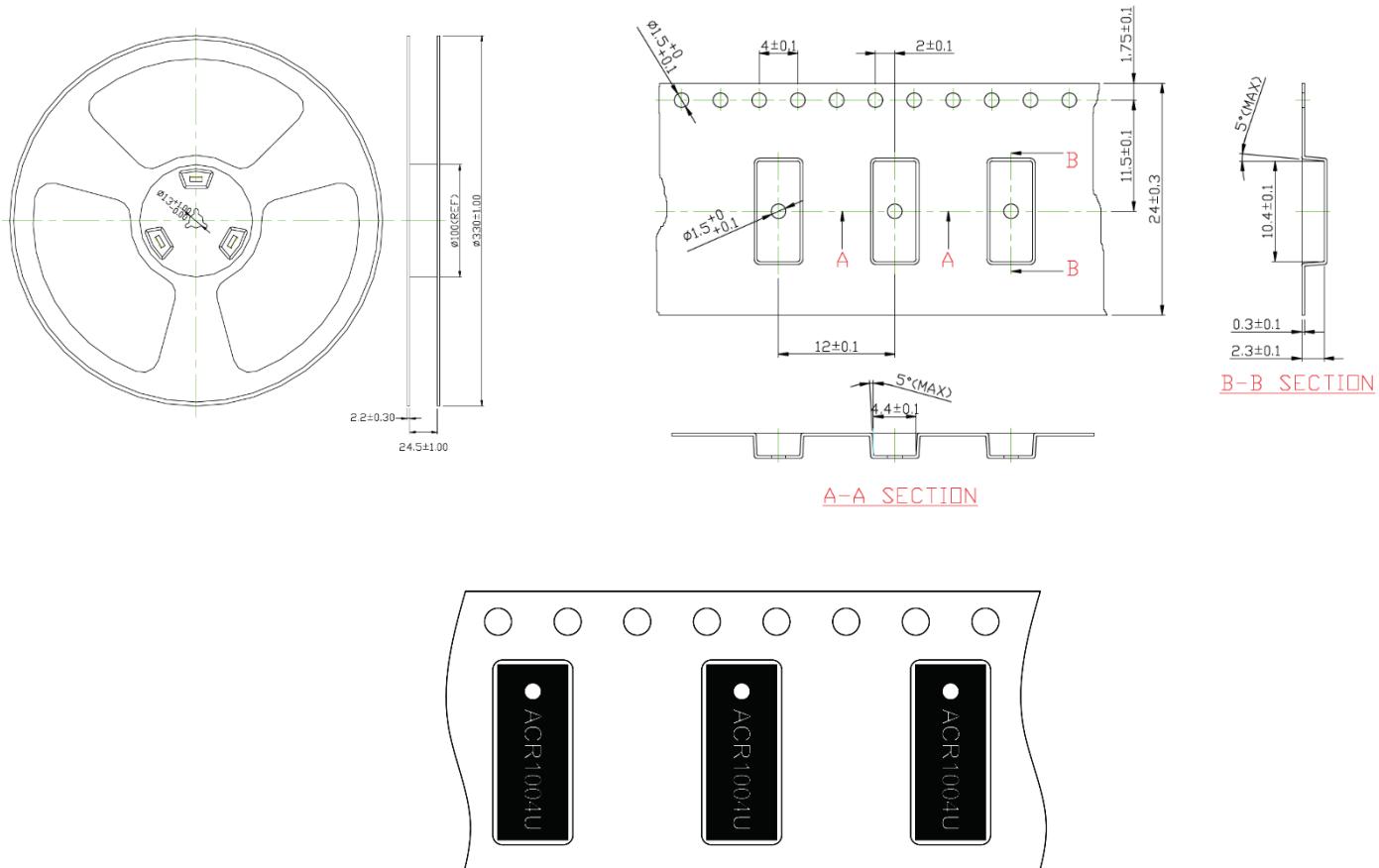
## Precautions

- Do not directly solder onto the gold electrode of the antenna pattern.
- Do not use the chip antenna in a corrosive gaseous atmosphere for example sulfur gas, chlorine gas.

## Packaging Information

Number of pieces/tapes : 2000

Blister tape to IEC 286-3, Polyester



Unit : mm

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