

# Product Specification

Mica 2.4 GHz SMD Antenna



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## 1. FEATURES

- Designed for 2.4 GHz applications [Bluetooth™, WiFi™ (802.11b/g), Zigbee™, WiMedia™ etc.]
- Intended for SMD mounting
- Supplied in tape on reel

## 2. DESCRIPTION

The Mica antenna is intended for use with all 2.4 GHz applications. The antenna requires a groundplane, i.e your device acts as an active part of the antenna and thus demand careful consideration concerning its placement

## 3. APPLICATION

- Mobile phones
- PDAs
- Headsets
- Laptops
- Medical equipment
- Automotive

#### 4.MODEL NAME

|           |           |                   |                       |
|-----------|-----------|-------------------|-----------------------|
| <b>30</b> | <b>30</b> | <b>A5645 - 01</b> |                       |
|           |           |                   | <b>Drawing No.</b>    |
|           |           |                   | <b>Technology</b>     |
|           |           |                   | -PCB                  |
|           |           |                   | <b>Antenna Family</b> |
|           |           |                   | -SMD                  |

#### 5. GENERAL DATA

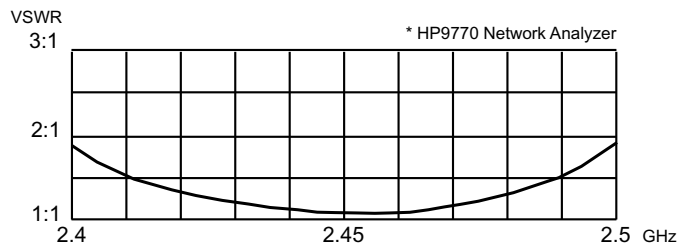
|                       |                  |
|-----------------------|------------------|
| Product Name          | Mica 2.4 GHz     |
| Article No.           | 3030A5645-01     |
| Frequency             | 2.4-2.5 GHz      |
| Polarization          | Linear           |
| Operating temperature | -40 to + 85 degC |
| Impedance             | 50 Ohm           |
| Weight                | 0.4 gram         |
| Antenna type          | SMD              |

#### 6. ELECTRICAL CHARACTERISTICS

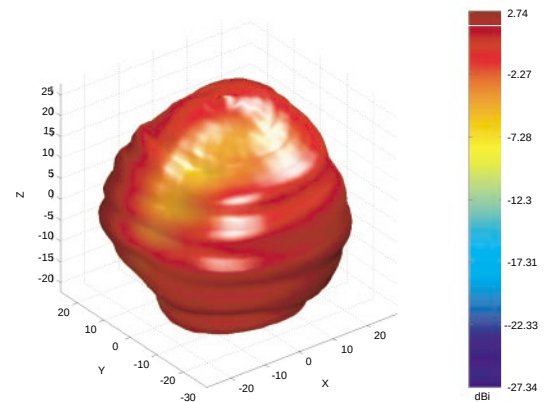
|                                                                                | Characteristics |         |         | Conditions*                                                 |
|--------------------------------------------------------------------------------|-----------------|---------|---------|-------------------------------------------------------------|
|                                                                                | Min             | Typ     | Max     |                                                             |
| Peak Gain                                                                      | 2.1 dBi         | 2.4 dBi | 2.7 dBi | Frequency 2.4-2.5 GHz, Measured in 3D chamber ( near field) |
| Efficiency                                                                     | 70%             | 75%     | 79%     |                                                             |
| VSWR                                                                           | 1.0:1           | 1.5:1   | 1.9:1   | Frequency 2.4-2.5 GHz, Measured in Network Analyzer         |
| *Note all data provided in this table are based on the gigaAnt reference board |                 |         |         |                                                             |

## 7. ELECTRICAL PERFORMANCE

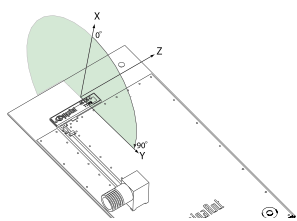
### 7.1 Voltage Standing Wave Ratio



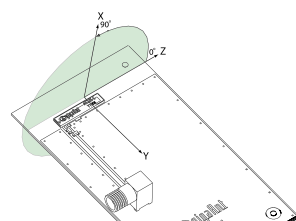
### 7.2 3D-Radiation



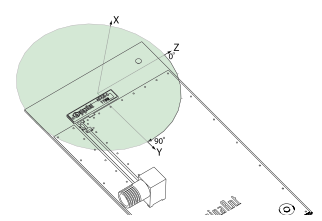
### 7.3 Radiation patterns



XY- Plane

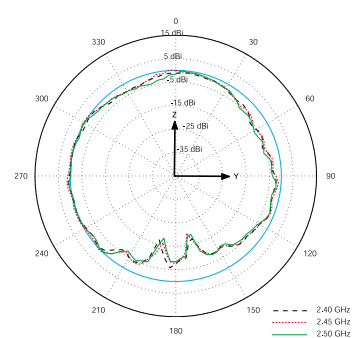
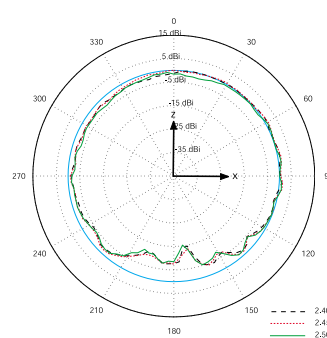
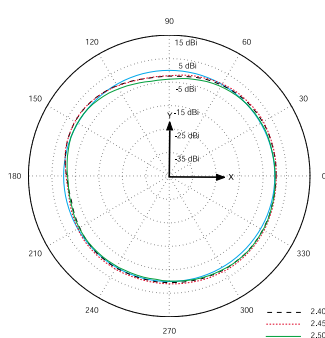


XZ- Plane

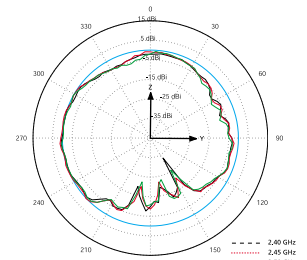
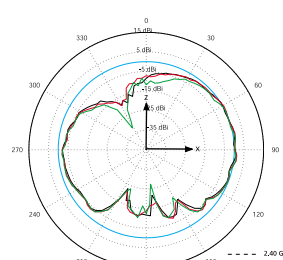
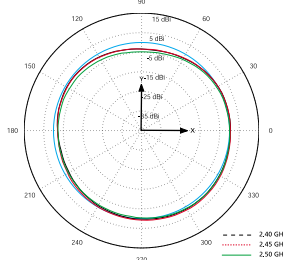


YZ- Plane

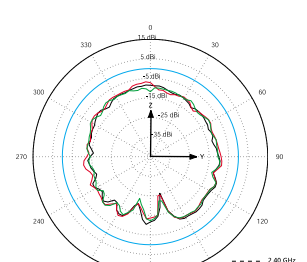
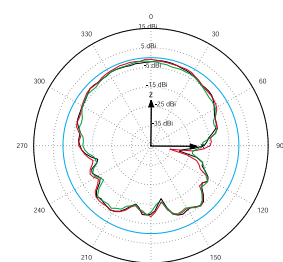
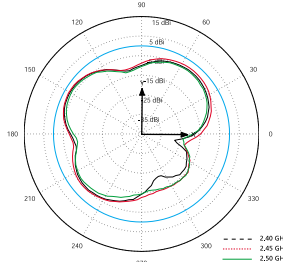
Total polarization



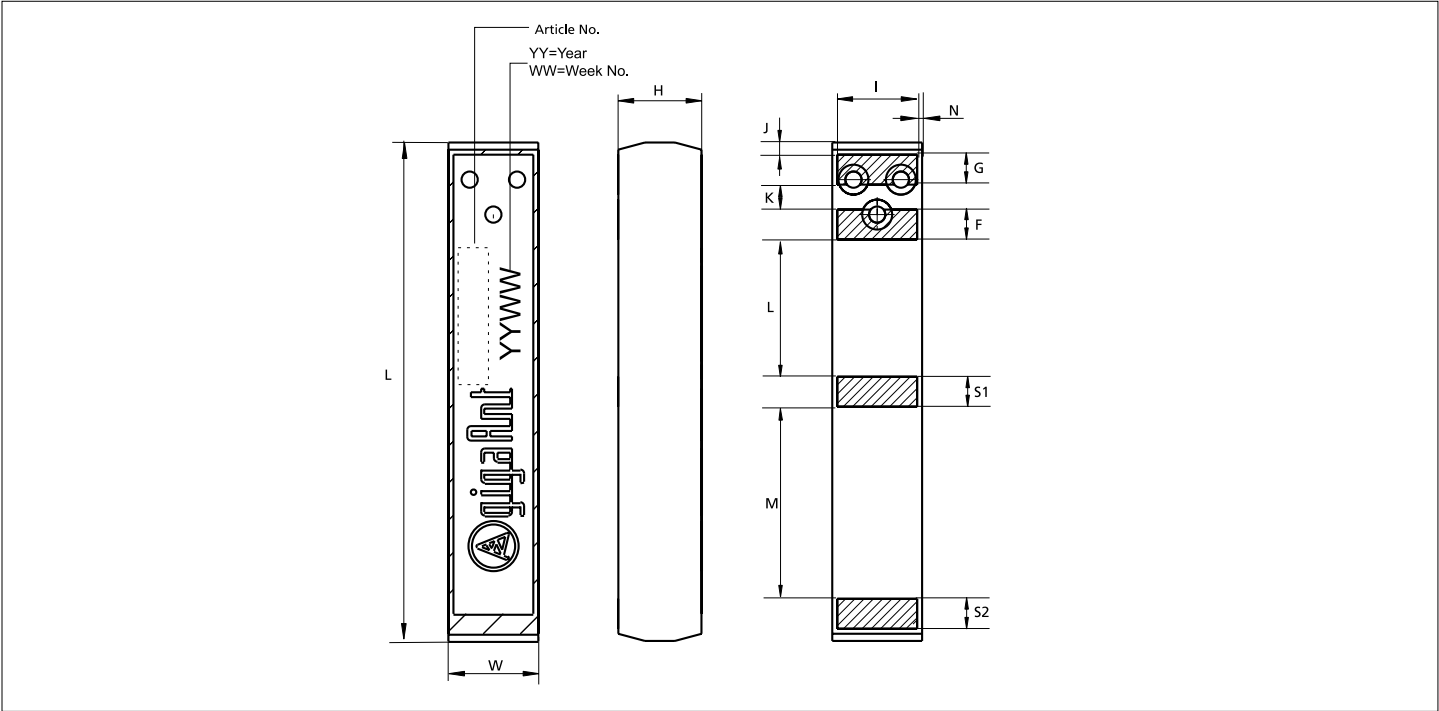
Vertical polarization



Horizontal polarization

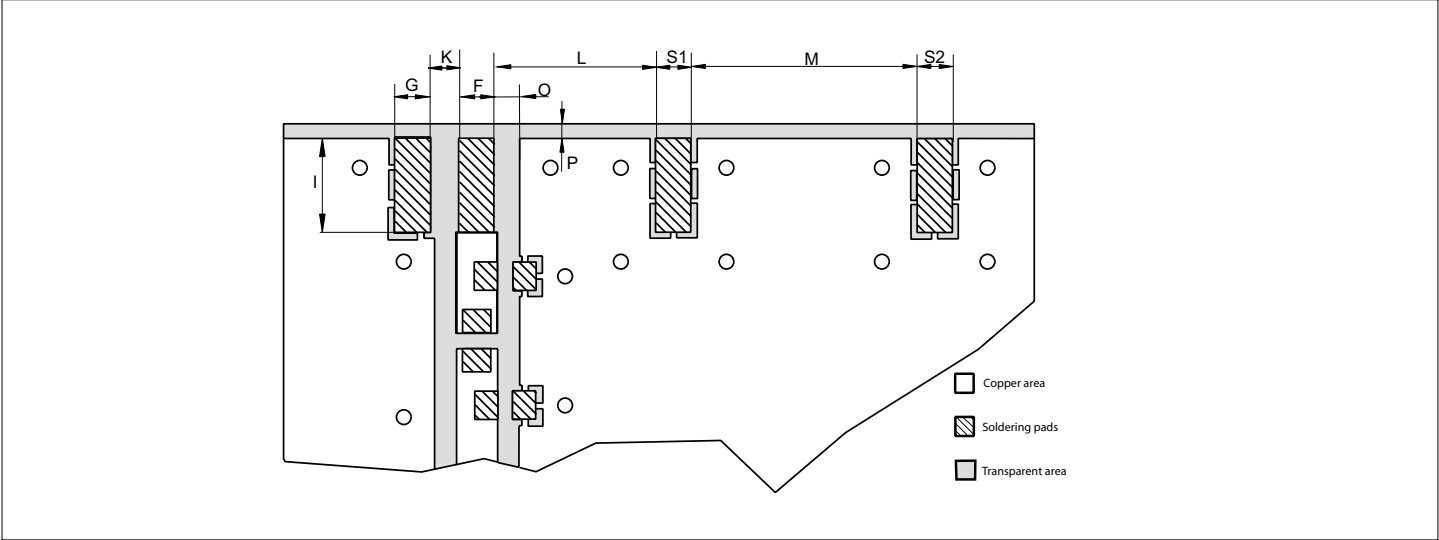


8. ANTENNA DIMENSIONS



| L                        | W        | H       | G       | F       | S1, S2  | I       | J         | K       | L       | M       | N       |
|--------------------------|----------|---------|---------|---------|---------|---------|-----------|---------|---------|---------|---------|
| Length                   | Width    | Height  | Ground  | Feed    | Solder  | Feed    | Feed      |         |         |         |         |
| 20.5 ±0.2                | 3.6 ±0.1 | 3.3±0.2 | 1.2±0.1 | 1.2±0.1 | 1.2±0.1 | 3.2±0.1 | 0.55±0.25 | 1.0±0.1 | 5.5±0.1 | 7.7±0.1 | 0.2±0.1 |
| Dimensions in millimeter |          |         |         |         |         |         |           |         |         |         |         |

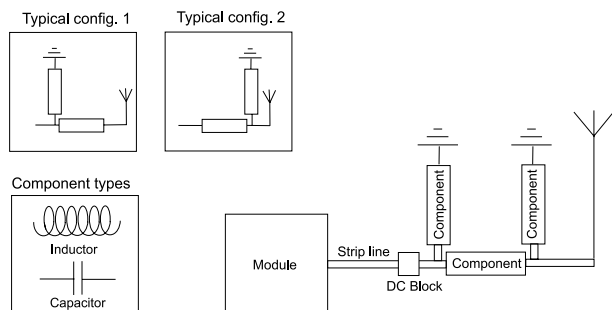
9. ANTENNA FOOT PRINT



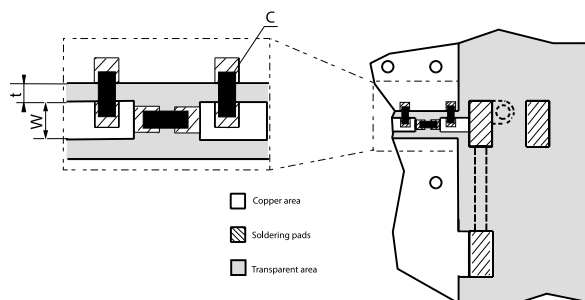
| G                         | F       | S1      | S2      | I       | K       | L       | M       | O       | P       |
|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ground                    | Feed    | Solder  | Solder  |         |         |         |         |         |         |
| 1.2±0.1                   | 1.2±0.1 | 1.2±0.1 | 1.2±0.1 | 3.2±0.1 | 1.0±0.1 | 5.5±0.1 | 7.7±0.1 | 0.5±0.1 | 0.5±0.1 |
| Dimensions in millimeters |         |         |         |         |         |         |         |         |         |

## 10. ELECTRICAL INTERFACE

### 10.1 Transmission line and matching



The matching network has to be individually designed using one, two or three components.

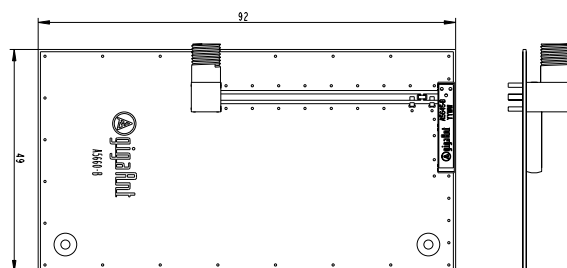


t, w = Unique dimensioning according to your PCB \*

C = Inductor and capacitor values according to your specific device\*

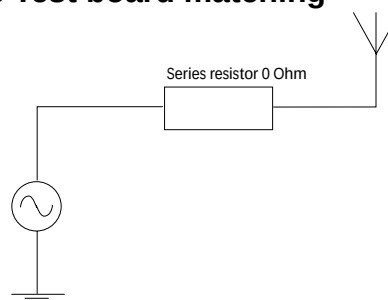
\* gigaAnt provides this service upon request

### 10.2 Test board dimensions



The testboard is designed for evaluation purposes for Mica 2.4 GHz SMD antenna. The board has the same size as a typical PCMCIA card and is fitted with an SMA connector.

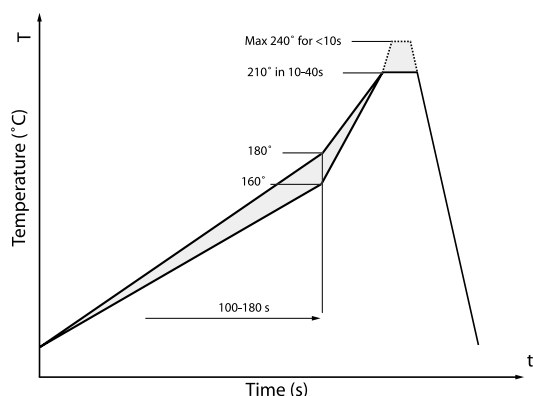
### 10.3 Test board matching



The testboard is matched with above specified component. Note! The component value(s) will vary depending on size of PCB, surrounding components etc.

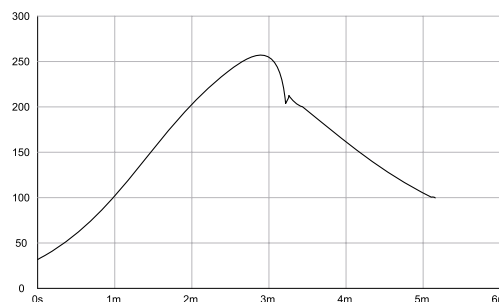
## 11. SOLDERING

### 11.1 Recommended soldering conditions



### 11.2 Leadfree soldering

The antenna has been tested and approved for leadfree soldering. The reflow curve and solder paste used is listed below.



Solder paste: KOKI S3X58-M405

## 12. RELIABILITY

### 12.1 Temperature and Humidity

| Item                             | Standard                                          | Low               | High      | Duration            |
|----------------------------------|---------------------------------------------------|-------------------|-----------|---------------------|
| Operating temperature            | EN/IEC 60068-2-2, Test Bd: Dry heat               | -30 degC          | +90 degC  | -                   |
| Temperature cycling              | EN/IEC 60068-2-14, Test Na: Change of temperature | -40 degC          | +90 degC  | 500 cycles / 10 min |
| Storage life<br>Humidity         | EN/IEC 60068-2-1, Test Ca: Damp heat              | +60 degC / 90% RH |           | 500 h               |
| Storage life<br>Low temperature  | EN/IEC 60068-2-1, Test Ad: Cold                   | -55 degC          | -         | 500 h               |
| Storage life<br>High temperature | EN/IEC 60068-2-2, Test Bb: Dry heat               | -                 | +125 degC | 500 h               |

### 12.2 Mechanical

| Item      | Standard                               | Low                                                                                                                     | High | Duration                              |
|-----------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------|
| Bending   | IEC 60068-2-21, Test Ue1: Bending      | Bending 1 mm at a rate of 1 mm/s with support at end of PCB 1mm depth on reference board                                |      |                                       |
| Shear     | IEC 60068-2-21, Test Ue3: Shear        | Force of 5 N applied to the side of the antenna.                                                                        |      |                                       |
| Drop test |                                        | Dummy weight: 150g<br>Height: 170cm                                                                                     |      | One drop at each side, total drops: 6 |
| Vibration | EN/IEC 60068-2-6, Test Fc (sinusoidal) | Acceleration spectral density:10-1000Hz<br>Acceleration: 20m/s <sup>2</sup><br>Number of axes: 3 mutually perpendicular |      | 5 cycles per axis                     |

### 12.3 Miscellaneous

| Item          | Standard                   | Low                                                                                                 | High | Duration |
|---------------|----------------------------|-----------------------------------------------------------------------------------------------------|------|----------|
| Solderability | EN/IEC 60068-2-58, Test Td | Visual inspection of soldering pads. Estimation of how many % of the pads that are well tin plated. |      |          |

### 12.4 Judgement standard

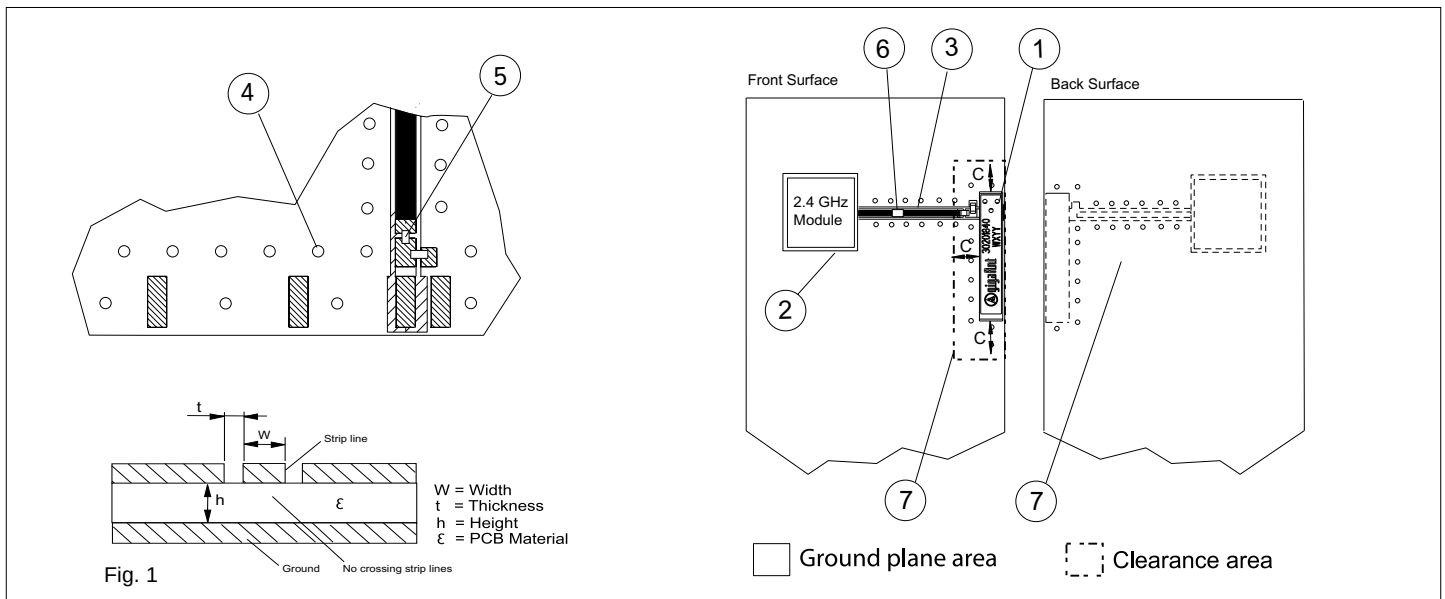
The judgement of the above tests should be made as follows:

1. Visual inspection - Normal appearance with no obvious cracking, peeling-off.
2. Electrical inspection - The DUT satisfies the VSWR specification throughout the 2.4-2.5 GHz band

## 13. HAZARDOUS MATERIAL REGURATION CONFORMANCE

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| Cadmium and cadmium compound.           | Lead and lead compound                   |
| Organic brominated compound (PBB, PBDE) | Mercury and mercury compound             |
| Polychlorinated biphenyl (PCB)          | Sesquivalent chrome compound             |
| Polychlorinated naphthalene (PCN)       | Chlorinated paraffin (CP)                |
| Organic tin compound                    | Mirex                                    |
| Asbestos                                | Formaldehyde                             |
| Azo compound                            | Tetra-bromo-bisphenol-A-bis (TBBP-A-bis) |

## 14. APPLICATION EXAMPLE



### General

The antenna is of a quarter wave type and is dependent on the groundplane area to complete the antenna function. The antenna performance is also dependent on the size of the groundplane.

#### 1. Placement of the antenna

The antenna shall be placed on a groundplane area, preferably at the edge of the PCB oriented as above.

#### 2. Placement of 2.4 GHz module

To avoid losses in the strip line, the module shall be placed as close to the antenna as possible.

#### 3. Strip line

The strip line must be dimensioned according to your specific PCB. ( see fig 1). No crossing strip lines are allowed between the strip line and its ground plane.

#### 4. Via connections

To avoid spurious effects, via connections must be made to analogue ground.

#### 5. Component matching

Component values are depending on antenna placement, PCB dimensions and location of other components.

#### 6. DC Block

Might be needed depending on RF Module configuration.

#### 7. Clearance

Front surface: Minimum clearance to other components, C = 2-5 mm

Back surface: Components allowed.

#### 8. Casing material

No metal casing or plastics using metal flakes shall be used, avoid also metallic based paint or laquer.

**Note ! Incorrect implementation of the antenna will affect the performance.  
Contact gigaAnt for implementation services.**

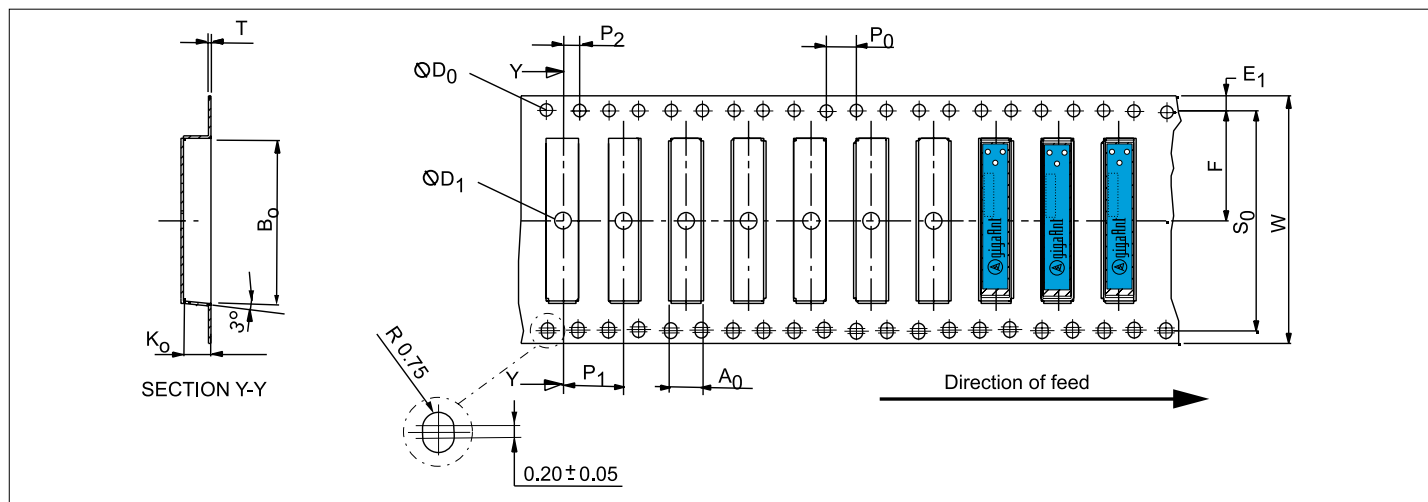


## 15. PACKAGING

### 15.1 Shelf storage recommendation

|               |                                             |
|---------------|---------------------------------------------|
| Temperature   | -10 to +40 degree C                         |
| Humidity      | Less than 75% RH                            |
| Shelf Life    | 18 Months                                   |
| Storage place | Away from corrosive gas and direct sunlight |

### 15.2 Tape characteristics



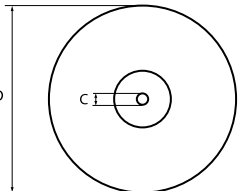
| W      | S <sub>0</sub> | F        | E <sub>1</sub> | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | A <sub>0</sub> | B <sub>0</sub> | K <sub>0</sub> | T        | D <sub>0</sub> | D <sub>1</sub> |
|--------|----------------|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------------|----------------|
| 32±0.3 | 28.4±0.3       | 14.2±0.1 | 1.75±0.1       | 4.0±0.1        | 8.0±0.1        | 2.0±0.1        | 4.0±0.1        | 21±0.1         | 3.7±0.1        | 0.3±0.05 | 1.5±0.1        | Min 2.0        |

Dimensions in millimeter

| Quantity        | Leading space            | Trailing space           |
|-----------------|--------------------------|--------------------------|
| 2000 Pcs / reel | 50 blank antenna holders | 37 blank antenna holders |

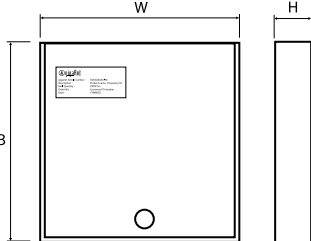
### 15.3 Reel dimension

|                                  |             |
|----------------------------------|-------------|
| Material: Conductive Polystyrene |             |
| Width [mm]                       | W: 32       |
| Reel dia [mm]                    | D: 330(13") |
| Hub dia [mm]                     | H: 100(4")  |
| Shaft dia [mm]                   | C: 13       |



### 15.4 Box dimension

|                     |        |
|---------------------|--------|
| Material: Cardboard |        |
| Width [mm]          | W: 345 |
| Breadth [mm]        | B: 345 |
| Thickness [mm]      | H: 45  |



### 15.5 Bag properties

|                                                                                |                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Antistatic Aluminium Moisture Barrier Bag</p> <p>Thickness [mil] T: 3.2</p> | <p><b>15.6 Reel label information</b></p>  <p>gigaAnt Article number : XXXXAXXX-XX<br/>           Description : Product name, Frequency Hz<br/>           Reel Quantity : XXXX Pcs.<br/>           Order No: Customer PO number<br/>           Date: YYMMDD</p> |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 16. CONTACT INFORMATION

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