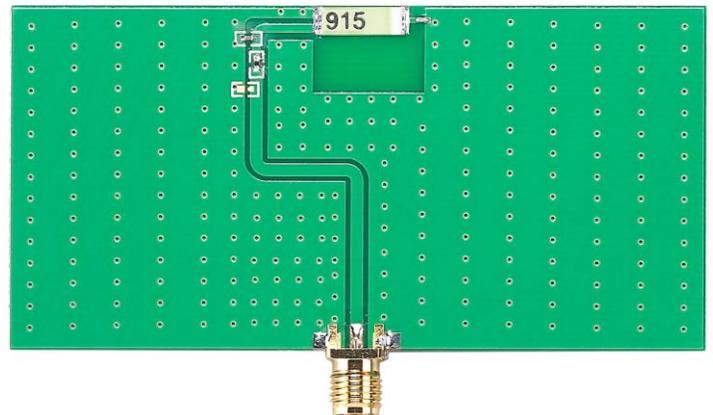


# SPECIFICATION

- Part Number : **ILA.01**
- Product Name : Low Profile and High Efficiency 915 MHz ISM Band Loop Antenna
- Features : Small size antenna, low profile, and high efficiency  
915 MHz ISM Band  
1 dBi Peak Gain  
10 x 3.2 x 0.5 mm size  
SMT Compatible  
**RoHS Compliant**



# 1. Introduction

The ILA.01 is a 915 MHz ISM band antenna with excellent efficiency, 60% at the center frequency and 45% at the band edges. This antenna works the best when placed at the center of the board edge. The antenna, at 10 x 3.2 x 0.5 mm, is low profile and would be suitable for devices with space constraints. The ILA.01 is delivered on tape and reel and now allows M2M customers to use an omni-directional SMT antenna. The omni-directional radiation characteristics allow for excellent performance regardless of device orientation. This is especially useful for devices that are not fixed in one particular spot during use. When there is little PCB space available for antenna placement, but high performance is required, the ILA.01 is the ideal choice. The ILA.01 Loop antenna can be used in automated meter reading (AMR), radio frequency identification (RFID), remote monitoring, healthcare, sensing, and other 915 MHz applications.

# 2. Specification

| ELECTRICAL                |                  |
|---------------------------|------------------|
| ANTENNA                   | ILA.01           |
| STANDARD                  | 915 MHz ISM      |
| Operation Frequency (MHz) | 902-928 MHz      |
| Polarization              | Linear           |
| Impedance                 | 50 Ohms          |
| Max VSWR (dBi)            | 2:1              |
| Max Return Loss (dB)      | -10              |
| Peak Gain                 | 1 dBi            |
| Efficiency (%)            | 50 typ.          |
| Average Gain (dB)         | -3               |
| Radiation Properties      | Omni-directional |
| Max Input Power           | 5 W              |

\* The ILA.01 antenna performance was measured with 80x40 mm ground plane.

| MECHANICAL          |            |
|---------------------|------------|
| Dimensions (mm)     | 10x3.2x0.5 |
| Required Space (mm) | 11x10.4    |
| Material            | Ceramic    |
| EVB Connector       | SMA(F)     |

| ENVIRONMENTAL         |                |
|-----------------------|----------------|
| Operation Temperature | -40°C to 85°C  |
| Storage Temperature   | -40°C to 105°C |
| Relative Humidity     | 40% to 95%     |
| RoHS Compliant        | Yes            |

### 3. Test Setup



**Figure 1.** Impedance measurements (left hand) and peak gain, average gain, efficiency, and radiation pattern measurements (right hand).

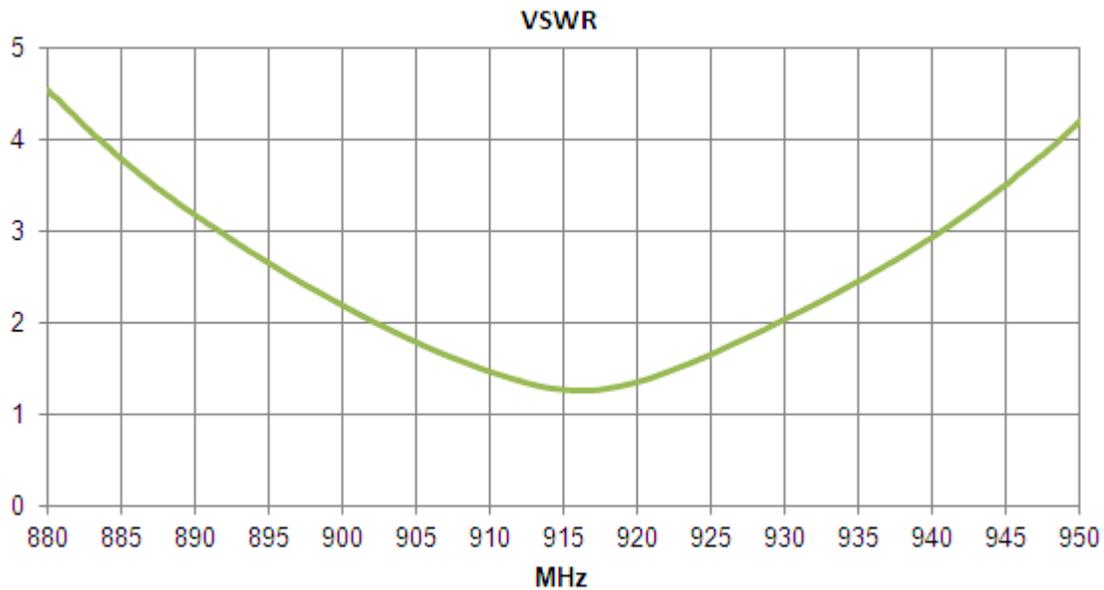
## 4. Antenna Paramaters

### 4.1. Return Loss



**Figure 2.** Return loss of 915MHz ISM Band Antenna ILA.01

### 4.2. VSWR



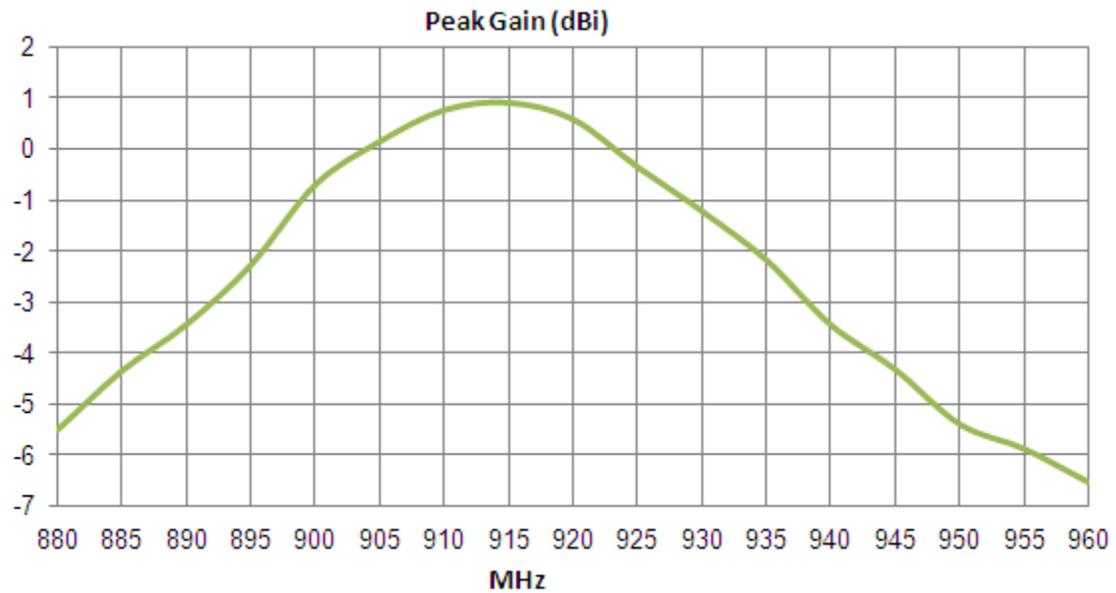
**Figure 3.** VSWR of 915 MHz ISM Band Antenna ILA.01

### 4.3. Efficiency



**Figure 4.** Efficiency of 915 MHz ISM Band Antenna ILA.01

### 4.4. Peak Gain



**Figure 5.** Peak Gain of 915 MHz ISM Band Antenna ILA.01

## 4.5. Average Gain

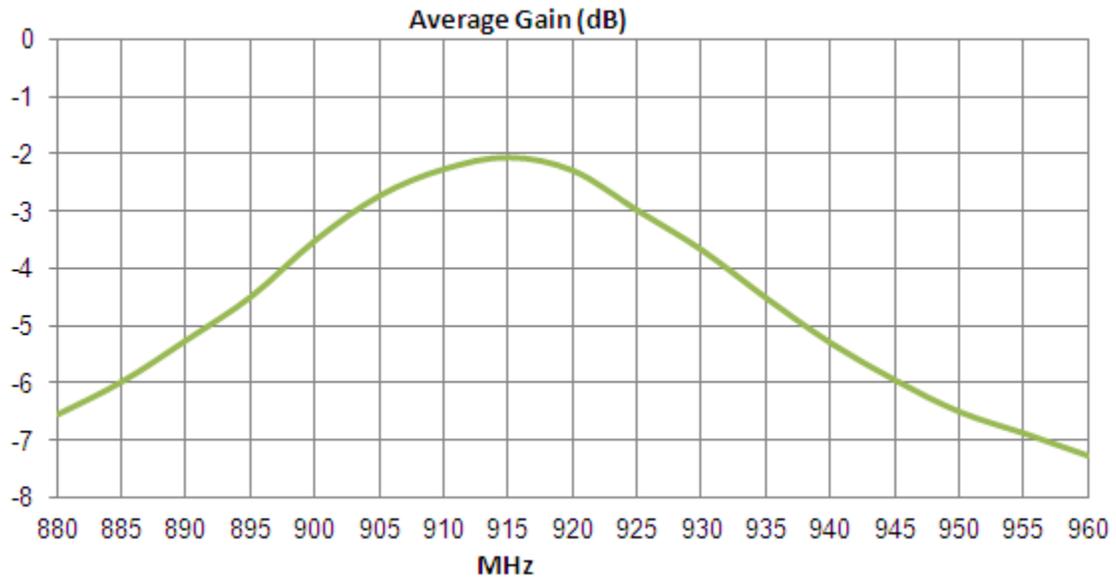


Figure 6. Average Gain of 915 MHz ISM Band Antenna ILA.01

## 4.6. Radiation Pattern

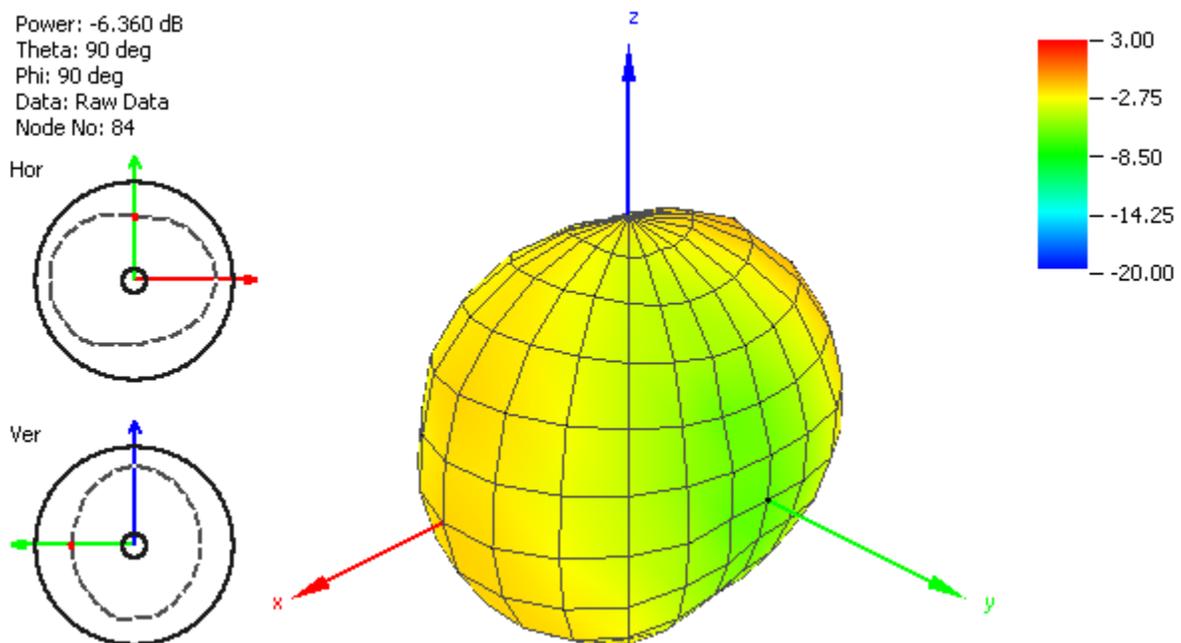
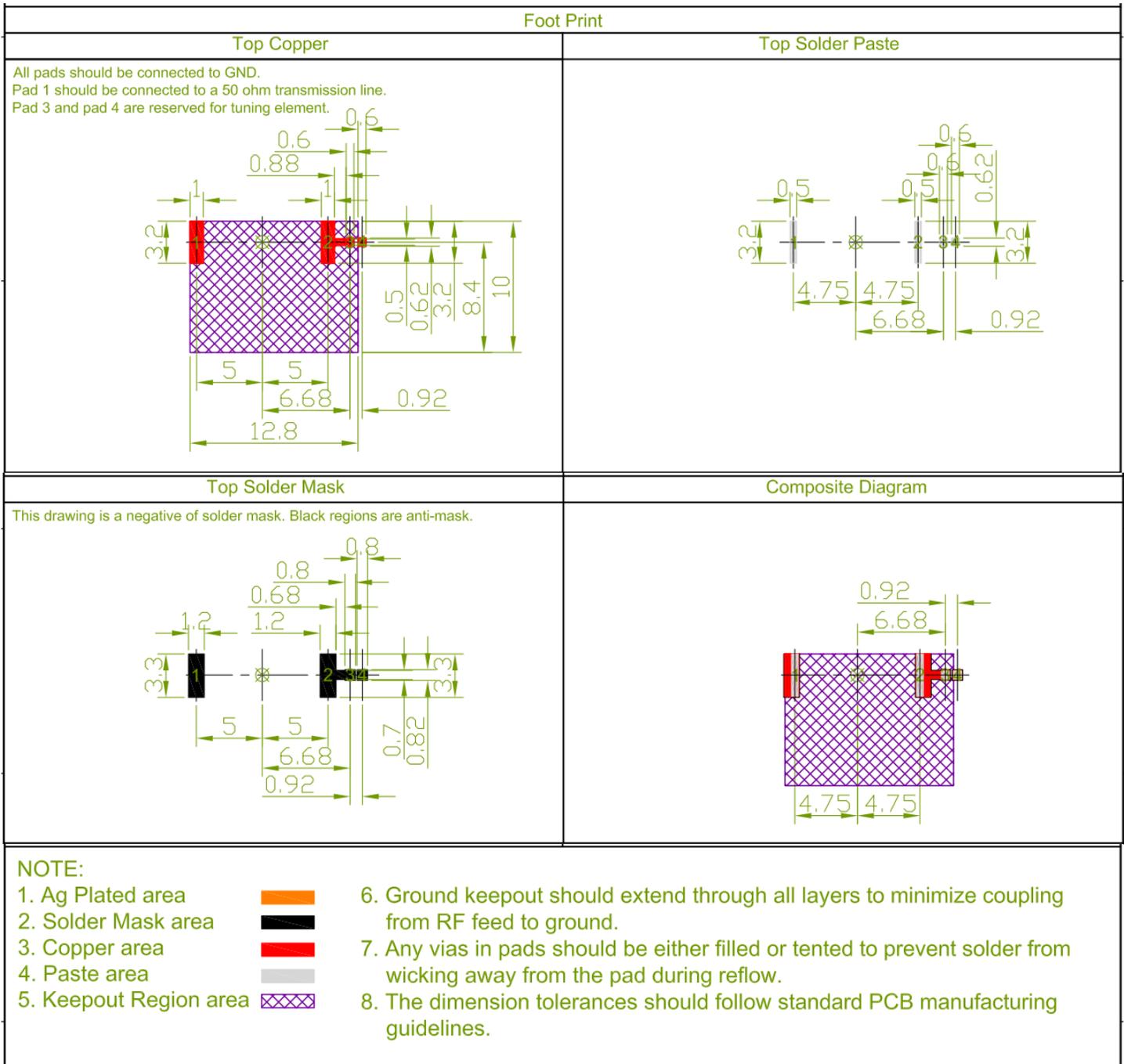


Figure 7. Radiation Pattern at 915 MHz of the ILA.01 Antenna.

# 5. Layout Guide

## 5.1 Solder Land pattern

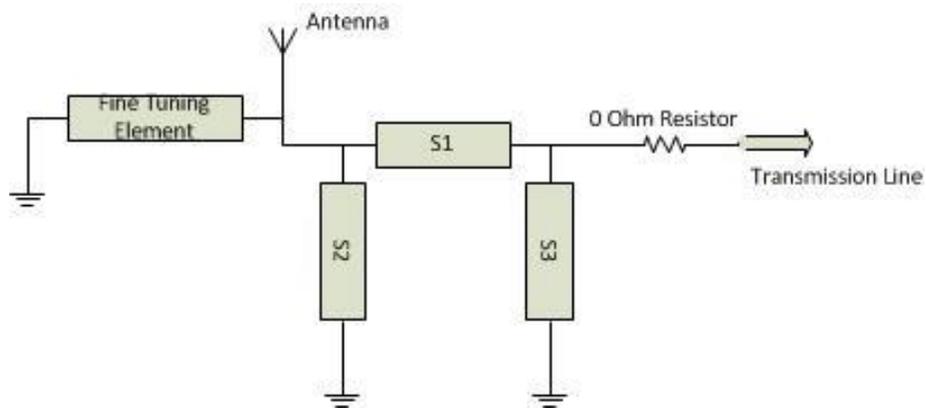
Land pattern for soldering is as shown below. A matching circuit similar to the one shown in section 5.2 is also required.



**Figure 8.** Foot Print Drawing of the ILA.01 Antenna

## 5.2 Matching Circuit

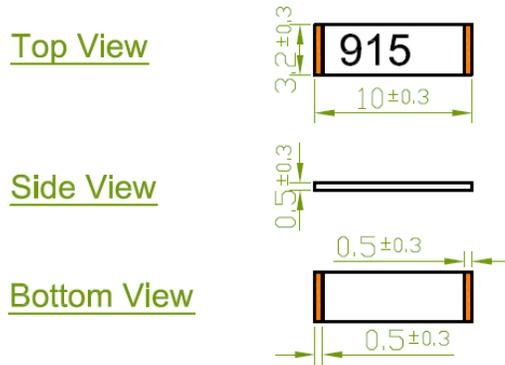
Like all antennas, surrounding components, enclosures, and changes to the GND plane dimensions can alter performance. A pi-matching network like the one shown below is required in case adjustments need to be made. The antenna EVB has a similar matching network. The components on the EVB are a good starting point for a new design, but will need to be adjusted upon integration for best performance. The zero ohm resistor is needed for the ability to solder down a coax pigtail to make measurements with a vector network analyzer.



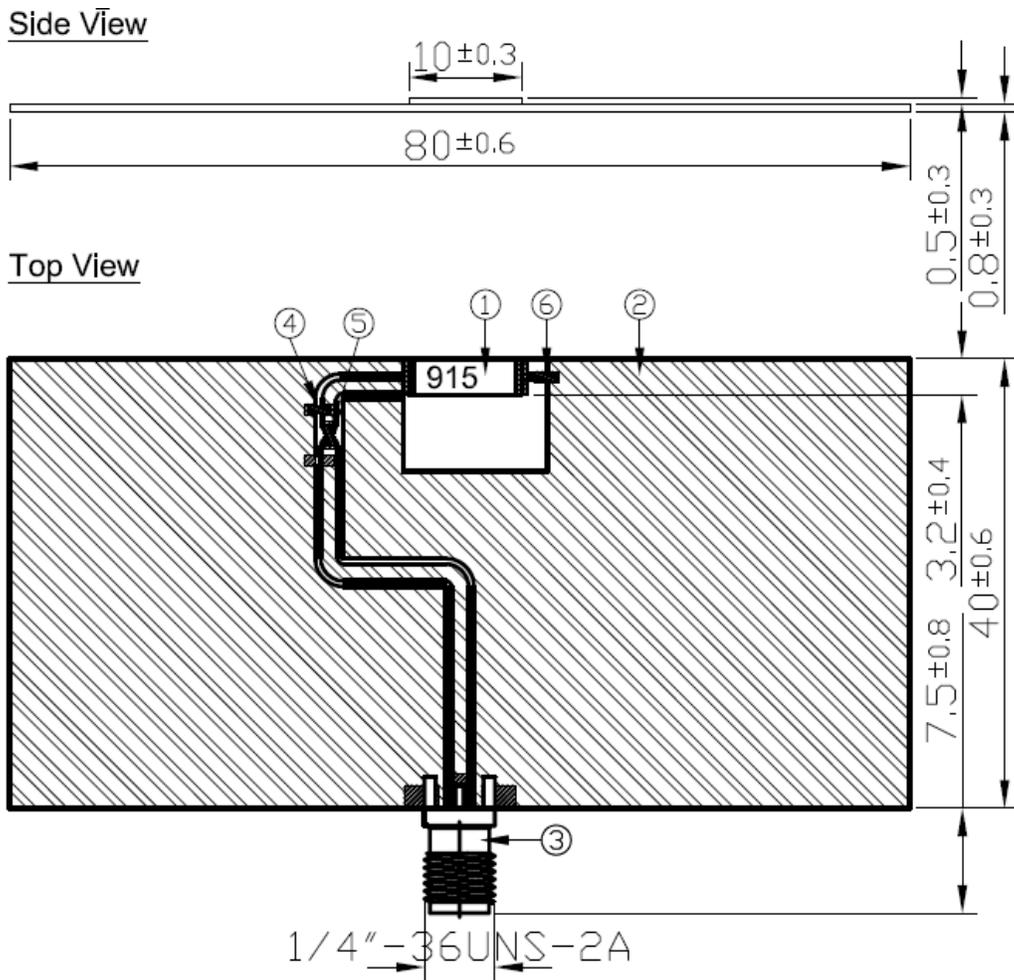
**Figure 9.** Matching Circuits Block Diagram.

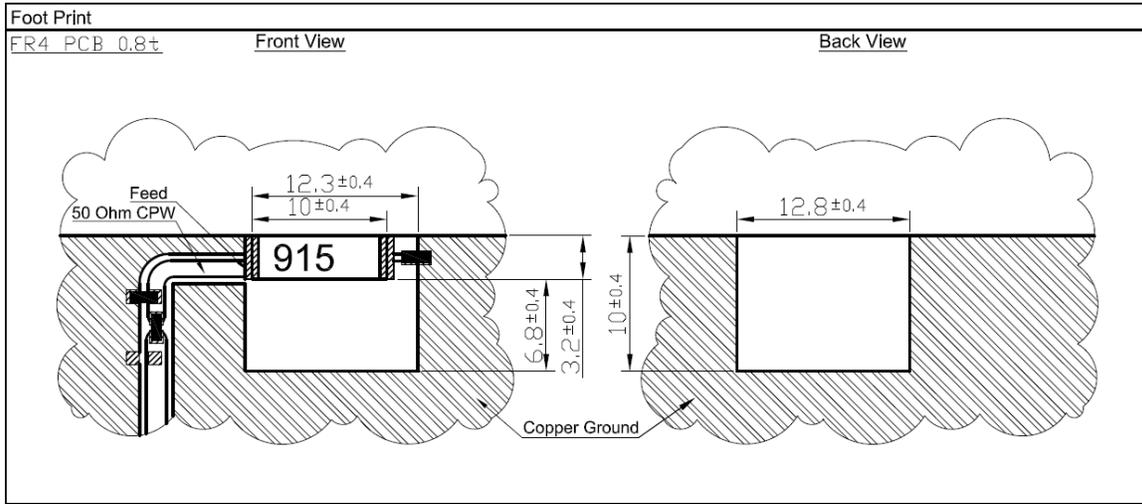
## 6. Drawings

### Antenna Main Body



### Antenna with EVB





NOTES:

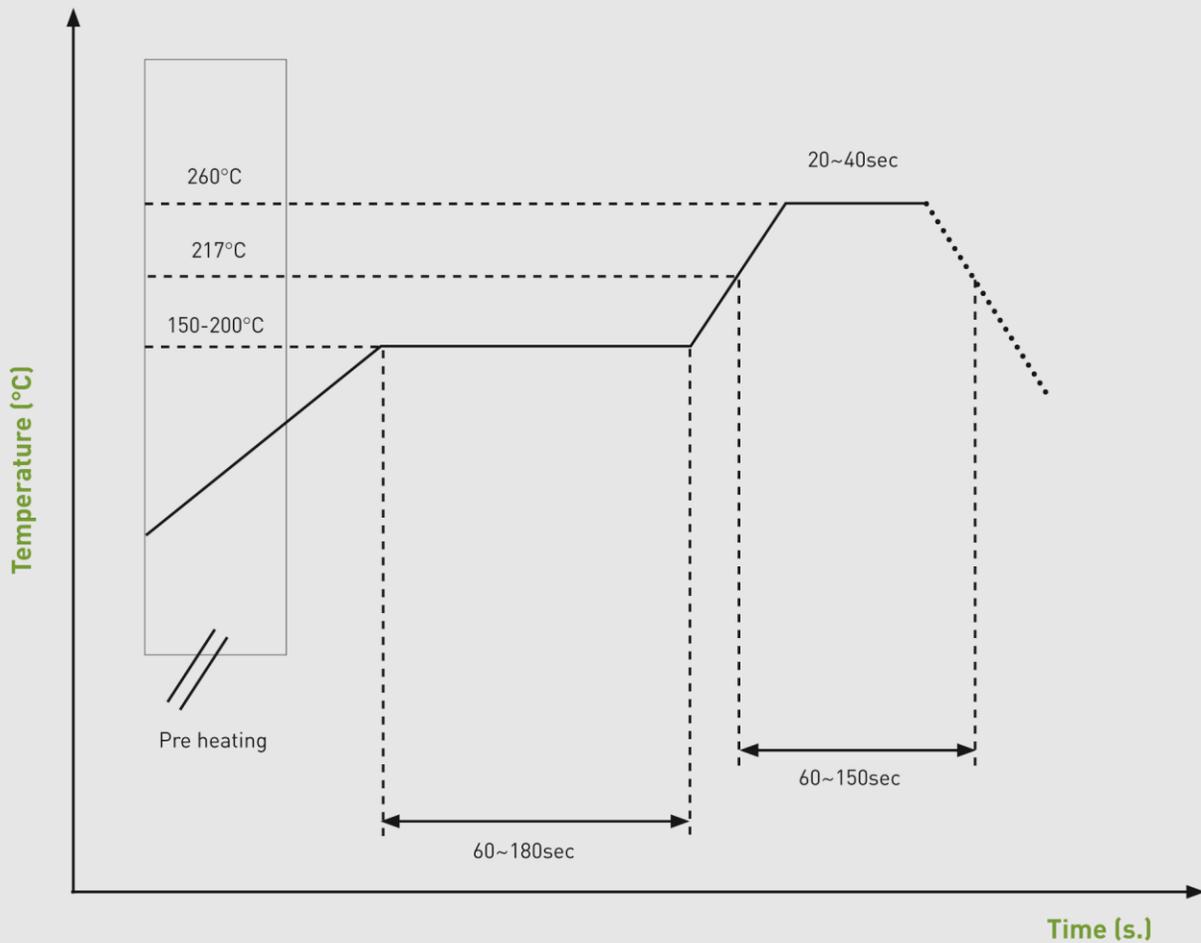
1. Solder Area 
2. Logo & Text Ink Printing : Black
3.  Copper
4.  Matching Component
5. Component 6 is the tuning element of this antenna. 

|   | Name                   | P/N            | Material | Finish | QTY |
|---|------------------------|----------------|----------|--------|-----|
| 1 | ILA.01 Antenna         | 001513F000012A | Ceramic  | N/A    | 1   |
| 2 | ILA.01 EVB Board       | 100213F000012A | FR4 0.8t | Green  | 1   |
| 3 | SMA(F) ST              | 200413F000012A | Brass    | Gold   | 1   |
| 4 | Capacitor 4.3pF (0402) | 001514F020012A | Ceramic  | N/A    | 1   |
| 5 | Resistor 0Ω (0402)     | 001511J010012A | Ceramic  | N/A    | 1   |
| 6 | Capacitor 10pF (0402)  | 001514F010012A | Ceramic  | N/A    | 1   |

Figure 10. Drawing of the ILA.01 Antenna

## 7. Recommended Reflow

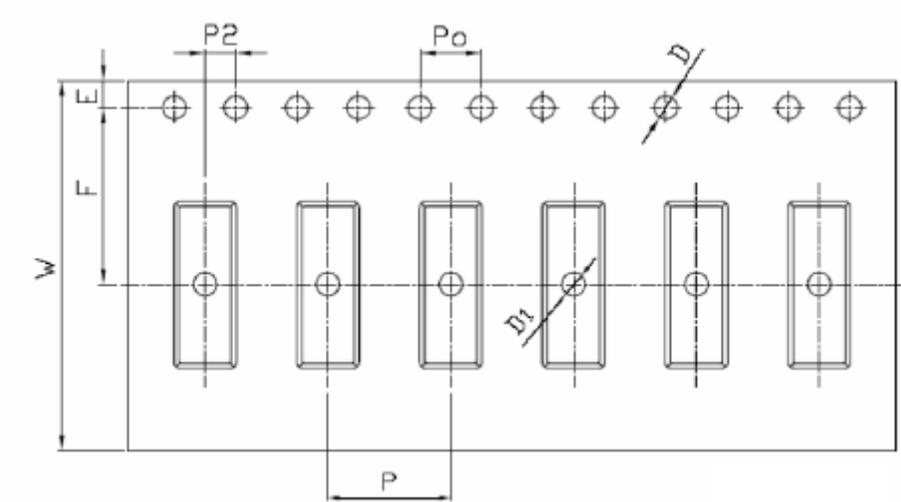
The ILA01 Loop Antenna can be assembled following either Sn-Pb or Pb-Free assembly processes. The recommended soldering temperatures are as follows:



**Figure 11.** Reflow Temperature Recommendation

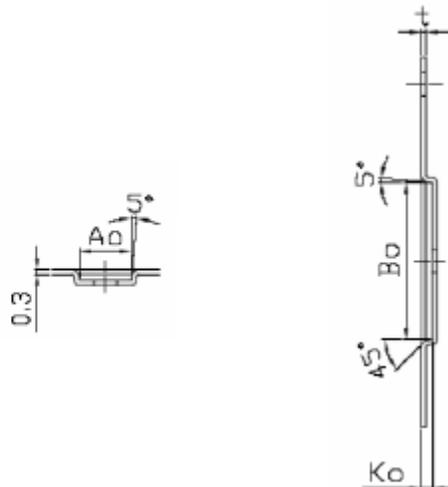
## 8. Packaging

The ILA.01 antennas are delivered in tape and reel with EIA 481-B polystyrene with 6000 pieces per reel.



**Figure 12.** Tape description for the ILA.01

| Symbol        | Spec         |
|---------------|--------------|
| w             | 24.0+/- 0.30 |
| P             | 8.0+/- 0.10  |
| E             | 1.75+/- 0.10 |
| F             | 11.5+/- 0.10 |
| P2            | 2.0+/- 0.10  |
| D             | 1.5+/- 0.10  |
| D1            | 1.5+/- 0.10  |
| Po            | 4.0 +/- 0.10 |
| 10Po          | 40 +/- 0.20  |
| <del>As</del> | 3.4 +/- 0.10 |
| <del>Bo</del> | 10.20+/-0.10 |
| <del>Ko</del> | 0.7+/- 0.10  |
| t             | 0.3+/- 0.05  |



**Figure 13.** Tape dimensions for the ILA.01.

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