

## DATASHEET

IRENA SZC-C-3M12 | Ceramic Chip Antenna | ISM433

### Features:

ISM433: 432-435

>-7.0dBi Peak Gain

Dimensions: 1.6 x 1.6 x 0.8 mm

Clearance Area: 33.0 x 16.0 mm

RoHs compliant

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## Introduction

**IRENA** (Part Number: **SZC-C-3M12**) is a compact and high-performance ceramic chip antenna designed for use in ISM (Industrial, Scientific, and Medical) 433 MHz applications. With its small dimensions of 1.6 x 0.8 x 0.8 mm, the IRENA antenna offers an ideal solution for devices with limited space, providing reliable and efficient performance. This antenna requires a clearance area of 33 x 16 mm for optimal installation and functionality. It is engineered to deliver excellent signal quality while maintaining a low profile, making it perfect for a variety of applications, including:

### **Applications:**

IoT Smart Home Devices

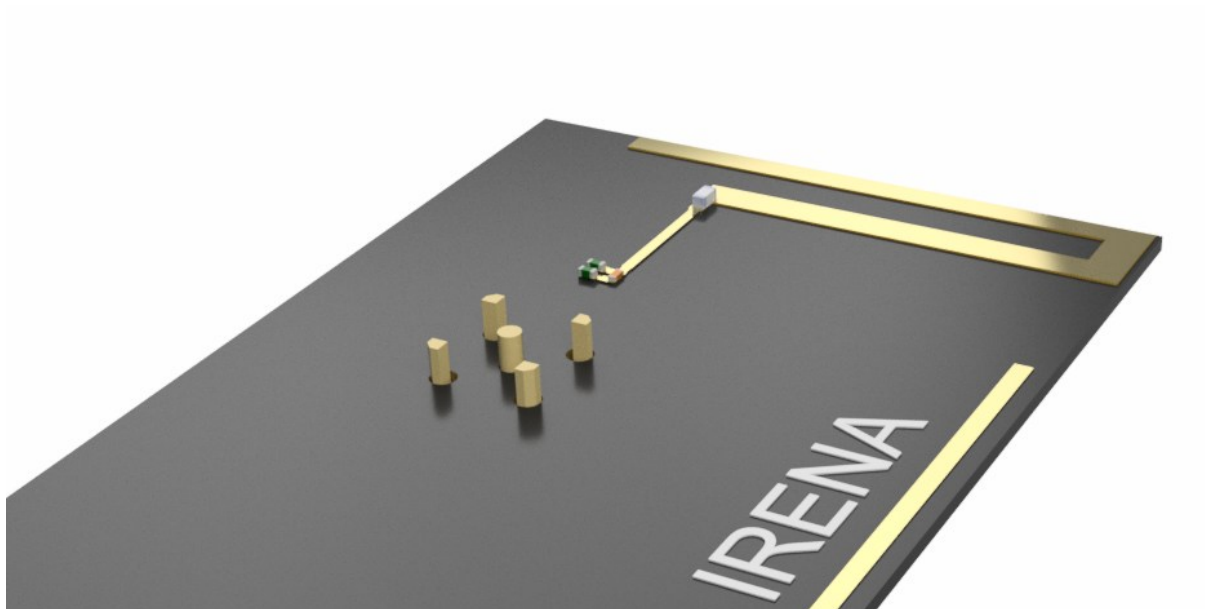
Wireless Sensors for Industrial Monitoring

Vehicle Telematics and Fleet Management

M2M Communication for Remote Equipment

Asset Tracking in Automotive Systems

Wireless Control Systems for Automotive Applications



## Mechanical Specifications

| Parameter           |                                |
|---------------------|--------------------------------|
| Part Number         | SZC-C-3M12                     |
| Name                | IRENA                          |
| Dimensions (mm)     | 1.6 x 1.6 x 0.8                |
| Clearance Area (mm) | 33.0 x 15.0 (Corner placement) |
| Weight              | <0.1g                          |
| Antenna Type        | Surface Mount Ceramic Chip     |
| Polarisation        | Linear                         |
| Radiation Pattern   | Omni-directional               |

## Electrical / RF Specifications

| Band   | Frequency Range (MHz) | Average Gain (dB) | Peak Gain (dBi) | VSWR   | Impedance |
|--------|-----------------------|-------------------|-----------------|--------|-----------|
| ISM433 | 433-435               | -10.2             | -7.05           | 1.30:1 | 50 Ω      |

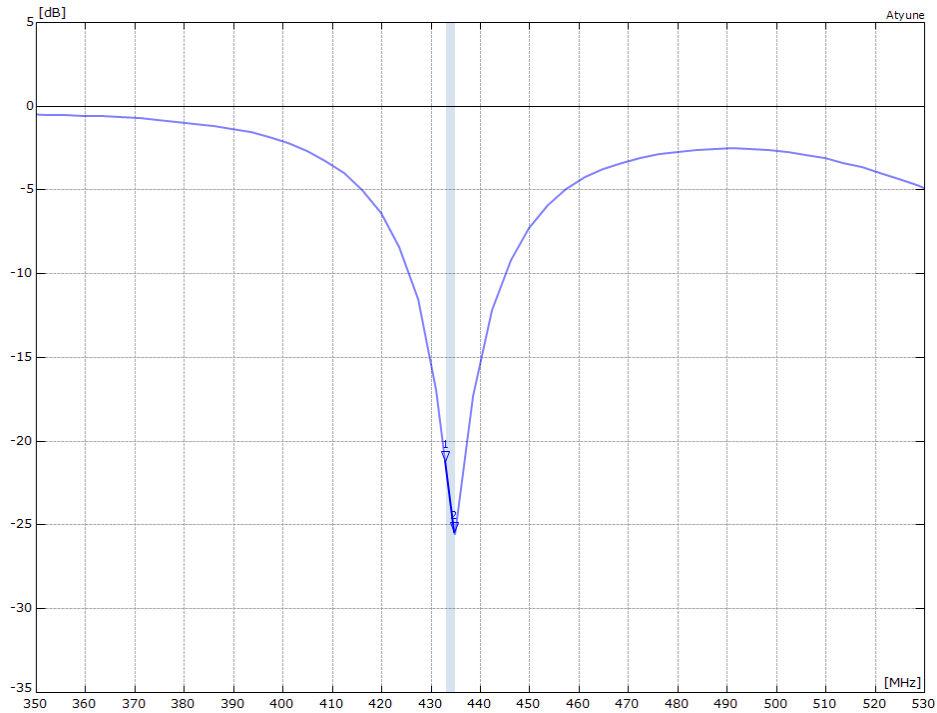
*Note: All performance stated is measured of SZDV-C-3M12 evaluation kit*

## Environmental

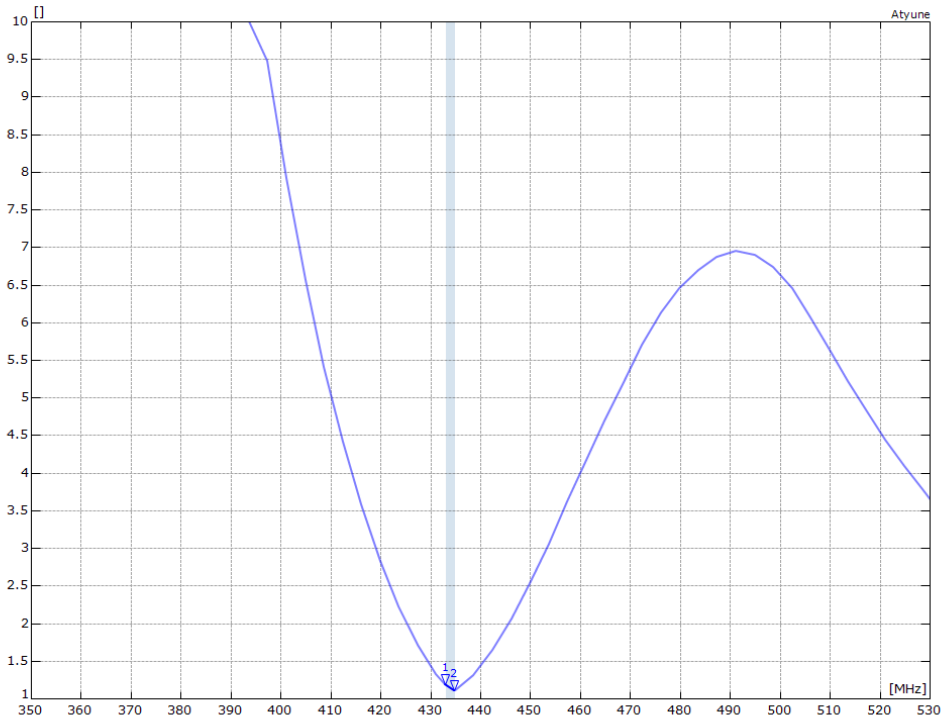
| Parameter                   |             |
|-----------------------------|-------------|
| Operational Temperature     | -40 to +125 |
| Storage Temperature         | -10 to +40  |
| Relative Humidity (Storage) | 65±20% RH   |
| Moisture Sensitivity        | 1           |
| RoHs and REACH compliant    | Yes         |

# RF Characteristics

## Return loss



## VSWR

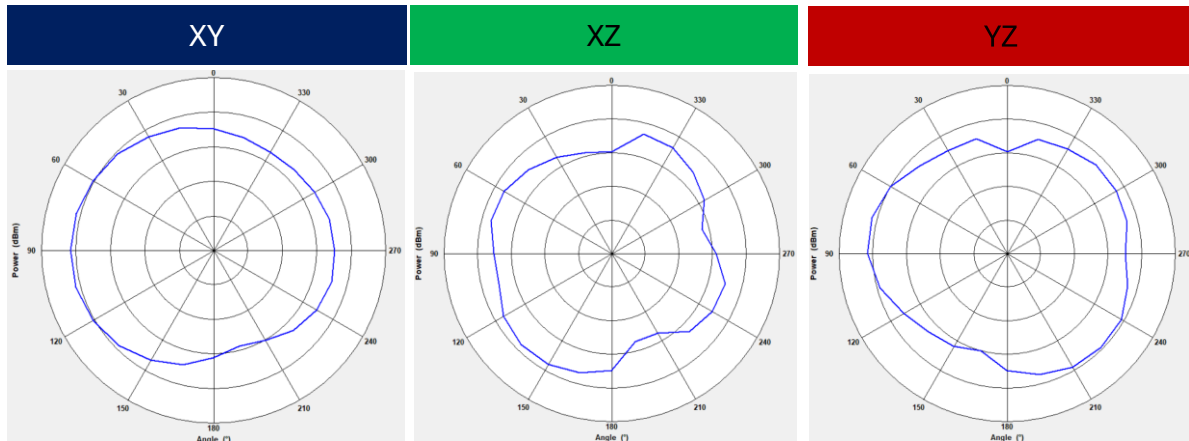
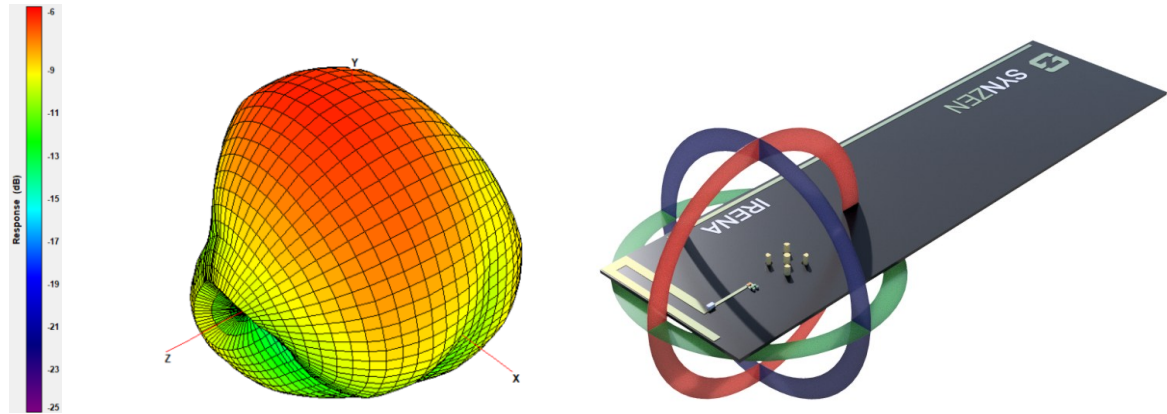


## Peak Gain



# RF Radiation Patterns

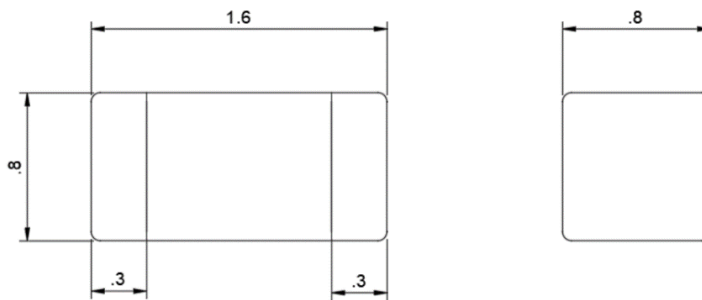
## RF Radiation Patterns at 433MHz



Max: 0  
 Min: -30  
 Scale: 5/div

**433 MHz**

## Mechanical Drawing



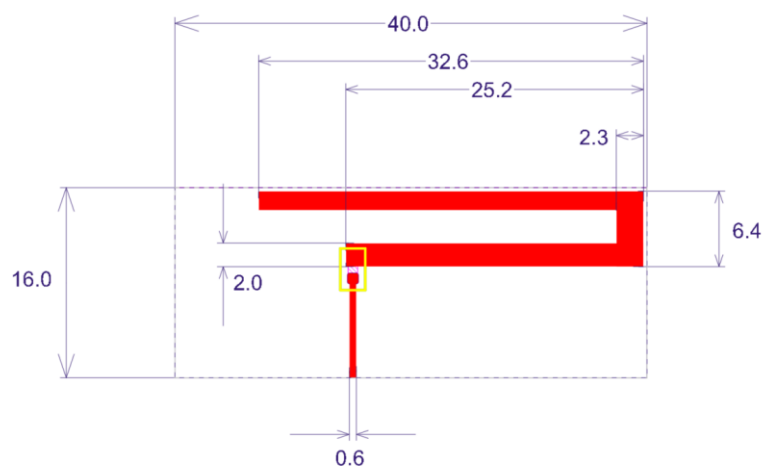
All dimensions in mm

| L         | W         | T         |
|-----------|-----------|-----------|
| 1.6 ±0.15 | 0.8 ±0.15 | 0.8 ±0.15 |

## Required Host PCB Footprint

The host PCB requires the footprint shown below. PCB library files and DXF is available from our website [www.synzen.com.tw/products](http://www.synzen.com.tw/products).

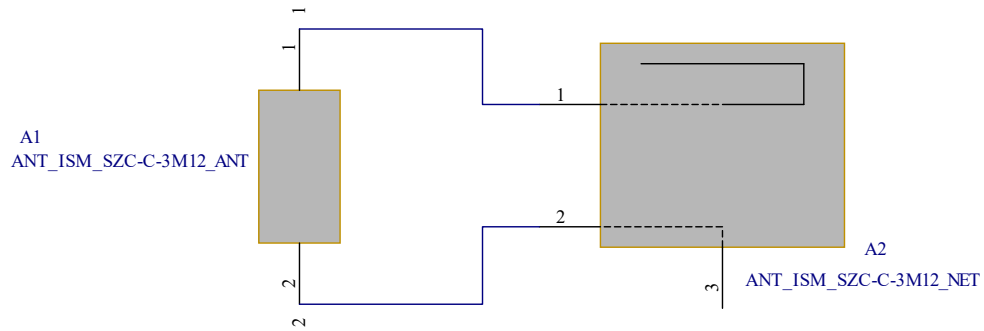
The required clearance for the host PCB is 40.0 x 15.0 (mm) on all layers.



Dimensions in mm



## Schematic Symbol

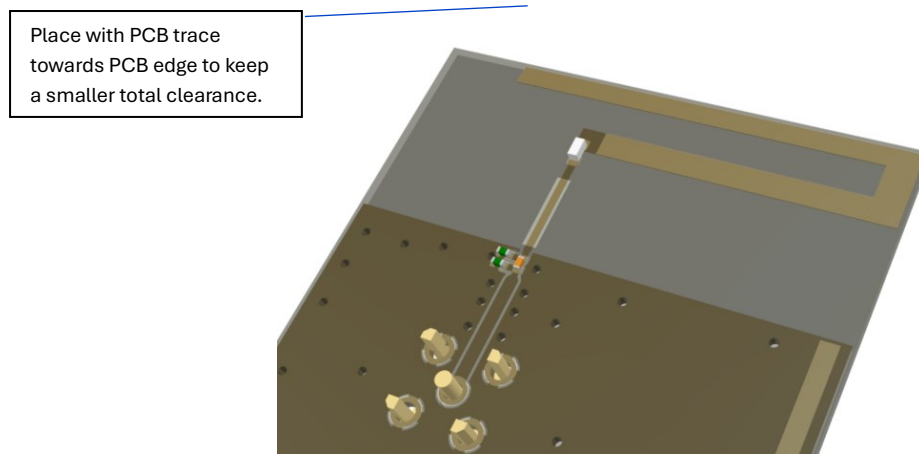


| Pin | Description                               |
|-----|-------------------------------------------|
| 1   | Antenna pad 1 - Not orientation sensitive |
| 2   | Antenna pad 2 - Not orientation sensitive |
| 3   | Antenna feed – 50R transmission line      |

# PCB Layout Guide

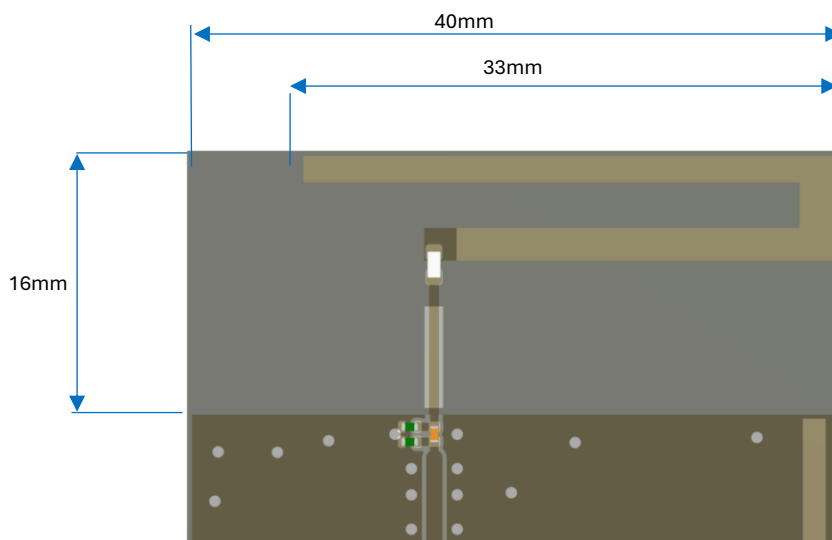
## Placement

The antenna is designed to function placed at the end of the shortest side. For minimal clearance area of 33mm place the antenna with the end of the trace to towards the PCB edge.



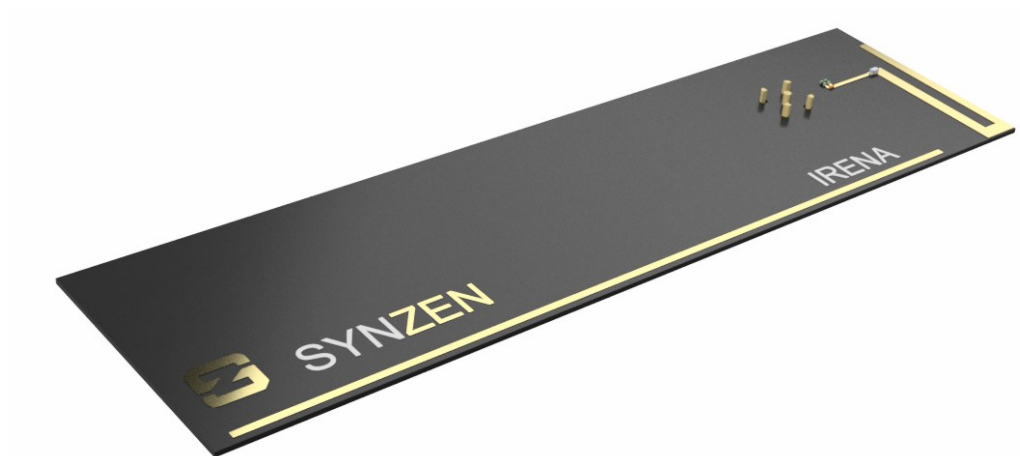
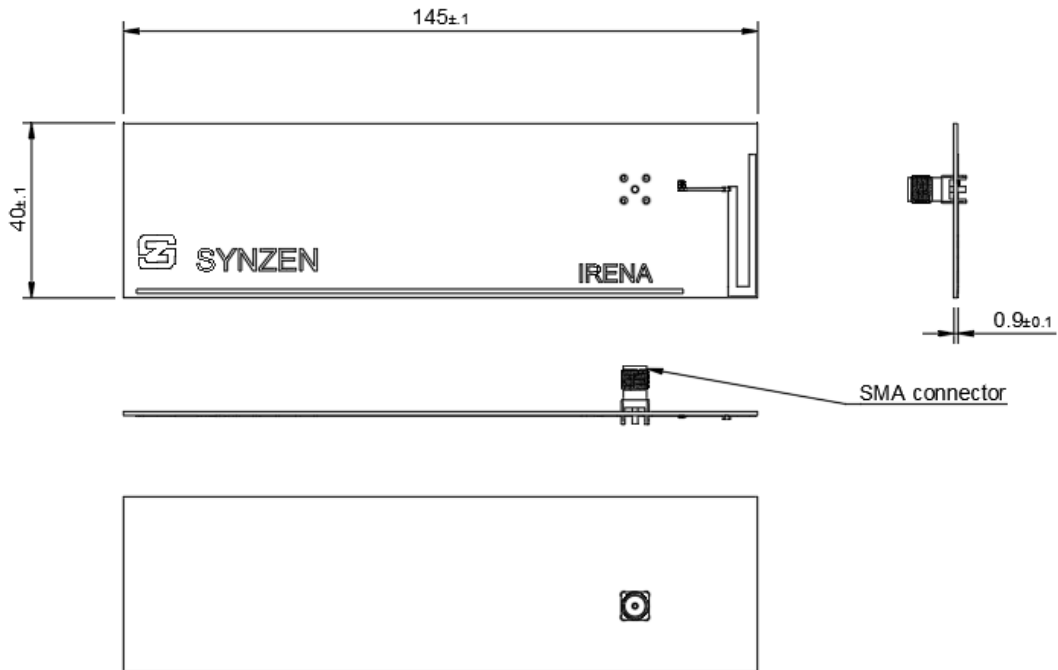
## Clearance

A clearance is required through all PCB layers for the precise area shown. Also, any components such as battery or display must also avoid this area. The rest of the area under the antenna should be filled GND. The clearance to PCB edge from antenna trace section can be reduced to 33mm.



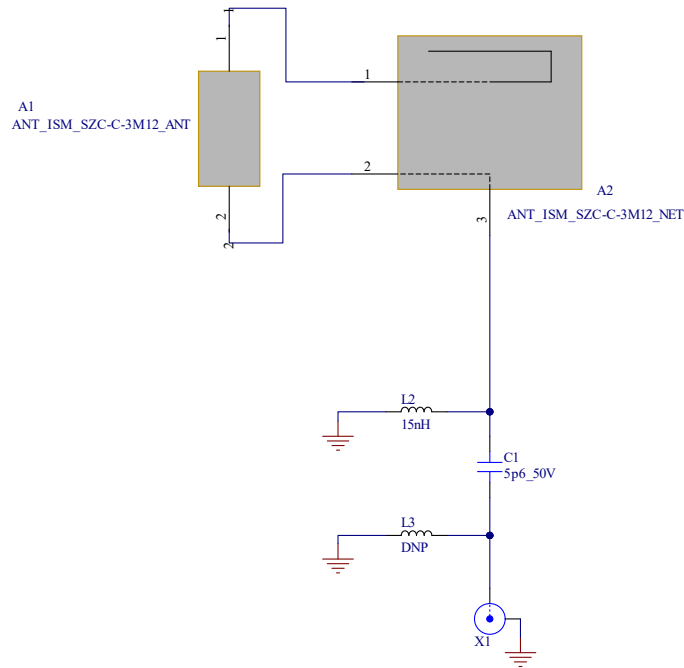
## Evaluation Kit

The SZDV-C-3M12 development kit is a PCBA with the antenna (SZC-C-3M12) fitted and optimised with a matching network. Connection to the antenna is made using the fitted female SMA connector.



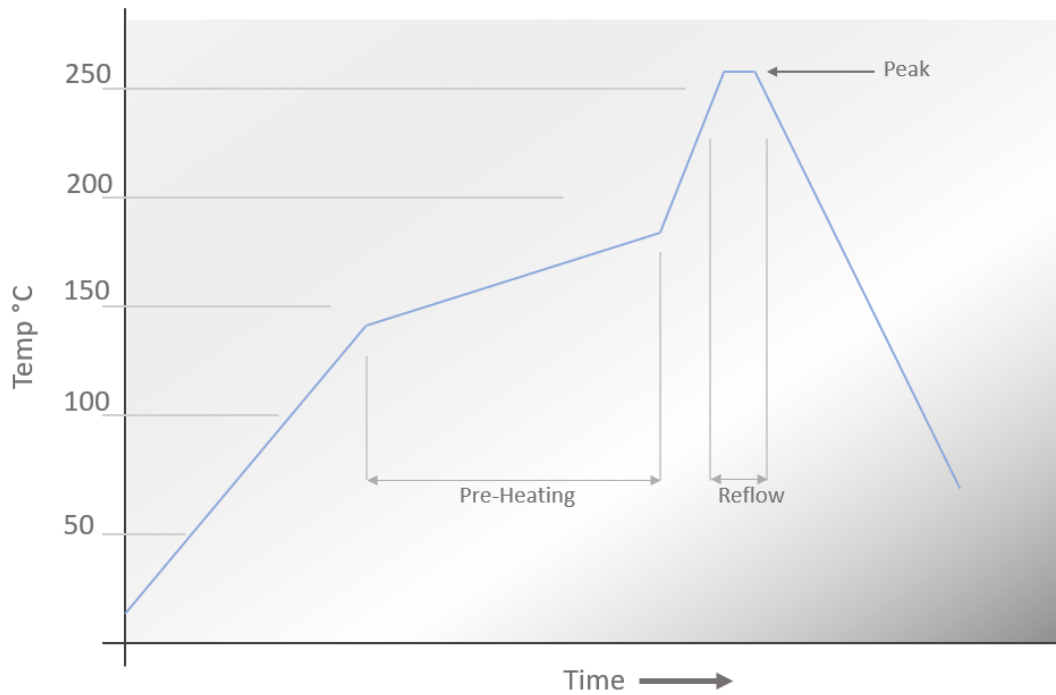
## Evaluation Kit Matching Circuit

The circuit of the DEV kit along with the BOM is shown below. The matching network topology should be used on the device host PCB although the matching values will be dependent on the host PCB and device environment. Synzen provide a matching service to optimise your device to ensure the best performance, please contact [sales@synzen.com.tw](mailto:sales@synzen.com.tw) for more information.



| Designator | Component Type | Value  | Size | Manufacturing Part No. |
|------------|----------------|--------|------|------------------------|
| A1         | Antenna        | IRENA  | -    | SZC-C-3M12             |
| C1         | Capacitor      | 5.6pF  | 0402 | GJM1555C1H5R6WB01D     |
| L2         | Inductor       | 15nHpF | 0402 | LQG15HS15NH02D         |

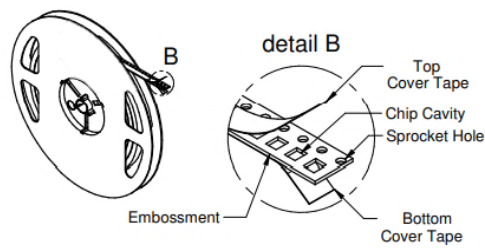
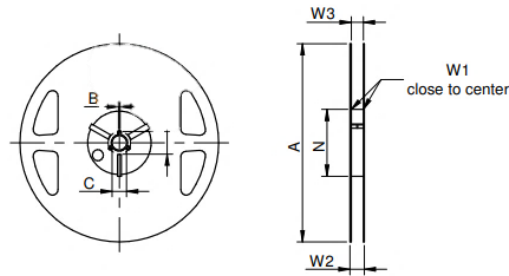
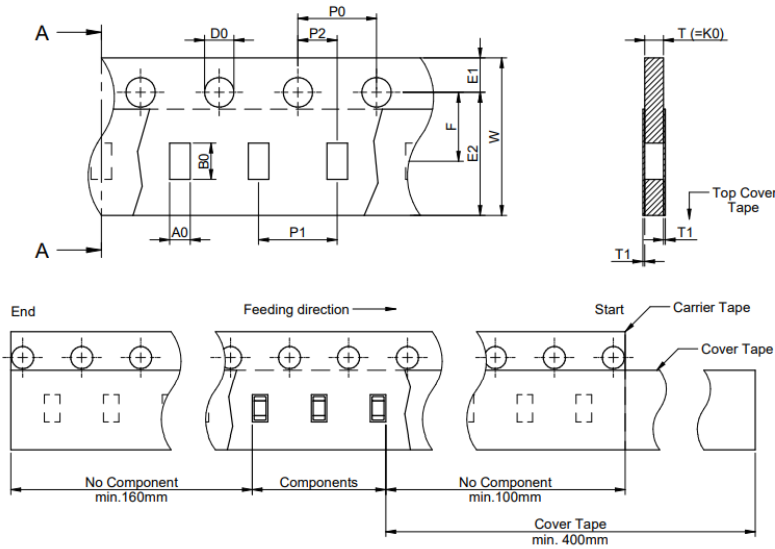
## Soldering Profile



|                         |             |                   |
|-------------------------|-------------|-------------------|
| <b>Pre-Heating</b>      | 130 - 180°C | 50 to 190 seconds |
| <b>Reflow</b>           | >220 °C     | 50 to 160 seconds |
| <b>Peak Temperature</b> | 260 °C      | 15 to 45 seconds  |

# Packaging

|                  |            |           |           |            |          |           |           |           |           |             |           |           |          |                     |                             |
|------------------|------------|-----------|-----------|------------|----------|-----------|-----------|-----------|-----------|-------------|-----------|-----------|----------|---------------------|-----------------------------|
|                  |            | <b>A0</b> | <b>B0</b> | <b>W</b>   | <b>T</b> | <b>T1</b> | <b>P0</b> | <b>P1</b> | <b>P2</b> | <b>D0</b>   | <b>E1</b> | <b>E2</b> | <b>F</b> | <b>Tape Type 1a</b> | <b>VPE / packaging unit</b> |
| <b>tolerance</b> | Tolerances | typ.      | typ.      | +0.3/ -0.1 | typ.     | max.      | ±0.1      |           | +0.05     | +0.1 / -0.0 | ±0.1      | min.      | ±0.05    |                     | pcs.                        |
| <b>size</b>      | 0603       | 1.05      | 1.85      | 8.00       | 0.95     | 0.10      | 4.00      | 4.00      | 2.00      | 1.50        | 1.75      | 6.25      | 3.50     | Paper               | 4000                        |



| A (mm) | B (mm) | C (mm) | D (mm) | N (mm) | W1 (mm) | W2 (mm) | W3 (mm) | W3 (mm) | Material                  |
|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------------------------|
| ± 2.0  | min.   | min.   | min.   | min.   | +1.5    | max.    | min.    | max.    |                           |
| 178    | 1.5    | 12.8   | 20.2   | 50     | 8.4     | 14.4    | 7.9     | 10.9    | Polystyrene/ Polyurethane |

## Material Regulation

The antenna has been assessed to conform to RoHS requirements. A certificate of conformance is available upon request.

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