



TAOGLAS®



Datasheet

Low Profile and High Efficiency 868 MHz ISM Band Loop Antenna

Part No:
ILA.02

Description

868 MHz ISM Band Loop Antenna

Features:

- Small size antenna, low profile, and high efficiency
- 868 MHz ISM Band
- 1 dBi Peak Gain
- 10 x 3.2 x 0.5 mm size
- SMT Compatible
- RoHS & REACH Compliant

| | | |
|-----------|----------------------------------|-----------|
| 1. | Introduction | 2 |
| 2. | Specification | 3 |
| 3. | Antenna Characteristics | 4 |
| 4. | Radiation Patterns | 8 |
| 5. | Mechanical Drawing | 10 |
| 6. | Packaging | 11 |
| 7. | Antenna Integration Guide | 13 |
| 8. | Solder Reflow Profile | 20 |
| <hr/> | | |
| | Changelog | 21 |

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1. Introduction



The ILA.02 is a 868 MHz ISM band antenna featuring an excellent efficiency of 60% across the band. 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.02 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.02 is the ideal choice.

This antenna can be mounted with no performance degradation in either orientation as long as the antenna is soldered correctly via Surface mounting. Please see the integration instructions section for further detail regarding the optimum way to integrate this antenna into your device.

For further optimization to customer-specific device environments and for support to integrate and test this antennas performance in your device, contact your regional Taoglas Customer Services Team.

Applications:

- Automated Meter Reading (AMR)
- Radio Frequency Identification (RFID)
- Remote Monitoring
- Healthcare
- Sensing
- 868 MHz Applications

2. Specification

LTE Electrical

| Band | Frequency (MHz) | Efficiency (%) | Average Gain (dB) | Peak Gain (dBi) | Impedance | Polarization | Radiation Pattern | Max. input power |
|--------|-----------------|----------------|-------------------|-----------------|-----------|--------------|-------------------|------------------|
| 868MHz | 863-870 | 58.7 | -2.31 | 0.95 | 50 Ω | Linear | Omni | 5W |

Mechanical

| | |
|---------------------|----------------|
| Dimensions (mm) | 10 x 3.2 x 0.5 |
| Required Space (mm) | 11 x 10.4 |
| Material | Ceramic |
| EVB Connector | SMA(F) |

Environmental

| | |
|----------------------------|----------------|
| Temperature Range | -40°C to 85°C |
| Storage Temperature | -40°C to 105°C |
| Humidity | 40% to 95% |
| Moisture Sensitivity Level | 3 (168 Hours) |

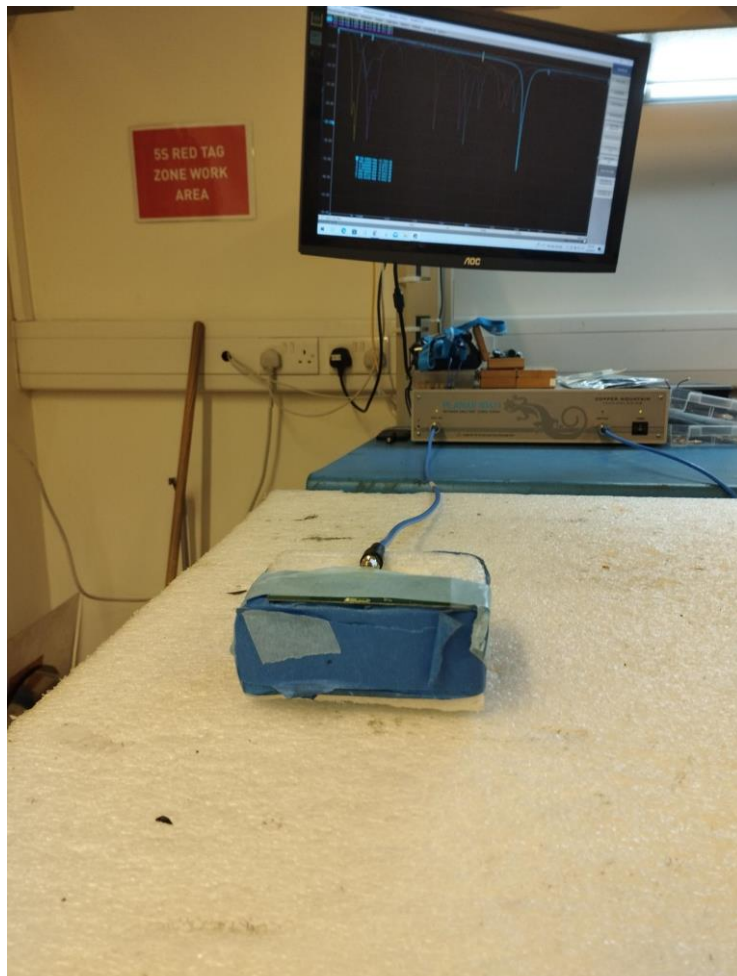
3. Antenna Characteristics

3.1 Test Setup

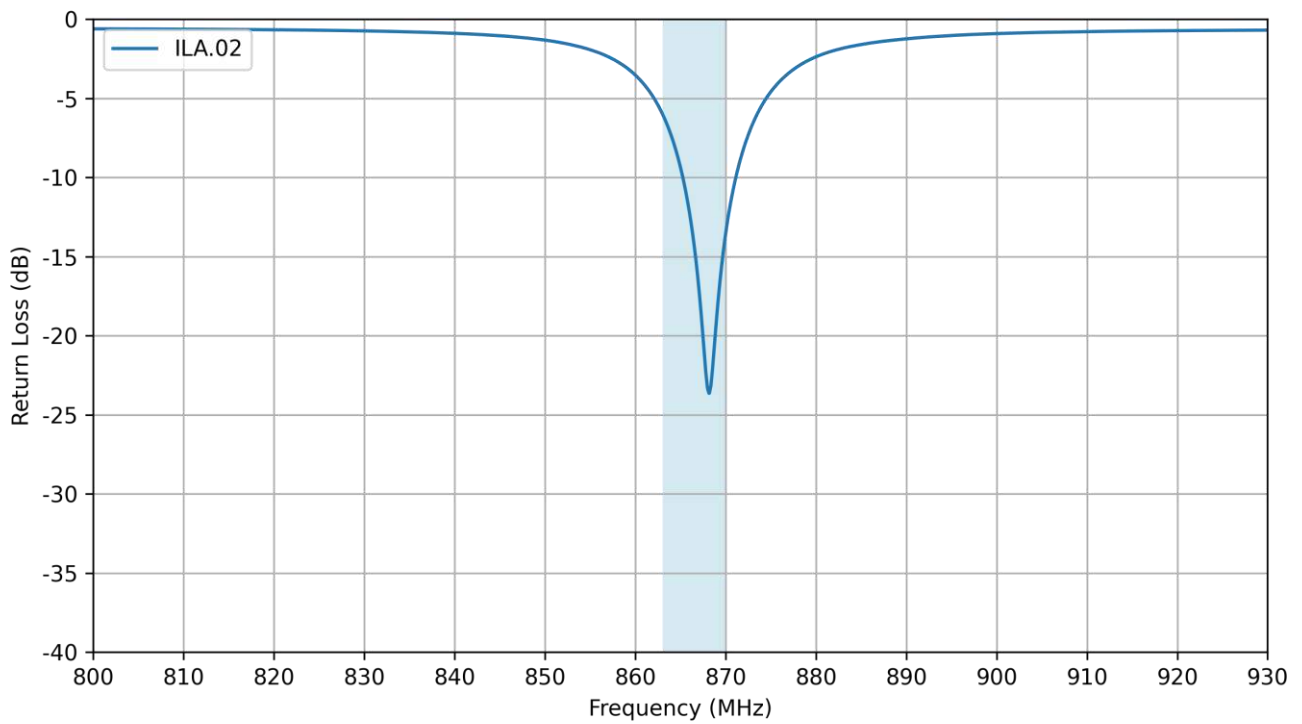
AUT



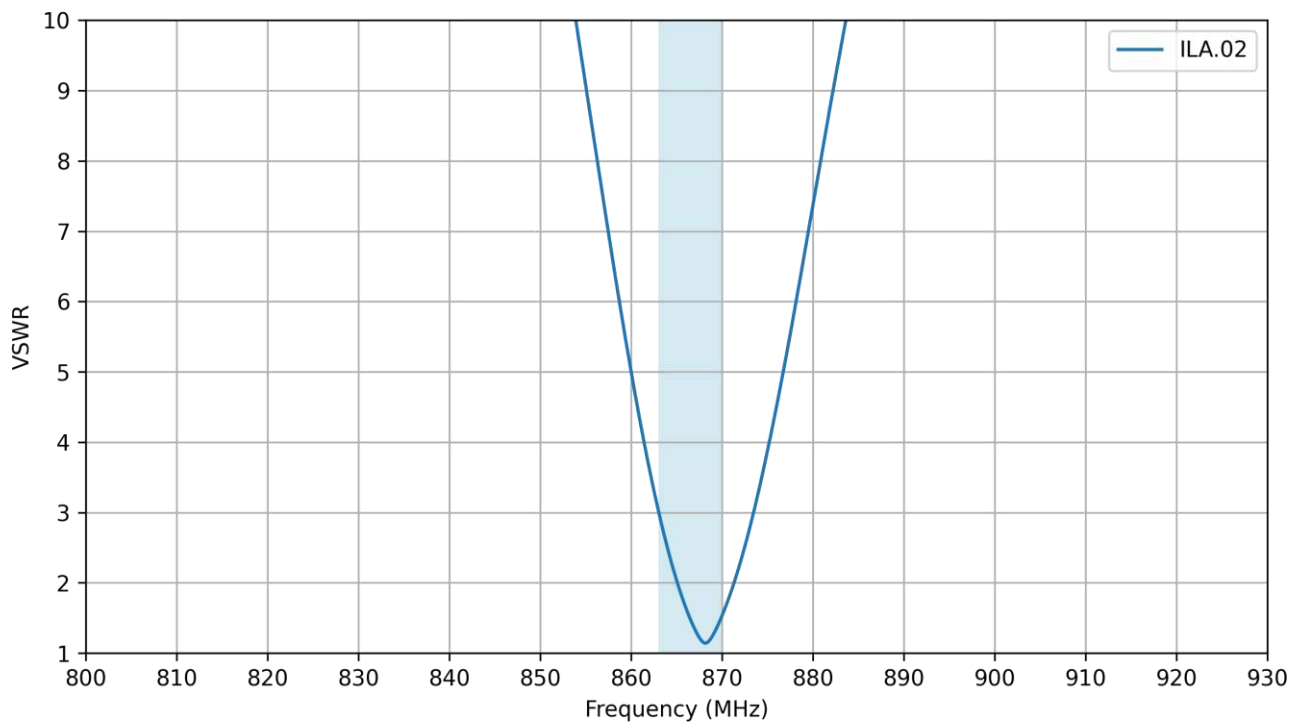
Vector Network Analyzer



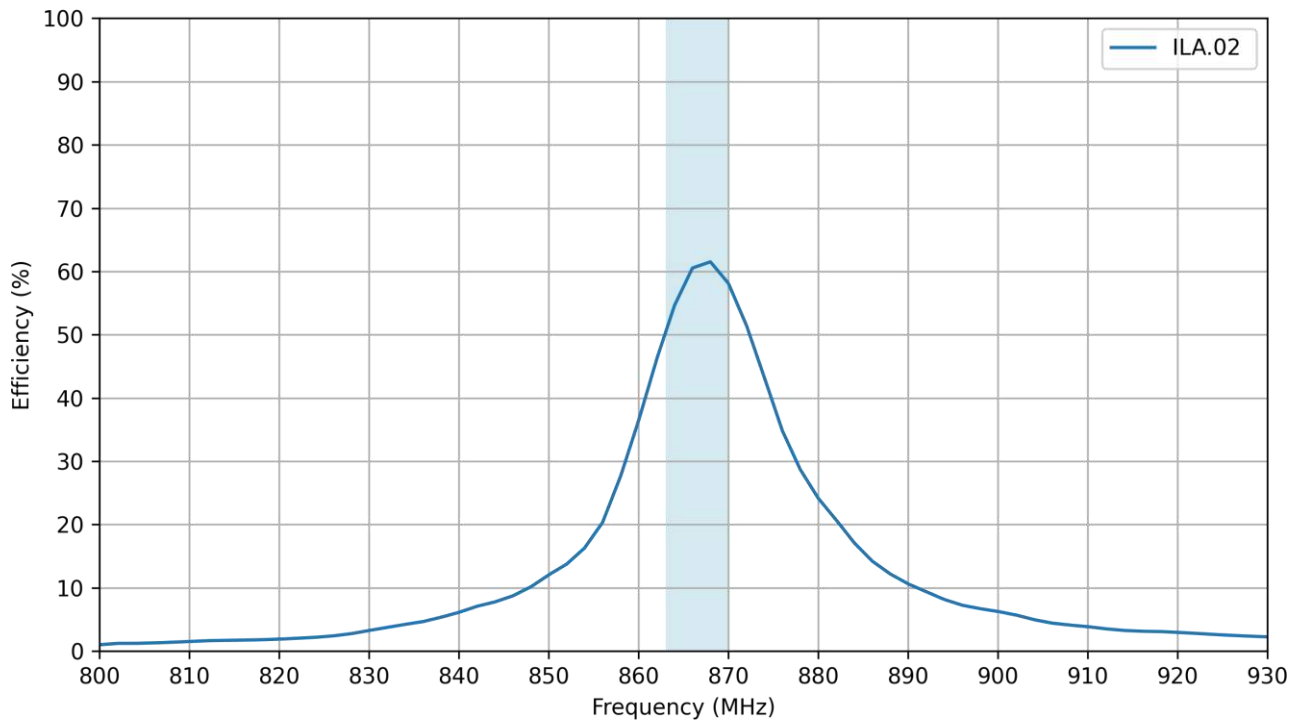
3.2 Return Loss



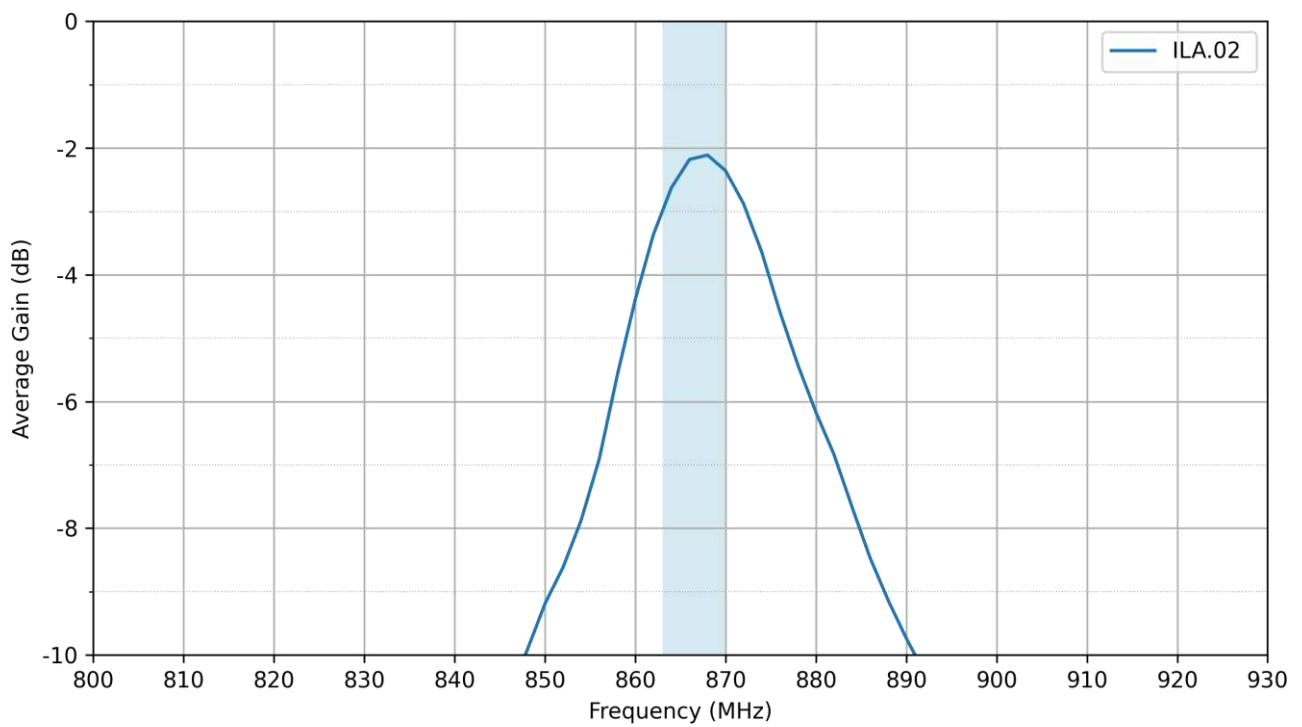
3.3 VSWR



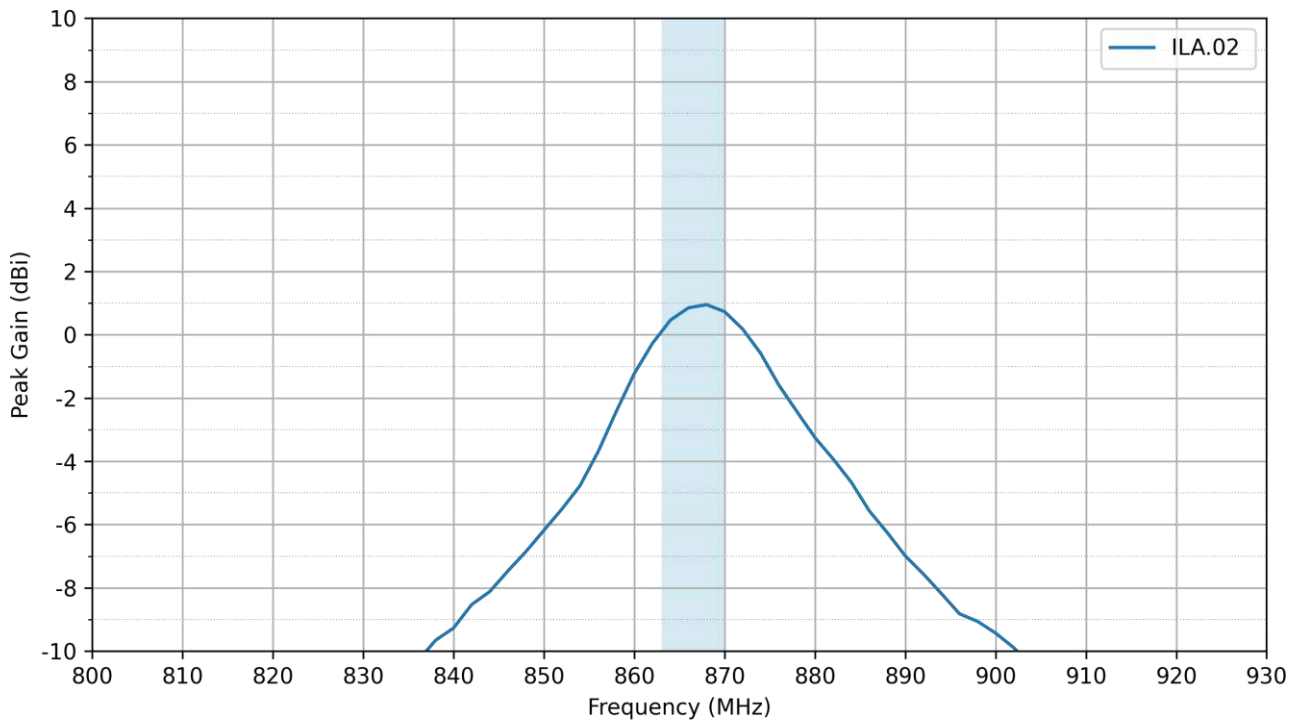
3.4 Efficiency



3.5 Average Gain

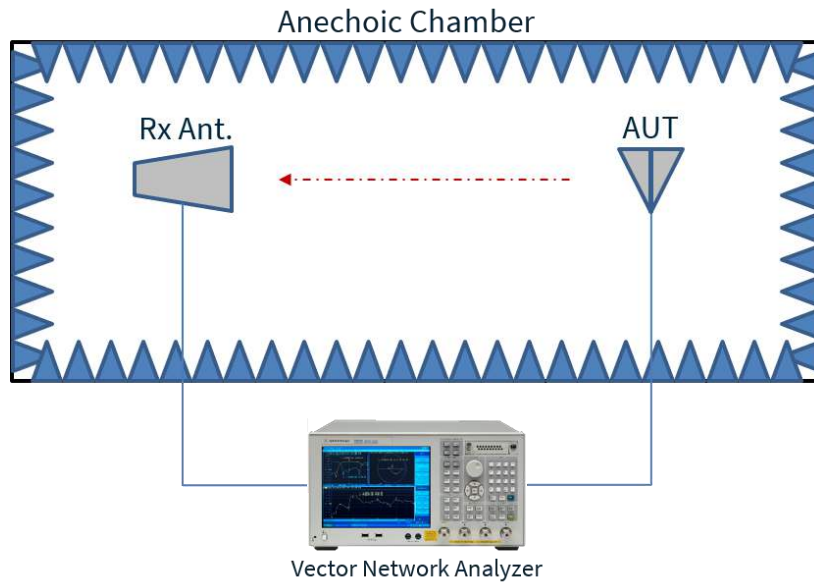


3.6 Peak Gain

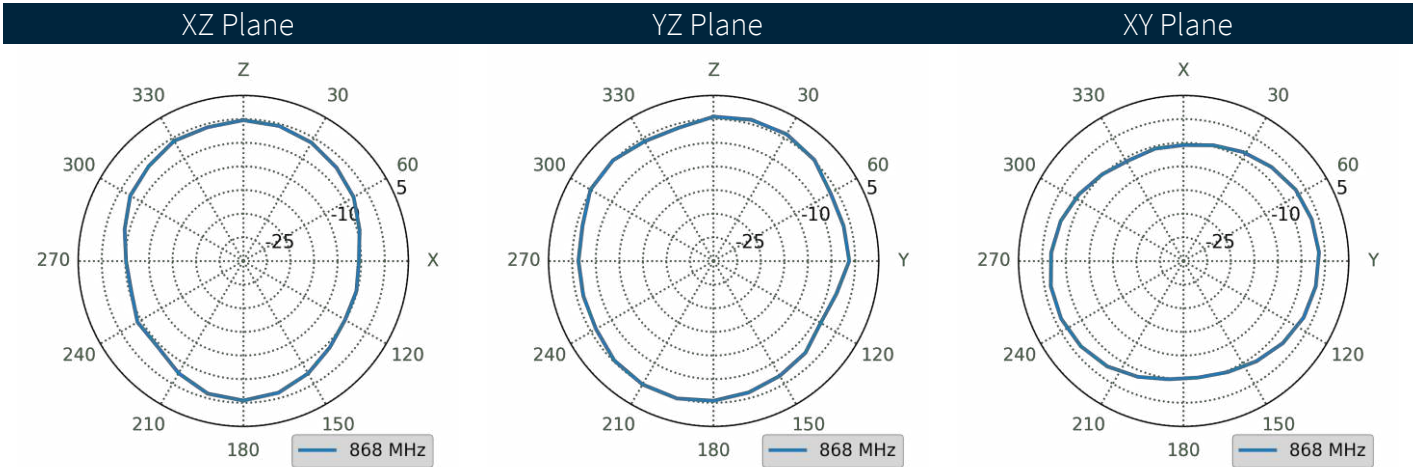
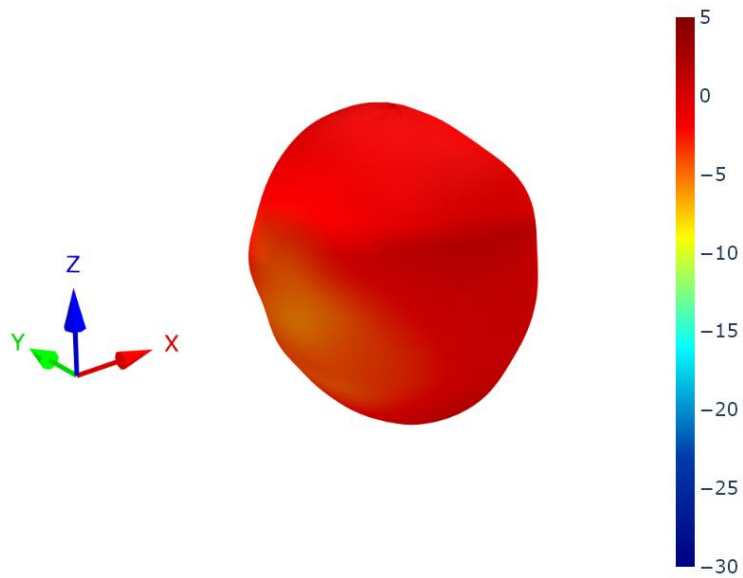


4. Radiation Patterns

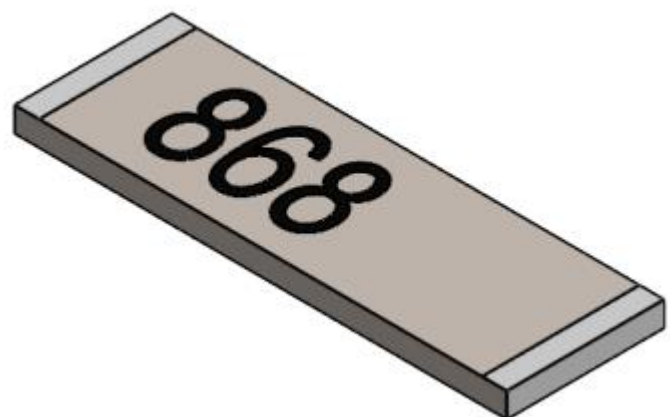
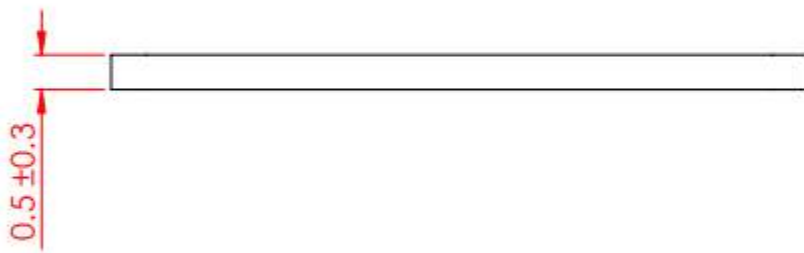
4.1 Test Setup



4.2 ILA.02 Patterns at 868 MHz

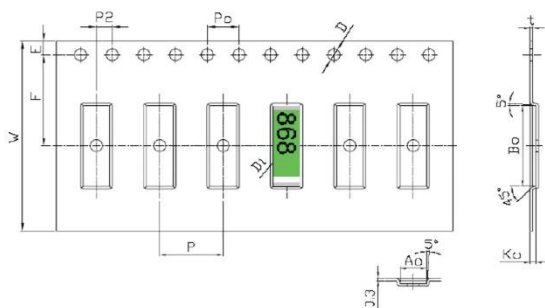
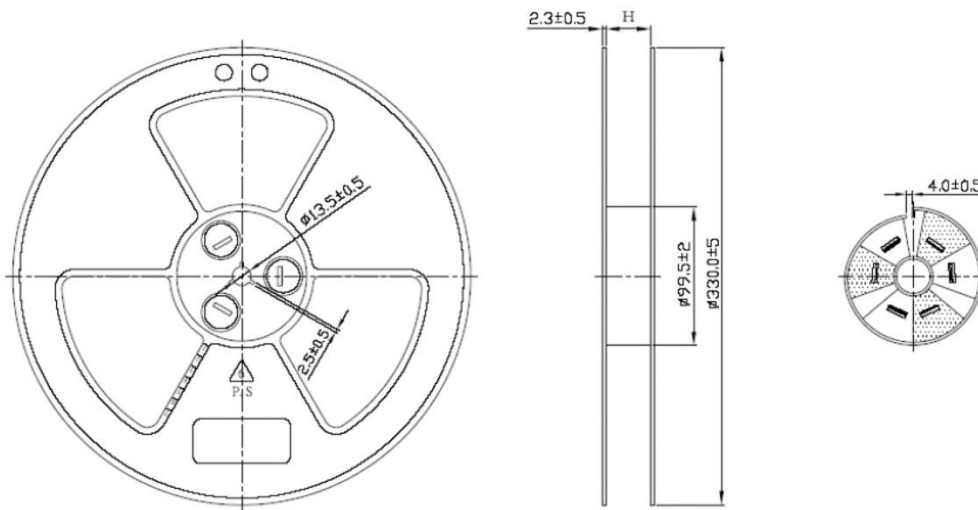


5. Mechanical Drawing



6. Packaging

6000 pcs ILA.02 reel
 Dimensions - 420*380mm
 Weight -1030g



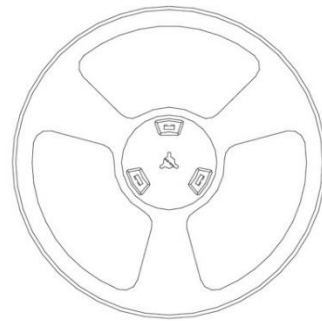
Tape Dimensions(unit: mm)

| Feature | Specifications | Tolerances |
|---------|----------------|------------|
| W | 24.00 | ±0.30 |
| P | 8.00 | ±0.10 |
| E | 1.75 | ±0.10 |
| F | 11.50 | ±0.10 |
| P2 | 2.00 | ±0.10 |
| D | 1.50 | +0.10 |
| D1 | 1.50 | ±0.10 |
| Po | 4.00 | ±0.10 |
| 10Po | 40.00 | ±0.20 |

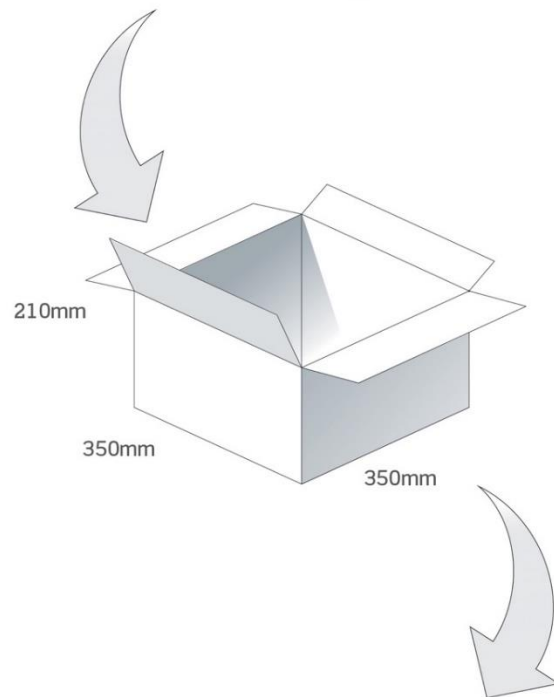
Pocket Dimensions(unit: mm)

| Feature | Specifications | Tolerances |
|---------|----------------|------------|
| Ao | 3.40 | ±0.10 |
| Bo | 10.20 | ±0.10 |
| Ko | 0.70 | ±0.10 |
| t | 0.30 | ±0.05 |

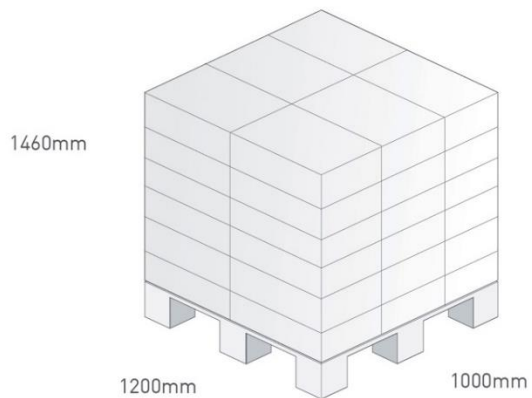
6000 pcs ILA.02 reel
Dimensions - 420*380mm
Weight -1030g



6 reels, 36000pcs
in one carton
Carton Dimensions - 350*350*210mm
Weight - 7Kg



Pallet Dimensions 1200*1000*1460mm
36 Cartons per Pallet
6 Cartons per layer
6 Layers



7. Antenna Integration Guide

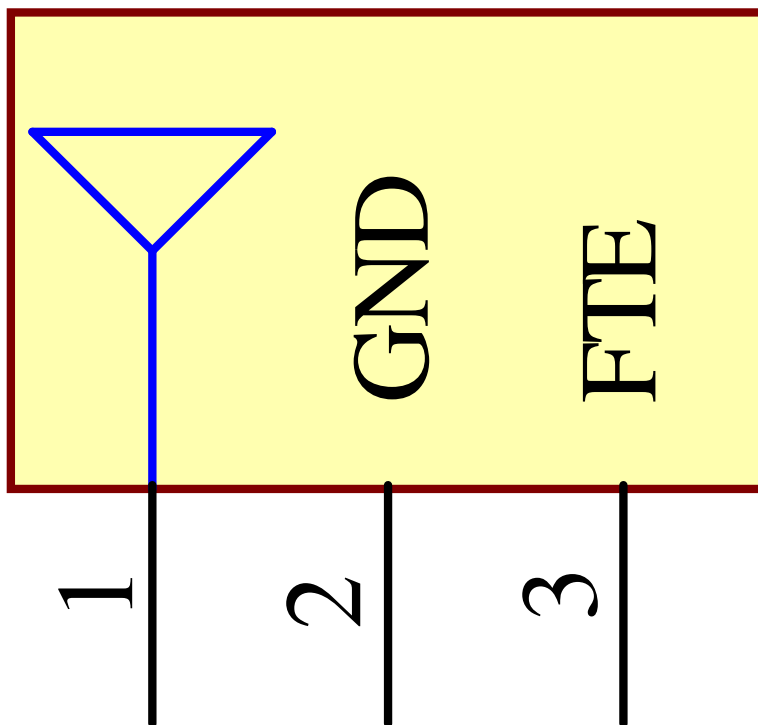


7.1 Schematic and Symbol Definition

The circuit symbol for the antenna is shown below. The antenna has 4 pins with all pins as functional.

| Pin | Description |
|------|---------------------------|
| 1 | RF Feed |
| 2 | Ground |
| 3, 4 | FTE (Fine Tuning Element) |

TAOGLAS_ILA.02 ANT1



7.2 Antenna Integration

For any given PCB size, the antenna should ideally be placed on the PCB's longest side, to take advantage of the ground plane. Optimized matching components can be placed as shown.



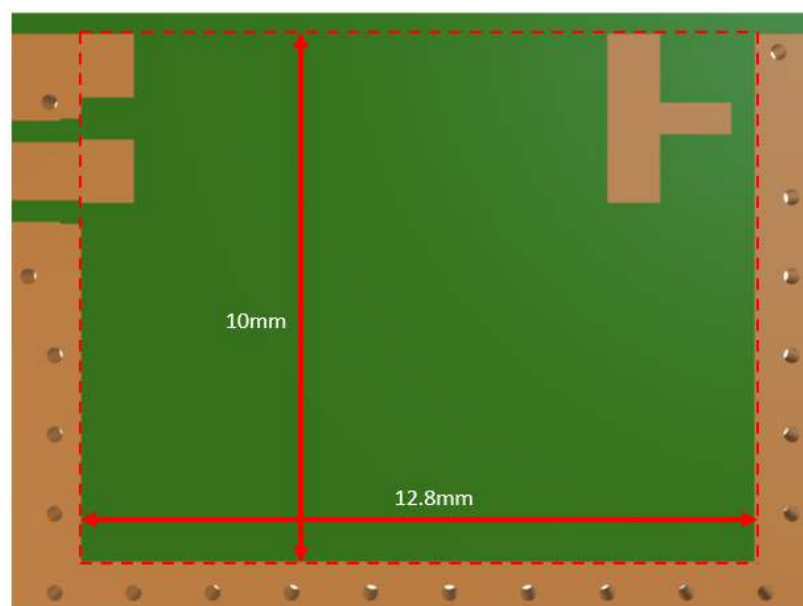
With Solder Mask



Without Solder Mask

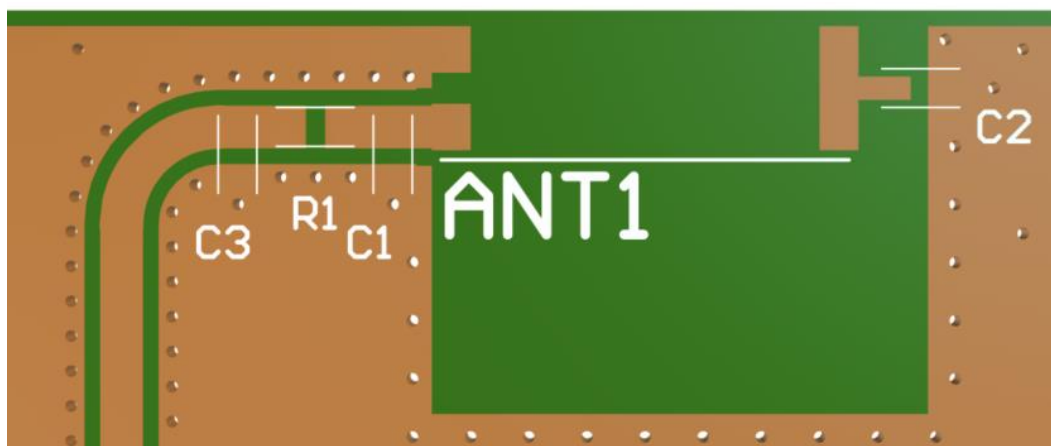
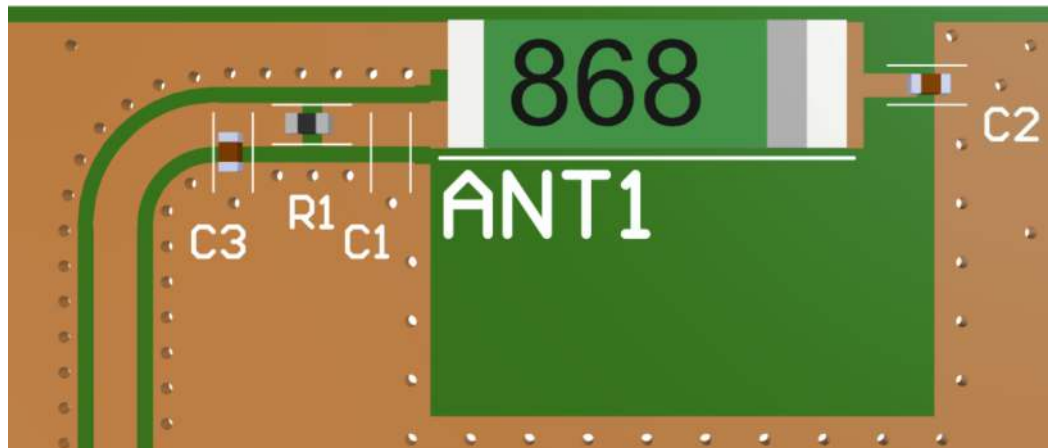
7.3 PCB Clearance

Below shows the antenna footprint and clearance through ALL layers on the PCB. Only the antenna pads and connections to feed and GND are present within this clearance area (marked RED). The clearance area extends to 10mm in length and 12.8mm in width from the centre of the PCB's board edge mechanical pads to the ground area. This clearance area includes the bottom side and ALL internal layers on the PCB.



7.4 PCB Layout

The footprint and clearance on the PCB must meet the layout drawing in section 7.7. Note the placement of the optimized components. R1 is placed as close as possible to the RF feed (pad 1) in series connecting to ground. C3 is then placed tightly in parallel after that. C2 is placed close to the FTE (pad 3) as possible connecting to ground. C1 is an optional component but the footprint is recommended in case it is needed.

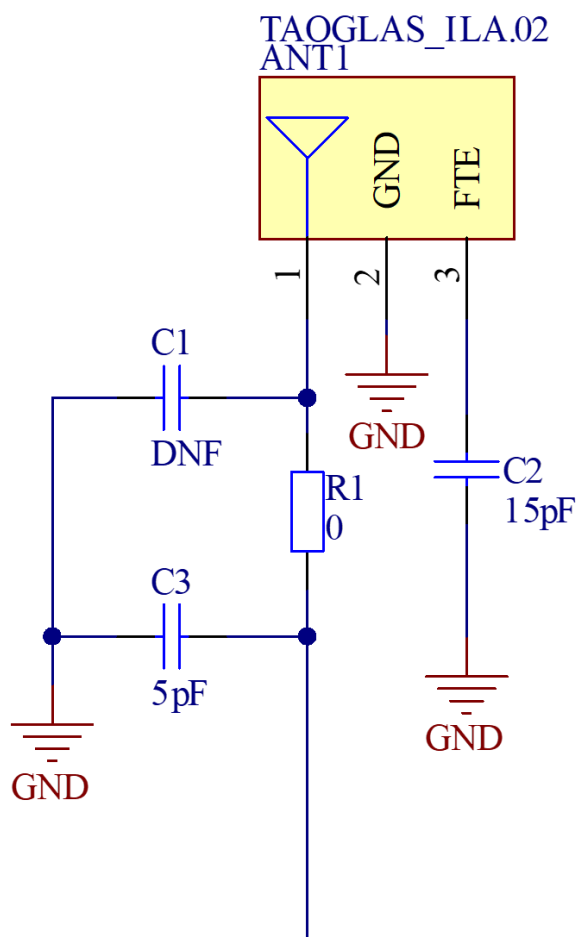


7.5 Evaluation Board



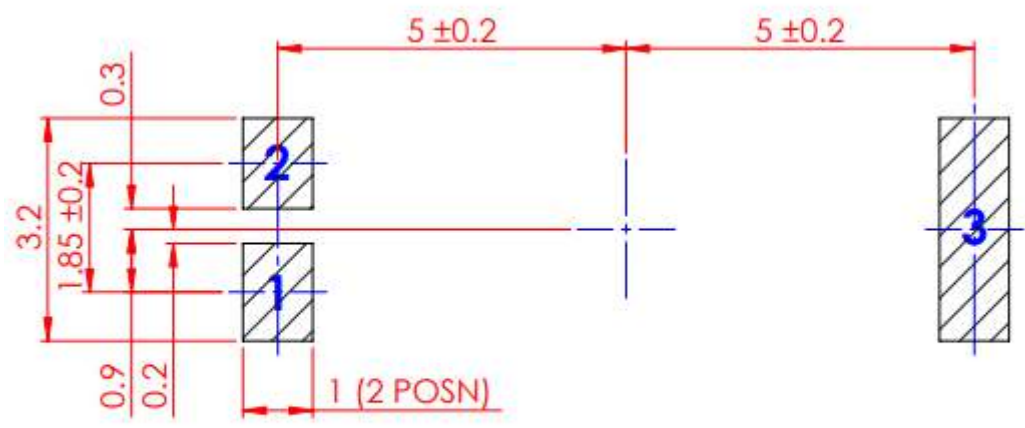
7.6 Evaluation Board Matching Circuit

Matching components with the ILA.02 are recommended for the antenna to have optimal performance on the evaluation board, located in the spaces specified in previous sections. Additional matching components may be necessary for your device, so we recommend incorporating extra component footprints, forming a “pi” network, between the cellular module and the edge of the ground plane.

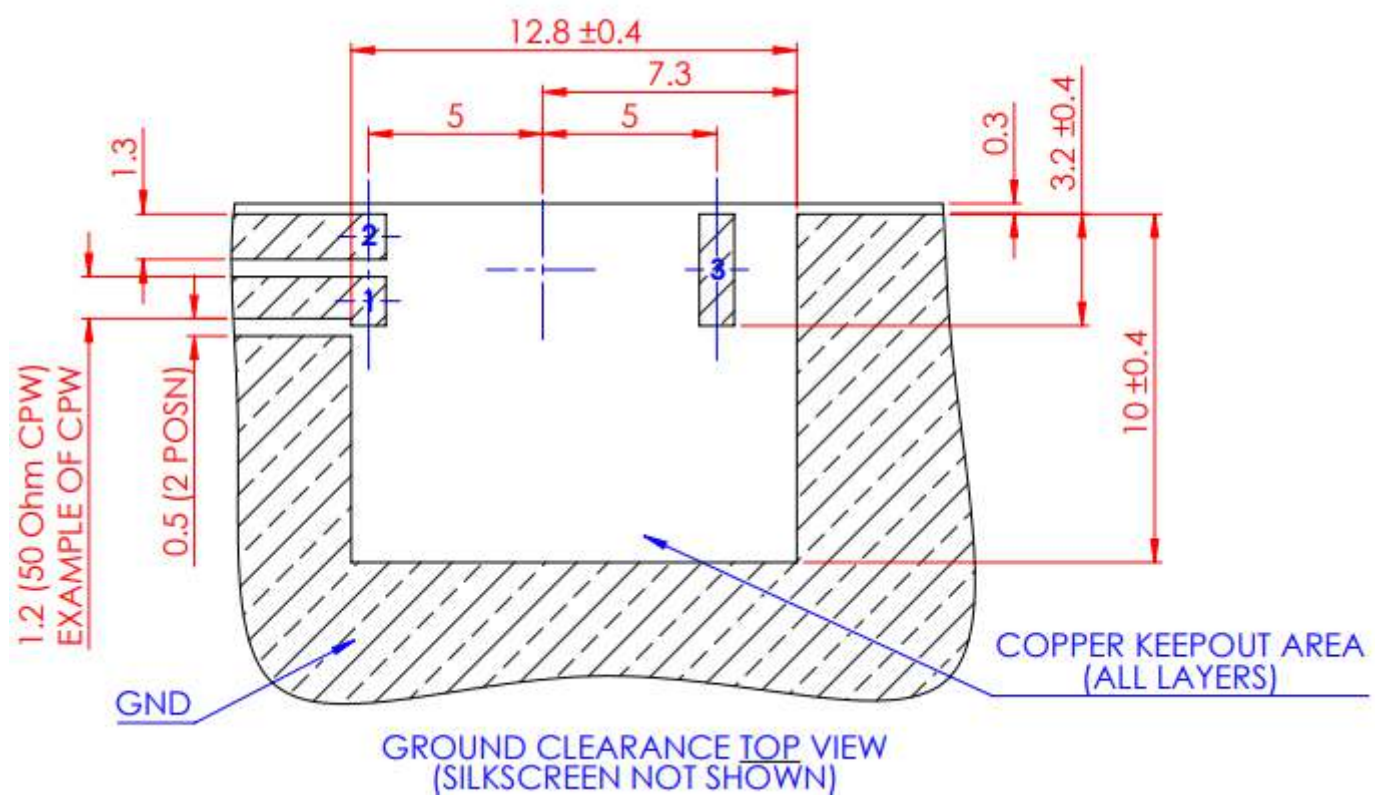


| Designator | Type | Value | Manufacturer | Manufacturer Part Number |
|------------|-----------|------------|--------------------|--------------------------|
| R1 | Resistor | 0 Ohms | Yageo | RC0402JR-070RL |
| C1 | Capacitor | Not Fitted | - | - |
| C2 | Capacitor | 15pF | Murata Electronics | GRM1555C1H150JA01D |
| C3 | Capacitor | 5pF | Murata Electronics | GRM1555C1H5R0CA01D |

7.7 Footprint

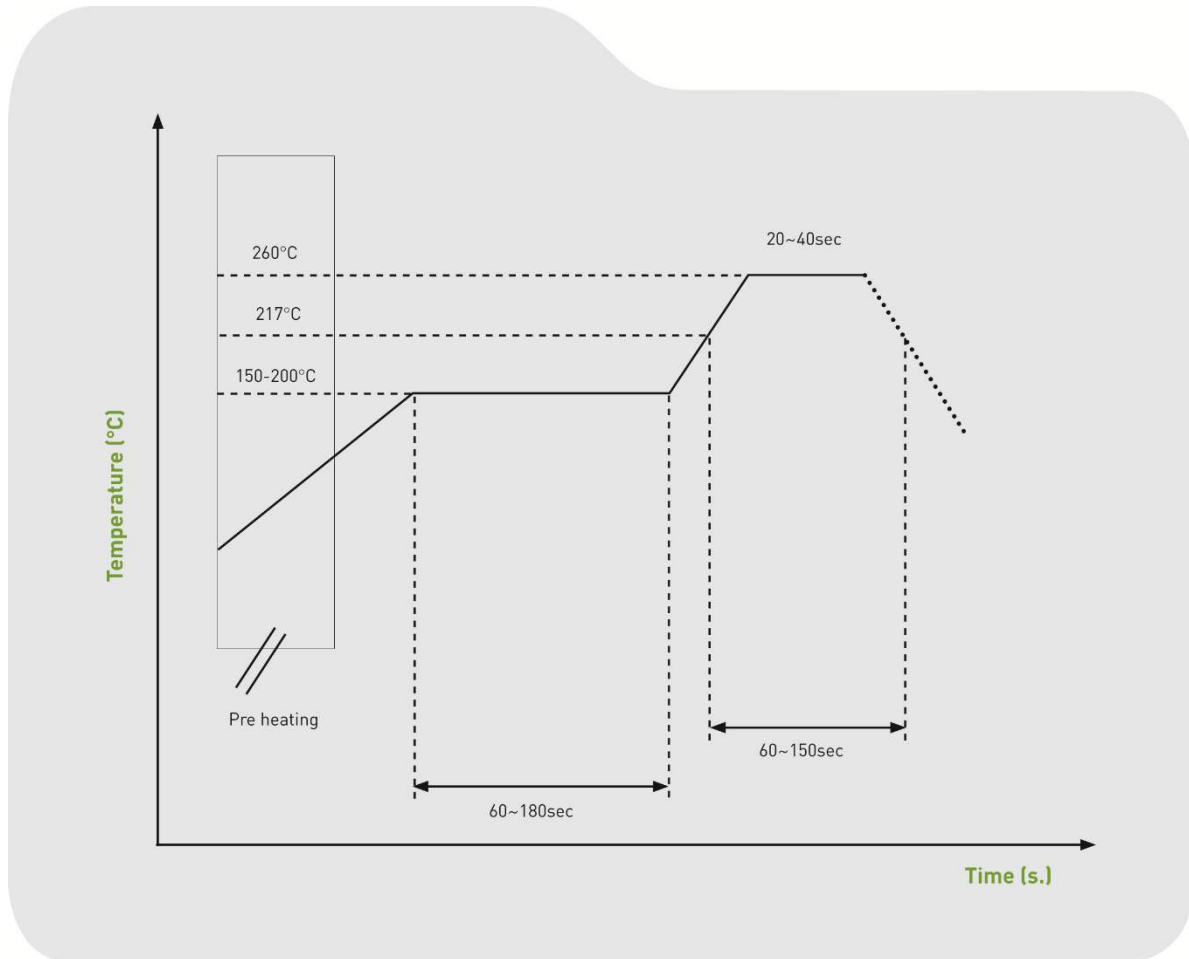


FOOTPRINT PCB



8. Solder Reflow Profile

Typical Soldering profile for lead-free process:



Changelog for the datasheet

SPE-12-8-080– ILA.02

Revision: J (Current Version)

| | |
|------------------|-----------------------|
| Date: | 2023-04-19 |
| Changes: | Full datasheet update |
| Changes Made by: | Gary West |

Previous Revisions

Revision: I

| | |
|------------------|-----------------------|
| Date: | 2023-01-17 |
| Changes: | Updated image product |
| Changes Made by: | Cesar Sousa |

Revision: D

| | |
|------------------|------------|
| Date: | 2016-09-12 |
| Changes: | |
| Changes Made by: | STAFF |

Revision: H

| | |
|------------------|--|
| Date: | 2022-06-23 |
| Changes: | Updated graphs , radiation patterns and Antenna Installation Guide |
| Changes Made by: | Evan Murphy |

Revision: C

| | |
|------------------|-----------------|
| Date: | 2014-08-19 |
| Changes: | EVb & Footprint |
| Changes Made by: | AINE DOYLE |

Revision: G (Current Version)

| | |
|------------------|--------------------|
| Date: | 2021-10-28 |
| Changes: | Format Change, MSL |
| Changes Made by: | Erik Landi |

Revision: B

| | |
|------------------|------------|
| Date: | 2012-06-27 |
| Changes: | |
| Changes Made by: | STAFF |

Revision: F

| | |
|------------------|-------------------------|
| Date: | 2017-10-23 |
| Changes: | Packing drawing updated |
| Changes Made by: | Carol Faughnan |

Revision: A (Original First Release)

| | |
|---------|-----------------|
| Date: | 2012-05-08 |
| Notes: | Initial Release |
| Author: | STAFF |

Revision: E

| | |
|------------------|------------|
| Date: | 2017-04-21 |
| Changes: | |
| Changes Made by: | STAFF |



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