



Product image for illustration Purposes only

### **Introduction**

LPRS's ceramic chip antenna is designed for use within the ISM 868MHz frequency bands, covering frequencies from 863MHz ~ 870MHz.

Perfect for applications where the antenna must be mounted internally within a product enclosure, the LPRS-CCA-868 offers excellent RF performance and is fully compatible with surface mount production processes, enabling low assembly cost, improved quality and consistency.

### **Features**

- Stable and reliable performance.
- Low profile, compact size.
- RoHS compliant.
- SMD process compatible.
- Smart Home.

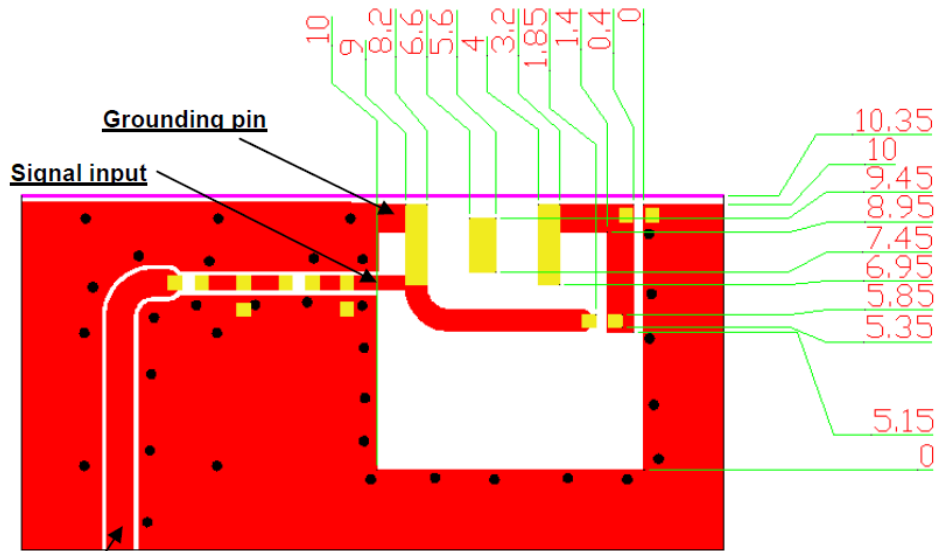
### **Applications**

- Ideal for any ISM RF application.
- Short Range Devices (SRD).
- Wireless Sensors.
- Internet of Things.

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I. Layout Guide and Electrical Specifications



Transmission Line with 50Ω Impedance Characteristic

Figure 1 Layout Guide Top View (mm)

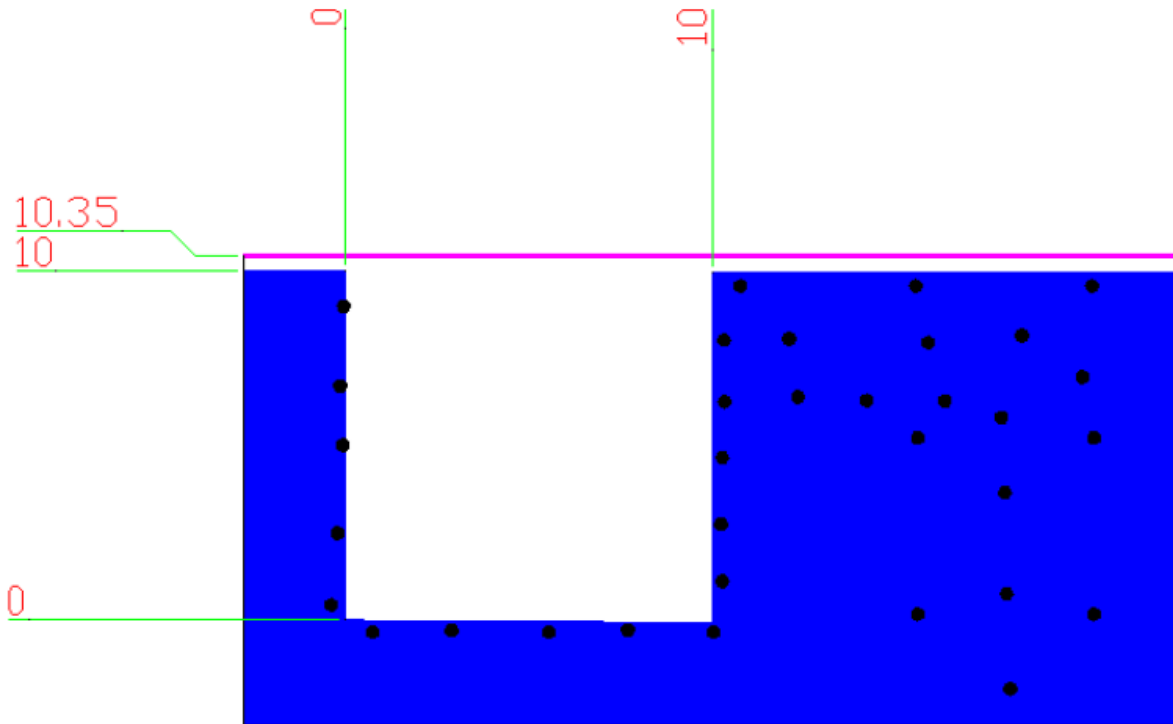


Figure 2 Layout guide Bottom View (mm)

**1.1 Solder Land Pattern:**

The solder land pattern (gold marking areas) is shown above in Figure 1. Recommendations on matching circuit will be provided according to customer's installation conditions.

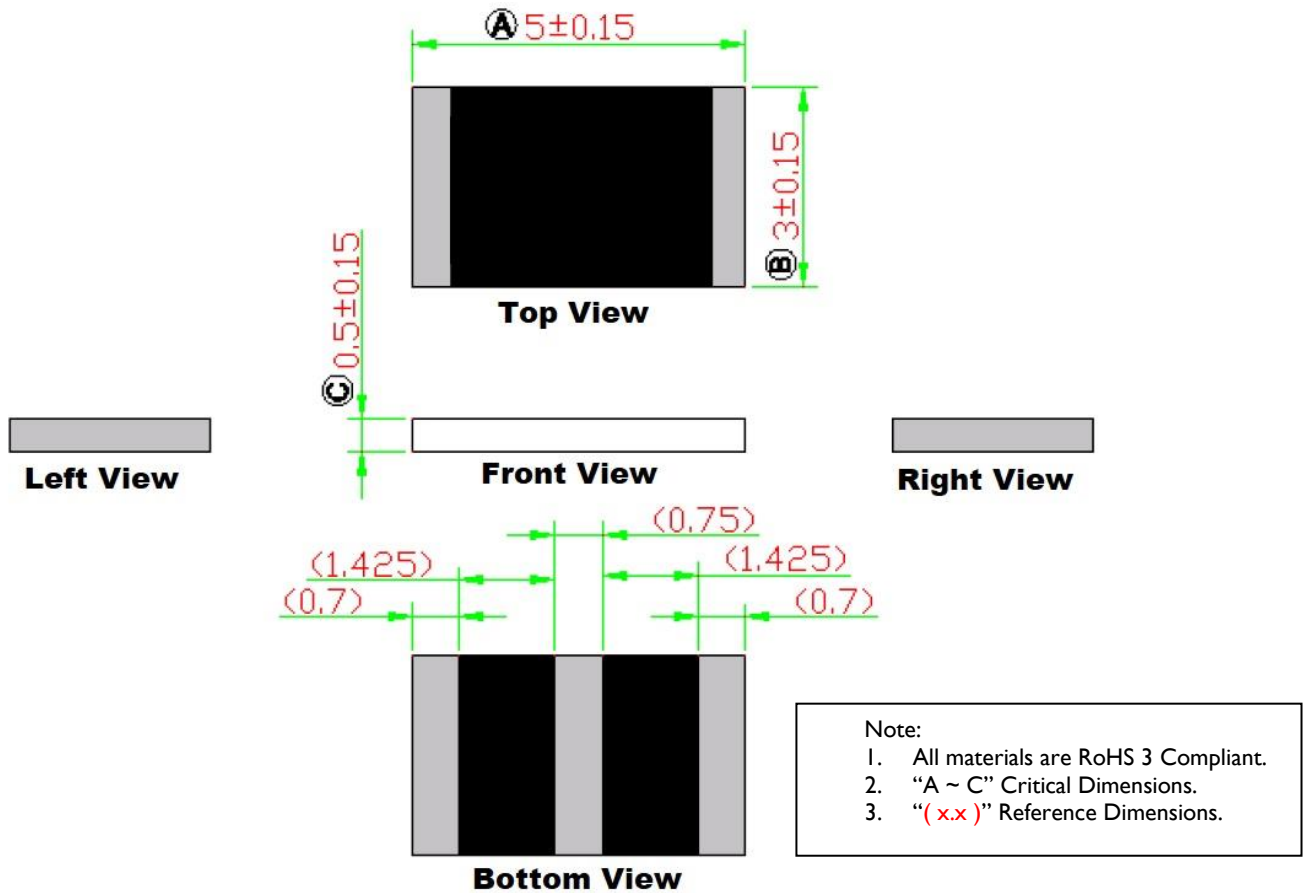
**2. Antenna Outline Dimensions**


Figure 3 Physical Dimensions (mm)

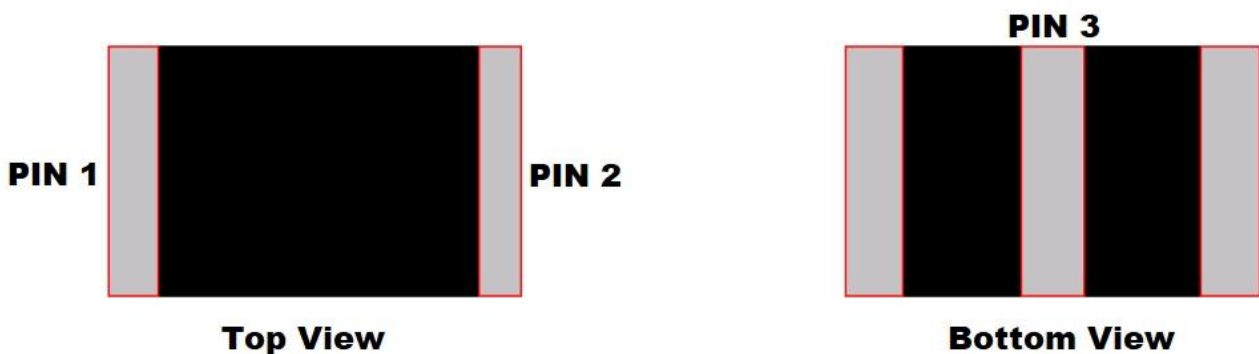
**2.1. Pin Definitions.**


Figure 4 Pin Assignments

Pin	1	2	3
Soldering Pad	Signal	Tuning / Ground	N/C

**3. Electrical Specifications (Based on Evaluation Board Dimensions: 80 x 40 mm<sup>2</sup>)**

Characteristics		Specifications	Unit
Outline Dimensions		5.0 x 3.0 x 0.5	mm
Ground Plane Dimensions		80 x 40	mm
Working Frequency		863 ~ 870	MHz
VSWR (@ centre frequency*)		2	
Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@868 MHz)	0 (Typical)**	dBi
Efficiency		47 (Typical)**	%

\* Centre frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board

\*\* A typical value is for reference only, not guaranteed.

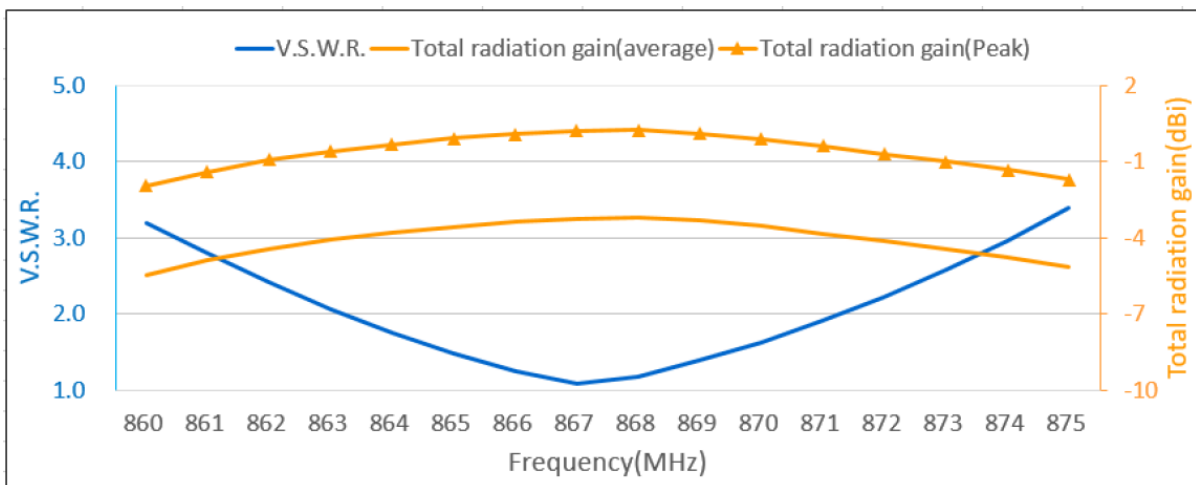
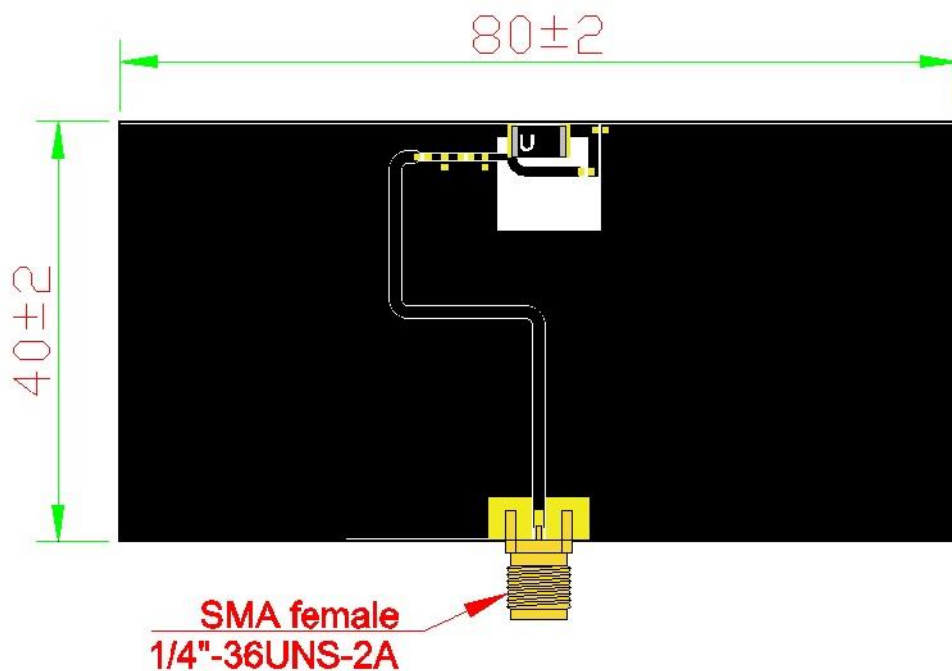


Figure 5 Frequency Vs VSWR and Total Radiation Gain



Unit: mm

Figure 6 Evaluation Board

4. Radiation Pattern (based on the evaluation board)

3D gain pattern @ 868MHz in dBi

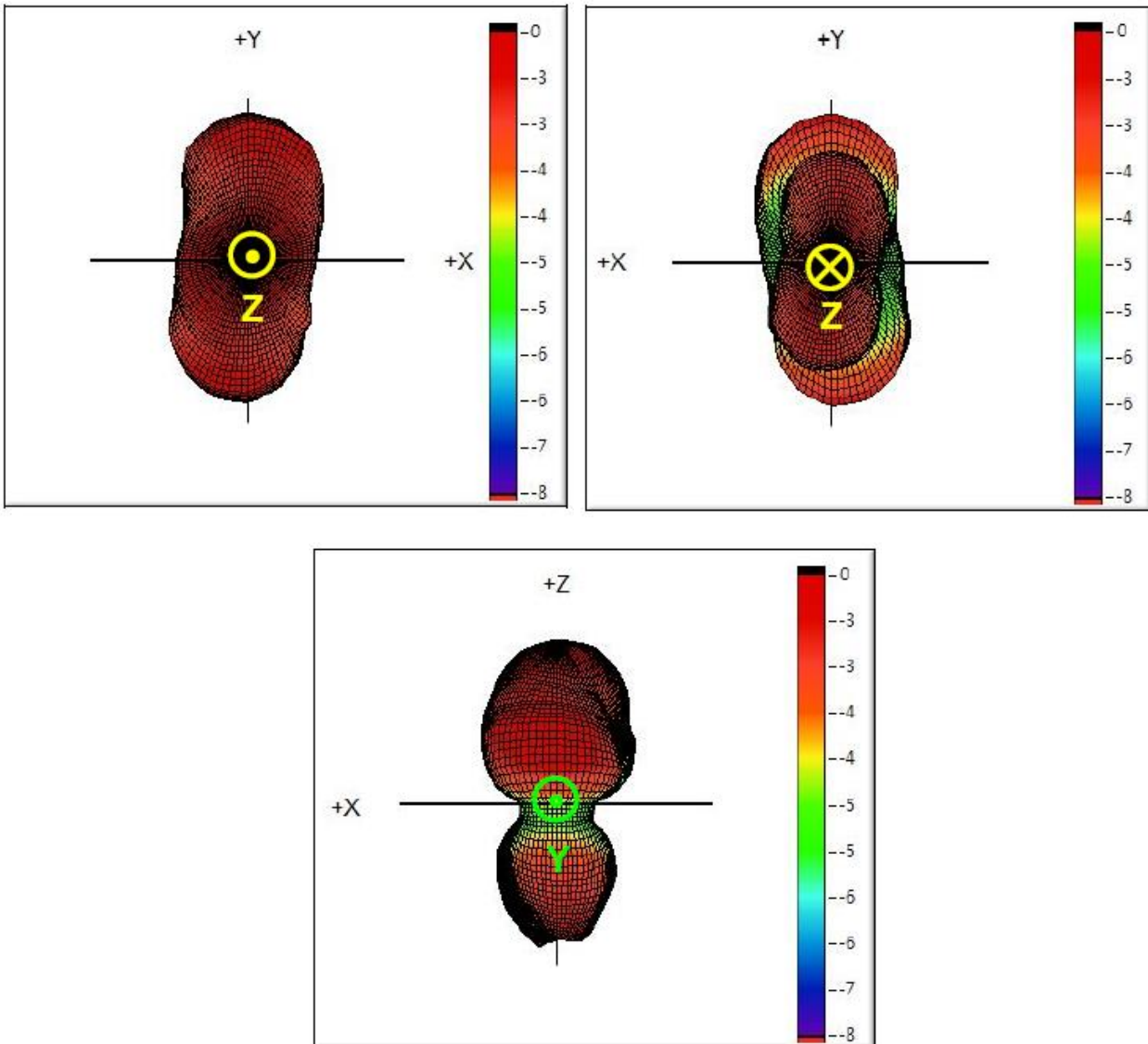
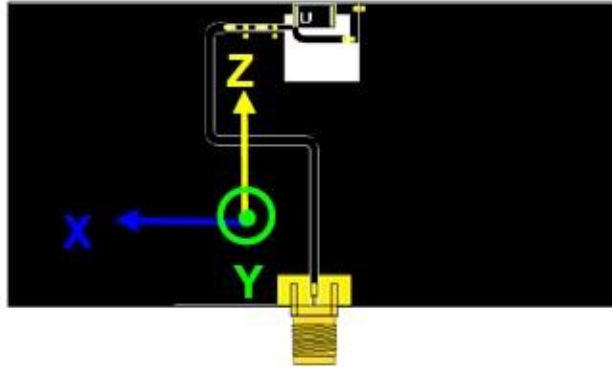


Figure 7 Radiation patterns for X, Y and Z

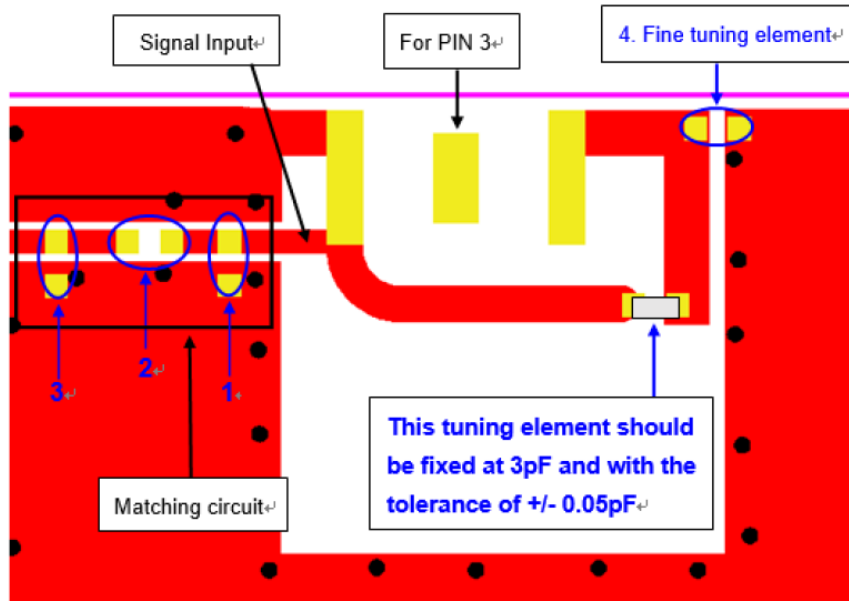
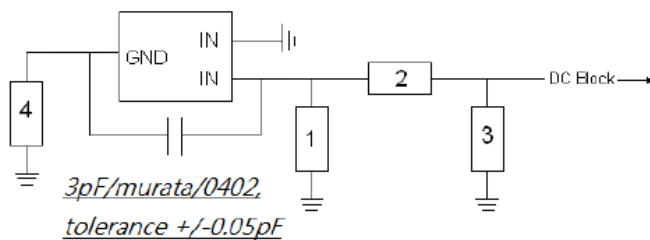
**5. Frequency Tuning and Matching Circuit**


Figure 8 Typical tuning Circuit

**5.1 Matching Circuit**

With the following recommended values of matching and tuning components, the centre frequencies will be about 868MHz using the standard 80 x 40 mm<sup>2</sup> evaluation board. However, these are typical reference values which may require changes when circuit boards are part vendors are different.



System Matching Circuit Component			
Location	Description	Vender	Tolerance
1	N/A	-	-
2	2.7nH, (0402)	Murata	$\pm 0.1nH$
3	N/A	-	-
4	Fine Tuning Element	Murata	$\pm 0.05pF$

Figure 9 Matching circuit

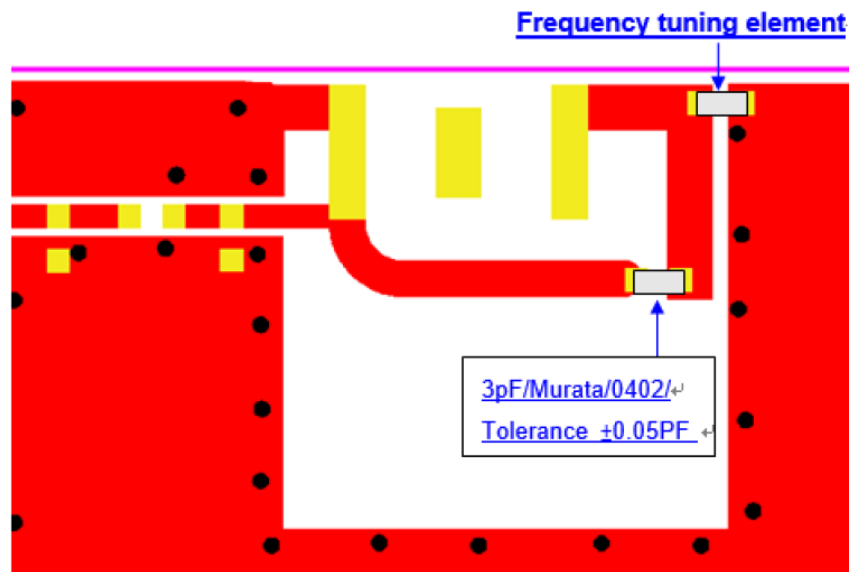


Figure 10 Frequency Tuning Element

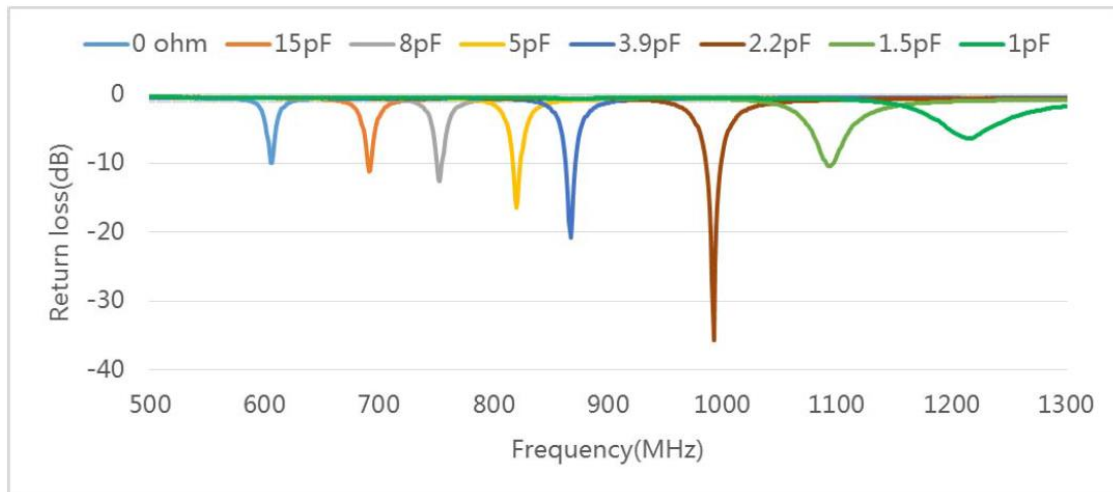


Figure 11 Frequency Tuning Element Reference

## 6. Soldering Profile

Typical soldering profile for Lead-free process.

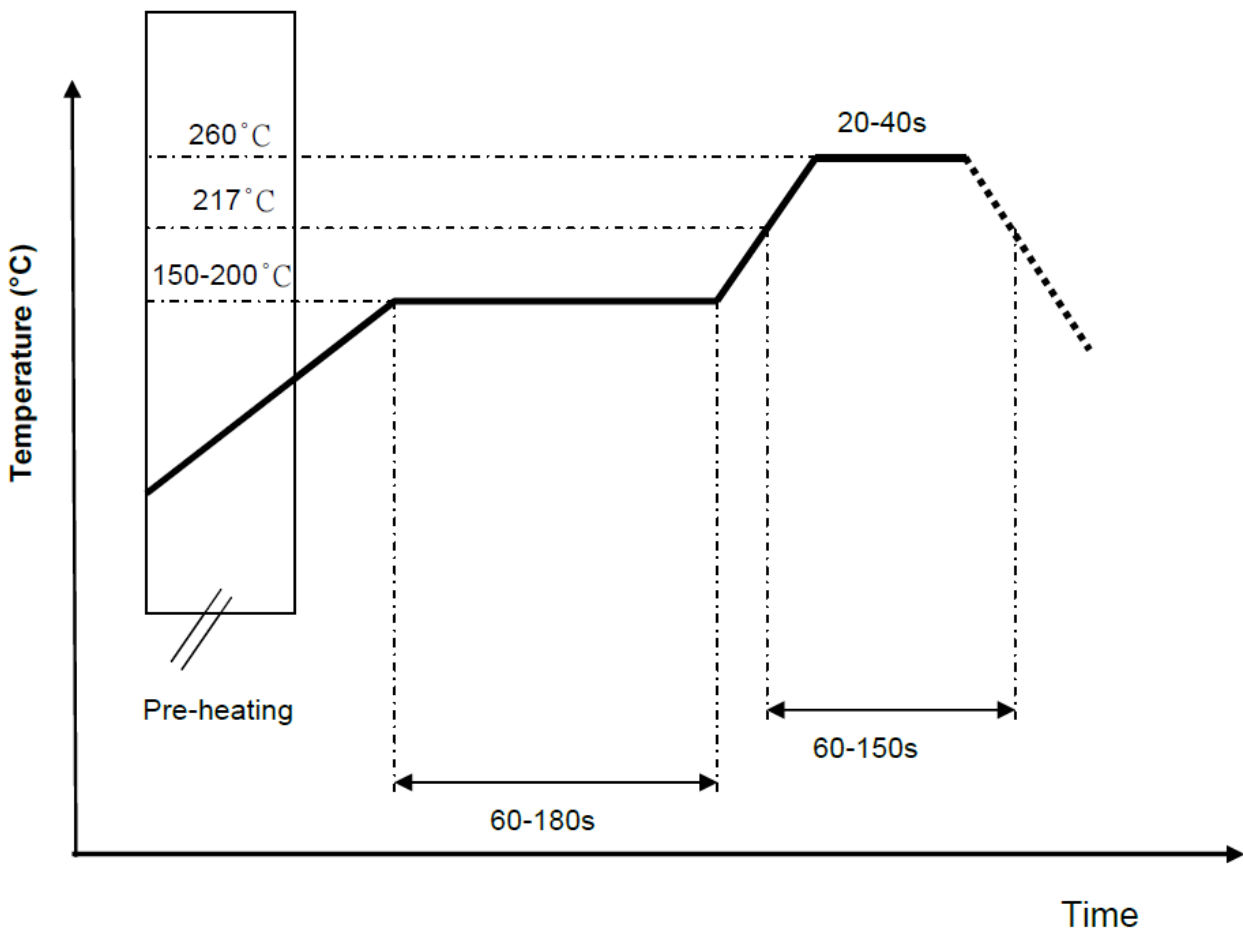


Figure 12 Typical Soldering Profile



## 7. Handling and Manufacturing Notes

### 7.1 Handling

This chip antenna is made from ceramic materials which are relatively more rigid and brittle compared to circuit board materials. Furthermore, the length of this antenna is quite long. Bending of the circuit board at the locations where the chip antenna is mounted may cause cracking to solder joints or to the antenna chip itself.

### 7.2 Punching and Cutting

Punching or cutting of the break-off tab of the PCB panel may cause severe bending of the circuit board which may result in cracking of solder joints or chip antenna. Therefore break-off tab shall be located away from the installation location of the chip antenna.

### 7.3 Ultrasonic Welding Process

Use all caution when ultrasonic welding, especially if used near the location where the chip antenna is installed. Strong ultrasonic vibration may cause the cracking of the chip antenna solder joints.

## 8 Packing

- (1) Quantity/Reel: 6000 pcs/Reel
- (2) Plastic Tape

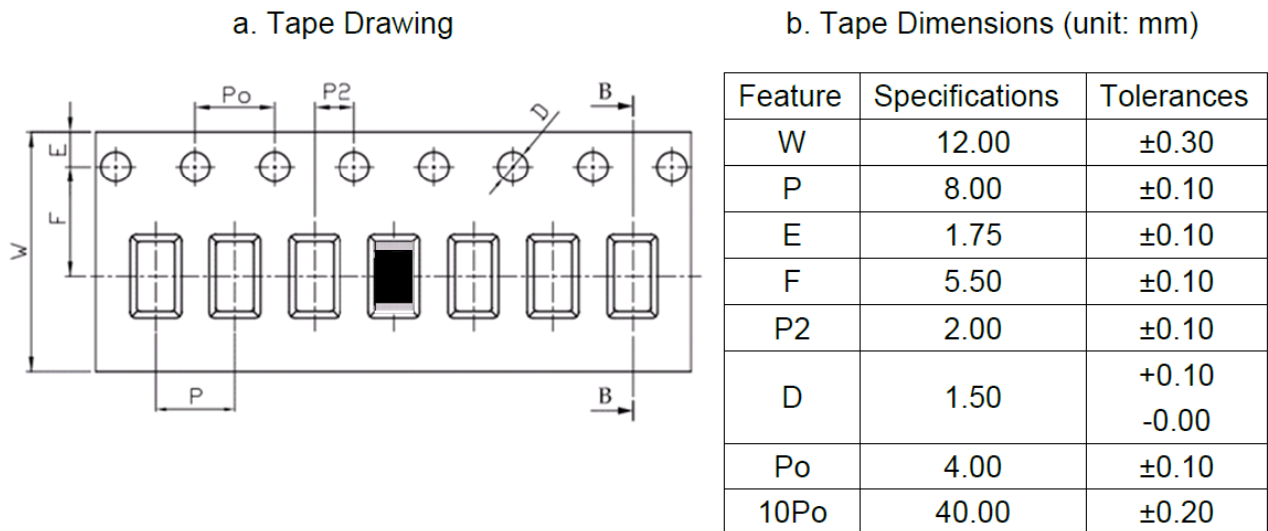


Figure 13 Tape and Reel drawing & Dimensions

## 9. Operating & Storage Conditions.

### 9.1 Operating

- (1) Maximum Input Power: 2 W
- (2) Operating Temperature: -40°C to 85°C
- (3) Relative Humidity: 10% to 70%

### 9.2 Storage (Sealed)

- (1) Storage Temperature: -5°C to 40°C
- (2) Relative Humidity: 20% to 70%
- (3) Shelf Life: 1 year

### 9.3 Storage (Unsealed)

Meets the criteria of J-STD-033 MSL2a

### 9.4 Storage (after mounted on Customers PCB with SMD process)

- (1) Storage Temperature: -40°C to 85°C
- (2) Relative Humidity: 10% to 70%

**10. Product Order Code**

Name	Description	Order Code
LPRS-CCA-868	Ceramic chip antenna @ 868MHz	LPRS-CCA-868

Please contact the sales office for availability of other variants of the standard product.

**11. Notice**

Installation guide

(1) Installation Guide: "General Guidelines for the installation of LPRS chip antennas (AN001)".

(2) all specifications are subject to change without notice.

**12. Document History**

Issue	Date	Revision
1.1	March 2020	Provisional datasheet

**Changes to this Document**

This data sheet has been updated to reflect changes throughout the range of LPRS modules. Specific changes are recorded in the documentation history above.

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