



Product image for illustration Purposes only

### **Introduction**

LPRS's ceramic chip antenna is designed for use within the ISM 2.4GHz frequency bands, covering frequencies from 2400MHz ~ 2500MHz.

Perfect for applications where the antenna must be mounted internally within a product enclosure, the LPRS-CCA-2.4 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 3 compliant.
- SMD process compatible.

### **Applications**

- Ideal for any ISM 2.4GHz applications.
- ZigBee/BLE Applications
- Wireless PCMCIA Cards or USB dingles.
- Bluetooth earphone systems.
- Handheld devices using WiFi/BLE functions e.g. Smart phones
- IEEE 802.11 b/g/n

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### I. Layout Guide and Electrical Specifications

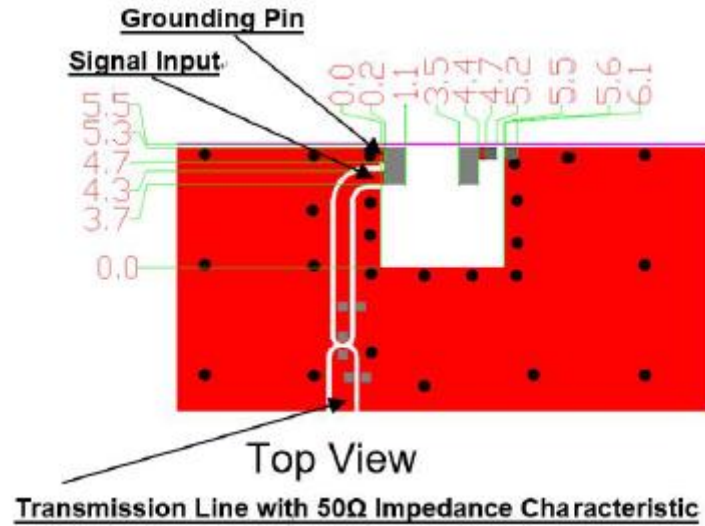


Figure 1 Layout Guide Top View (mm)

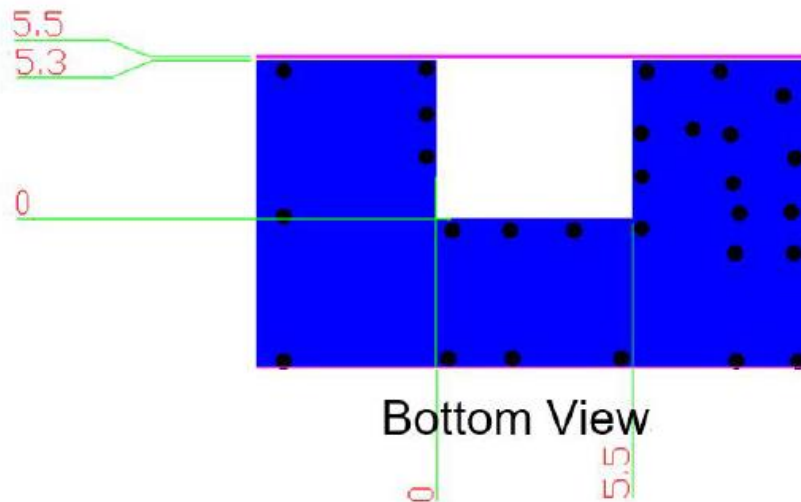


Figure 2 Layout guide Bottom View (mm)

#### I.1 Solder Land Pattern:

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

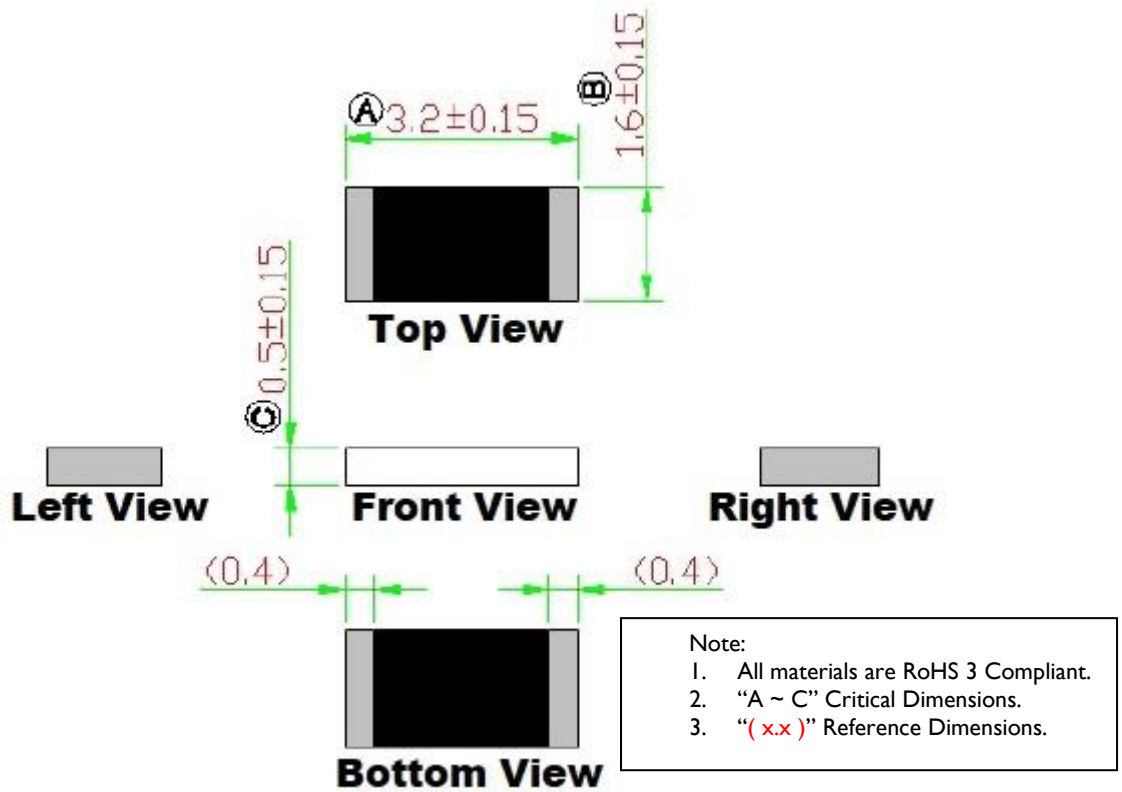
**2. Antenna Outline Dimensions**


Figure 3 Physical Dimensions (mm)

**2.1. Pin Definitions.**


Figure 4 Pin Assignments

Pin	1	2
Soldering Pad	Signal	Tuning / Ground

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

Characteristics		Specifications	Unit
Outline Dimensions		3.2 x 1.6 x 0.5	mm
Ground Plane Dimensions		80 x 40	mm
Working Frequency		2400 ~ 2500	MHz
VSWR (@ centre frequency) *		2	
Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442 MHz)	1.5 (Typical)**	dBi
Efficiency		75 (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.

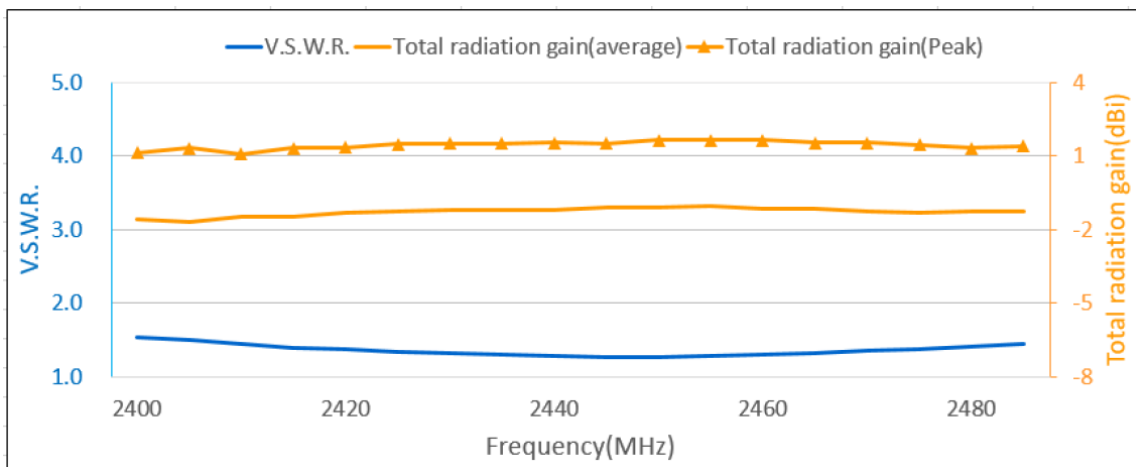


Figure 5 Frequency Vs VSWR and Total Radiation Gain

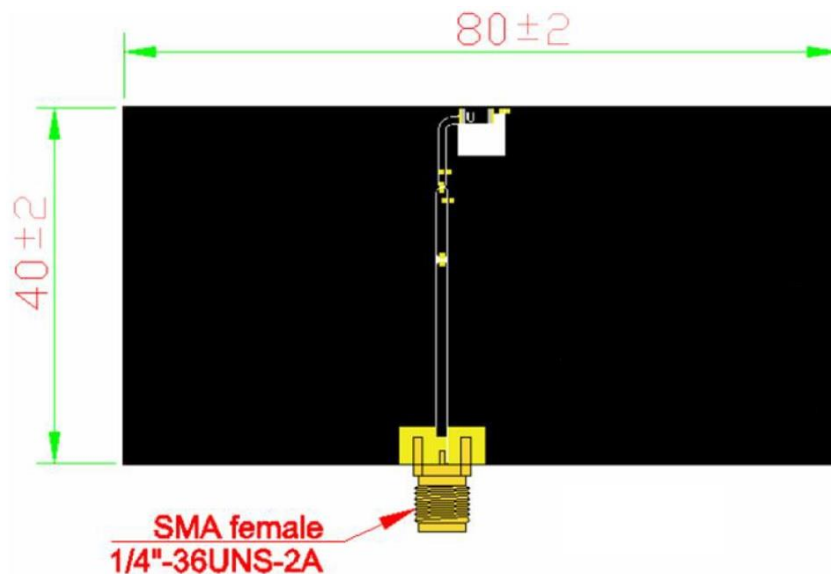


Figure 6 Evaluation Board (mm)

**4. Radiation Pattern (based on the 80 x 40 mm<sup>2</sup> evaluation board)**

3D gain pattern @ 2442MHz in dBi

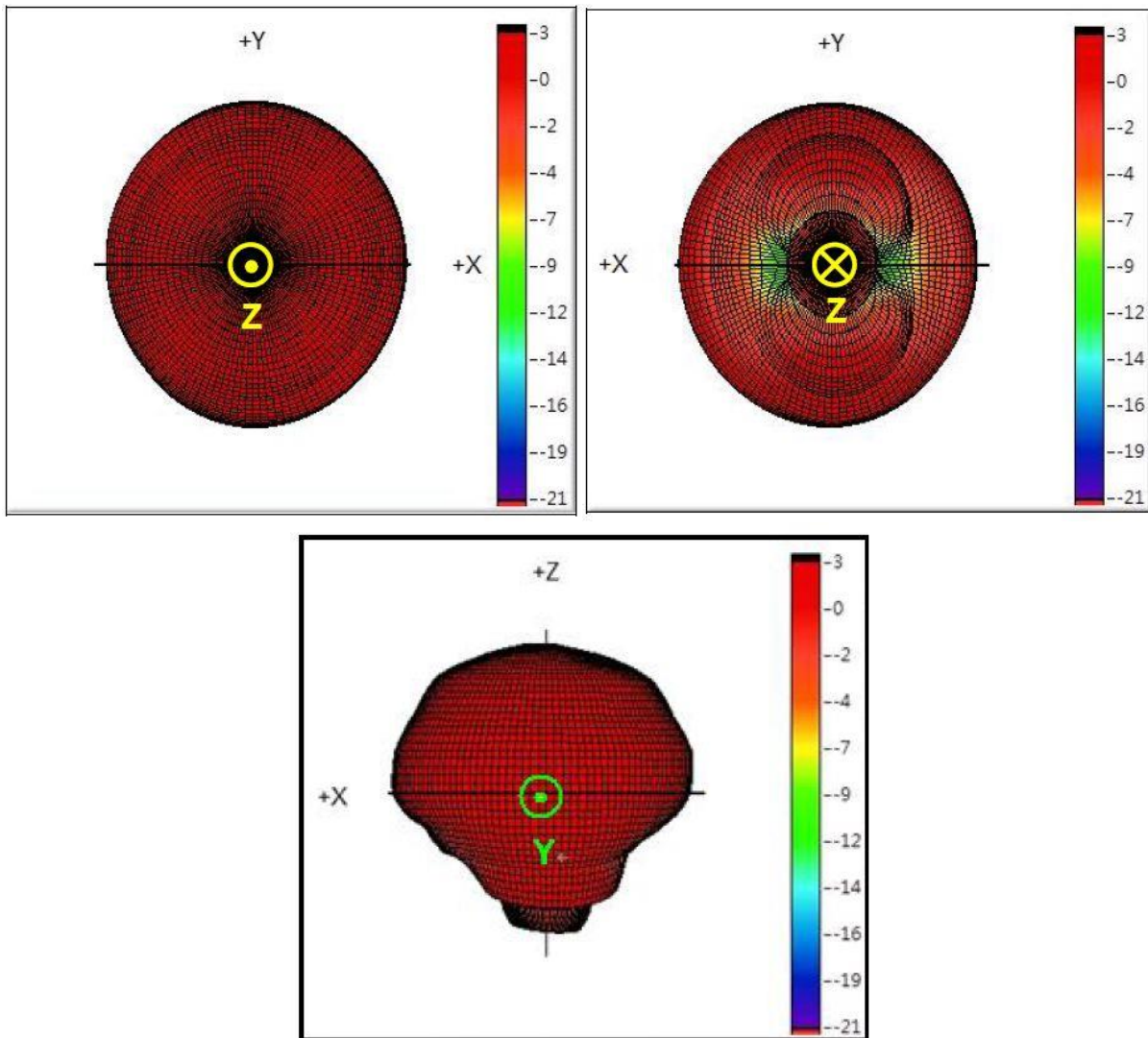
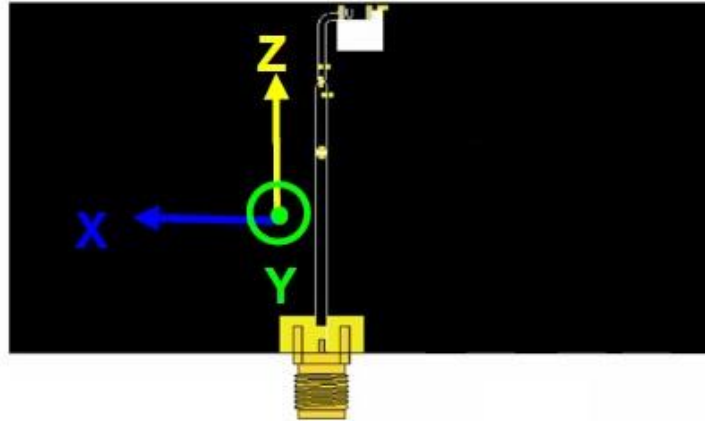


Figure 7 Radiation patterns for X, Y and Z

## 5. Frequency Tuning and Matching Circuit

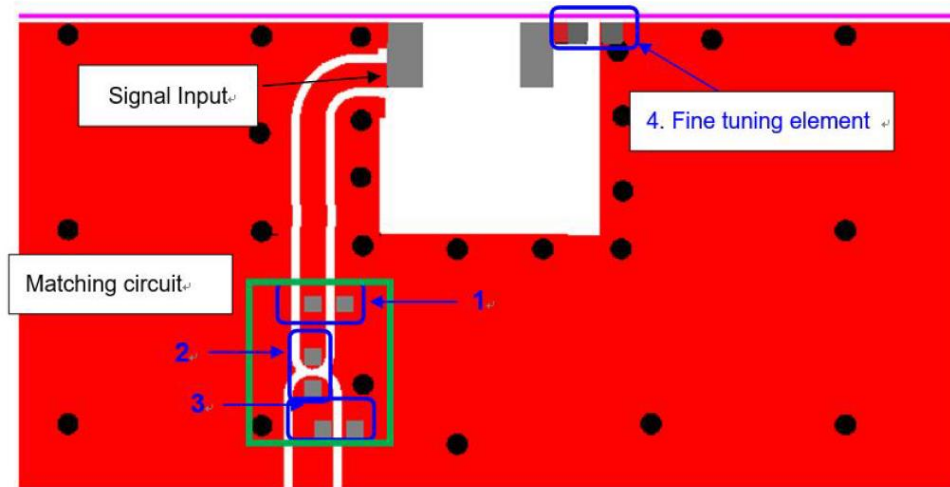


Figure 8 Typical tuning Circuit

### 5.1 Matching Circuit

With the following recommended values of matching and tuning components, the centre frequencies will be about 2442MHz 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.

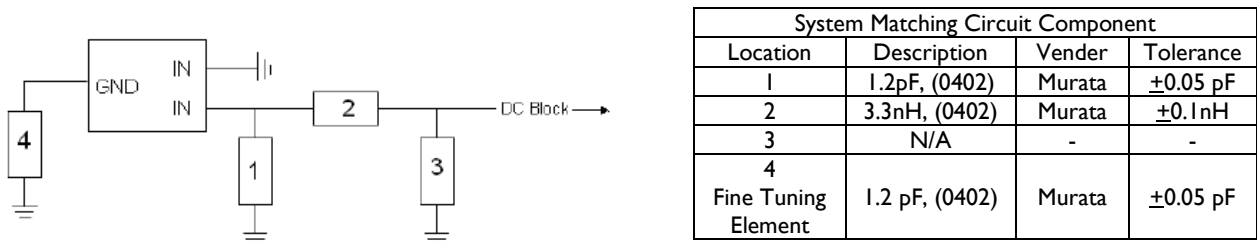


Figure 9 Matching circuit

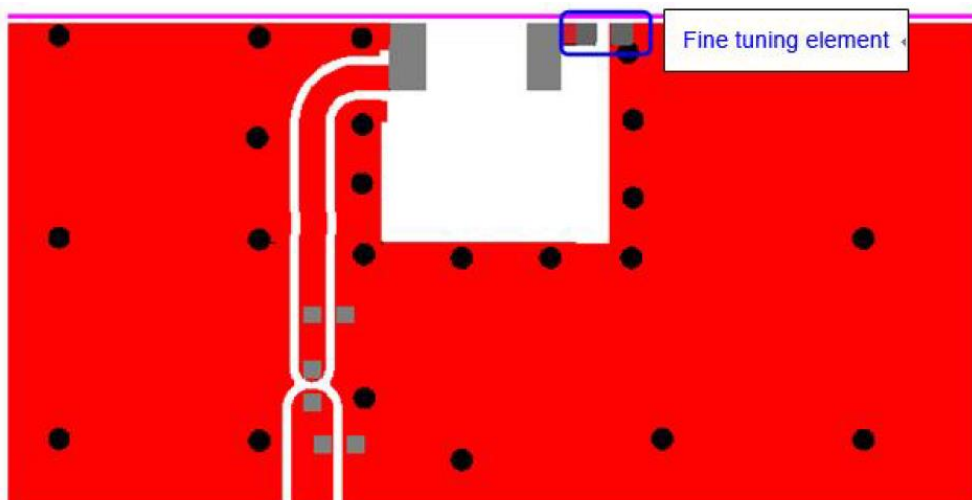


Figure 10 Frequency Tuning Element

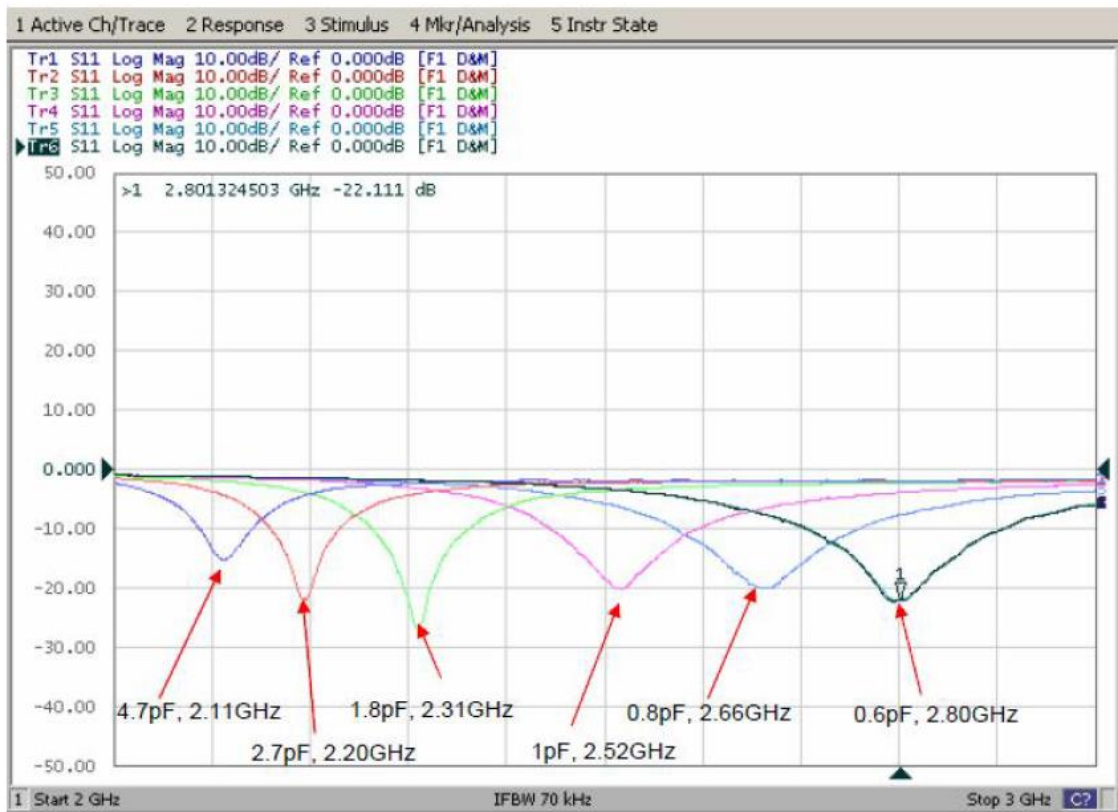


Figure 11 Frequencies vs Capacitance Frequency Tuning Element

## 6. Soldering Profile

Typical soldering profile for Lead-free process. Recommended solder paste alloy: SAC305 (Sn96.5 /Ag3 /Cu0.5) Lead free solder paste.

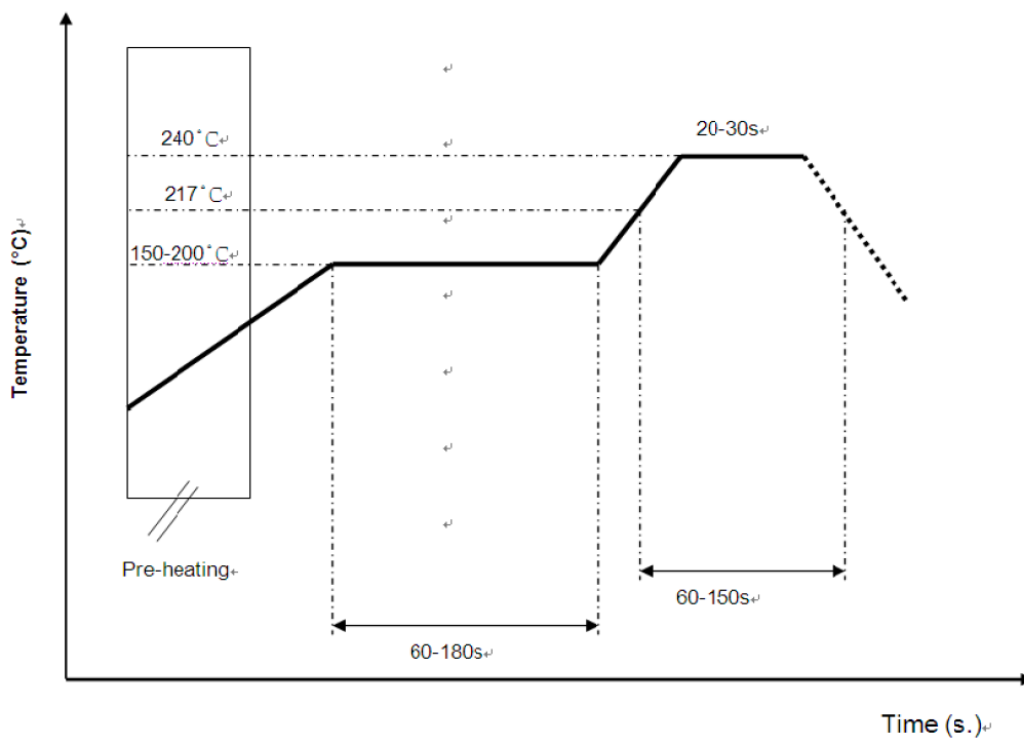


Figure 12 Typical Soldering Profile



**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: 5000 pcs/Reel
- (2) Plastic Tape: Black conductive polystyrene

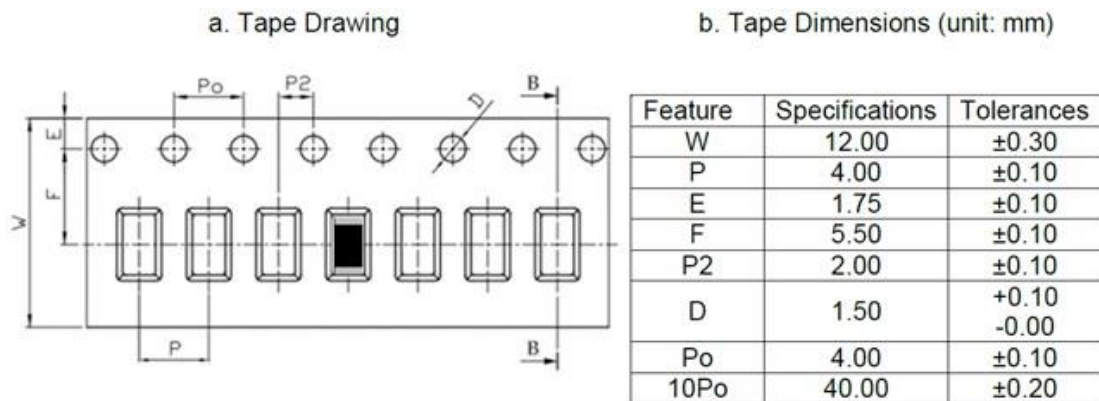


Figure 13 Tape and Reel drawing & Dimensions

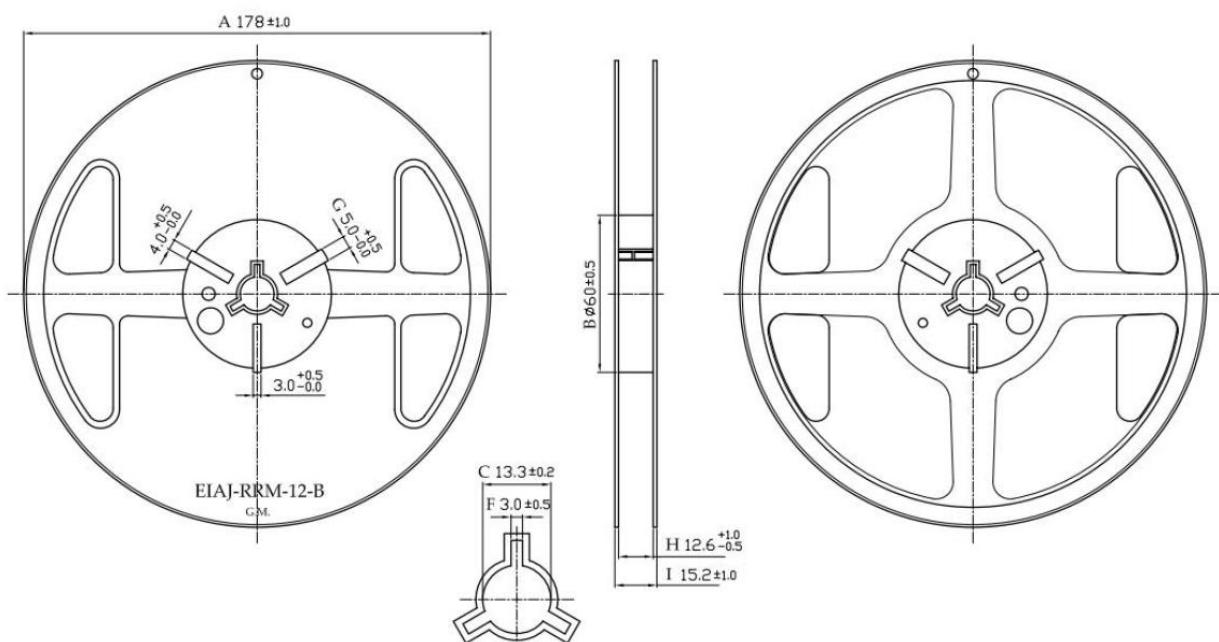


Figure 14 Reel Drawing

**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-2.4	Ceramic chip antenna @ 2400~2500MHz	LPRS-CCA-2.4

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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