

SATELLITE L BAND SMD ANTENNA CENTER MOUNT

Part Number: LK1850201

Description: Satellite L band SMD Antenna Center Mount

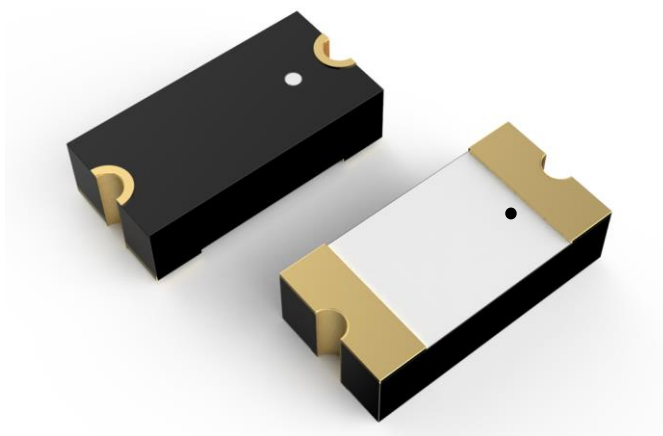
Frequency: 1610-1680MHz

Size: 3.2 mm x 1.6 mm x 0.5 mm

Features:

- ✧ Support L band satellite communication including Iridium, Globalstar, Inmarsat, Thuraya, Courier and Skywave.
- ✧ Omni-directional radiation pattern
- ✧ Surface Mount Device (SMD) tape & reel supply
- ✧ Easy integration and flexible placement
- ✧ Ultra-low profile with a height of 0.5 mm

RoHS compliant



Revision: B

Apr 09, 2024

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1.0 Product Description

The LK1850201 is an ultra-low profile SMD antenna with a height of 0.5 mm. It leverages cutting-edge technology to support L band satellite communication globally including Iridium, Globalstar, Inmarsat, Thuraya, Courier and Skywave simultaneously. Additionally, it's extremely small form factor makes it easier for designers to create outstanding products with high integration and a thinner profile while maintaining superior antenna performance.

Features:

- Support L band satellite communication
- Easy integration
- Omni-directional radiation pattern
- Low profile with flexible placement
- SMD supplied in Tape & Reel

Applications:

- Tracker
- Utilities
- Smart agriculture
- Construction
- Satellite IoT

2.0 General Specification

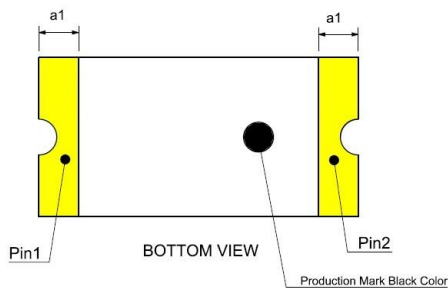
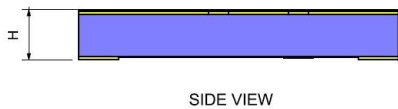
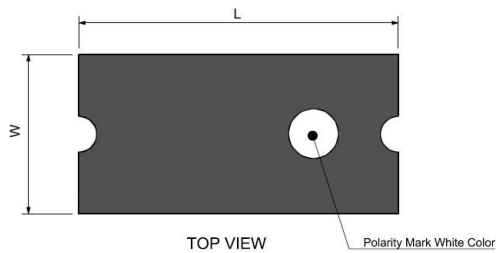
Part Number	LK1850201
Frequency (MHz)	1610-1680
S11 (Return Loss) (dB)	< -8.0
VSWR	< 2.3
Average Efficiency	> 65%
Peak Gain (dBi)	1.6
Polarization	Linear
Radiation Pattern	Omni-directional
Antenna Type	Loop
Impedance	50 Ω
Power Rating	5 Watts
Weight	< 0.01g
Operation Temperature	-40°C to +125°C
Storage Temperature	-40°C to +85°C

Notes:

1. The above performances are the typical values measured on the Leankon evaluation board.

3.0 Mechanical and Environmental Specification

3.1 Product Dimension



Typical Antenna Dimensions:

L (mm)	W (mm)	H (mm)	a1 (mm)
3.2±0.15	1.6±0.15	0.5±0.1	0.4±0.1

Pin Description:

Pin	Definition	Description
Pin1	Grounding pad	Connect to the ground plane of main PCB
Pin2	Feeding pad	Connect to feeding transmission line

3.2 Environmental Specification

Item	Test item	Test condition	Specifications
1	Temperature Cycling Test	-40°C (30 minutes) to 125°C (30 minutes) 1008 cycles	1. No apparent damage 2. Electrical properties within the test Spec.
2	High temperature high humidity test	85°C; 85% RH for 96 hours	1. No apparent damage 2. Electrical properties within the test Spec.
3	High Temperature test	1000 hours at 125°C	1. No apparent damage 2. Electrical properties within the test Spec.
4	Salt Mist test	Concentration: 5%±1 Spray time: 24 hours Ambient Temperature: 35 ± 2°C	1. No apparent damage 2. Electrical properties within the test Spec.
5	Shear force	Push from side surface (length side) after IR reflow soldering	> 2.0 Kg

4.0 Electrical Characteristics

The electrical characteristics are measured on the Leankon evaluation board in below.



Figure 4.1: The evaluation board of LK1850201

Notes:

- 1) To request an evaluation board for pre-verification, please reach out to info@leankon.com.
- 2) The size of evaluation board is 90mm x 30mm x 1mm.

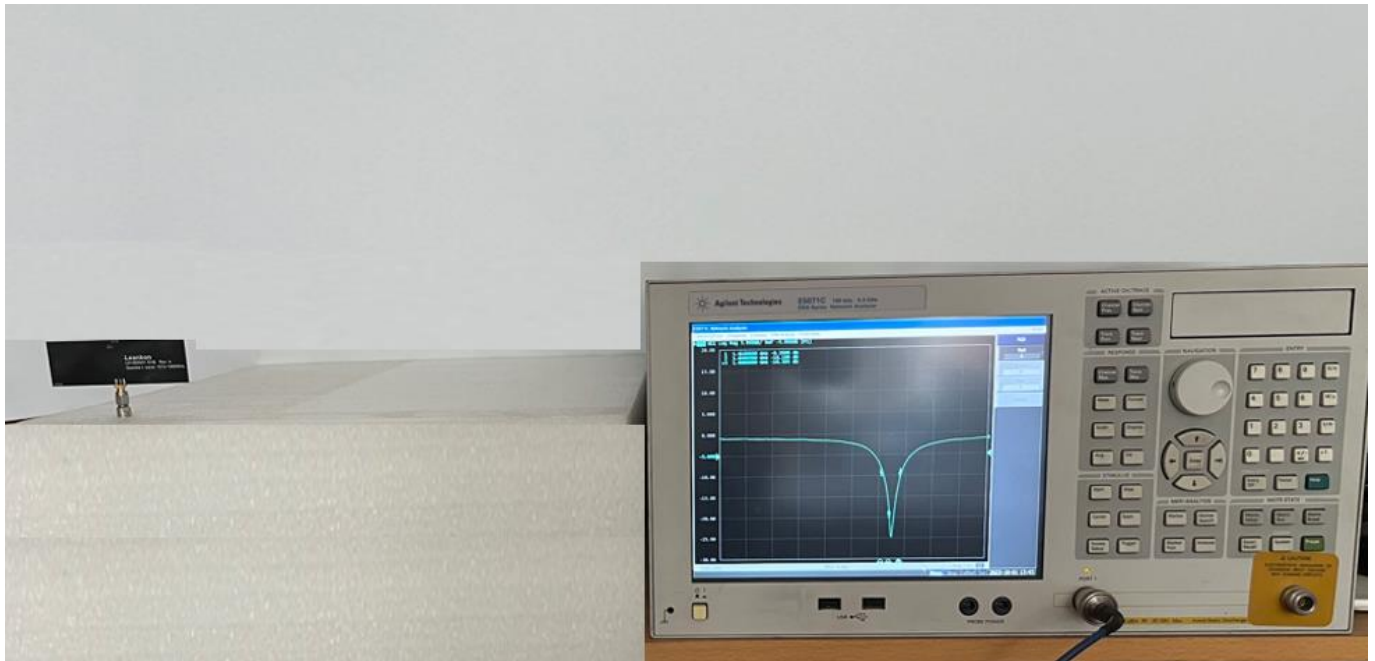


Figure 4.2: The free space test condition of Return Loss and VSWR

4.1 S11/Return Loss

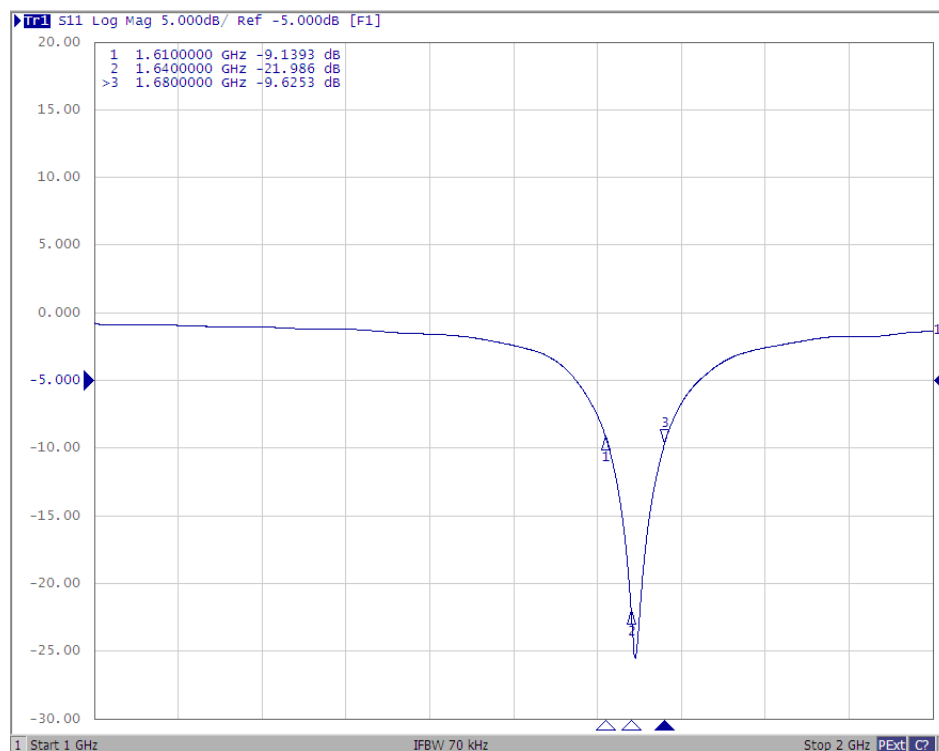


Figure 4.3 S11/Return Loss in Free Space

4.2 VSWR

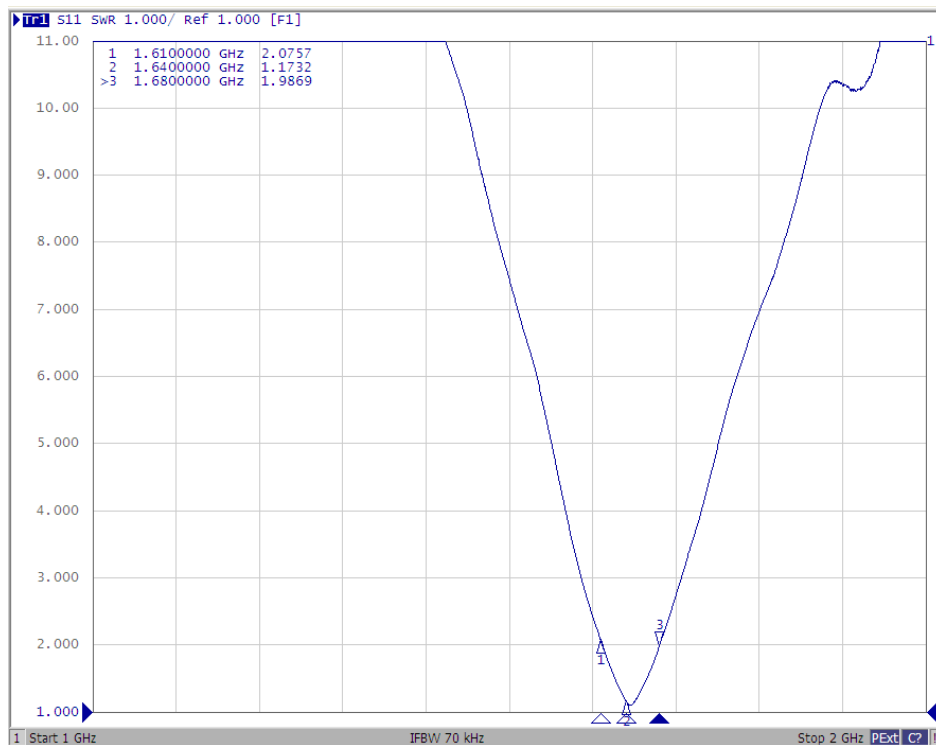


Figure 4.4 VSWR in Free Space

4.3 Efficiency

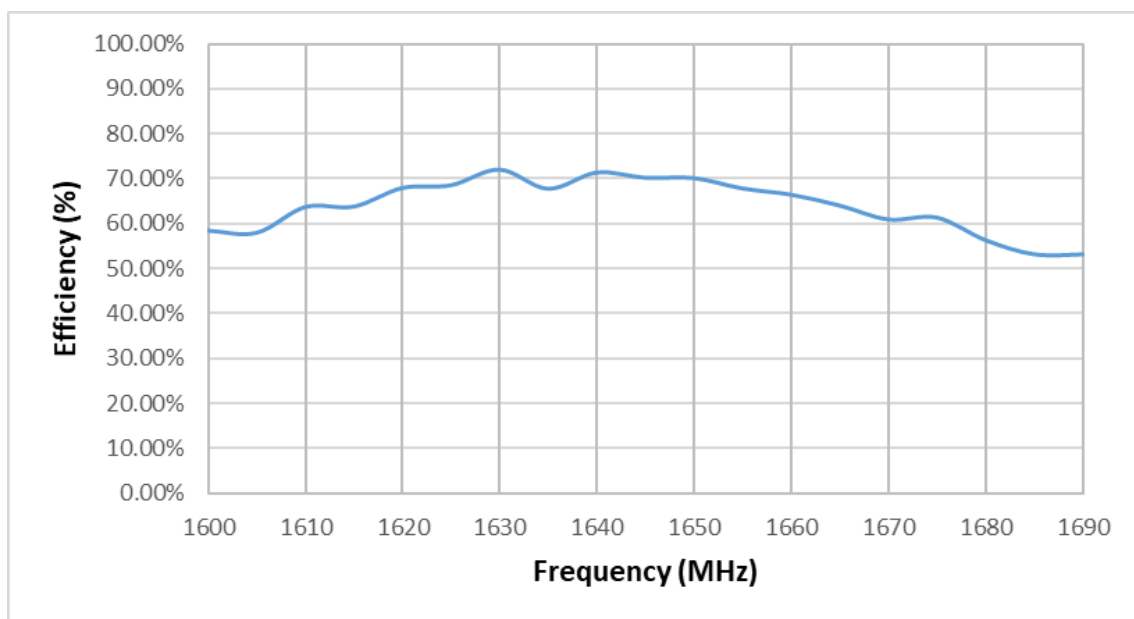


Figure 4.5 Efficiency in Free Space

4.4 Peak Gain

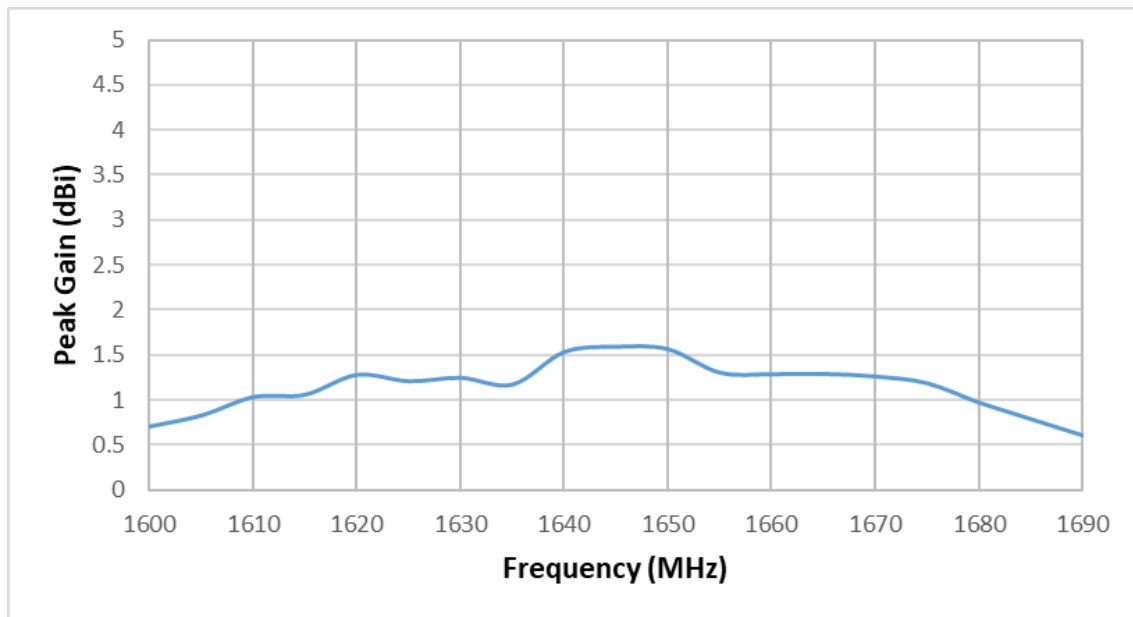


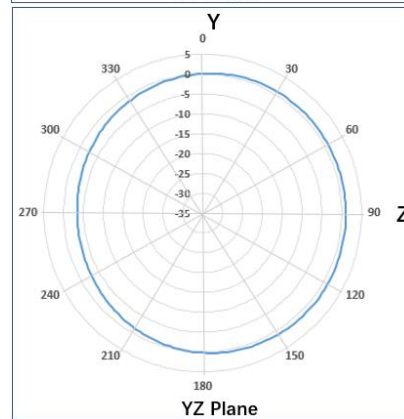
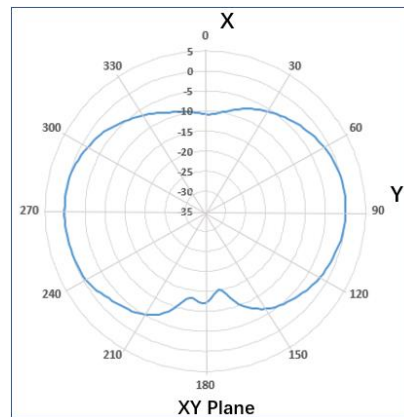
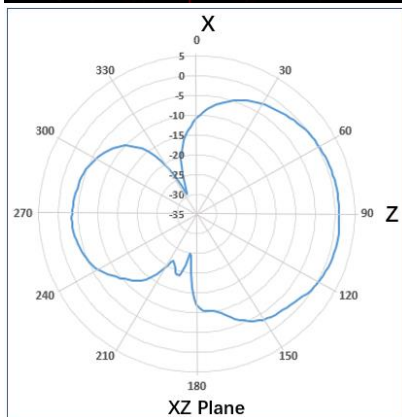
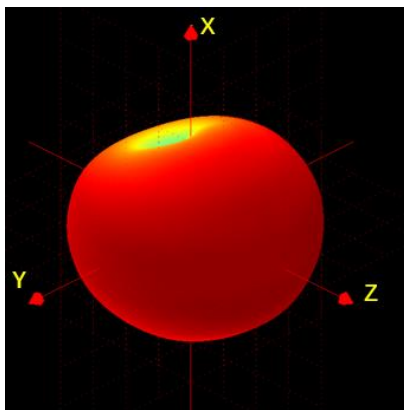
Figure 4.6 Peak Gain in Free Space

4.5 Radiation Pattern

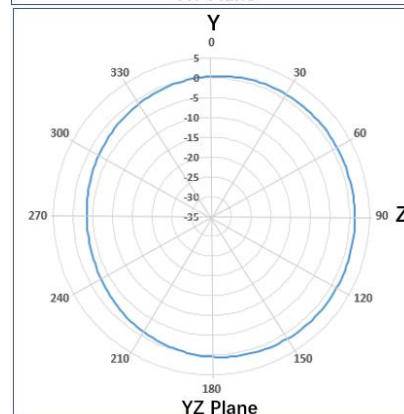
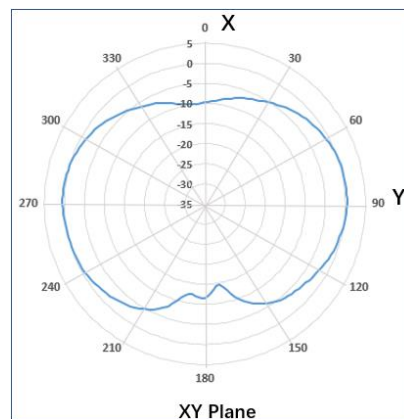
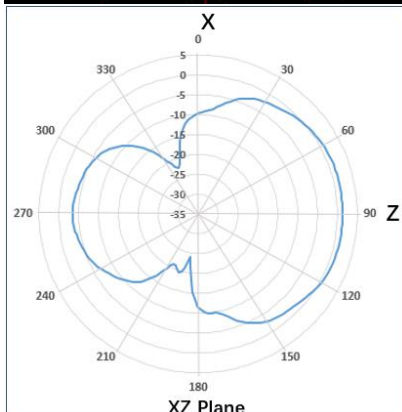
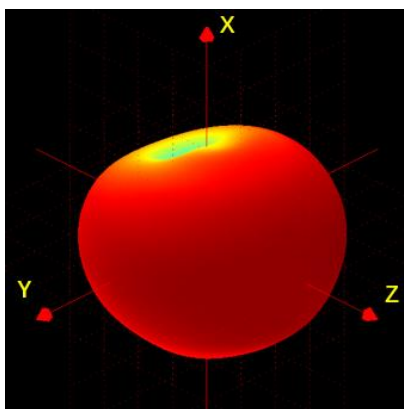
Below shows the antenna radiation pattern measured in 3D anechoic chamber.



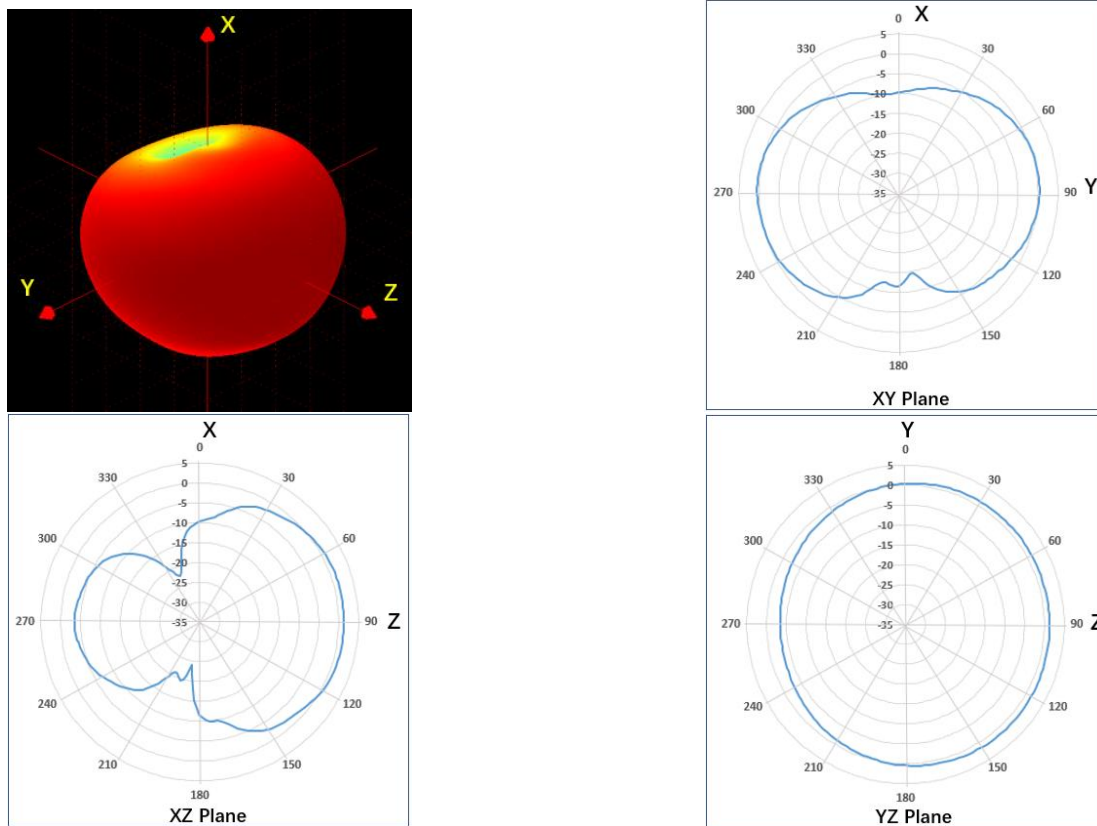
■ 1620MHz Radiation Pattern



■ 1640MHz Radiation Pattern



■ 1670MHz Radiation Pattern



5.0 Recommended PCB Layout

5.1 Recommended PCB Layout

To provide designer with more options, two different PCB layouts are offered. Details of these two layouts are shown in Figure 5.1.1 and Figure 5.1.2.

The antenna performances of these two PCB layouts are equivalent.

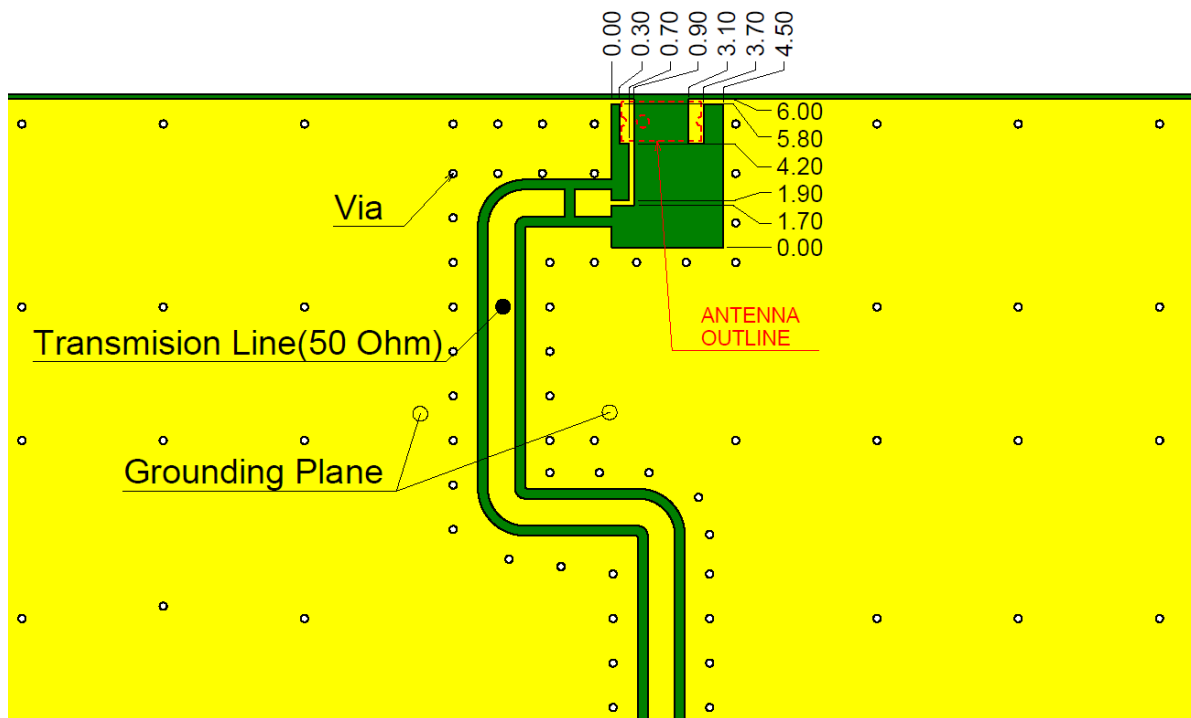


Figure 5.1.1: Recommended PCB Layout

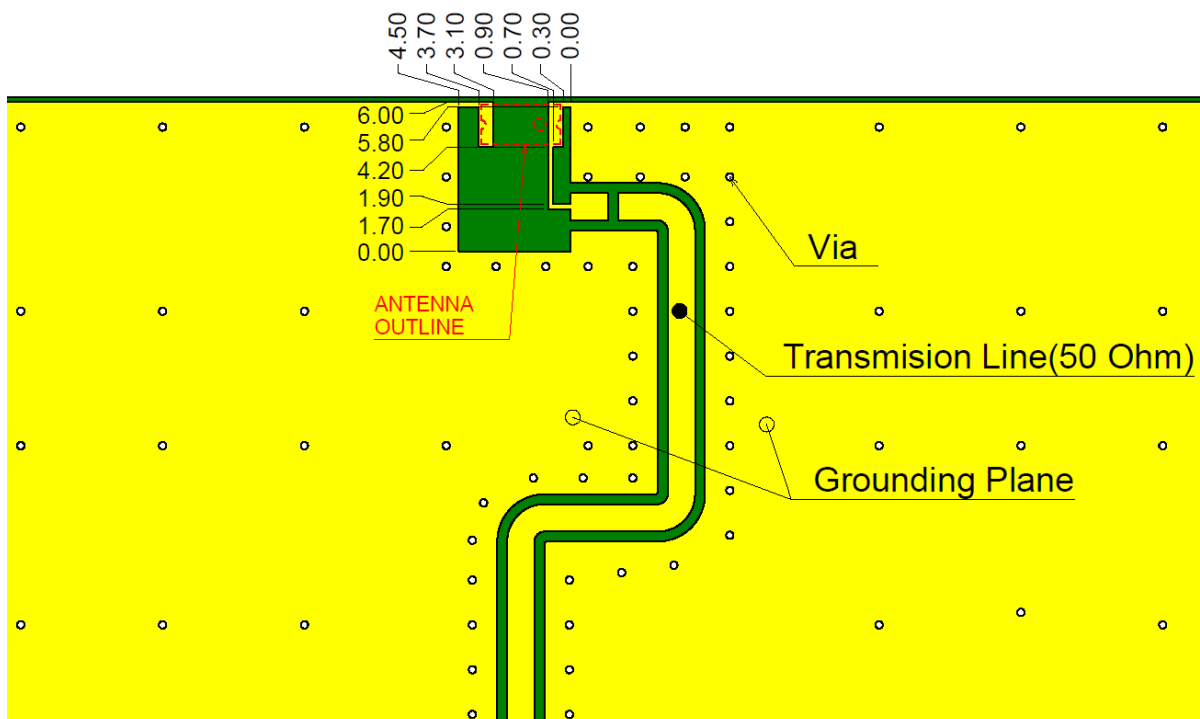


Figure 5.1.2: Recommended mirrored PCB Layout

5.2 Recommended Soldering Pad

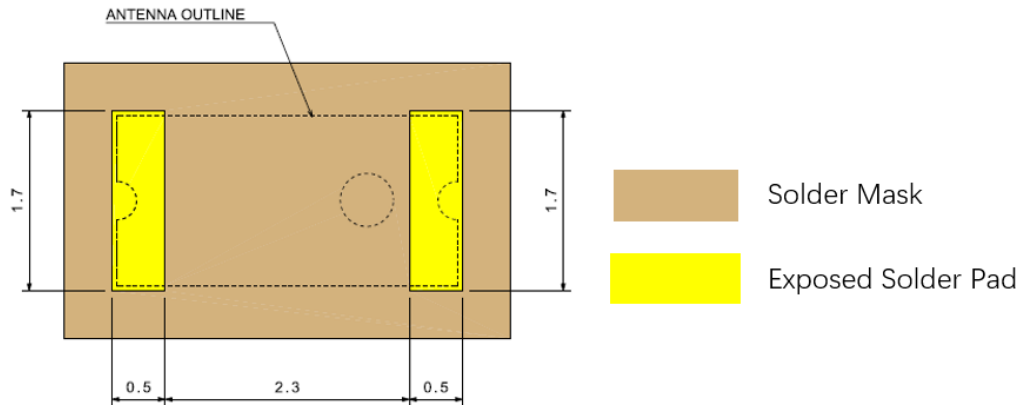


Figure 5.2.1: Recommended Soldering Pads on host PCB

5.3 Recommended Clearance Area

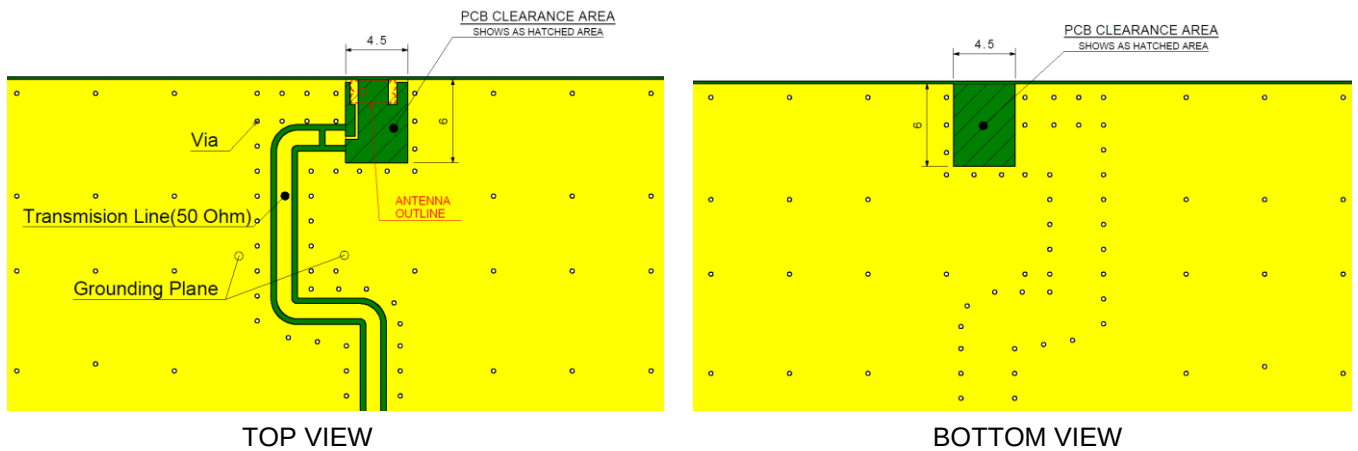


Figure 5.3.1: Recommended PCB Clearance Area

Notes:

1. The term “clearance” also refers to “keep out”. The clearance area is 4.5 mm x 6.0 mm.
2. In all PCB layers, the clearance area must be free of ground plane or metal.
3. The clearance area is the same for mirrored application.

5.4 Antenna Placement Application Guidelines

LK1850201 provides flexible antenna placement for different PCB sizes. Assumed PCB size is X (mm) by Y (mm), as shown in Figure 5.4.1:

- 1) When $Y > X$, the location 1 is recommended.

- 2) When $Y < X$, the location 2 is recommended.
- 3) To achieve optimal antenna performance, it is recommended to position the antenna at the center edge of the PCB or as close to the center as possible, regardless of the conditions mentioned above.

Leankon also provides antenna location recommendations and antenna performance simulations based on your specific PCB shape and size. Please email us at info@leankon.com with your detailed inquiry.

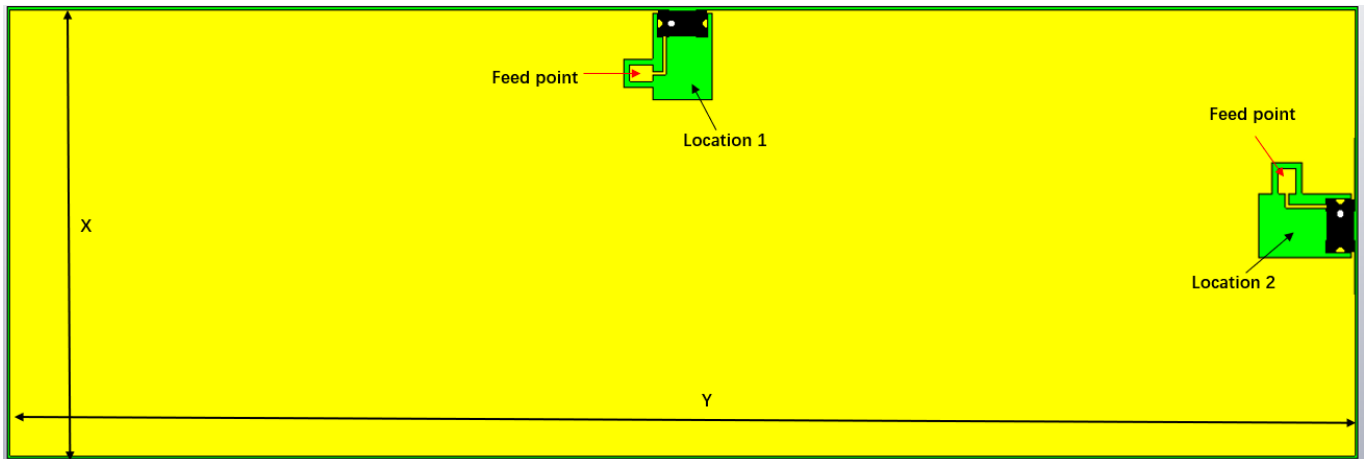


Figure 5.4.1: The antenna placement of LK1850201

The antenna can be placed on either the top layer or the bottom layer of the host PCB. The following demonstrates the three mounting methods on the host PCB. Mounting the antenna on the same layer as the module is preferred to minimize transmission line loss.

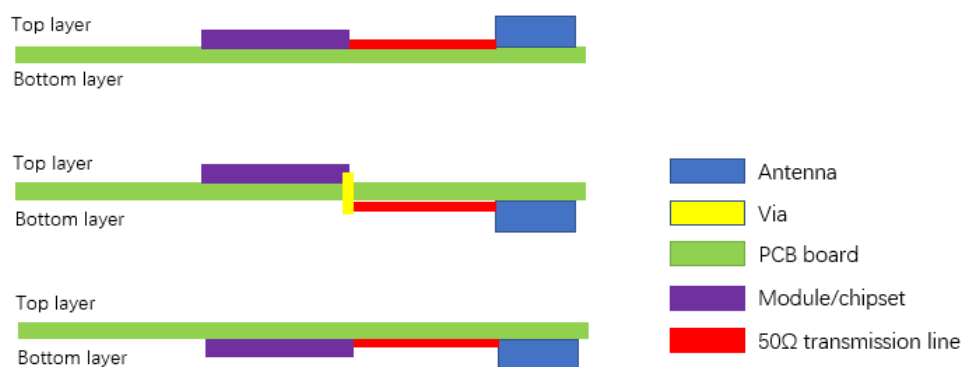


Figure 5.4.2: The antenna placement on host PC

6.0 Matching Network

A matching network is proposed on the host PCB to maximize impedance bandwidth. It is highly recommended to design the PCB layout according to the reference matching component positions provided below for optimal antenna performance.

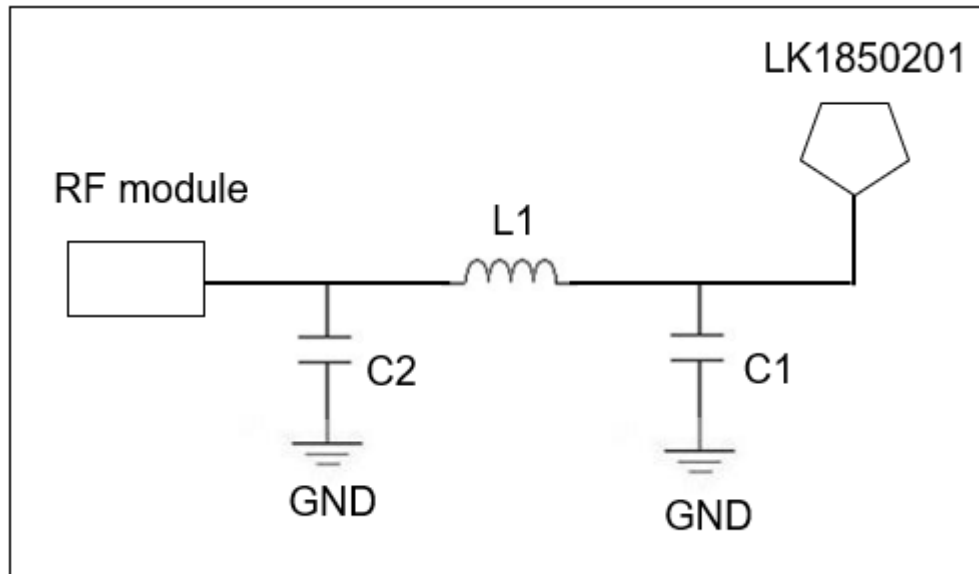


Figure 6.1: The matching circuit schematics

Table 1: Recommended matching circuit values

Matching circuit	Value	Component size	Part number
C1	1.3 pF	0402	GRM1555C1H1R3BA01D
L1	3.9 nH	0402	LQW15AN3N9B00D
C2	NA	0402	Not Applicable

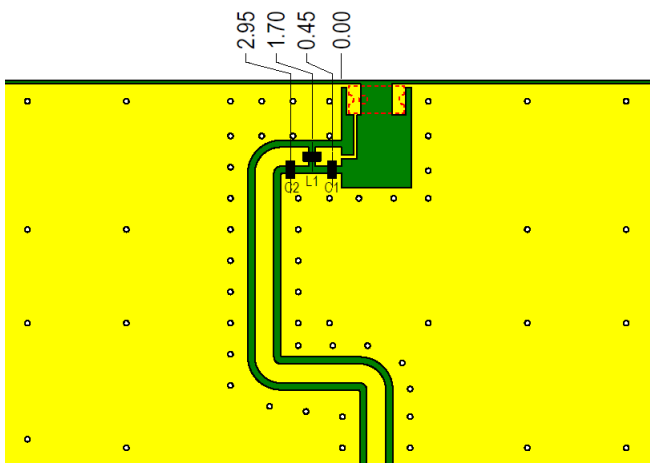


Figure 6.2: Matching location dimensions

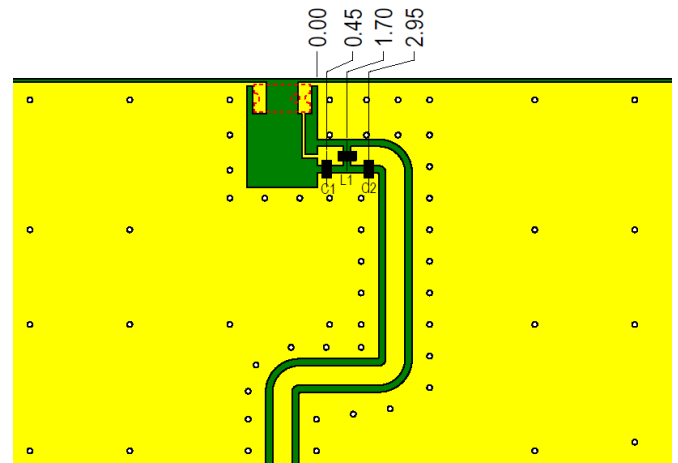


Figure 6.3: Matching location dimensions of mirrored application

Notes:

1. The matching values are the same for mirrored application.
2. In real-world device applications, antenna resonance frequencies may be affected by factors such as shielding cans, PCB size and shape, device enclosures, and so on. To compensate for these impacts, slight adjustments to the matching circuit values are necessary. Leankon offers free technical support to designers in order to streamline the development process, which includes:
 - a) Early-phase antenna selection and placement recommendations.
 - b) Antenna PCB layout evaluation and recommendations.
 - c) Antenna performance evaluation based on actual applications.
 - d) Matching network optimization in actual devices.
 - e) Passive antenna parameter measurements in actual devices, such as Return loss, Gain, Efficiency, and Radiation pattern, among others.
 - f) Active antenna measurements in actual devices, such as OTA (Over The Air) tests for both TRP (Total Radiation Power) and TIS (Total Isotropic Sensitivity) to reduce the certification risks.
3. Leankon also offers the custom design services for specific applications where off-the-shelf products are not suitable.
4. For more information or technical support, please contact info@leankon.com to speak directly with engineering team.

7.0 Recommended Reflow Profile

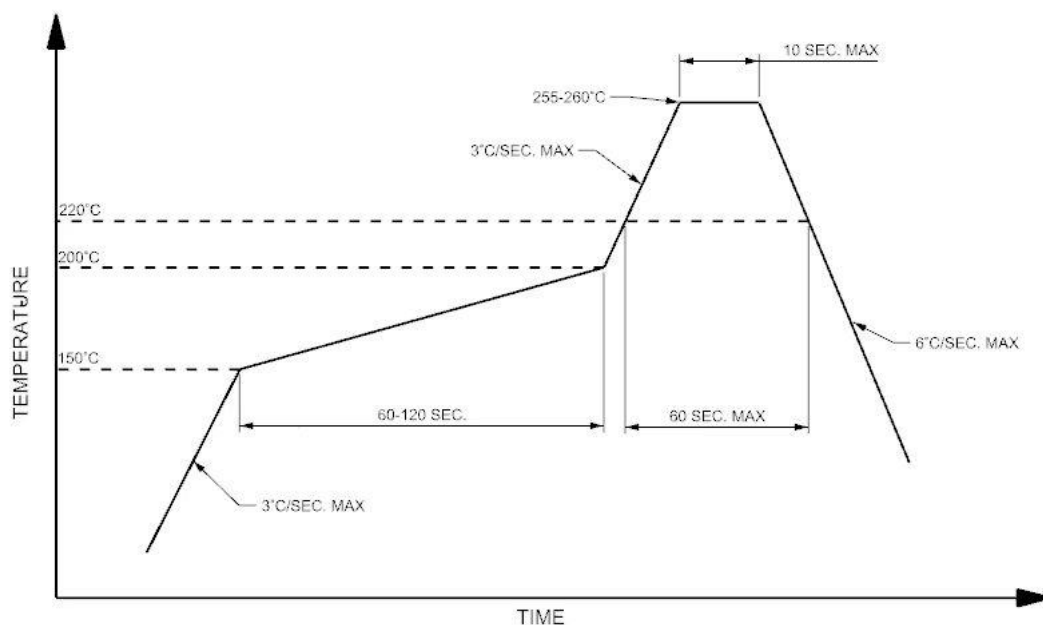
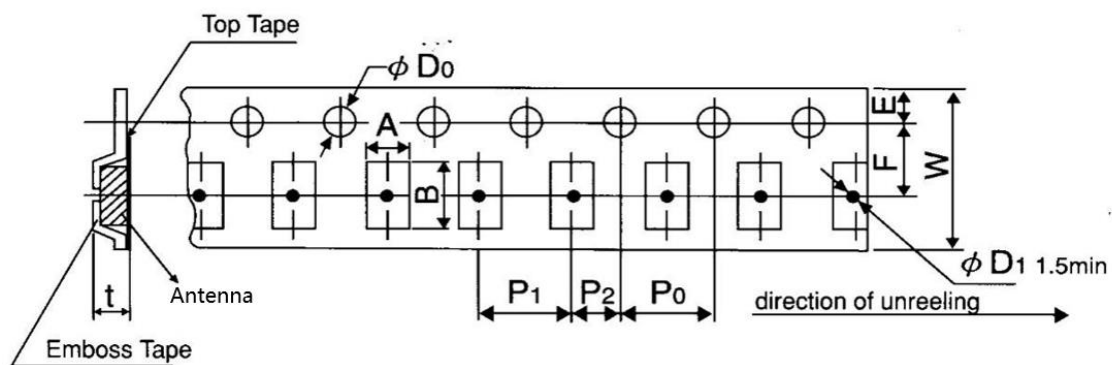


Figure 7.1: Recommended Reflow profile

8.0 Packaging

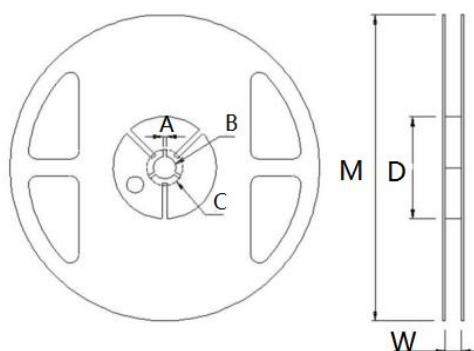
■ Tape dimensions (Unit: mm)

A	B	D0	E	F	P0	P1	P2	W	T
±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.15
2.05	3.65	1.55	1.75	3.50	4.00	4.00	2.00	8.00	1.20



■ Reel dimensions (Unit: mm)

A	B	C	D	M	W
±0.5	±0.5	±0.5	±0.5	±3.0	±0.5
2.00	13.5	21.0	60.0	178.0	9.0



9.0 Website and Company Address

Website: www.leankon.com
Address: B1337 1F, Building 3, 5018 Hutai Road, Baoshan District, Shanghai China.

10.0 Revision History

Revision	Date	Description	Issued by:
A	2022-08-17	Initial release	Tony
B	2024-04-09	Reduced the height	Tony

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