antenova

DATASHEET

Velox

SR41052 • IamiiANT®

Features

- Antenna for ISM 868 and 915 MHz applications.
- Frequency bands from 863- 928MHz
- Maintains high performance on device: DFI (Designed for Integration)
- Low profile innovative design.
- SMD mounting
- Supplied in Tape and Reel
- Automotive temperature rating

1. Description

Velox uses a ground plane on the host PCB to radiate effectively. The antenna itself requires a clearance underneath. An external matching circuit is used to optimise the antenna within a device to the required bands. Designed specifically for 868/915 ISM applications that require a small robust solution.

2. Applications

- Industrial/Scientific/Medical (ISM)
- Remote monitoring/ Smart meters
- Network Devices
- Manufacturing automation
- Agriculture/Environment
- Consumer tracking

3. Part number

SR4I052

4. General data

Frequency	863 – 928MHz
Polarization	Linear
Operating temperature	-40°C to 140°C
Environmental condition test	ISO16750-4 5.1.1.1/5.1.2.1/5.3.2
Operating temperature	-40°C to140°C
Impedance with matching	50 Ω
Weight	<2g
Antenna type	SMD
Dimensions	35.0 x 8.0 x 0.9 (mm)

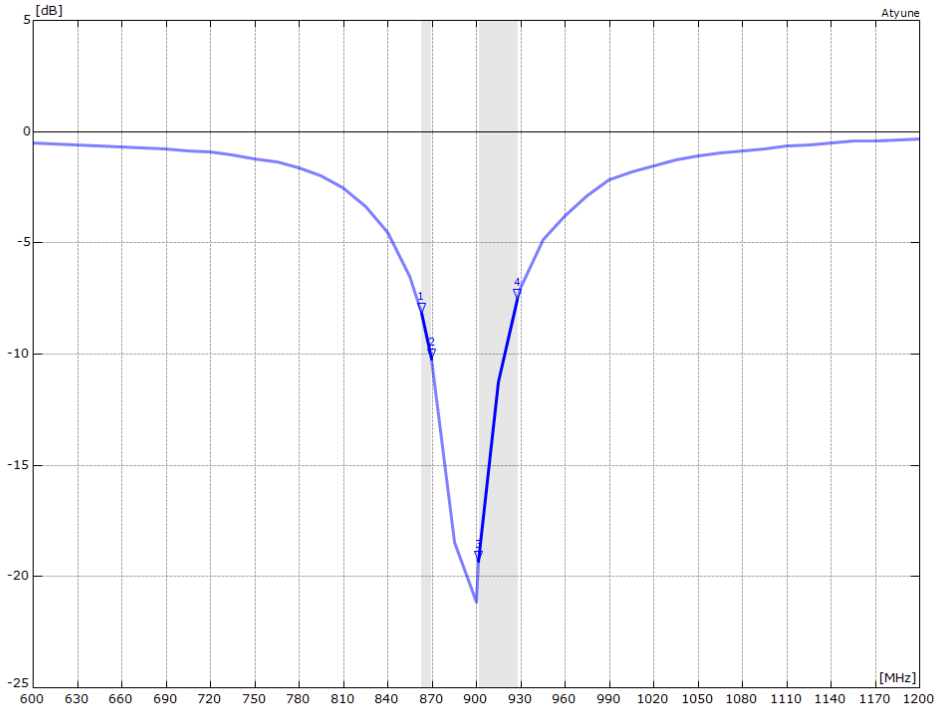
5. RF characteristics

	863 – 928 MHz
Peak gain	1.60dBi
Average gain (Linear)	-1.60dBi
Average efficiency	>70%
Maximum return loss	<-7.5dB
Maximum VSWR	2.4:1

All data measured on Antenova's evaluation PCB
Part No. SR4I052-EVB-1

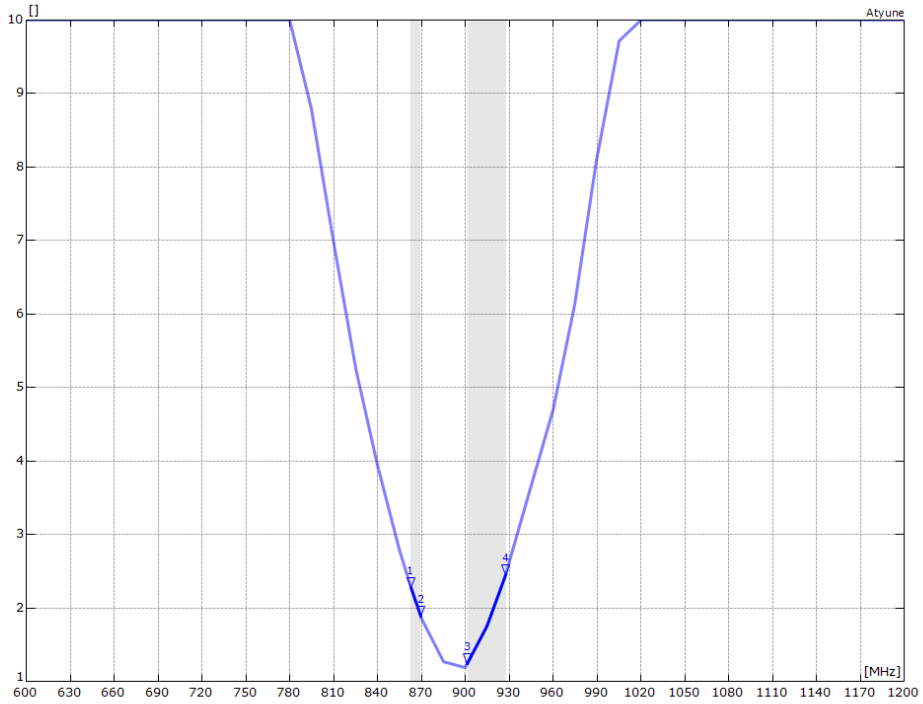
6. RF performance

6.1. Return loss



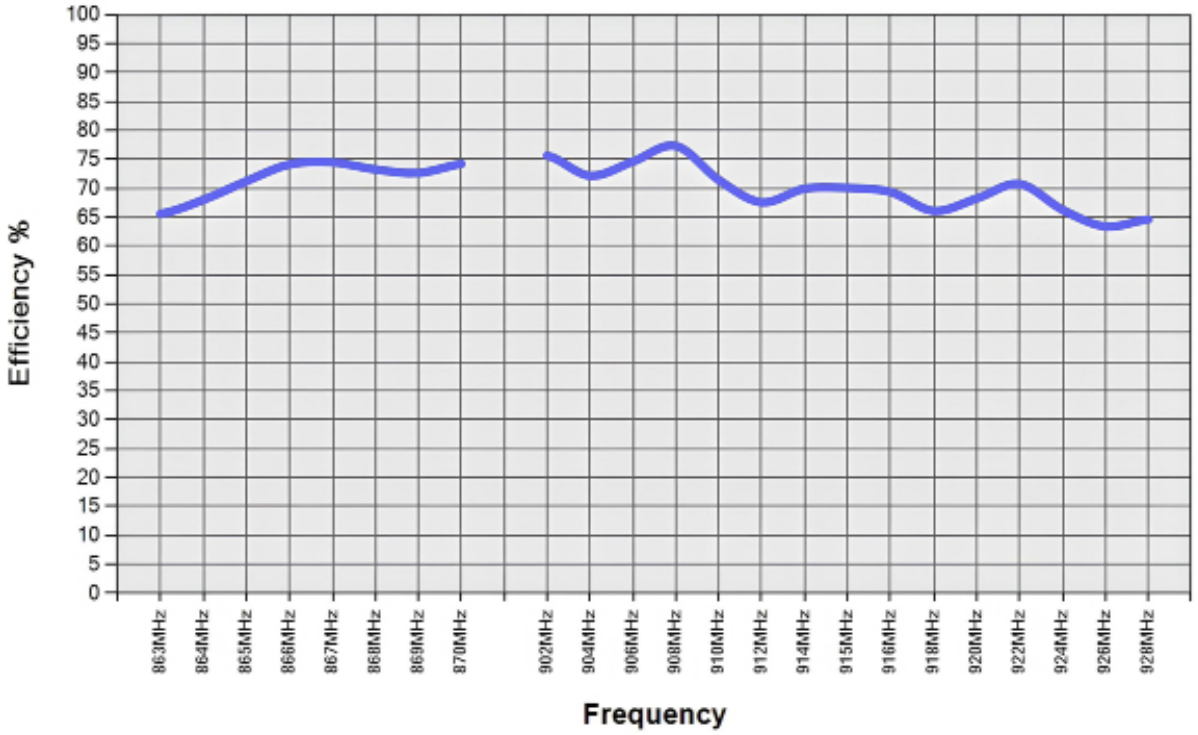
All data measured on Antenova's evaluation PCB
Part No. SR4I052-EVB-1 (EVK size 100mm x 36mm)

6.2. VSWR



All data measured on Antenova's evaluation PCB
Part No. SR4I052-EVB-1 (EVK size 100mm x 36mm)

6.3. Efficiency

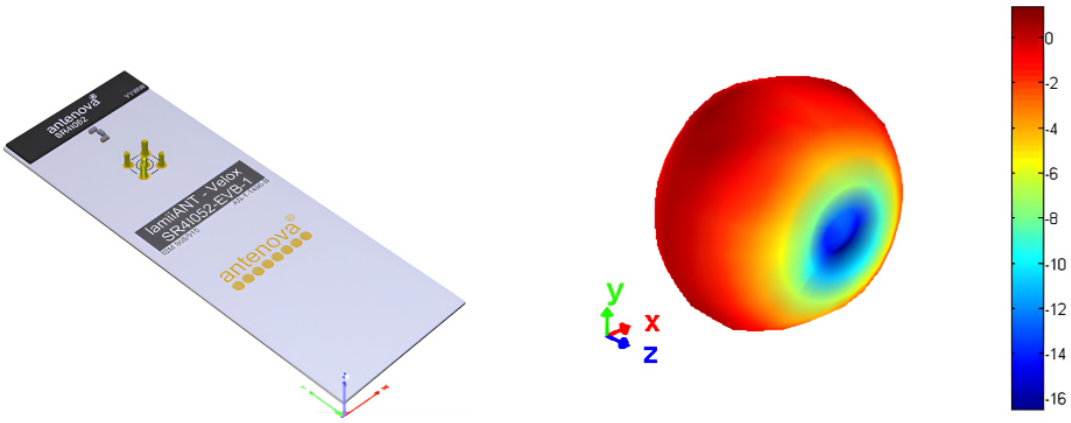


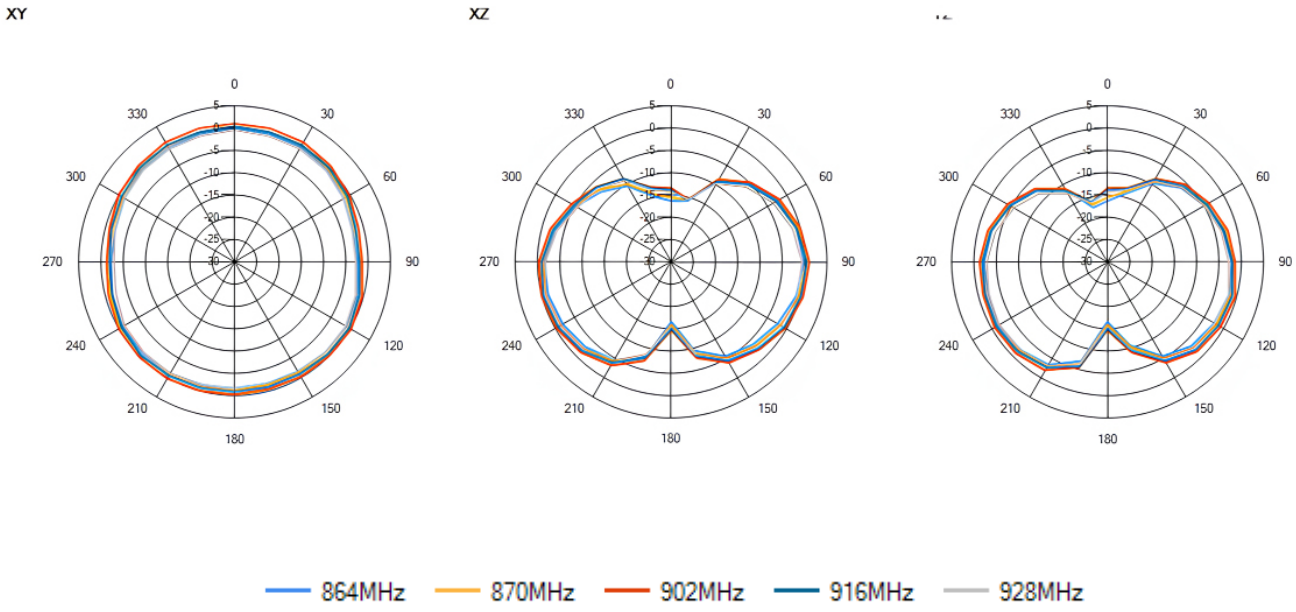
All data measured on Antenova's evaluation PCB
Part No. SR4I052-EVB-1 (EVK size 100mm x 36mm)

6.4. Antenna pattern

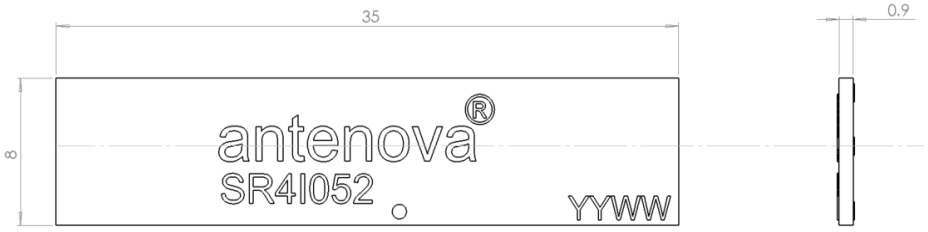
6.4.1. 863 MHz - 928 MHz

3D pattern at 902 MHz





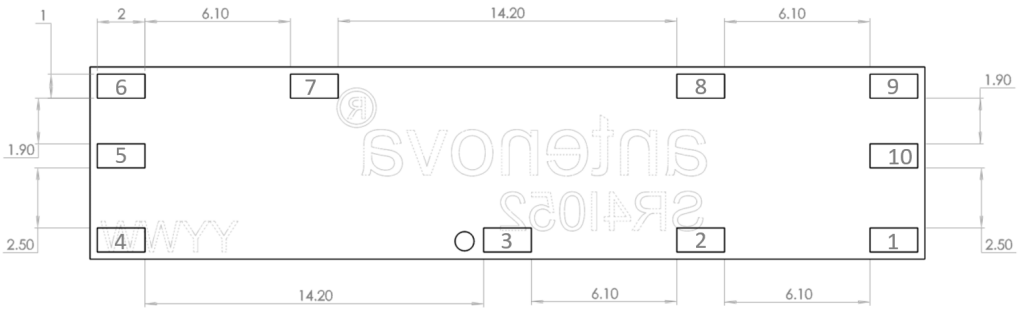
7. Antenna dimensions



Top view

L	W	H
35.0 ±05	8.0 ±0.1	0.9 ±0.1 -0.0

All dimensions in (mm)

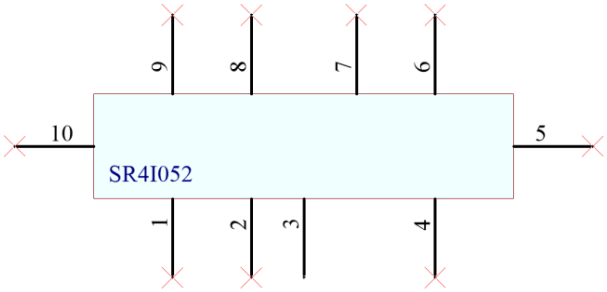


Bottom view

8. Schematic symbol and pin definition

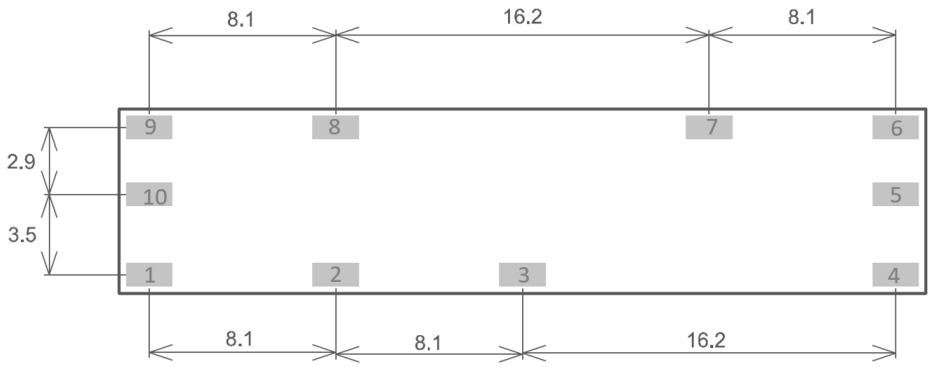
The circuit symbol for the antenna is shown below. The antenna has 10 pins and only Pin 3 is functional. All other pins are for mechanical strength.

Pin	Description
3	Feed
1,2,4,5,6,7,8,9,10	Not connected



9. Host PCB footprint

The recommended host PCB footprint is below.



10 SMD pads all 2.0 x 1.0 (mm)
All Dimensions in mm

10. Electrical interface

10.1. Transmission line

All transmission lines should be designed to have a characteristic impedance of 50Ω.

- The length of each transmission lines should be kept to a minimum
- All other parts of the RF system like transceivers, power amplifiers, etc, should also be designed to have a 50 Ω impedance

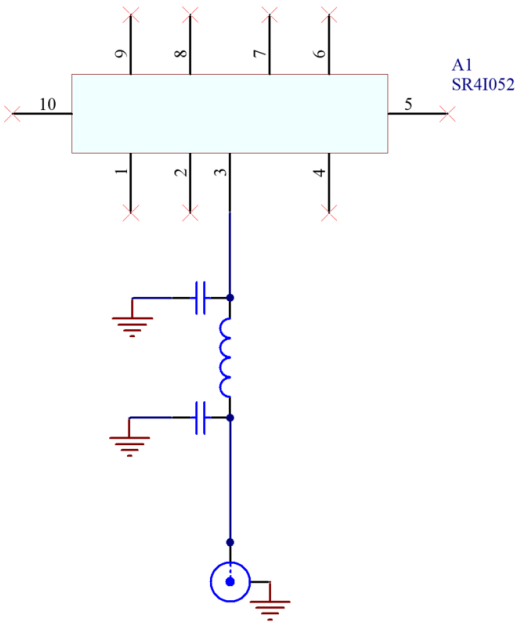
A co-planar transmission line can be designed using an online transmission line calculator tool, such as:

https://blog.antenova.com/rf-transmission-line-calculator

The PCB thickness, copper thickness and substrate dielectric constant are entered, then the tool calculates the transmission line width and gaps on either side of the track to give a 50 Ω impedance.

10.2. Matching circuit

The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to three components and the following circuit should be designed into the host PCB. Not all components may be required but should be included as a precaution. The matching network should be placed close to the antenna feed to ensure it is optionally effective in tuning the antenna.

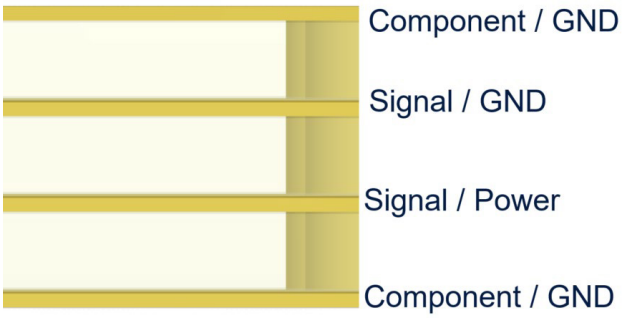


11. Antenna integration guide

We recommend the following during the design phase to maximise antenna performance and minimize noise:

- Minimum 4 layer PCB
- Route signals and power internally where possible
- Flood all layers with ground
- Knit ground on all layers together with plenty of vias

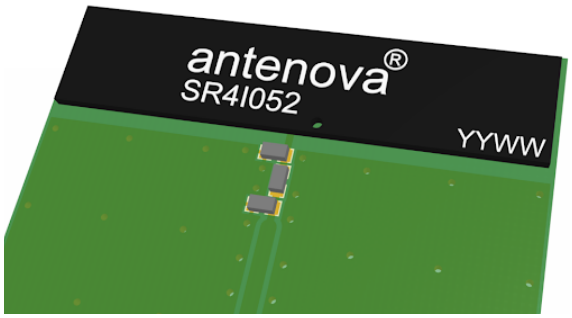
Follow placement guidance carefully. Antenova provide technical support to help you with your design, and also provide design assistance on PTCRB certification. Register for an account on https://ask.antenova.com/ to access technical support.



11.1. Antenna placement

Whatever the size of the host PCB, the best antenna position is placed on the shortest side of the host PCB.

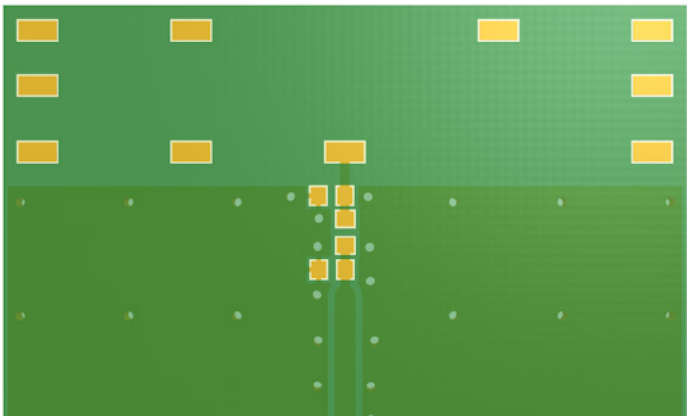
The Antenova placement tool can be used to advise on antenna placement, see: https://blog.antenova.com/intelligent-antenna-selection-and-placement-tool-antenova



11.2. Host PCB layout

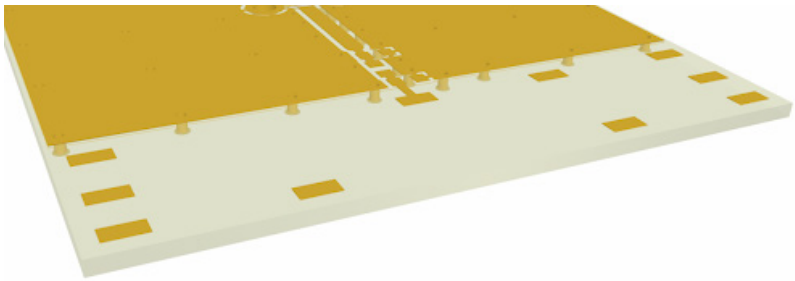
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.

The feed (Pin 3) connects to the matching circuit close to the antenna.

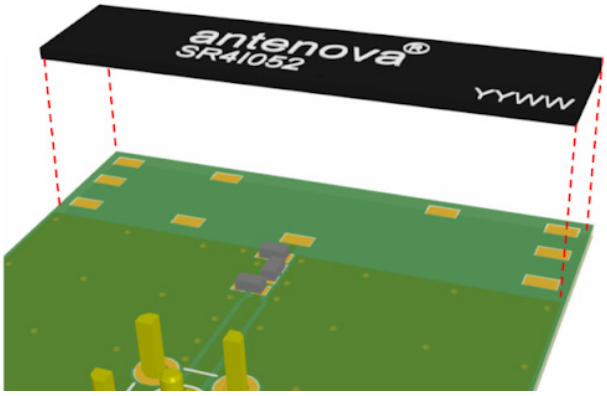


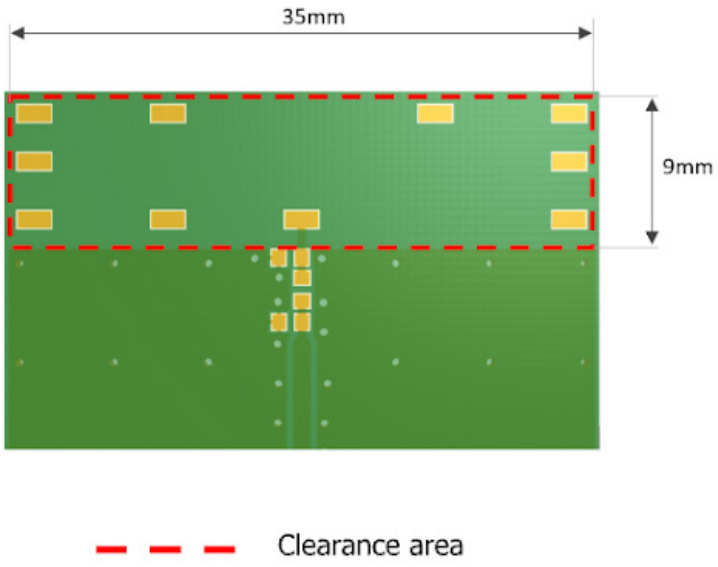
11.3. Host PCB clearance

The diagram below shows the antenna footprint and clearance through all layers on the PCB. Only the antenna pads and connections to feed are present within this clearance area. The clearance area required is 35.0 x 9.0 (mm). The solder mask is removed to show this more clearly.



The clear-out area is simply defined as the same size as the antenna, with a 1mm additional clearance below the antenna to the GND.





12. Reference board

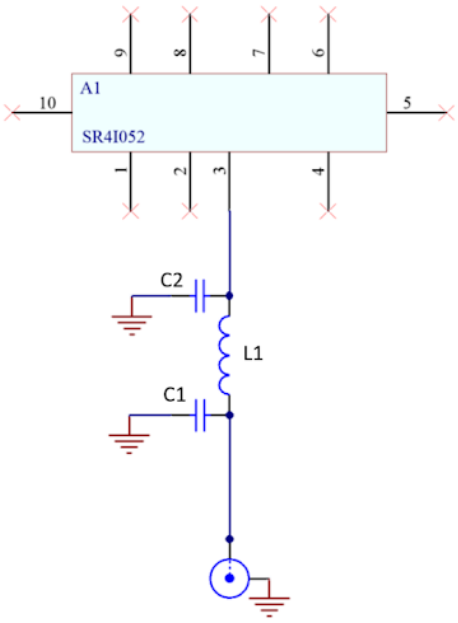
The reference board has been designed for the purpose of evaluating the SR4I052 antenna and includes a SMA female connector.(Part number: SR4I052-EVB-1).

To order a reference board please see antenova.com

12.1. Reference board matching circuit

The reference board has been designed for the purpose of evaluating the SR4I052 antenna and includes a SMA female connector.

Designator	Type	Value	Description
C1	Capacitor	3.9pF	Murata GJM15HN series
C2	Capacitor	DNP	Not fitted
L1	Inductor	4.3nH	Murata LQG15 series



13. Soldering

This antenna is suitable for lead free soldering. The reflow profile should be adjusted to suit the device, oven and solder paste, while observing the following conditions:

- For leaded soldering, the maximum temperature should not exceed 240 °C.
- For lead free soldering, a maximum temperature of 255 °C for no more than 20 seconds is permitted.
- The antenna should not be exposed to temperatures exceeding 120 °C more than 3 times during the soldering process.

14. Hazardous material regulation conformance

The antenna has been tested to conform to RoHS and REACH requirements. A certificate of conformance is available from Antenova's website.

15. Packaging

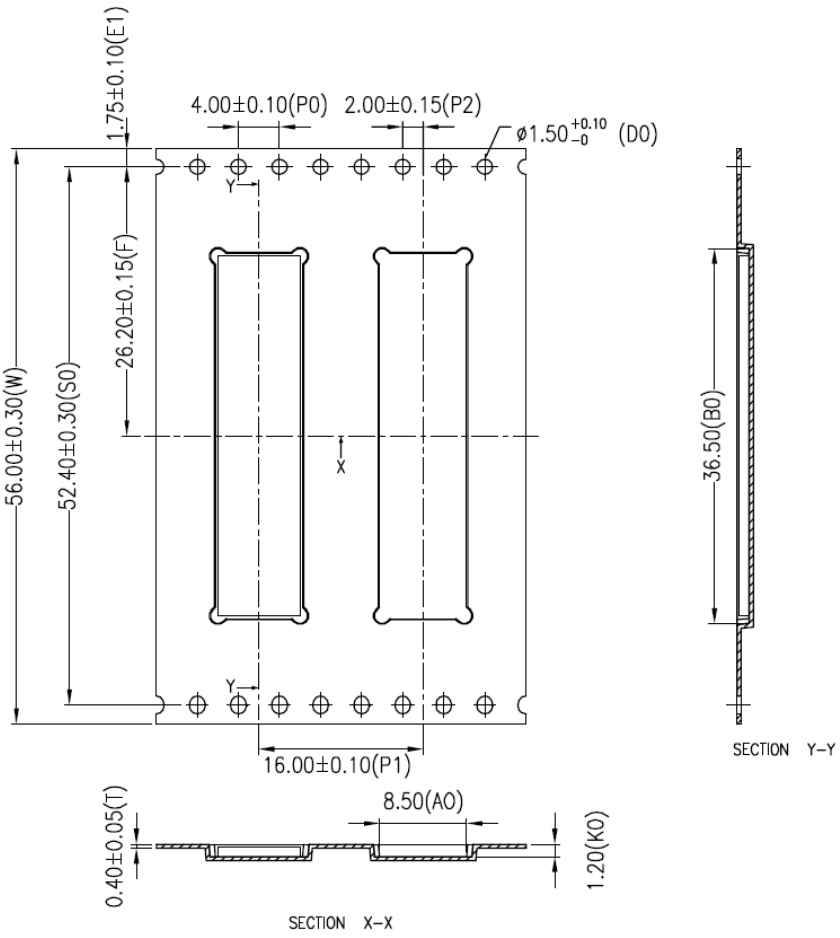
15.1. Optimal storage conditions

Temperature	-10°C to 40°C
Humitidy	Less than 75% RH
Shelf life	24 Months
Storage place	Away from corrosive gas and direct sunlight
Packaging	Reels should be stored in unopened sealed manufacturer's plastic packaging.

Note: Storage of open reels of antennas is not recommended due to possible oxidization of pads on antennas. If short term storage is necessary, then it is highly recommended that the bag containing the antenna reel is re-sealed and stored in conditions as described in the table above.

The shelf life of the antenna is 2 years provided the factory seal on the package has not been broken.

15.2. Tape characteristics

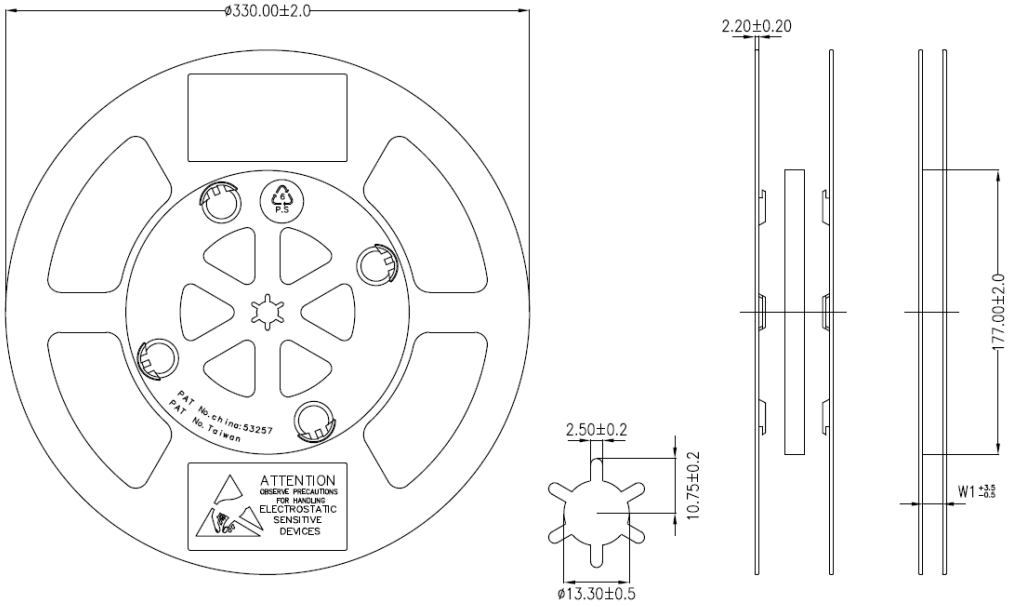


Ko	Ao	Bo	P0	P1	P2
1.20	8.5 ± 0.1	36.5 ± 0.1	4.00 ± 0.1	16.00 ± 0.1	2.00 ± 0.15

E1	F	W
1.75 ± 0.1	26.2 ± 0.15	56.00 ± 0.3

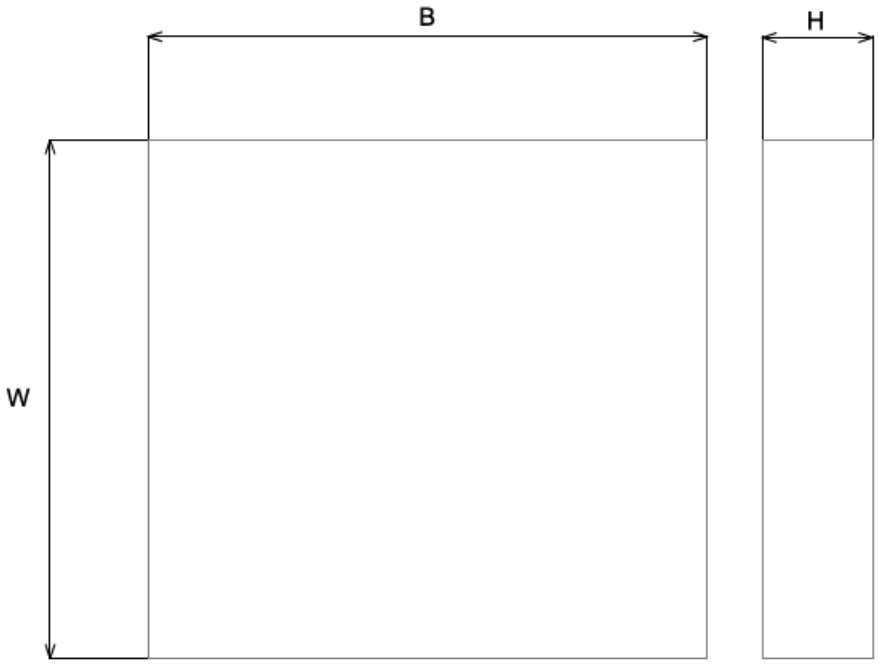
All dimensions in (mm)

15.3. Reel dimensions



A	W1
330.0 ± 2.0	56.5 + 0.35/-0.5

15.4. Box dimensions

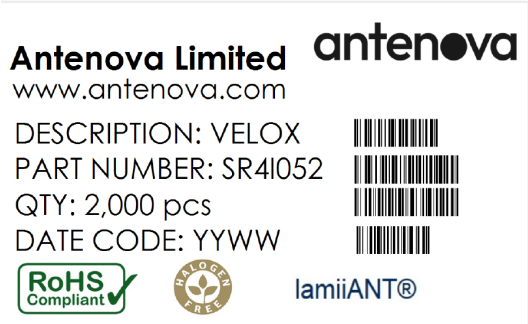


Width (W)	Breadth (B)	Thickness (H)
358mm	350mm	73mm

15.5. Bag properties

Reels are supplied in protective plastic packaging.

15.6. Reel label information



Quality statements

Antenova's products conform to REACH and RoHS legislation. For our statements regarding these and other quality standards, please see antenova.com.

Datasheet version

2.01 release Dec 25th 2024

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Antenna design, integration and test resources

Product designers – the details contained in this datasheet will help you to complete your embedded antenna design. Please follow our technical advice carefully to obtain optimum antenna performance.

We aim to support our customers to create high performance wireless products. You will find a wealth of design resources, calculators and case studies to aid your design on our website.

Antenova's design laboratories are equipped with the latest antenna design tools and test chambers. We provide antenna design, test and technical integration services to help you complete your design and obtain the required certifications.

If you cannot find the antenna you require in our product range, please contact us to discuss creating a custom antenna to meet your exact requirements.

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