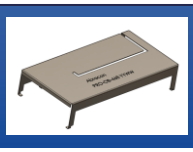
434 MHz or GSM/NB-IoT – Stamped Metal Antenna



PRO-OB-468

Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

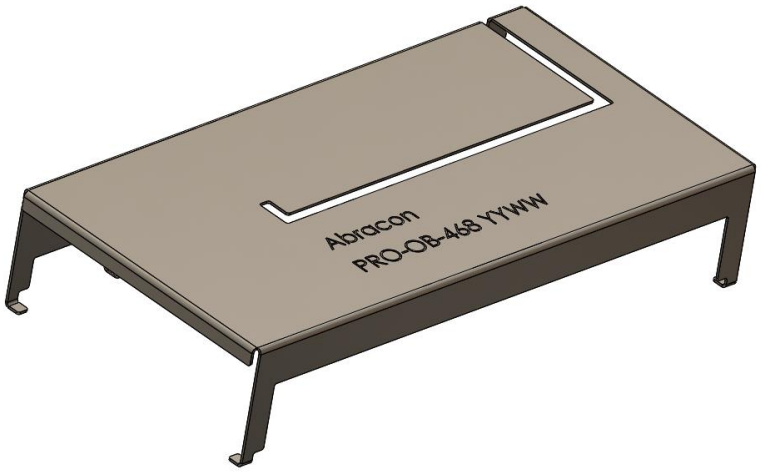
Features

- Supports 434 MHz or GSM/NB-IoT
  - Recommended alternative antenna for GSM/NB-IoT applications: PRO-OB-572
- Mixed Linear Polarization
- Surface Mount
- Durable-Shelf life of up to 10 years
- Two different evaluation boards available:
  - “SMD 434” for 434 MHz
  - “SMD GSM/NB-IoT” for 824-960 + 1710-2170 MHz

Applications

- 2G/3G/GSM/UMTS Applications
- IoT
  - Industrial
  - Medical / Telemetry
  - Consumer
- M2M
- Metering
- Alarms
- Wireless Remote Control

Product Image



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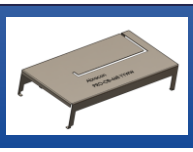

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Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

Electrical Specification

Parameter	Specification			Unit
	SMD 434	SMD GSM/NB-IoT		
Operating Frequency	433 - 435	824 - 960	1710 - 2170	MHz
Return Loss	< -9.1	< -7.3	< -6.2	dB
Polarization	Mixed Linear			
Peak Gain	2.8	3.3	4.9	dBi
Efficiency	> -5.4 (29)	> -2.3 (59)	> -2.4 (58)	dB (%)
Impedance	50			Ω

Note: All measurements were conducted on the evaluation boards in free space. Performance will vary depending on the ground plane, application, and environment.

Mechanical Specification

Parameter	Specification
Antenna Dimensions	49.93 x 24.97 x 10.00 mm
Evaluation Board PCB Dimensions	120 x 52 x 0.8 mm
Mounting Type	Surface Mount

Environmental Specification

Parameter	Specification
Operating Temperature	-40°C to +125°C
Storage Temperature	
Maximum Temperature	400°C
RoHS Compliance	Yes Compliant with EU directive 2011/65/EU and 2015/863
Shelf life	10 years
MSL	Level 1, unlimited

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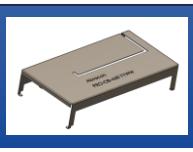

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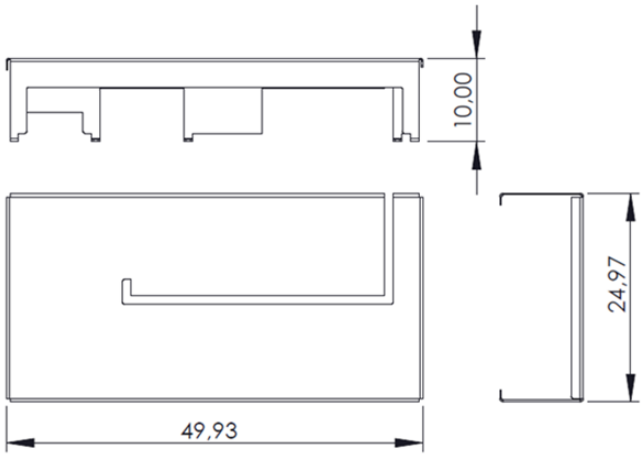
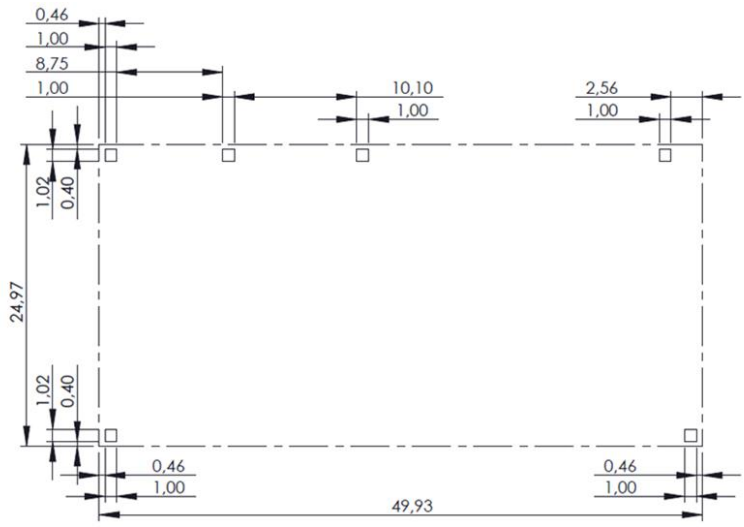
49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

Product Dimension



Unit : mm

Antenna pins and keep-out block



Unit : mm

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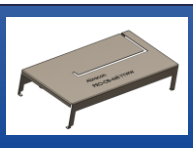


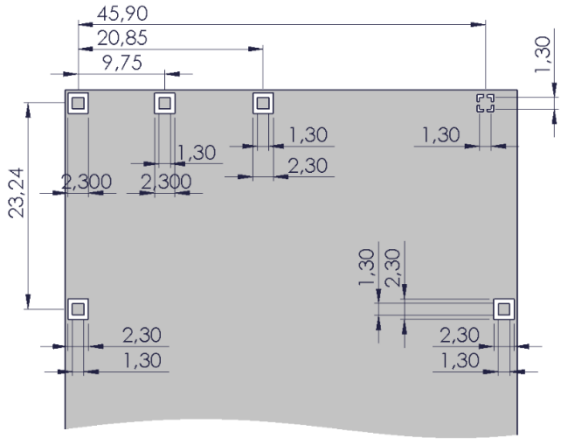
PRO-OB-468

Request Samples | Check Inventory

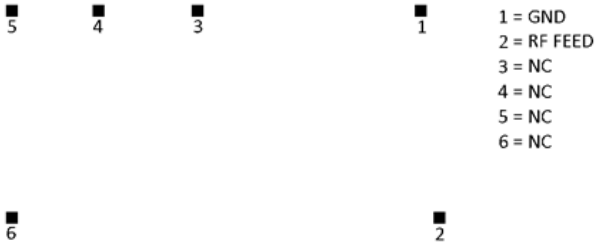
49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

SMD 434 - PCB layout and antenna pin numbering

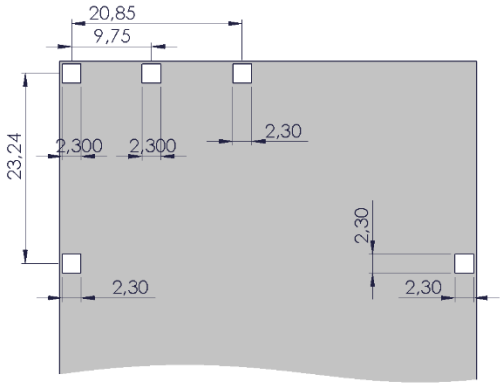
The antenna uses PIFA technology and should thus be mounted on a ground plane. If there are several layers in the PCB, there is an advantage to add vias for smooth interconnection of the ground areas to avoid splits in the ground plane. It is also important that there is a ground clearance around the NC pads and the RF feed pad, through all layers of the PCB. It is recommended to implement a matching network to optimize the antenna impedance in your application. The components can be positioned under the antenna. See recommendations in the figures below.



PCB Layout (from evaluation board)



Pin configuration



Clarance through all layers

Unit: mm

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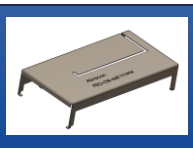

PRO-OB-468

Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

SMD GSM/NB-IoT - PCB layout and antenna pin numbering

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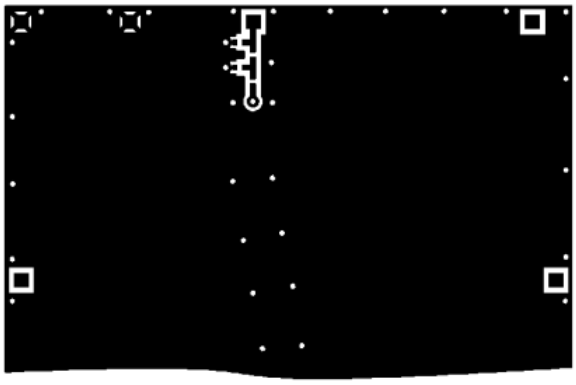
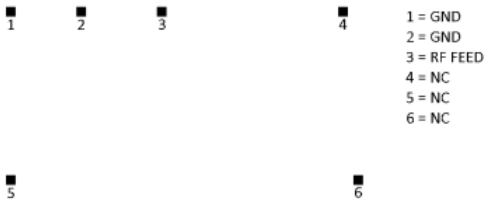
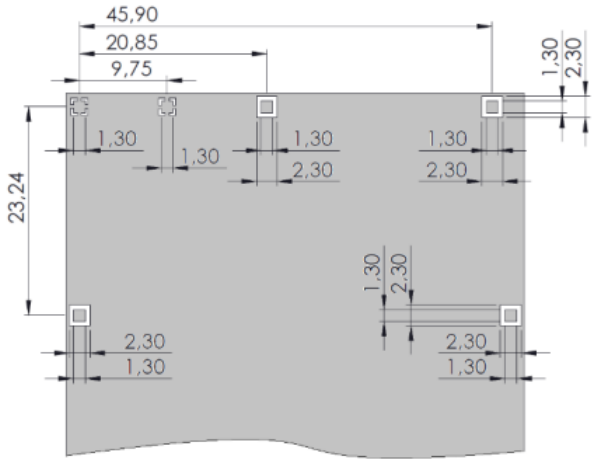
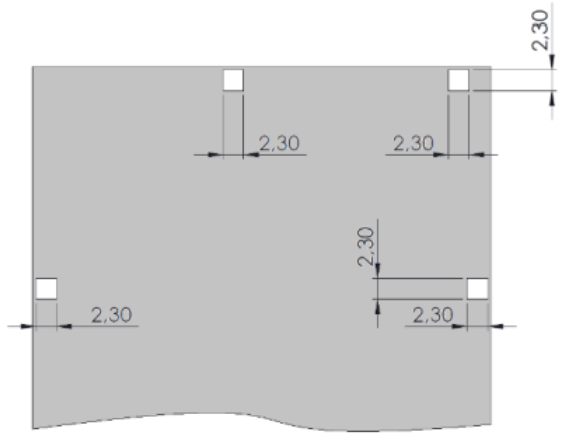


PCB Layout (from evaluation board)



Pin configuration





Clearance through all layers

Unit: mm

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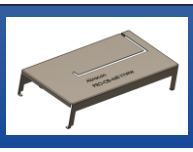

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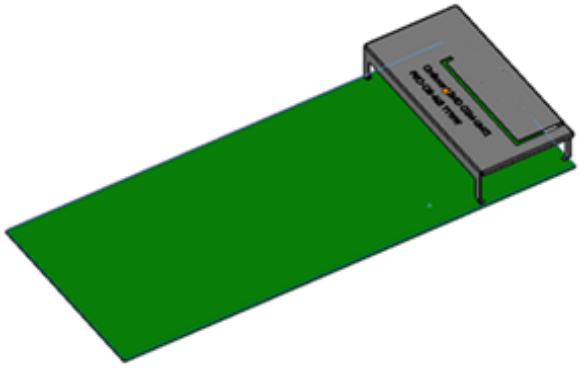
Request Samples Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

Measurement Setup

The antenna measurements were all done in free space with the evaluation boards (both PCB's have a size of 120 x 52 mm).



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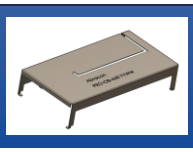

PRO-OB-468

Request Samples | Check Inventory

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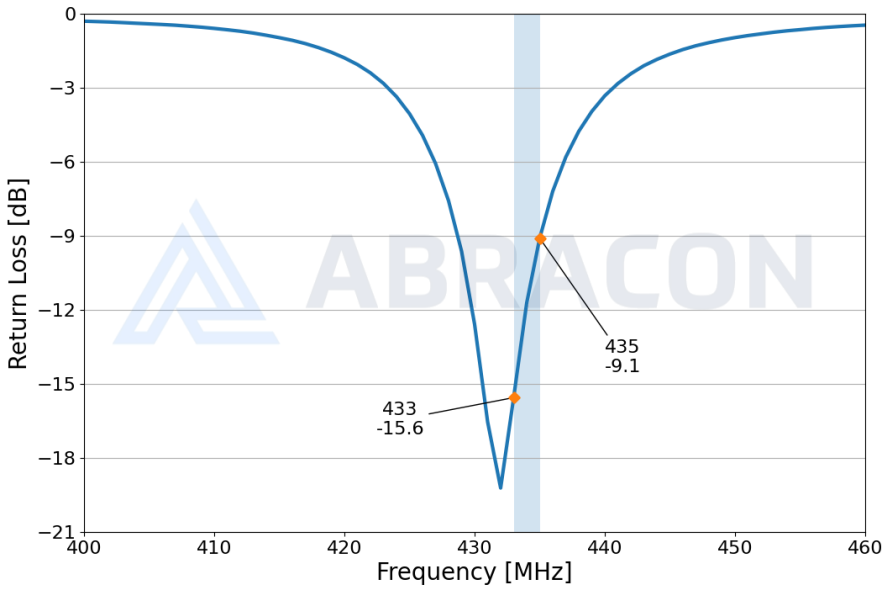
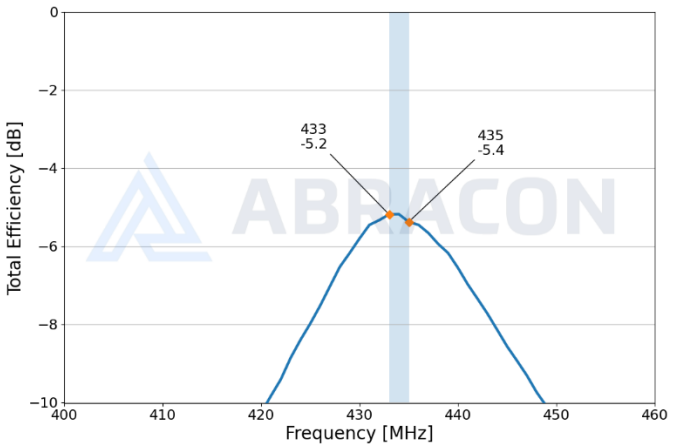
RoHS/RoHS II Compliant
MSL Level = 1

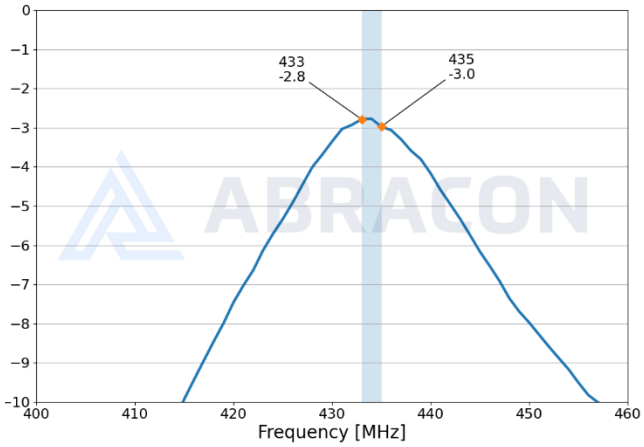
SMD 434 – Return Loss



SMD 434 – Total Efficiency



SMD 434 – Maximum Gain



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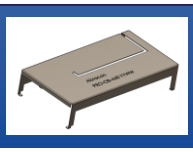

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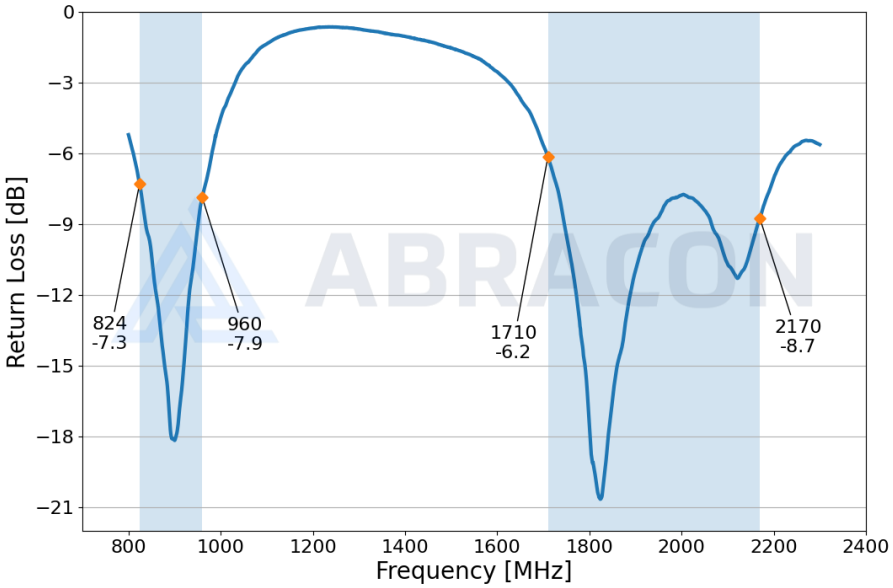
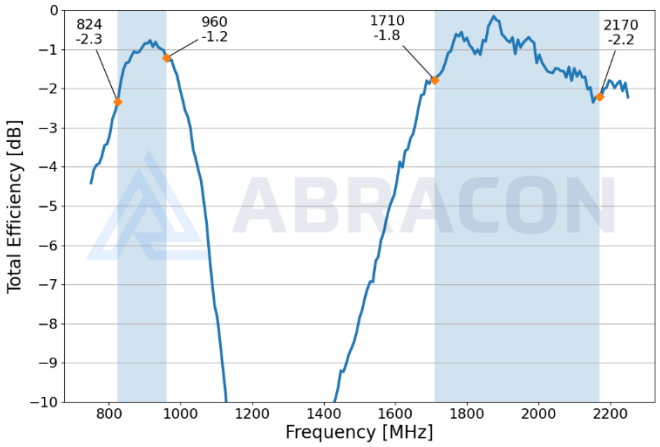
RoHS/RoHS II Compliant
MSL Level = 1

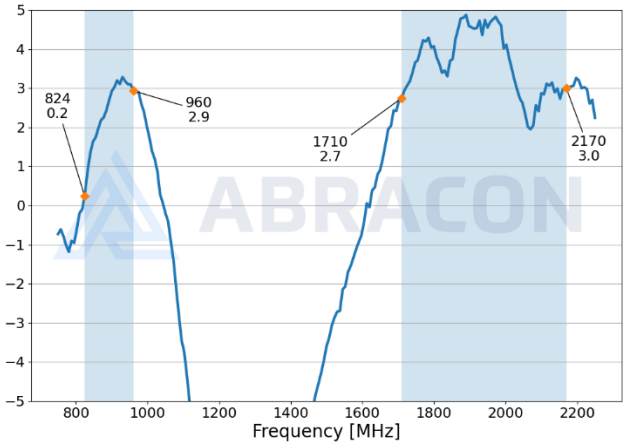
SMD GSM/NB-IoT – Return Loss



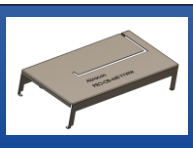
SMD GSM/NB-IoT – Total Efficiency



SMD GSM/NB-IoT – Maximum Gain



434 MHz or GSM/NB-IoT – Stamped Metal Antenna



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Request Samples | Check Inventory

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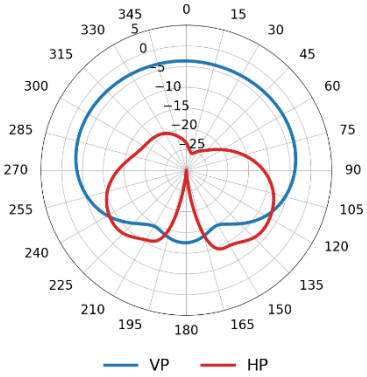
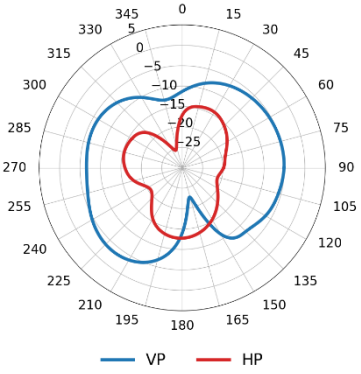
RoHS/RoHS II Compliant
MSL Level = 1

SMD 434 - Radiation Characteristics – 2D Pattern (433 MHz)

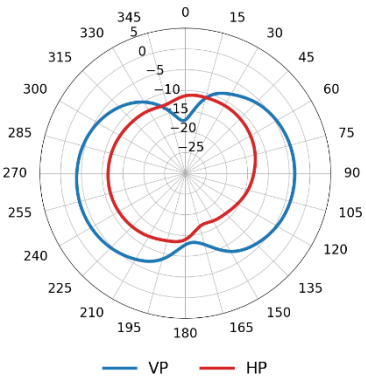
H

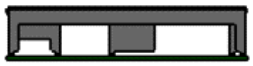


V0



V90





VP: Vertical Polarization
HP: Horisontal Polarization

Unit: dBi

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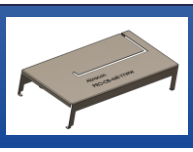

PRO-OB-468

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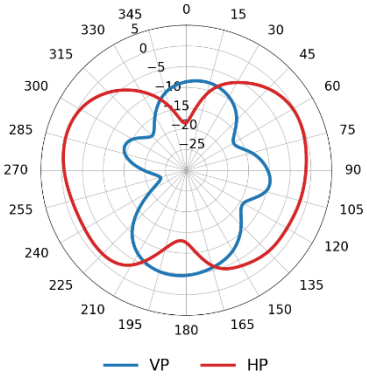
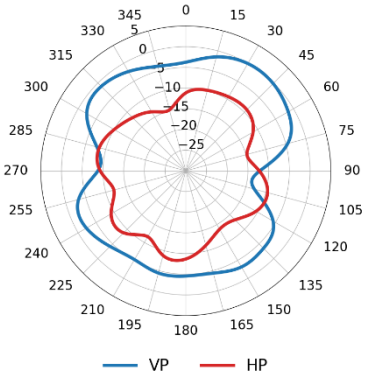
RoHS/RoHS II Compliant
MSL Level = 1

SMD GSM/NB-IoT - Radiation Characteristics – 2D Pattern (824 MHz)

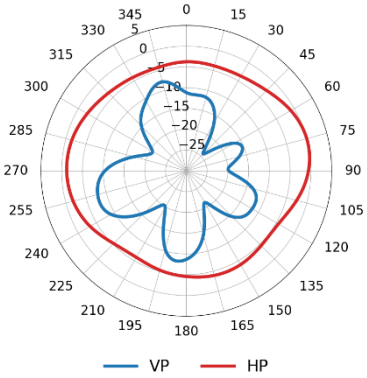
H

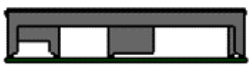


V0



V90





VP: Vertical Polarization
HP: Horisontal Polarization

Unit: dBi

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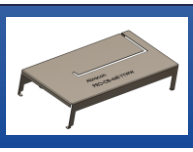


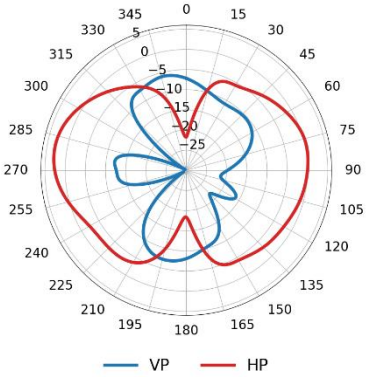
PRO-OB-468

Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

SMD GSM/NB-IoT - Radiation Characteristics – 2D Pattern (960 MHz)

H



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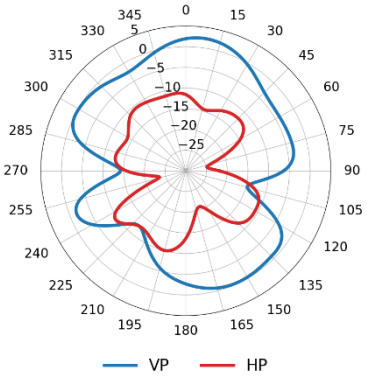
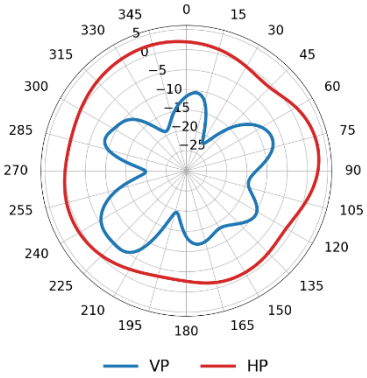


V90



VP: Vertical Polarization
HP: Horisontal Polarization

Unit: dBi

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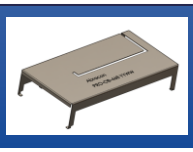


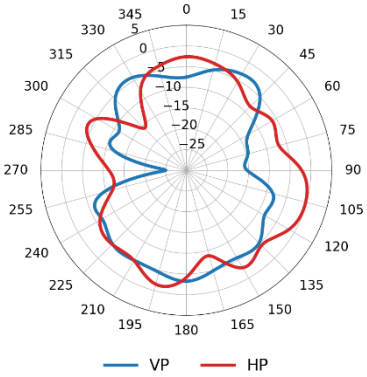
PRO-OB-468

Request Samples | Check Inventory

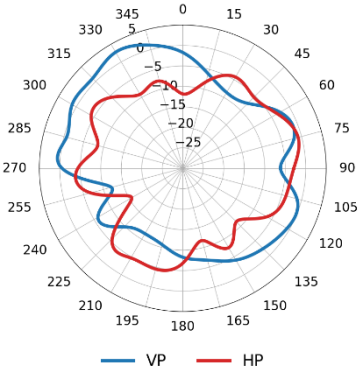
49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

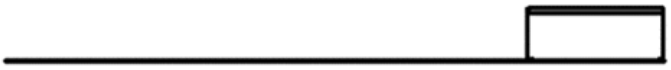
SMD GSM/NB-IoT - Radiation Characteristics – 2D Pattern (1710 MHz)

H

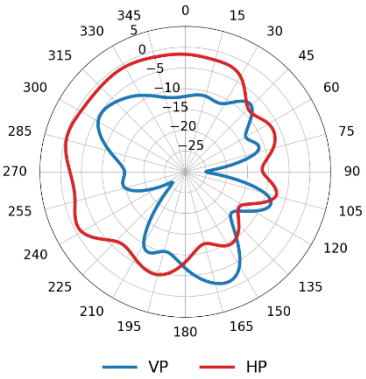


V0





V90



VP: Vertical Polarization
HP: Horisontal Polarization

Unit: dBi

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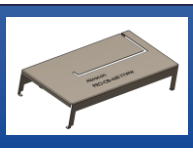
434 MHz or GSM/NB-IoT – Stamped Metal Antenna



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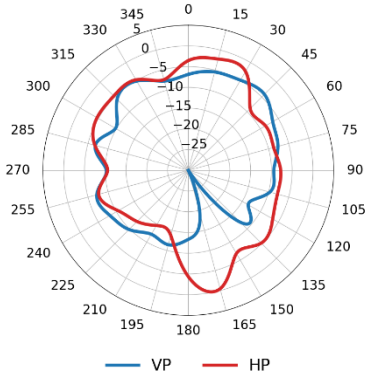
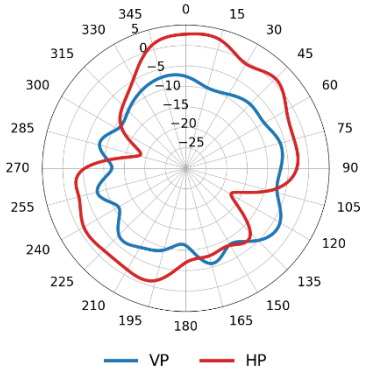
49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

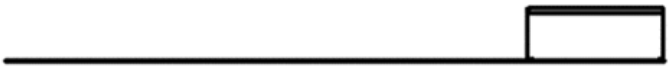
SMD GSM/NB-IoT - Radiation Characteristics – 2D Pattern (2170 MHz)

H

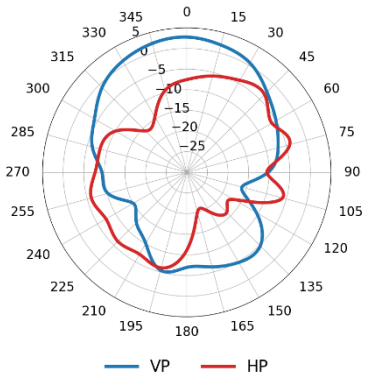


V0





V90



VP: Vertical Polarization
HP: Horisontal Polarization

Unit: dBi

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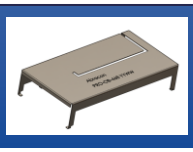

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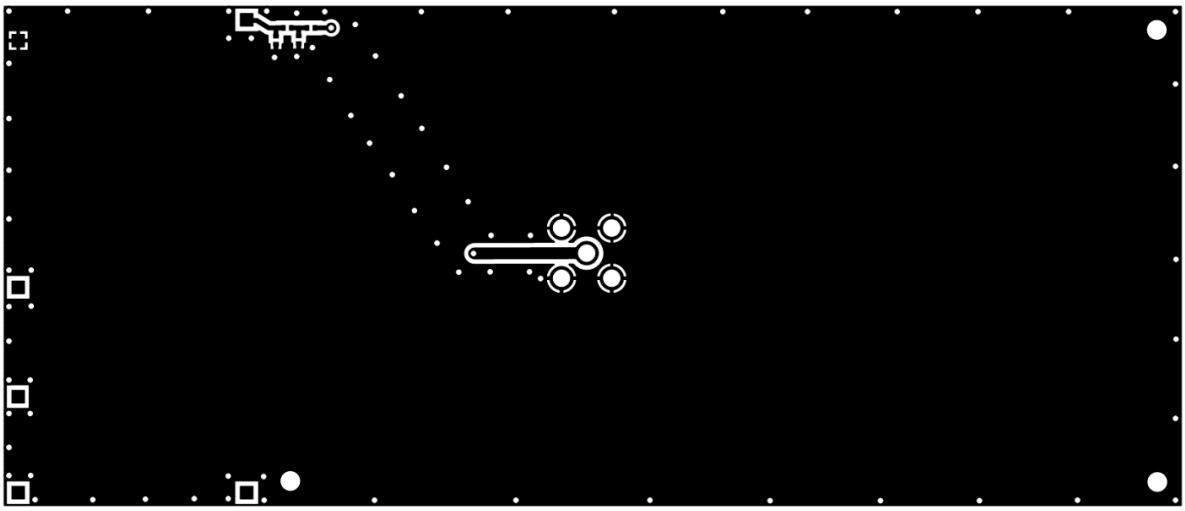
Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

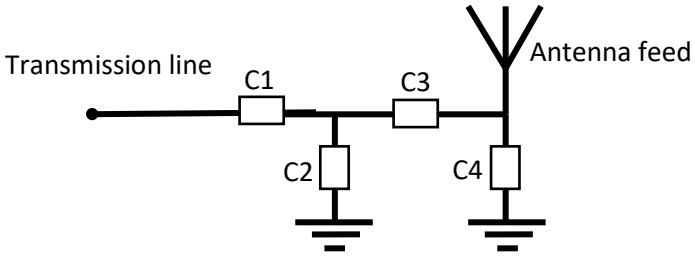
SMD 434 - Evaluation Board Outline & Matching Circuit

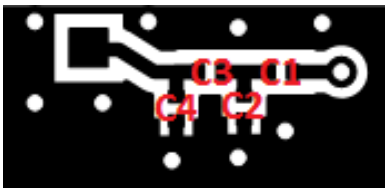
The evaluation board is developed to simplify antenna testing and evaluation. It has an arbitrary size of 120 x 52 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Evaluation board outline

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.





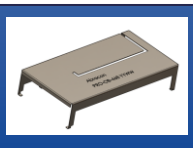
Matching circuit

The antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at the 434 MHz frequency band. The component values for this setup are:

C1 = 2.2 nH (Murata LQW15AN2N2C10D)
C2 = 11 nH (Murata LQW15AN11NG00D)
C3 = 2.2pF (Murata GJM1555C1H2R2WB01)
C4 = Not Mounted

However, it is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed with other values/components/brands for compensation of such effects. This is further described in the General Implementation Guidelines section below.

434 MHz or GSM/NB-IoT – Stamped Metal Antenna



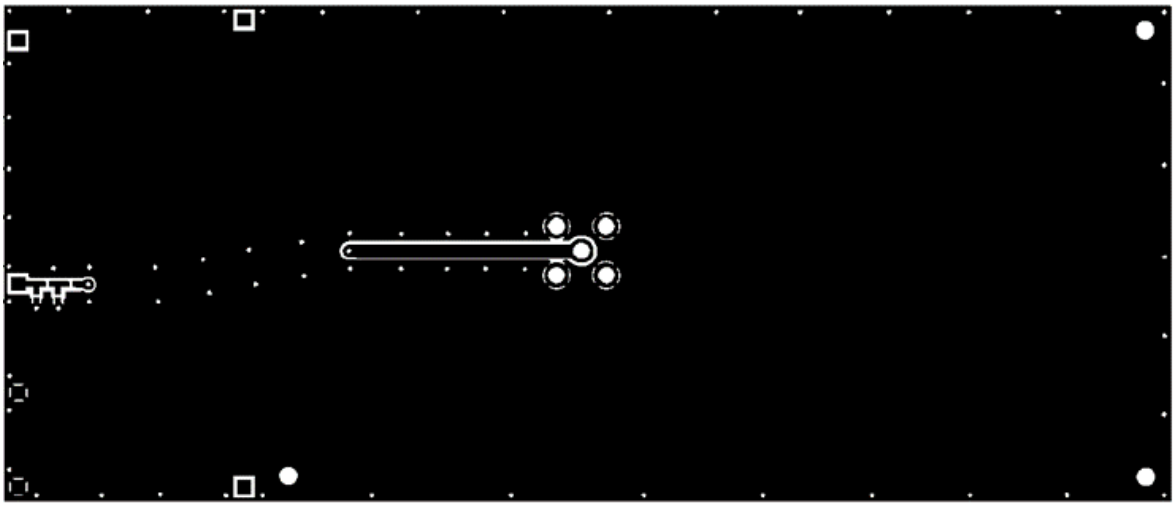
PRO-OB-468

Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

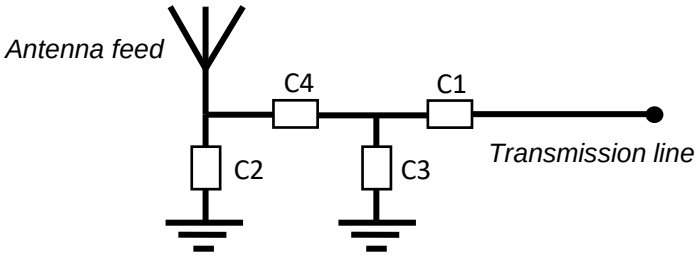
SMD GSM/NB-IoT - Evaluation Board Outline & Matching Circuit

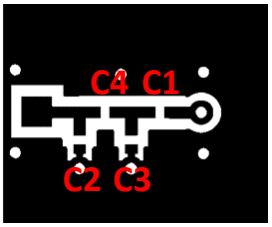
The evaluation board is developed to simplify antenna testing and evaluation. It has an arbitrary size of 120 x 52 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Evaluation board outline

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.





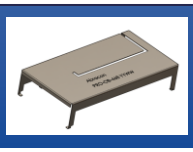
Matching circuit

The antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at the GSM/UMTS frequency bands using the following (can be replaced by equivalent):

C1 = 2.4nH (Murata LQW15AN2N4B00)
C2 = Not Mounted
C3 = 0.5pF (Murata GJM1555C1HR50WB01)
C4 = 5.6pF (Murata GJM1555C1H5R6WB01)

However, it is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed with other values/components/brands for compensation of such effects. This is further described in the General Implementation Guidelines section below.

434 MHz or GSM/NB-IoT – Stamped Metal Antenna



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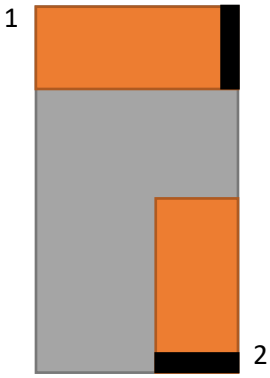
Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

SMD 434 - General Implementation Guidelines

The antenna can be positioned in different ways, although there are some positions which are more beneficial. Below picture shows a typical PCB with two possible antenna positions.



▬ = *feed section (pin 1 & pin 2)*

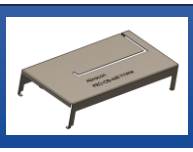
The antenna should be aligned with the PCB edge if possible. It is also important to align pin 1, 2, 3 and 4 along the outer side of the PCB, and even more preferably close to a corner.

The antenna enables that small electrical components are mounted inside the antenna keep-out block. This is a space-efficient solution which has very little influence on the performance. It may have an impact on the antenna tuning, but is fully possible if there is limited space on the PCB.

Another general aspect on surface mounted antennas is regarding the PCB population. If other electrical components are positioned in the surrounding area of the antenna, some impact on the antenna tuning and radiated performance may be expected. It is recommended that such components are distributed below a topographical slope that starts on PCB level at the antenna keep-out block, and slowly increases the height.

It shall also be highlighted that plastic and metal parts in the near proximity of antennas may influence the antenna tuning and/or performance. This aspect should be noted as a general guideline for all antennas. The effects are difficult to estimate without detailed information, but it is common that a plastic housing above the antenna shifts the resonant frequency down. It is recommended to measure the antenna in the actual device after implementation.

434 MHz or GSM/NB-IoT – Stamped Metal Antenna



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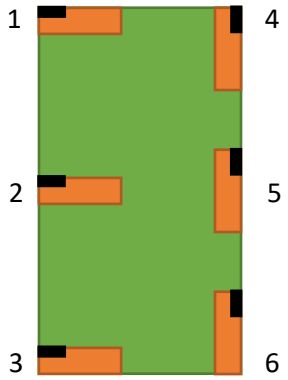
Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

SMD GSM/NB-IoT - General Implementation Guidelines

The antenna can be positioned in different ways, although there are some positions which are more beneficial. Below picture shows a typical PCB with examples on different antenna positions. The optimal position is option 1 or 4.



= *GND pin(s)*

Optimal

1 & 4
3
6
2 & 5

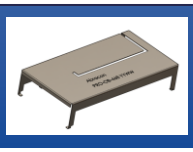
The antenna should be aligned with the PCB edge if possible, preferably with the GND pin(s) close to a corner.

The antenna enables that small electrical components are mounted inside the antenna keep-out block. This is a space-efficient solution which has very little influence on the performance. It may have an impact on the antenna tuning, but is fully possible if there is limited space on the PCB.

Another general aspect on surface mounted antennas is regarding the PCB population. If other electrical components are positioned in the surrounding area of the antenna, some impact on the antenna tuning and radiated performance may be expected. It is recommended that such components are distributed below a topographical slope that starts on PCB level at the antenna keep-out block, and slowly increases the height.

It shall also be highlighted that plastic and metal parts in the near proximity of antennas may influence the antenna tuning and/or performance. This aspect should be noted as a general guideline for all antennas. The effects are difficult to estimate without detailed information, but it is common that a plastic housing above the antenna shifts the resonant frequency down. It is recommended to measure the antenna in the actual device after implementation.

434 MHz or GSM/NB-IoT – Stamped Metal Antenna



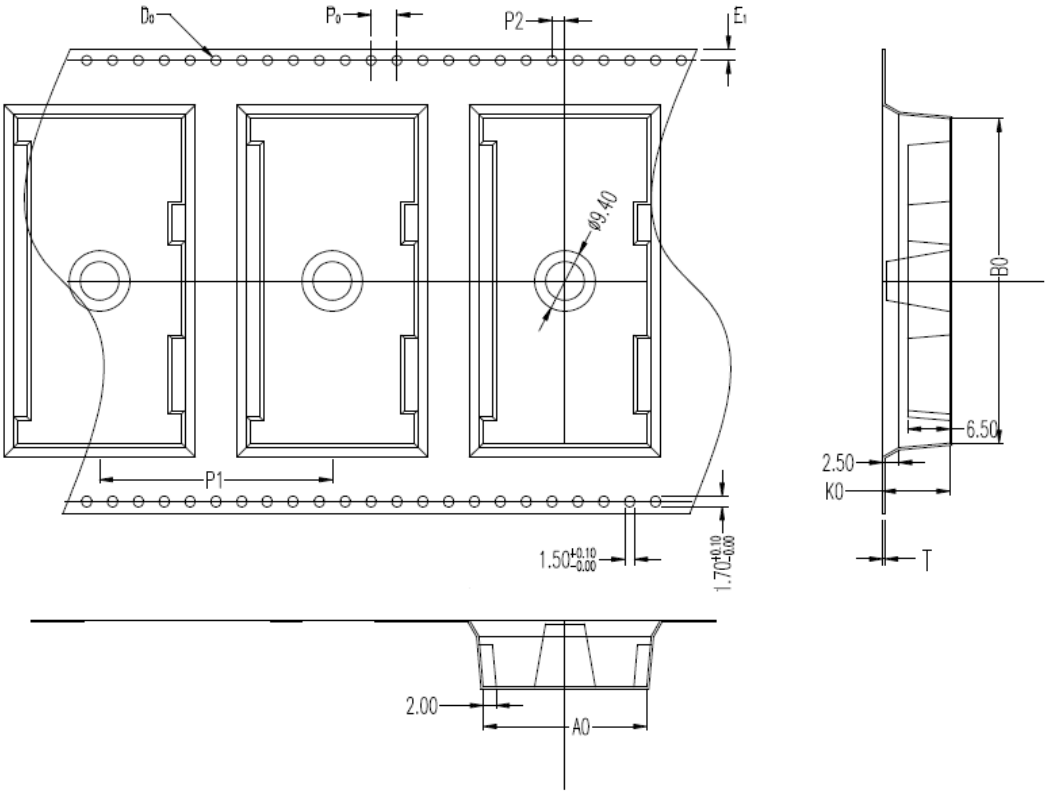
PRO-OB-468

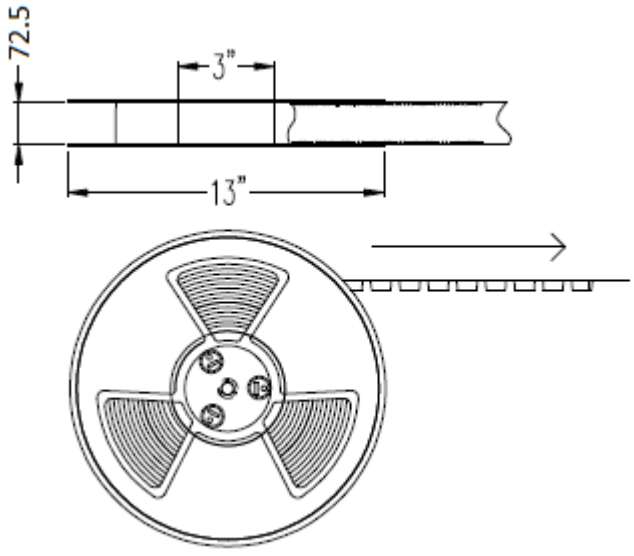
Request Samples | Check Inventory

49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

Packaging

The antenna is delivered on tape and reel according to following specifications. The quantity per 13” reel is 100 pcs.





A_0	25.3 ±0.1
B_0	50.3 ±0.1
D_0	ø1.5 $^{+0.10}_{-0.00}$
E_1	1.75 ±0.1
F	26.2 ±0.15
K_0	10.4±0.1
P_0	4.0 ±0.1
P_1	12.0 ±0.1
P_2	2.0 ±0.15
S_0	
T	0.4 ±0.05
W	72.0 ±0.3

Unit: mm (unless otherwise noted)

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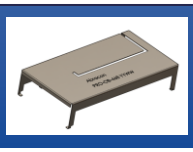

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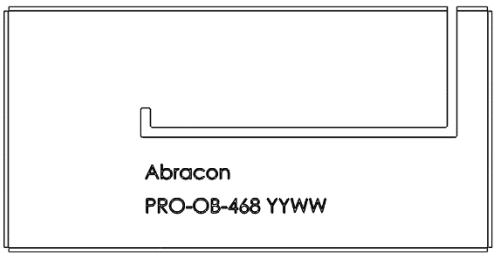
49.93 x 24.97 x 10 mm
RoHS/RoHS II Compliant
MSL Level = 1

Part Marking

The top marking of the antenna is arranged according to the following illustration.

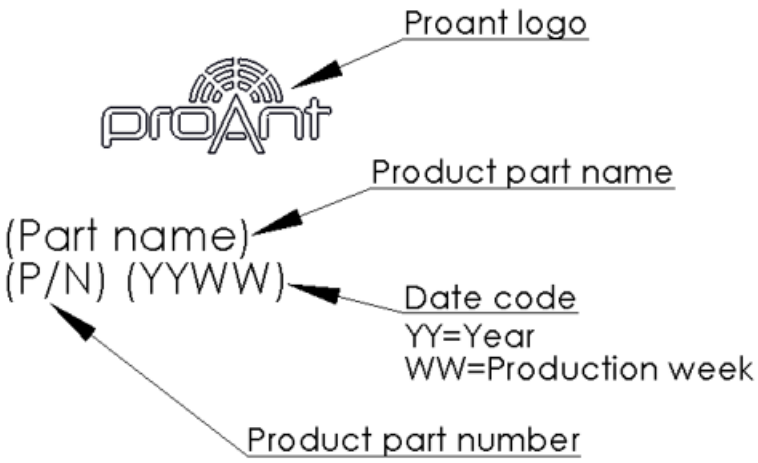
Abracon
PRO-OB-468
Product part number

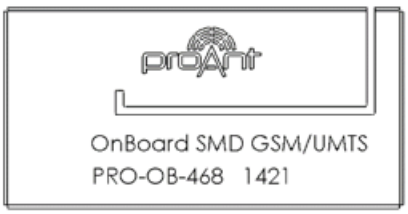
YYWW
Date code
YY=Year
WW=Week



Example top marking

There will be a transition period for the part marking until production batches after 2222 (YYWW). Produced batches before 2222 are marked according to the below illustration.





Example top marking

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