Pulse | LARSEN Antennas
A YAGEO Company

TECHNICAL DATA SHEET

**Description**: 1.575 GHz GNSS Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER: W3011**

## Features:

- Frequency 1559-1606.6MHz
- Gain 1 / 1.8 / 1.4dBi
- Size 3.2 x 1.6 x 1.1 mm
- PCB Keep out 4 x 4.25 mm
- Polarization Linear
- Radiation pattern Omni

## Applications:

- L1 GNSS Receivers
- Beidou, GPS, Galileo Glonass
- IoT, M2M
- Asset tracking
- Portable satellite receivers

All dimensions are in mm / inches

Issue: 2019

RoHS COMPLIANT



For more information:

Pulse Worldwide Headquarters
15255 Innovation Drive #100
San Diego, CA 92128
USA
Tel:1-858-674-8100

Pulse/Larsen Antennas
18110 SE 34th St Bldg 2 Suite 250
Vancouver, WA 98683
USA
Tel: 1-360-944-7551

Europe Headquarters
Pulse GmbH & Do, KG
Zeppelinstrasse 15
Herrenberg, Germany
Tel: 49 7032 7806 0

Pulse (Suzhou) Wireless Products Co, Inc.
99 Huo Ju Road(#29 Bldg,4th Phase
Suzhou New District
Jiangsu Province, Suzhou 215009 PR China
Tel: 86 512 6807 9998

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## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Antenna Type | Chip antenna |
| Frequency | 1559-1563MHz<br>1574.4-1576.4MHz<br>1598.6-1606.6MHz |
| Nominal Impedance | 50 Ω |
| Return Loss (Max) | -6 / -10 / -7 dB |
| Radiation Pattern | Omni |
| Gain(Min) | 1 / 1.8 / 1.4dBi |
| Efficiency(Min) | 50 / 68 / 60 % |
| Polarization | Vertical |
| Power Withstanding | 2W |

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| Compact size | 3.2 x 1.6 x 1.1mm |
| Weight | 0.033g |
| Fixing system | SMT |
| MSL(MOISTURE SENSITIVITY LEVEL) | 1 |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Operating Temperature | -40 ~ +85° C |
| Storage Temperature | -40 ~ +85° C |
| RoHS Compliant | Yes |




RoHS COMPLIANT

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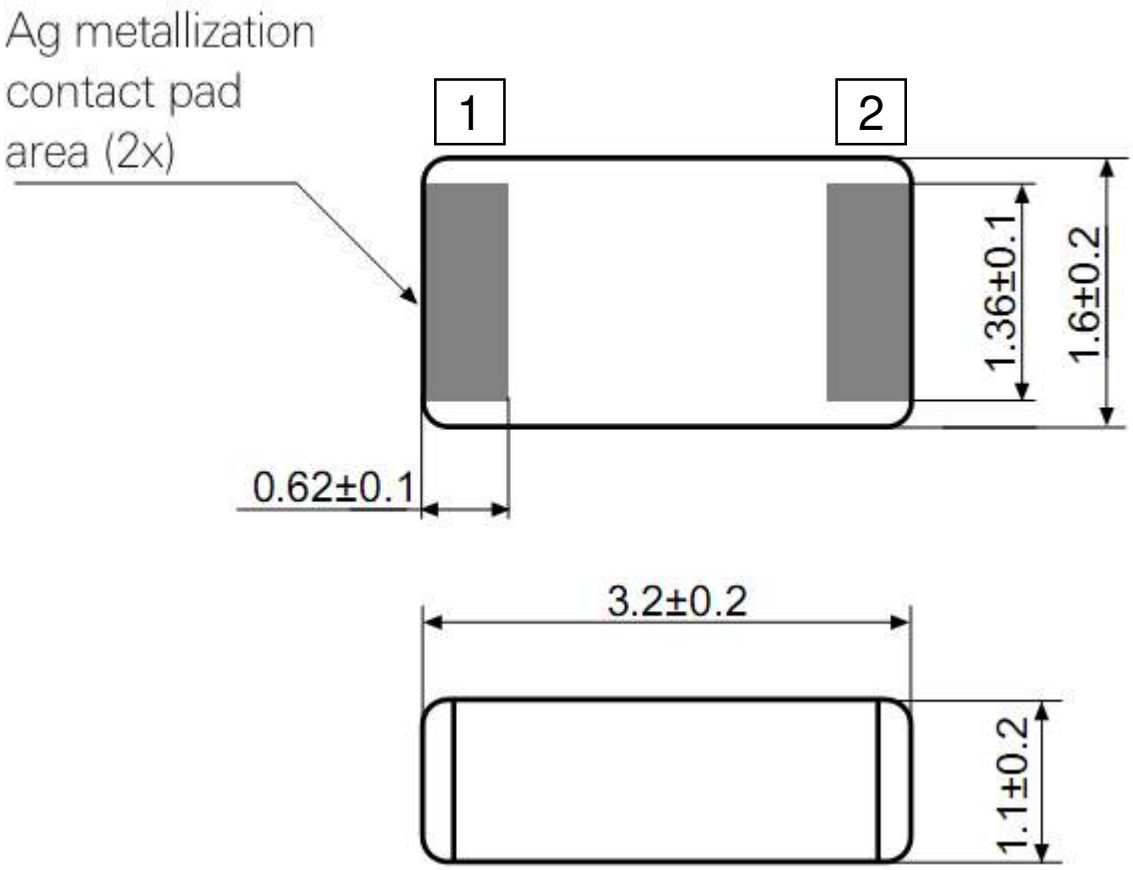
## MECHANICAL DRAWING




## Antenna features

| No. | Terminal name | Terminal Dimensions |
|---|---|---|
| 1 | Feed / GND | 0.62 x 1.36 mm |
| 2 | Feed / GND | 0.62 x 1.36 mm |

Antenna is symmetrical.
Either of terminals 1 or 2 can be feed / GND

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## W3011 GPS Antenna PWB Layout

Ground cleared under antenna, clearance area 4.00 x 4.25 mm
Matching and tuning component value and placement depend on application and surrounding mechanics / materials.

Feed line should be designed to match 50 Ω characteristic impedance, depending on PWB material and thickness.
Recommended test board layout for electrical characteristic measurement, test board outline size 80 x 37 mm.




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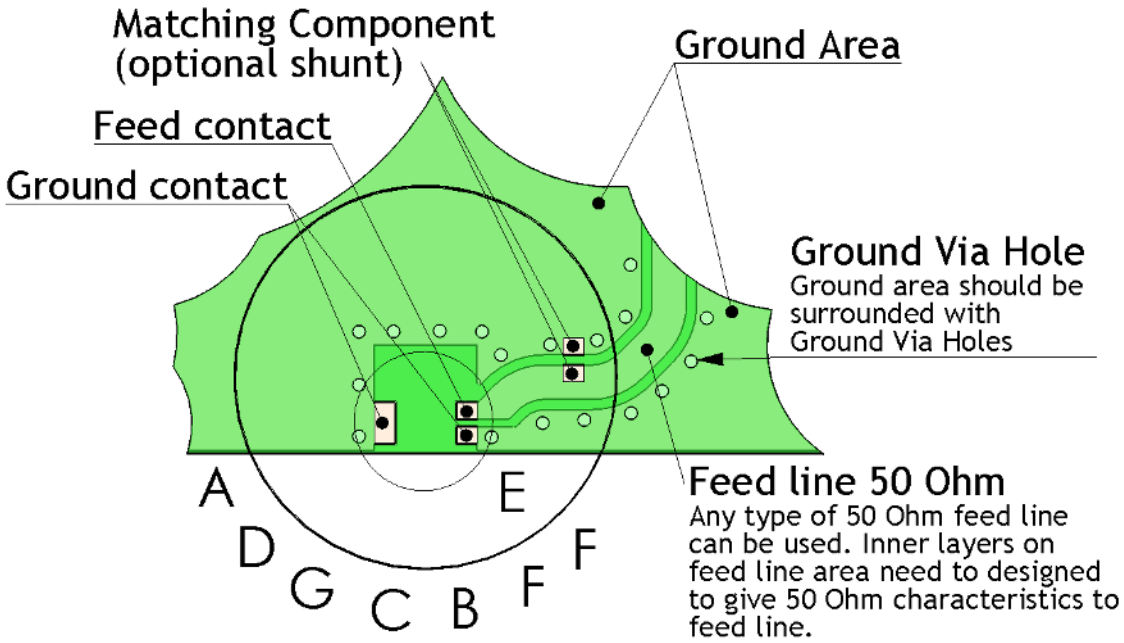
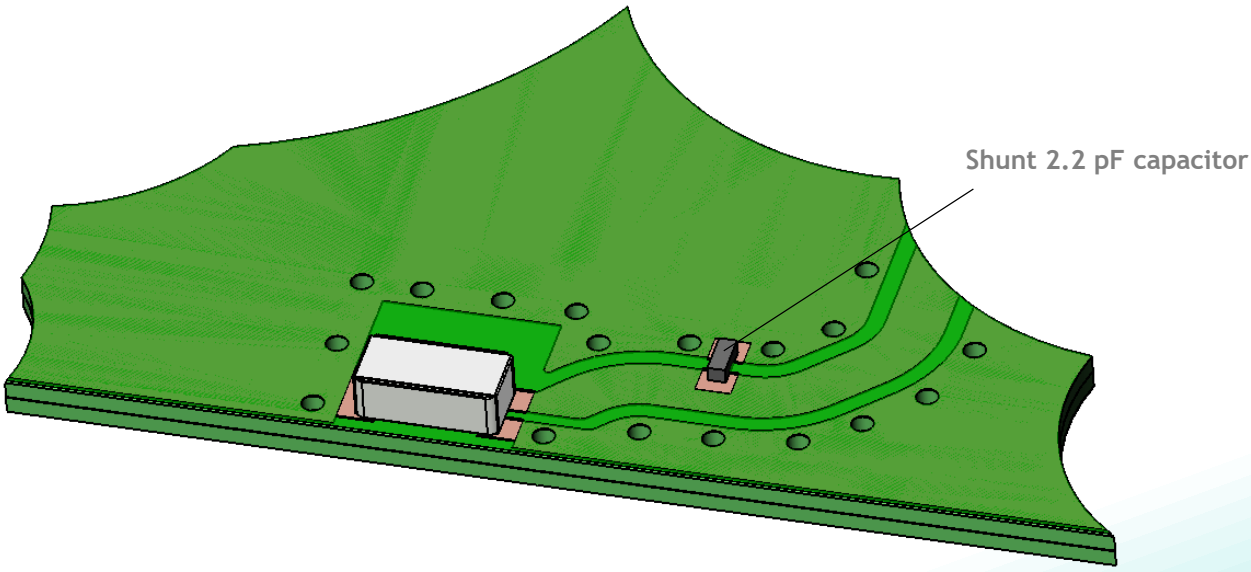
## *PWB layout for W3011 GPS Antenna*

**Note: All dimensions are in metric system.**








RoHS COMPLIANT

**Description**: 1.575 GHz GNSS Ceramic Chip Antenna

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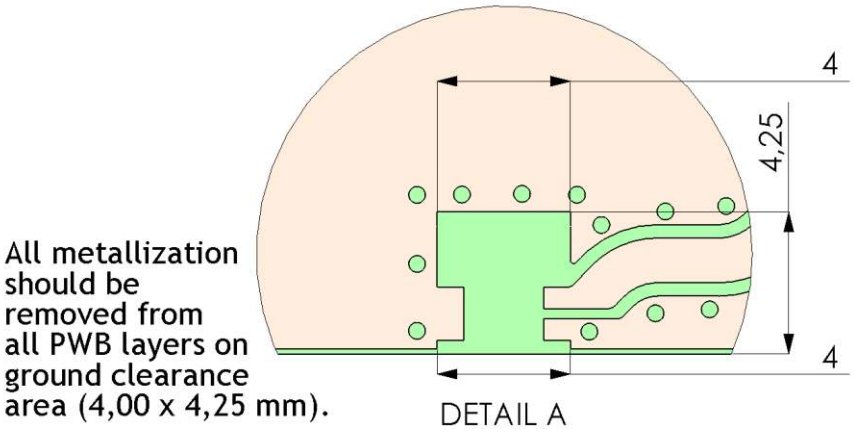
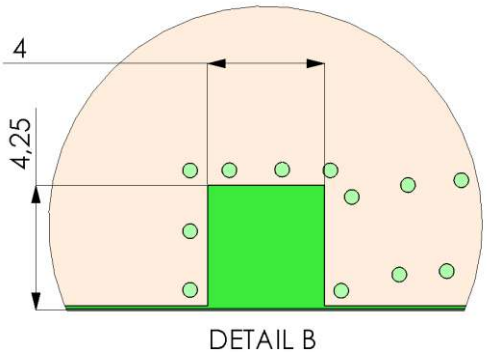
**PART NUMBER: W3011**

## Ground clearance area for W3011 GPS Antenna

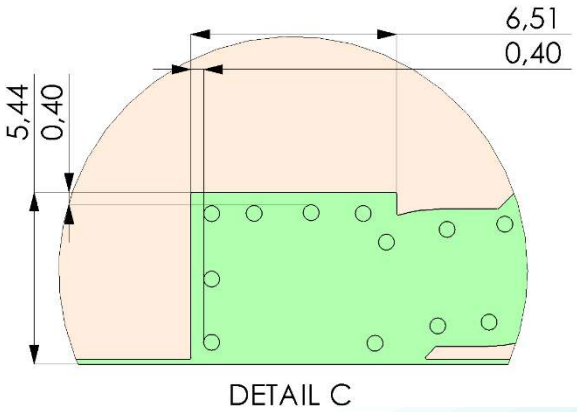
**Ground clearance area (4,00 x 4,25 mm)**




**Opening in bottom/inner ground layers**




**Opening in other layers (no ground/ RF)**








RoHS COMPLIANT

**Description**: 1.575 GHz GNSS Ceramic Chip Antenna

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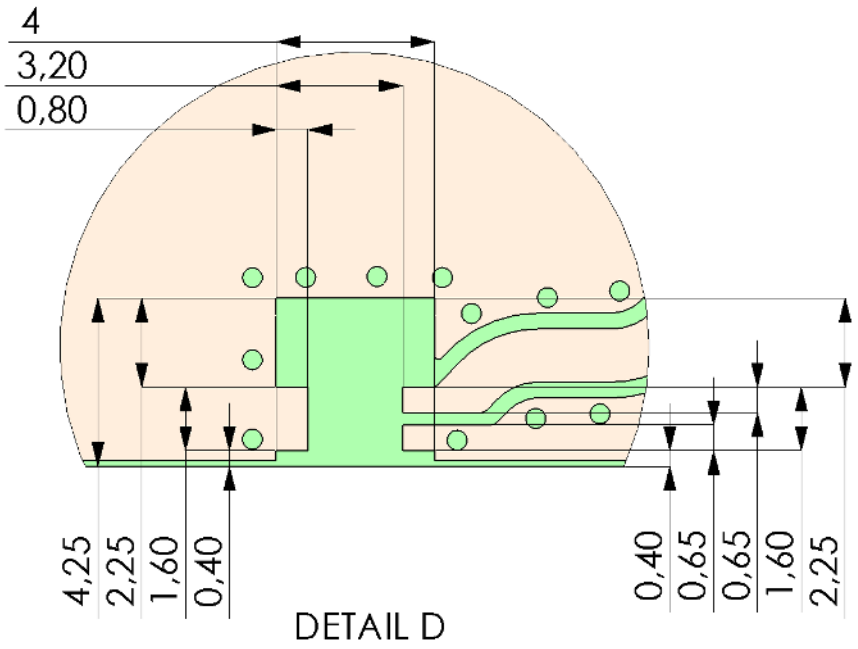
**PART NUMBER: W3011**

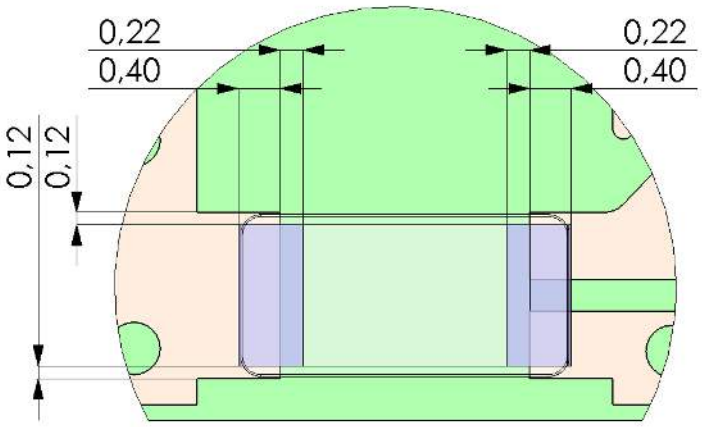
## PWB pad dimensions and antenna position for W3011 GPS Antenna

**Pad dimensions in top copper**




DETAIL D

**Antenna position on PWB layout**




Antenna pads are marked blue

DETAIL E





RoHS COMPLIANT

**Description**: 1.575 GHz GNSS Ceramic Chip Antenna

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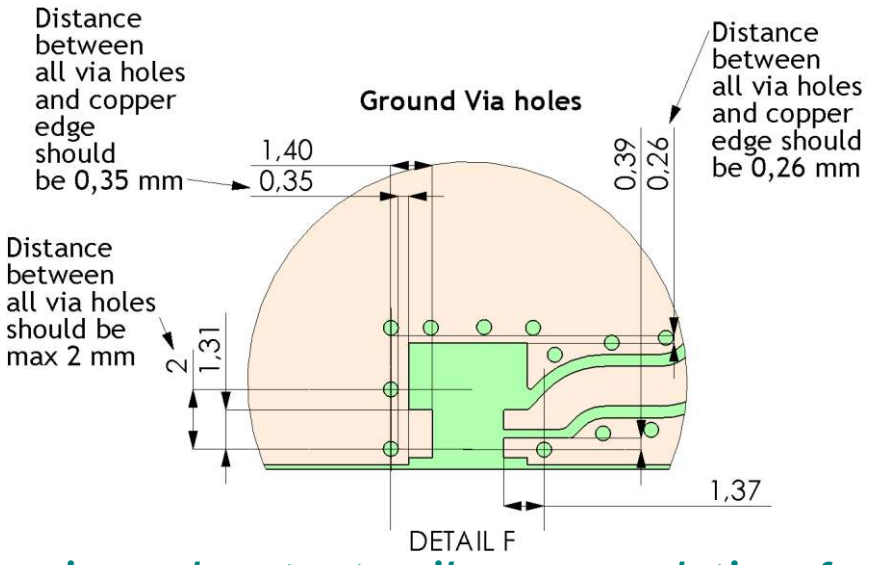
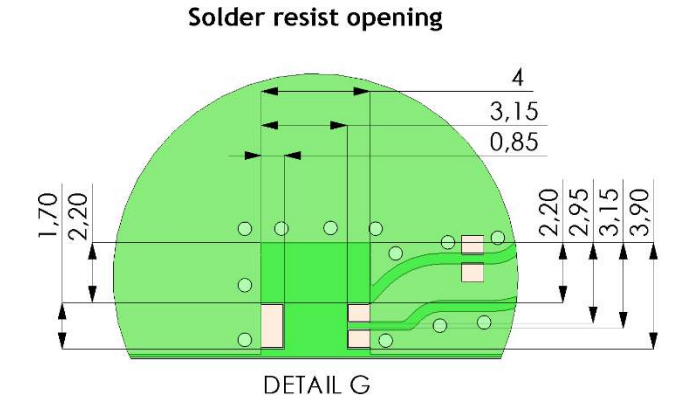
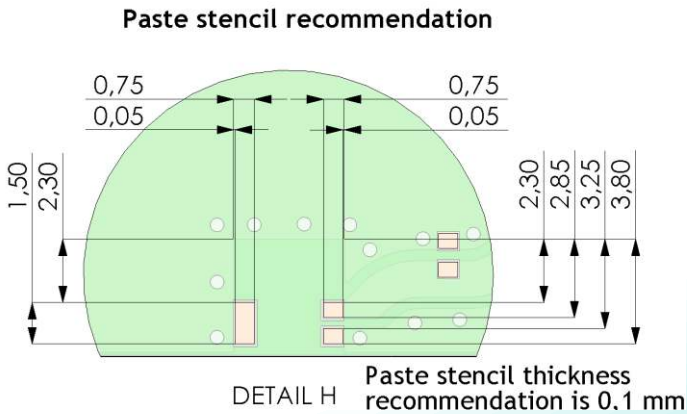
**PART NUMBER: W3011**

## Typical Ground via hole placement in PWB layout for W3011 GPS Antenna




## *Solder resist opening and paste stencil recommendations for W3011 GPS Antenna*





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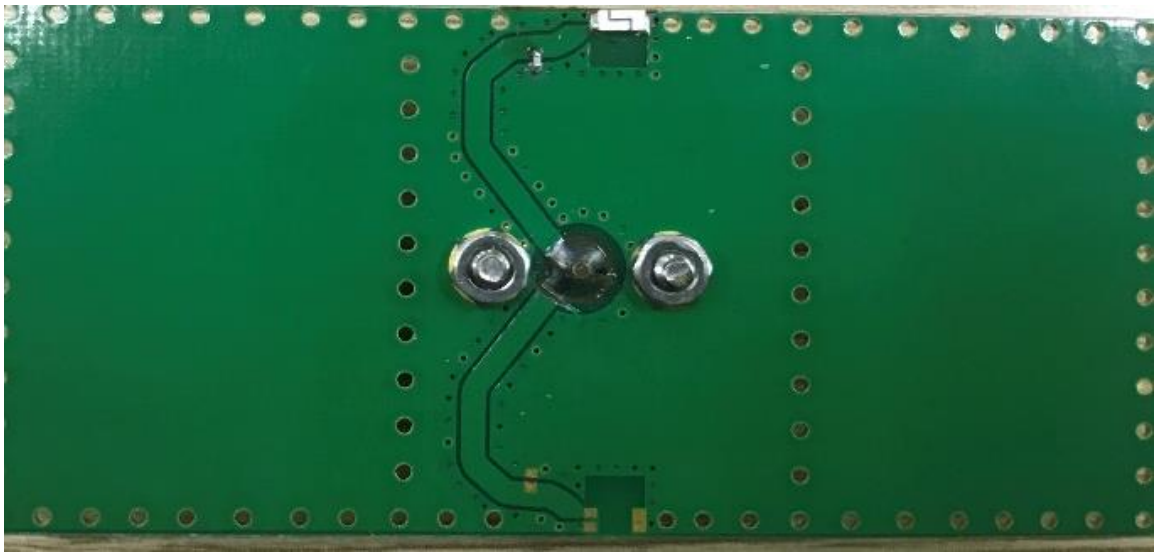
**PART NUMBER: W3011**

## TEST SETUP

All RF parameters tested on 80x37mm sized test board.
Antenna position on side center of PCB long edge.








RoHS COMPLIANT

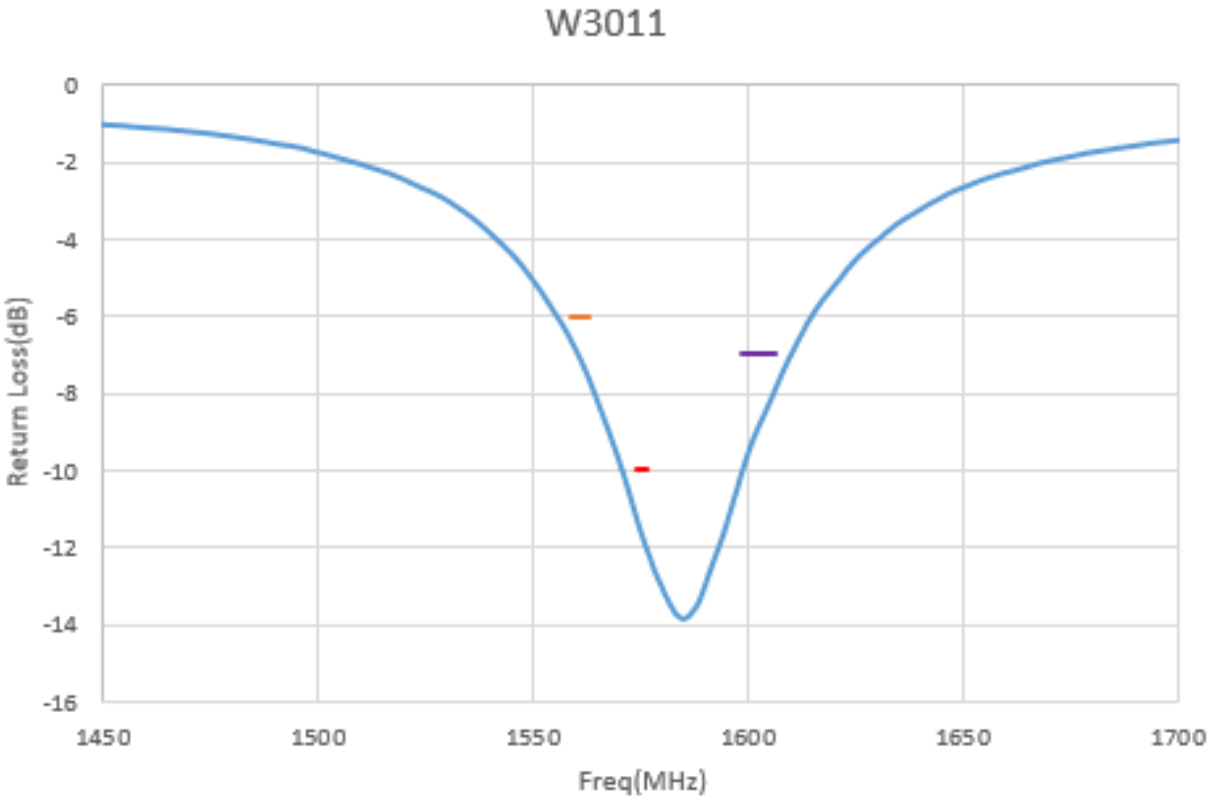
**Description**: 1.575 GHz GNSS Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER: W3011**

## CHARTS

### Return Loss vs Frequency





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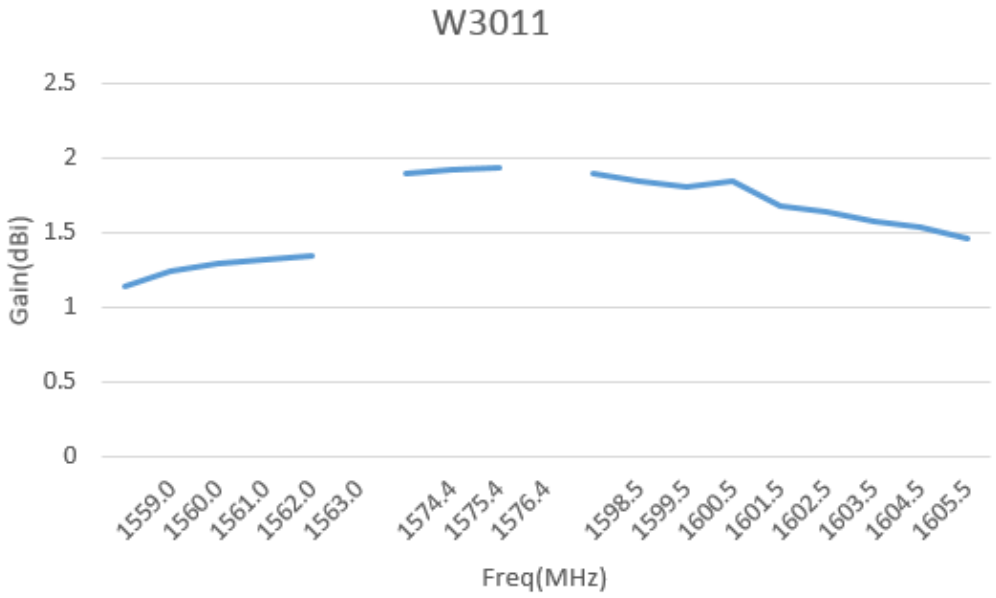
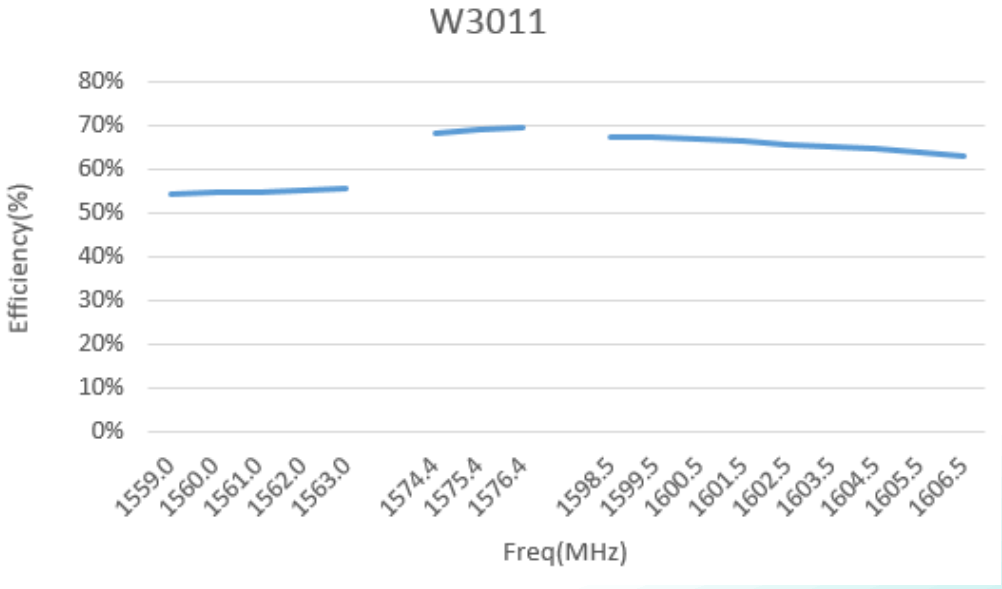
## CHARTS

### Gain vs Frequency




### Radiation Efficiency vs Frequency





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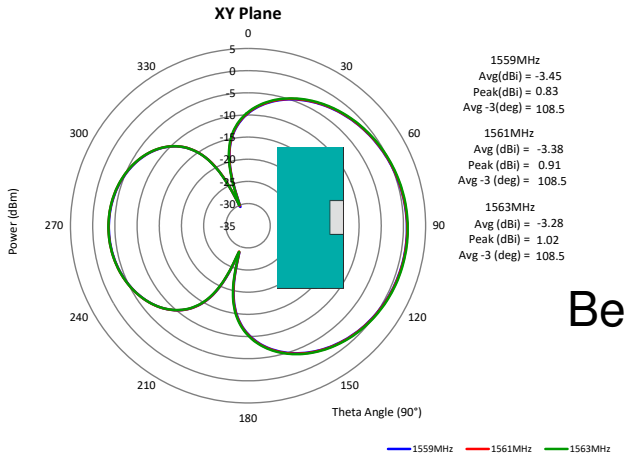
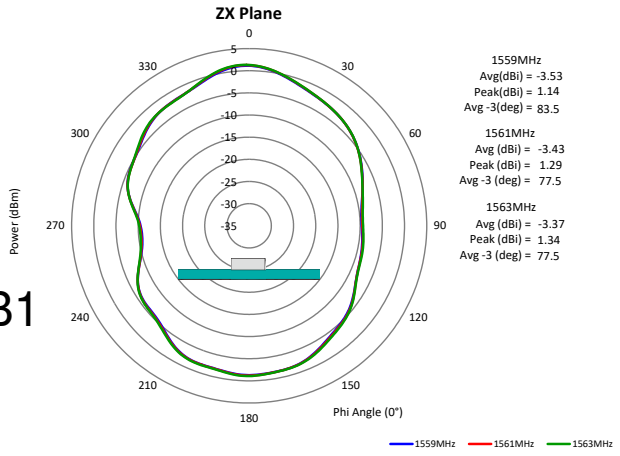
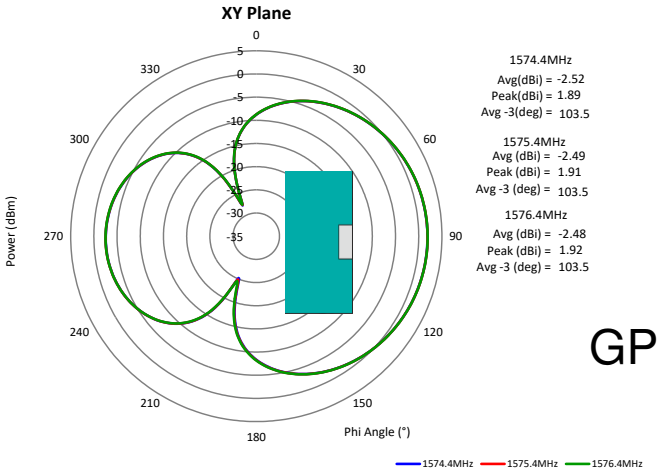
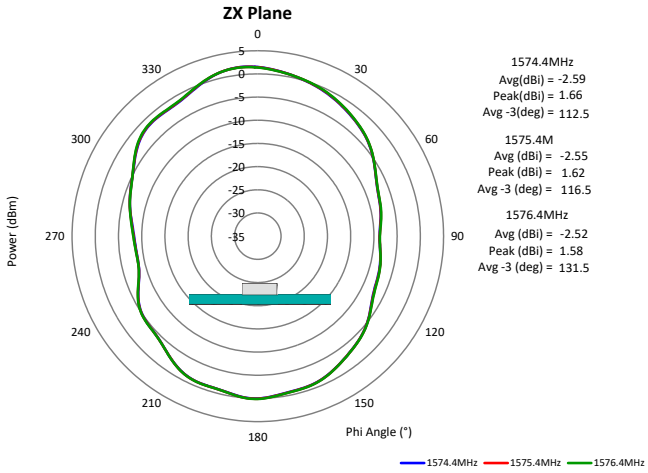
## CHARTS



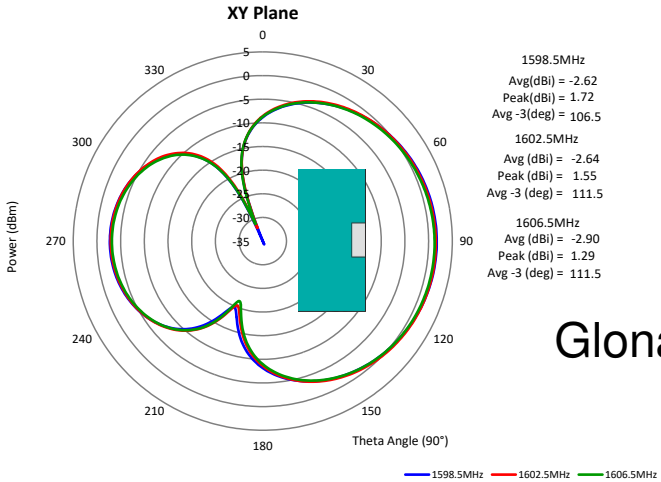



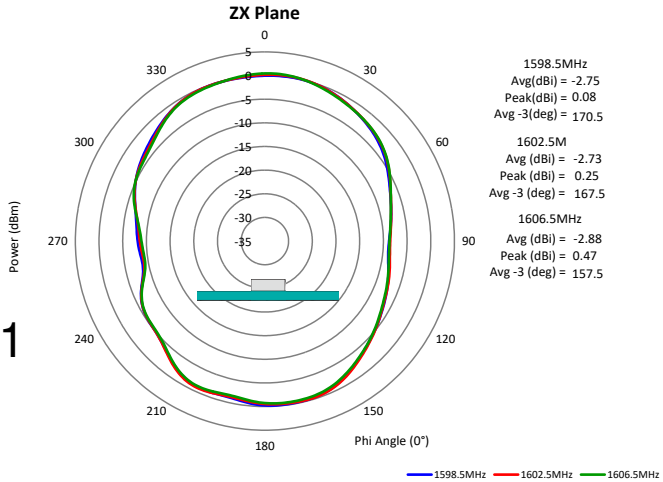

Beidou B1




GPS L1




Glonass L1



In the effort to improve our products, we reserve the right to make changes judged to be necessary.

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## Recommendation for reflow soldering process

Printing stencil thickness 0,15 - 0,25 mm is recommended for the solder paste. The maximum soldering temperature should not exceed 260°C. The temperature profile recommendations for reflow soldering process is presented in the Figures 1 and 2. The reflow profile presented in figure 1 describes minimum reflow temperatures. The reflow profile presented in figure 2 describes maximum reflow temperatures. located at the center of the coverage area.

| | Method of heat transfer | Controlled hot air convection |
|---|---|---|
| 1 | Average temperature gradient in preheating | 2.5 °C/s |
| 2 | Soak time | 2-3 minutes |
| 3 | Max temperature gradient in reflow | 3 °C/s |
| 4 | Time above 217 °C | Max 30 sec |
| 5 | Peak temperature in reflow | 230 °C for 10 seconds |
| 6 | Temperature gradient in cooling | Max -5 °C/s |

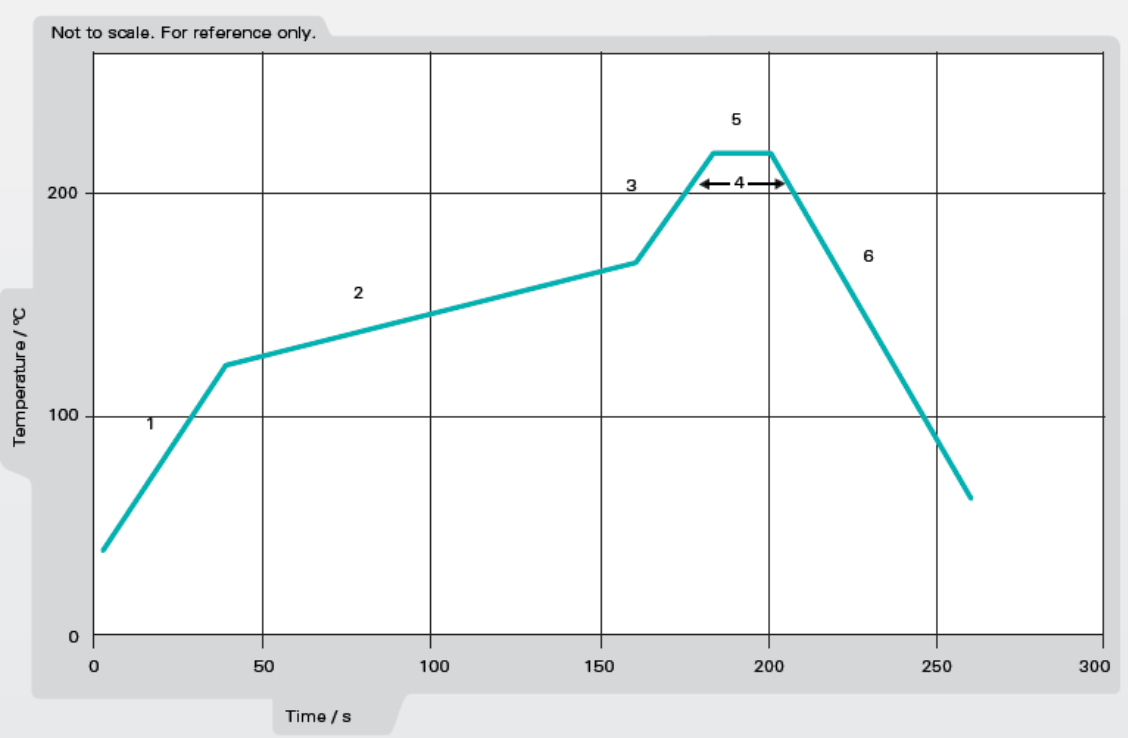


Figure 1. Minimum temperature profile recommendation for reflow soldering process





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## Recommendation for reflow soldering process

| | Method of heat transfer | Controlled hot air convection |
|---|---|---|
| 1 | Average temperature gradient in preheating | 2.5 °C/s |
| 2 | Soak time | 2-3 minutes |
| 3 | Max temperature gradient in reflow | 3 °C/s |
| 4 | Time above 217 °C | Max 60 sec |
| 5 | Time above 230 °C | Max 50 sec |
| 6 | Time above 250 °C | Max 10 sec |
| 7 | Peak temperature in reflow | 260 °C for 5 seconds |
| 8 | Temperature gradient in cooling | Max -5 °C/s |

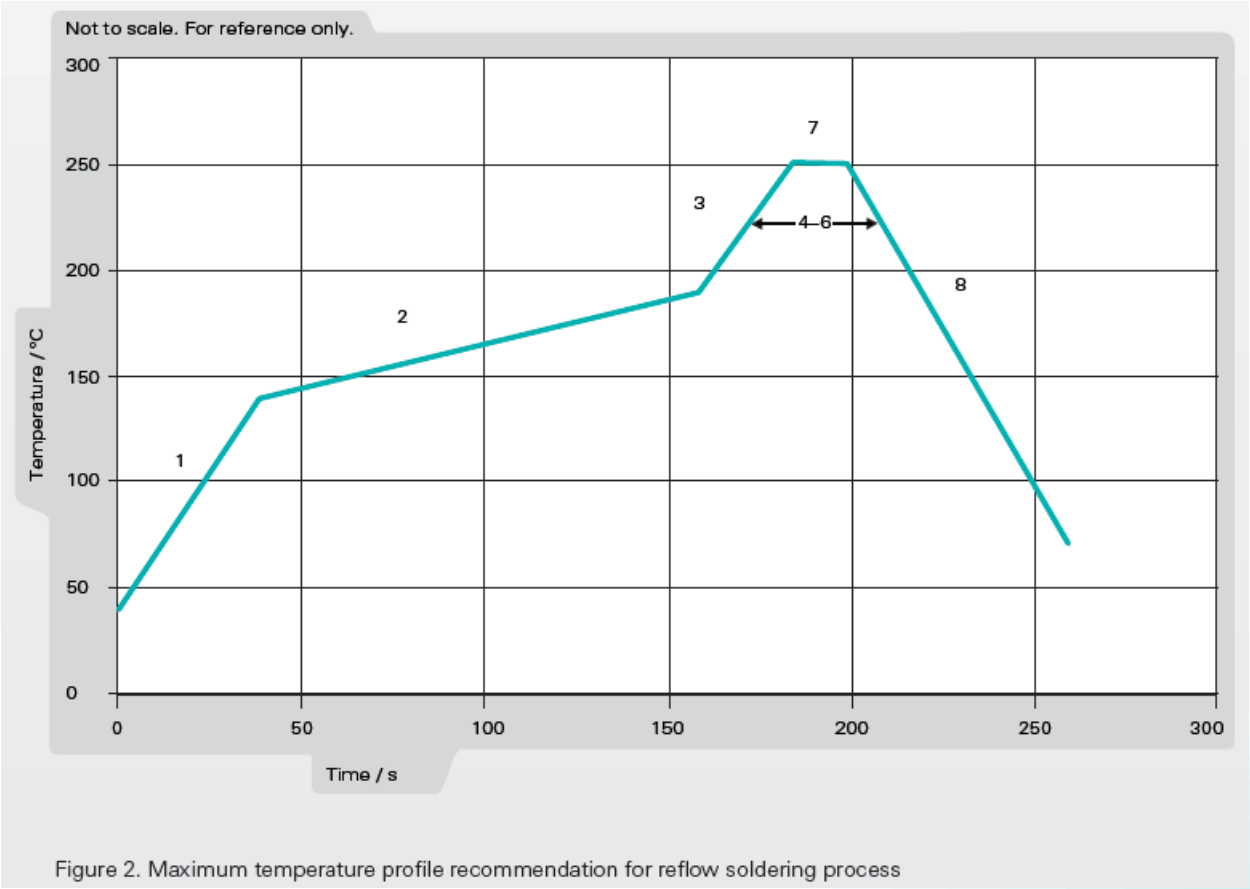


Figure 2. Maximum temperature profile recommendation for reflow soldering process





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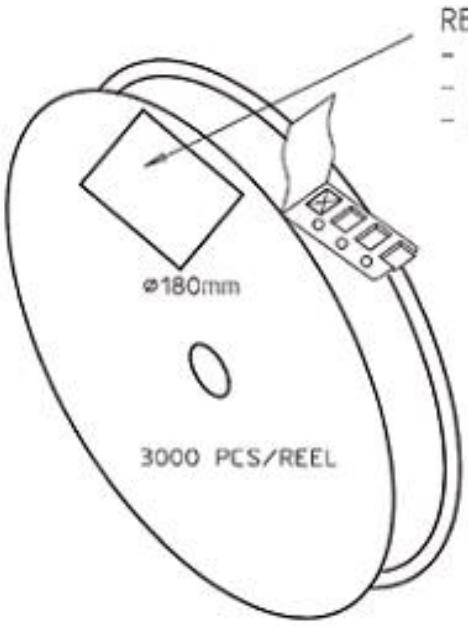
## PACKAGING

Taping package
3000PCS/Reel
30000PCS/Carton box

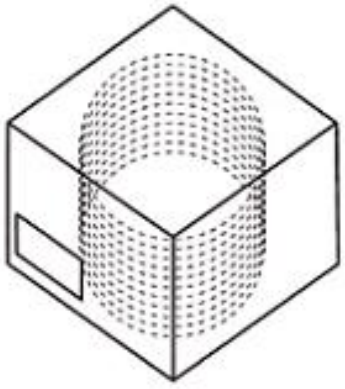



CARRIER TAPE H8S-00125
width=8,00 depth=1,22
COVER TAPE H8S-00126
width=5,60

LENGTH OF TAPE:

- Leader section: 50 empty cavities before component section
- Trailer section: 25 empty cavities after component section.

Empty part cavities at leader and trailer section of the tape must be sealed with top cover tape.



| | |
|---|---|
| BOX H8S-00128 (182x182x132) | 1 pcs |
| - LABEL | 1 pcs/BOX |
| REEL H8S-00127 (D180,W12) | 10 pcs |
| - REEL LABEL | 1 pcs/REEL |

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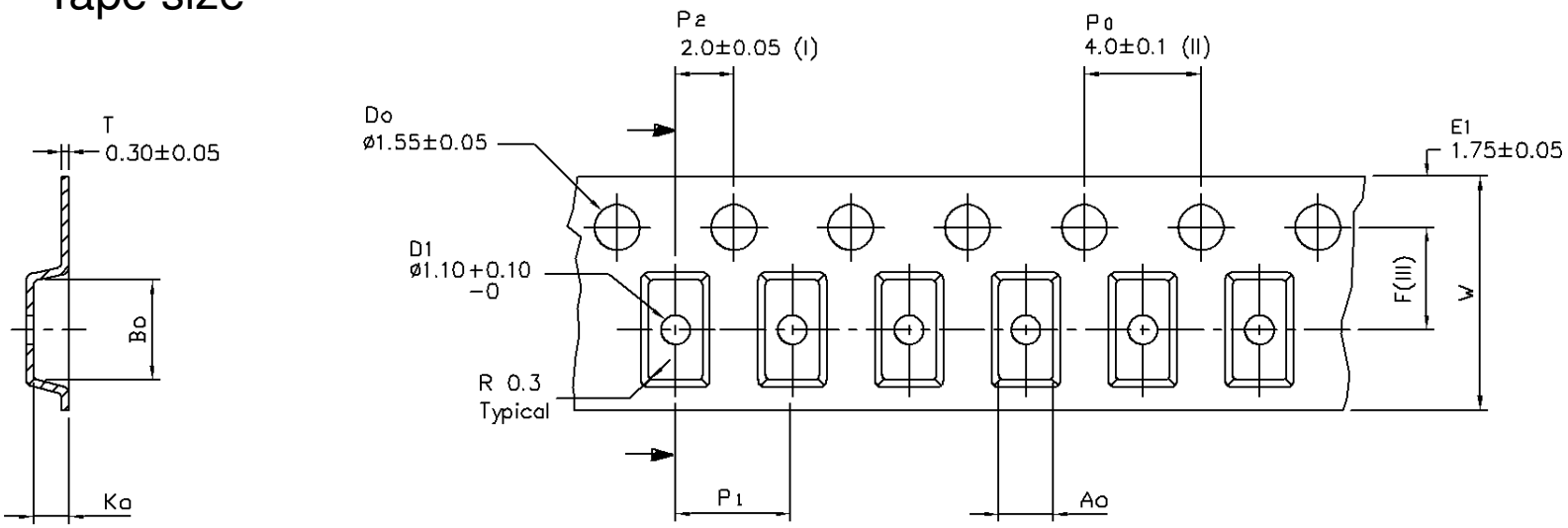
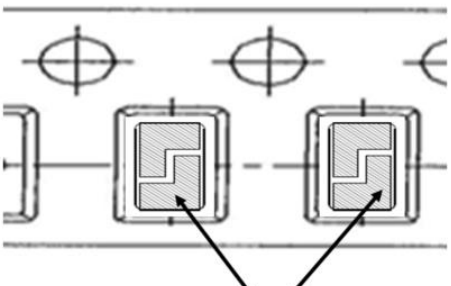
## PACKAGING

### Tape size




| | | |
|---|---|---|
| Ao | 1.85 | +/− 0.1 |
| Bo | 3.43 | +/− 0.1 |
| Ko | 1.22 | +/− 0.1 |
| F | 3.50 | +/− 0.05 |
| P1 | 4.00 | +/− 0.1 |
| W | 8.00 | +/− 0.1 |



TOP SURFACE OF THE ANTENNA (ANTENNA SOLDERING PADS FACING SOWN TO THE BOTTOM OF THE CARRIER TAPE)

TOP VIEW OF THE CARRIER TAPE





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