

**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

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**Description:** 1.575 GHz GNSS Ceramic  
Chip Antenna**Series:** Ceramic Chip Antenna**PART NUMBER:** W3011**ELECTRICAL SPECIFICATIONS**

Antenna Type	Chip antenna
Frequency	1559-1563MHz 1574.4-1576.4MHz 1598.6-1606.6MHz
Nominal Impedance	50 $\Omega$
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

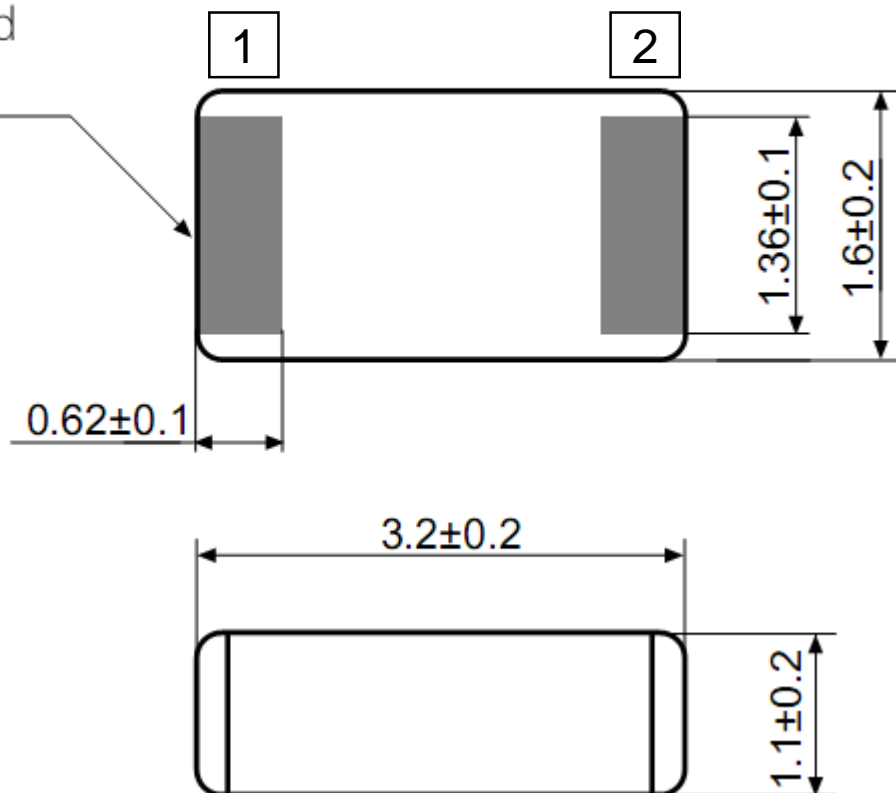
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## MECHANICAL DRAWING

Ag metallization  
contact pad  
area (2x)



### 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  $\Omega$  characteristic  
impedance, depending on PWB material and thickness.

Recommended test board layout for electrical characteristic  
measurement, test board outline size 80 x 37 mm.

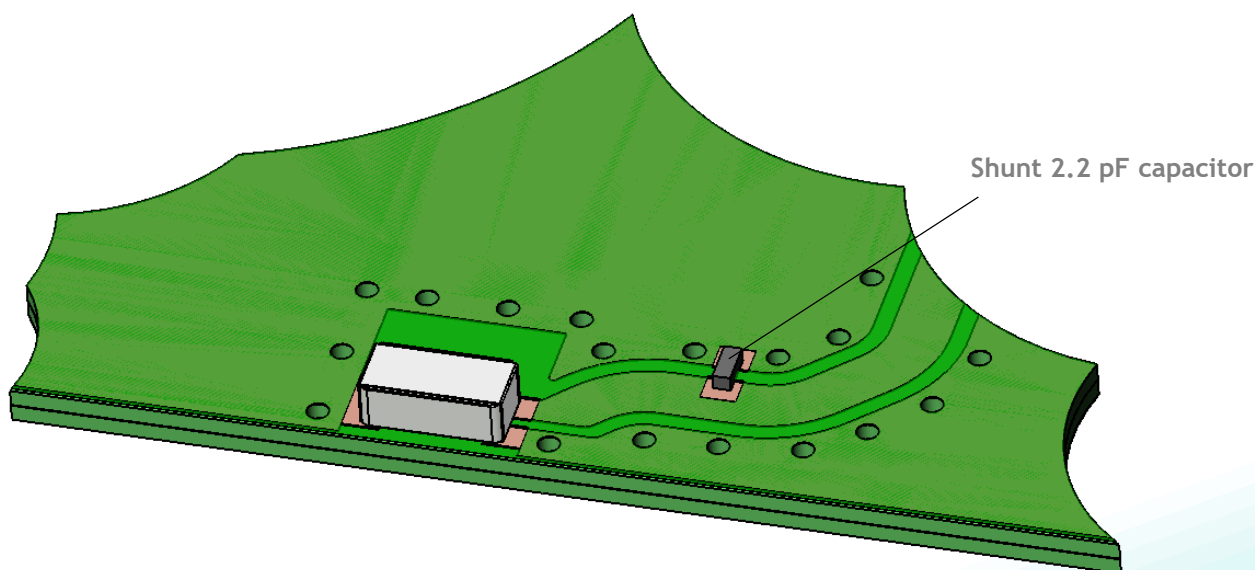
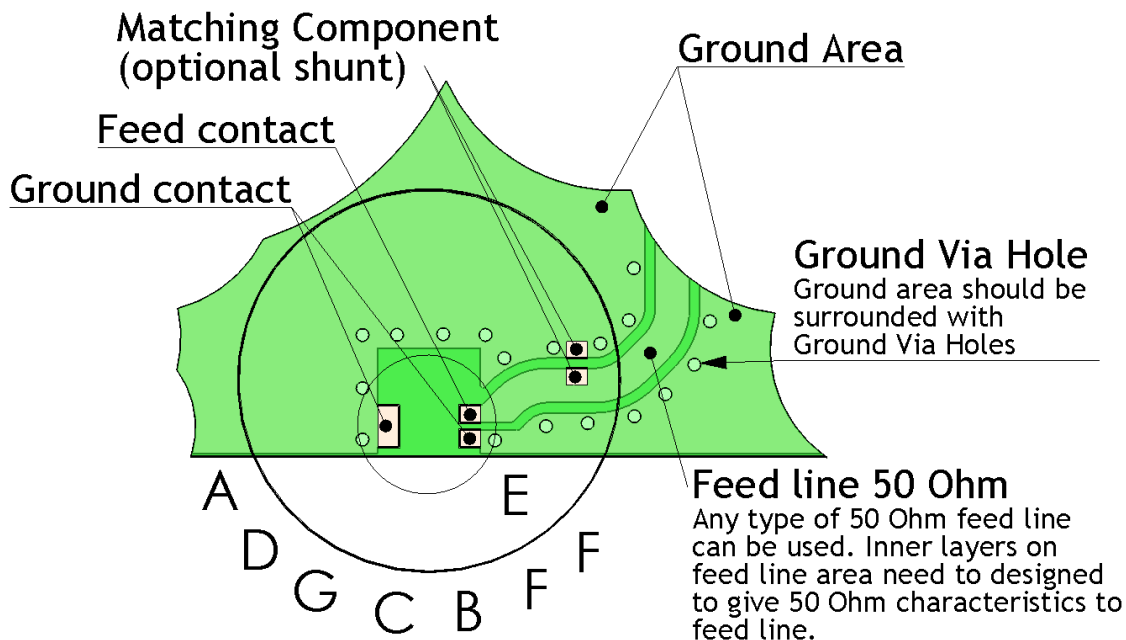
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## PWB layout for W3011 GPS Antenna

Note: All dimensions are in metric system.



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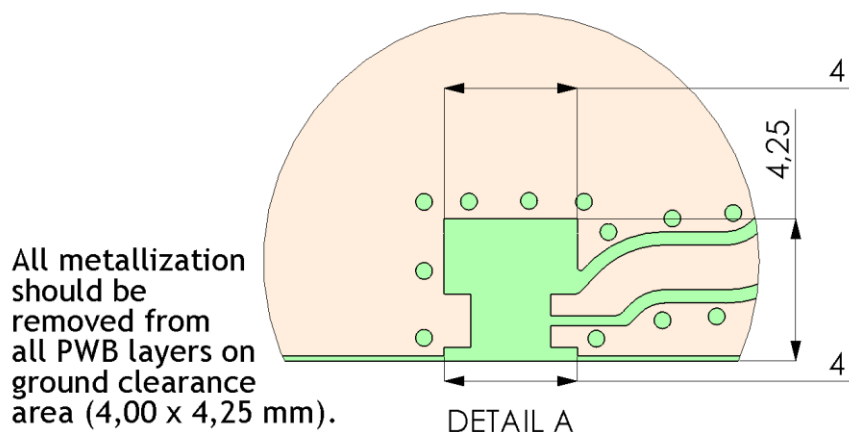
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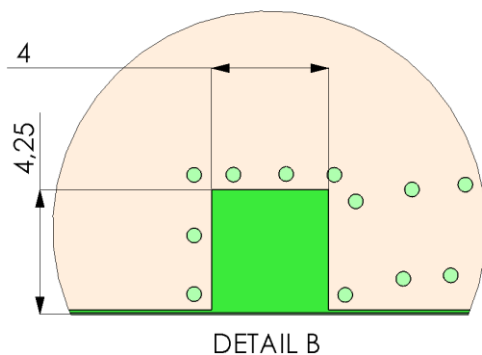
**PART NUMBER:** W3011

## Ground clearance area for W3011 GPS Antenna

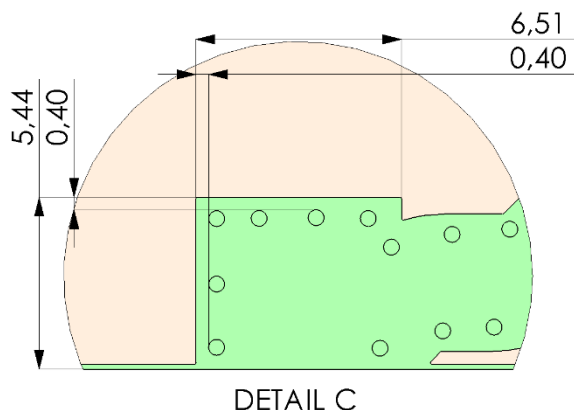
Ground clearance area (4,00 x 4,25 mm)



Opening in bottom/inner ground layers



Opening in other layers (no ground/ RF)



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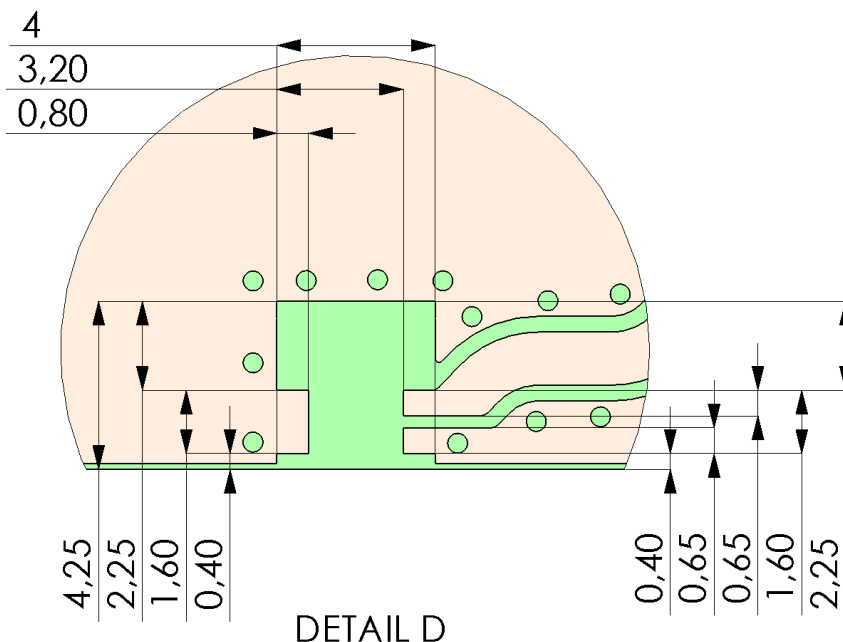
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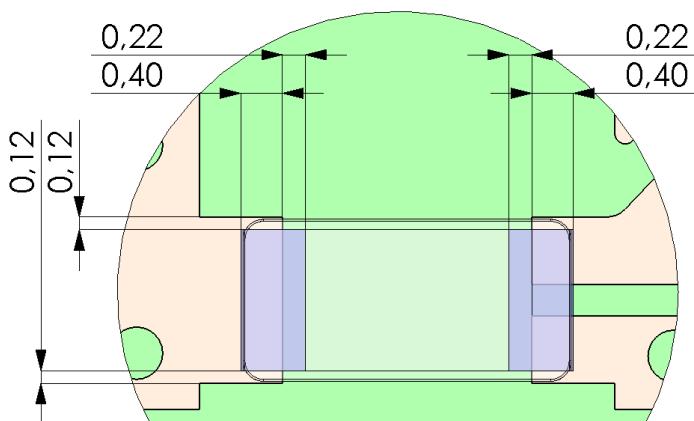
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## PWB pad dimensions and antenna position for W3011 GPS Antenna

**Pad dimensions in top copper**



**Antenna position on PWB layout**



Antenna pads are marked blue

DETAIL E

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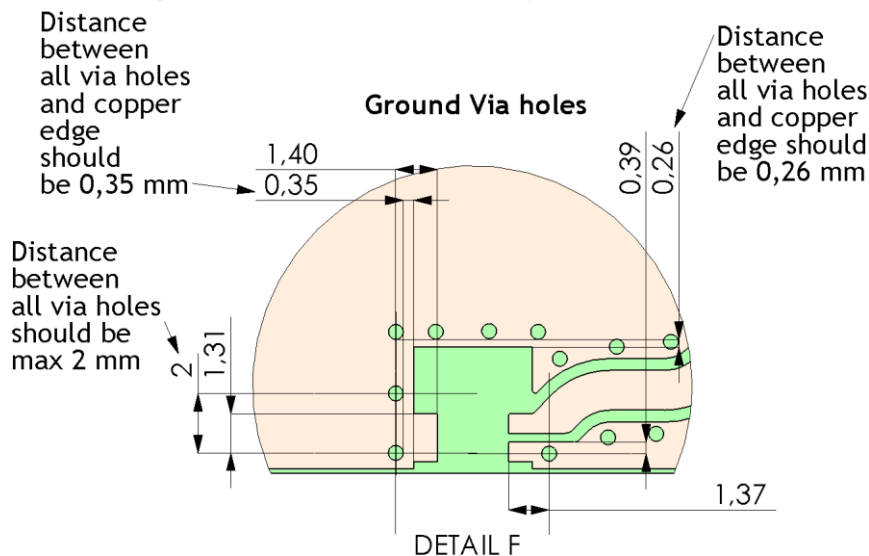
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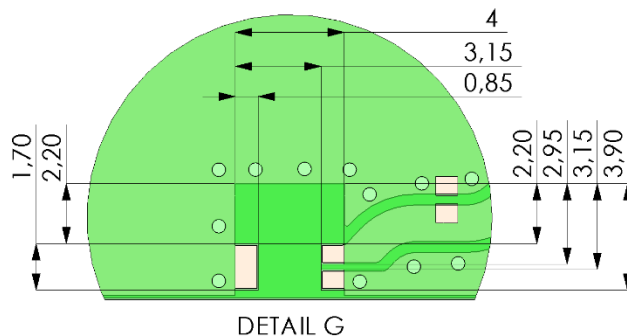
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Typical Ground via hole placement in PWB layout for W3011 GPS Antenna

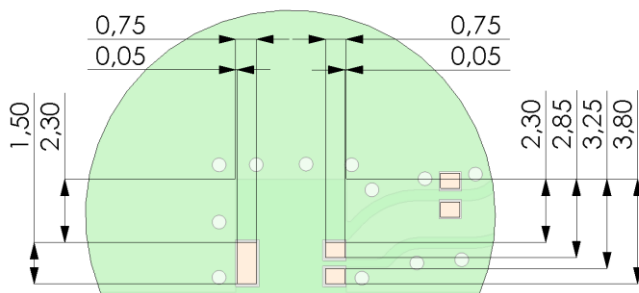


Solder resist opening and paste stencil recommendations for W3011 GPS Antenna

Solder resist opening



Paste stencil recommendation



Paste stencil thickness recommendation is 0.1 mm

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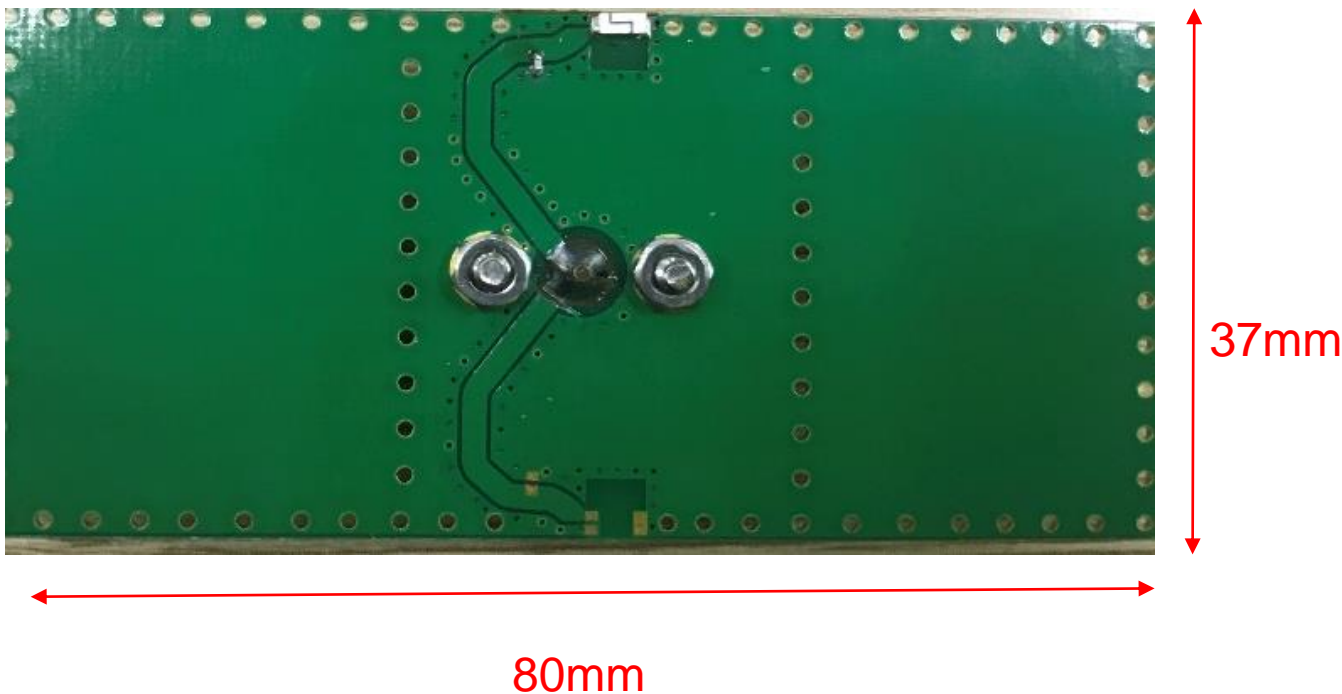
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## TEST SETUP

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



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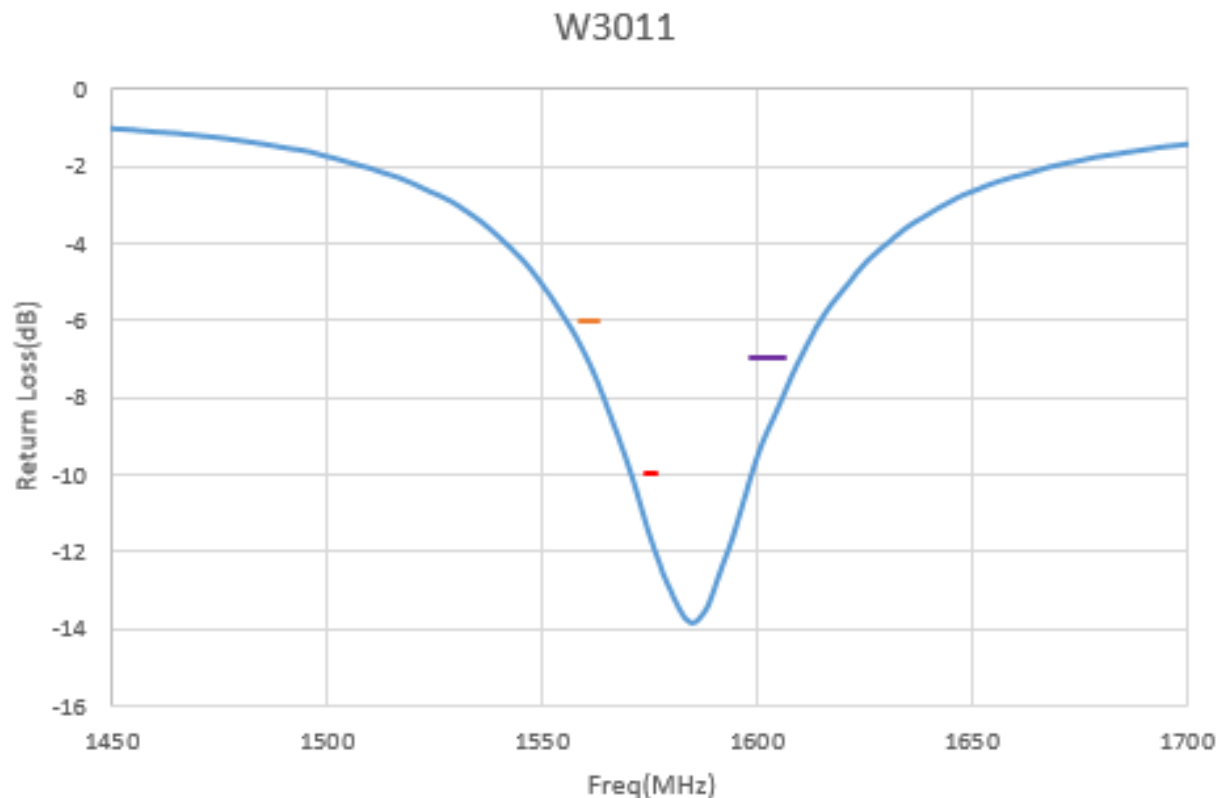
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## CHARTS

### Return Loss vs Frequency



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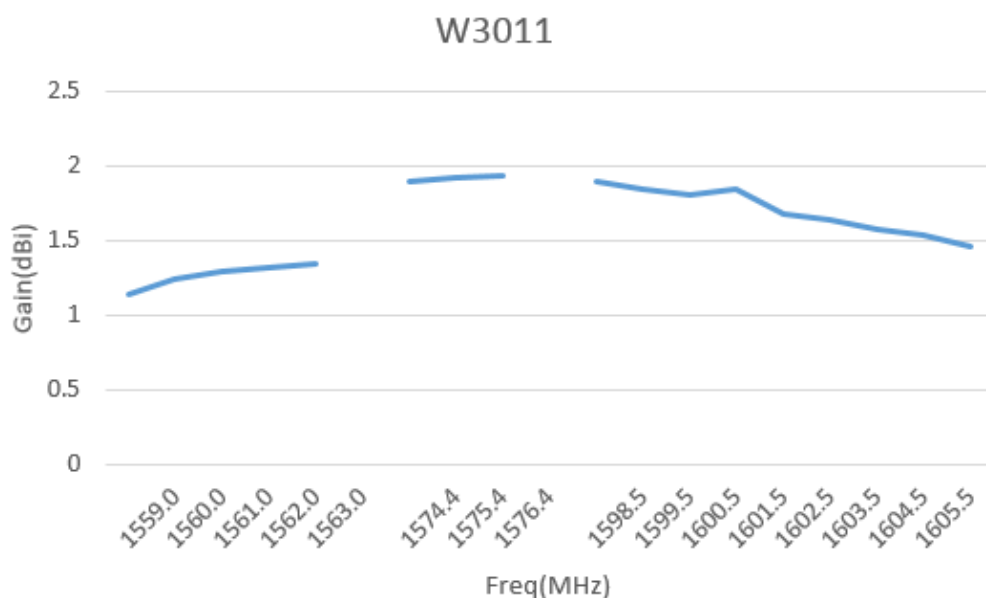
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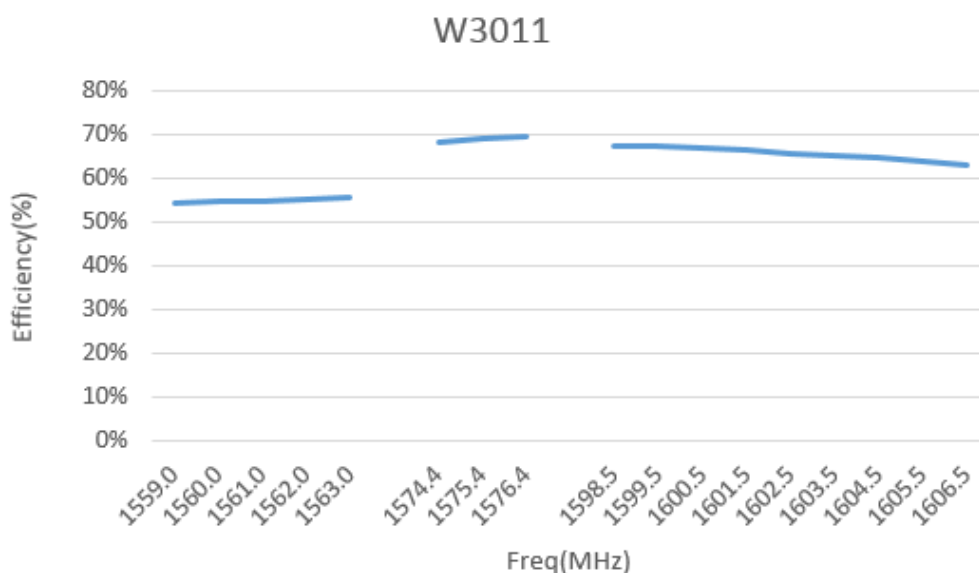
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## CHARTS

### Gain vs Frequency



### Radiation Efficiency vs Frequency



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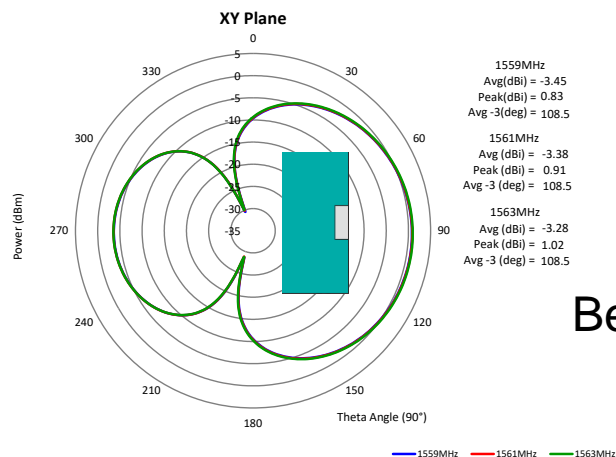
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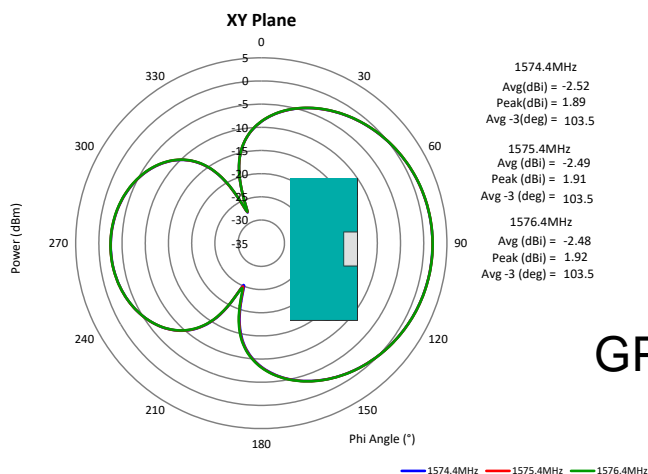
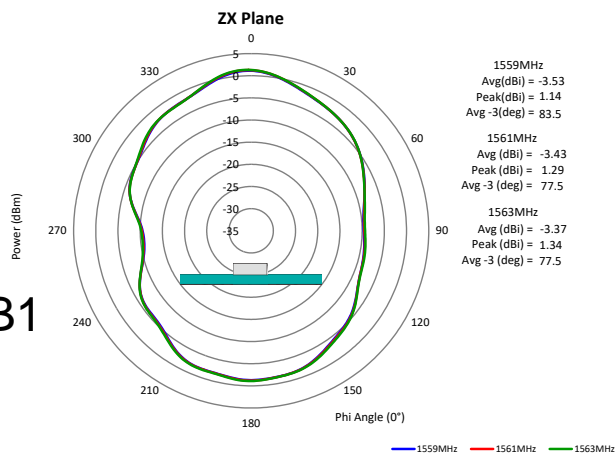
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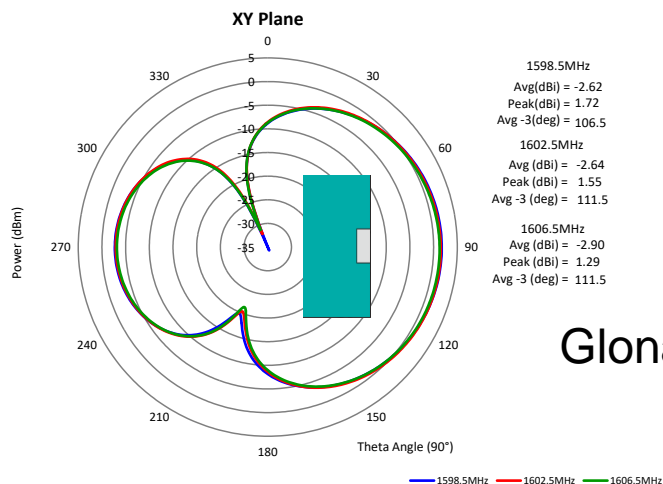
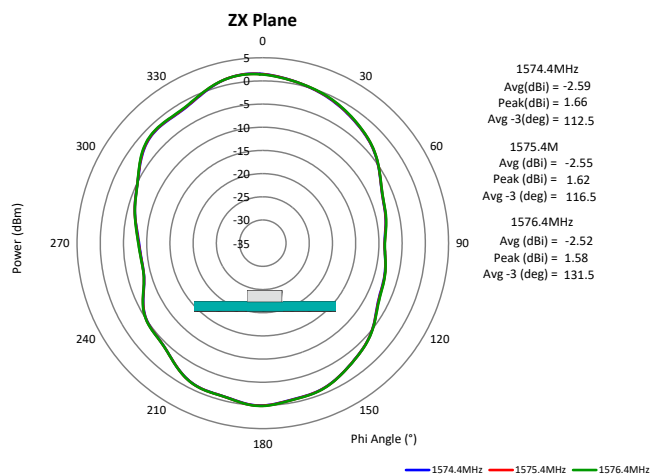
## CHARTS



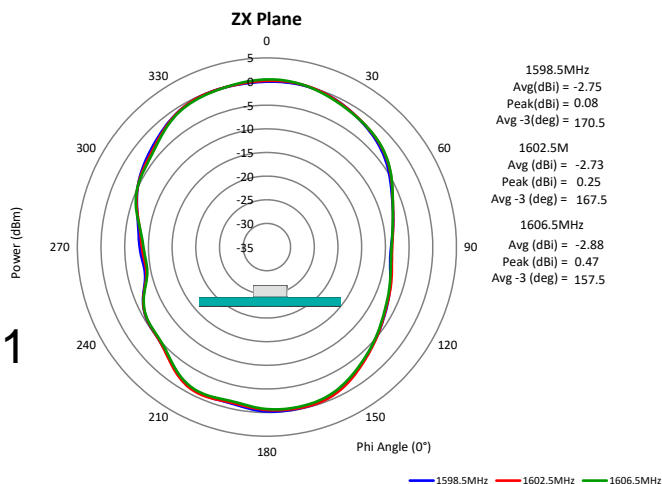
Beidou B1



GPS L1



Glonass L1



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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

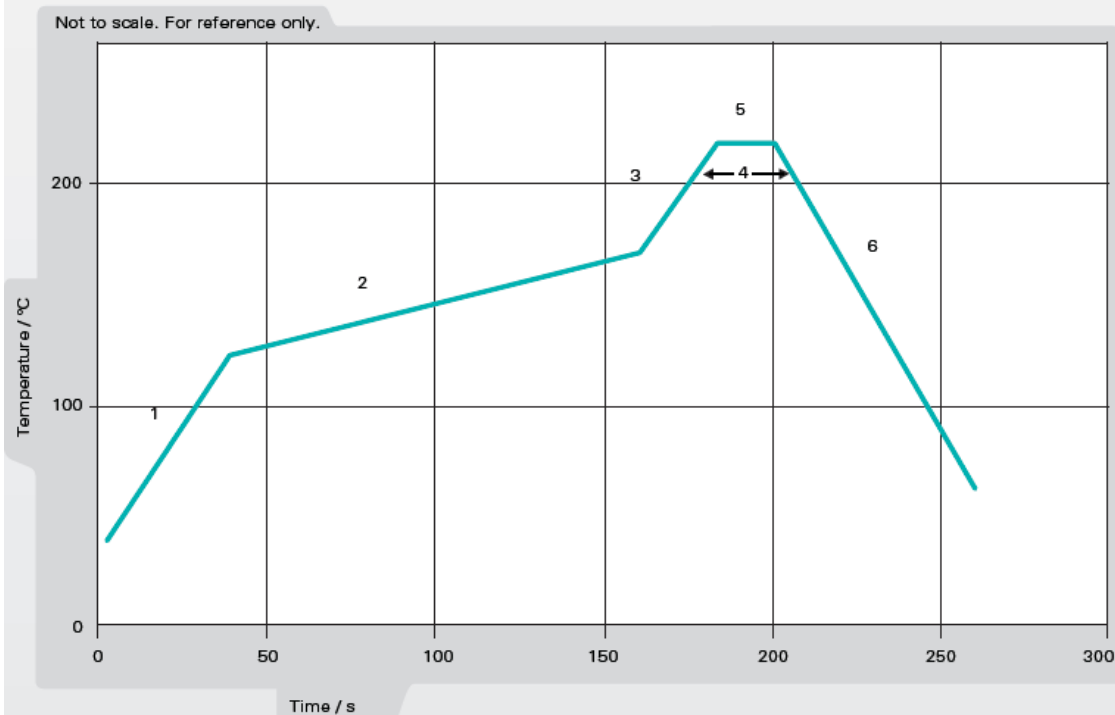


Figure 1. Minimum temperature profile recommendation for reflow soldering process

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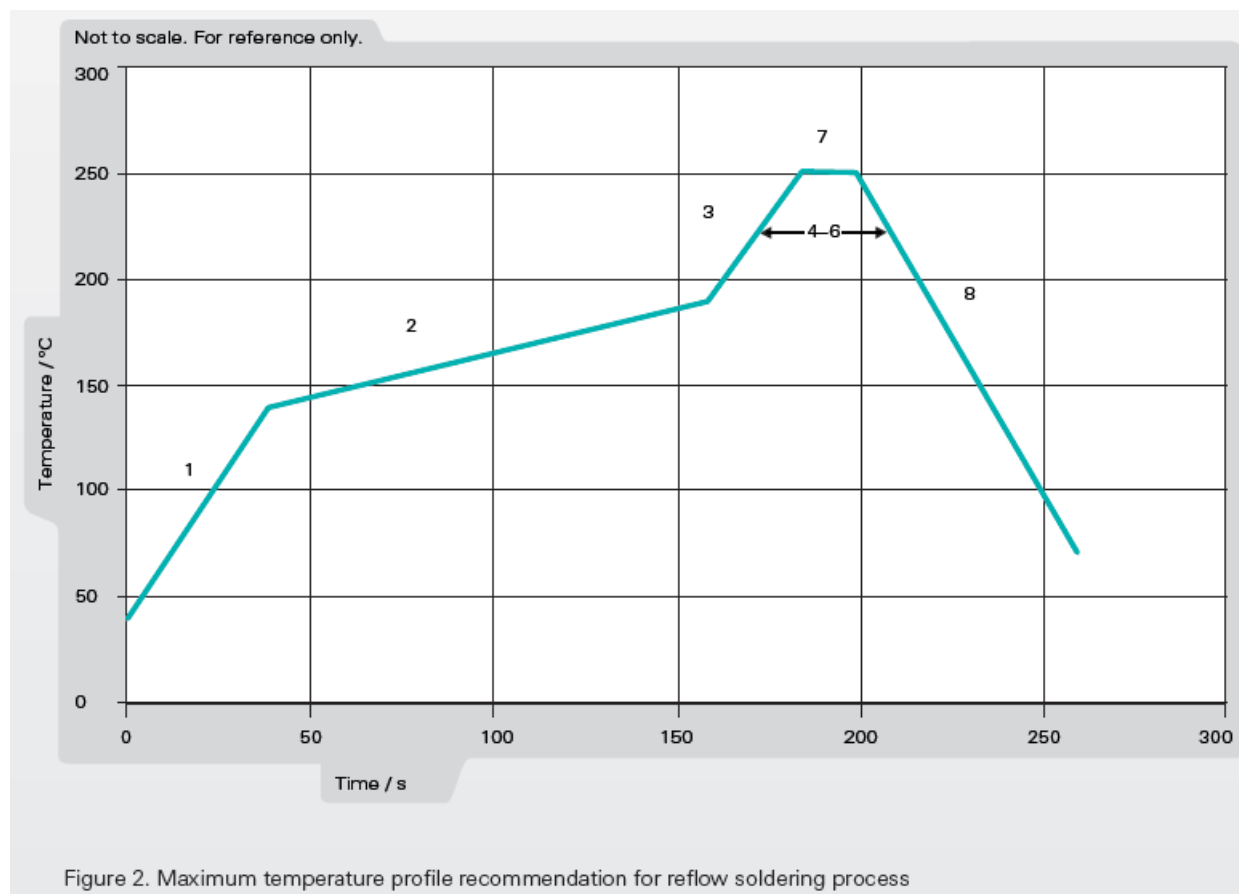
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**Recommendation for reflow soldering process**

	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



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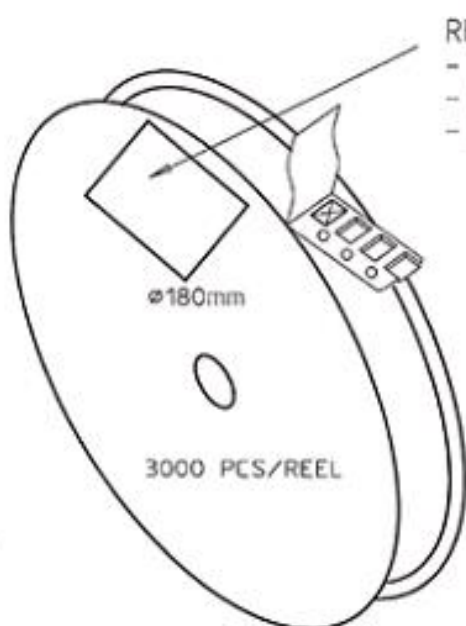
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## PACKAGING

Taping package

3000PCS/Reel

30000PCS/Carton box



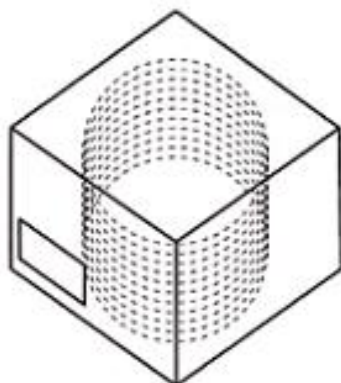
REEL LABEL INFORMATION:  
- TRACEABILITY  
- QUANTITY  
- PRODUCT CODE

CARRIER TAPE H85-00125  
width=8,00 depth=1,22  
COVER TAPE H85-00126  
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 H85-00128 (182x182x132)	1 pcs
- LABEL	1 pcs/BOX
REEL H85-00127 (D180, W12)	10 pcs
- REEL LABEL	1 pcs/REEL

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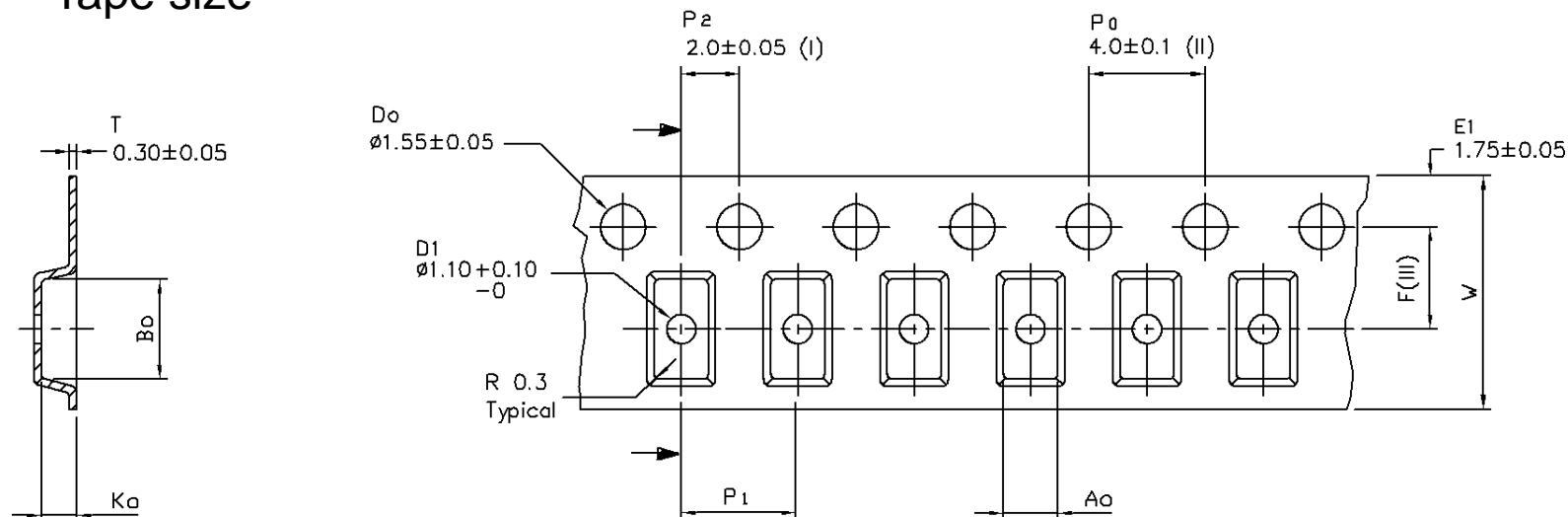
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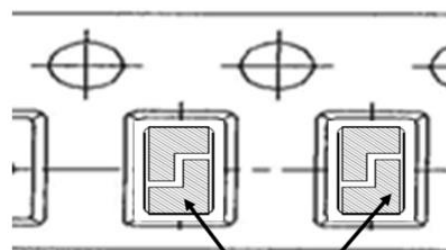
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**PACKAGING**

**Tape size**



$A_0$	1.85	+ / - 0.1
$B_0$	3.43	+ / - 0.1
$K_0$	1.22	+ / - 0.1
$F$	3.50	+ / - 0.05
$P_1$	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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