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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

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Jiangsu Province, Suzhou 215009 PR China
Tel: 86 512 6807 9998

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ELECTRICAL SPECIFICATIONS

Antenna Type	Chip antenna
Frequency	1559-1563MHz 1574.4-1576.4MHz 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

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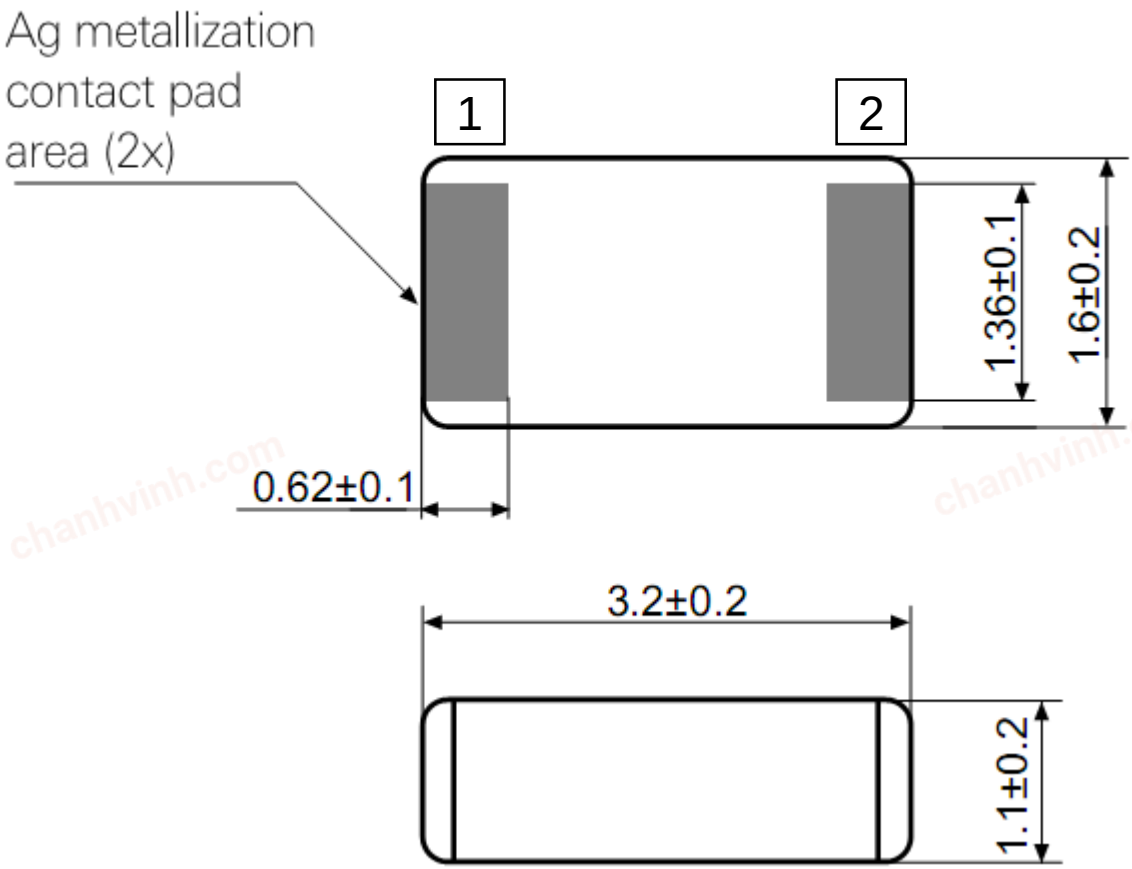
MECHANICAL DRAWING



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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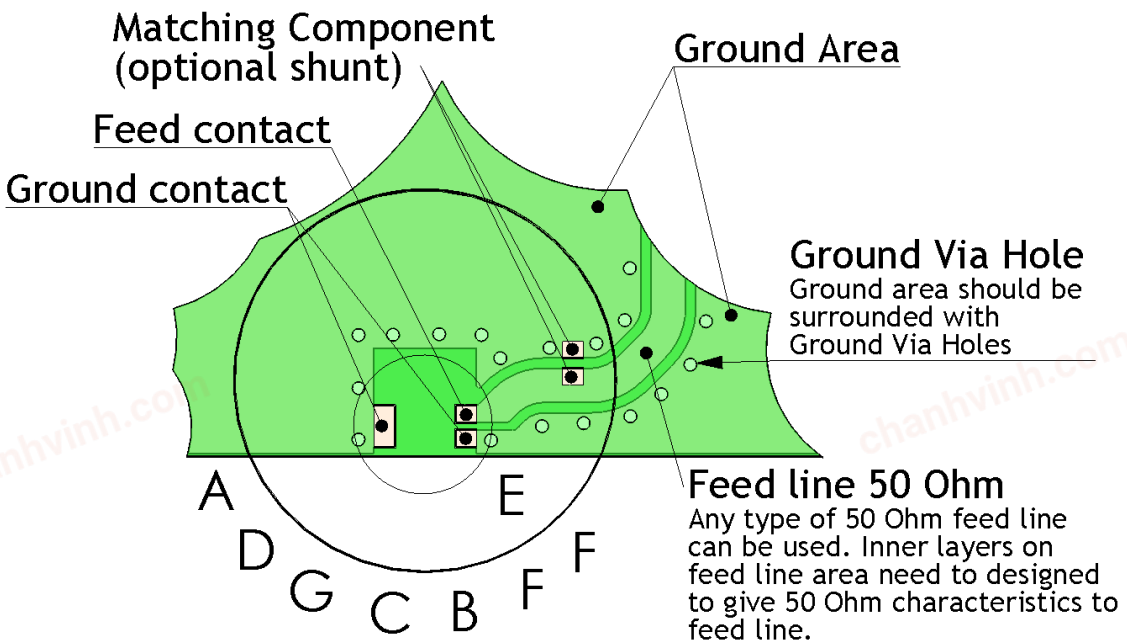
Description: 1.575 GHz GNSS Ceramic Chip Antenna

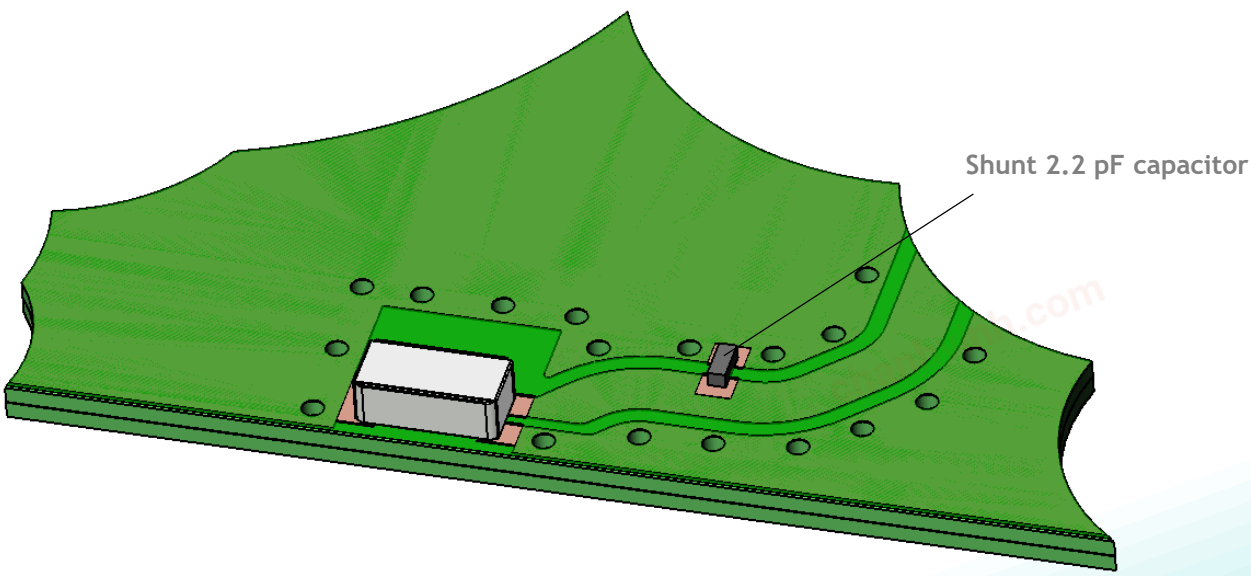
Series: Ceramic Chip Antenna

PART NUMBER: W3011

PWB layout for W3011 GPS Antenna

Note: All dimensions are in metric system.





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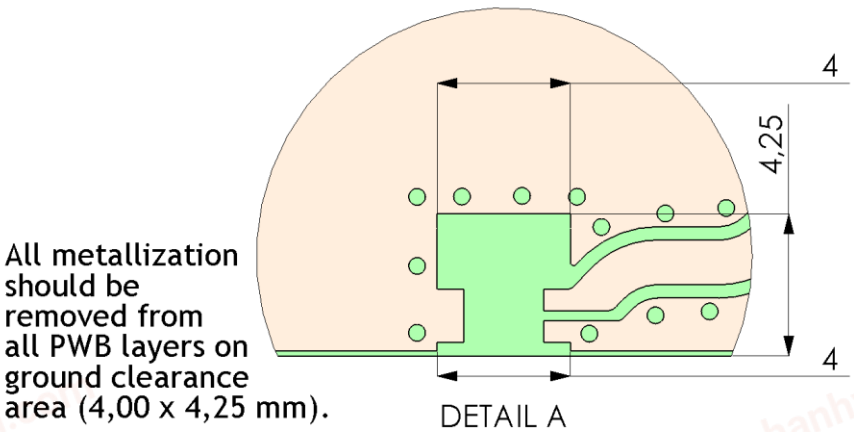
Description: 1.575 GHz GNSS Ceramic Chip Antenna

Series: Ceramic Chip Antenna

PART NUMBER: W3011

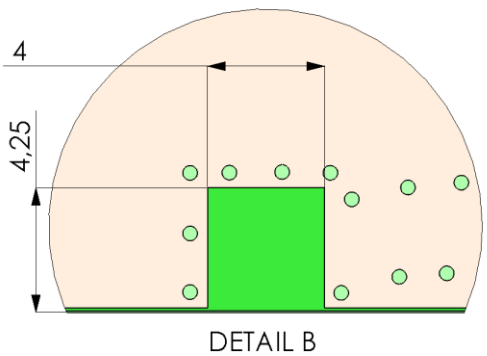
Ground clearance area for W3011 GPS Antenna

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

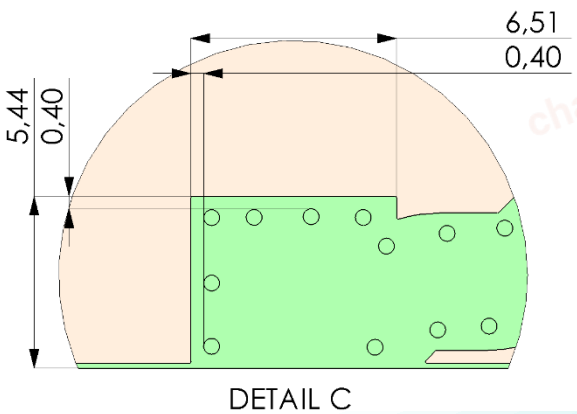


All metallization should be removed from all PWB layers on ground clearance area (4,00 x 4,25 mm).

Opening in bottom/inner ground layers



Opening in other layers (no ground/ RF)



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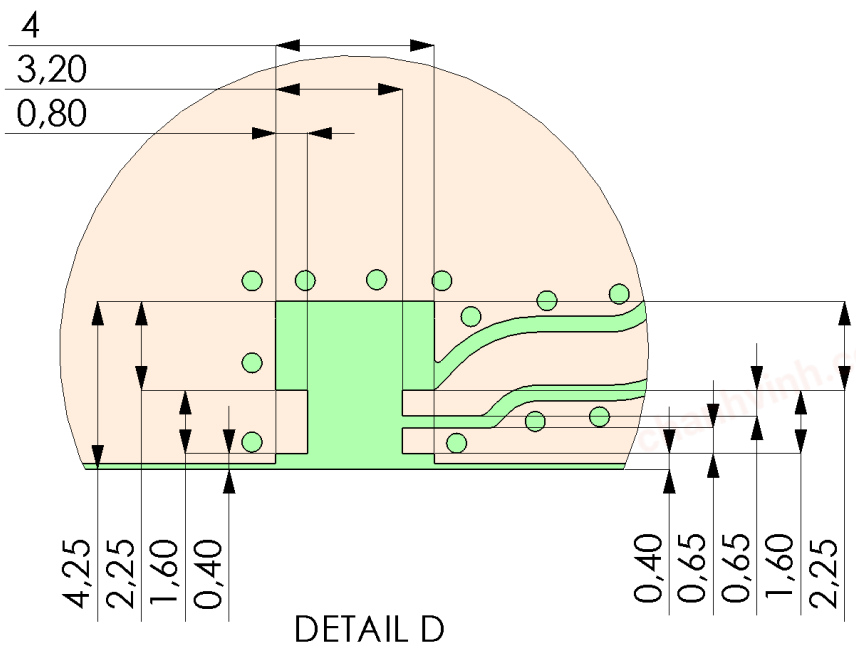
Description: 1.575 GHz GNSS Ceramic Chip Antenna

Series: Ceramic Chip Antenna

PART NUMBER: W3011

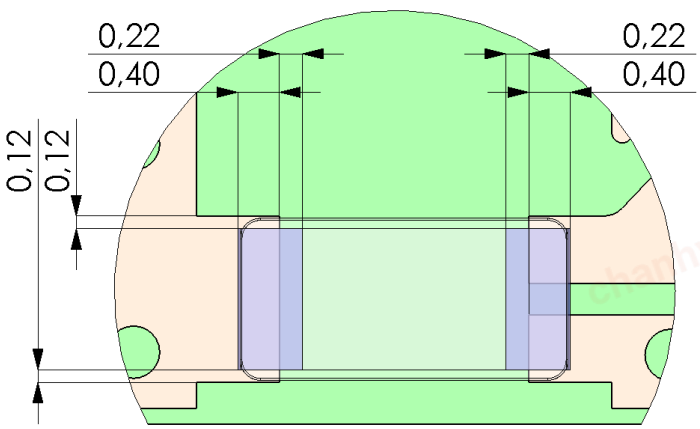
PWB pad dimensions and antenna position for W3011 GPS Antenna

Pad dimensions in top copper



DETAIL D

Antenna position on PWB layout



Antenna pads are marked blue

DETAIL E

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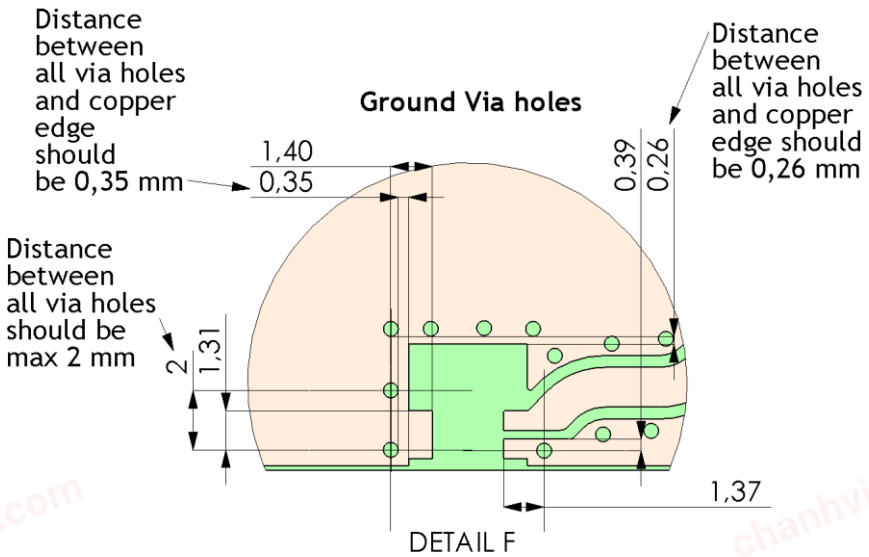
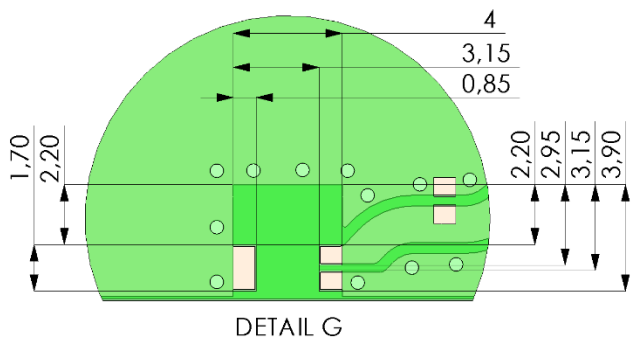
Typical Ground via hole placement in PWB layout for W3011 GPS Antenna

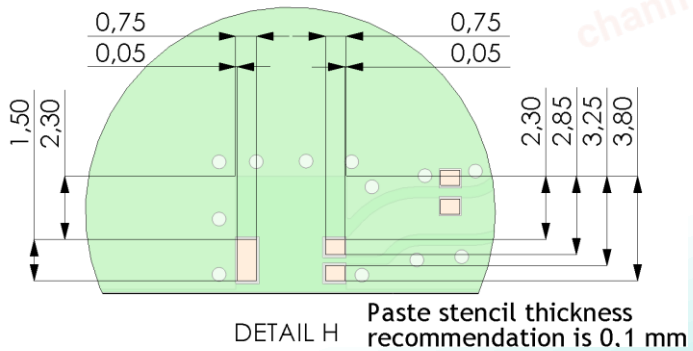


Solder resist opening and paste stencil recommendations for W3011 GPS Antenna

Solder resist opening



Paste stencil recommendation



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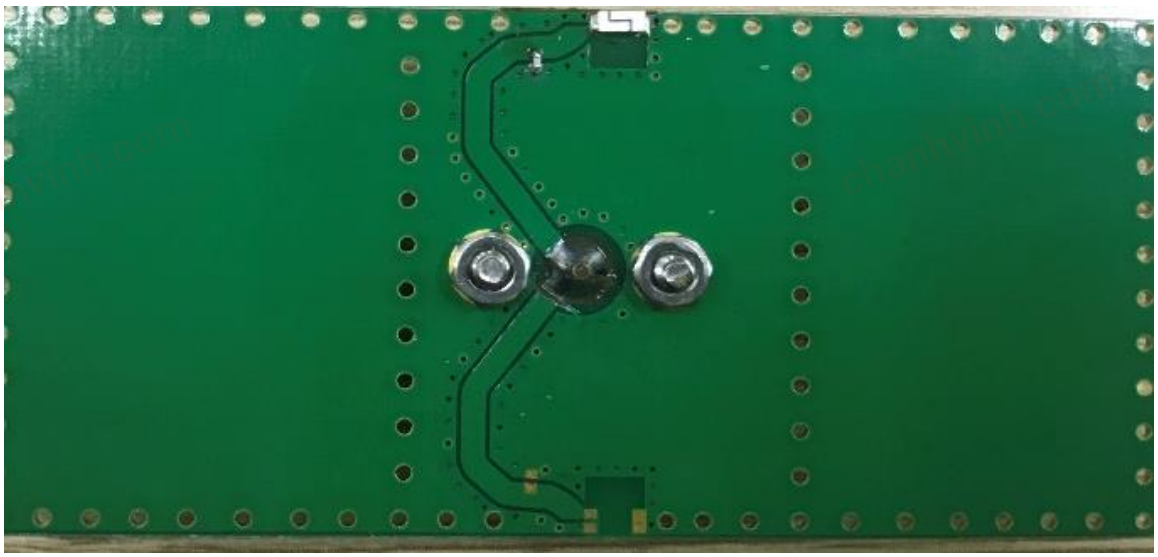
TEST SETUP

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



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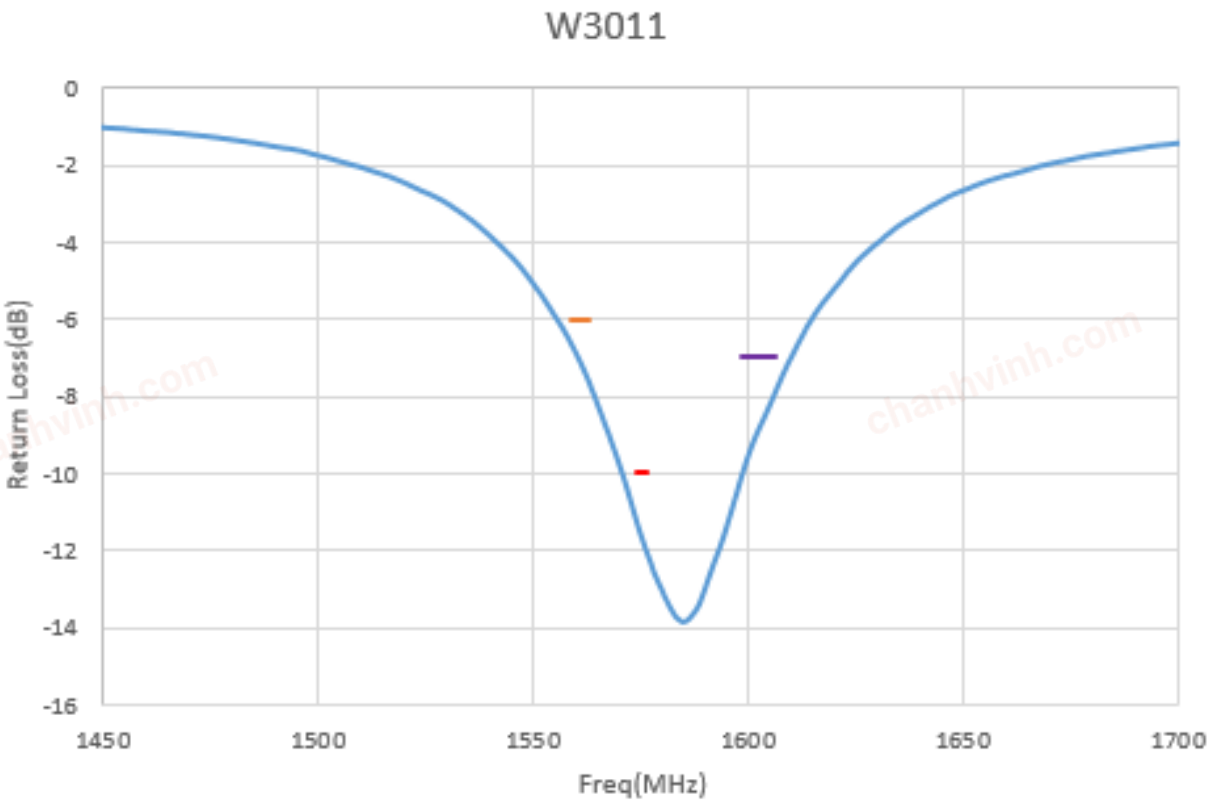
CHARTS

Return Loss vs Frequency



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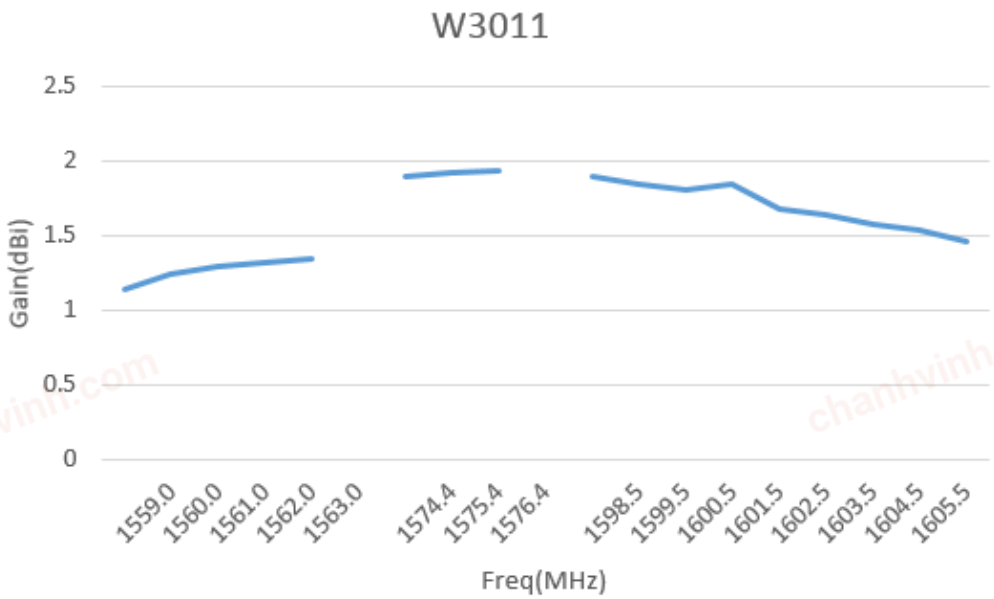
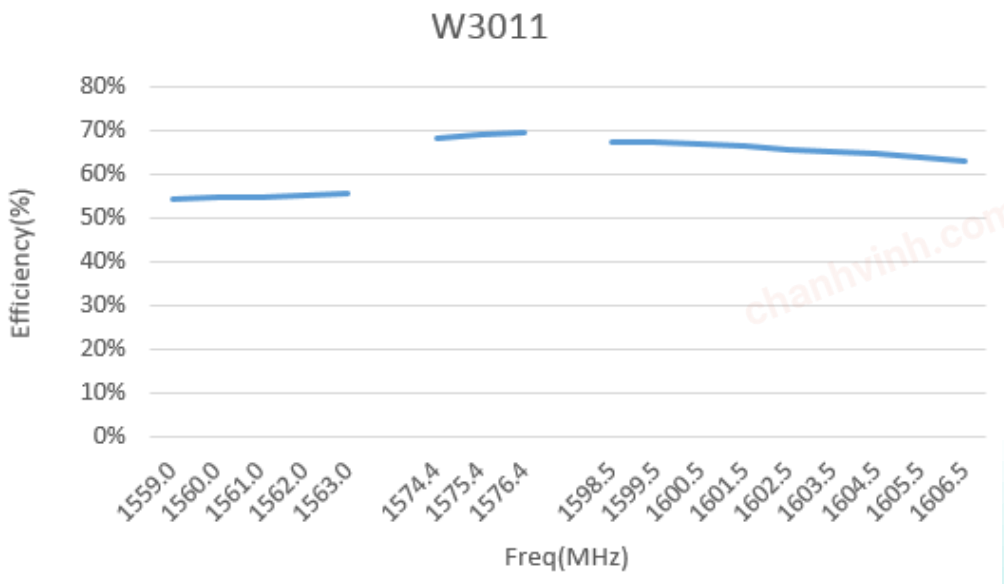
CHARTS

Gain vs Frequency



Radiation Efficiency vs Frequency



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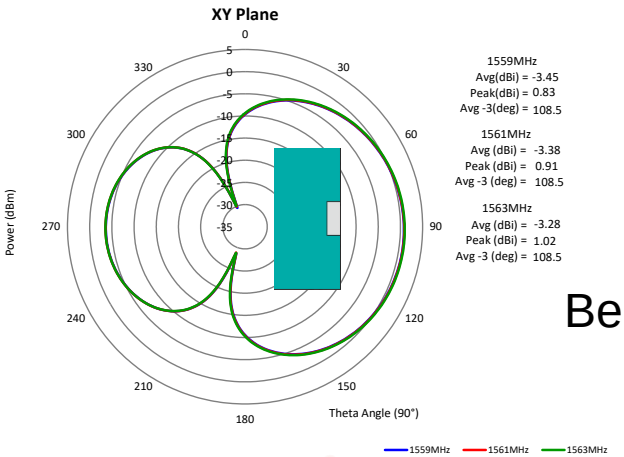
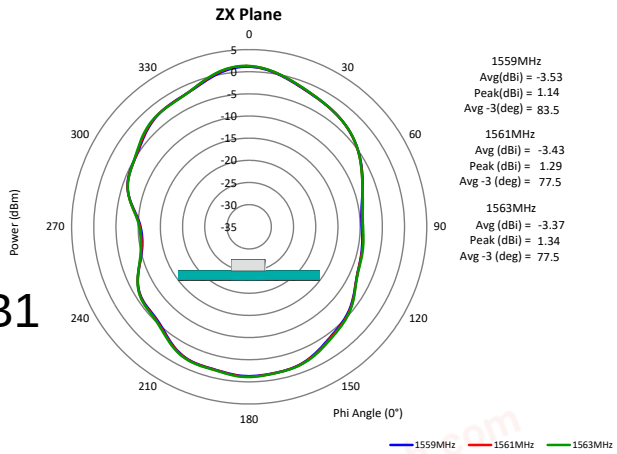
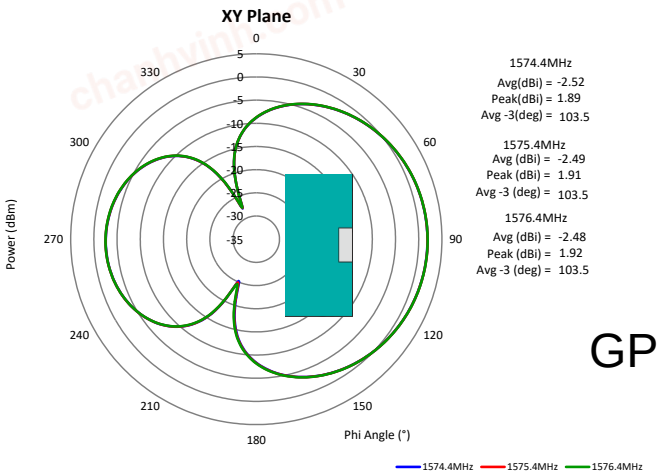
CHARTS

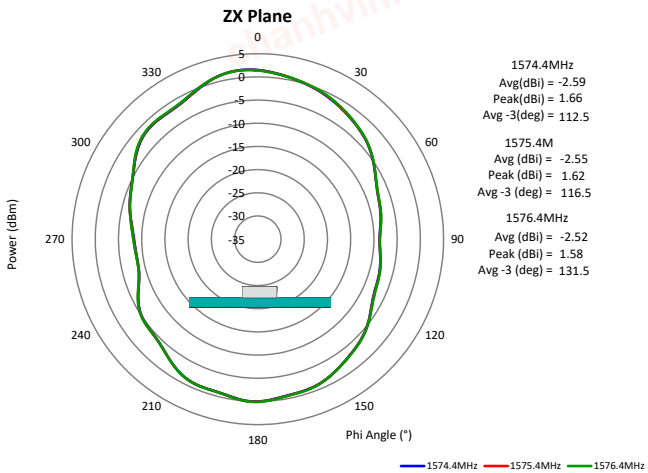
Beidou B1



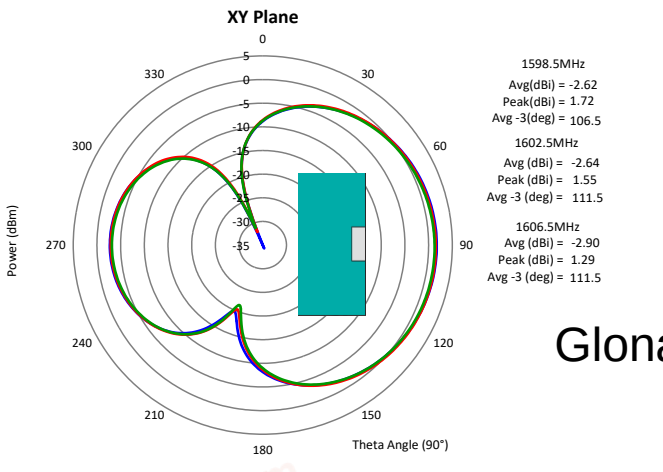


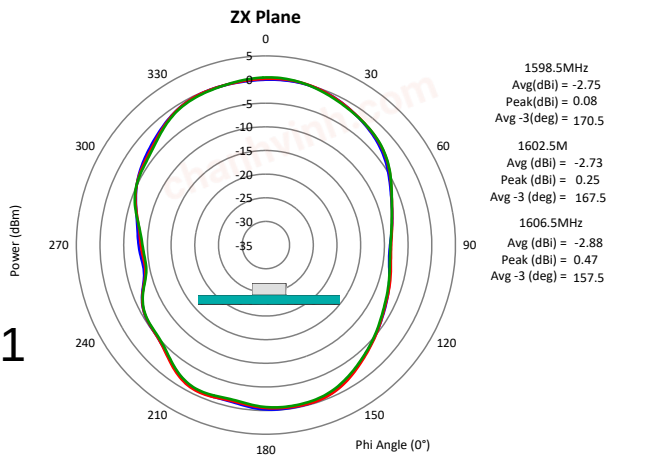
GPS L1





Glonass L1





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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

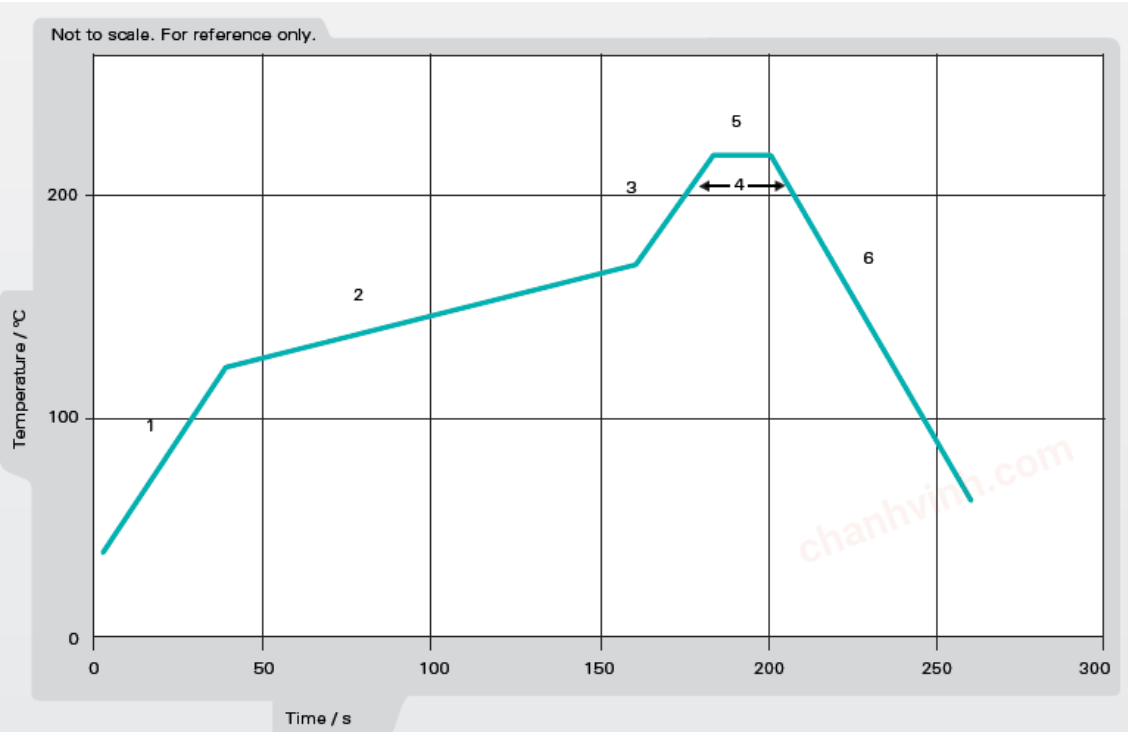

Figure 1. Minimum temperature profile recommendation for reflow soldering process

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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

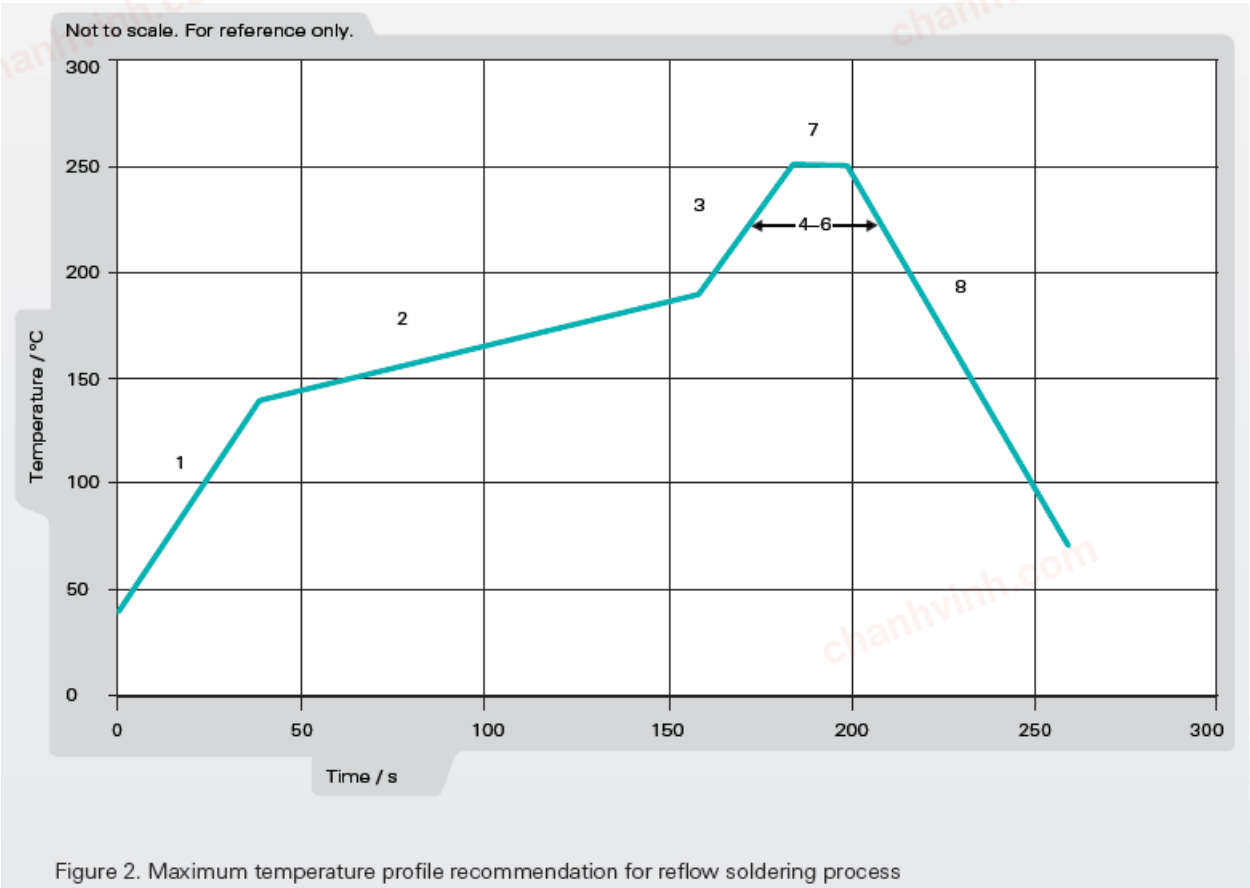

Figure 2. Maximum temperature profile recommendation for reflow soldering process

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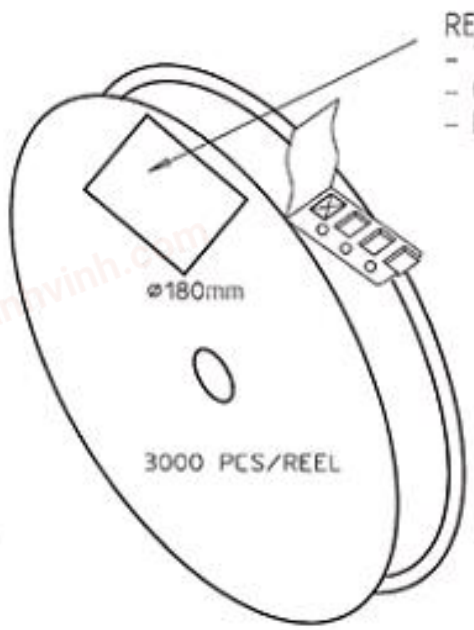
PACKAGING

Taping package
3000PCS/Reel
30000PCS/Carton box

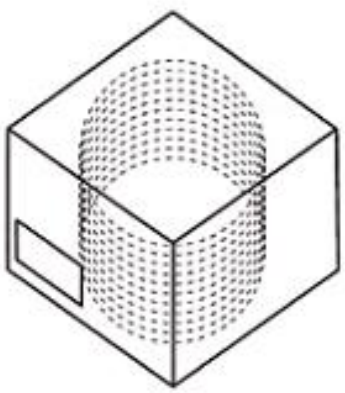


CARRIER TAPE H8S-00125
width=8,00 depth=1,22
COVER TAPE H8S-00126
width=5,60

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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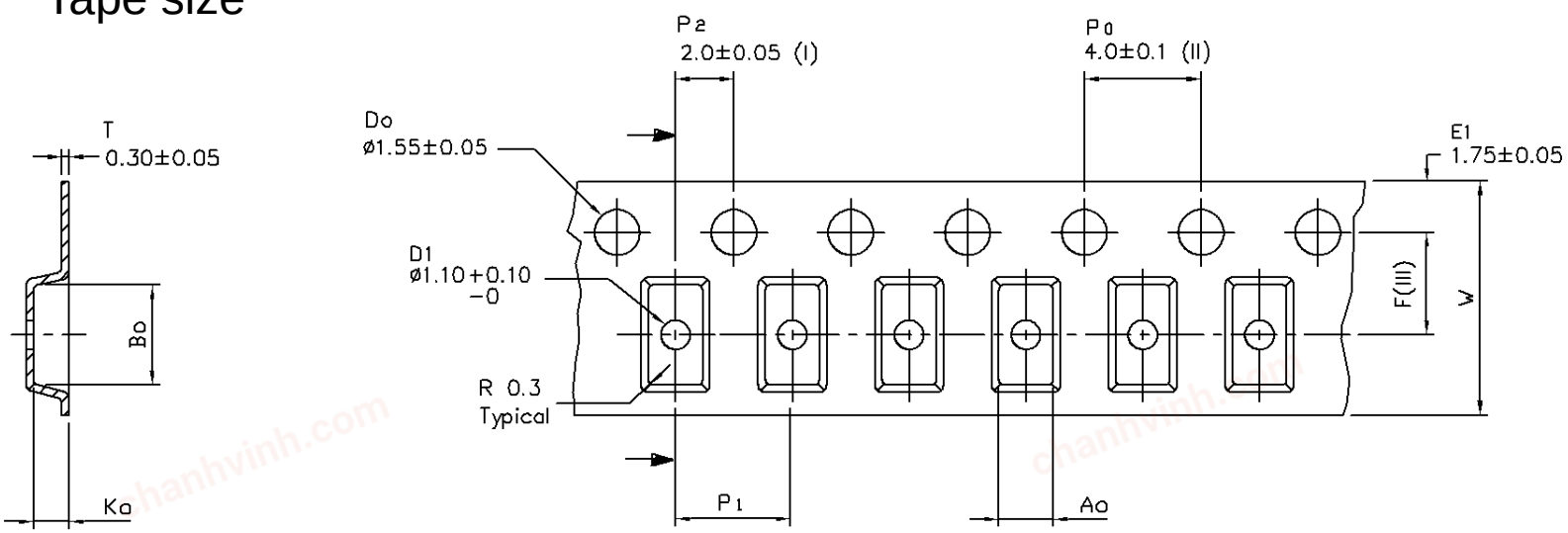
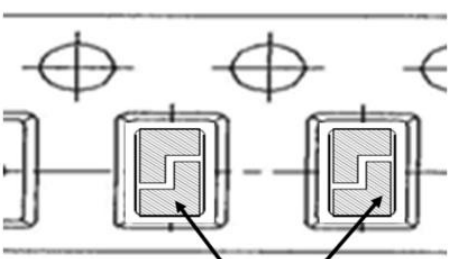
PACKAGING

Tape size



Ao	1.85	+/− 0.1
Bo	3.43	+/− 0.1
Ko	1.22	+/− 0.1
F	3.50	+/− 0.05
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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