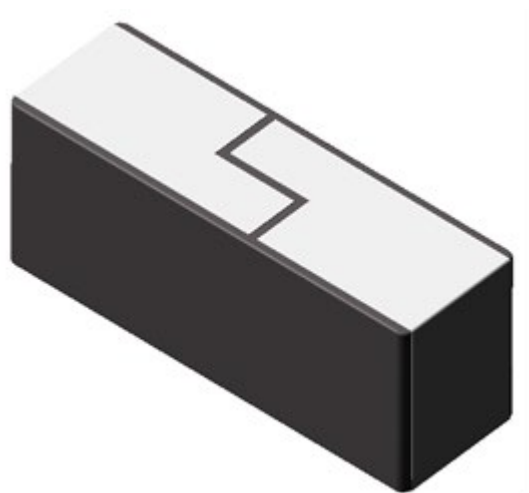


**Description:** 868MHz Ceramic Chip Antenna**Series:** Ceramic Chip Antenna**PART NUMBER:** W3013**Features:**

- Frequency 866-870 MHz
- Gain 1.5dBi
- Size 10 x 3.2 x 4 mm
- PCB Keep out 10.8 x 8.25 mm
- Polarization Linear
- Radiation pattern Omni

**Applications:**

- ISM 868MHz Band

All dimensions are in mm / inches

Issue: 2525

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Pulse GmbH & Co, KG  
Zeppelinstrasse 15  
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Pulse (Suzhou) Wireless Products Co, Inc.  
99 Huo Ju Road(#29 Bldg, 4<sup>th</sup> Phase  
Suzhou New District  
Jiangsu Province, Suzhou 215009 PR China  
Tel: 86 512 6807 9998



**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

### ELECTRICAL SPECIFICATIONS

Antenna Type	Chip antenna
Frequency	868-870MHz
Nominal Impedance	50 $\Omega$
Return Loss (Max)	-10dB
Radiation Pattern	Omni
Gain(Min)	1.5 dBi
Efficiency(Min)	68 %
Polarization	Vertical
Power Withstanding	3W

### MECHANICAL SPECIFICATIONS

Compact size	10 x 3.2 x 4mm
Weight	0.6g
Fixing system	SMT
MSL(MOISTURE SENSITIVITY LEVEL)	1

### ENVIRONMENTAL SPECIFICATIONS

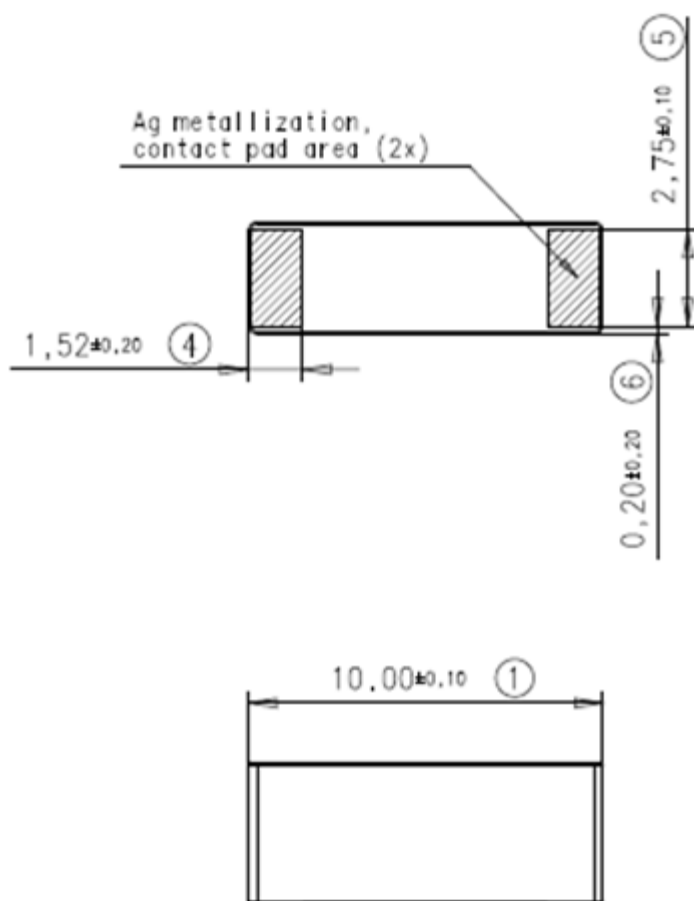
Operating Temperature	-40 ~ +85° C
Storage Temperature	-10 ~ +30° C
RoHS Compliant	Yes

**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

**MECHANICAL DRAWING**



No.	Terminal Name	Terminal Dimensions
1	Feed / GND	1.5 x 2.75 mm
2	Feed / GND	1.5 x 2.75 mm
Antenna is symmetrical. Either of terminals 1 or 2 can be Feed / GND		

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**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

### W3011 GPS Antenna PWB Layout

## W3013 Antenna PWB Layout Specifications

Ground cleared under antenna, clearance area **10.80 x 8.25 mm**

Matching and tuning component values 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 100 x 37 mm.

### PWB layout for W3013 Antenna

Note: All dimensions are in metric system.

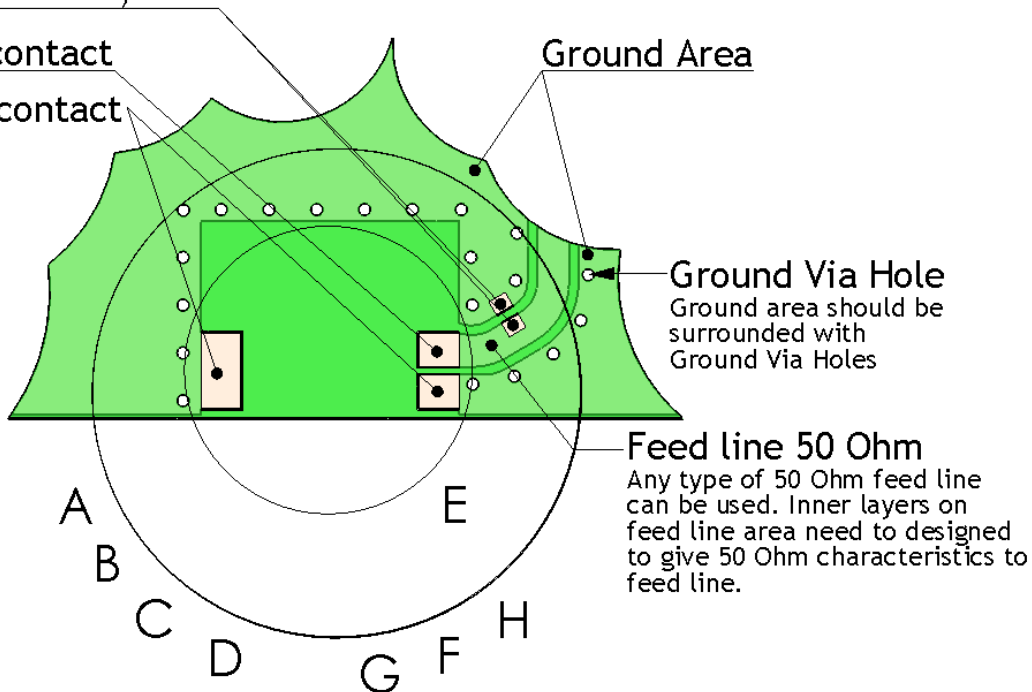
Matching Component  
(optional shunt)

Feed contact  
Ground contact

Ground Area

Ground Via Hole  
Ground area should be surrounded with Ground Via Holes

Feed line 50 Ohm  
Any type of 50 Ohm feed line can be used. Inner layers on feed line area need to be designed to give 50 Ohm characteristics to feed line.



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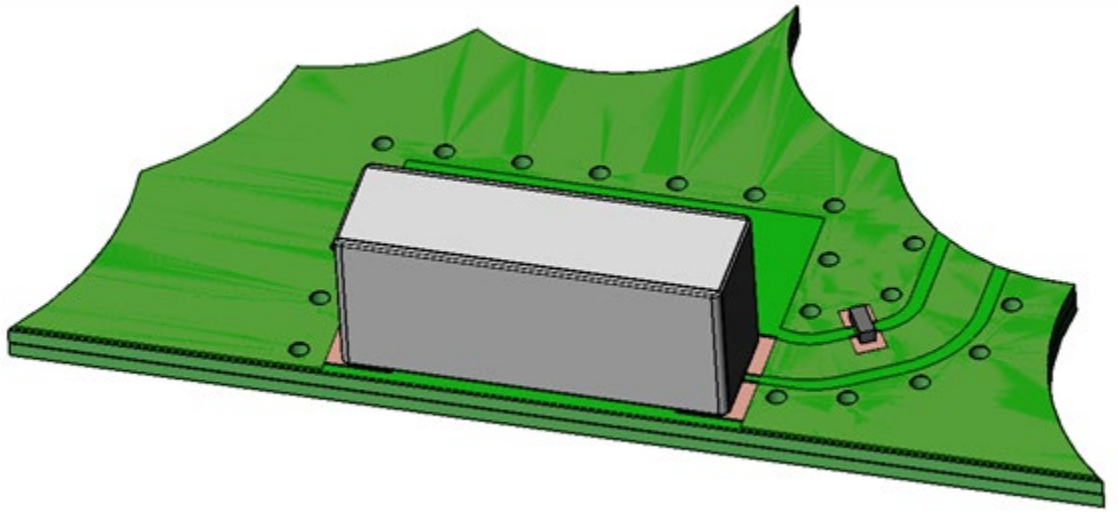
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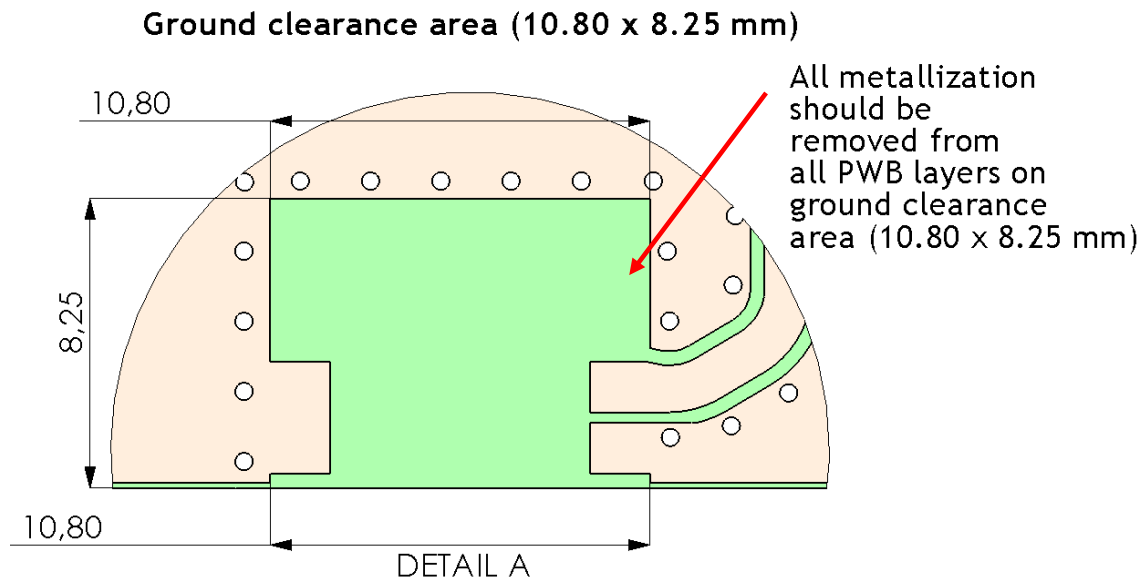
**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013



*Ground clearance area for W3013 Antenna*



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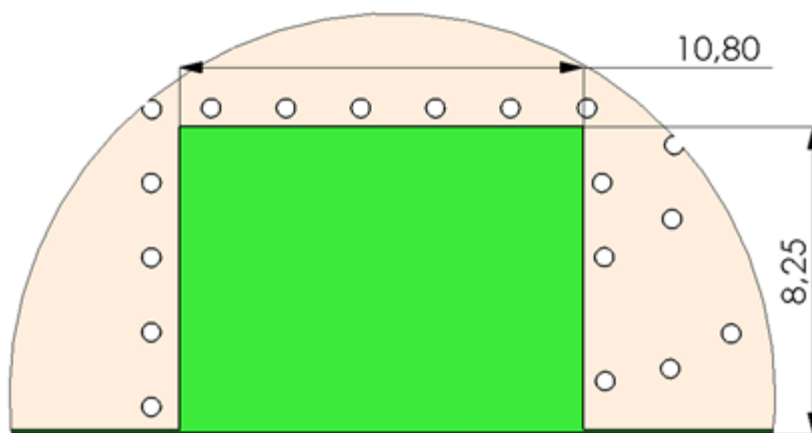
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**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

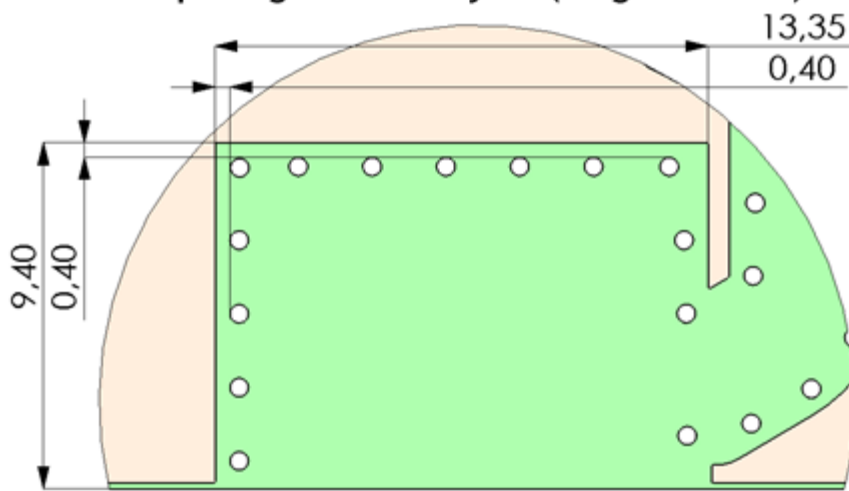
**PART NUMBER:** W3013

Opening in bottom/inner ground layers



DETAIL B

Opening in other layers (no ground/ RF)



DETAIL C

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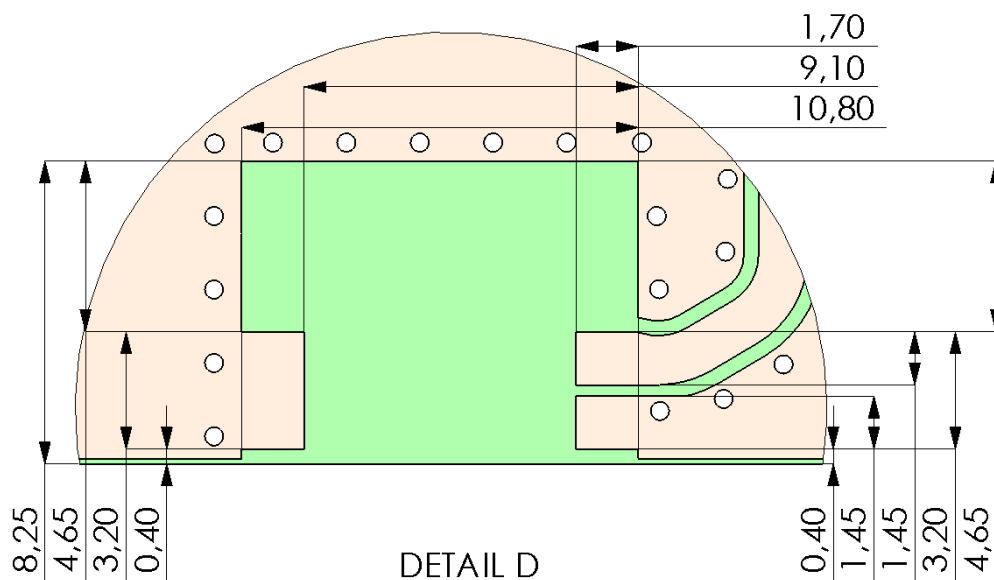
**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

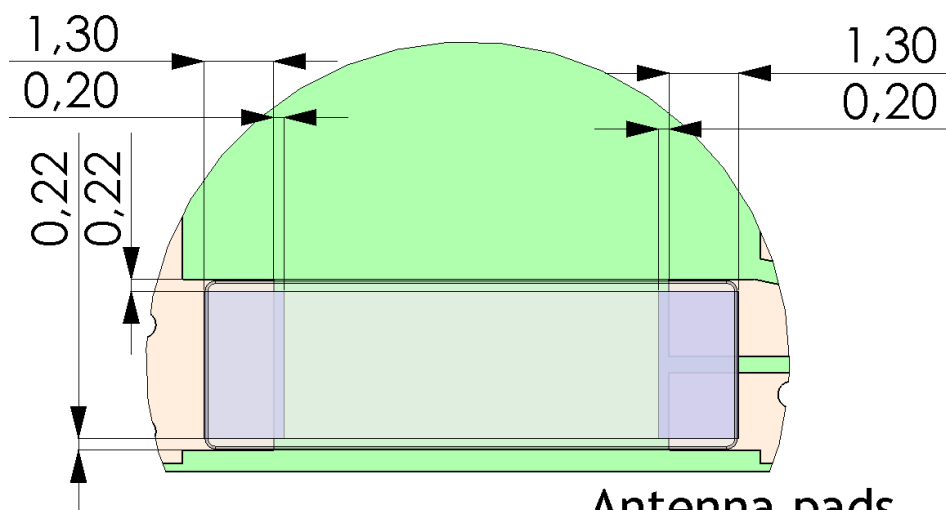
**PART NUMBER:** W3013

*PWB pad dimensions and antenna position for W3013 Antenna*

**Pad dimensions in top copper**



**Antenna position on PWB layout**



**Antenna pads  
DETAIL E are marked blue**

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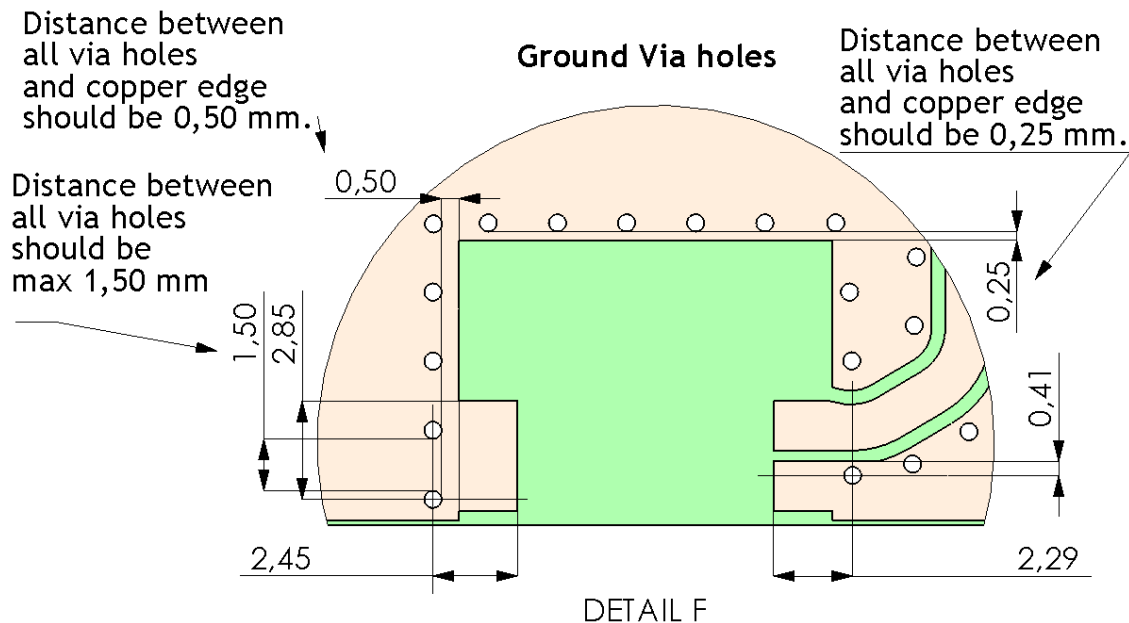
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**Description:** 868MHz Ceramic Chip Antenna

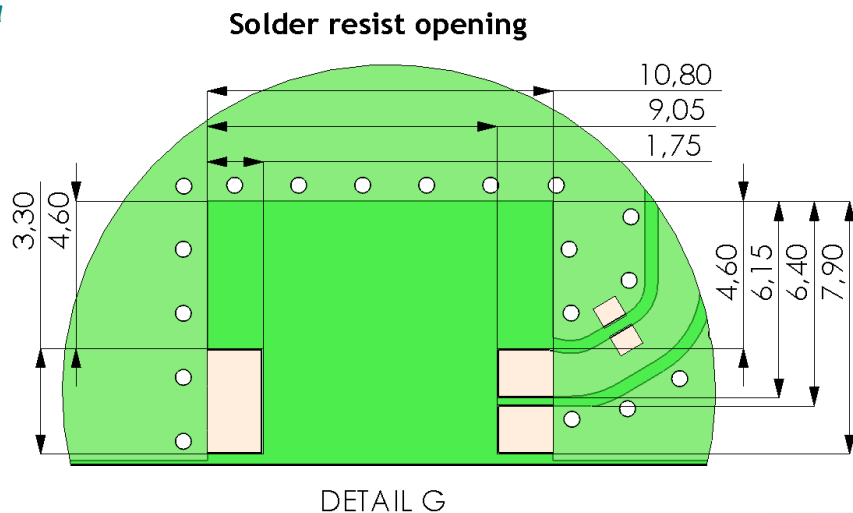
**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

*Typical ground via hole placement in PWB layout for W3013 Antenna*



*Solder resist opening and Paste stencil recommendation for W3013 Antenna*



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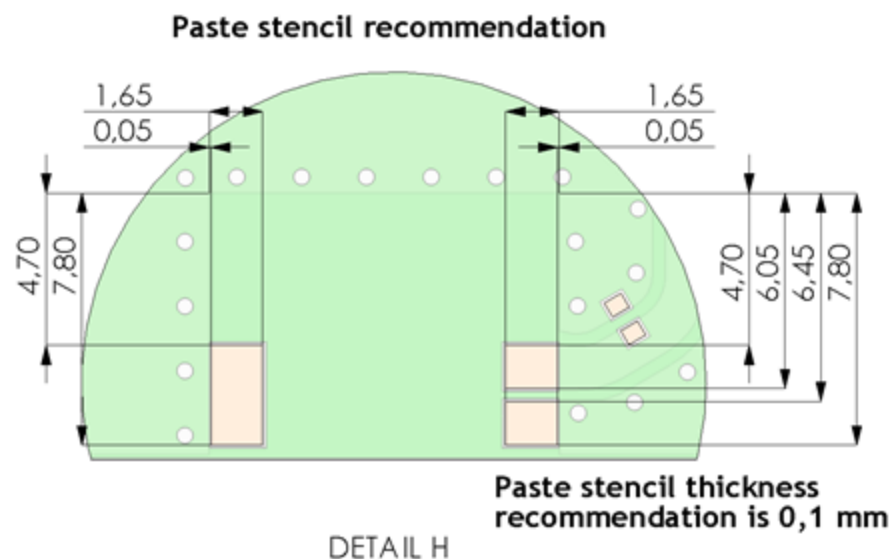
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**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013



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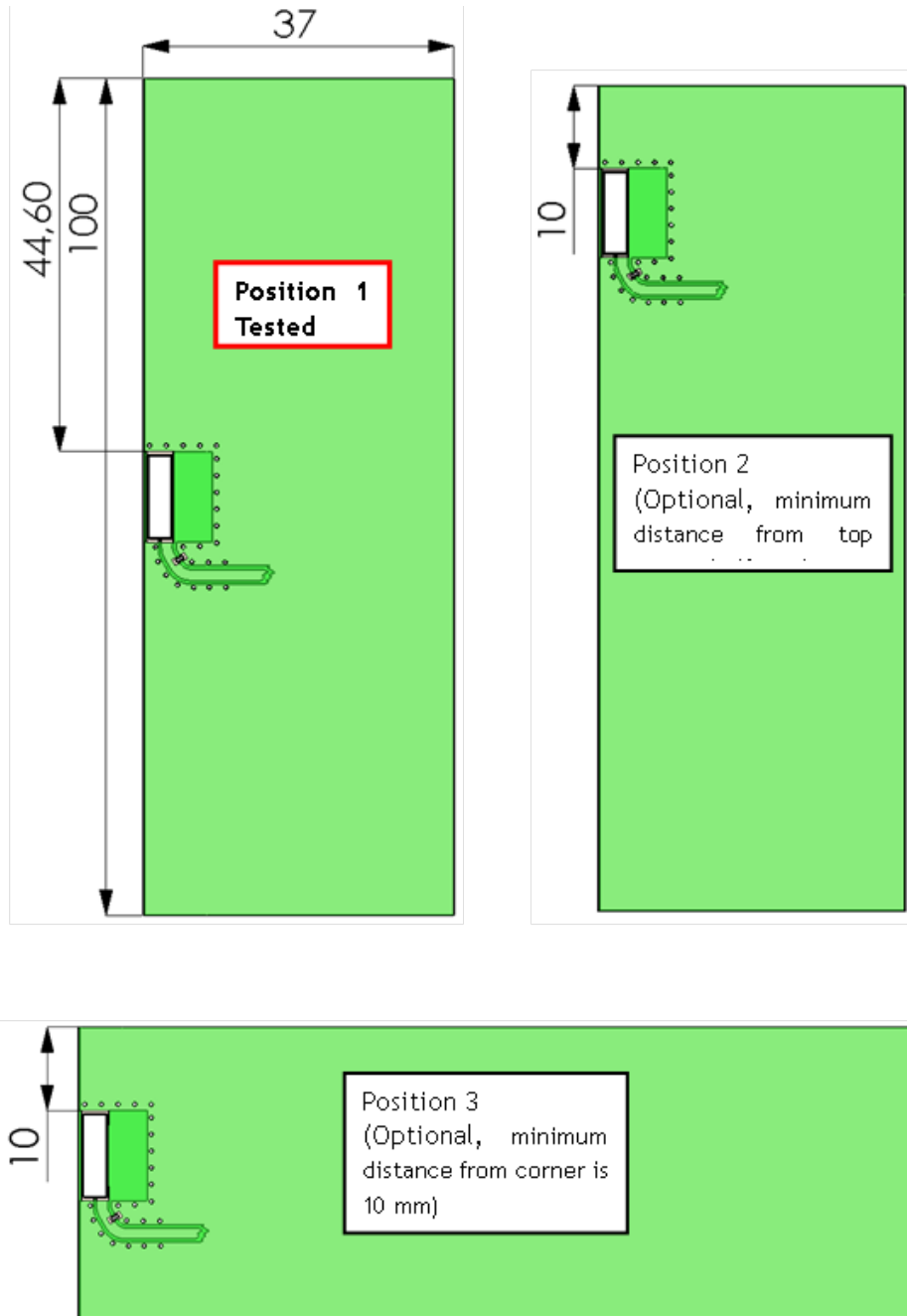
**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

*Recommended antenna position on PWB for W3013 Antenna*

Our test PWB size is 37 x 100 mm, other sized boards can be used depending on customer device size (minimum 35 x 35 mm)



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**Series:** Ceramic Chip Antenna

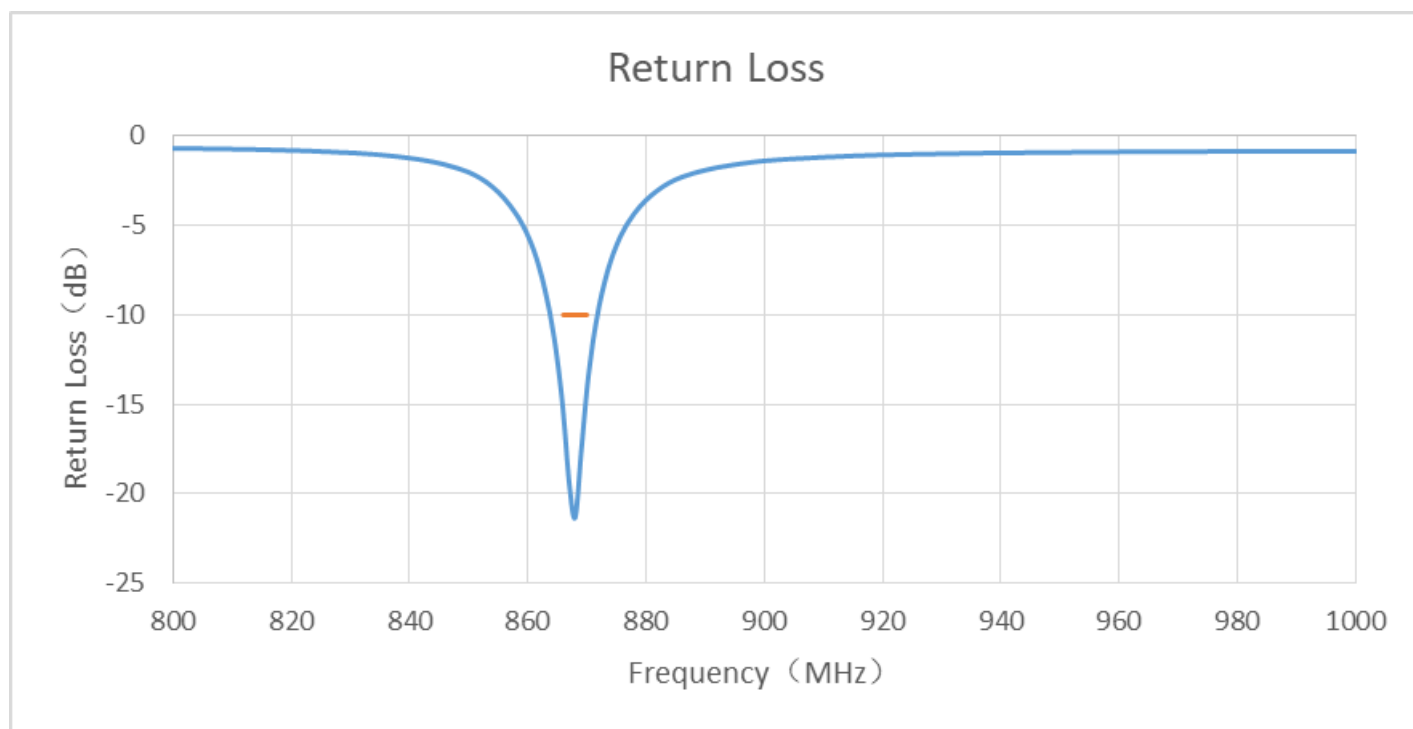
**PART NUMBER:** W3013

## GHARTS

### Typical Electrical Characteristics (T=25 °C)

*Measured on the 100 x 37mm test board with 3 pF matching capacitor.*

### Typical Return Loss S11/ impedance



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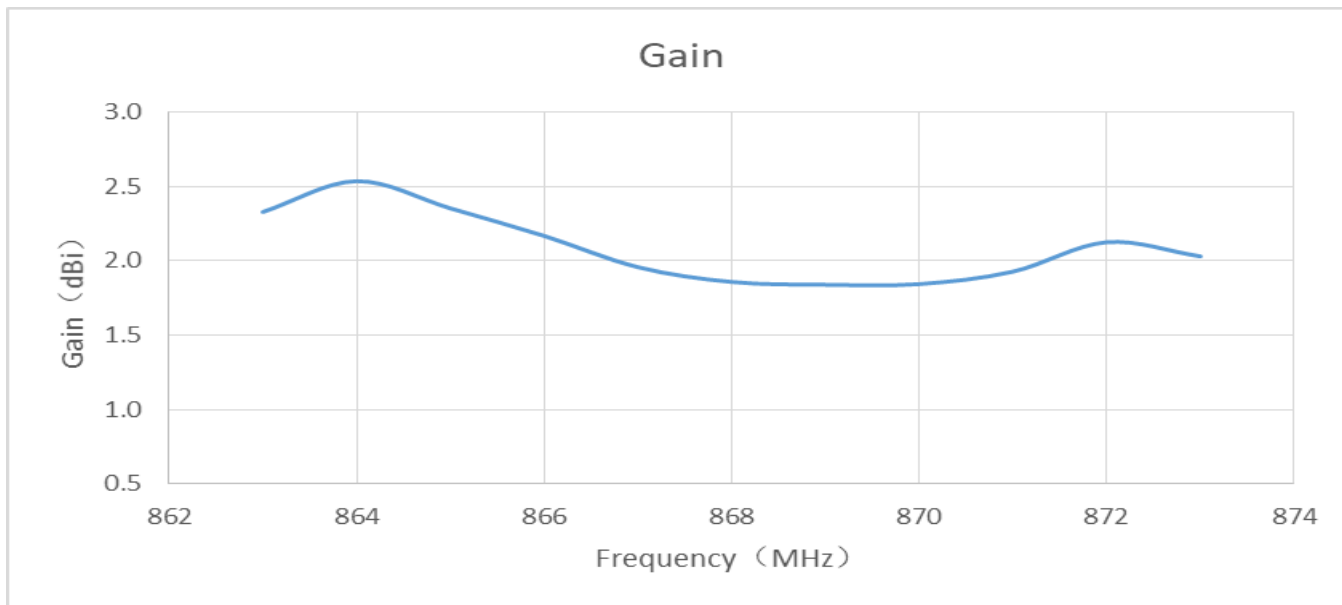
**Description:** 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

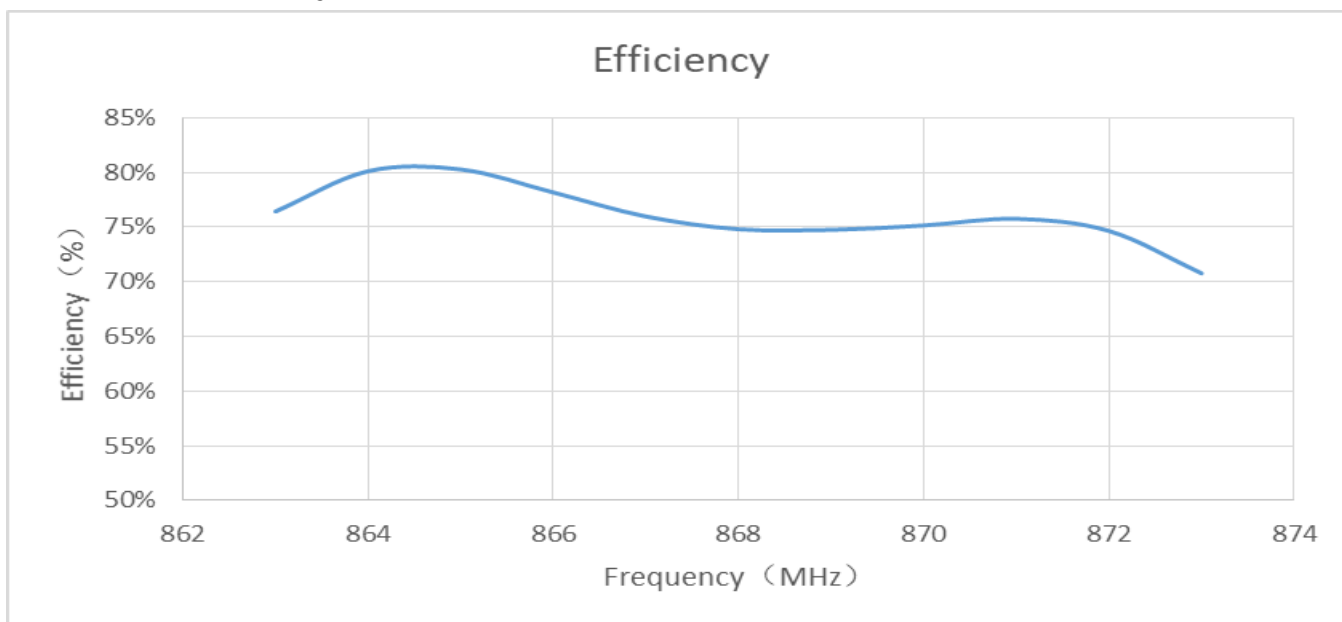
**PART NUMBER:** W3013

### CHARTS

#### Gain



#### Radiation Efficiency



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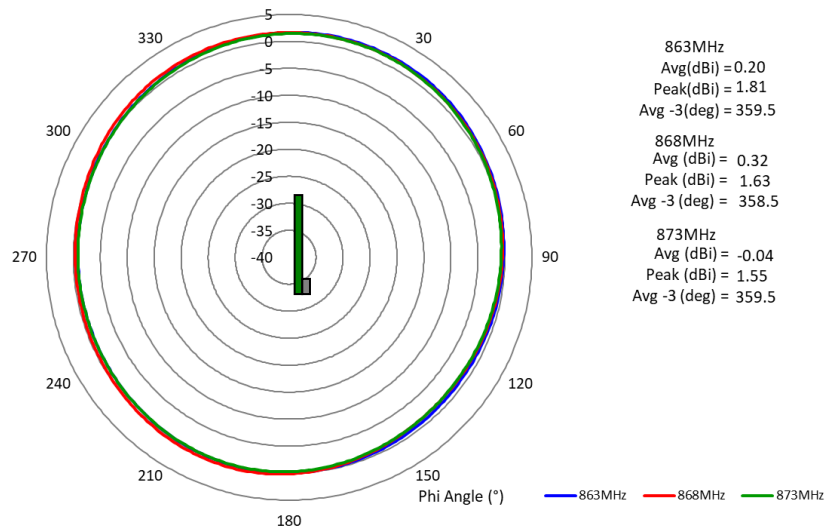
**Description: 868MHz Ceramic Chip Antenna**

**Series: Ceramic Chip Antenna**

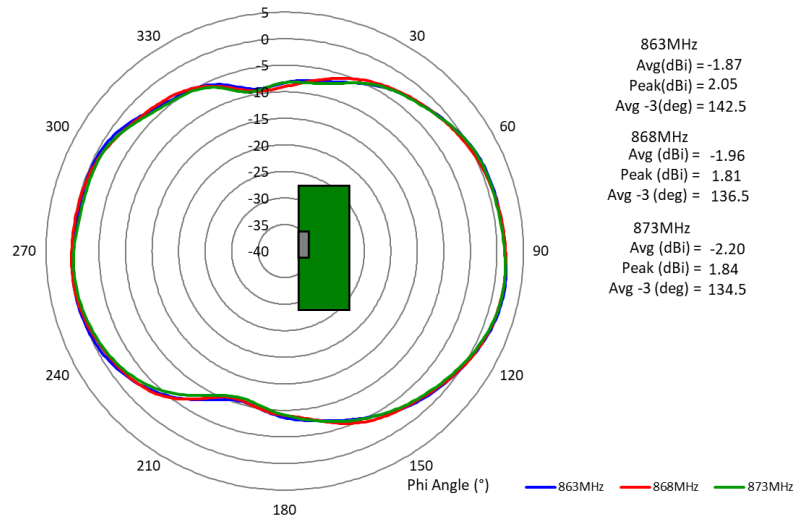
**PART NUMBER: W3013**

**CHARTS**

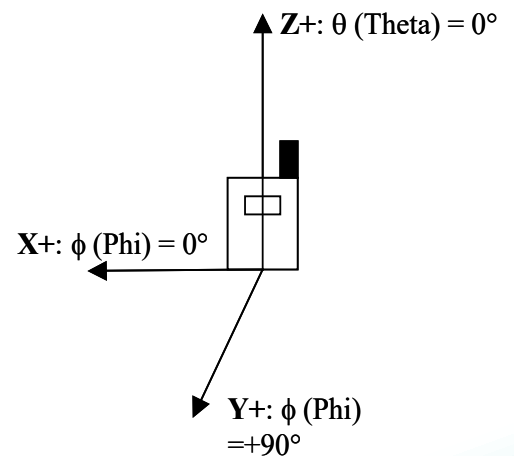
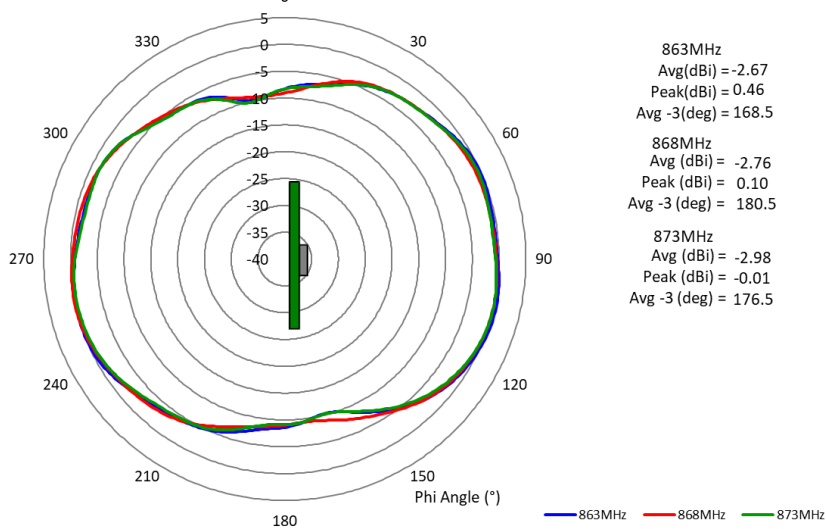
**XY Plane**



**ZX Plane**



**YZ Plane**



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**Description:** 868MHz Ceramic Chip Antenna**Series:** Ceramic Chip Antenna**PART NUMBER:** W3013

## Recommendations for ceramic chip antenna storage

### Storage environmental conditions

To maintain solderability of Pulse ceramic products care must be taken to control the storage and use conditions:

- Do not store or use products in a corrosive atmosphere, especially where chloride, sulphur or sulfide, alkali or acid salts exist in the air. Corrosive gases may cause oxidation of electrodes and reduce solderability
- Keep temperature and humidity stable and do not exceed the below mentioned minimum and maximum conditions: Temperature: -10 to +30 Deg C  
Humidity: below 60% RH
- Do not store the products under direct sun light.

It is recommended to keep the products in manufacturers packing (tape&reel) until the time of assembly and soldering process. Air tight vacuum package is recommended in the conditions where it is know to be some corrosive gases.

### Handling

Do not touch the components with bare hands. Protective gloves must be used to prevent contamination of terminals which may cause reduced solderability. Do not touch or damage the silver plated surface by any sharp objects. Soft materials (plastic, wood etc.) must be used if tweezers or other tools are used to pick the components. Avoid any excess mechanical shock or vibration during storage and handling.

### Description: 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

#### 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

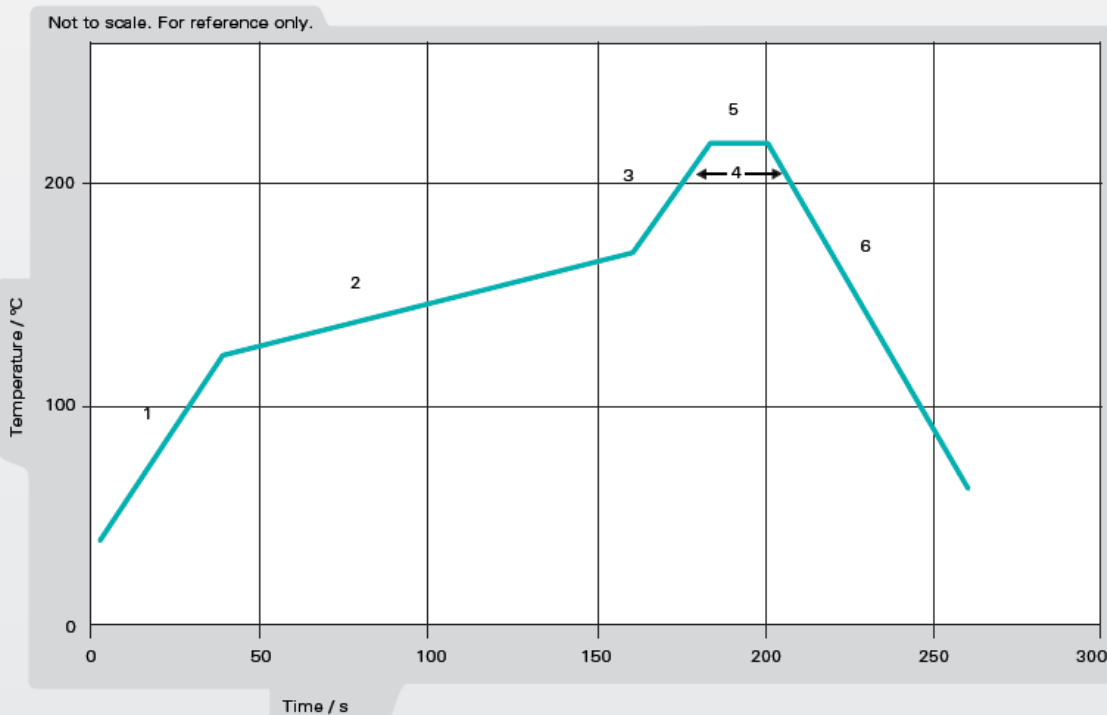


Figure 1. Minimum temperature profile recommendation for reflow soldering process

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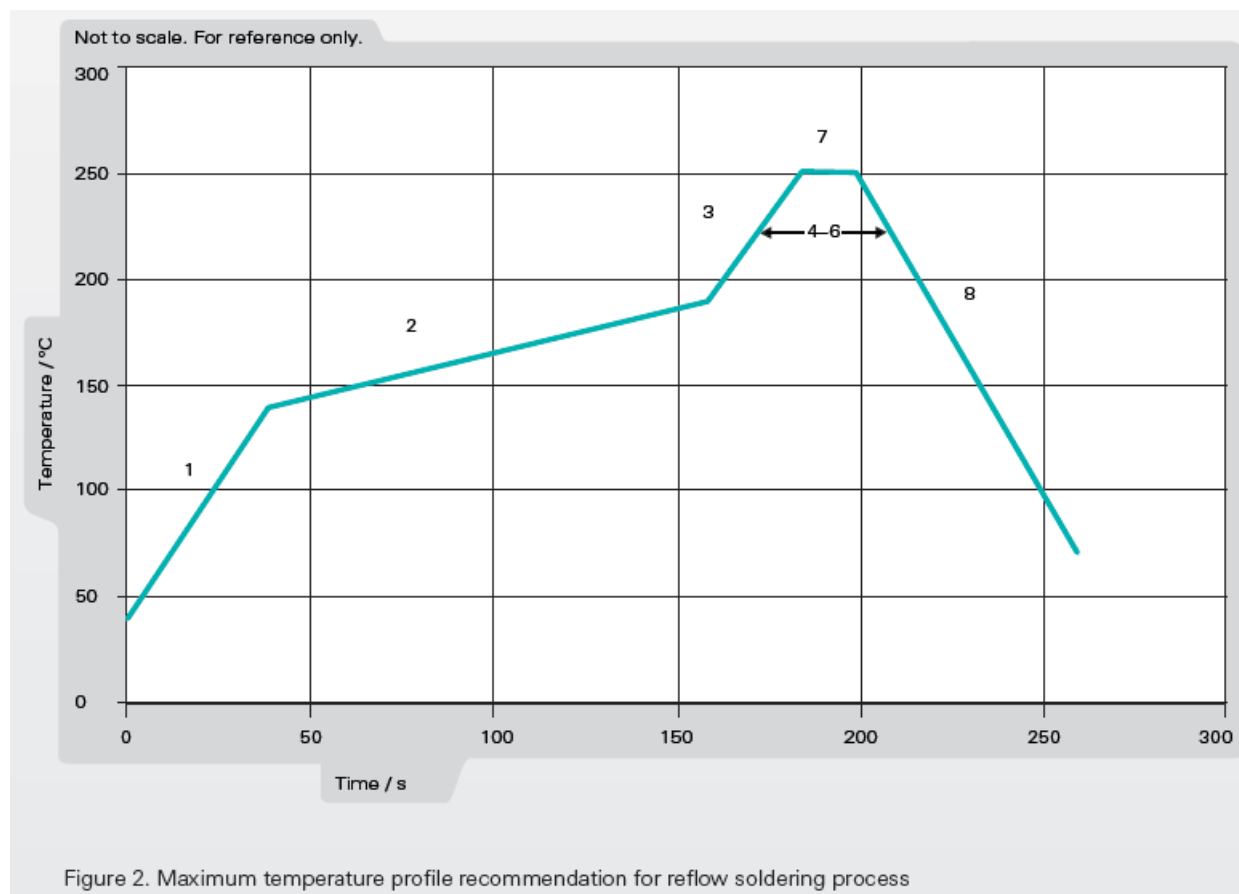
### Description: 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

**PART NUMBER:** W3013

### 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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### Description: 868MHz Ceramic Chip Antenna

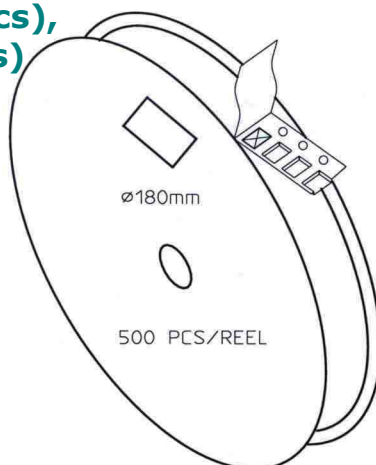
**Series:** Ceramic Chip Antenna

**PART NUMBER: W3013**

## PACKAGING

### Packing form

**500pcs in one Reel,  
3 reel in one inbox (1500 pcs),  
2 inbox in out box (3000pcs)**

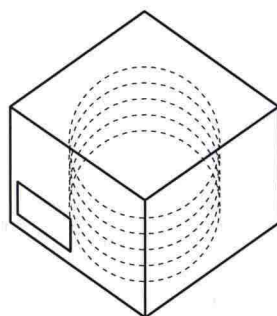


CARRIER TAPE H85-00158  
width=24,00 depth=4.15  
COVER TAPE H85-00159  
width=21.20

#### LENGTH OF TAPE:

- Leader section: min 350 mm before component section
- Trailer section: min 40 mm after component section.



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



BOX H85-00128 1 pcs  
(182x182x125)  
- LABEL 1 pcs/BOX  
REEL H85-00160 4 pcs  
(D180,W28)  
- REEL LABEL 1 pcs/REEL

#### MATERIAL

#### HANDLINGS

		RATIO	DRWN	160107 PeHa	H	
			DGNER		G	
			CHKD		F	
			APPRD		E	
PRODUCT			APPRD BY		D	
H90-OY800-F01P01					C	
					B	
					A	
DENOMINATION			VERSION		MOD/DATE/NAME	
PACKING FORM						

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## Description: 868MHz Ceramic Chip Antenna

**Series:** Ceramic Chip Antenna

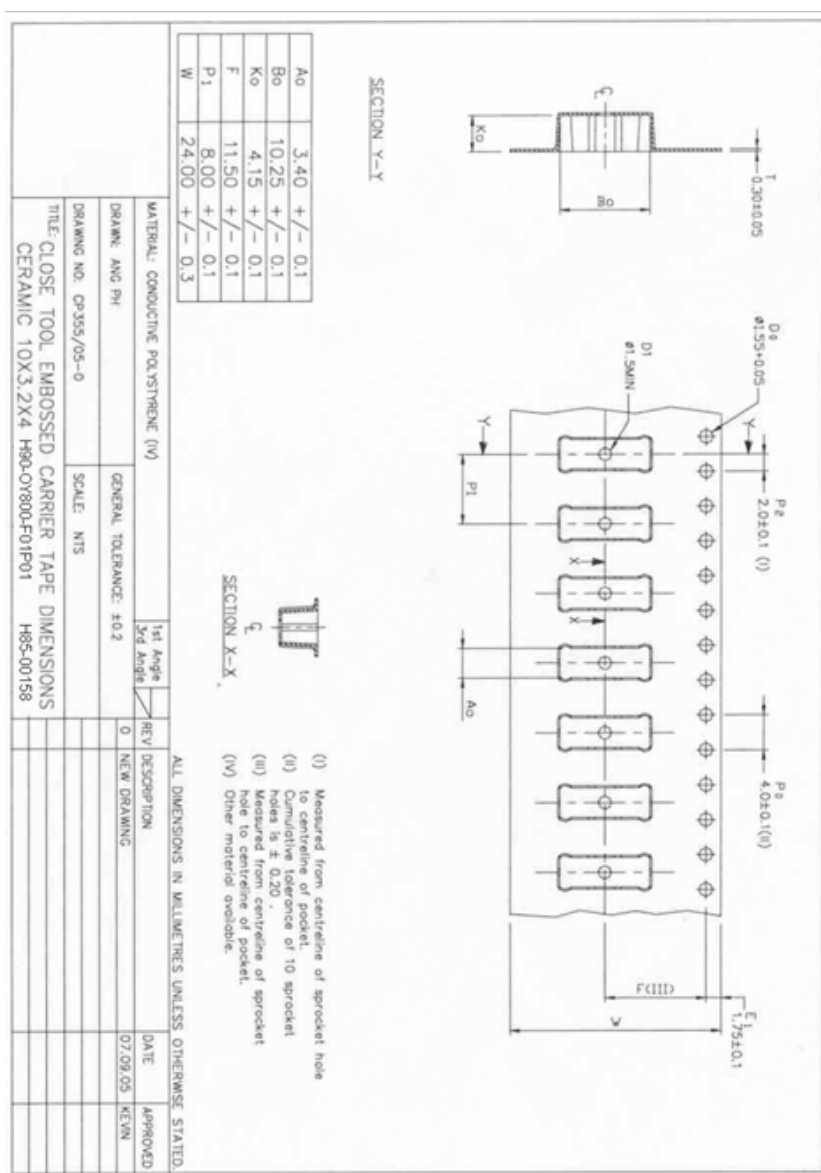
**PART NUMBER:** W3013

## PACKAGING

### General

Tape and reel packing is used. Carrier tape, reel and box dimensions are presented in following pictures.

### Carrier tape



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