Pulse | LARSEN Antennas
A YAGEO Company

TECHNICAL DATA SHEET

Description: 860-930MHz Embedded Helical Antenna

PART NUMBER: W3139

Series:
SMD Helical Antenna

Features:

- Antenna type: Helix with molded plastic support
- Fully SMD compatible
- Size 14x3mm
- Minimum keep out 4.2mm
- RoHS compliant

Applications:

- ISM 868MHz and 915MHz radio systems
- Sensors
- Remote controls
- Security
- IoT

All dimensions are in mm / inches

Issue: 1924

RoHS COMPLIANT

For more information:

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

Pulse/Larsen Antennas
18110 SE 34th St Bldg 2 Suite 250
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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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TECHNICAL DATA SHEET

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

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ELECTRICAL SPECIFICATIONS

Antenna Type	Helical
Frequency	860-930MHz
Nominal Impedance	50 Ω
Radiation Pattern	Omni
Polarization	Linear
Power Withstanding	2W

	Frequency band	Return Loss	Gain	Efficiency
PWB 1 (small clearance, 4.2mm copper free area from the PCB edge)	ISM868±5MHz	<-8dB	-2.5	35%
	ISM915±13MHz	<-8dB	-2.5	30%
PWB 2 (big clearance, 9.5mm copper free area from the PCB edge)	ISM868±5MHz	<-10dB	-0.5	55%
	ISM915±13MHz	<-10dB	-1	45%

Description: 860-930MHz Embedded Helical Antenna

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MECHANICAL SPECIFICATIONS

Overall Length / Height	14 mm / 3 mm
Weight	0.52 g
Antenna Color / Material	White
Fix system	SMD+Glue
Recommended Glue	Resinlab EP1320LV Black
Solder Paste Thickness	Min 0.15mm

ENVIRONMENTAL SPECIFICATIONS

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

OTHER SPECIFICATIONS

RoHS COMPLIANT

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TECHNICAL DATA SHEET

Description: 860-930MHz Embedded Helical Antenna

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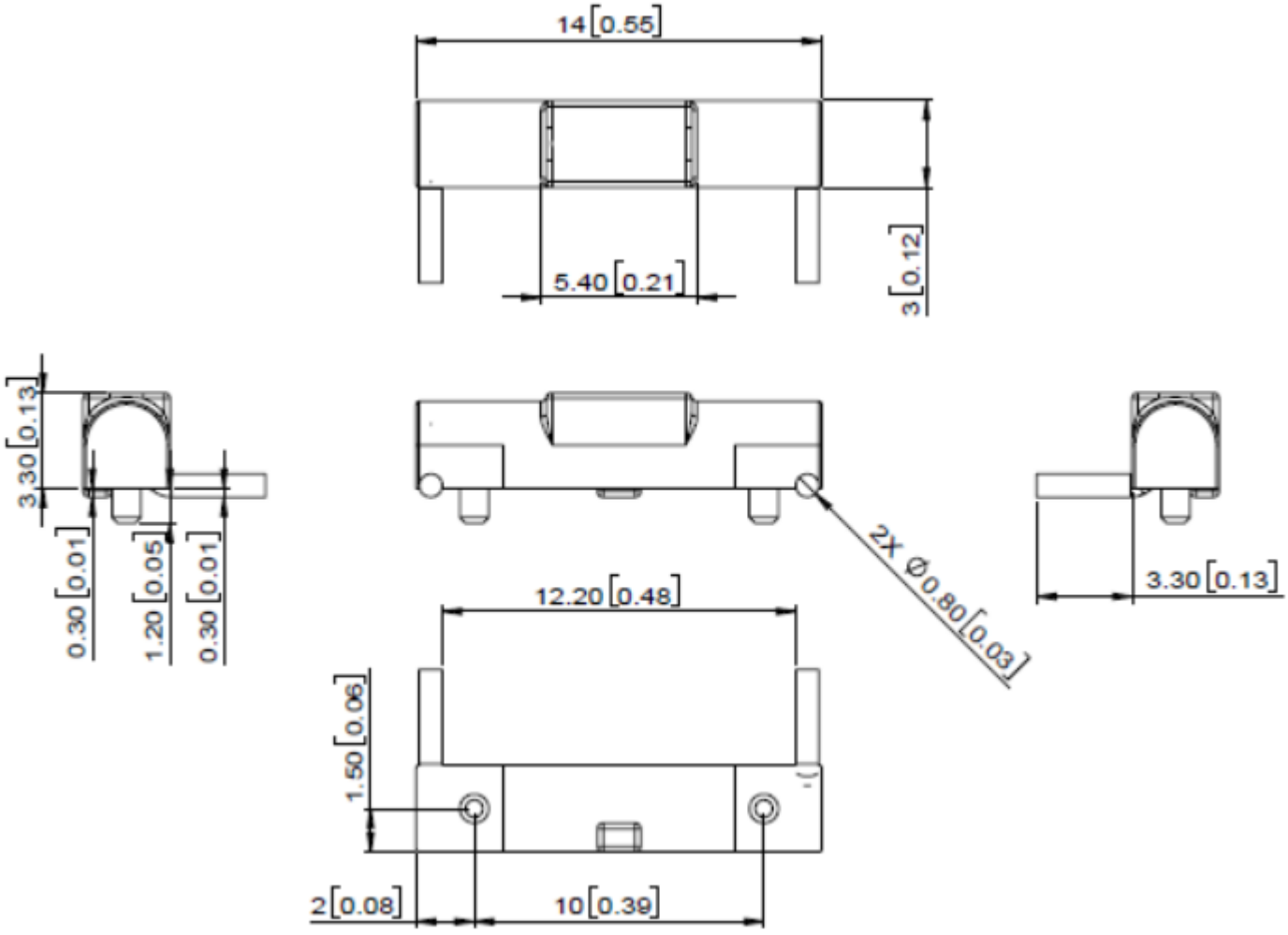
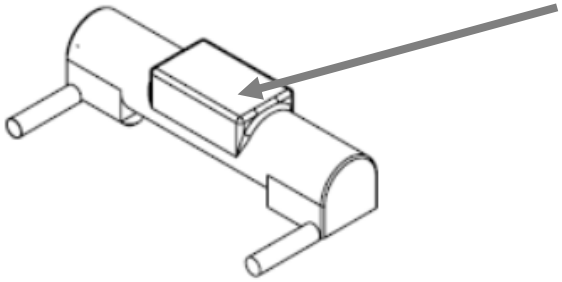
SMD Helical Antenna

PART NUMBER: W3139

MECHANICAL DRAWING





Dimension Unit: mm[inch]

Issue: 1924

RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

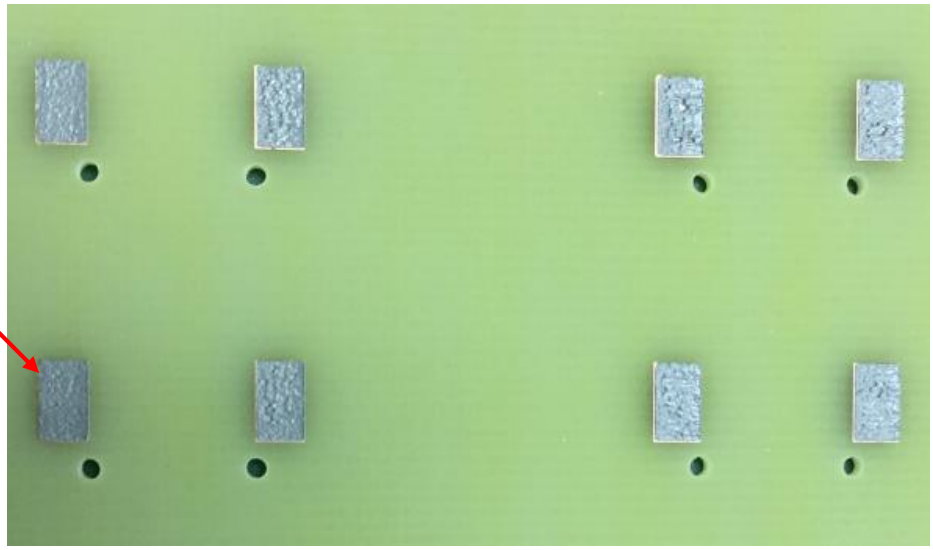
PART NUMBER: W3139

FIX SYSTEM RECOMMENDATION

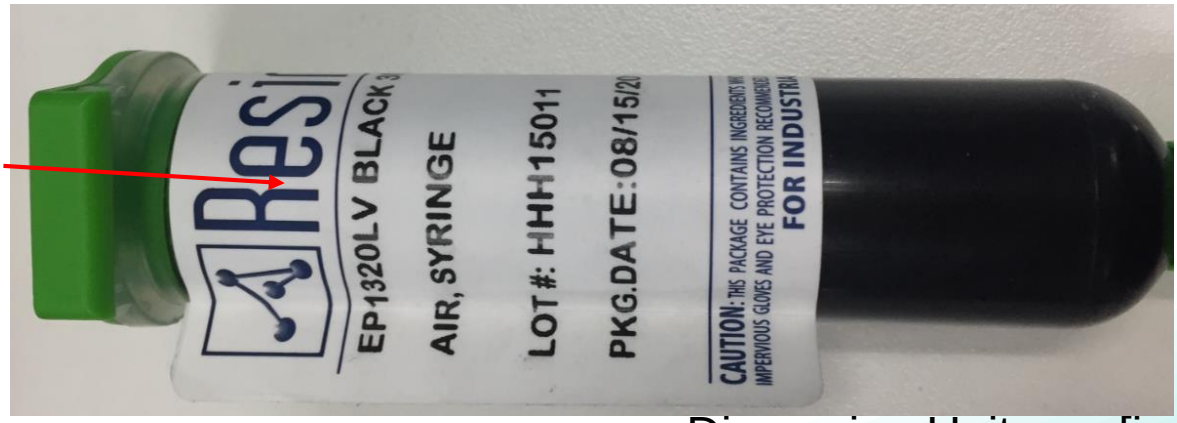
Fix system

1. SMD process
2. Solder paste thickness: minimum 0.15mm
3. Glue is required, Recommended Glue: Resinlab EP1320LV Black, usage and position see below recommended area.

Solder paste



Recommended Glue Type



Dimension Unit: mm[inch]

RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

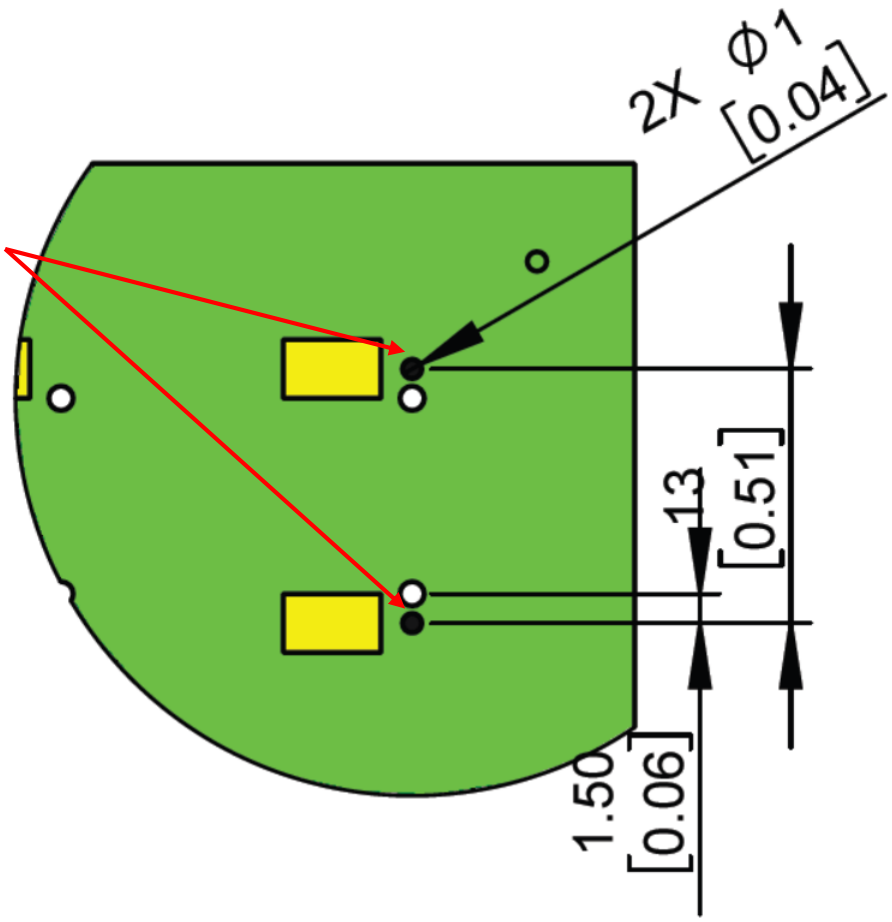
PART NUMBER: W3139

FIX SYSTEM RECOMMENDATION

Fix system

1. Glue position on PCB for recommendation

Glue position on PCB for recommendation



Dimension Unit: mm[inch]

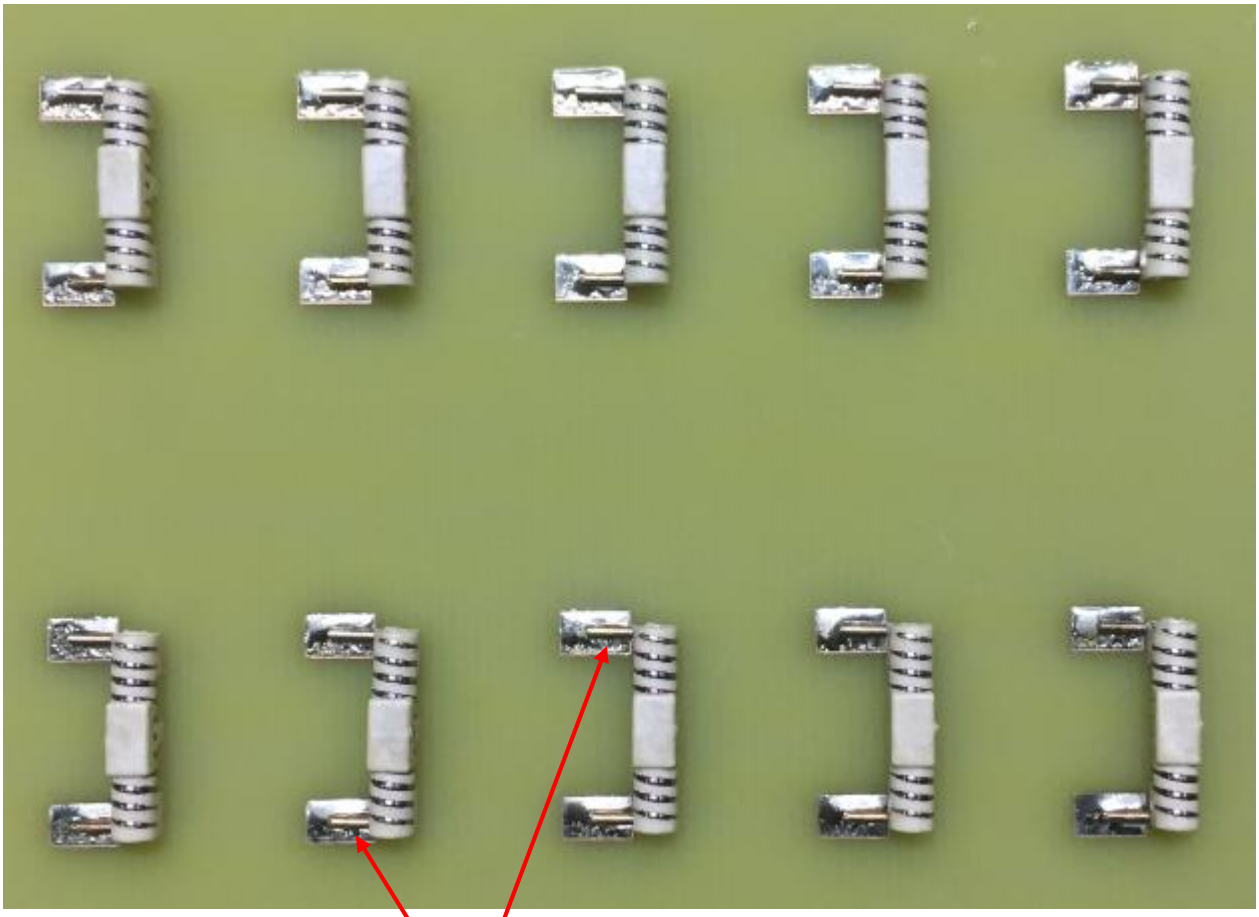
RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

FIX SYSTEM RECOMMENDATION



Solder effect

Dimension Unit: mm[inch]

RoHS COMPLIANT

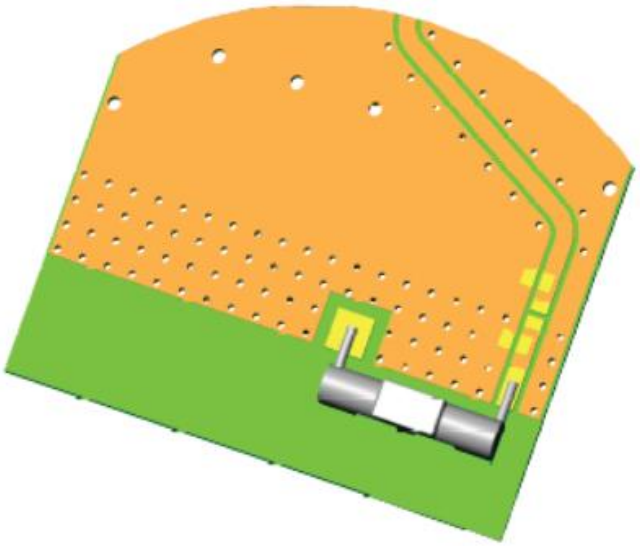
Description: 860-930MHz Embedded Helical Antenna

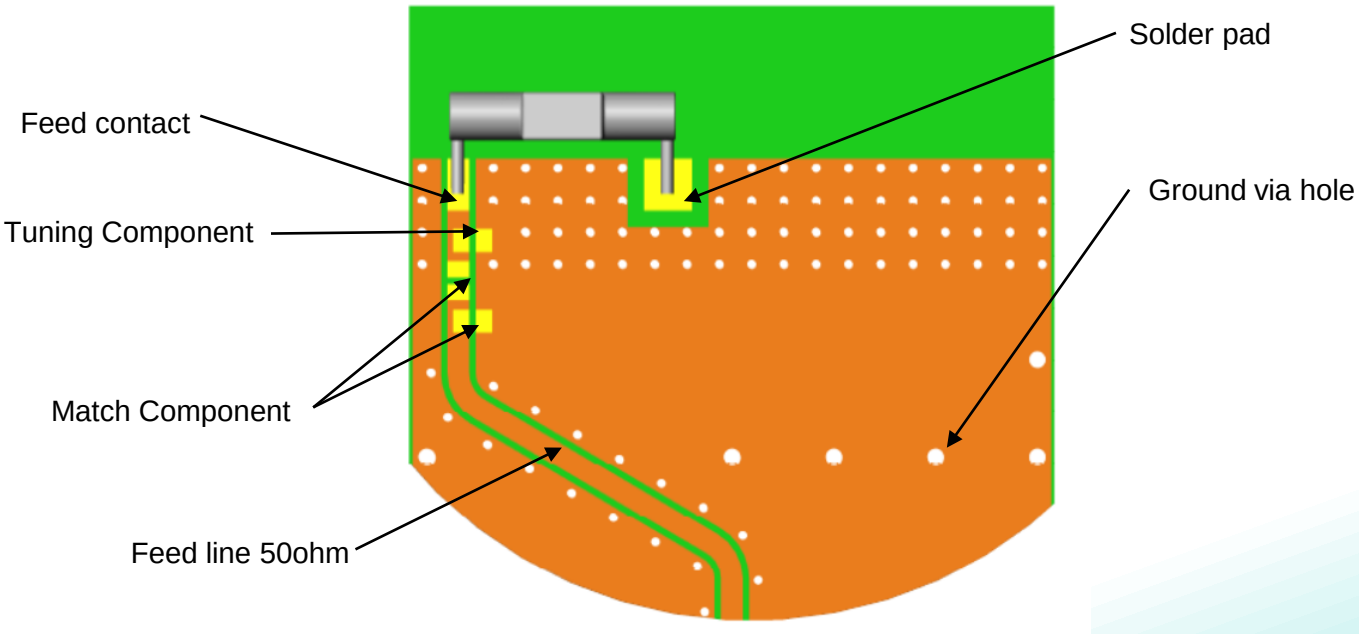
Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 1 Layout for W3139 SMD Helical Antenna





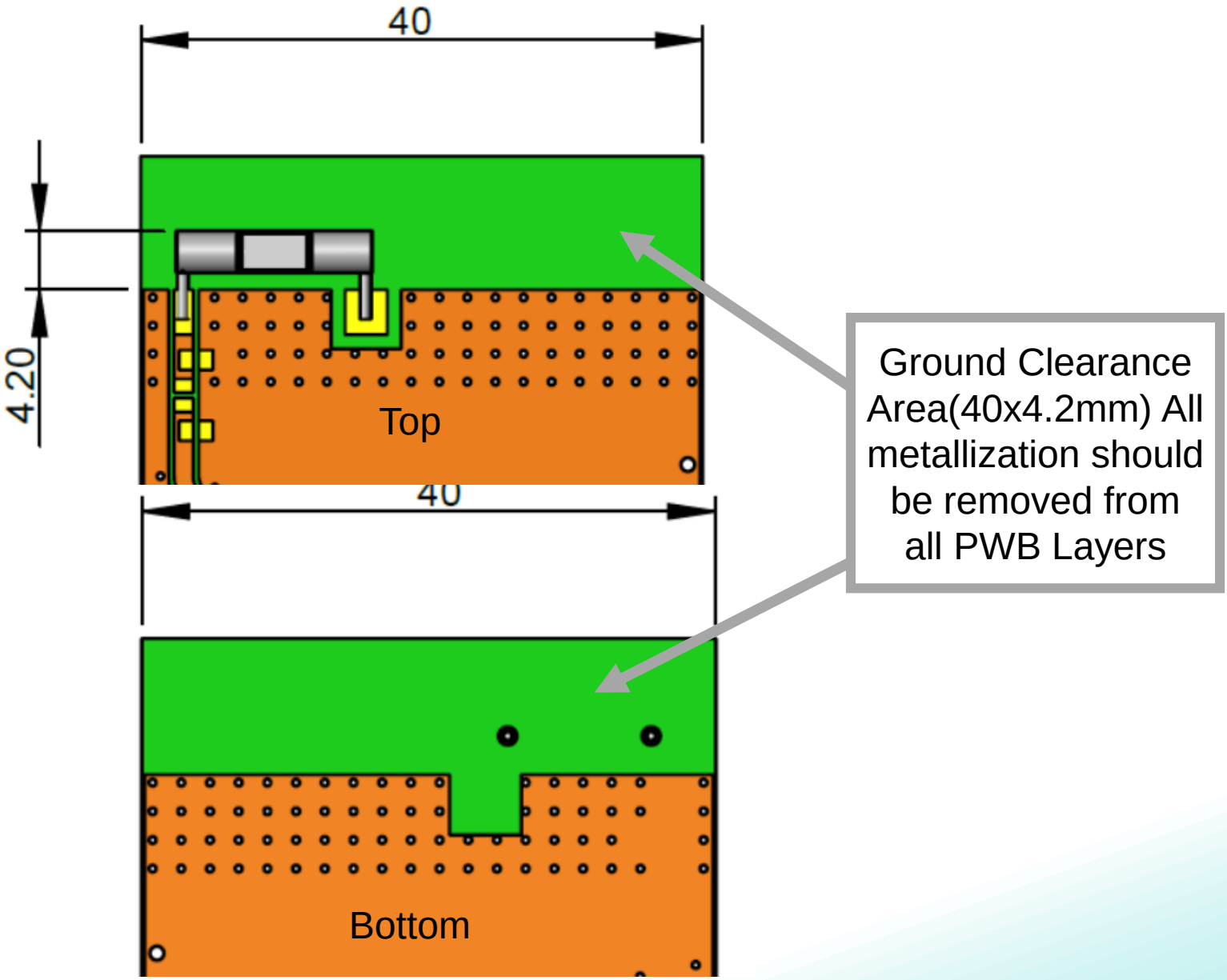
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 1 ground clearance area (Top):40x4.2mm
PWB 1 ground clearance area (Bottom):40x4.2mm



RoHS COMPLIANT

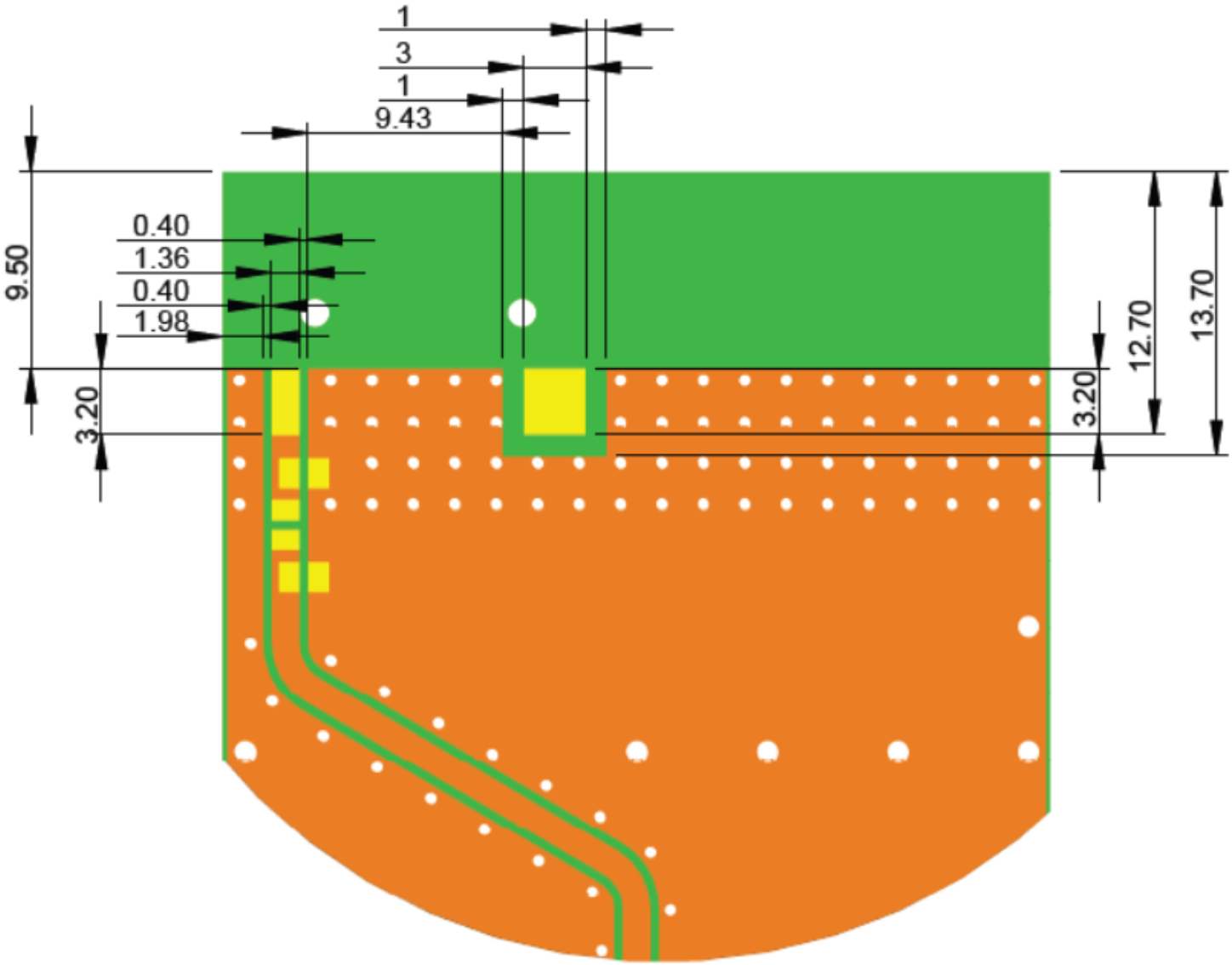
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 1 Pad dimension in top copper



RoHS COMPLIANT

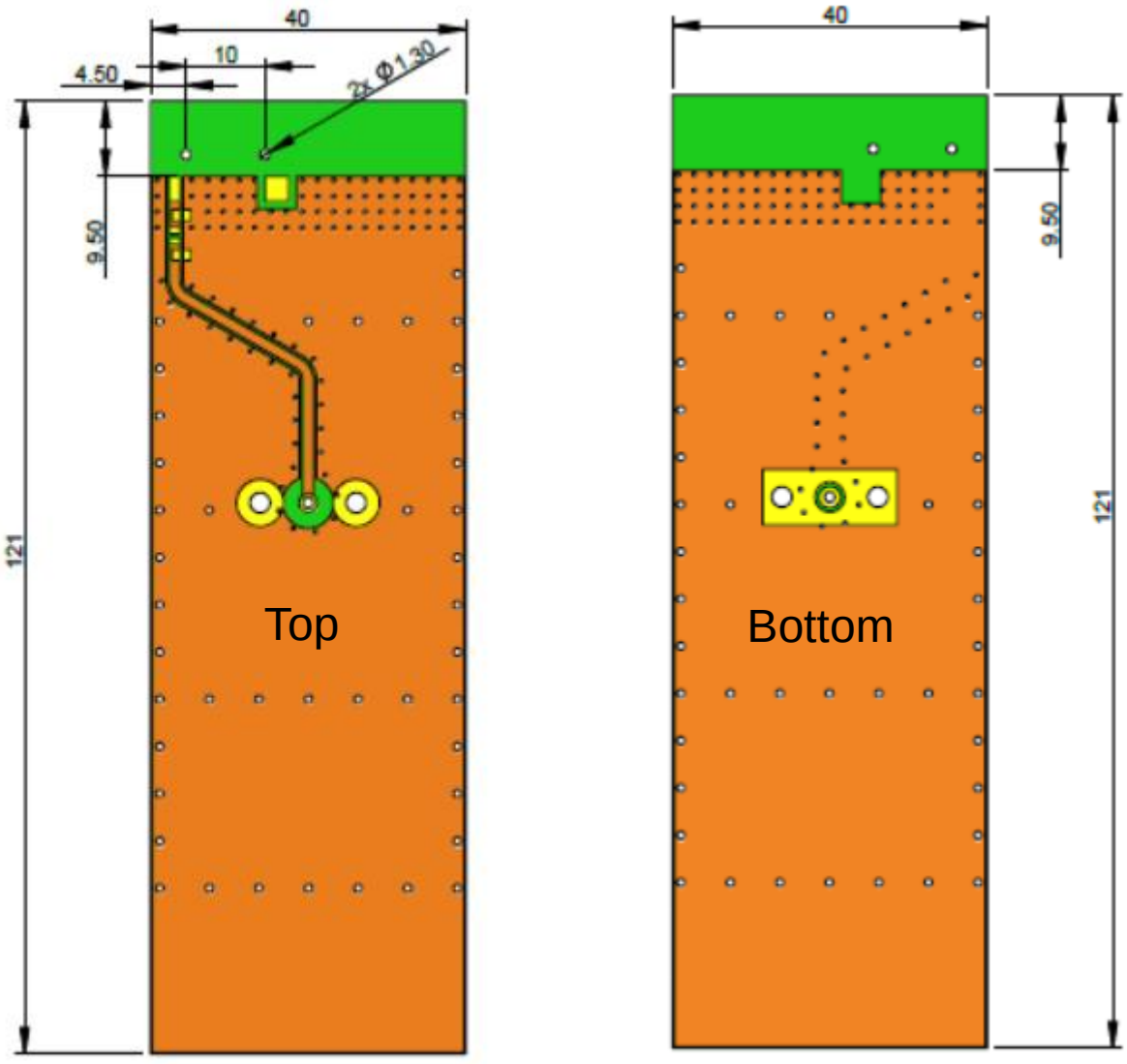
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 1 Pad dimension in top copper



RoHS COMPLIANT

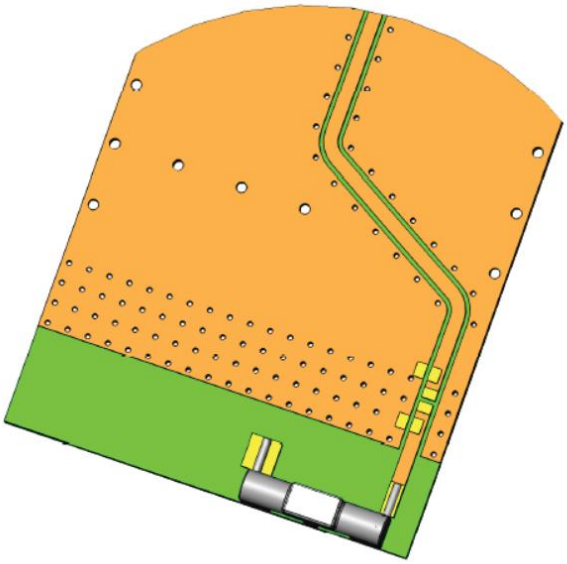
Description: 860-930MHz Embedded Helical Antenna

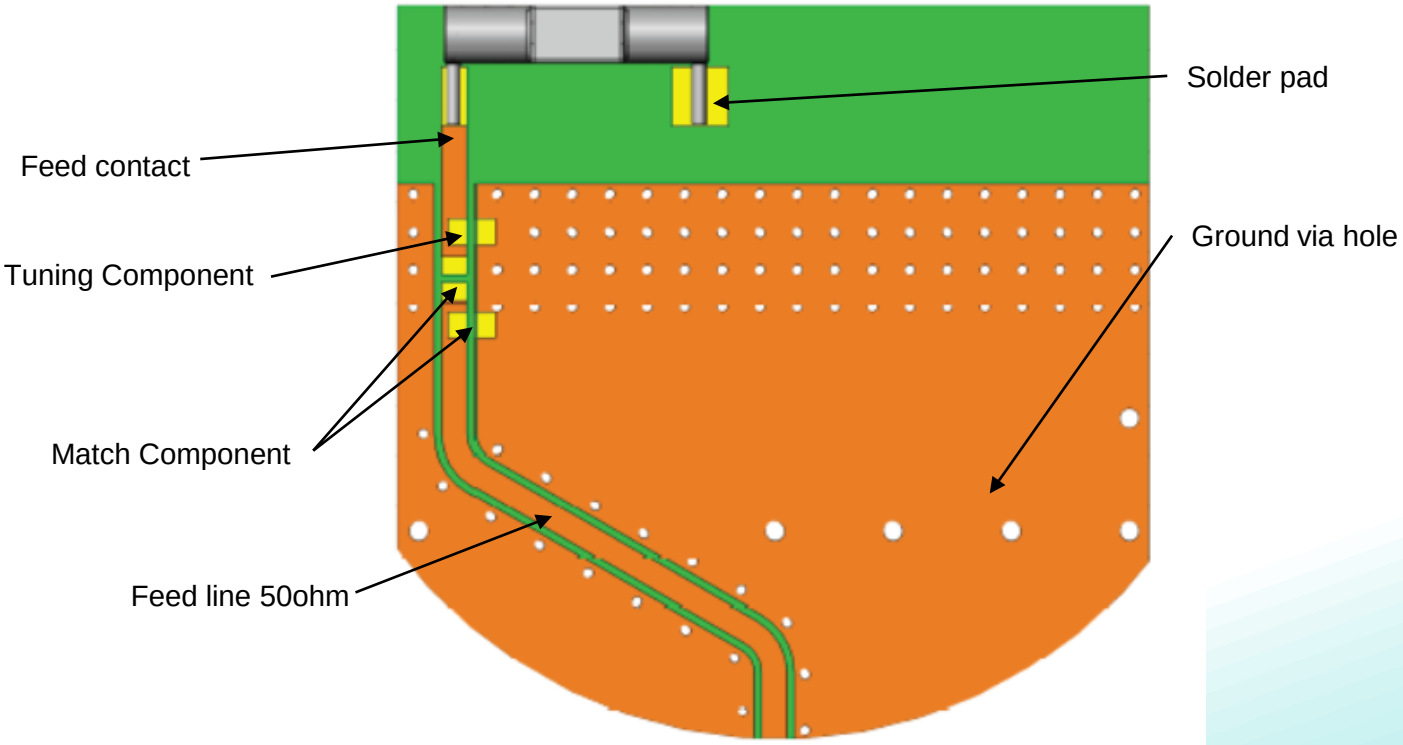
Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 2 Layout for W3139 SMD Helical Antenna





RoHS COMPLIANT

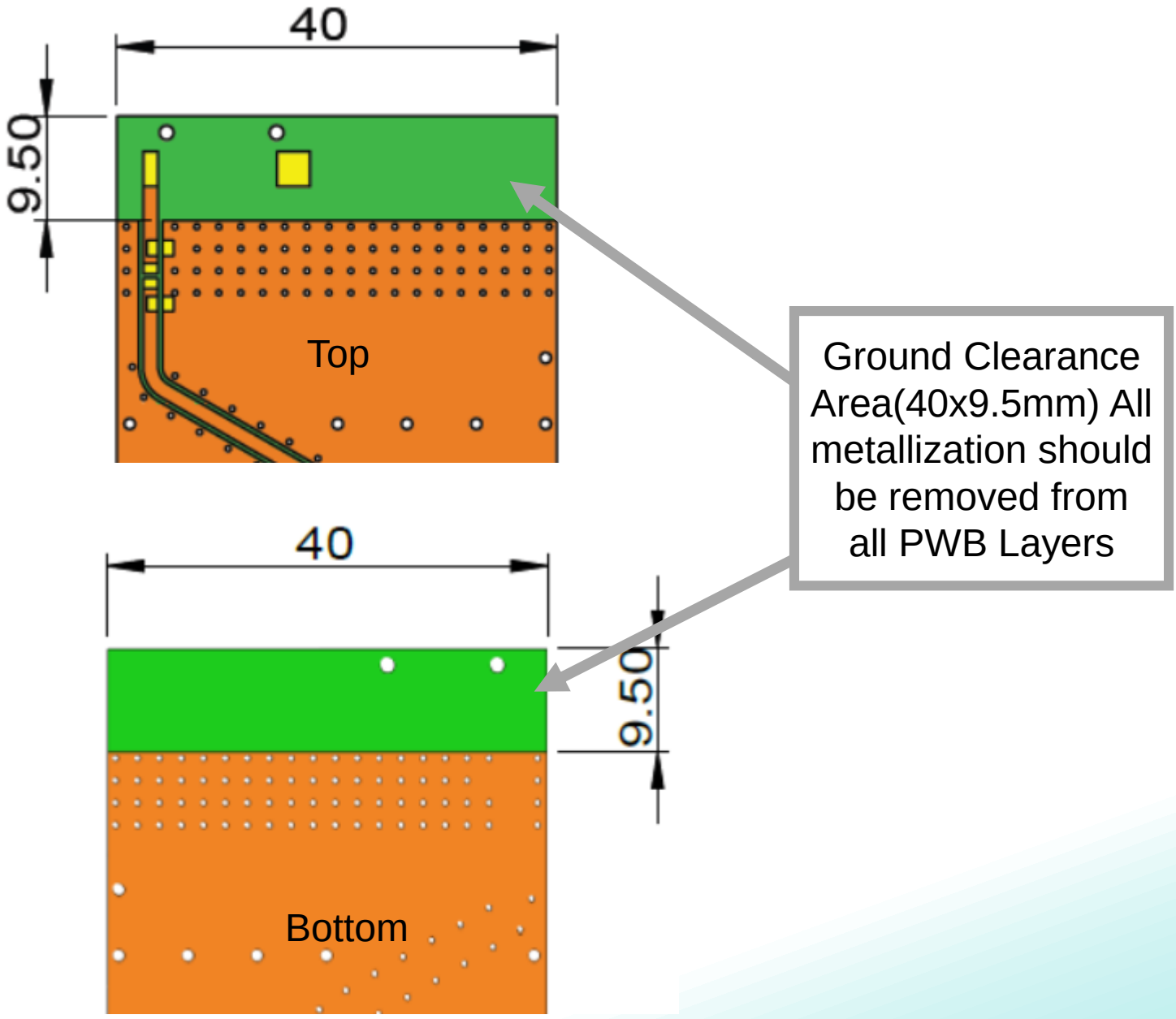
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 2 ground clearance area (Top):40x9.5mm
PWB 2 ground clearance area (Bottom):40x9.5mm



RoHS COMPLIANT

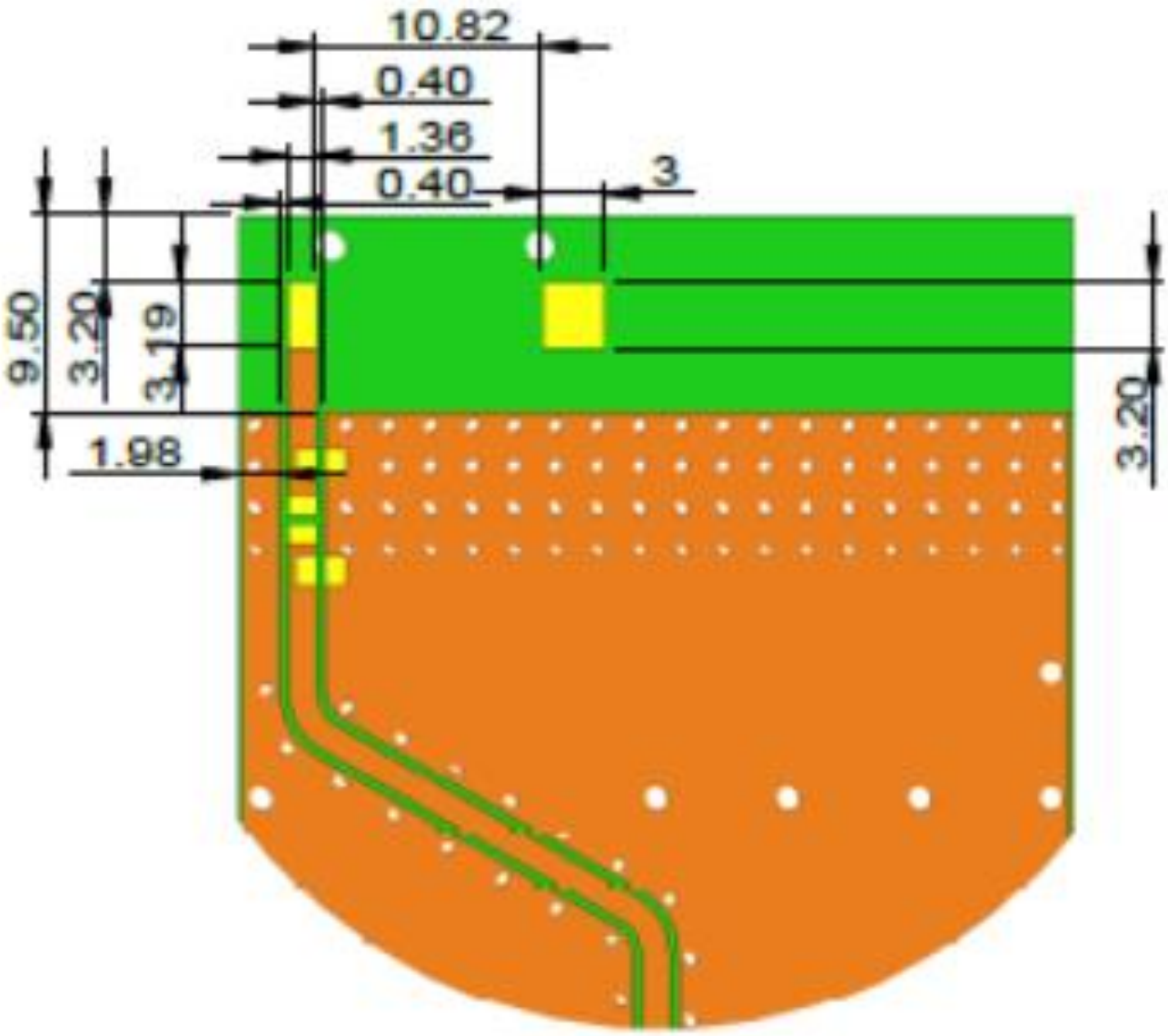
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 2 Pad dimension in top copper



RoHS COMPLIANT

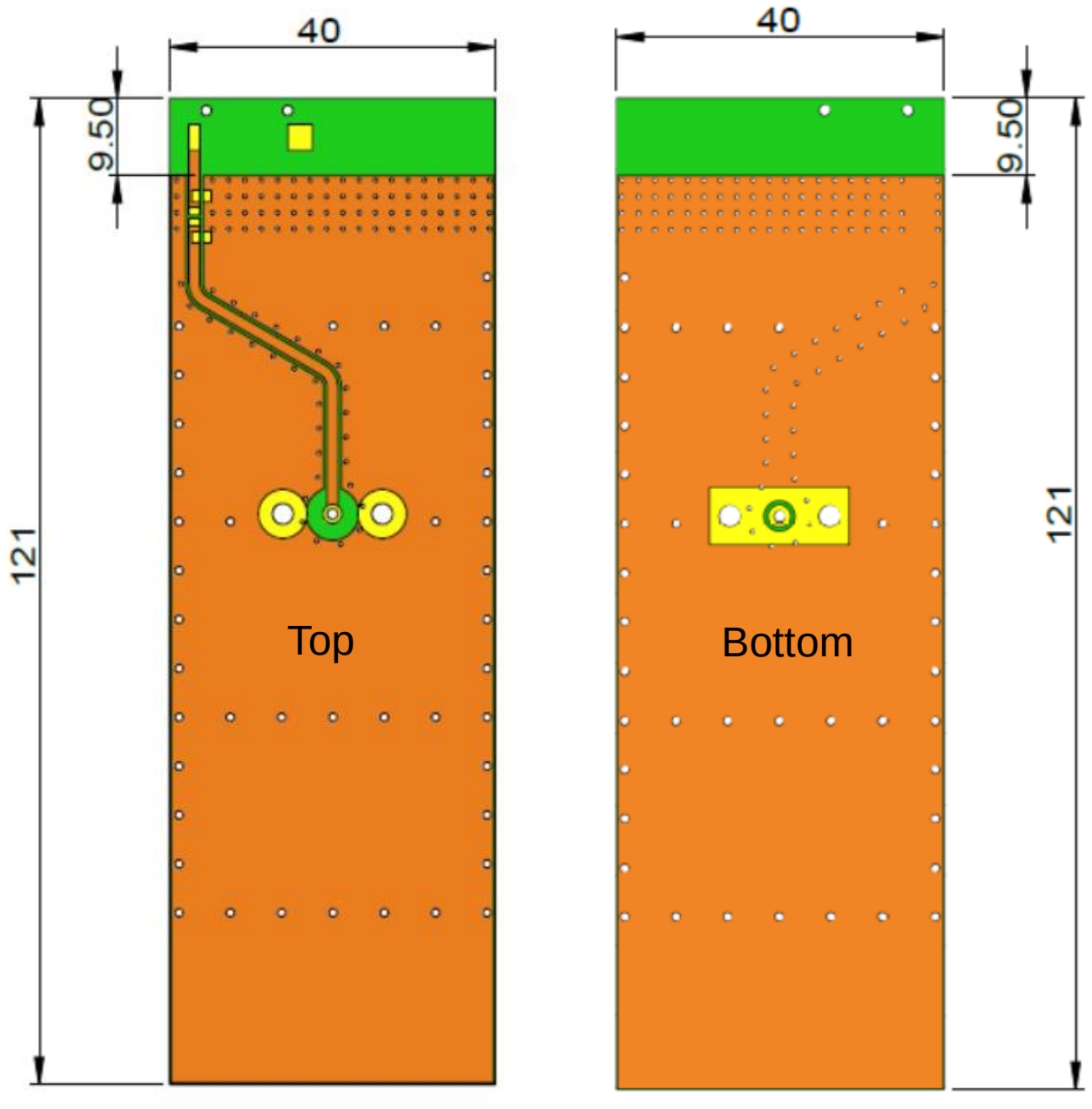
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

TEST SETUP

PWB 2 Pad dimension in top copper



RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

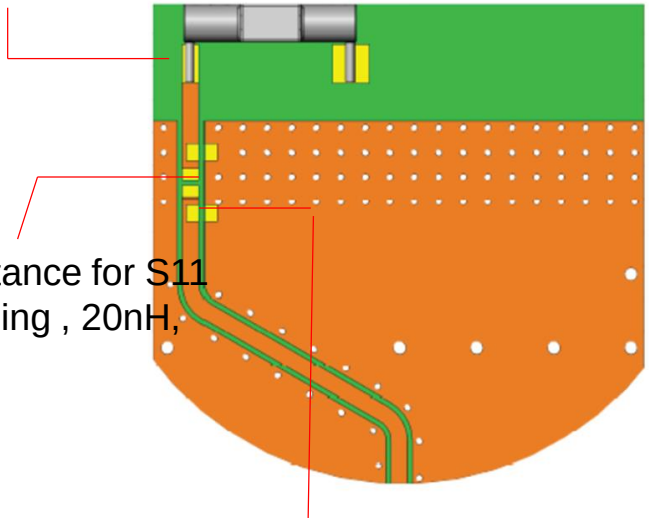
PART NUMBER: W3139

TEST SETUP

ISM 868MHz matching circuit.

(PWB 2 big clearance)

Antenna feed point

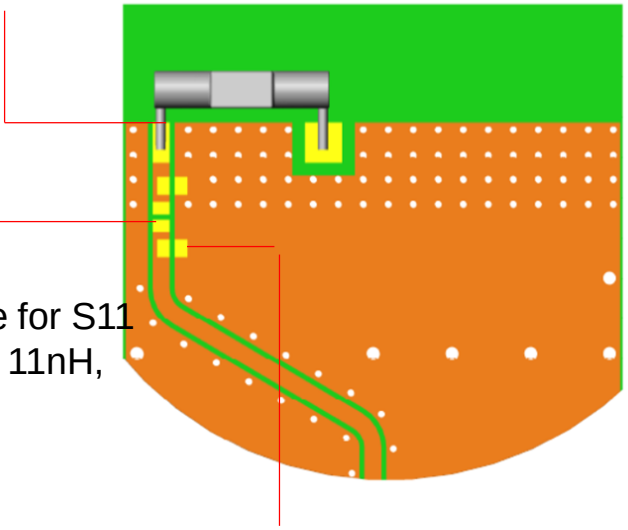


Inductance for S11 matching , 20nH, series

Capacitance for S11 matching , 6.8pF, shunt

(PWB 1 small clearance)

Antenna feed point



Inductance for S11 matching , 11nH, series

Capacitance for S11 matching , 9.1pF, shunt

Note : Exact matching and tuning components value depend on application , board size ,cover etc.

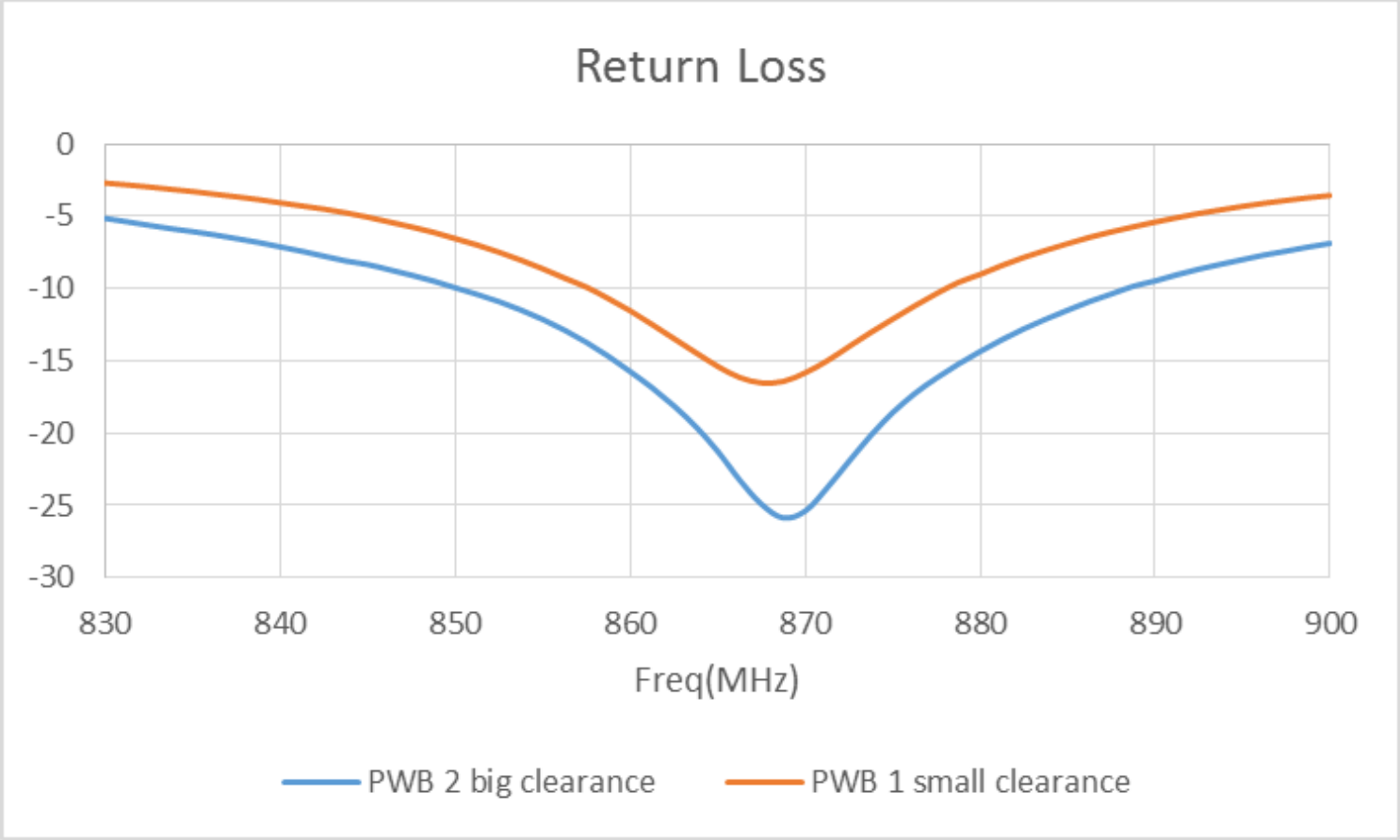
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 868MHz two version performance , test in free space.



RoHS COMPLIANT

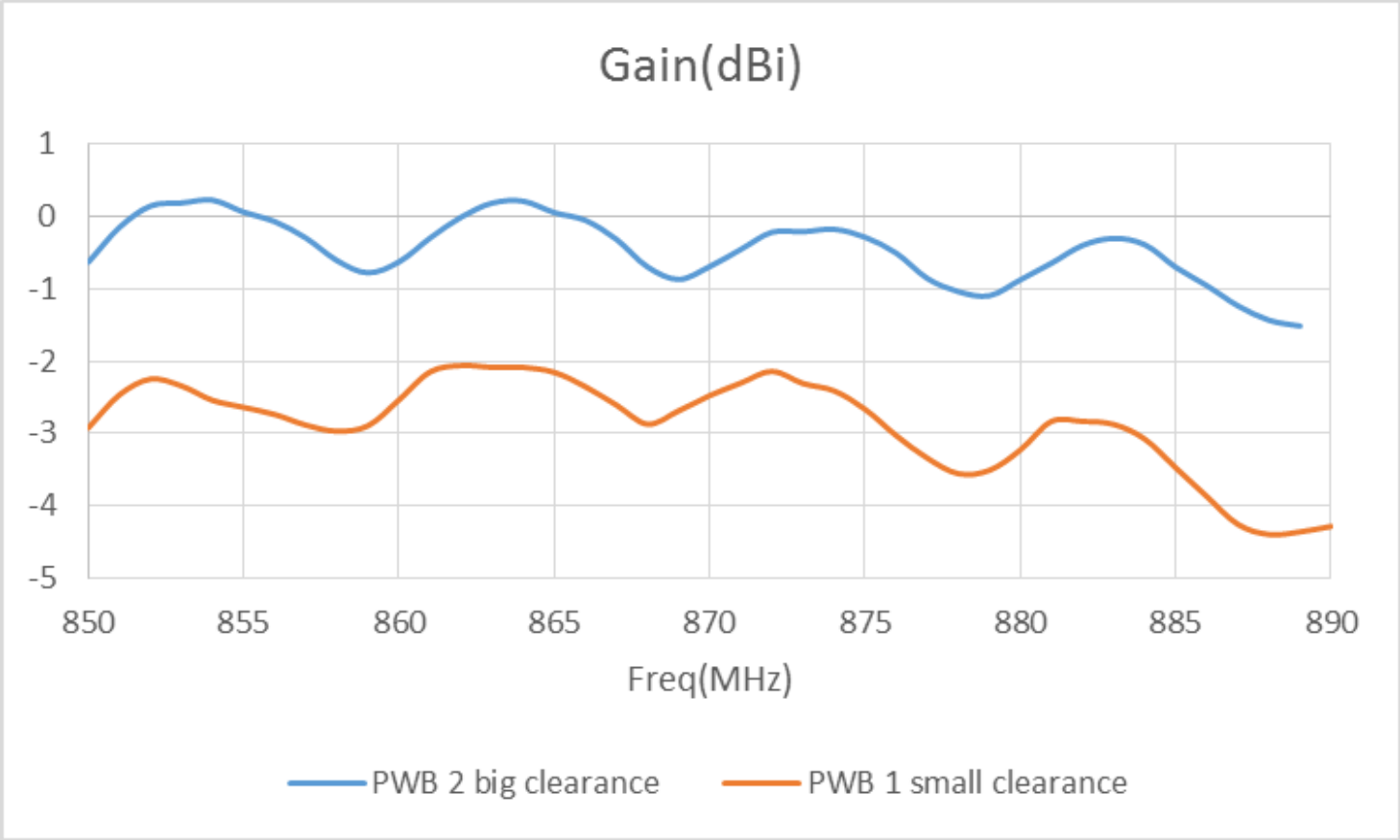
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 868MHz two version performance ,test in free space.



RoHS COMPLIANT

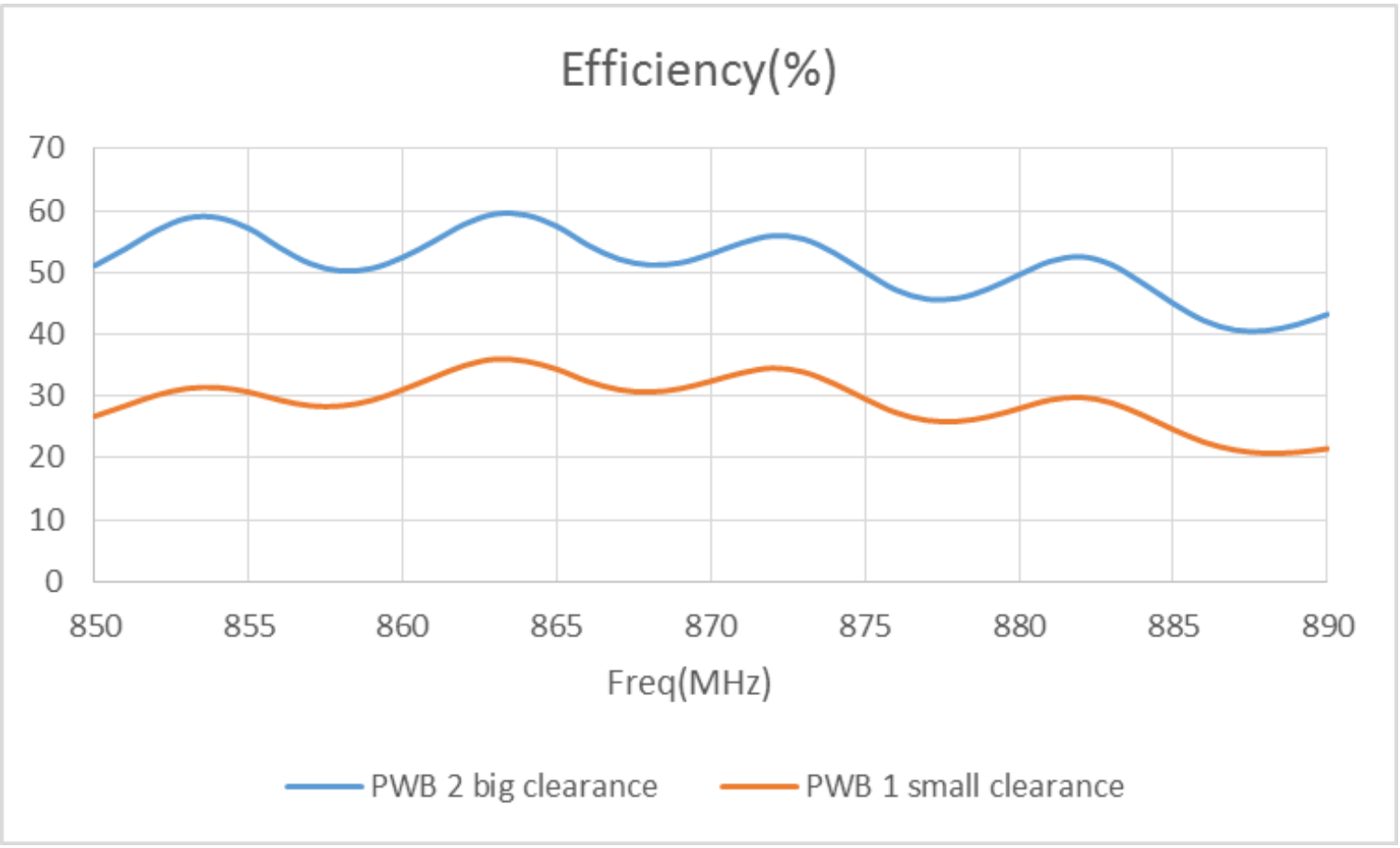
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 868MHz two version performance , test in free space.



RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

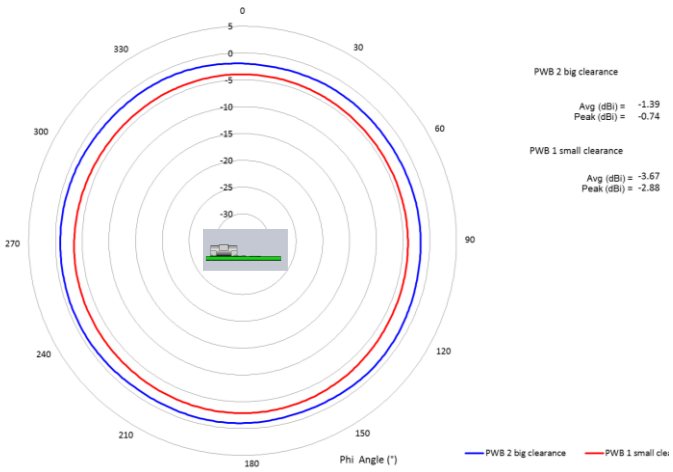
Series:
SMD Helical Antenna

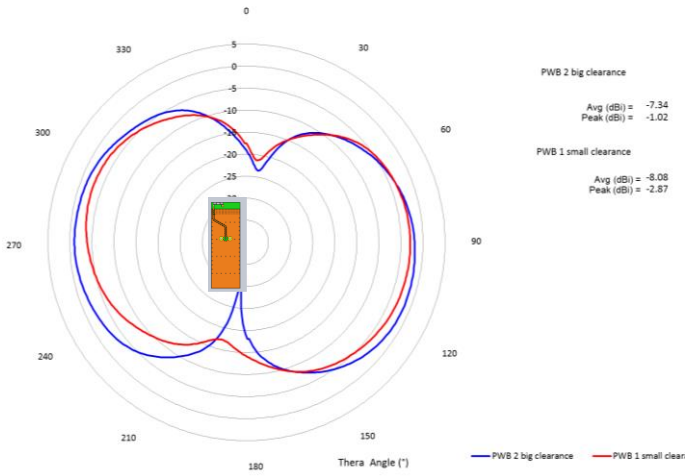
PART NUMBER: W3139

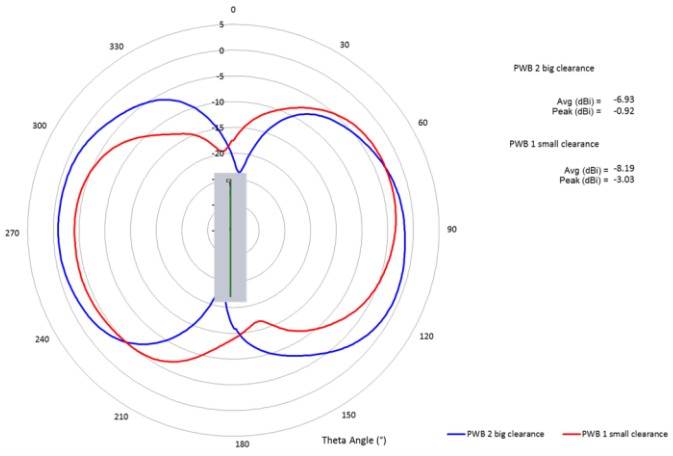
CHARTS

ISM 868MHz two version performance , test in free space.

Typical radiation pattern in free space







RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

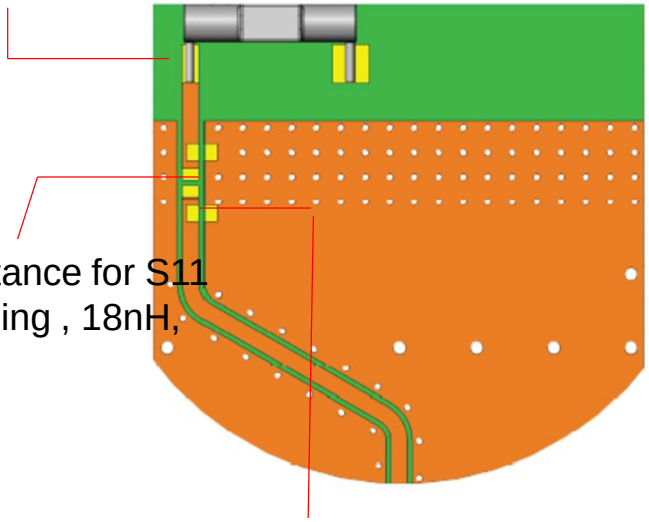
PART NUMBER: W3139

TEST SETUP

ISM 915MHz matching circuit.

(PWB 2 big clearance)

Antenna feed point

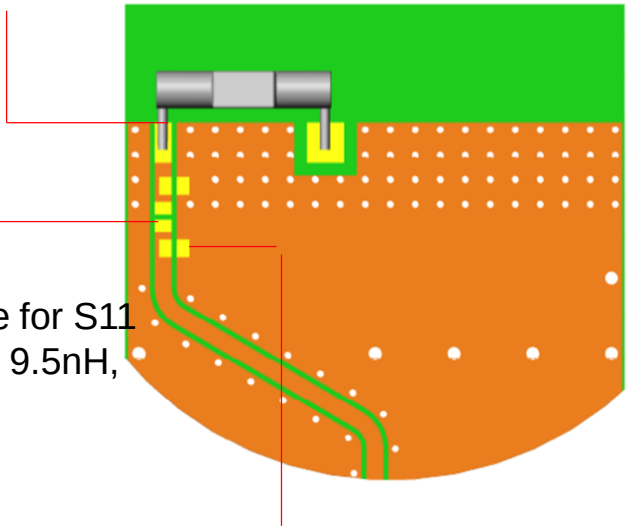


Inductance for S11 matching , 18nH, series

Capacitance for S11 matching , 5.1pF, shunt

(PWB 1 small clearance)

Antenna feed point



Inductance for S11 matching , 9.5nH, series

Capacitance for S11 matching , 9.1pF, shunt

Note : Exact matching and tuning components value depend on application , board size ,cover etc.

RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 915MHz two version performance , test in free space.

RoHS COMPLIANT

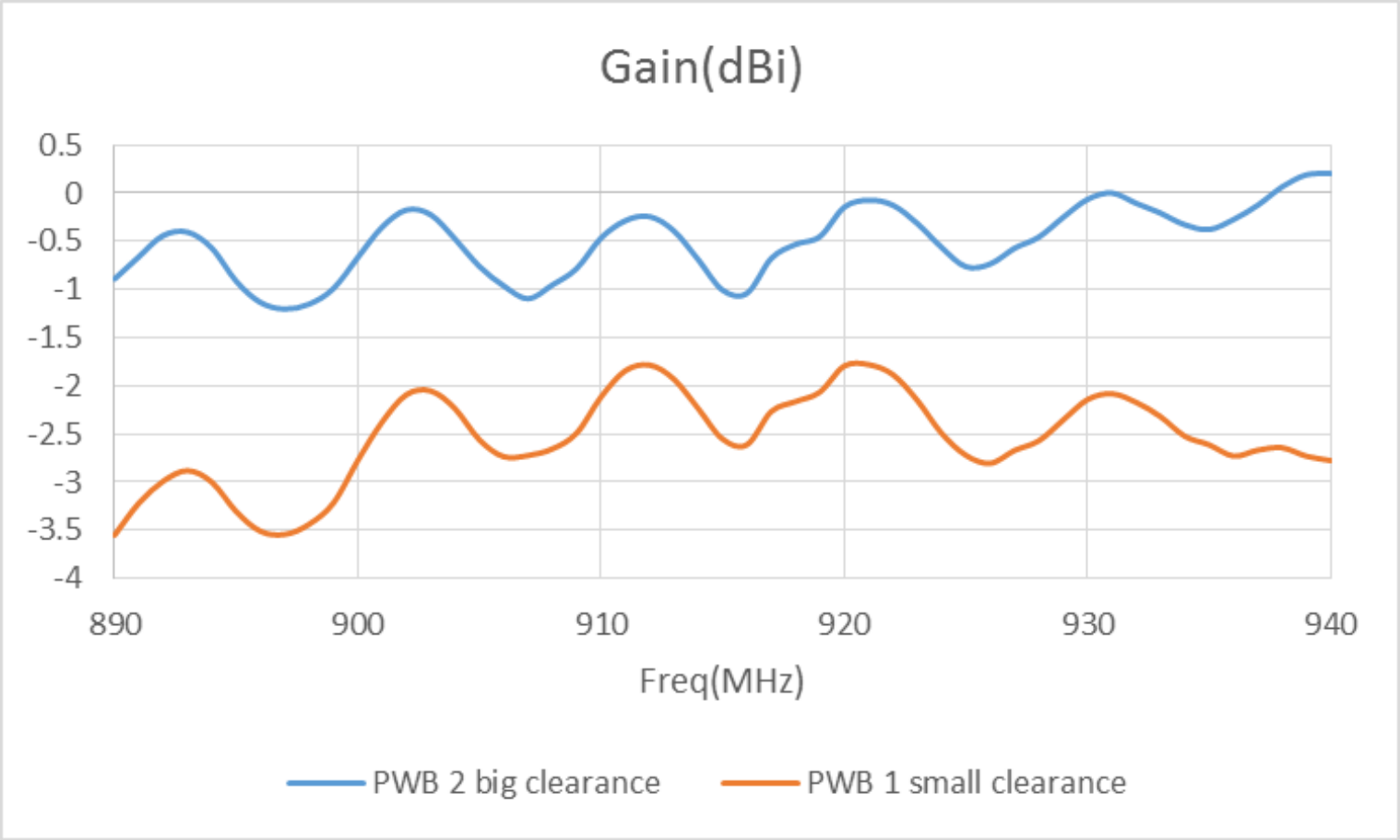
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 915MHz two version performance , test in free space.



RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

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SMD Helical Antenna

PART NUMBER: W3139

CHARTS

ISM 915MHz two version performance , test in free space.

RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

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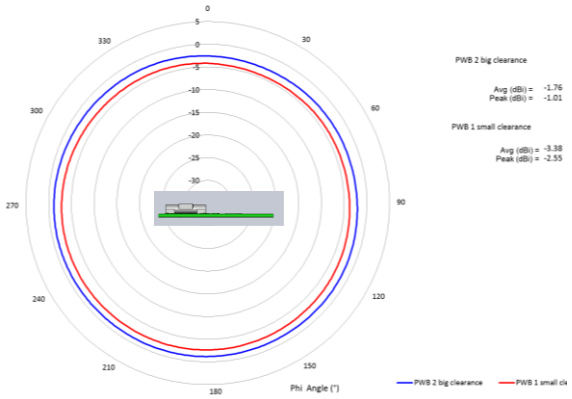
SMD Helical Antenna

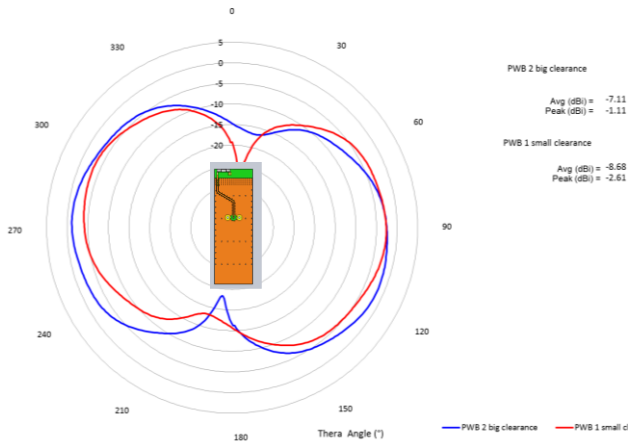
PART NUMBER: W3139

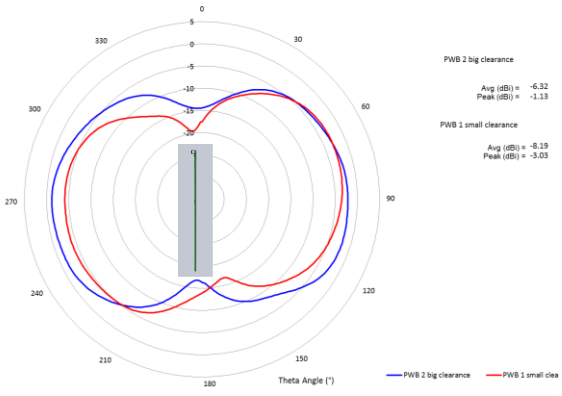
CHARTS

ISM 915MHz two version performance .

Typical radiation pattern in free space







RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

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

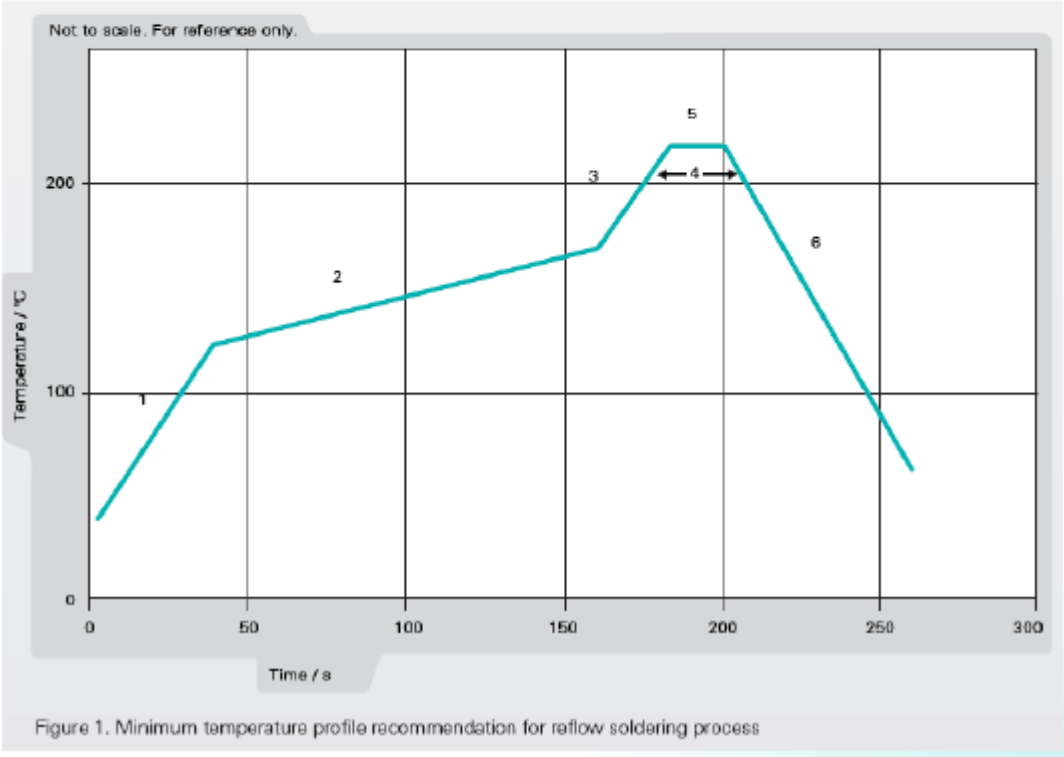


Figure 1. Minimum temperature profile recommendation for reflow soldering process

RoHS COMPLIANT

Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

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

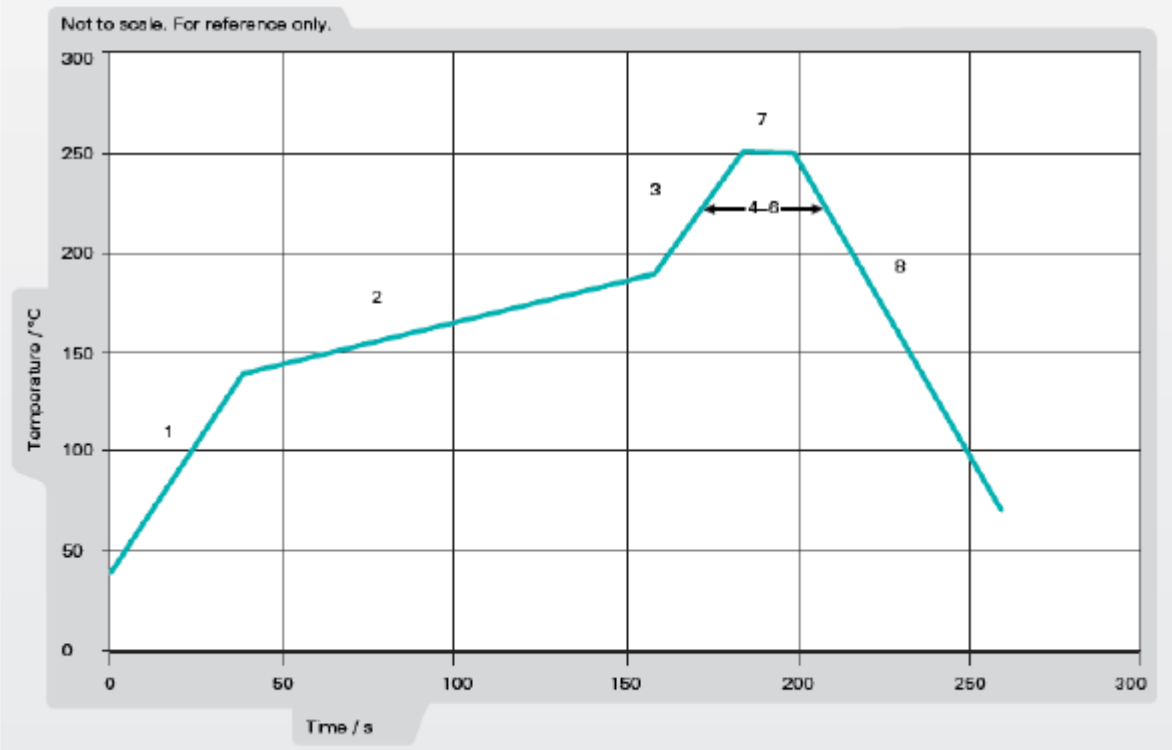


Figure 2. Maximum temperature profile recommendation for reflow soldering process

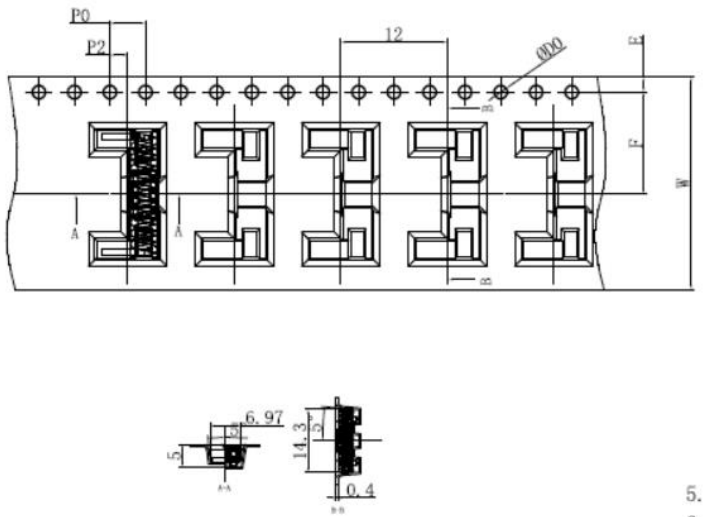
RoHS COMPLIANT

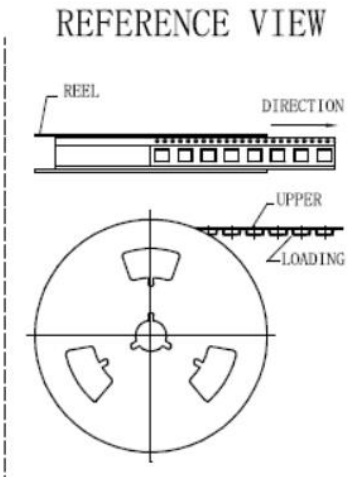
Description: 860-930MHz Embedded Helical Antenna

Series:
SMD Helical Antenna

PART NUMBER: W3139

PACKAGING





Manufacture Data	
Total PCS	1056PCS
Reel	13″/44
Package Qty	1000PCS

5. All the size design with reference to the EIA - 481 - C - 2003.
6. Loading within 250 mm length maximum curvature is less than 1 mm (see chart).

Notes:
1. 10 side hole of the cumulative tolerance cannot be more than + / - 0.2 mm.
2. Material specifications: PS black antistatic, thickness of 0.50 mm.
3. 13 inches (100) axis reel package length: 4.6 m. (the front air bag length: 0.33 m, parts packing length: 4 m, after a period of empty packet length: 0.33 meters).
4. 13 inches (100) axis reel packaging components to the total number of stars: 1056. (the front air bag star count: 28, actual packing parts the number: 1000, after a period of empty bag star count: 28).

Total 1000 PCS In Reel
Reel Size: 330MM[13INCH]
Total 2 PCS Reel In Package Box
Package Box Size:350x350x120mm

RoHS COMPLIANT