

Rufa 2.4 GHz SMD Antenna

Part No. A5839 / A5887

gigaNOVA[®]

Product Specification

1 Features

- Designed for 2.4 GHz applications: Bluetooth[®], Wi-Fi[®] (802.11b/g), ZigBee[®], etc.
- Easy to integrate
- Low profile design for use with no ground beneath the antenna
- High efficiency
- Light weight
- Intended for SMD mounting
- Supplied in tape on reel

2 Description

Rufa is intended for use with all 2.4 GHz applications. The antenna uses a ground plane in order to radiate efficiently, but this ground plane must not extend underneath the antenna itself.

The antenna is available in two versions with the feed locations on the right or left hand side of the antenna.

3 Applications

- Mobile phones
- PDAs
- PNDs
- Headsets
- PMPs / MP3s
- Laptops
- PC-Cards
- Sensors



4 Part numbers

Rufa Left: A5839



Rufa Right: A5887



5 General data

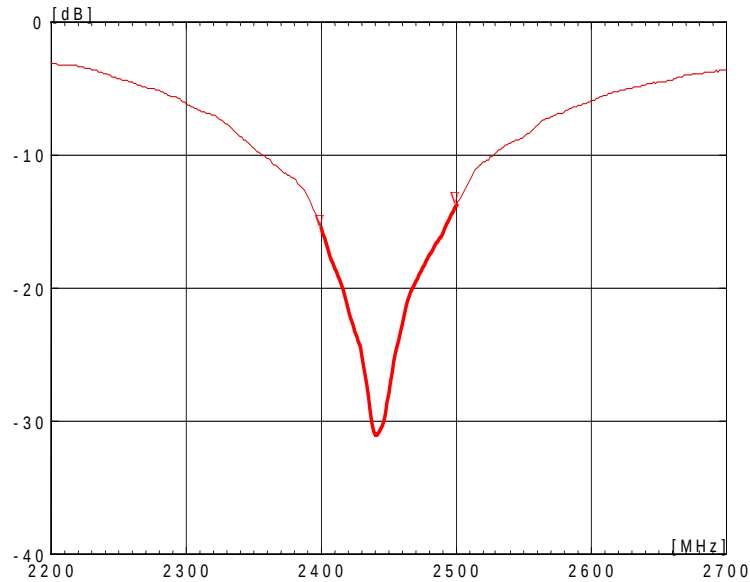
Product name	Rufa 2.4 GHz
Part Number	A5839 (Left)
	A5887 (Right)
Frequency	2.4 – 2.5 GHz
Polarization	Linear
Operating temperature	-40 °C to +85 °C
Impedance with matching	50 Ω
Weight	0.1 g
Antenna type	SMD
Dimensions	12.8 x 3.9 x 1.1 [mm]

6 Electrical characteristics

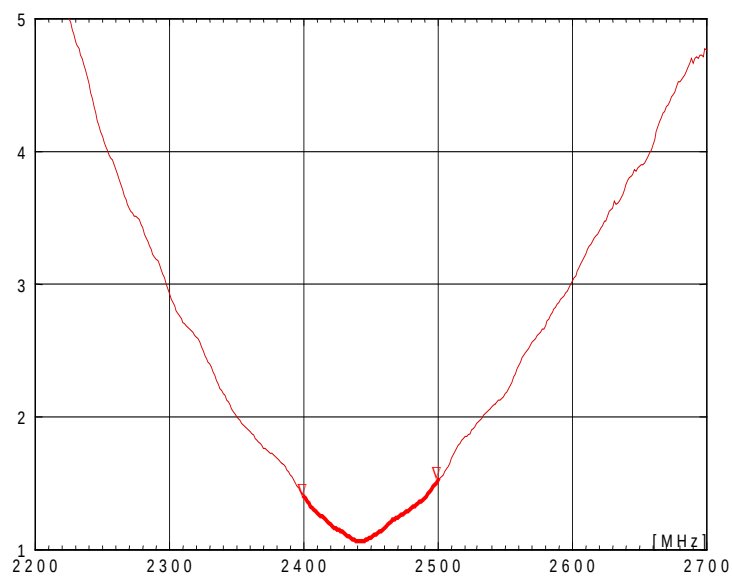
	Typical performance	Conditions
Peak gain	2.1 dBi	All data measured on Antenova's reference boards, part numbers A5839-U1 and A5887-U1 Data given for the 2.4 – 2.5 GHz frequency range
Average gain	-1.2 dBi	
Average efficiency	75%	
Maximum Return Loss	-11 dB	
Maximum VSWR	1.8:1	

7 Electrical performance

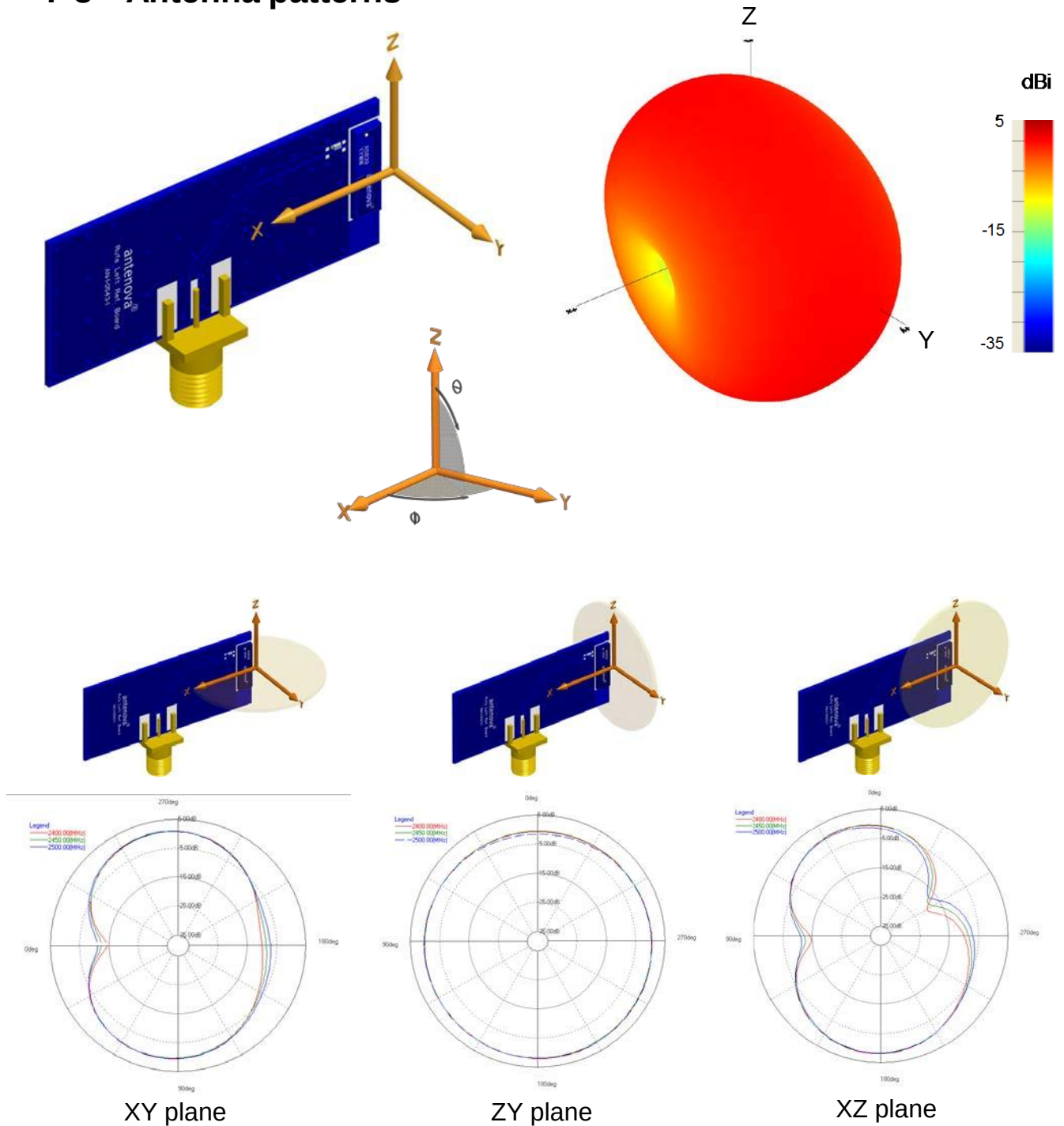
7-1 Return Loss



7-2 VSWR



7-3 Antenna patterns

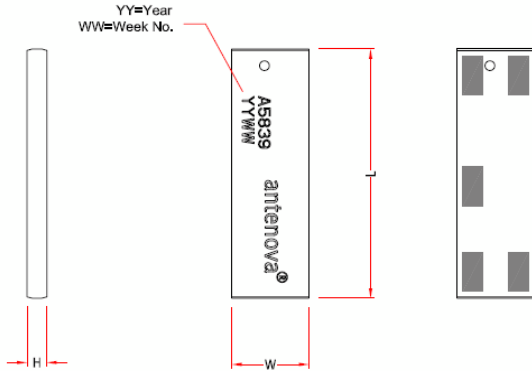


Patterns show combined polarisations
measured on reference board A5839-U1

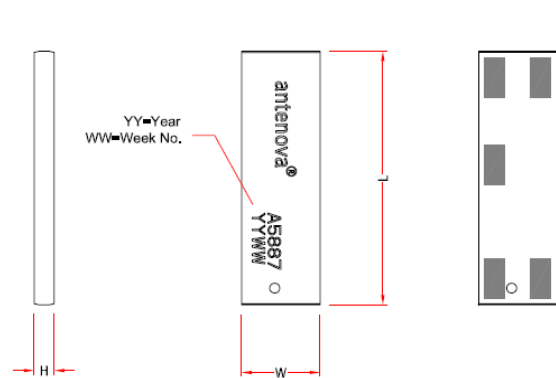
Antennas for Wireless M2M Applications

8 Antenna dimensions

Rufa Left



Rufa Right



L	W	H
Length	Width	Height
12.8 ± 0.2	3.9 ± 0.2	1.1 ± 0.2

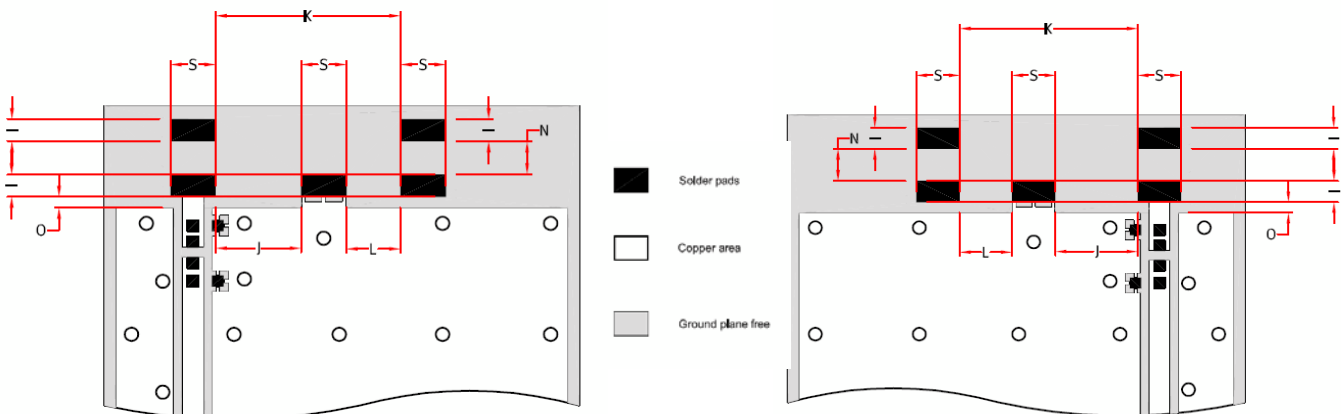
Dimensions in mm

9 Antenna footprint

Rufa Left (Part No: A5839)

* CAD files of the antenna footprint are available from Antenova M2M on request.

Rufa Right (Part No: A5887)



Please contact sales@antenova-m2m.com for further details.

I	S	K	J	N	L	O
1.0 ± 0.1	2.0 ± 0.1	8.1 ± 0.1	3.7 ± 0.1	1.3 ± 0.1	2.4 ± 0.1	0.5 ± 0.1

Dimensions in mm

Antennas for Wireless M2M Applications

10 Electrical interface

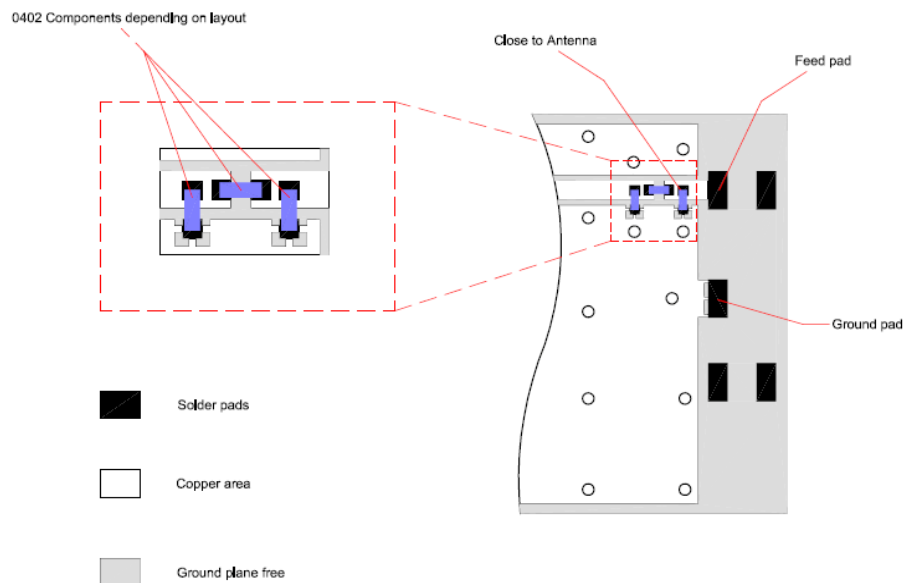
10-1 Transmission lines

- All transmission lines should be designed to have a characteristic impedance of $50\ \Omega$
- The length of the transmission lines should be kept to a minimum
- Any other parts of the RF system like transceivers, power amplifiers, etc, should also be designed to have an impedance of $50\ \Omega$

Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the program will calculate the appropriate transmission line width and gaps on either side of the track so the characteristic impedance of the coplanar transmission line is $50\ \Omega$.

10-2 Matching circuit

The antenna requires a matching circuit that must be optimized for each customer's product. The matching circuit will require up to three components and the following pad layout should be designed into the device so the correct circuit can be installed:



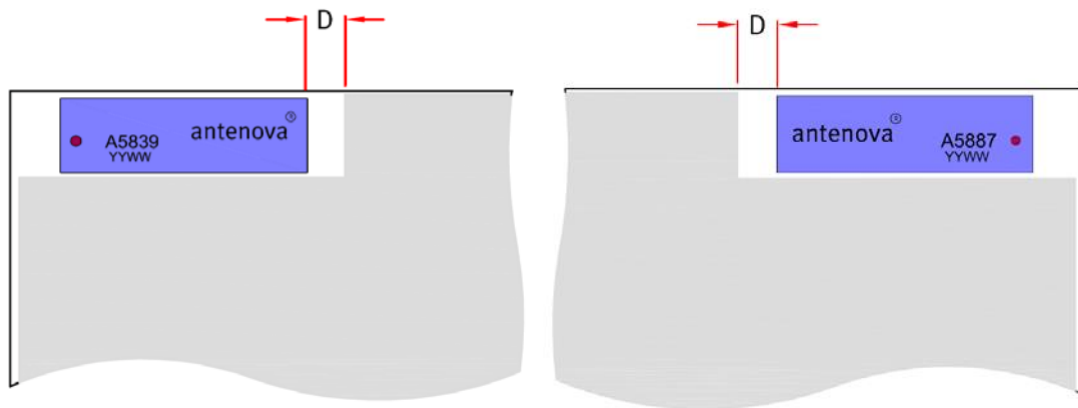
The antenna feed pad and the antenna ground pad are indicated in the drawing above. Additional pads are for mechanical attachment only and should not be grounded.

In addition to the matching circuit, a separate DC blocking capacitor will also be required between the radio and the antenna matching circuit.

Note: The component values for the matching circuit will vary depending on the size of the PCB and surrounding components. The impedance of the antenna should be measured before selecting suitable matching components. Antenova M2M offers this service on request. Contact sales@antenova-m2m.com for further information.

10-3 Antenna placement

Antenova M2M strongly recommends placing the antenna near the edge of the board. Maximum antenna performance is achieved by placing the antenna towards one of the corners of the PCB and with the feed point of the antenna as close to same corner of the PCB as possible.

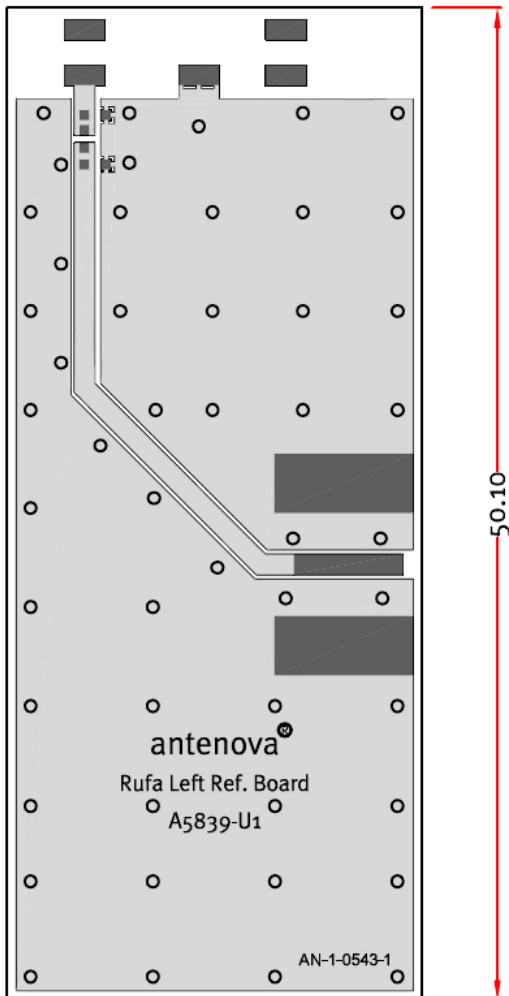


Additional ground and components near the antenna should be at a distance of at least 2 mm. Where possible the antenna should be clear of ground from both sides, although the antenna can work well with a minimum clearance of $D \geq 2 \text{ mm}$ as shown in the drawing above.

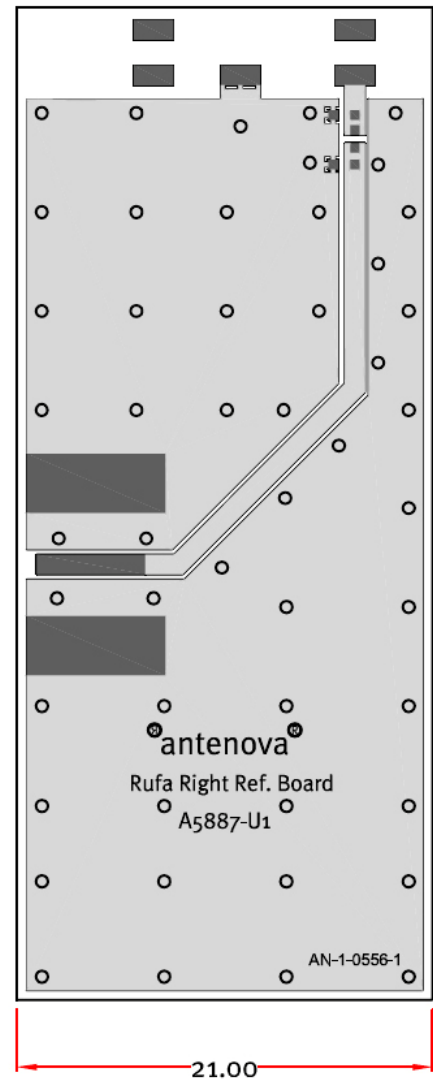
10-4 Reference boards

The reference boards have been designed for evaluation purposes of Rufa 2.4 GHz and they include a SMA female connector

Rufa Left



Rufa Right



Dimensions in mm

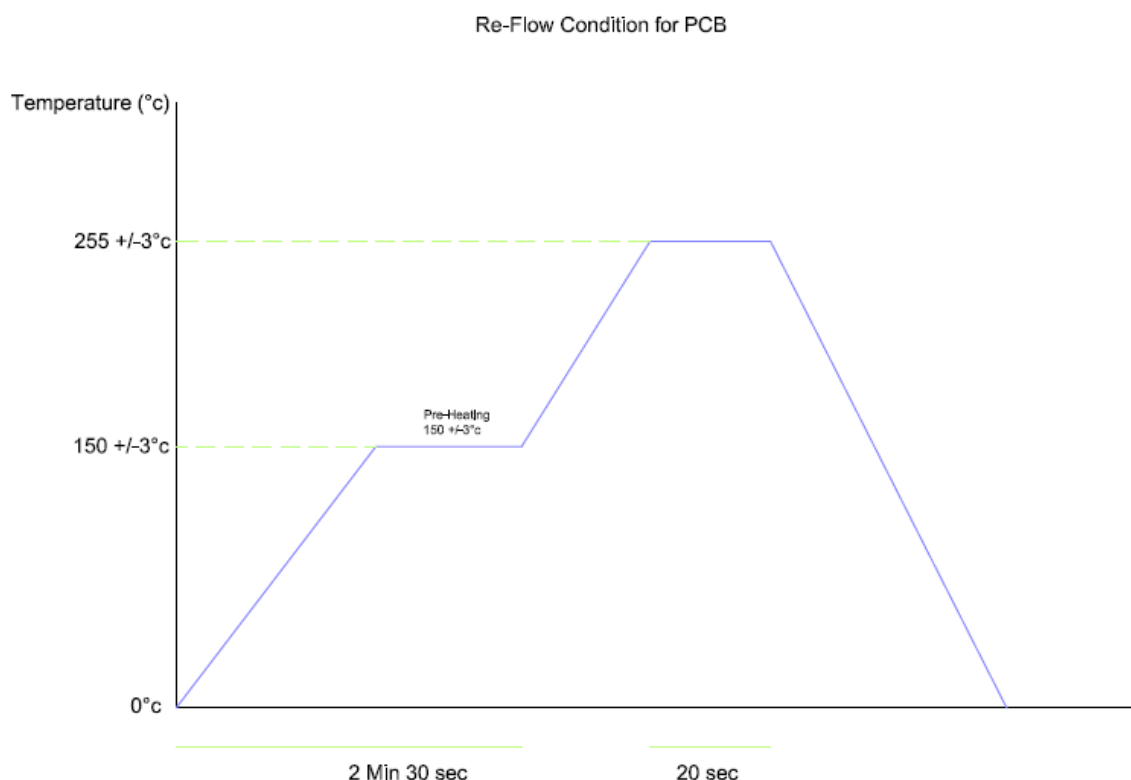
To order a reference board contact sales@antenna-m2m.com.

11 Soldering

This antenna is suitable for lead free soldering.

The reflow profile should be adjusted to suit the device, oven and solder paste, while observing the following conditions:

- The maximum temperature should not exceed 240 °C
- However for lead free soldering, a maximum temperature of 255 °C for no more than 20 seconds is permitted.
- The antenna should not be exposed to temperatures exceeding 120 °C more than 3 times during the soldering process.



12 Hazardous material regulation conformance

The antenna has been tested to conform to RoHS requirements. A certificate of conformance is available from Antenova's website.

13 Packaging

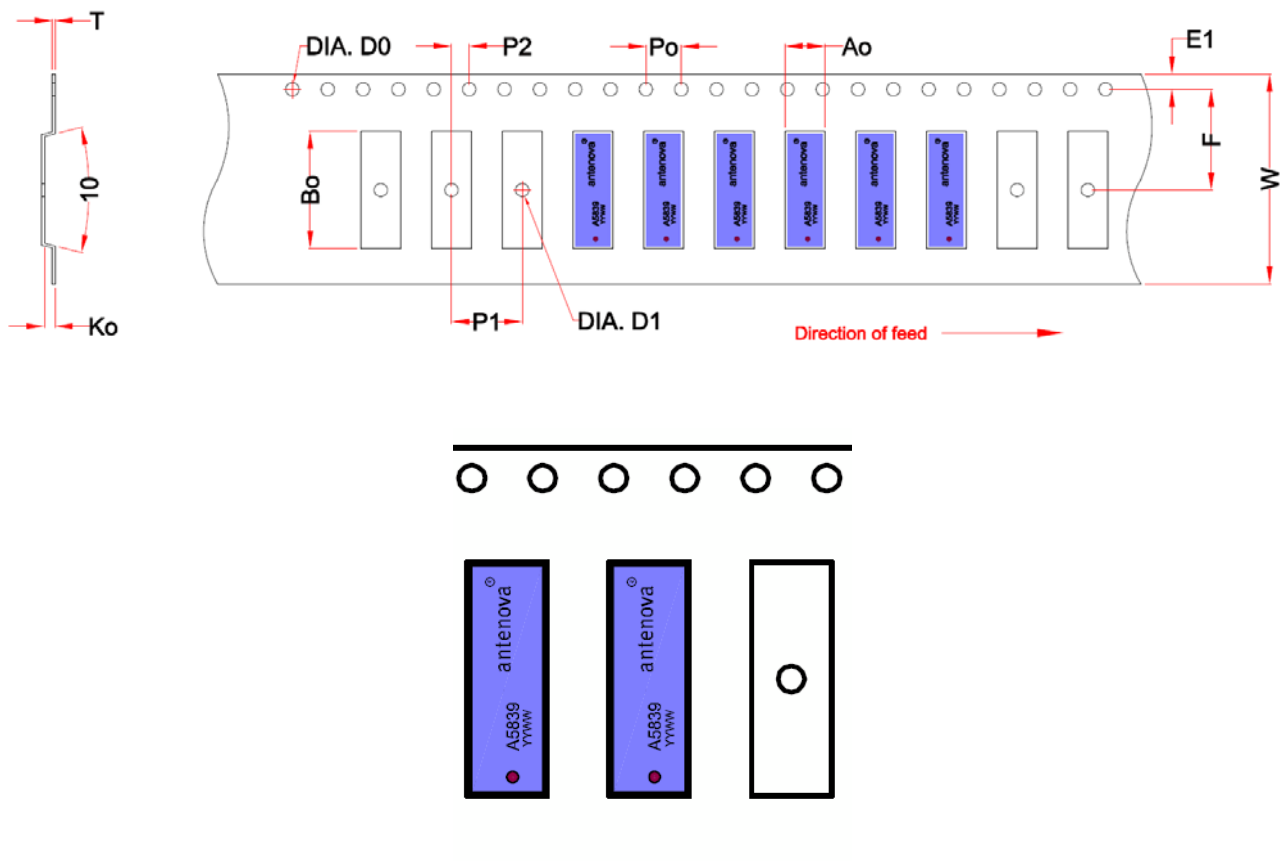
13-1 Optimal storage conditions for packaged reels

Temperature	-10°C to 40°C
Humidity	Less than 75% RH
Shelf Life	18 Months
Storage place	Away from corrosive gas and direct sunlight
Packaging	Reels should be stored in unopened sealed manufacturer's plastic packaging.

Note: Storage of open reels of antennas is not recommended due to possible oxidization of pads on antennas. If short term storage is necessary, then it is highly recommended that the bag containing the antenna reel is re-sealed and stored in like storage conditions as in above table.

13-2 Tape characteristics

Rufa Left
[Part Number: A5839]



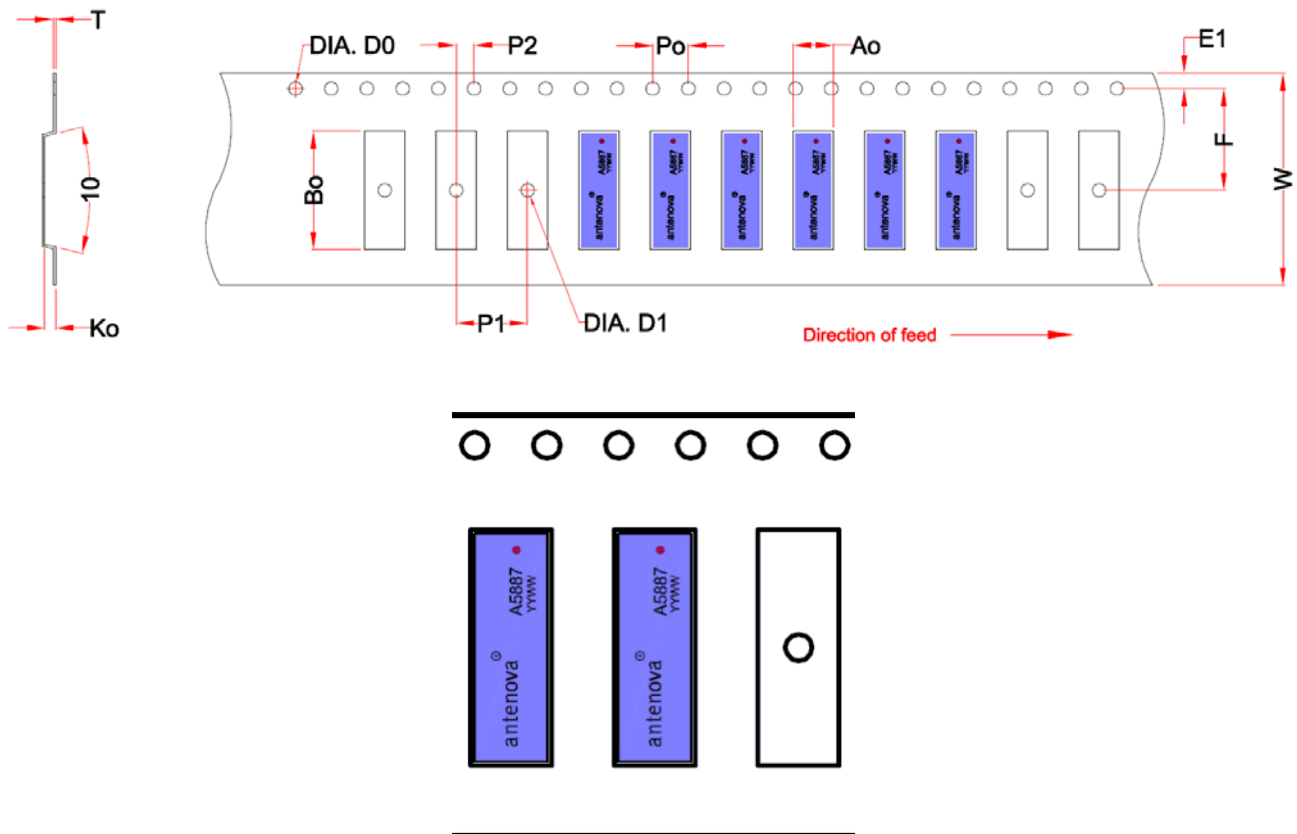
W	F	E1	P0	P1	P2	A0	B0	K0	T	D0	D1
24 ± 0.2	11.5 ± 0.1	1.75 ± 0.1	4 ± 0.1	8 ± 0.1	2 ± 0.1	4.3 ± 0.1	13.1 ± 0.1	1.4 ± 0.1	0.3 ± 0.05	Min 1.5	Min 1.5

Dimensions in mm

Quantity	Leading Space	Trailing Space
1000 pcs / reel	50 blank antenna holders	37 blank antenna holders

Antennas for Wireless M2M Applications

Rufa Right [Part Number: A5887]



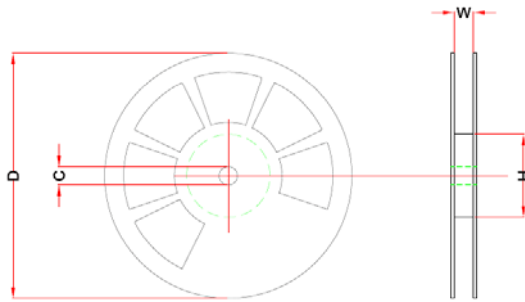
W	F	E1	P0	P1	P2	A0	B0	K0	T	D0	D1
24 ± 0.2	11.5 ± 0.1	1.75 ± 0.1	4 ± 0.1	8 ± 0.1	2 ± 0.1	4.3 ± 0.1	13.1 ± 0.1	1.4 ± 0.1	0.3 ± 0.05	Min 1.5	Min 1.5

Dimensions in mm

Quantity	Leading Space	Trailing Space
1000 pcs / reel	50 blank antenna holders	37 blank antenna holders

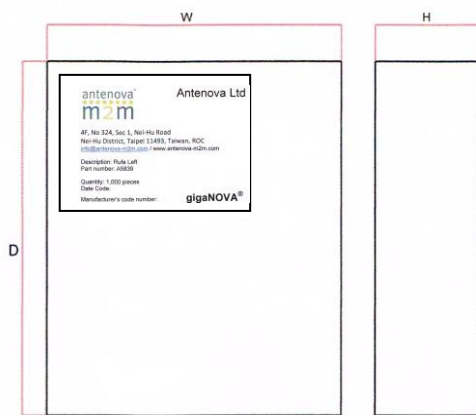
Antennas for Wireless M2M Applications

13-3 Reel dimensions



Width (W)	Reel Diameter (D)	Hub Diameter (H)	Shaft Diameter (C)
24 mm	180 mm (7")	60 mm (2")	13 mm

13-4 Box dimensions



Width (W)	Breadth (B)	Thickness (H)
203 mm	188 mm	40 mm

13-5 Bag properties

Reels are supplied in protective plastic packaging

13-6 Reel label information

Rufa Left



Rufa Right



Dimensions in mm

Antennas for Wireless M2M Applications



www.antenova-m2m.com

Corporate Headquarters

Antenova Ltd.
2nd Floor, Titan Court
3 Bishop Square
Hatfield
AL10 9NA

North America Headquarters

Antenova Ltd.
Rogers Business Park
2541 Technology Drive Suite 403
Elgin, IL 60124

Asia Headquarters

Antenova Asia Ltd.
4F, No. 324, Sec. 1, Nei-Hu Road
Nei-Hu District
Taipei 11493
Taiwan, ROC

Tel: +44 1223 810600
Email: sales@antenova-m2m.com

Tel: +1 (847) 551 9710
Email: sales@antenova-m2m.com

Tel: +886 (0) 2 8797 8630
Fax: +886 (0) 2 8797 6890
Email: sales@antenova-m2m.com

Copyright® Antenova Ltd. All Rights Reserved. Antenova®, Antenova M2M®, gigaNOVA®, and the Antenova and Antenova M2M logos are trademarks and/or registered trademarks of Antenova Ltd. Any other names and/or trademarks belong to their respective companies.

The materials provided herein are believed to be reliable and correct at the time of print. Antenova does not warrant the accuracy or completeness of the information, text, graphics or other items contained within these information. Antenova further assumes no responsibility for the use of this information, and all such information shall be entirely at the user's risk.



Certificate No: 4598

Antennas for Wireless M2M Applications

2.4GHz 1608 Chip Antenna: RANT1608F245C01/1608F245C04/1608F245C05



Application:

WLAN, 802.11b/g, Bluetooth, WLAN, etc...

Features

SMD, high reliability, ultra Impact, Omni-directional...

Part number Information

RANT 1608 F 245 C 01/04
(A) (B) (C) (D) (E) (F)

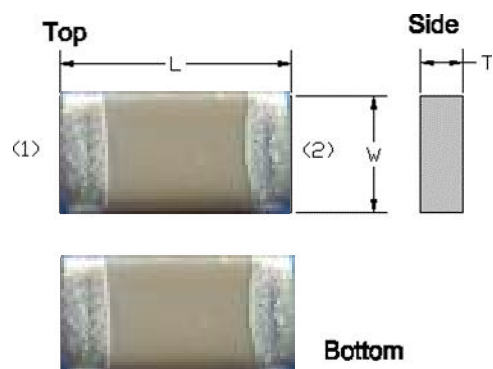
(A)Product Type	Chip Antenna
(B) Size Code	1.6x0.8mm(±0.1mm)
(C) Material	High K material
(D) Frequency	2.4 ~ 2.5GHz
(E) Feeding mode	PIFA & Single Feeding
(F) Antenna type	Type=01/04/05



Electrical Specification

Working Frequency Range	2400 ~2500 MHz
Bandwidth	120 MHz (Min.)
Peak Gain	2.7 dBi (Typ.)
Impedance	50 Ohm
Return loss	10 dB (Min)
Polarization	Linear
Azimuth Beamwidth	Omni-directional
Operation Temperature(°C)	-40 ~85°C
Resistance to Soldering Heats	10sec. (@ 280°C)
Termination	Ni / Au (Leadless)

Dimension and Terminal Configuration



Dimension (mm)	
L	1.60 ± 0.10
W	0.80 ± 0.10
T	0.80 ± 0.10

No.	Terminal Name
1	Feeding/GNG
2	GND/Feeding

咏成國際科技有限公司
RAIN International Technology Co., Ltd.

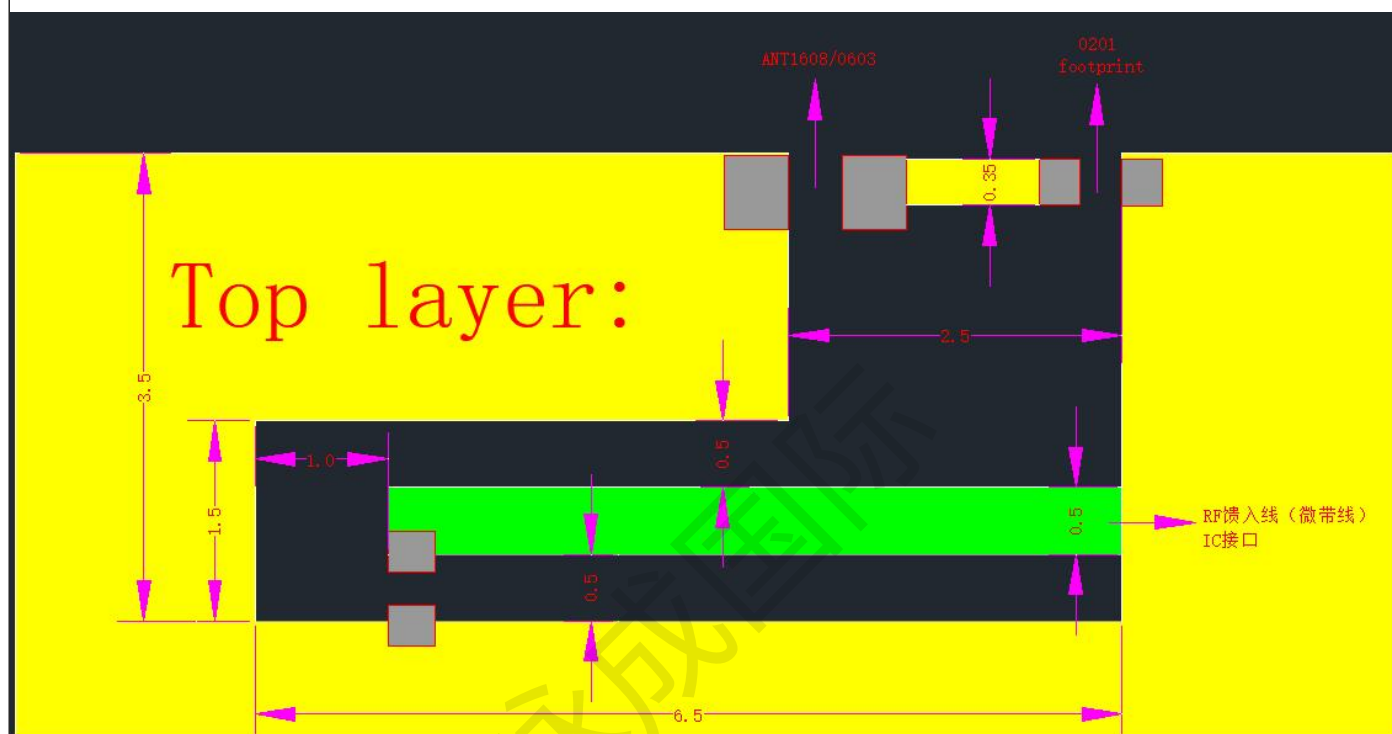
電話: 13530576606
TEL: 13530576606



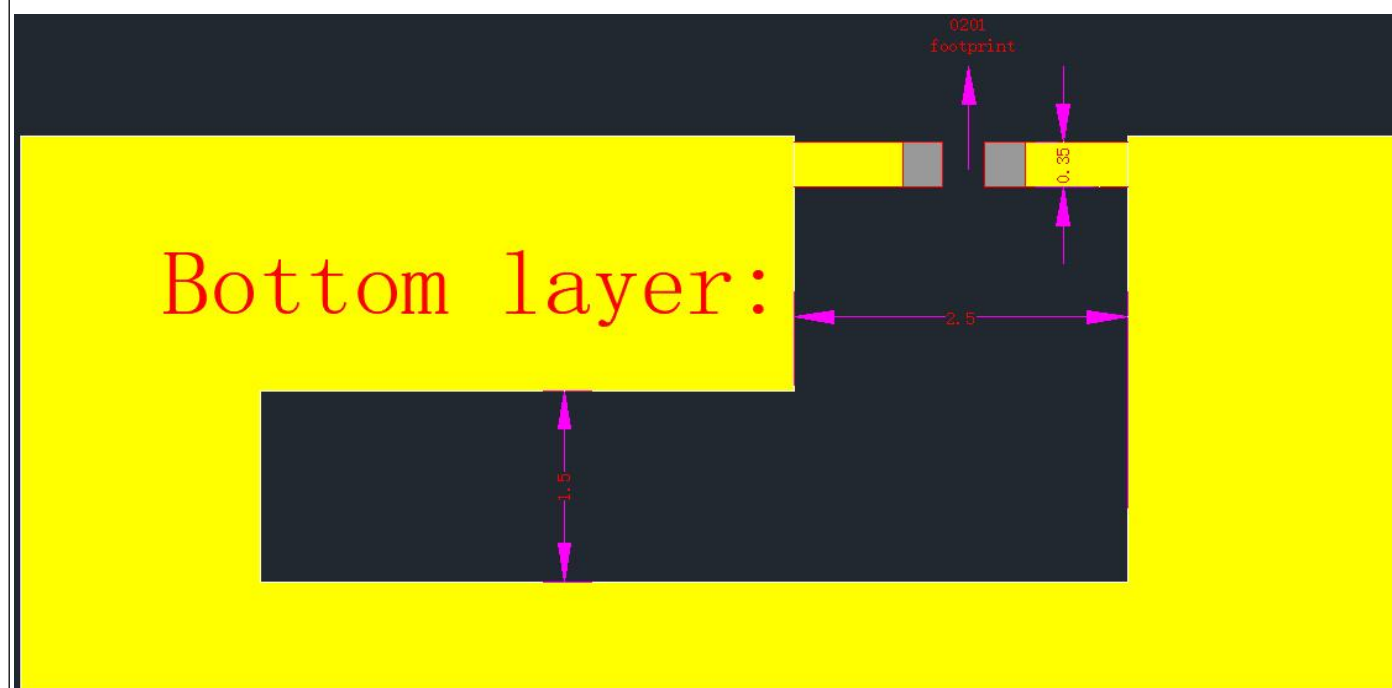
Evaluation Board Reference

长条板Layout建议参考如下:

Top layer:

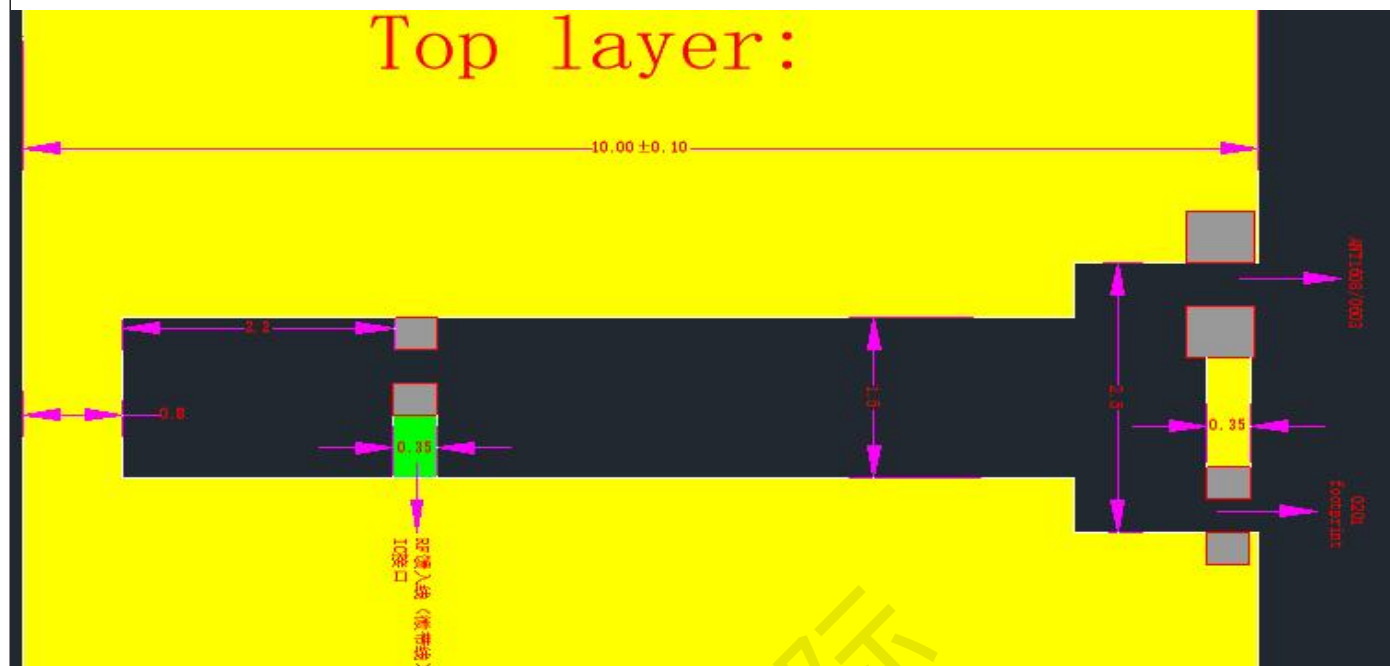


Bottom layer:

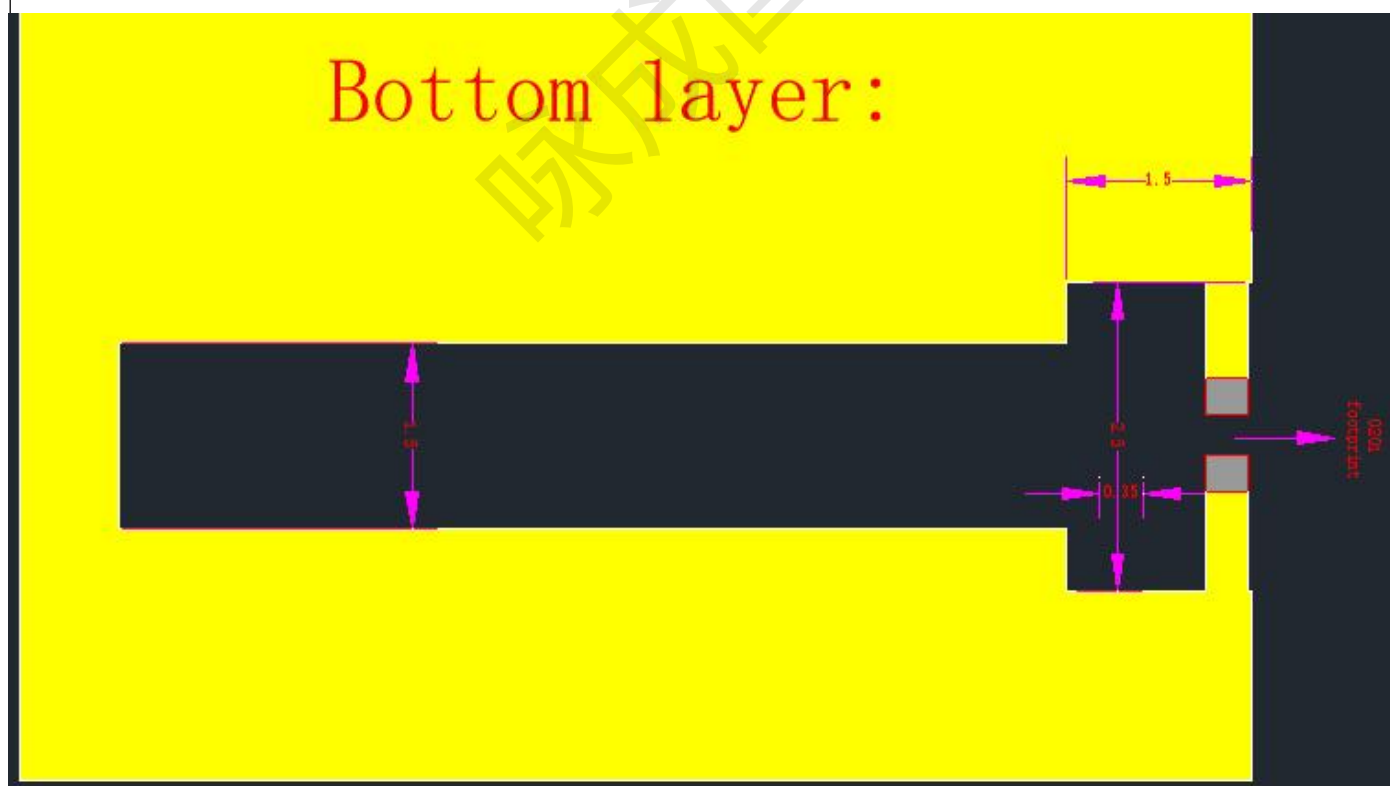


异形Layout建议参考如下:

Top layer:



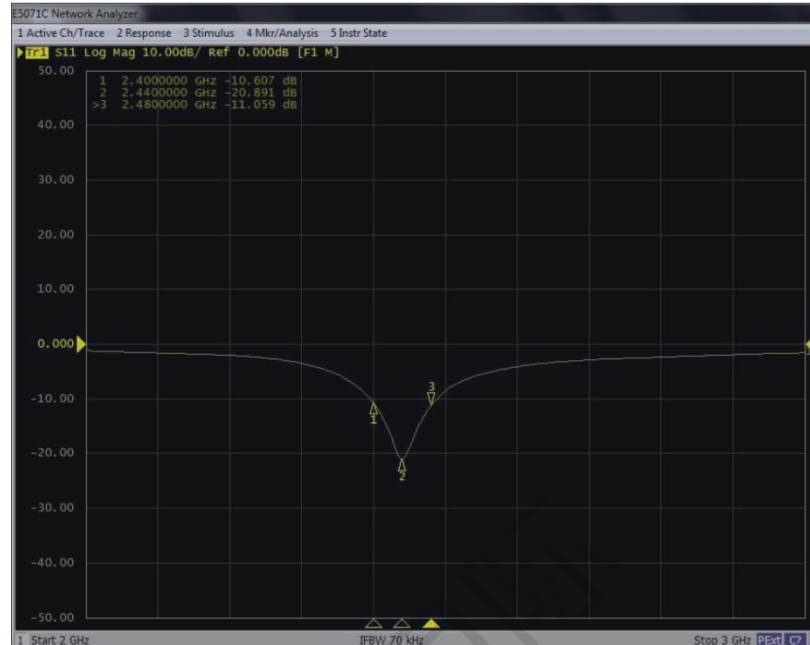
Top layer:



Electrical Characteristics

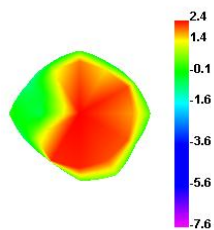
Return Loss & Radiation

ELECTRICAL CHARACTERISTICSS11

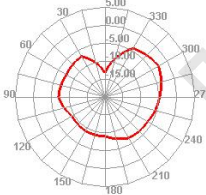


Radiation Pattern

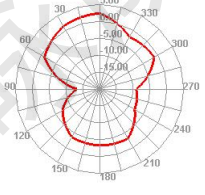
2400.000MHz



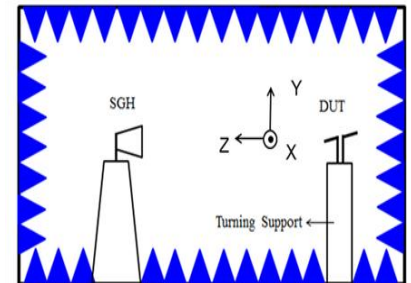
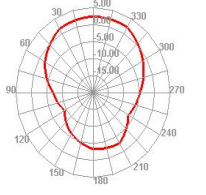
2400.000MHz H



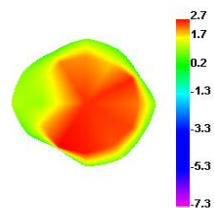
2400.000MHz E1



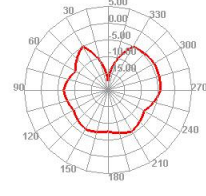
2400.000MHz E2



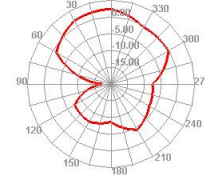
2450.000MHz



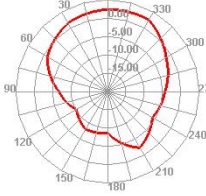
2450.000MHz H



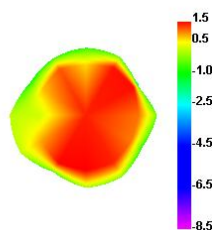
2450.000MHz E1



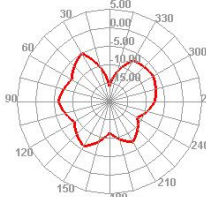
2450.000MHz E2



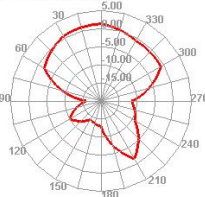
2500.000MHz



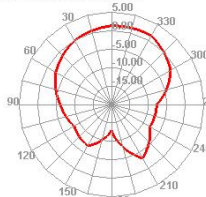
2500.000MHz H



2500.000MHz E1



2500.000MHz E2



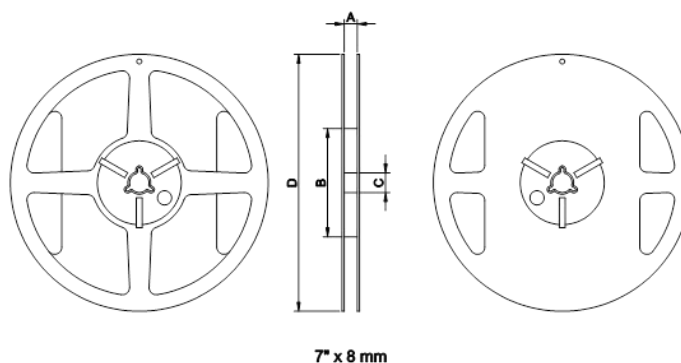
Electrical Characteristics

	Feature	Specification
1	Central frequency	2.45GHz&5.5GHz
2	Bandwidth	>150MHz
3	Peak gain	2~3dBi
4	VSWR	<2
5	Polarization	Linear
6	Azimuth beamwidth	Omnidirectional
7	Impedance	50 Ω

Taping Specifications

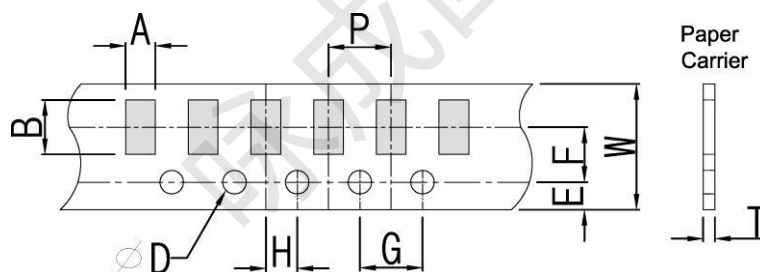
Reel and Taping Specification

Reel Specification



TYPE	SIZE		A	B	C	D
1608	7"	4K/Reel	4.0±0.5	4.0±2	13.5±0.5	178±2

Tapping Specification



Packaging	Type	A	B	W	E	F	G	H	T	ψD	P
Paper Type	1608	1.90±0.20	3.50±0.20	8.0±0.20	1.75±0.10	3.5±0.05	4.0±0.10	2.0±0.05	0.75±0.10	1.50±0.10	4.0±0.1

2.4GHz 1608 Chip Antenna: RANT1608F245C01/1608F245C04/1608F245C05 Reliability Table



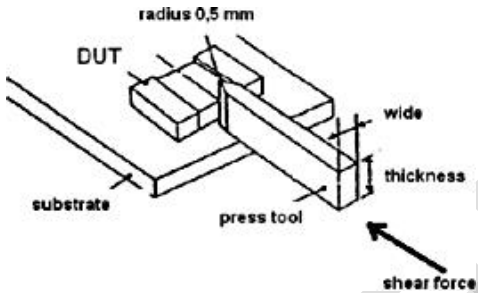
Test Item	Procedure	Requirements Ceramic Type	Remark (Reference)
Electrical Characterization		Fulfill the electrical specification	User Spec.
Thermal Shock	1. Preconditioning: 50 ± 10°C / 1 hr , then keep for 24 ± 1 hrs at room temp. 2. Initial measure: Spec: refer Initialspec. 3. Rapid change of temperature test: -30°C to +85°C; 100 cycles; 15 minutes at Lower category temperature; 15 minutes at Upper category temperature.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 107
Temperature Cycling	1. Initial measure: Spec: refer Initialspec. 2. 100 Cycles (-30°C to +85°C), Soak Mode=1 (2 Cycle/hours). 3. Measurement at 24 ± 2Hours after test condition.	No Visible Damage. Fulfill the electrical specification.	JESD22 JA104
High Temperature Exposure	1. Initial measure: Spec: refer Initialspec. 2. Unpowered; 500hours @ T=+85°C. 3. Measurement at 24 ± 2 hours aftertest.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 108
Low Temperature Storage	1. Initial measure: Spec: refer Initialspec. 2. Unpowered: 500hours @ T=-30°C. 3. Measurement at 24 ± 2 hours aftertest.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 108
Solderability (SMD Bottom Side)	Dipping method: a. Temperature: 235 ± 5°C b. Dipping time: 3 ± 0.5s	The solder should cover over 95% of the critical area of bottom side.	IEC 60384-21/22 4.10
Soldering Heat Resistance (RSH)	Preheating temperature: 150 ± 10°C. Preheating time: 1~2 min. Solder temperature: 260 ± 5°C. Dipping time: 5 ± 0.5s	No Visible Damage.	IEC 60384-21/22 4.10
Vibration	5g's for 20 min., 12 cycles each of 3 orientations Note: Use 8"X5" PCB .031" thick 7 secure points on, one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz.	No Visible Damage.	MIL-STD-202 Method 204
Mechanical Shock	Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks) Peak value: 1,500g's Duration: 0.5ms Velocity change: 15.4 ft/s Waveform: Half-sine	No Visible Damage.	MIL-STD-202 Method 213
Humidity Bias	1. Humidity: 85% R.H., Temperature: 85 ± 2 °C. 2. Time: 500 ± 24 hours. 3. Measurement at 24 ± 2hrs after test condition.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 Method 106

2.4GHz 3216 Chip Antenna:

RANT1608F245C01/RANT1608F245C04/1608F245C05



RAIN

Board Flex (SMD)	1. Mounting method: IR-Reflow. PCB Size (L:100 × W:40 × T:1.6mm) 2. Apply the load in direction of the arrow until bending reaches 2 mm.	No Visible Damage.	AEC-Q200 005
Adhesion	Force of 1.8Kg for 60 seconds. 	No Visible Damage Magnification of 20X or greater may be employed for inspection of the mechanical integrity of the device body terminals and body/terminal junction.	AEC-Q200 006
Physical Dimension	Any applicable method using x10 magnification, micrometers, calipers, gauges, contour projectors, or other measuring equipment, capable of determining the actual specimen dimensions.	In accordance with specification.	JESD22 JB100

Revision History

Revision	Date	Content
1	2019/03/01	New Datasheet
2	2020/02/22	Add 2D radiation characteristic