

# Compact 2.4 GHz WiFi/Bluetooth/BLE Patch Antenna



APARN1204-S2450



12.0 x 12.0 x 4.0 mm  
RoHS/RoHS II Compliant  
MSL = N/A

## Features

- Compact 12.0 x 12.0 mm patch
- Peak gain of 2 dBi
- Linear polarization
- Surface mount
- 2.4 GHz WiFi/Bluetooth support

## Applications

- WiFi/Bluetooth/BLE/Zigbee/ISM
- IoT
- Drones, robotics
- AR/VR applications
- Industrial controls

## Electrical Characteristics

Item	Spec
Working Frequency	2400~2500MHz
Bandwidth	100MHz @ -7dB Return Loss
Dimension	12.0 x 12.0 x 4.0mm
VSWR	3.0 max @ Center Frequency
Peak Gain	+2 dBi typ.
Polarization	Linear
Impedance	50 $\Omega$
Operating Temperature	-40°C to +105°C
Termination	Ag (Environmentally-Friendly Pb Free)

\* Above values are measured on 50.0 x 50.0 mm<sup>2</sup> Evaluation Board

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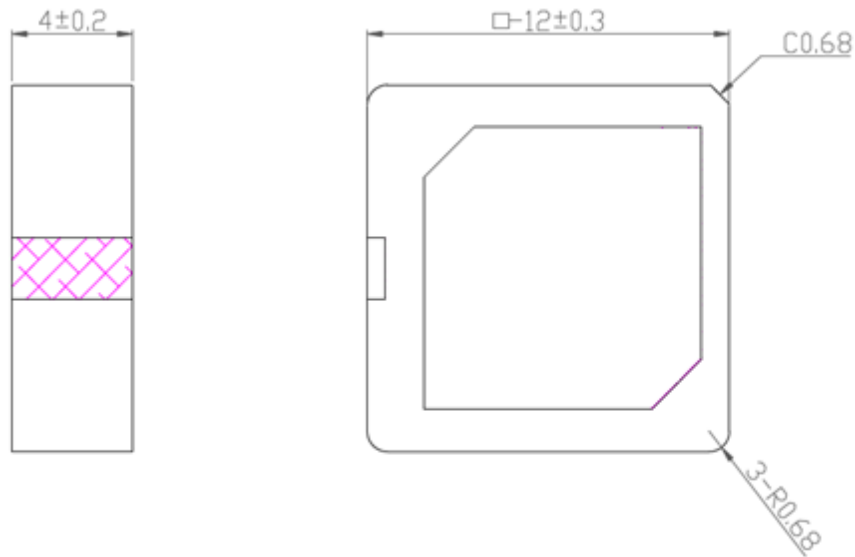


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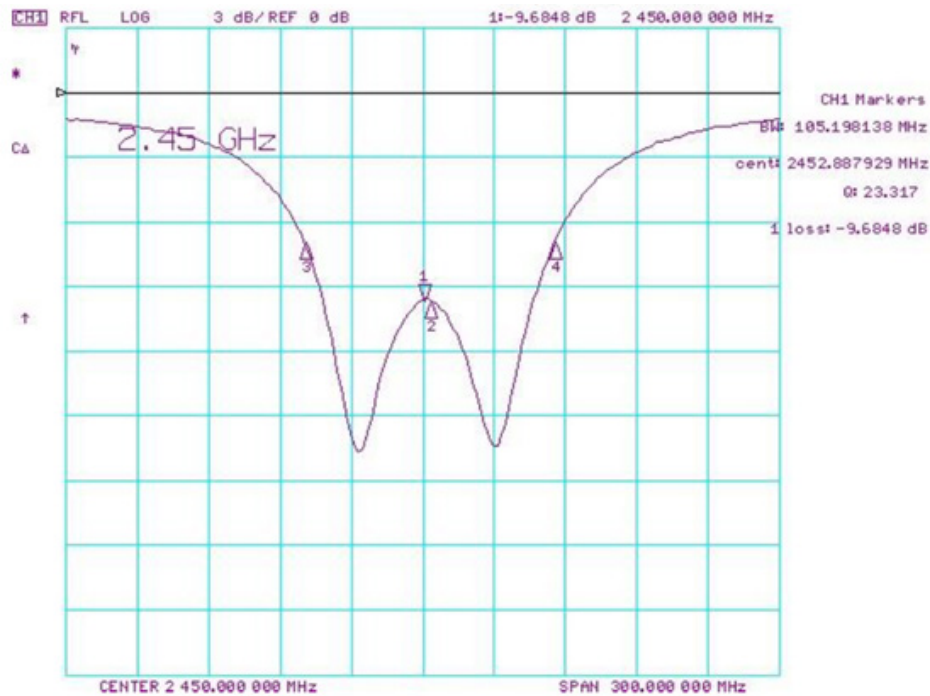
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## Dimensions



Unit: mm

## Typical Electrical Characteristics



With a 50.0 x 50.0 mm<sup>2</sup> Evaluation Board



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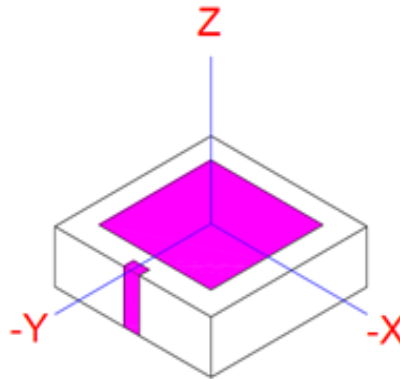


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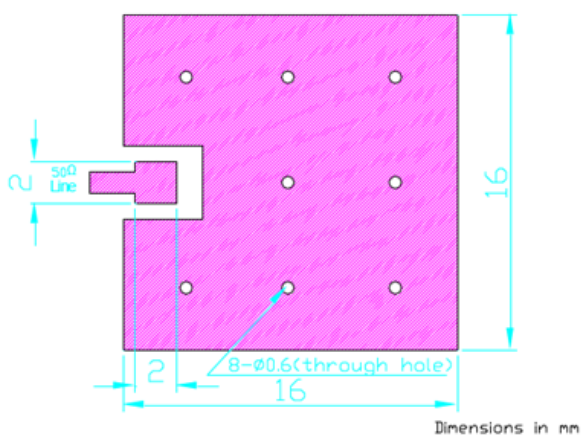


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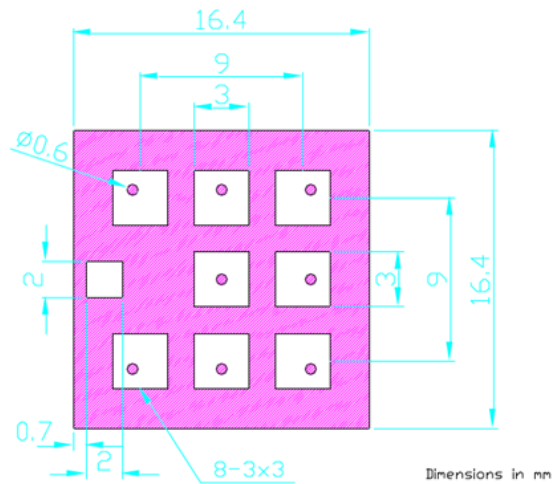
## Definition of X-Y-Z Plane



## Recommended PC Board Patterns



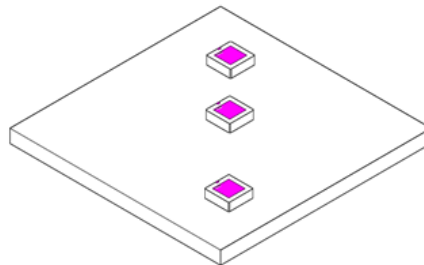
Electrode



Solder Resist

## Antenna Mounting Method

This antenna can be mounted in any position on a main board.



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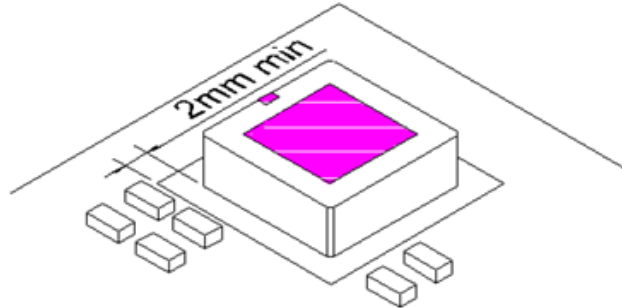
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## Antenna Mounting Method

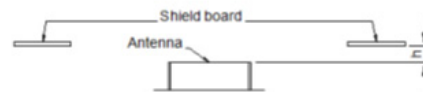
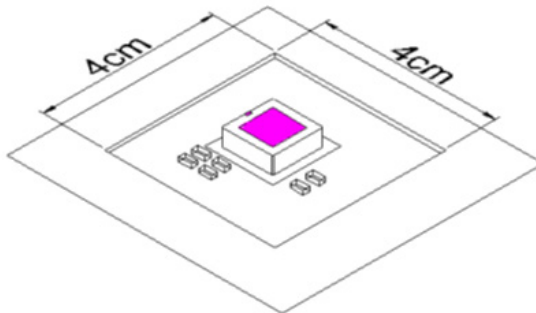
Other components should be mounted about 2mm apart from the antenna (16x16mm land pattern recommended).



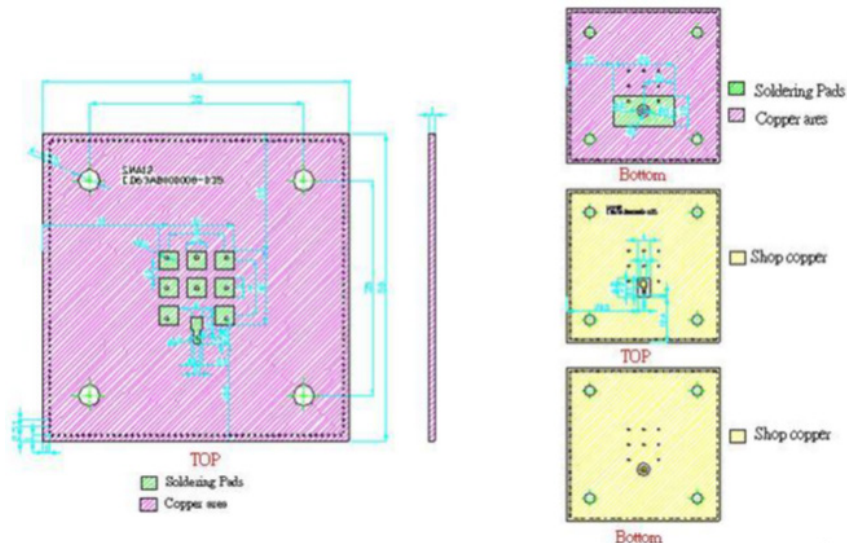
## Surroundings Around Mounted Antenna

The surroundings around the mounted antenna should be preferably free from any metal piece, because the gain and directivity are affected by a metal piece.

If the antenna is incorporated in equipment with electromagnetic shielding, open a 4x4cm or larger window through the shielding (h=0mm). Then its gain is hardly lower. (If h is high, make the window larger).



## Evaluation Board Dimensions





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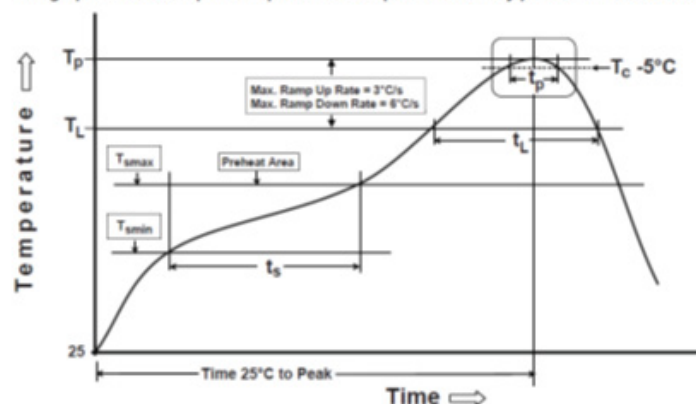
## Recommended Reflow Soldering Profile

Abrakon Products can be assembled following Pb-free assembly. According to the standard **IPC/JDEC J-STD-020C**, the temperature profile suggested is as follows:

Phase	Profile features	Pb-Free Assembly (SnAgCu)
PREHEAT	-Temperature Min(Tsmin)	150°C
	-Temperature Max(Tsmax)	200°C
	-Time(ts) form (Tsmin to Tsmax)	60-120 seconds
RAMP-UP	Avg. Ramp-up Rate (Tsmax to TP)	3°C/second(max)
REFLOW	-Temperature(TL)	217°C
	-Total Time above TL (t L)	30-100 seconds
PEAK	-Temperature(TP)	260°C
	-Time(tp)	20-30 second
RAMP-DOWN	Rate	6°C / second max.
Time from 25°C to Peak Temperature		8 minutes max.
Composition of solder paste		96.5Sn/3Ag/0.5Cu
Solder Paste Model		SHENMAO PF606-P26

Note: All the temperature measure points are on the top surface of the component. If the temperature is over recommended, it will make the component surface peel or damage.

The graphic shows temperature profile for component assembly process in reflow ovens



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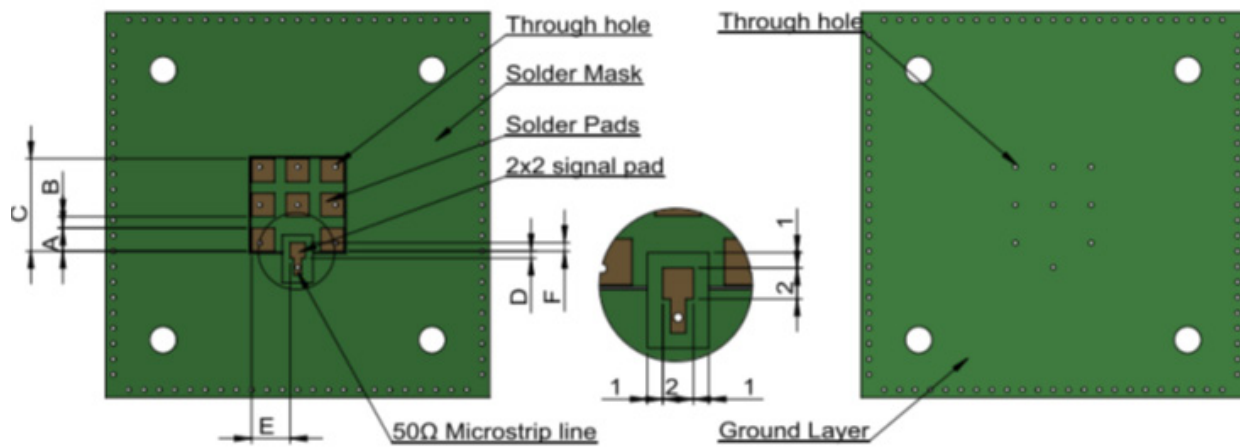
## Soldering With Iron:

### Soldering condition:

Soldering iron temperature  $270 \pm 10$  °C.

Apply preheating at 120 °C for 2-3 minutes. Finish soldering for each terminal within 3 seconds. If soldering iron is over the temperature  $270 \pm 10$  °C or held longer than 3 seconds, it will make the component surface peel or damage.

## Recommendations of the Antenna Foot Print Tables:

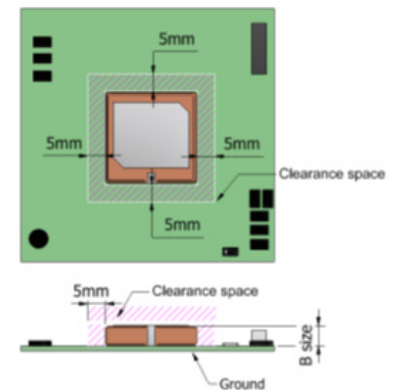


Type/Size	A	B	C	D	E	F
12x12x4	3±0.2	1.5±0.2	12±0.2	0.9±0.2	5.0±0.2	1.1±0.2

Unit: mm

## Recommendations of The PCB Layout:

- It needs at least 5mm clearance between LCD panel/shielding and around antenna.
- Keep ground area around antenna as symmetrical as possible.
- It's can't be obscured metal in top of antenna space.



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