Compact 2.4 GHz WiFi/Bluetooth/BLE Patch Antenna

APARN1204-S2450

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Frequency</td>
<td>2400~2500MHz</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>100MHz @ -7dB Return Loss</td>
</tr>
<tr>
<td>Dimension</td>
<td>12.0 x 12.0 x 4.0mm</td>
</tr>
<tr>
<td>VSWR</td>
<td>3.0 max @ Center Frequency</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>+2 dBi typ.</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +105°C</td>
</tr>
<tr>
<td>Termination</td>
<td>Ag (Environmentally-Friendly Pb Free)</td>
</tr>
</tbody>
</table>

* Above values are measured on 50.0 × 50.0 mm² Evaluation Board
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Dimensions

![Dimensions Diagram]

Unit: mm

Typical Electrical Characteristics

![Typical Characteristics Graph]

With a 50.0 x 50.0 mm² Evaluation Board
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12.0 x 12.0 x 4.0 mm
RoHS/RoHS II Compliant
MSL = N/A

Definition of X-Y-Z Plane

Recommended PC Board Patterns

Antenna Mounting Method

This antenna can be mounted in any position on a main board.
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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 4×4cm 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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Environmental Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Temperature</td>
<td>-40°C to + 105°C</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>0% to 95% @ +40°C</td>
</tr>
<tr>
<td>Maximum Temperature for Soldering of Feed Pin</td>
<td>+290°C for 3 seconds</td>
</tr>
</tbody>
</table>

Precautions

- Antenna pattern use an silver electrode.
- Please don’t use the corrosion gas (sulfur gas, chlorine gas) in the atmosphere.
- Please don’t direct solder onto the silver electrode of Antenna pattern.

Packaging

1. 500pcs/reel
2. 350 x 340 x 67mm(500pcs/Carton-Inside)
3. 370 x 360 x 305mm(2000pcs/Carton-Outside)
4. GW - 10.46KG
Recommended Reflow Soldering Profile

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

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

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.
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Soldering With Iron:

**Soldering condition:**
Soldering iron temperature 270±10 ºC.
Apply preheating at 120 ºC for 2-3 minutes. Finish soldering for each terminal within 3 seconds. If soldering iron is over the temperature 270±10 ºC or his 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:

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

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