WiFi / Bluetooth Chip Antenna
Model: AA029

Product Number: H2U262GKBA0100

REFERENCE SPECIFICATION
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1 Introduction

Unictron’s AA029 chip antenna is designed for ISM 2.4GHz applications, covering frequencies 2400~2500MHz. Fabricated with proprietary design and processes, AA029 shows excellent performance and is fully compatible with SMT processes which can decrease the assembly cost and improve device’s quality and consistency.

Features

* Stable and reliable in performances
* Low profile, compact size
* RoHS compliance
* SMT processes compatible

Applications

* ISM 2.4 GHz applications
* ZigBee/BLE applications
* Bluetooth earphone systems
* Hand-held devices when WiFi / Bluetooth functions are needed, e.g., Smart phones
* IEEE802.11 b/g/n
* Wireless PCMCIA cards or USB dongles
2  Electrical Characteristics

2.1 Table with electrical properties:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specifications</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outline Dimensions</td>
<td>5.0 x 2.2 x 1.6</td>
<td>mm</td>
</tr>
<tr>
<td>Working Frequency</td>
<td>2400~2500 MHz</td>
<td>MHz</td>
</tr>
<tr>
<td>VSWR (@center frequency)*</td>
<td>2 Max.</td>
<td></td>
</tr>
<tr>
<td>Characteristic Impedance</td>
<td>50</td>
<td>Ω</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear Polarization</td>
<td></td>
</tr>
<tr>
<td>Peak Gain ( @2442MHz)</td>
<td>2.2 (typical)</td>
<td>dBi</td>
</tr>
<tr>
<td>Efficiency</td>
<td>66 (typical)</td>
<td>%</td>
</tr>
</tbody>
</table>

*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.
2.2 Return Loss (S\textsubscript{11})

![Graph showing Return Loss (S\textsubscript{11})](image)

2.3 VSWR (S\textsubscript{11})

![Graph showing VSWR (S\textsubscript{11})](image)
2.4 Efficiency Table

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>2400</th>
<th>2412</th>
<th>2417</th>
<th>2422</th>
<th>2427</th>
<th>2432</th>
<th>2437</th>
<th>2442</th>
<th>2447</th>
<th>2452</th>
<th>2457</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency (dB)</td>
<td>-2.3</td>
<td>-2.2</td>
<td>-2.1</td>
<td>-1.8</td>
<td>-1.9</td>
<td>-1.7</td>
<td>-1.8</td>
<td>-1.8</td>
<td>-1.8</td>
<td>-1.8</td>
<td>-1.9</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>59.3</td>
<td>60.9</td>
<td>62.2</td>
<td>66.1</td>
<td>64.2</td>
<td>68.4</td>
<td>67.5</td>
<td>66.8</td>
<td>65.2</td>
<td>65.8</td>
<td>64.8</td>
</tr>
<tr>
<td>Gain (dBi)</td>
<td>1.4</td>
<td>1.6</td>
<td>1.8</td>
<td>2.1</td>
<td>2.0</td>
<td>2.3</td>
<td>2.3</td>
<td>2.2</td>
<td>2.0</td>
<td>2.1</td>
<td>1.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>2462</th>
<th>2467</th>
<th>2472</th>
<th>2484</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency (dB)</td>
<td>-1.9</td>
<td>-1.9</td>
<td>-2.0</td>
<td>-2.0</td>
<td>-2.1</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>65.1</td>
<td>64.0</td>
<td>62.4</td>
<td>63.0</td>
<td>61.5</td>
</tr>
<tr>
<td>Gain (dBi)</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
<td>1.8</td>
<td>1.7</td>
</tr>
</tbody>
</table>

2.5 Efficiency vs. Frequency
2.6 Radiation Pattern (with 40x40mm² Evaluation Board)

3D Gain Pattern @ 2442 MHz (unit: dBi)
3 Layout

3.1 Antenna Dimensions

Unit: mm

NOTE:
1. All materials are RoHS compliant
2. “Ⓐ - Ⓖ” Critical dimensions
3. “ ( ) “ Reference dimensions

PIN Definitions

<table>
<thead>
<tr>
<th>PIN</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldering Pad</td>
<td>Signal</td>
<td>N/C</td>
</tr>
</tbody>
</table>
3.2 Evaluation Board with Antenna

Unit: mm
3.3 Solder Land Pattern

The solder land pattern (gold marking areas) is shown below. Recommendation on matching circuit will be provided according to customer’s installation conditions.
4 Frequency tuning

Chip antenna tuning scenario

With the following recommended values of matching and tuning components, the center frequencies will be about 2442 MHz at our standard 40x40 mm² evaluation board. However, these are typical reference values which may need to be changed when circuit boards or part vendors are different.

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Vendor</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>2.2 nH, (0402)</td>
<td>DARFON</td>
<td>±0.1 nH</td>
</tr>
<tr>
<td>3</td>
<td>1 pF, (0402)</td>
<td>DARFON</td>
<td>±0.1 pF</td>
</tr>
<tr>
<td>4</td>
<td>0 Ω, (0402)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
5 Packing

1. Quantity/Reel: 3000 pcs/Reel
2. Plastic tape:

a) Tape drawing:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>12.00</td>
<td>±0.30</td>
</tr>
<tr>
<td>P</td>
<td>8.00</td>
<td>±0.10</td>
</tr>
<tr>
<td>E</td>
<td>1.75</td>
<td>±0.10</td>
</tr>
<tr>
<td>F</td>
<td>5.50</td>
<td>±0.10</td>
</tr>
<tr>
<td>P2</td>
<td>2.00</td>
<td>±0.10</td>
</tr>
<tr>
<td>D</td>
<td>1.50</td>
<td>+0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.00</td>
</tr>
<tr>
<td>Po</td>
<td>4.00</td>
<td>±0.10</td>
</tr>
<tr>
<td>10Po</td>
<td>40.00</td>
<td>±0.20</td>
</tr>
</tbody>
</table>
6 Notes

6.1 Typical Soldering Profile for Lead-free Process

![Soldering Profile Diagram]

- **Pre-heating**
  - 150-200°C
  - 60-180s

- **Rising Temperature**
  - 217°C
  - 60-150s

- **Stabilization**
  - 260°C
  - 20-40s

- **Cooling**
  - 60-150s
6.2 Operating and storage conditions:

**Operating:**
- Maximum Input Power: 2W
- Operating Temperature: -40°C to +85°C

**Storage:**
- Storage Temperature: -5°C to +40°C
- Relative Humidity: 20% to 70%
- Shelf Life: 1 year

6.3 Installation guide:

Request Unictron’s application notes “General guidelines for the installation of Unictron’s chip antennas” for further information at e-sales@unictron.com.
Presented data were measured on reference PCB (ground) as shown in this specification. When the antenna placement or size of the PCB is changed, antenna performance and values of matching components may differ from data shown here.

Information presented in this Reference Specification is believed to be correct as of the date of publishing. Unictron Technologies Corporation reserves the rights to change the Reference Specification without notice due to technical improvements, etc. Please consult with Unictron’s engineering team about the latest information before using this product. Per request, we may provide advice and assistance in implementing this antenna to a customer’s device by simulation or real measurement of the interested device in our testing facilities.

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