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></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 ($S_{11}$)

![Graph showing return loss](image)

2.3 VSWR ($S_{11}$)

![Graph showing VSWR](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>-1.6</td>
<td>-1.7</td>
<td>-1.8</td>
<td>-1.9</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

![Efficiency vs. Frequency Graph](image-url)
2.6 Radiation Pattern (with 40x40mm² Evaluation Board)

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

3.1 Antenna Dimensions

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.

Transmission line with 50 Ohm impedance characteristics.

Top View

Bottom View

Signal Input

Transmission line with 50 Ohm impedance

Downloaded from Arrow.com.
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>System Matching Circuit Component</th>
<th>Location</th>
<th>Description</th>
<th>Vendor</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>N/A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2.2 nH, (0402)</td>
<td>DARFON</td>
<td>±0.1 nH</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>1 pF, (0402)</td>
<td>DARFON</td>
<td>±0.1 pF</td>
</tr>
<tr>
<td>4</td>
<td></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:

   b) Tape dimensions (unit: mm)

<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>
6.1 Typical Soldering Profile for Lead-free Process

- **Pre-heating:** 150-200°C
- **Time (s.):**
  - 60-180s
  - 60-150s

- **Temperature (°C):**
  - 260°C
  - 217°C
  - 150-200°C
  - 20-40s
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.

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