

CA-C01 Specification

OverAir™ SMD Antenna Series (2.4GHz Band)

HWJ ELEC
Guangzhou Cambric Electronic Technology Co., Ltd.

PN: CA-C01 RoHS Compliant

Features

- **Compact Dimensions:** Small footprint SMD chip antenna measuring only $3.20 \times 1.60 \times 0.40 \text{ mm}^3$.
- **High Performance:** Low energy loss and high antenna radiation efficiency.
- **High Stability:** Excellent environmental stability under varying temperature and humidity conditions.

Structure & Dimensions

The antenna pin layout and mechanical specifications are detailed below:



Figure 1: Antenna Pin Definition

Applications

- 2.4GHz ISM Band antenna applications.
- Bluetooth, Wi-Fi, Wireless connectivity.
- Smart Home devices and IoT applications.

1. Antenna Feed Terminal
2. Antenna Feed Side Ground Terminal
3. Antenna Ground Terminal

Symbol	Description	Dimensions (mm)
L	Length	3.20 ± 0.10
W	Width	1.60 ± 0.10
T	Thickness	0.40 ± 0.05
a	Terminal Width	0.60 ± 0.10

Electrical Characteristics

Parameter	Specification Value
Working Frequency Range	2450 ± 50 MHz
Bandwidth	> 100 MHz
Impedance	50 Ω
Peak Gain	2.96 dBi
VSWR	< 2.0
Operating Temperature	-40°C to +85°C
Power Capacity	3 W (Max)

Note: An external impedance matching network is required to tune and optimize the center operating frequency to 2.45GHz.

PCB Reference Design & Matching Network

To optimize antenna performance, follow the recommended schematic layout and clearance guidelines below:

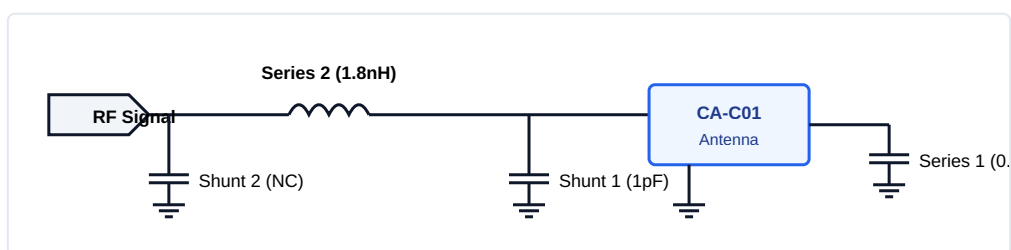


Figure 2: Reference Schematic and Matching Network Circuit

Matching Component Position	Recommended Value (Evaluation Board thickness 1.0mm)
Series Component 1 (Series 1)	0.75 pF
Shunt Component 1 (Shunt 1)	1.0 pF
Series Component 2 (Series 2)	1.8 nH
Shunt Component 2 (Shunt 2)	NC (Not Connected)

Layout Routing Guidelines:

- ***Empty Area (Clearance Zone):** A full clearance area of $8.3mm \times 5.5mm$ must be implemented across ALL layers. Do not pour copper or route any traces within this area.
- ****50Ω Feed line:** The transmission line routing in the copper-pour ground zone must be strictly designed to maintain a characteristic impedance of 50Ω.

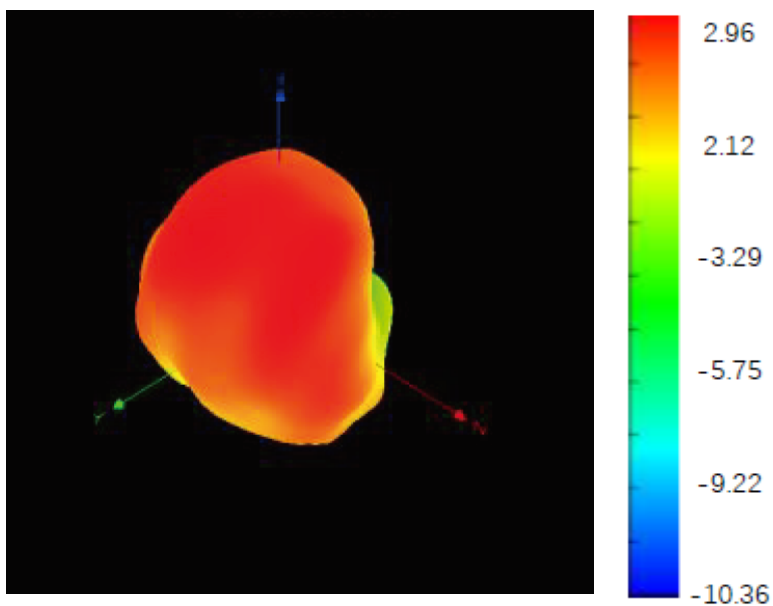
Antenna Radiation Performance

The following efficiency and maximum gain data are measured in an ETS 3D Anechoic Chamber based on the standard reference evaluation board ($51.8\text{mm} \times 42.8\text{mm}$, thickness 1.0mm):

Frequency (MHz)	Max Gain (dBi)	Radiation Efficiency (%)
2400	2.52	51.40%
2410	2.59	53.09%
2420	2.59	53.58%
2430	2.62	53.83%
2440	2.96	57.41%
2450	2.62	57.94%
2460	2.13	55.21%
2470	2.26	54.70%
2480	2.53	55.08%
2490	2.10	53.83%
2500	1.48	51.88%

3 D Radiation pattern

Ferq: 2440 MHz Unit: dBi



Soldering Conditions (Reflow Profile)

A typical reliable, non-destructive Pb-Free reflow soldering profile specification is outlined below:

Profile Feature	Pb-Free Assembly (SnAgCu) Specification
Average Ramp-up Rate (T_{smax} to T_p)	3°C / second max
Preheat: Min Temperature (T_{smin})	150°C
Preheat: Max Temperature (T_{smax})	200°C
Preheat: Time (t_{smin} to t_{smax})	60 - 180 seconds
Reflow Liquidus Temperature (T_L)	217°C
Total Time maintained above T_L (t_L)	60 - 150 seconds
Peak Temperature (T_p)	260°C
Time within 5°C of actual Peak Temperature (t_p)	20 - 40 seconds
Ramp-down Rate	6°C / second max
Time from 25°C to Peak Temperature	8 minutes max

Packaging & Storage Specifications

1. Tape & Reel Dimensions

Embossed plastic carrier tape and reel dimensions conform to standard automated pick-and-place specifications (Unit: mm):

A_o	B_o	D	T	W	E	F	P_o	P_1	P_2
2.0±0.1	3.6±0.1	1.55±0.05	0.9±0.1	8.2±0.1	1.75±0.1	3.2±0.1	4.0±0.1	4.0±0.1	2.0±0.1

Reel Index	A (Diameter)	B (Hub Diameter)	C (Width)	Standard Packaging Quantity
Dimension (mm)	178 mm	60 mm	13.5 mm	3000 PCS / Reel

2. Storage Environmental Conditions

- **Temperature & Humidity:** Store within -10°C to +40°C and 30% to 70% RH.
- **Atmosphere:** Avoid direct contact with corrosive gases (such as sulfur, chlorine, or bulk acids) as they cause electrode oxidation and degrade solderability.
- **Handling:** Keep sealed in original moisture-barrier bags/toolboxes. Avoid exposure to damp environments, heavy dust, thermal fluctuations, direct sunlight, or strong vibrations.

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