

CERAMIC ANTENNA SPECIFICATION

2.4 GHz Ceramic Chip Antenna

Model: 2450AT18B100E

Peak Gain: 0.5 dBi

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1. General Description

The 2450AT18B100E is a surface-mount ceramic chip antenna designed for 2.4 GHz ISM band applications, including Wi-Fi (802.11b/g/n/ax), Bluetooth (BR/EDR/LE), and Zigbee. The antenna features compact size, stable performance, and easy PCB integration without external matching components.

Key Features:

- Compact SMD package (3.2 x 1.6 x 0.5 mm)
- Peak gain: 0.5 dBi, near-omnidirectional H-plane pattern
- Wide bandwidth covering full 2.4 GHz ISM band (2400-2500 MHz)
- VSWR ≤ 2.0 across operating band
- No external matching network required
- RoHS compliant, lead-free soldering compatible

2. Electrical Specifications

2.1 General Parameters (T=25°C)

Parameter	Specification
Frequency Range	2400 – 2500 MHz
Center Frequency	2450 MHz
Bandwidth (VSWR ≤ 2.0)	≥ 100 MHz
Peak Gain	0.5 dBi (typical)
Average Gain	-1.5 dBi (typical)
Efficiency	$\geq 50\%$
VSWR	≤ 2.0 (across operating band)
Return Loss	≤ -10 dB (across operating band)
Impedance	50 Ω (nominal)
Polarization	Linear (Vertical)
H-Plane Beamwidth	360° (near omnidirectional)
E-Plane Beamwidth	$\sim 80^\circ$ (typical)
Max Input Power	2 W (CW)
Operating Temperature	-40°C to +85°C

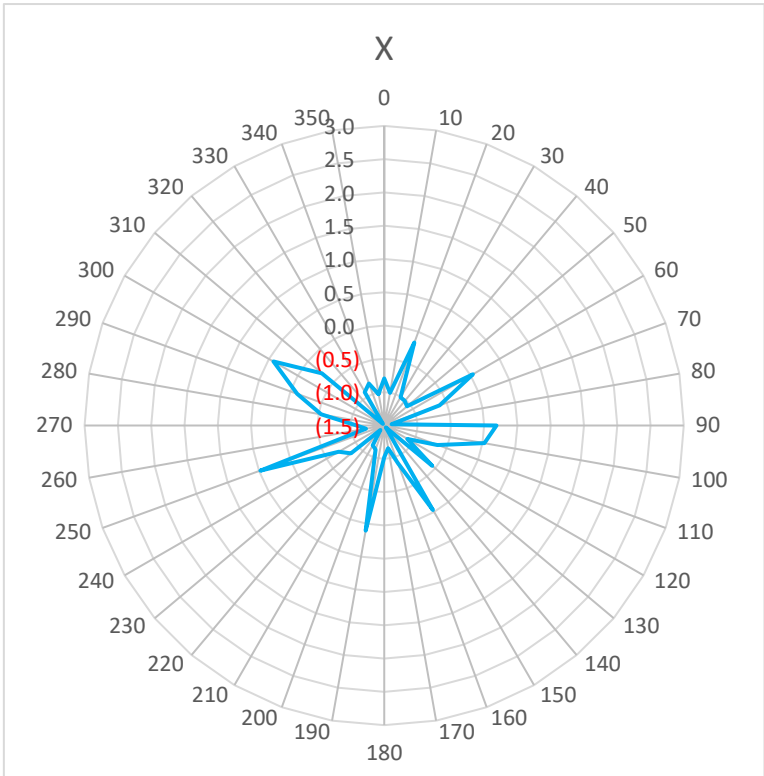
3. Mechanical Specifications

Parameter	Specification
Package Type	SMD (Surface Mount Device)
Dimensions (L x W x H)	3.2 x 1.6 x 0.5 mm

Parameter	Specification
Substrate Material	High-frequency ceramic (LTCC)
Electrode Material	Ag-Pd (Silver-Palladium)
Weight	~0.012 g
Pad Layout	See Section 5 (PCB Layout)

4. Radiation Patterns

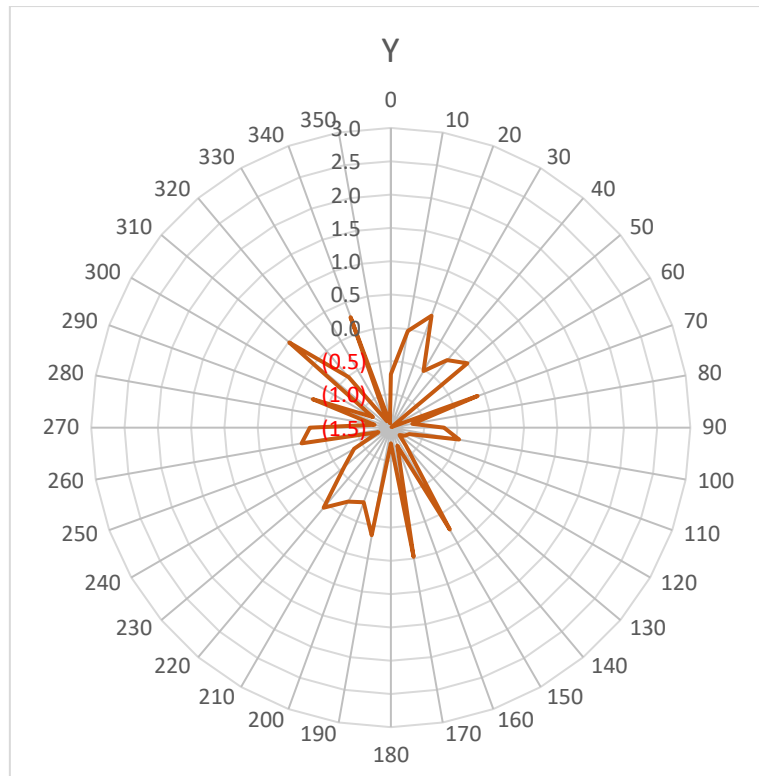
4.1 H-Plane (Horizontal Plane)



2402 MHz | Peak Gain: 0.48 dBi

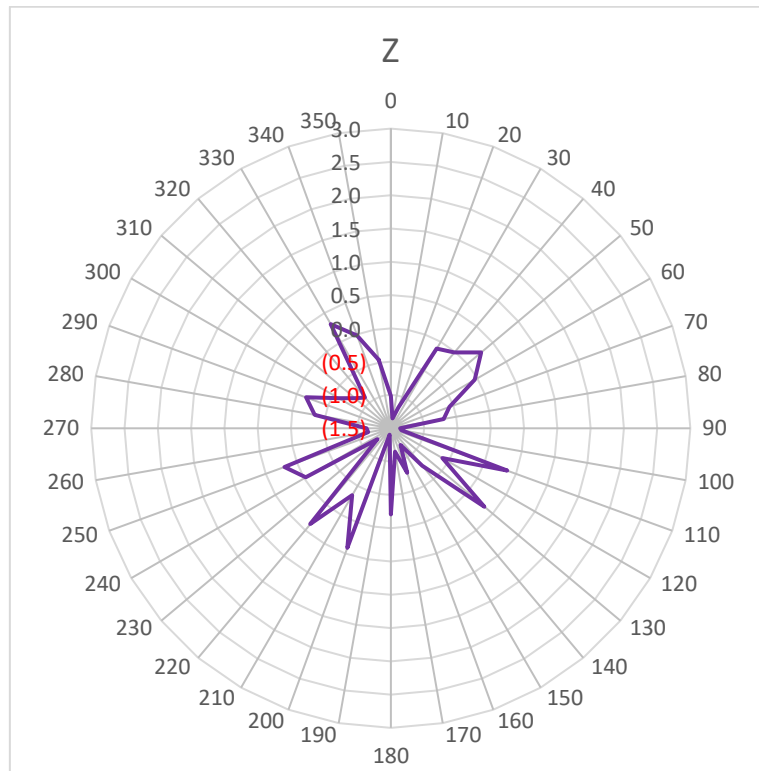
The H-plane pattern exhibits near-omnidirectional characteristics with ± 0.6 dB roundness variation, suitable for general indoor wireless applications where uniform coverage is desired.

4.2 E-Plane (Vertical Plane)



2450 MHz Peak Gain: 0.5 dBi

The E-plane pattern shows a figure-eight shape with the main lobe directed perpendicular to the PCB plane, providing broad vertical coverage.



2480 MHz Peak Gain: 0.41 dBi

4. Return Loss / VSWR

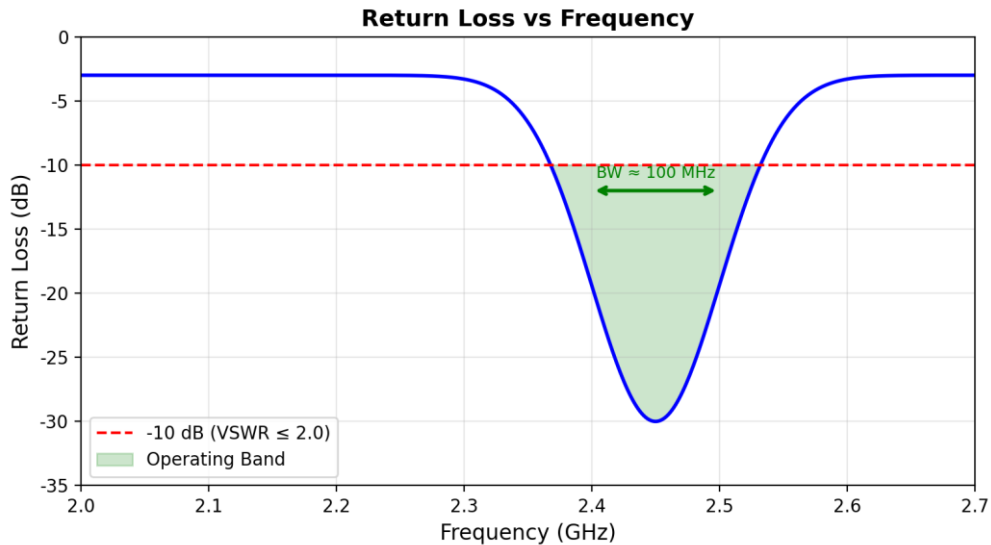


Figure 4: Return Loss vs Frequency

Parameter	Specification
Return Loss (at 2450 MHz)	≤ -20 dB (typical)
Bandwidth ($S_{11} \leq -10$ dB)	≥ 100 MHz (2400-2500 MHz)
VSWR (across band)	$\leq 2.0:1$

5. PCB Layout Guidelines

Proper PCB layout is critical for achieving optimal antenna performance. The following guidelines should be observed:

- Keep-out area: Maintain a minimum 5 mm clearance around the antenna with no copper pour or ground plane on the same layer
- Feed line: Use 50Ω microstrip or coplanar waveguide trace from RF source to antenna feed point
- Ground clearance: No ground plane directly beneath the antenna element (all layers)
- Antenna placement: Position at the PCB edge or corner for best performance
- Via stitching: Place ground vias along the feed line to minimize parasitic inductance
- Solder paste: Use Type 3 or Type 4 paste, stencil aperture ratio 1:1 with pad size
- Reflow profile: Peak temperature 240-250°C, time above 217°C: 60-90 seconds

6. Environmental & Reliability

Test Item	Requirement
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +125°C
Humidity	5% – 95% RH (non-condensing)
Thermal Shock	-40°C / +85°C, 100 cycles, IEC 60068-2-14
Solder Heat Resistance	260°C × 10s, IEC 60068-2-20

Test Item	Requirement
Vibration	10-500 Hz, 0.75mm/0.5g, 2h/axis, IEC 60068-2-6
Drop Test	1.0 m free fall, 3 times, IEC 60068-2-31
RoHS Compliance	Compliant (lead-free)

7. Packaging Information

Parameter	Specification
Tape Width	8 mm
Reel Diameter	7 inch (180 mm)
Quantity per Reel	4,000 pcs
Tape Material	Embossed plastic carrier tape
Cover Tape	Heat-seal top cover tape
Moisture Sensitivity Level	MSL 1 (unlimited floor life)

Mechanical Dimensions

	In	mm
L	0.236 ± 0.008	6.00 ± 0.20
W	0.079 ± 0.008	2.00 ± 0.20
T	0.047 0.2 +.004 / -.008	1.20 + 0.1 / -0.2
a	0.020 ± 0.012	0.50 ± 0.30