

BLAZETRACK PRIVATE LIMITED

DASHPOD 2.4 GHz PCB ANTENNA DATASHEET

Version 1.1

1. PRODUCT OVERVIEW

The **Dashpod 2.4 GHz PCB Antenna** is a compact **Meandered Inverted-F Antenna (MIFA)** optimised for embedded wireless products operating in the 2.4 GHz ISM band.

The antenna delivers **stable omnidirectional radiation** with uniform gain performance across all principal planes, making it suitable for compact IoT and consumer electronics.

2. KEY FEATURES

- Uniform radiation in all planes
- **Peak Gain: 2 dBi (XY, XZ, YZ)**
- Compact PCB footprint
- Wide ISM band coverage (2.4–2.483 GHz)
- 50 Ω impedance
- Stable performance inside plastic enclosures
- Cost-effective PCB-integrated solution
- Suitable for mass production

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3. ELECTRICAL SPECIFICATIONS

Parameter	Specification
Operating Frequency	2.400 – 2.483 GHz
Antenna Type	Meandered Inverted-F Antenna (MIFA)
Peak Gain (XY Plane)	2 dBi
Peak Gain (XZ Plane)	2 dBi
Peak Gain (YZ Plane)	2 dBi
Average Radiation Efficiency	≥ 65% (typical)
Impedance	50 Ω
VSWR	< 2.0 across ISM band
Return Loss	< -10 dB
Polarization	Linear
Radiation Pattern	Omnidirectional
PCB Area Required	~15 × 6 mm
Maximum Input Power	100 mW
Typical LOS Range	100–150 m (environment dependent)

4. RADIATION CHARACTERISTICS

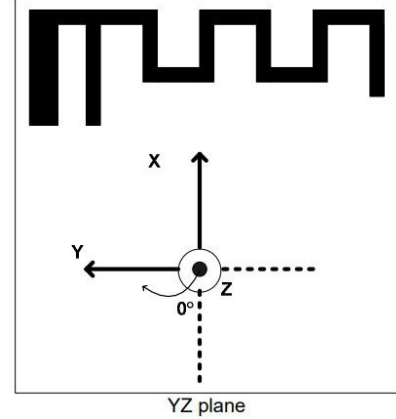
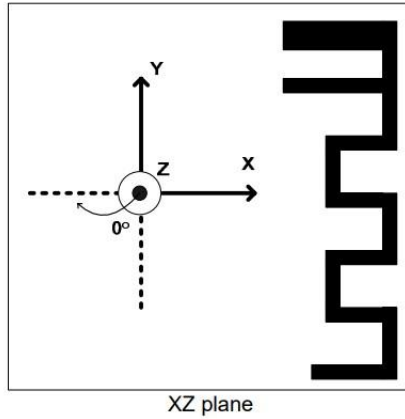
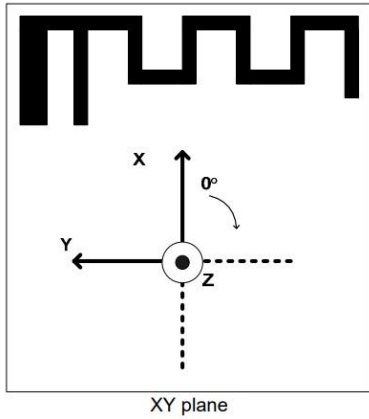
The antenna exhibits **consistent radiation behaviour** across all orthogonal planes.

Radiation Planes

- **XY Plane:** 2 dBi peak gain

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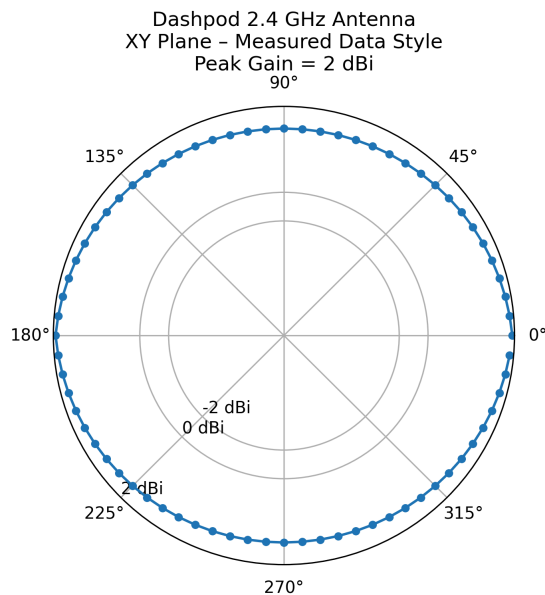
- **XZ Plane:** 2 dBi peak gain
- **YZ Plane:** 2 dBi peak gain



Pattern Description

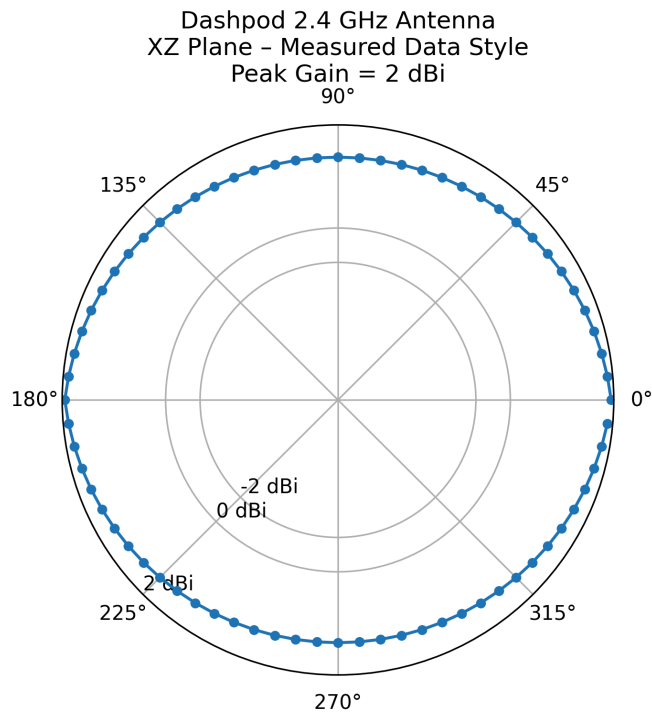
- Smooth omnidirectional radiation
- Minimal nulls
- Uniform coverage suitable for mobile and orientation-independent devices

Radiation Pattern: XY Plane Polar Plot

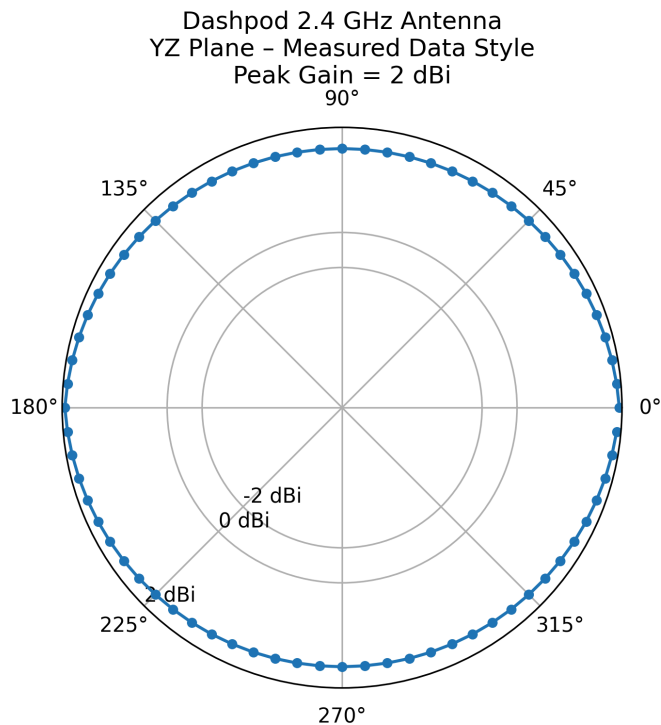


Radiation Pattern: XZ Plane Polar Plot

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Radiation Pattern: YZ Plane Polar Plot

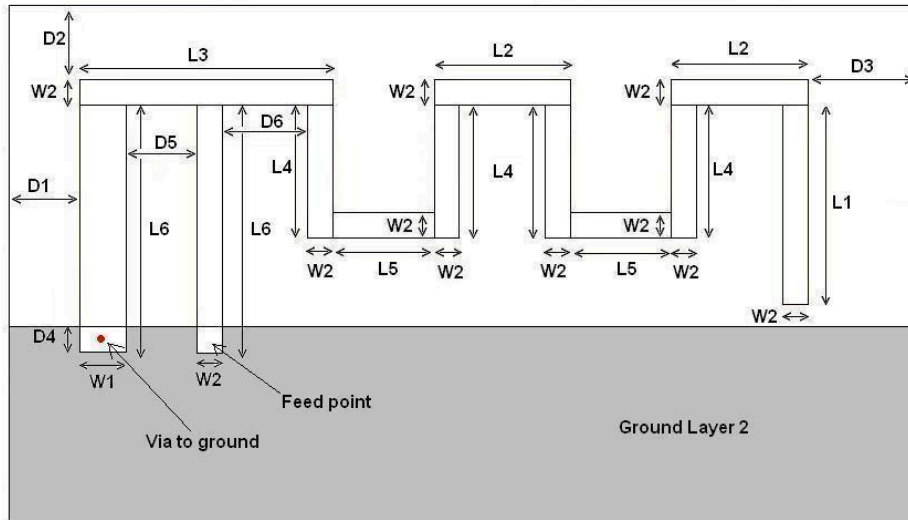


5. MECHANICAL DETAILS

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Parameter	Value
Antenna Length	~15 mm
Antenna Height	~6 mm
Placement	PCB edge (recommended)
Feed Type	50 Ω microstrip / CPW
Mounting	Top PCB layer

6. PCB LAYOUT GUIDELINES



L1	3.94 mm
L2	2.70 mm
L3	5.00 mm
L4	2.64 mm
L5	2.00 mm
L6	4.90 mm
W1	0.90 mm
W2	0.50 mm
D1	0.50 mm
D2	0.30 mm
D3	0.30 mm

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D4	0.50 mm
D5	1.40mm
D6	1.70 mm

-Antenna Dimensions

Recommended Practices:

- Place the antenna at the PCB edge or corner
- Maintain a **no-ground keep-out** beneath the antenna
- Keep **≥ 10 mm clearance** from metal objects
- Use a solid ground plane behind the feedline
- Stitch ground vias along the feedline

Avoid:

- Metal enclosures near the antenna
- Ground plane under antenna radiator
- High-speed digital or switching power traces near the antenna
- Shield cans covering the antenna region

7. MATCHING & TUNING

- The antenna is designed for **direct 50 Ω feed**
- No matching components required if the layout is followed
- For enclosure-induced detuning, provide **optional LC matching pads** near the feed
- Fine-tuning can be done using a VNA after final assembly

8. ENCLOSURE & ENVIRONMENTAL EFFECTS

Performance may vary due to:

- Battery placement
- Display modules
- Human body proximity
- Enclosure material and thickness

Recommendation:

Validate antenna performance in the **final product enclosure**, not in an open PCB condition.

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9. TESTING & VALIDATION

Recommended RF Tests

- S11 / Return Loss measurement
- VSWR sweep across the ISM band
- OTA throughput testing
- RSSI stability vs orientation
- PER vs distance
- EIRP compliance verification

Regulatory Standards

- FCC Part 15
- CE EN 300 328
- BIS (India ISM band)

10. TYPICAL APPLICATIONS

- IoT sensors and controllers
- Home automation products
- Wearables and trackers
- Smart plugs and switches
- Wireless metering devices
- Health monitoring equipment

11. REVISION HISTORY

Version	Date	Notes
1.0	2025	Initial release
1.1	2025	Updated peak gain to 2 dBi (all planes)