Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

Features
- Multipurpose for various frequencies
- Omni directional radiation
- Low profile
- Compact size W x L x H (7 x 1.6 x 1.6 mm)
- Low weight (86 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS compliant product

Applications
- Bluetooth, WLAN, WiFi
- IEEE 802.11b/g
- ZigBee IEEE 802.15.4
- 2.4 GHz WLAN
- 2.4 GHz ISM Band System
- 868 MHz ISM Band Systems
- GPS 1.575 GHz

Electrical specifications @ +25 °C
Note: Electrical characteristics depend on test board (GP) size and antenna positioning on GP and ground clearance area size. Matching and tuning circuit component values are case depended.
# Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

## Monopole 1.575 GHz

Typical performance

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Case #1 11x40mm</td>
<td>1565 – 1585</td>
<td>-3.5 (Peak)</td>
<td>0.1 (Peak)</td>
<td>50/-3 (Peak)</td>
<td>-12</td>
<td>50</td>
<td>-40 to +85</td>
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<tr>
<td></td>
<td></td>
<td>-3.9 (Band edges)</td>
<td>-0.2 (Band edges)</td>
<td>45/-3.5 (Band edges)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Case #2 20x30mm</td>
<td>1565 – 1585</td>
<td>-3.9 (Peak)</td>
<td>0.3 (Peak)</td>
<td>50/-3 (Peak)</td>
<td>-15</td>
<td>50</td>
<td>-40 to +85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-4.1 (Band edges)</td>
<td>0 (Band edges)</td>
<td>45/-3.5 (Band edges)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Case #3 37x80mm</td>
<td>1565 – 1585</td>
<td>-2.7 (Peak)</td>
<td>2.0 (Peak)</td>
<td>70/-1.55 (Peak)</td>
<td>-18</td>
<td>50</td>
<td>-40 to +85</td>
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<tr>
<td></td>
<td></td>
<td>-2.9 (Band edges)</td>
<td>1.7 (Band edges)</td>
<td>65/-1.9 (Band edges)</td>
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## Monopole 2.4 GHz

Typical performance

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</thead>
<tbody>
<tr>
<td>Case #1 11x40mm</td>
<td>2400 – 2483.5</td>
<td>-4.1 (Peak)</td>
<td>2.5 (Peak)</td>
<td>65/-0.3 (Peak)</td>
<td>-18</td>
<td>50</td>
<td>-40 to +85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3.7 (Band edges)</td>
<td>2.1 (Band edges)</td>
<td>55/-0.6 (Band edges)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Case #2 20x30mm</td>
<td>2400 – 2483.5</td>
<td>-4.0 (Peak)</td>
<td>2.2 (Peak)</td>
<td>52/-2.9 (Peak)</td>
<td>-12</td>
<td>50</td>
<td>-40 to +85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-4.3 (Band edges)</td>
<td>1.5 (Band edges)</td>
<td>46/-3.4 (Band edges)</td>
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</table>

## ISM 868 MHz

Typical performance

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Case #1 20x40mm Vertical</td>
<td>868 – 878</td>
<td>-6.5 (Peak)</td>
<td>-1.8 (Peak)</td>
<td>29/5.4 (Peak)</td>
<td>-10</td>
<td>50</td>
<td>-40 to +85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-7 (Band edges)</td>
<td>-2.5 (Band edges)</td>
<td>25/6 (Band edges)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case #2 20x40mm Horizontal</td>
<td>868 – 878</td>
<td>-6.5 (Peak)</td>
<td>-1.4 (Peak)</td>
<td>30/5.3 (Peak)</td>
<td></td>
<td>50</td>
<td>-40 to +85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-6.8 (Band edges)</td>
<td>-2 (Band edges)</td>
<td>28/5.5 (Band edges)</td>
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</tbody>
</table>

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Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

Terminal Configuration and Dimensions

Antenna features

<table>
<thead>
<tr>
<th>No.</th>
<th>Terminal name</th>
<th>Terminal Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Feed / GND</td>
<td>1.00 x 1.36 mm</td>
</tr>
<tr>
<td>2</td>
<td>Feed / GND</td>
<td>1.00 x 1.36 mm</td>
</tr>
</tbody>
</table>

Antenna is symmetrical.
Either of terminals 1 or 2 can be feed / GND
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

Packing Form

CARRIER TAPE HB5-00192
width=16.00 depth=1.70
COVER TAPE HB5-00193
width=13.40

LENGTH OF TAPE:
- Leader section: min 350 mm before component section
- Trailer section: min 40 mm after component section.

Empty part cavities at leader and trailer section of the tape must be sealed with top cover tape.

BOX HB5-00128
(182x182x125) 1 pcs
LABEL 1 pcs/BOX
REEL HB5-00164
(D180,W28) 6 pcs
- REEL LABEL 1 pcs/REEL
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

Antenna PWB Layout Specifications
Ground cleared under antenna, clearance area 11.00 x 6.00 mm

Matching and tuning component values depend on application and surrounding mechanics / materials. Feed line should be designed to match 50 Ω characteristic impedance, depending on PWB material and thickness. Recommended test board layout for electrical characteristic measurement, test board outline size 11 x 40 mm. Recommended PWB manufacturing tolerances according to standard: IPC-A-600, revision G

PWB layout for CW3000 Monopole Antenna
Note: All dimensions are in metric system.
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

PWB Pad Dimensions

All metallization should be removed from all PWB layers on ground clearance area.
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #1

Board Size 40 x 11 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #1, Test Set Up and Measurement Performance

Ground cleared under antenna, clearance area 11.00 x 6.00 mm.

Typical Electrical Characteristics (T=25 °C)

Measured on the 11 x 40 mm test board with matching circuit. Measured in antenna position 1 on PWB layout, see previous page. Typical Return Loss S11/ impedance, free space efficiency and gain.
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #1

Typical Free Space Radiation Patterns
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #2

Board Size 20x30
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #2, Test Set Up and Measurement Performance

Ground cleared under antenna, clearance area 20.00 x 6.00 mm.

Typical Electrical Characteristics (T=25 °C)

Measured on the 30 x 20 mm test board with matching circuit. Measured in antenna position1 on PWB layout, see previous page. Typical Return Loss S11/ impedance, free space efficiency and gain.

GPS 1.575 GHz Case #2

24 Feb 2009 12:50:25

CH1 S118MLDG 5 dBREF 0 dB

CENTER 1.575 GHz SPAN 400 MHz

GPS 1.575 GHz Case #2

Rad Eff [%] Rad Eff [dB]

GPS 1.575 GHz #2

24 Feb 2009 12:56:33

CH1 S118M T U FS

1. 52.109 D -11.857 Q 1.58500 GHz 2. 44.985 D -5.4199 Q 18.644 pF 1.57600 GHz 3. 36.271 D 0.7773 Ω 1.58600 GHz

GPS 1.575 GHz Case #2

Unsat MAX Gain [dB] Average Gain [dB]

GPS 1.575 GHz Case #2

RHCP MAX Gain [dB] RHCP AVG Gain [dB]

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Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #2

Typical Free Space Radiation Patterns

XZ-PLANE

ZY-PLANE

XY-PLANE

Z°: θ (Meta) = 0°
X°: φ (Phi) = 5°
Y°: Φ (Phi) = ±90°
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #3

Board Size 37 x 80 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #3, Test Set Up and Measurement Performance

Ground cleared under antenna, clearance area 20.00 x 6.00 mm.

Typical Electrical Characteristics (T=25 °C)

Measured on the 30 x 20 mm test board with matching circuit. Measured in antenna position 1 on PWB layout, see previous page. Typical Return Loss S11/ impedance, free space efficiency and gain.
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

GPS Antenna Case #3

Typical Free Space Radiation Patterns
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

WiFi Antenna Case #1

Board Size 40 x 11 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

WiFi Antenna Case #1, Test Set Up and Measurement Performance
Ground cleared under antenna, clearance area 11.00 x 6.00 mm.

Typical Electrical Characteristics (T=25 °C)
Measured on the 11 x 40 mm test board with matching circuit. Measured in antenna position1 on PWB layout, see previous page. Typical Return Loss S11/ impedance, free space efficiency and gain.

Datasheet version 1.2. CW3000 Antenna. (12/09)
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WiFi Antenna Case #1

Typical Free Space Radiation Patterns

XZ-PLANE

ZY-PLANE

XY-PLANE

Z: θ (Max) = 0°
X: φ (Min) = 5°
Y: φ (Max) = 90°
Ceramic Monopole Antenna

Ground cleared under antenna. Pulse Part Number: CW3000

WiFi Antenna Case #2

Board Size 20 x 30 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

WiFi Antenna Case #2, Test Set Up and Measurement Performance
Ground cleared under antenna, clearance area 20.00 x 6.00 mm.

Typical Electrical Characteristics (T=25 °C)
Measured on the 30 x 20 mm test board with matching circuit. Measured in antenna position1 on PWB layout, see previous page. Typical Return Loss S11/impedance, free space efficiency and gain.

2.4 GHz WiFi Case #2
19 Oct 2008 23:48 19

2.4 GHz WiFi Case #2
11 Feb 2008 11:47:36

2.4 GHz WiFi Case #2
19 Oct 2008 23:48 19

2.4 GHz WiFi Case #2
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WiFi Antenna Case #2

Typical Free Space Radiation Patterns
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

ISM 868 MHz Antenna Case #1

Board Size 20 x 40 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

ISM 868 MHz Antenna Case #1, Test Set Up and Measurement Performance

Typical Electrical Characteristics (T=25 °C)
Measured on the 20 x 40 mm test board with matching circuit. Measured in antenna position 1 on PWB layout, see previous page. Typical Return Loss S11, impedance, free space efficiency and gain.

ISM 868 MHz Case #1
24 Mar 2009 16:05:57
CH1 S116MLOG 5 dB/REF 0 dB

ISM 868 MHz #1
24 Mar 2009 16:06:06
CH1 S116M 1 UFS

ISM 868 MHz Case #1

ISM 868 MHz Case #1

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Ceramic Monopole Antenna
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ISM 868 MHz Antenna Case #1

Typical Free Space Radiation Patterns

[Images of XZ-PLANE, ZY-PLANE, and XY-PLANE radiation patterns]
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

ISM 868 MHz Antenna Case #2

Board Size 20 x 40 mm
Recommended antenna position on PWB for CW3000 MONOPOLE Antenna

0 Ohm jumper (fine tuning inductor)
Tuning inductor 39 nH
Matching inductor 6n8
Ceramic Monopole Antenna
Ground cleared under antenna. Pulse Part Number: CW3000

ISM 868 MHz Antenna Case #2, Test Set Up and Measurement Performance

Typical Electrical Characteristics (T=25 °C)
Measured on the 20 x 40 mm test board with matching circuit. Measured in antenna position1 on PWB layout, see previous page. Typical Return Loss S11, impedance, free space efficiency and gain
Ceramic Monopole Antenna
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ISM 868 MHz Antenna Case #2

Typical Free Space Radiation Patterns
Ceramic Monopole Antenna
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