Eliminating space and PCB real-estate constraints, LDS-MID and Ceramic GNSS/GPS antennas combine ease of integration with reduced cost of implementation over a variety of wireless navigation device applications

**Features and Benefits**

<table>
<thead>
<tr>
<th>Antennas</th>
<th>Helix GPS (146235)</th>
<th>RHCP* LDS-MID GPS (146216)</th>
<th>RHCP Ceramic GPS (146168)</th>
<th>GPS/BEDOU/GLONASS Ceramic (204286)</th>
<th>Low-profile GNSS Ceramic (204293)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>3.00 by 5.00 by 4.00mm</td>
<td>11.80 by 11.55 by 6.00mm</td>
<td>25.00 by 25.00 by 4.00mm</td>
<td>25.00 by 25.00 by 4.00mm</td>
<td>3.20 by 1.60 by 1.10mm</td>
</tr>
<tr>
<td>PCB Clearance</td>
<td>4mm x 6mm</td>
<td>No clearance</td>
<td>No clearance</td>
<td>No clearance</td>
<td>5mm x 6mm</td>
</tr>
<tr>
<td>Type</td>
<td>LDS</td>
<td>LDS</td>
<td>Ceramic</td>
<td>Ceramic</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Material</td>
<td>Monopole</td>
<td>PIFA</td>
<td>Patch</td>
<td>Patch</td>
<td>Loop</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>1561 - 1602MHz</td>
<td>1575MHz</td>
<td>1575MHz</td>
<td>1561 - 1602MHz</td>
<td>1561 - 1602MHz</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>&lt;1dB</td>
<td>&lt;1dB</td>
<td>&lt;1dB</td>
<td>&lt;1dB</td>
<td>&lt;1dB</td>
</tr>
<tr>
<td>Return Loss</td>
<td>1.1dBi</td>
<td>1dBi</td>
<td>5.5dBi</td>
<td>5.5dBi</td>
<td>2.0dBi</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>&gt;50%</td>
<td>&gt;55%</td>
<td>&gt;75%</td>
<td>&gt;70%</td>
<td>&gt;60%</td>
</tr>
<tr>
<td>Total Efficiency</td>
<td>Elliptic</td>
<td>RHCP</td>
<td>RHCP</td>
<td>Elliptic</td>
<td>Linear</td>
</tr>
<tr>
<td>Polarization</td>
<td>&lt;6.0</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
<td>&lt;13.0</td>
<td>-</td>
</tr>
<tr>
<td>Benefits</td>
<td>Compact size</td>
<td>Greater space savings (no PCB clearance needed)</td>
<td>Greater space savings (no PCB clearance needed)</td>
<td>Vertical space savings with low profile; compact size</td>
<td></td>
</tr>
</tbody>
</table>

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**Applications**

**Automotive**
- Commercial Aviation
  - Consumer (Recreational)
  - Geocaching
- Industrial
  - Maritime Port Management System
  - Surveying and Mapping Systems
  - Emergency Response Systems

**Commercial Vehicle**
- Agricultural Vehicle
- Rail

**Maritime Port Management**

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*GNSS (Global Navigation Satellite System) is the standard generic term for satellite navigation systems that provide autonomous geo-spatial positioning with global coverage. This term includes GPS (USA), GLONASS (Russian), Galileo (European Union), BEIDOU (China) and other regional satellite systems.

*RHCP – An industry acronym for “Right Hand Circularly Polarized”*
Specifications

REFERENCE INFORMATION
Packaging: Tape on reel
(146216, 146235, 204283), Tray (146168, 204286)
Reference Platform:
100.00 by 100.00 by 1.00mm (146216)
100.00 by 50.00 by 1.00mm (146235)
70.00 by 70.00mm (146168, 204286)
80.00 by 40.00 by 0.80mm (204283)
Designed In: Millimeters
RoHS Compliant: Yes
Halogen-free: Yes
Ground Clearance: Refer to Application Specification of each respective Series

ELECTRICAL
RF Power (max.): 2 Watts
Return Loss - S11(dB): Refer to Product Specifications
Average Total Radiation Efficiency(%): Refer to Product Specifications
Peak Gain (dBi): Refer to Product Specifications
Polarization: RHCP (146216, 146168); Elliptic (146235, 204286); Linear (204283)
Input Impedance (ohms): 50

MECHANICAL
Peeling Force (min.): 8N (146216, 146235)
Tape Test: Acceptance <10% peeling off (204283, 204286)

PHYSICAL
Housing: LCP-LDS, Vectra E840LDS, 40% mineral-filled LDS grade (146216, 146235)
Housing: Ceramic (146168, 204283, 204286)
Flammability: UL 94V-0
Plating:
Series 146216, 146235:
Hatched Area — 0.05micron Gold (Au) min.
MID Plane — 1.0 to 2.5micron Nickel (Ni)
Under-plating — 12 to 16micron Copper (Cu)
Series 146168: 8 to 10microns Silver (Ag)
Series 204283: 3 to 8microns Silver (Ag)
Series 204286: 4 to 7microns Silver (Ag)
Operating Temperature: -40 to 125°C

Ordering Information

<table>
<thead>
<tr>
<th>Series No.</th>
<th>Frequency Band (MHz)</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>204286</td>
<td>1561±5; 1575±5; 1602±5</td>
<td>25.00(L) by 25.00(W) by 4.00(H)</td>
</tr>
<tr>
<td>204283</td>
<td>3.20(L) by 1.60(W) by 0.80(H)</td>
<td></td>
</tr>
<tr>
<td>146235</td>
<td>5.00(L) by 3.00(W) by 4.00(H)</td>
<td></td>
</tr>
<tr>
<td>146216</td>
<td>11.80(L) by 11.50(W) by 5.95(H)</td>
<td></td>
</tr>
<tr>
<td>146168</td>
<td>25.00(L) by 25.00(W) by 4.00(H)</td>
<td></td>
</tr>
</tbody>
</table>