**2.4 and 2.4, 5 GHz Ceramic and MID Chip Antennas**

2.4 and 2.4, 5 GHz Ceramic and LDS-MID antennas offer outstanding performance and easy integration in connected city and home applications.

### Features and Advantages

<table>
<thead>
<tr>
<th>Attribute</th>
<th>2.4, 5 GHz Ceramic SMT Antenna (Series 211964)</th>
<th>2.4, 5 GHz SMT MID Chip Antenna (Series 146175)</th>
<th>2.4 GHz SMT MID Chip Antenna (Series 47948)</th>
<th>2.4 GHz SMT Ceramic Antenna (Series 206513)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>3.20(L) by 1.60(W) by 1.20(H) mm</td>
<td>5.00(L) by 3.00(W) by 4.00(H) mm</td>
<td>3.00 by 3.00 by 4.00mm</td>
<td>3.00 by 3.00 by 4.00mm</td>
</tr>
<tr>
<td>PCB Keep-out</td>
<td>6.00(L) by 4.00(W/mm)</td>
<td>6.00(L) by 4.00(W/mm)</td>
<td>4.00 by 4.00mm</td>
<td>4.00 by 4.00mm</td>
</tr>
<tr>
<td>Material</td>
<td>Ceramic</td>
<td>MID-LDS</td>
<td>MID-LDS</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>Loop</td>
<td>Loop</td>
<td>Monopole</td>
<td>Monopole</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>2.4 to 5 GHz</td>
<td>2.4 to 5 GHz</td>
<td>2.4 GHz</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>Return Loss</td>
<td>&lt;-6 dB</td>
<td>&lt;-5 dB</td>
<td>&lt;-6 dB</td>
<td>&lt;-7 dB</td>
</tr>
<tr>
<td>Peak Gain</td>
<td>2.7dBi</td>
<td>2.1dBi</td>
<td>2.2dBi</td>
<td>3 dBi</td>
</tr>
<tr>
<td>Total Efficiency</td>
<td>&gt;80%</td>
<td>&gt;70%</td>
<td>&gt;65%</td>
<td>&gt;70%</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
<td>Linear</td>
<td>Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +85°C</td>
<td>-40 to +125°C</td>
<td>-40 to +125°C</td>
<td>-40 to +125°C</td>
</tr>
<tr>
<td>Key Advantages</td>
<td>Single band and dual band, high operating efficiency. Small clearance zone; high RF performance; dual-band, halogen-free. Miniature in size but big in RF performance.</td>
<td>Symmetrical radiator design offers significant design flexibility by allowing reversed lateral placement on the PCB without affecting radiation pattern or performance. Laser Direct Structuring (LDS)-formed circuitry yields high, consistent RF performance, leveraging the excellent laser structuring precision, speed, accuracy and repeatability of LDS technology. Environmentally sustainable halogen-free LDS-MID housing withstands high reflow temperatures during assembly processing.</td>
<td>Cost-economical</td>
<td></td>
</tr>
</tbody>
</table>

**Attributes:**
- **Product:** 2.4, 5 GHz Ceramic SMT Antenna (Series 211964)
- **Technical Differences:**
  - Size: 3.20(L) by 1.60(W) by 1.20(H) mm
  - PCB Keep-out: 6.00(L) by 4.00(W/mm)
  - Material: Ceramic
  - Antenna Type: Loop
  - Frequency Range: 2.4 to 5 GHz
  - Return Loss: <-6 dB
  - Peak Gain: 2.7dBi
  - Total Efficiency: >80%
  - Polarization: Linear
  - Operating Temperature: -40 to +85°C
  - Key Advantages: Single band and dual band, high operating efficiency.

**Features:**
- High operating efficiency
- Symmetrical radiator design offers significant design flexibility by allowing reversed lateral placement on the PCB without affecting radiation pattern or performance
- Laser Direct Structuring (LDS)-formed circuitry yields high, consistent RF performance, leveraging the excellent laser structuring precision, speed, accuracy and repeatability of LDS technology
- Environmentally sustainable halogen-free LDS-MID housing withstands high reflow temperatures during assembly processing
- Cost-economical
2.4 and 2.4, 5 GHz Ceramic and MID Chip Antennas

Applications
- Connected Home
  - Security and Surveillance
  - Home Automation
  - Home Streaming Entertainment
  - Smart Appliances
  - Energy and Utilities
- Wireless Infrastructure
  - Wireless Solutions
- Telecommunications/Networking
  - Infrastructure/Networking
- Commercial Vehicles
  - Networking

Specifications

REFERENCE INFORMATION
- Packaging: Tape and Reel
- Designed In: Millimeters
- RoHS: Yes
- Halogen Free: Yes
- Glow Wire Compliant: No

ELECTRICAL
- RF Power (Watt): 2
- Return Loss: Refer to Product Specifications
- Average Total Radiation Efficiency(%): Refer to Product Specifications
- Peak Gain (dBi): Refer to Product Specifications
- Input Impedance (ohms): 50

MECHANICAL
- Refer to Product Specifications

PHYSICAL
- Material: Ceramic (206513, 211964)
- LCP-LDS (146175, 147948)
- Plating:
  - Silver (Ag) (206513, 211964)
  - Copper (Cu), Nickel (Ni), Gold (Au) (146175, 47948)
- Operating Temperature: -40 to +125°C
  - -40 to +85°C (211964)

Ordering Information

<table>
<thead>
<tr>
<th>Series No.</th>
<th>Frequency Band (MHz)</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>206513</td>
<td>2.4 to 2.5</td>
<td>3.00(L) by 3.00(W) by 4.00(H)</td>
</tr>
<tr>
<td>146175</td>
<td>2.4 to 2.5 and 5.15 to 5.85</td>
<td>5.00(L) by 3.00(W) by 4.00(H)</td>
</tr>
<tr>
<td>211964</td>
<td></td>
<td>3.20(L) by 1.60(W) by 1.20(H)</td>
</tr>
</tbody>
</table>

www.molex.com/link/standard_antennas.html

Molex is a registered trademark of Molex, LLC in the United States of America and may be registered in other countries; all other trademarks listed herein belong to their respective owners.