The smallest on-ground antenna of its kind, Molex’s 2.4 GHz SMD antenna requires no ground clearance and offers significant PCB real-estate savings.

Developed with the power and precision of Laser Direct Structuring (LDS) technology, Molex’s 2.4 GHz SMD on-ground antenna is the smallest on-ground MID (Molded Interconnect Device) antenna in the market. The lightweight Molded Interconnect Device (MID) chip antenna weighs only 0.03g and is used in portable electronic devices based on Bluetooth®, Wi-Fi®, ZIGBEE† and other wireless standards. These devices include tablet PCs, headsets, smart meters and more. Measuring only 3.00mm by 3.00mm by 4.00mm (0.118” by 0.118” by 0.157”) and using only on one side of the PCB, the antenna allows board makers to realize significant PCB real estate savings by leaving the ground layers in the PCB intact while freeing up space on the reverse side of the PCB for other component assemblies.

This monopole antenna has an omni-directional radiation pattern and requires only simple stripline matching on the PCB, without the need for discrete components. It is fully compatible with SMD and reflow processes and usable as a stand-alone device without the need for cable connection. Besides offering good thermal properties, the LCP body of the antenna provides a higher mechanical strain tolerance than ceramic ones.

Visit our website at www.molex.com/link/SMD_antenna.html for more information.

FEATURES AND BENEFITS

- Valuable PCB real estate savings on both sides of the PCB with the use of this miniature antenna
- No removal of ground layers from beneath the antenna is needed
- Consistent antenna RF performance with the application of Laser Direct Structuring (LDS) - a technology known for its excellent precision, performance and repeatability
- The high-temperature base material and the metal plating technology employed allows the antenna to endure reflow temperatures - an ideal condition for a standard SMT process
- The product is halogen-free and RoHS-compliant

SPECIFICATIONS

Reference Information
Packaging: Tape on reel
Reference Platform:
100mm by 40mm (3.91” by 1.57”)
Designed In: mm
RoHS: Yes
Halogen Free: Yes
Ground Clearance: None needed
SMD Compatible: Yes

Electrical
RF Power (Watt): 2
Frequency (MHz): 2400 to 2483.5
Return Loss - S11 (dB): < -9
Average Total Efficiency (%): > 70
Peak Gain (dBi): 3.0
Polarization: Linear
Input Impedance (Ohms): 50

Mechanical
Peeling Force: 1N (0.225 lb force)

Physical
Dimension: 3.00mm by 3.00mm by 4.00 mm (0.118” by 0.118” by 0.157”)
Housing: LCP-LDS, Vectra E840ILDS, 40% mineral-filled LDS grade
Flammability: UL 94V-0
Plating:
Hatched Area — 0.1μm (4μ”) Gold (Au) min.
MID Plane — 2.0μm (8μ”) Nickel (Ni) min.
Underplating — 12μm (472μ”) Copper min.
Operating Temperature: -35 to +85°C
Storage Temperature: -40 to +85°C

*Bluetooth is a registered trademark of Bluetooth SIG
**Wi-Fi is a registered trademarks of the Wi-Fi Alliance
†ZIGBEE is a registered trademark of trademark of Z/igBee Alliance
PRODUCT FEATURES

- In the left diagram below, four SMD pads are shown. Three dummy pads are to be attached to the PCB for strong mechanical bonding while the remaining signal SMD pad connects to the radio transceiver circuit on the PCB.
- In the right diagram below, the pick-and-place feature of the antenna works with a standard vacuum nozzle for component assembly operations.

Illustration showing the plated SMD pads of the 2.4GHz SMD On-ground antenna base

Illustration showing the 2.4GHz SMD On-ground antenna mounted onto a PCB

2.4 GHz Surface Mount Device (SMD) On-ground Antenna

Antenna radiator traces consisting of immersion Gold (Au) over Nickel (Ni) and Copper (Cu) under-plating

RF PERFORMANCE

Return Loss

Efficiency

Figure 1: Return Loss (S11) as measured on reference board

Figure 2: Total Efficiency (including Mismatch losses) as measured on reference board
RF PERFORMANCE

2.4 GHz Surface Mount Device (SMD) On-ground Antenna

Radiation Plots

Figure 3a: Antenna on a 100mm by 40mm reference board with full ground on the reverse side of the board

Figure 3b: Radiation diagram of X-Y plane shows combined polarizations as measured on reference board

Figure 3c: Radiation diagram of X-Z plane shows combined polarizations as measured on reference board

Figure 3d: Radiation diagram of Z-Y plane shows combined polarizations as measured on reference board
APPLICATIONS

- Telecommunication Applications
  - Bluetooth devices
  - Headsets
  - Notebooks and netbooks
  - Smart Phones
  - Tablet PCs
  - WiFi devices
  - Wireless LAN (WLAN)
  - IEEE 802.11b/g/n devices
- Industrial Applications
  - Machine-to-machine (M2M) communications
  - Smart meters
  - Lighting controls
  - ZigBee IEEE 802.15.4 devices
  - 2.4 GHz Industrial, Scientific and Medical (ISM) band systems and wireless devices
- Consumer Electronics (CE) Applications
  - Cameras
  - Mobile gaming devices
  - Personal navigation devices
  - Wireless internet TV and Audio
- Automotive Applications
  - Bluetooth devices
  - Infotainment systems
- Medical Applications
  - Telemedicine and Telehealth devices

ORDERING INFORMATION

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