TITLE

GPS RHCP PATCH CERAMIC ANTENNA (25MM*25MM*4MM)

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GPS RHCP PATCH CERAMIC ANTENNA

1.0 SCOPE

This product specification covers the mechanical, electrical and environmental performances specification for GPS RHCP patch ceramic antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

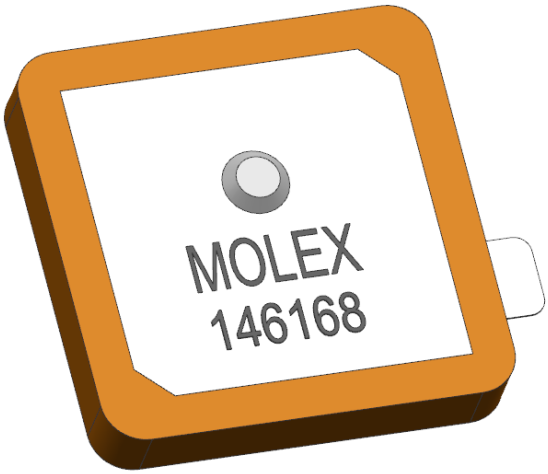
Product name: GPS RHCP patch ceramic antenna.
Series Number: 146168

2.2 DESCRIPTION

146168 is a ceramic GPS passive patch antenna, 25mm square and height 4mm. It is tuned and tested on a 70mmx70mm ground plane, working at GPS 1575.42MHz, with 5.50dBi peak gain, efficiency > 75%, axial ratio < 3dB. This antenna is perfect for applications in telematic, vehicle tracking, navigation, m2m/IOT… devices.

2.3 FEATURES

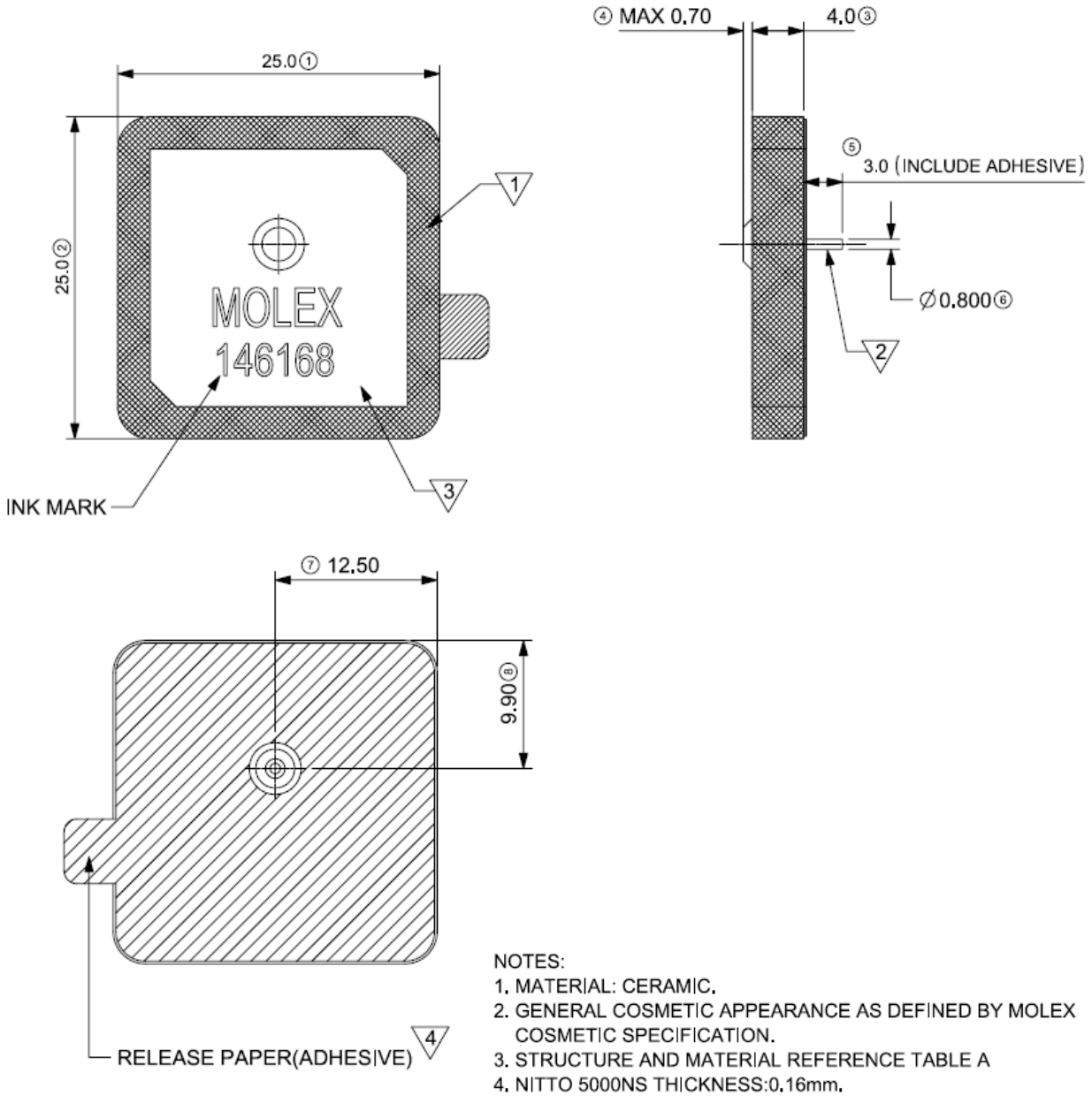
- High precision, GPS band operation
- Dims:25x25x4 mm, single feed patch
- Right-handed circular polarization
- Tuned on 70x70mm ground plane
- Through-hole Mounting Pin type
- RoHS Compliant



Molex 1461680001 GPS RHCP PATCH CERAMIC ANTENNA 3D View

2.4 PRODUCT STRUCTURE INFORMATION

P/N	1461680001



NOTES:
1. MATERIAL: CERAMIC.
2. GENERAL COSMETIC APPEARANCE AS DEFINED BY MOLEX COSMETIC SPECIFICATION.
3. STRUCTURE AND MATERIAL REFERENCE TABLE A
4. NITTO 5000NS THICKNESS:0.16mm.

TABLE A

NO.	DESCRIPTION	STRUCTURE AND MATEERIAL
1	ANTENNA SUBSTRATE	DIELECTRIC CERAMIC
2	PIN	COPPER AND TIN PLATED
3	PATCN	Ag PLATED
4	ADHESIVE TYPE	NITTO 5000NS

MECHANICAL STRUCTURE INFORMATION FOR 1461680001

3.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing(SD)	SD-1461680001	Mechanical Dimension of the product
Application Guide(AS)	AS-1461680001	Antenna Application and surrounding
Packing Drawing(PK)	PK-1461680001	Product packaging specifications

4.0 GENERAL SPECIFICATION

PRODUCT NAME	GPS RHCP PATCH CERAMIC ANTENNA
PART NUMBER	1461680001
FREQUENCY RANGE	1575.42 +/- 3MHz
POLARIZATION	Right-Handed Circular
IMPEDANCE WITH MATCHING	50 Ω
OPERATING TEMPERATURE	-40℃ to 85℃
STORAGE TEMPERATURE	-40℃ to 85℃
HUMIDITY	Storage:15%-70% RH (Non-condensing)
RF POWER	2 Watts
ANTENNA TYPE	Ceramic
CERAMIC DIMENSION	25x25x4 mm
PIN DIAMETER	0.8 mm
PIN LENGTH	3 mm
ADHESIVE TYPE	NITTO 5000NS (Thickness:0.16mm)
SINGLE WEIGHT	9.319g (FOR P/N:1461680001)

*Note: if you plan to re-use the products that be taken out from packaging. Suggest to re-pack them within 48 hours by re-seal to prevent oxidation!

5.0 ANTENNA SPECIFICATION

All measurements are done of the antenna mounted on reference PCB (70*70*1.5mm) with VNA Agilent E5071C and Over-The-Air (OTA) chamber.

5.0.1 ANTENNA PERFORMANCE	
P/N	1461680001
FREQUENCY RANGE	1575.42 +/- 3MHz
PEAK GAIN	5.5dBi
AVERAGE TOTAL EFFICIENCY	>75%
AXIAL RATIO	<3dB

Note that the above antenna performance is measured with just the antenna mounted on a 70*70mm PCB to similar a free-space condition. When implement into the system, the frequency resonant might be off-tune due to the loading of surrounding components especially metal plane. This off-tune can be compensated through matching. Although module manufacturers specify a peak gain limit, it is based on free-space conditions. The peak gain will be degraded by 1 to 2dBi in the actual implementation as the radiation pattern will change due to the surround components. As such, during selection of antenna, you can select one with high peak gain to compensate for the loss. Molex can offer assistant to choose the best location and best tuning in-order to meet this peak gain requirement.

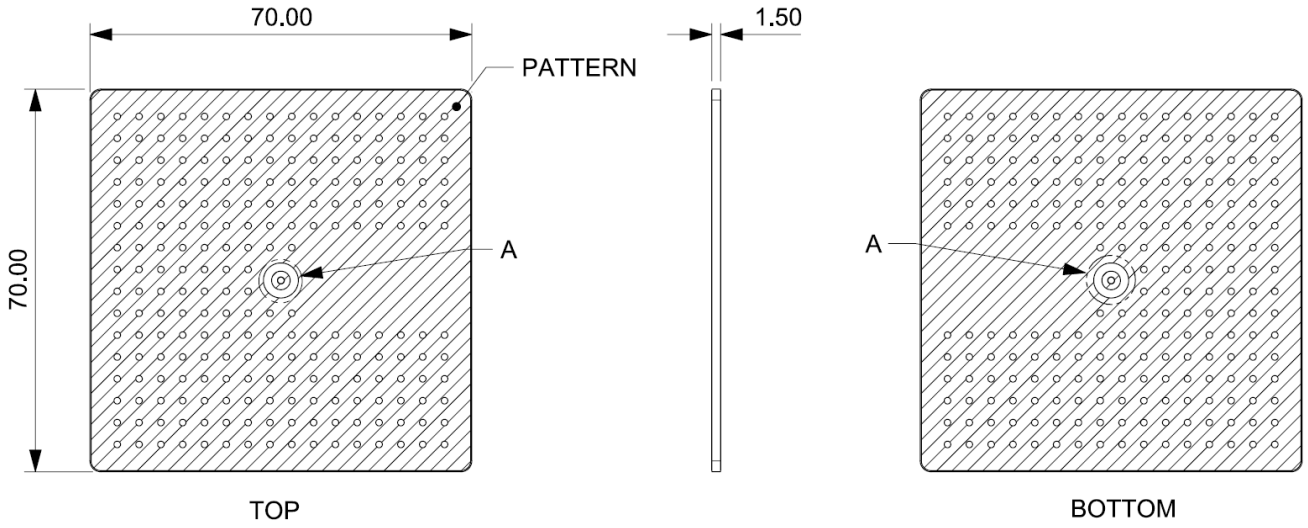
6.0 MECHANICAL REQUIREMENTS

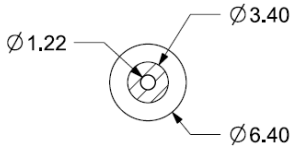
DESCRIPTION	TEST CONDITION	TEST RESULT
Cross Cut Test	Cross cut adhesion test Testing is performed in accordance with ASTM D-3359-93	Acceptance criteria > ASTM Class 2B as acceptance

7.0 ENVIRONMENTAL SPECIFICATION

DESCRIPTION	SPECIFICATION
Humidity Test Cycling	1. Temperature:25℃ humidity:95%，time:12h. Temperature:55℃ humidity:95%，time:12h. The cycle is repeated until a total of 6 cycles have been completed. 2. Parts should meet RF spec before and after test. 3. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
Temperature Cycling Test	1. a. The time of conversion to -40 ℃ is less than max 5 minutes and holding time 30 minutes. b. Conversion time to 125℃ is less than max 5 minutes and holding time 30 minutes. c. 72 cycles 2. Parts should meet RF spec before and after test. 3. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
High Temperature	1. Temperature:125℃, time:1008 hours 2. There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other 3. Parts should meet RF spec before and after test. 4. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
Salt Mist Test	1. The device under test is exposed to a spray of a 5% (by volume) resolution of NACL in water for 2 hours. Thereafter the device under test is left for 1 week in room temperature at a relative humidity of 95%. The cycle is repeated until a total of 2 cycles have been completed. Here after the conditions are stabilized at room temperature. 2. Parts should meet RF spec before and after test. 3. No visible corrosion. 4. Discoloration Accept.

8.0 PCB FOOTPRINT RECOMMENDATION

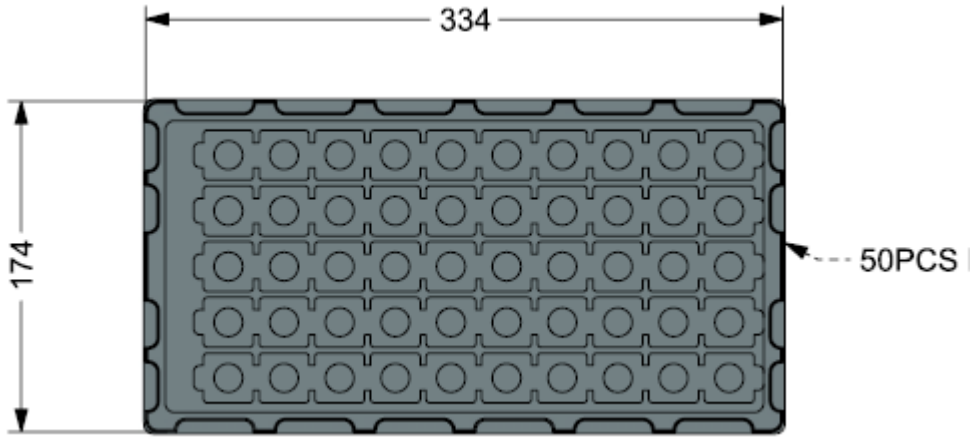




DETAIL A
SCALE 2:1
PAD SIZE

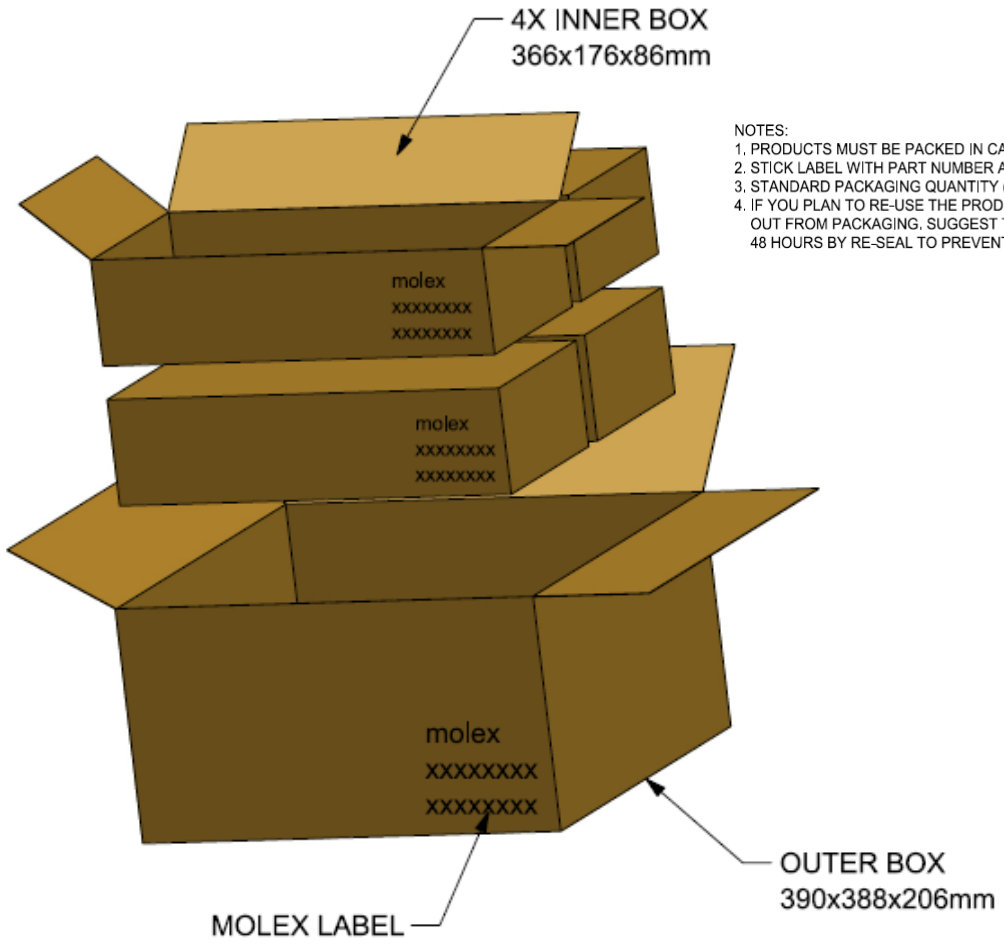
Recommended solder paste: ALPHA CAP-390 SAC305

9.0 PACKING



TRAY SZIE

P/N	PCS/TRAY	TRAY/INNER BOX	INNER BOX/OUTSIDE BOX	PCS/OUTSIDE BOX
1461680001	50	6+1	4	1200PCS



NOTES:
1. PRODUCTS MUST BE PACKED IN CARTONS AND SEALED UP WITH TAPE.
2. STICK LABEL WITH PART NUMBER AND DATE CODE
3. STANDARD PACKAGING QUANTITY (SPQ): 1200PCS.
4. IF YOU PLAN TO RE-USE THE PRODUCTS THAT BE TAKEN OUT FROM PACKAGING, SUGGEST TO REPACK THEM WITHIN 48 HOURS BY RE-SEAL TO PREVENT OXIDATION!

PACKAGING INFORMATION FOR 1461680001