



# PRODUCT SPECIFICATION

## TITLE

## 2.4GHZ MID SMT ANTENNA

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REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
<b>F1</b>	EC No: 702681 DATE: 2022/04/08	<b>2.4GHZ MID SMT Antenna Product Specification</b>	<b>1 of 11</b>
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
<b>PS-479480001</b>	<b>Kang Cheng</b>	<b>Cooper Zhou</b>	<b>Horace Ma</b>

## 2.4GHZ MID SMT ANTENNA

### 1.0 SCOPE

This product specification covers the mechanical, electrical and environmental performances specification for 2.4GHz MID SMT antenna.

### 2.0 PRODUCT DESCRIPTION

#### 2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: 2.4GHz MID SMT antenna

Series Number: 479480001

#### 2.2 DESCRIPTION

This is a high-performance antenna implemented using SMD option to meet the customer needs. It has low profile as the size of this antenna. It is designed to cover the frequency 2.4GHz-2.5GHz.

#### 2.3 FEATURES

- 2.4GHz, monopole,
- SMT embedded, PCB corner mounting
- High efficiency over 70% on 2.4-2.5GHz
- Antenna size 3x3x4mm
- RoHS Compliant

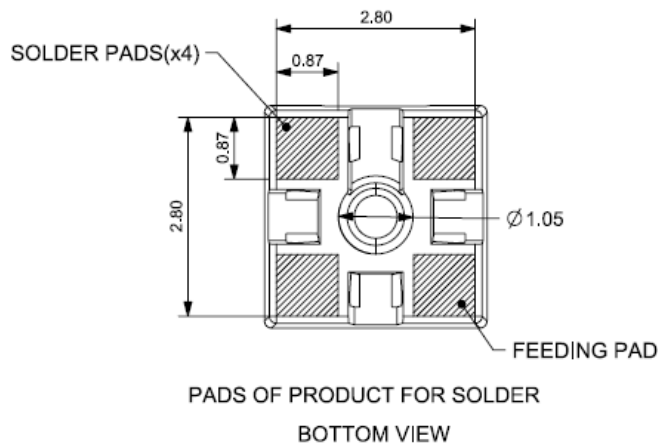
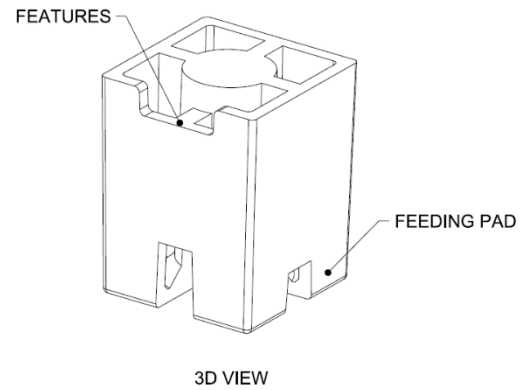
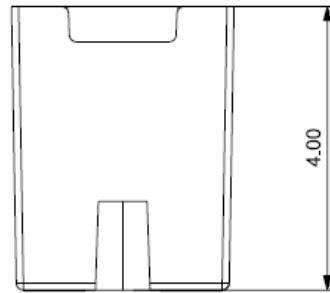
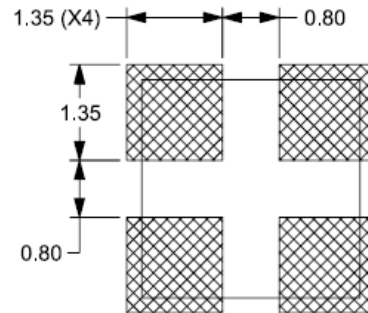
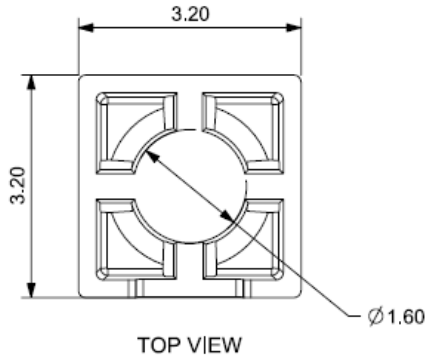


ANTENNA PICTURE

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## 2.4 PRODUCT STRUCTURE INFORMATION

P/N 479480001



### MECHANICAL STRUCTURE INFORMATION FOR 479480001

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## 3.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing (SD)	SD-479480001	Mechanical Dimension of the product
Application Guide (AS)	AS-479480001	Antenna Application and surrounding
Packing Drawing (PK)	PK-479480001	Product packaging specifications

## 4.0 GENERAL SPECIFICATION

PRODUCT NAME	2.4GHZ MID SMT antenna
PART NUMBER	479480001
FREQUENCY RANGE(+/-3MHz)	2.4~2.5GHz
POLARIZATION	Linear
IMPEDANCE WITH MATCHING	50 Ohms
OPERATION TEMPERATURE	-40°C to 85°C
STORAGE TEMPERATURE	-40°C to 85°C
AVERAGE TOTAL EFFICIENCY	>70%
RF POWER	2 Watts
NET WEIGHT	0.042g/PCS
ANTENNA TYPE	Plastics

\*If you plan to re-use the products that be taken out from packaging. Suggest to repacked them within 48 hours by re-seal to prevent oxidation!

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## 5.0 ANTENNA SPECIFICATION

All measurements are done of the antenna mounted on reference PCB (100\*40\*0.8mm Molex p/n:479489001) with VNA Agilent E5071C and Over-The-Air (OTA) chamber.

DESCRIPTION	EQUIPMENT	REQUIREMENT
Frequency Range	VNA E5071C	2.4~2.5GHz
Return Loss	VNA E5071C	< -6 dB
Peak Gain (Max)	OTA Chamber	3.7dBi
Average Total Efficiency	OTA Chamber	>70%
Polarization	OTA Chamber	Linear
Input Impedance	VNA E5071C	50 Ohms

Note that the above antenna performance is measured with just the antenna mounted on a recommended 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.

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## 6.0 MECHANICAL REQUIREMENTS

DESCRIPTION	SPECIFICATION
Shear Force	Apply three axial peeling force on parts soldered on the PCB at the speed rate of $25\pm 3$ mm/minute. Shear force:15N Min.
Solder-Ability Test	Dip solder pad in flux then immerse in solder bath at $245\pm 50^{\circ}\text{C}$ for 4~5seconds,95% of immersed area must show no voids

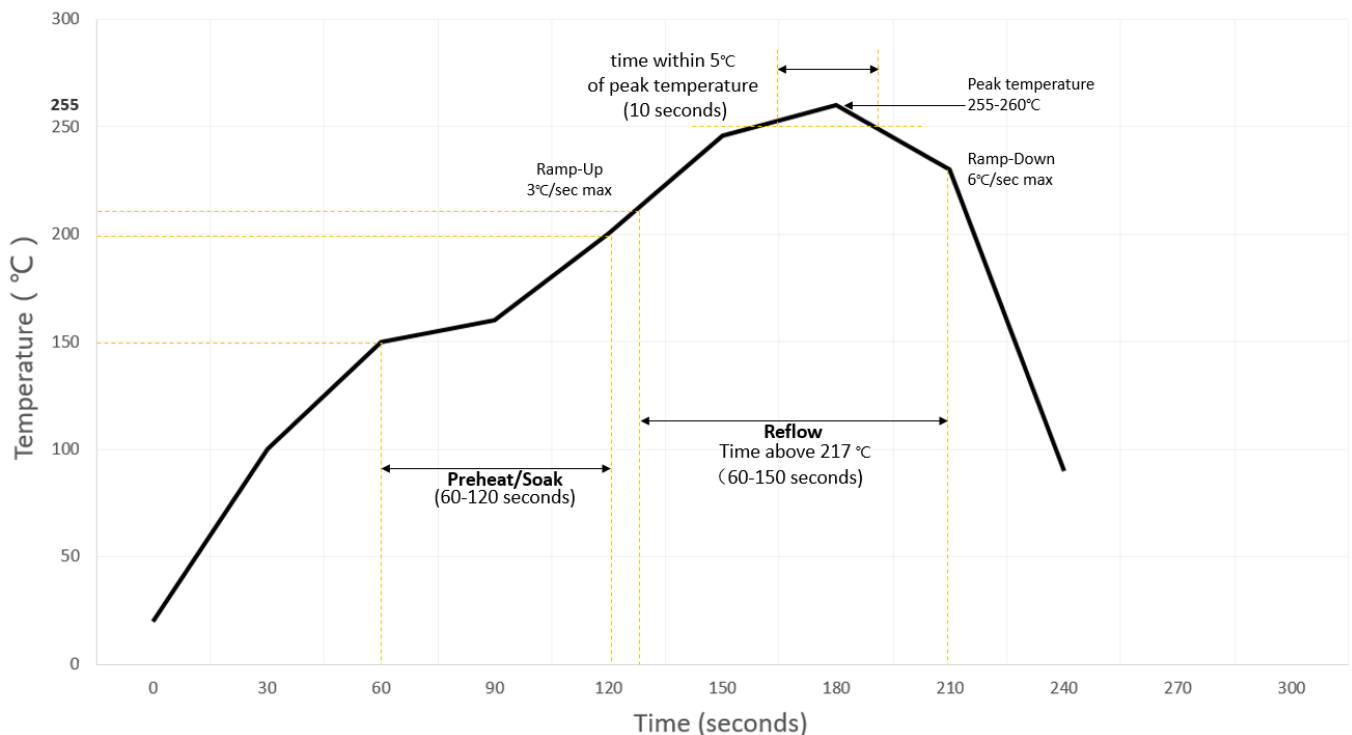
## 7.0 ENVIRONMENTAL SPECIFICATION

DESCRIPTION	SPECIFICATION
Temperature Cycling Test	<ol style="list-style-type: none"><li>1. The device under test is kept for 30 mins in an environment with a temperature of <math>-40^{\circ}\text{C}</math>.</li><li>2. Kept for 4 Hours in an environment with a temperature of 85 degrees.</li><li>3. Kept for 2 Hours in an environment with a temperature of 125 degrees.</li><li>4. The cycle is repeated until a total of 40 cycles have been completed. Hereafter the conditions are stabilized at room temperature.</li><li>5. No cosmetic problem (No bubble issue、No plating peeling off issue、No mechanical damage.)</li></ol>
Temperature Shock Test	<ol style="list-style-type: none"><li>1. The device under test at <math>-40^{\circ}\text{C}\leftrightarrow 125^{\circ}\text{C}</math> by 100 cycles, Dwell of 30 mins, transition time between Dwell 30 secs (61 mins / cycle) and each item should be measured after exposing them in normal temperature and humidity for 24 h.</li><li>2. No cosmetic problem (No bubble issue、No plating peeling off issue、No mechanical damage.)</li></ol>

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DESCRIPTION	SPECIFICATION
High Temperature	<ol style="list-style-type: none"> <li>1. Temperature:125°C, time:1008 hours.</li> <li>2. There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other.</li> <li>3. No visible corrosion.</li> </ol>
Salt Mist Test	<ol style="list-style-type: none"> <li>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.</li> <li>2. No visible corrosion.</li> <li>3. Discoloration acceptable.</li> </ol>

## 8.0 RECOMMENDED REFLOW CONDITION



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Recommended IR reflow times: 1 time.

Recommended solder paste: ALPHA CAP-390 SAC305(Ag%≥3%)

For mechanically challenging applications Molex recommends using surface mount adhesive (e.g. Loctite 3611) before reflow soldering process, to ensure increased mechanical retention on the PCB. (Figure 8.1)

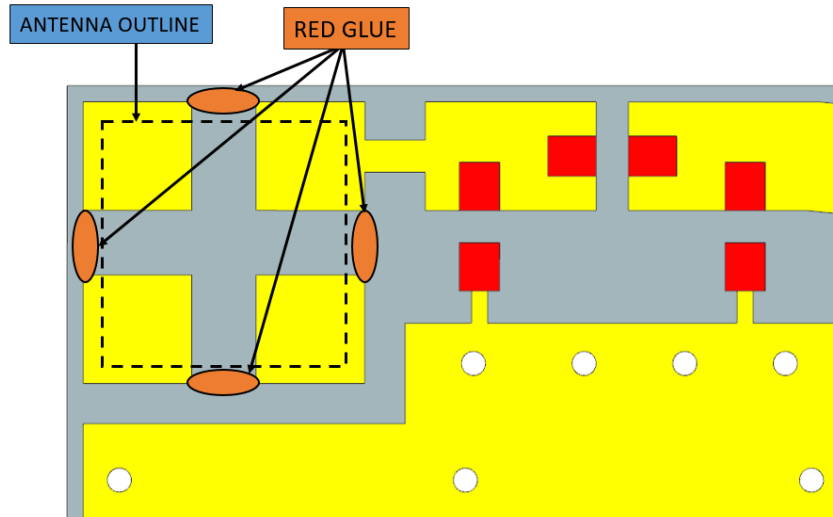
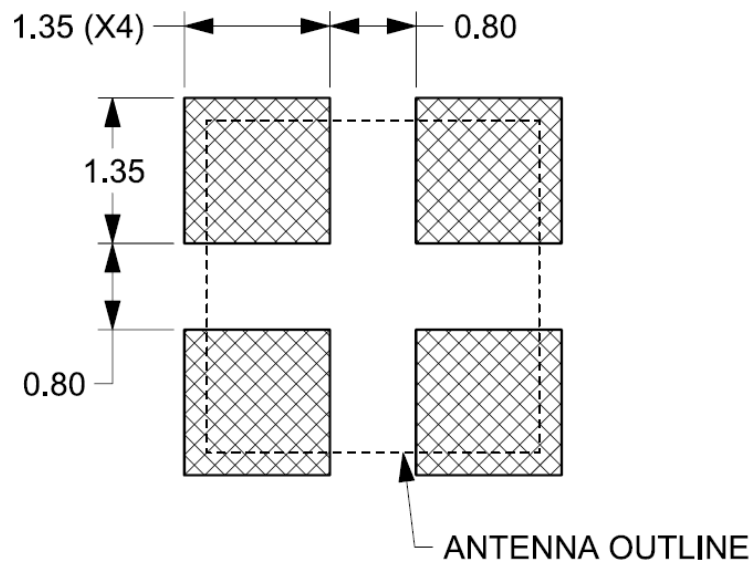


FIGURE 8.1 PCB BOARD SCHEMATIC PICTURE

## 9.0 RECOMMENDED FOOTPRINT ON PCB FOR SOLDERING

### 9.1 RECOMMENDED PCB PADS AREA

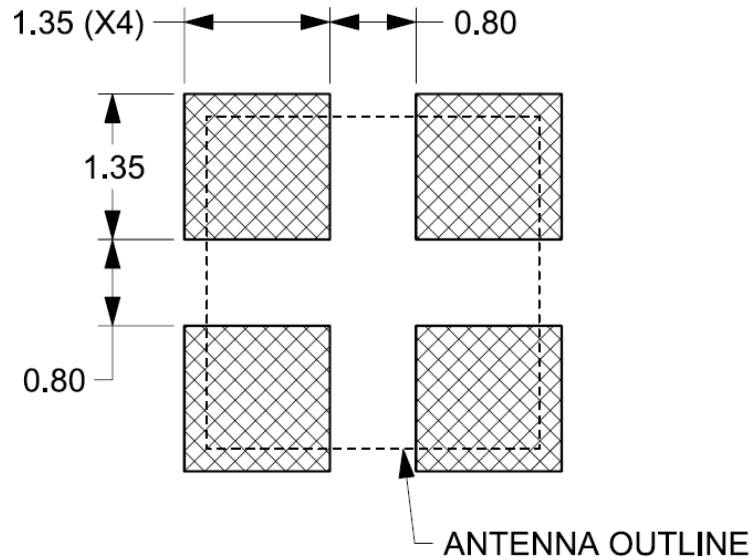


RECOMMENDED PCB LAYOUT

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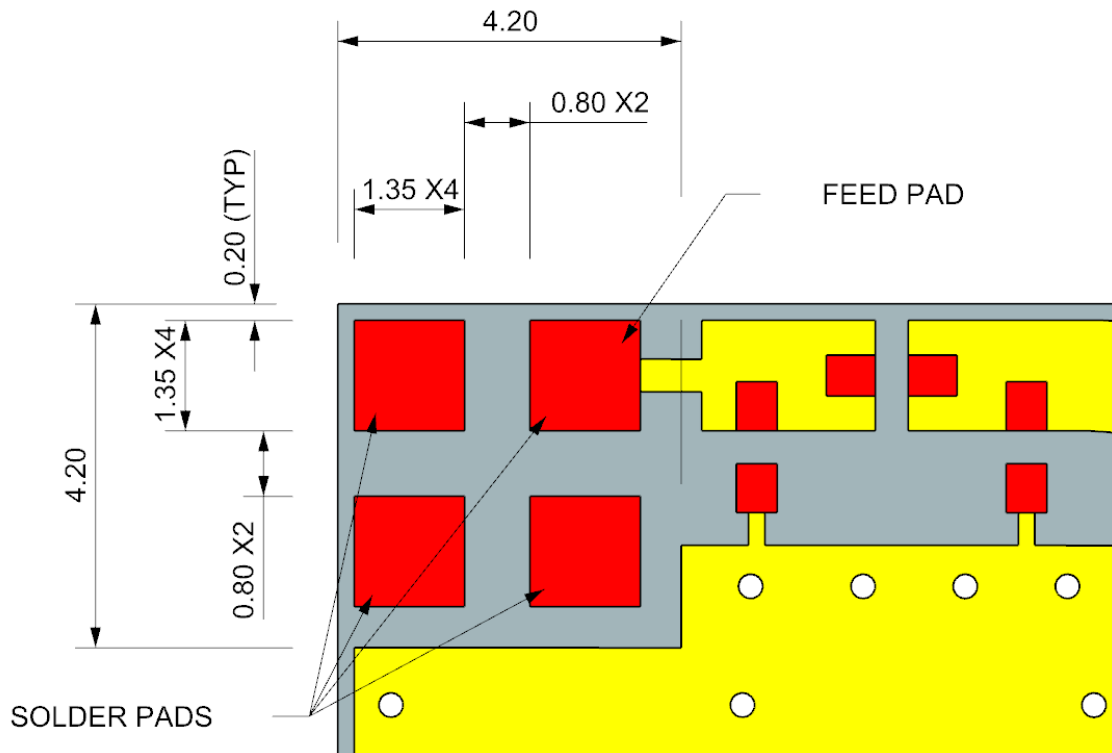


## 9.2 RECOMMENDED STENCIL OPENING DESIGN



Recommended Stencil Thickness > 0.1mm

## 9.3 RECOMMENDED PCB CLEARANCE KEEP OUT AREA

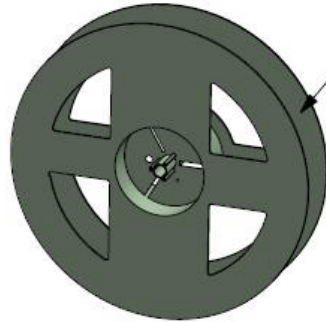


RECOMMENDED PCB CLEARANCE KEEP OUT AREA

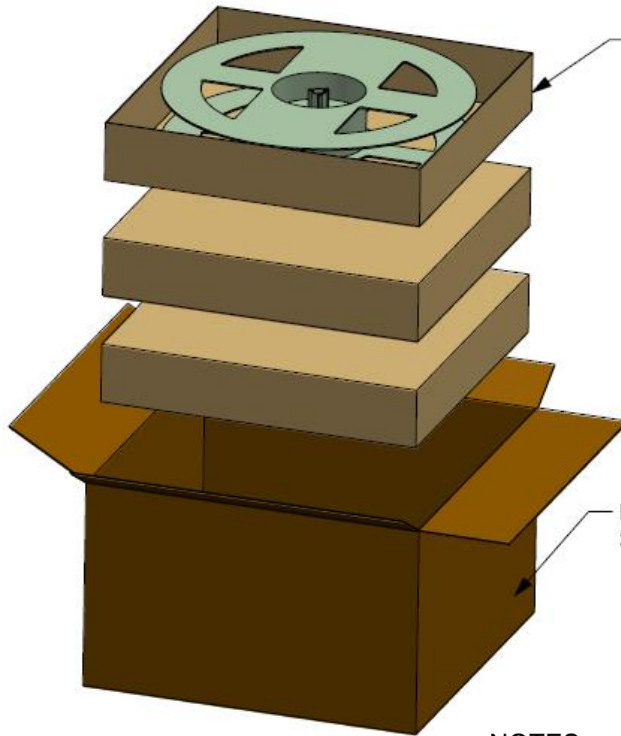
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## 10.0 PACKING

P/N	Q'TY/REEL	REEL/SMALL BOX	SMALL BOX/BIG BOX	SPQ
479480001	1800	1	5	1800



ONE REEL:885960695  
THE REEL NEED TO SEAL



SMALL BOX 885960736  
345X345X35MM

BIG BOX:885960363  
364X364X176MM

### 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:SEE TABLE
- 4.THIS PACKAGINGSPECIFICATION TO BE USED FOR "2.4GHz MID SMT ANTENNA".

### PACKAGING INFORMATION FOR 4794800001

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## 11.0 CHANGED HISTORY

REV	DATE	DESCRIPTION
F1	2022/04/08	Update 2.3 features description

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