# VGAP-CLE-AS-A1 Specification

## 1. Features and Application：

(1) This product is manufactured in ISO/TS16949 certified production factory.
(2) This product is qualified according to AEC-Q200.
(3) This product is for 2.4/5/7 GHz WiFi, 802.11 b/g/n, Zigbee, Bluetooth,…

## 2. Explanation of Part Number：

| VGAP | - | C | LE | - | A | S | - | A1 |
|---|---|---|---|---|---|---|---|---|
| | | (1) | (2) | | (3) | (4) | | (5) |

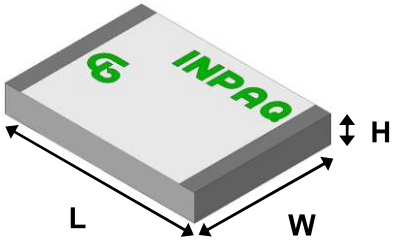
(1) Product Type：Chip Antenna
(2) Center Frequency/Band Code：2400~2500MHz、5150~7125MHz
(3) Size Code：5.0*3.6 mm (Length * Width)
(4) Special Code：RoHS Compliant
(5) Design Revision Code：Rev.1

## 3. Electrical Specification：

| Item | Specification | |
|---|---|---|
| Frequency Band | 2400 ~ 2500 MHz | 5150 ~ 7125 MHz |
| Polarization | Linear | |
| Impedance | 50 ohm Typ. | |
| VSWR | Less than 2.5 | Less than 2.5 |
| *Peak Gain | 1.03 dBi Typ. | 4.36 dBi Typ. |
| *Peak Efficiency | 69 % Typ. | 76.6 % Typ. |

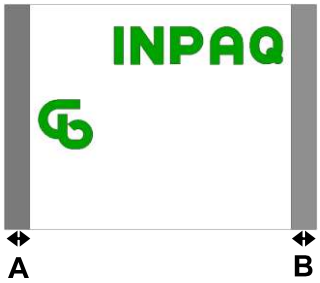
* Test condition：Test board size 80*40 mm
Matching circuit may be required

## 4. Physical Dimension：

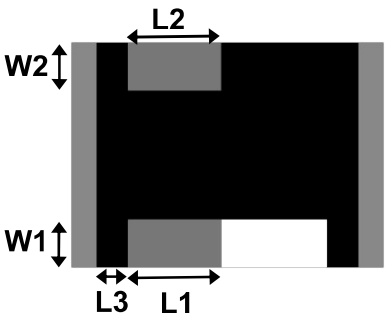



Marking is Green

Top view




Bottom view

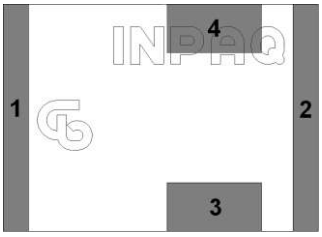



| | |
|---|---|
| L | 5.20 ± 0.30 |
| W | 3.70 ± 0.30 |
| H | 0.70 ± 0.15 |
| A | 0.45 ± 0.25 |
| B | 0.45 ± 0.25 |
| L1 | 1.60 ± 0.20 |
| W1 | 0.62 ± 0.20 |
| L2 | 1.50 ± 0.20 |
| W2 | 0.62 ± 0.20 |
| L3 | 0.50 ± 0.20 |

(Unit: mm)

Pin Configuration

Top View

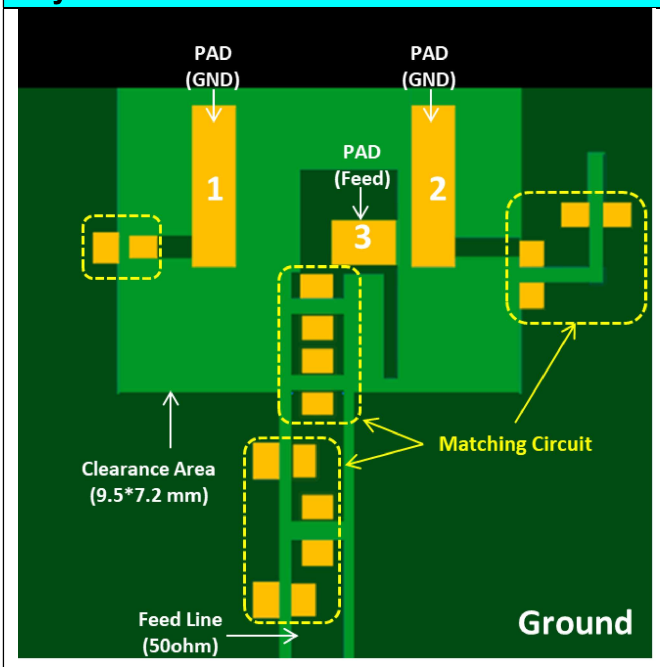
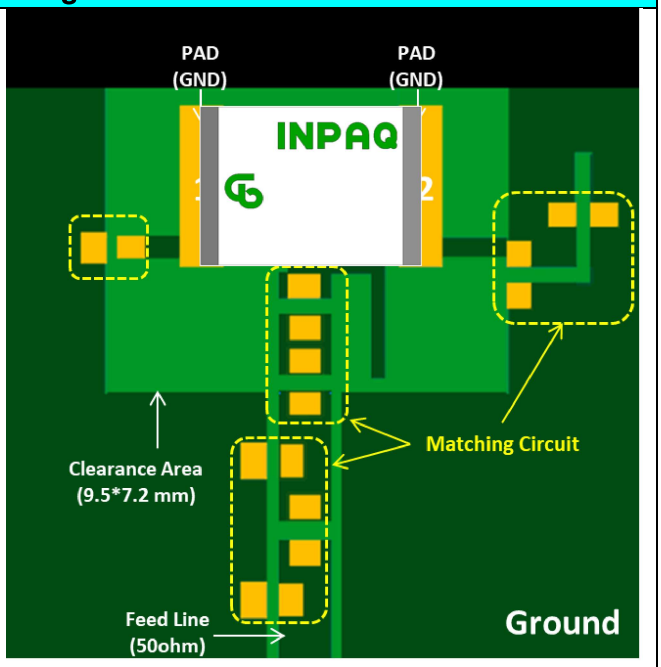



Pin Assignments

| Layout | |
|---|---|
| Pin | Function |
| 1 | GND |
| 2 | GND |
| 3 | Feed |
| 4 | No connect |

| | | | |
|---|---|---|---|
| UNLESS OTHER SPECIFIED TOLERANCES ON：<br>X=± X.X=± X.XX=<br>ANGLES=± HOLEDIA=± | | INPAQ TECHNOLOGY CO., LTD. | |
| SCALE： ----- | UNIT：mm | THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF INPAQ TECHNOLOGY CO.,LTD.AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION | |
| DRAWN BY：彭少君 | CHECKED BY：洪賢修 | | |
| DESIGNED BY：彭少君 | APPROVED BY：謝立庭 | | |
| TITLE：VGAP-CLE-AS-A1 Specification | | DOCUMENT NO. | ENS000177770 SPEC REV. P1 |

## 5. Recommend PCB Layout：

| Layout | Usage |
|---|---|
|  |  |



:Copper with paint
:Clearance area
:PAD

| | | | |
|---|---|---|---|
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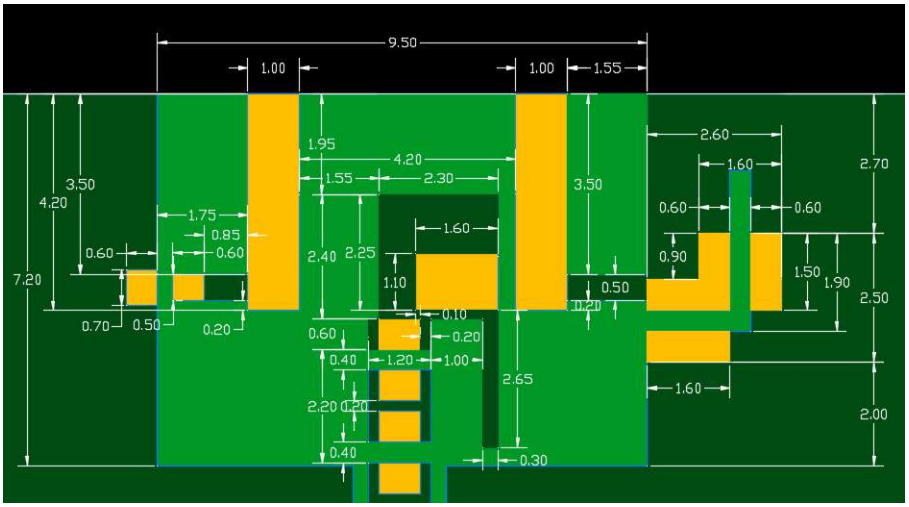
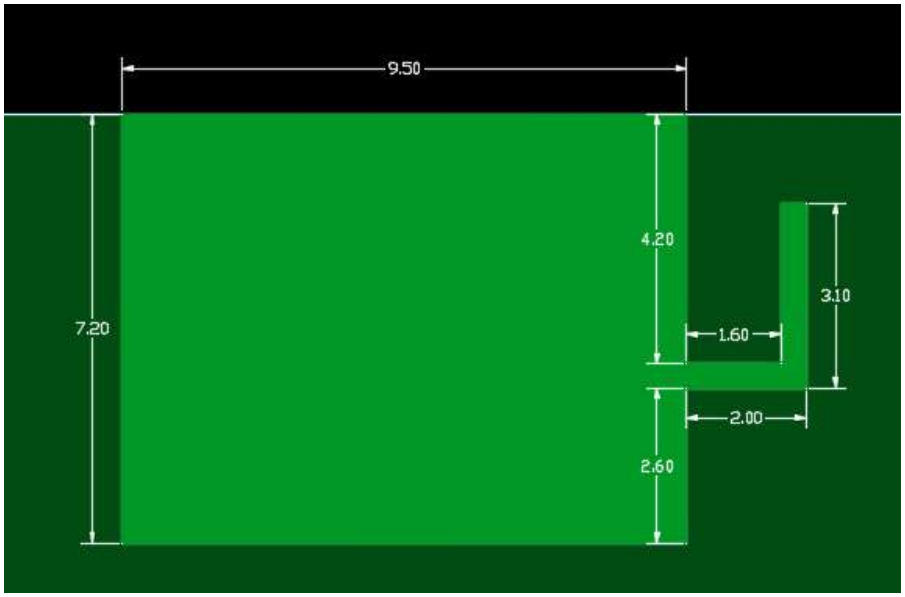
## Pad Dimensions on PCB Layout

### Top View




### Perspective View




**(Unit：mm)**

*Tolerance：±0.05 mm

| | | | |
|---|---|---|---|
| UNLESS OTHER SPECIFIED TOLERANCES ON：<br>X=± X.X=± X.XX=<br>ANGLES=± HOLEDIA=± | | INPAQ TECHNOLOGY CO., LTD. | |
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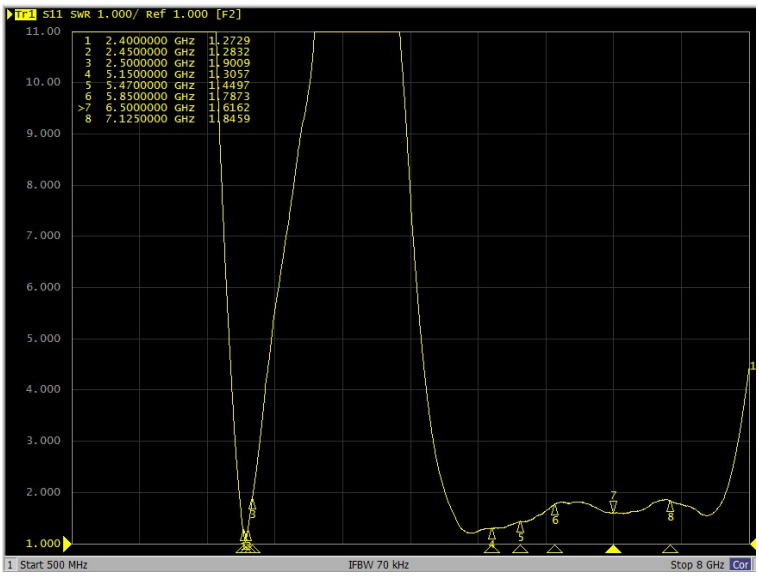
# 6. Electrical Characteristics：

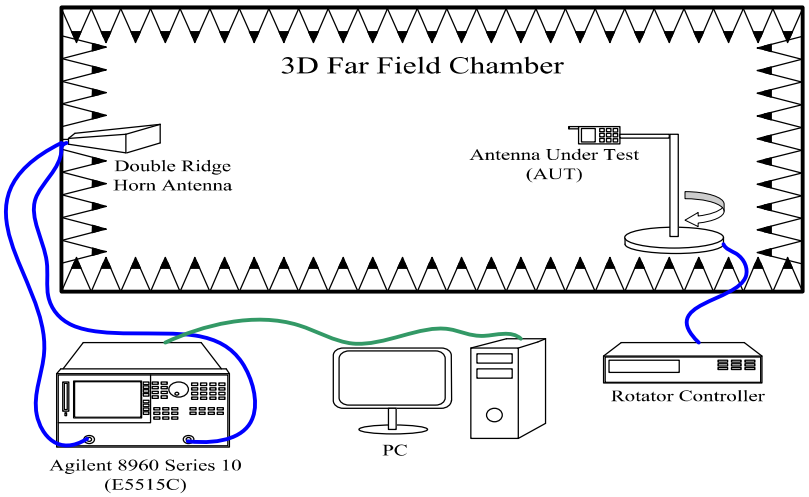
## VSWR：




| Frequency (MHz) | VSWR |
|---|---|
| 2400 | 1.27 |
| 2450 | 1.28 |
| 2500 | 1.90 |
| 5150 | 1.30 |
| 5470 | 1.44 |
| 5850 | 1.78 |
| 6500 | 1.61 |
| 7125 | 1.84 |

## Radiation Pattern：

The Gain pattern is measured in INPAQ's FAR-field chamber. DUT is placed on the table of rotator, a standard horn antenna and Vector Network Analyzer is used to collect data.




3D Chamber Definition

| | | | |
|---|---|---|---|
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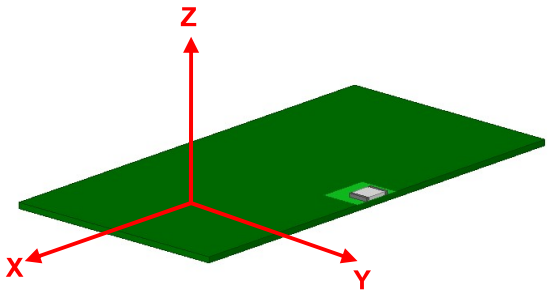
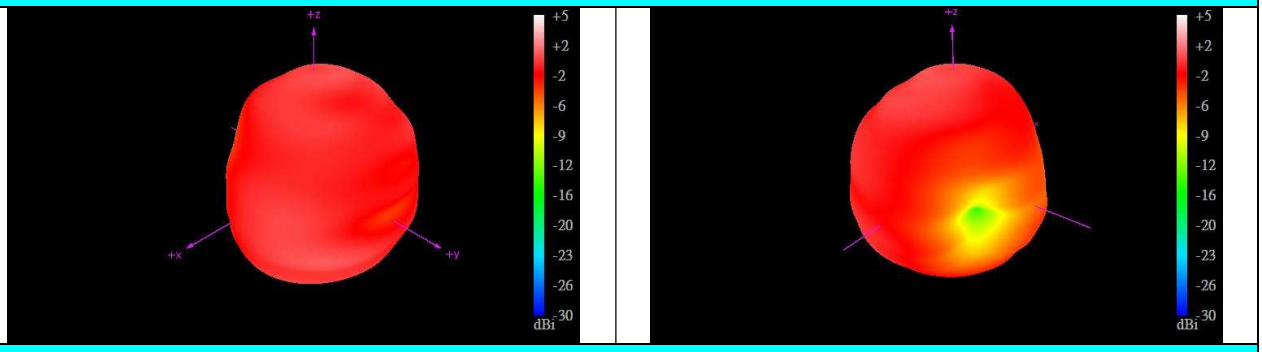
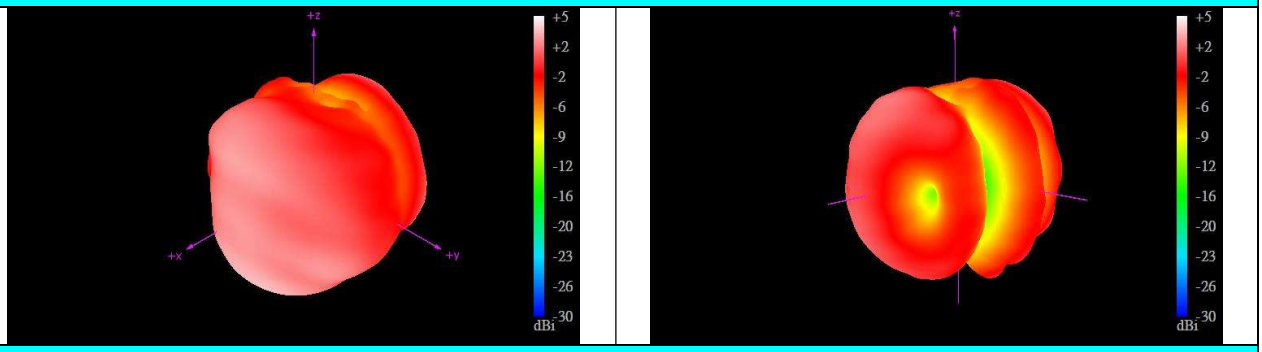
## 3D Gain Pattern



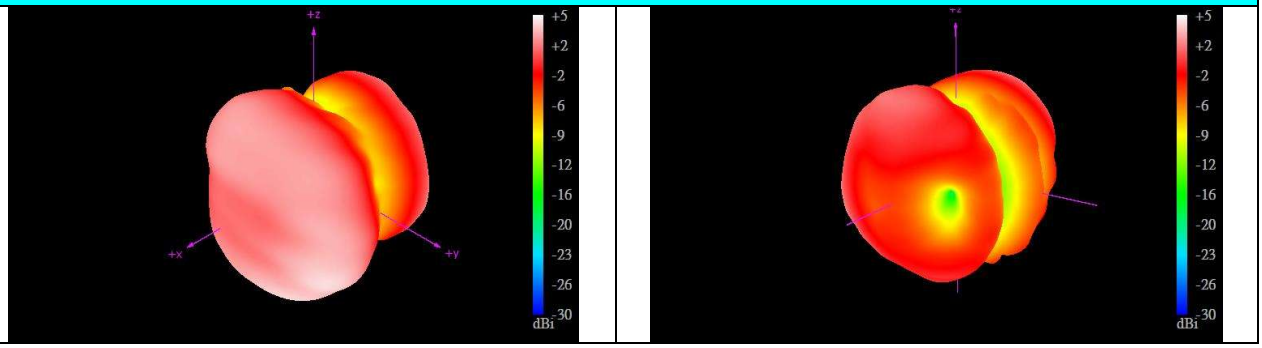

**2450 MHz**




**5470 MHz**




**6500 MHz**




| | | | |
|---|---|---|---|
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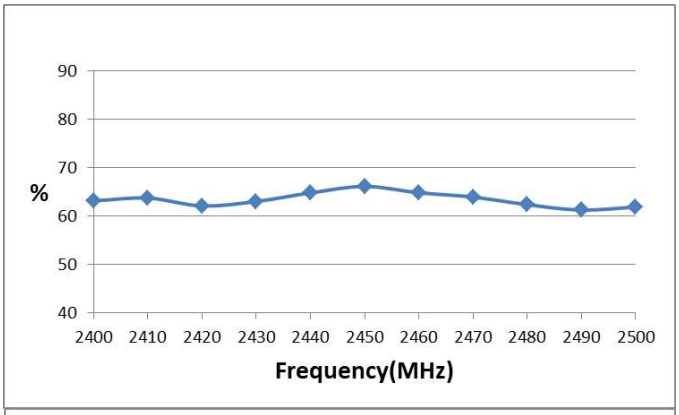
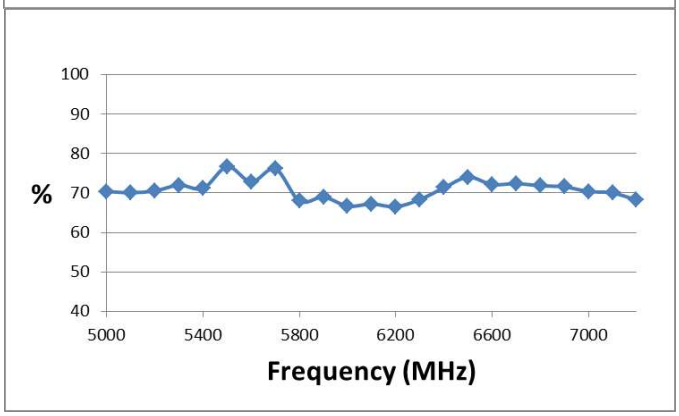
## Efficiency：




| Frequency (MHz) | Efficiency (%) |
|---|---|
| 2400 | 66 |
| 2450 | 69 |
| 2500 | 64 |
| 5150 | 71 |
| 5470 | 76 |
| 5850 | 68 |
| 6500 | 74 |
| 7125 | 70 |

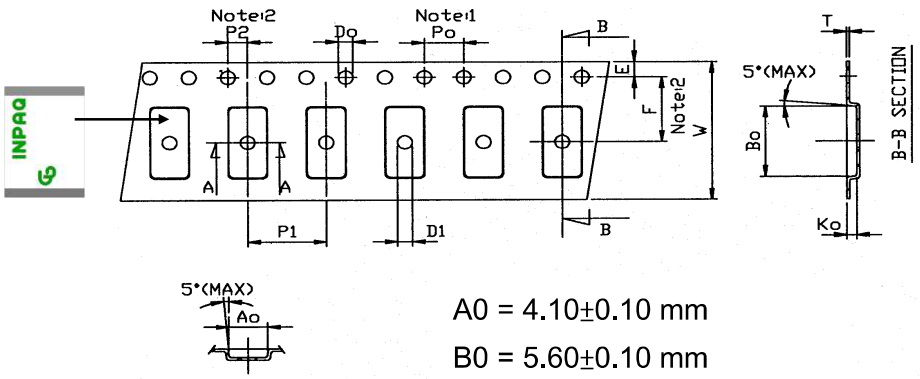
# 7. Taping Package and Label Marking：

(1) Quantity/Reel：2000pcs/Reel

(2) Carrier tape dimensions

(Unit：mm)

| Symbol | Spec. |
|---|---|
| Po | 4.00±0.1 |
| P1 | 8.00±0.1 |
| P2 | 2.00±0.05 |
| Do | 1.55±0.05 |
| D1 | 1.50(MIN) |
| E | 1.75±0.1 |
| F | 5.50±0.05 |
| 10Po | 40.00±0.2 |
| W | 12.00±0.1 |
| T | 0.25±0.05 |




A0 = 4.10±0.10 mm

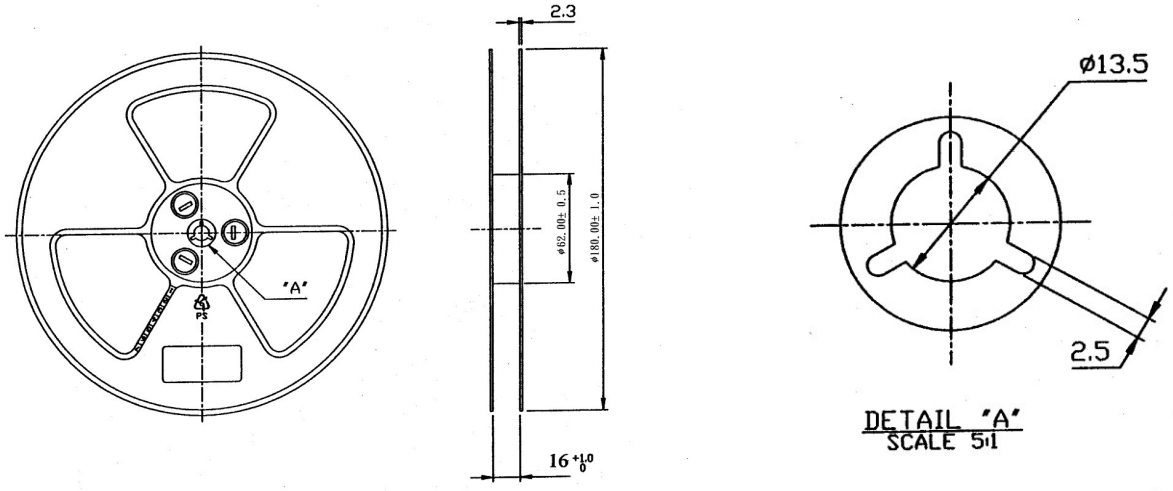
B0 = 5.60±0.10 mm

K0 = 1.02±0.10 mm

Notice:

1. 10 Sprocket hole pitch cumulative tolerance is ±0.1mm
2. Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
3. Ao & Bo measured on a place 0.3mm above the bottom of the pocket to top surface of the carrier.
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
5. Carrier camber shall be not than 1mm per 100mm through a length of 250mm.

(3) Taping reel dimensions




| | | | |
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## 8. Environmental Characteristics：

This product is qualified according to AEC-Q200.

**(1) Reliability Test**

| Item | Condition | Specification |
|---|---|---|
| **High Temperature Storage** | 150℃，1000hours | No Damaged |
| **Temperature Cycling** | -55℃ 30min/125℃ 30min，1000 cycle | No Damaged |
| **Biased Humidity** | 85℃、85% RH，1000hours | No Damaged |
| **Resistance to Solvent** | Add Aqueous wash chemical OKEMCLEAN for 5 min | No Damaged |
| **Mechanical Shock** | 1500G 0.5 ms , X,Y,Z axis 3 time | No Damaged |
| **Vibration** | 1. Frequency：10 to 2000 Hz<br>2. 5g's for 20 min<br>3. Duration time：2hr for each in X ,Y,Z | No Damaged |
| **Resistance to Soldering Heat** | Brush flux and put the board into solder bath 260℃ , 10sec. | No Damaged |
| **Solderability Test** | 1. 8 hours ± 15 min. steam conditioning<br>2. Put the sample on board by tape.<br>3. Brush flux and put the board into solder bath 260±5℃ , 5±1 sec | No Damaged |
| **Board Flex** | 2mm for 60sec. | No Damaged |
| **Termination strength (SMD)** | 1.8Kgf，60sec | No Damaged |

**(2) Storage condition**

**(a) At warehouse**：

The temperature should be within 0 ~ 30°C and humidity should be less than 60% RH.

The product should be used within 1 year from the time of delivery.

**(b) On board**：

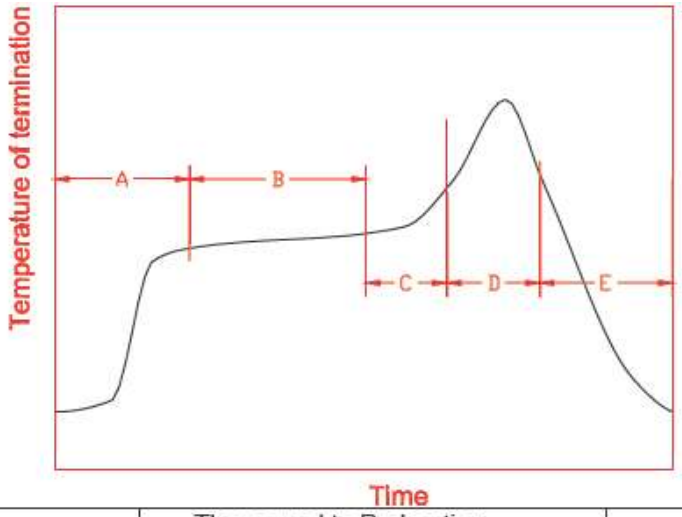
The temperature should be within -40 ~ 85°C and humidity should be less than 85% RH.

### (3) Operating temperature range

Operating temperature range：-40 ~ +125°C.

## 9. Recommended reflow soldering：

Reference：J-STD-020C




| | | | |
|---|---|---|---|
| A | 1st rising temperature | The normal to Preheating temperature | 30s to 60s |
| B | Preheating | 140℃ to 160℃ | 60s to 120s |
| C | 2nd rising temperature | Preheating to 200℃ | 20s to 40s |
| D | Main heating | if 220℃ | 50s～60s |
| | | if 230℃ | 40s～50s |
| | | if 240℃ | 30s～40s |
| | | if 250℃ | 20s～40s |
| | | if 260℃ | 20s～40s |
| E | Regular cooling | 200℃ to 100℃ | 1℃/s ～ 4℃/s |

### (1) Soldering gun procedure

Note the follows, in case of using solder gun for replacement.

(a) The tip temperature must be less than 350°C for the period within 3 seconds by using soldering gun under 30 W.

(b) The soldering gun tip shall not touch this product directly.

### (2) Soldering volume

Note that excess of soldering volume will easily get crack the body of this product.