

Data sheet of Multilayer Chip Antenna

Part No. : ALA131C3

January 23, 2008

AMOTECH Co., LTD.

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Notes

The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

1. SPECIFICATIONS

1.1 Electrical Specifications

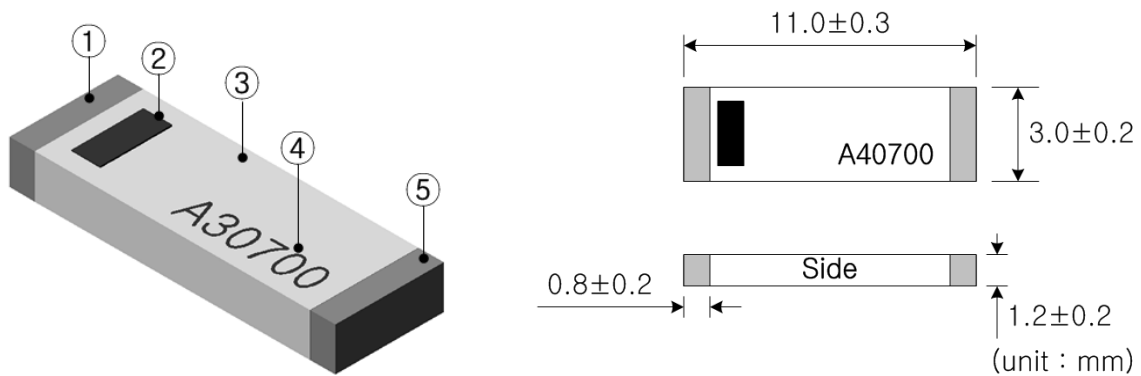
| No | ITEM | SPEC. | Remark |
|----|----------------------|---------------------|---------|
| 1 | Frequency Range | 2.4 ~2.485 GHz | for ISM |
| 2 | VSWR | 2.5 : 1 max. | |
| 3 | Gain | Avg. -3 dBi min. | |
| 4 | Polarization | Linear | |
| 5 | Azimuth Beam Pattern | Omni-directional | |
| 6 | Impedance | Nominal 50 Ω | |

※ These values are measured on the matched reference test board.

1.2 Mechanical Specifications

| No | ITEM | SPEC. | Remark |
|----|------------------------|------------------|---------|
| 1 | Internal Electrode | Ag | Pb-free |
| 2 | External Electrode | Ag/Ni/Sn | Pb-free |
| 3 | Dimensions (L x W x H) | 11.0 x 3.0 x 1.2 | mm |
| 4 | Unit Weight | 119 \pm 9 | mg |
| 5 | Operating Temperature | -35 ~ +85 | °C |

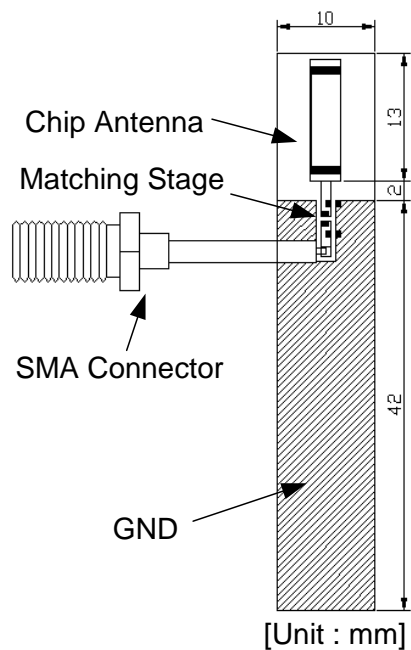
1.3 Appearance and Dimensions



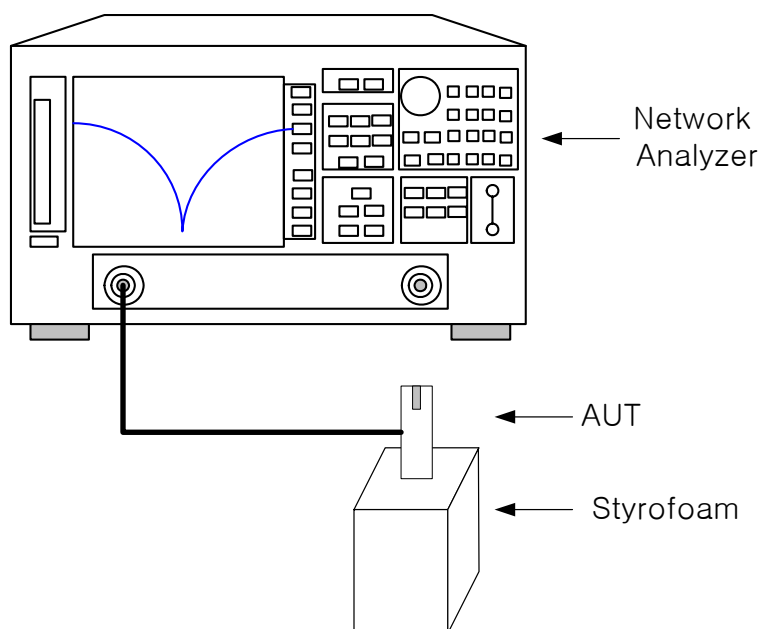
| No | Name | Function | Material |
|----|--------------------|--------------------------|----------|
| 1 | External Electrode | Soldering, Input Port | Ag/Ni/Sn |
| 2 | Direction index | Indication of Input Port | Ceramic |
| 4 | Ceramic Body | - | Ceramic |
| 3 | Model No. index | - | Ceramic |
| 5 | External Electrode | Soldering | Ag/Ni/Sn |

2. MEASUREMENT

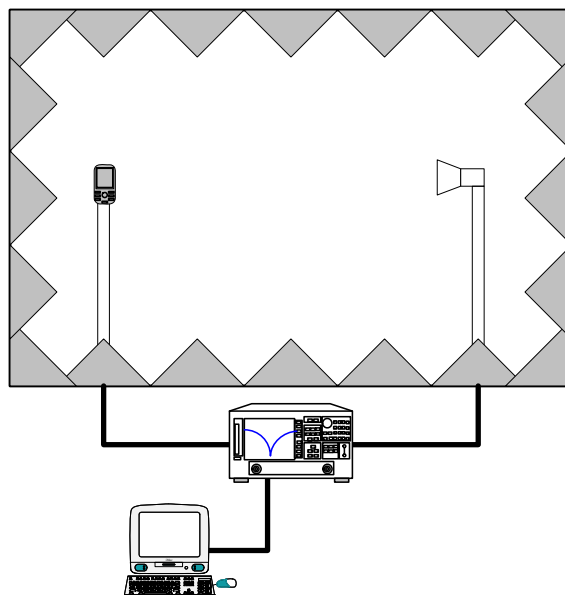
2.1 Reference Test Board for Measurement



2.2 Diagram for VSWR measurement



2.3 Diagram for radiation gain and pattern measurements

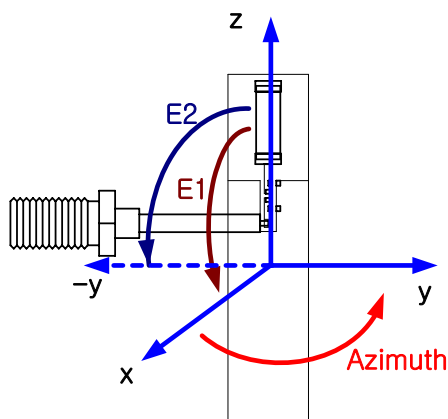


A. Anechoic chamber spec.

| Parameters | Condition | Unit |
|-----------------|------------------|------|
| Chamber size | 8x4x4 | m |
| Temperature | 21.5 | °C |
| Humidity | 55 | % RH |
| Measurement | S21 (8753ES) | |
| System software | Midas (Orbit/FR) | |

B. Measurement coordinates

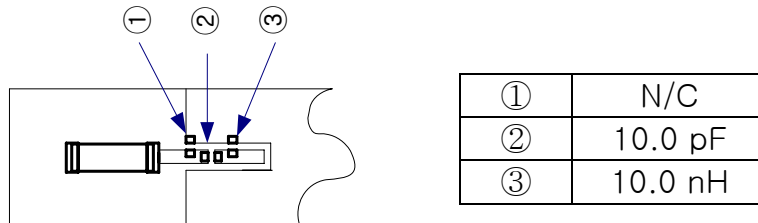
| Measurement Plane | Symbol | Rotating direction |
|-------------------|---------|--------------------|
| Azimuth | Azimuth | $x \rightarrow y$ |
| Elevation1 | E1 | $z \rightarrow x$ |
| Elevation2 | E2 | $z \rightarrow -y$ |



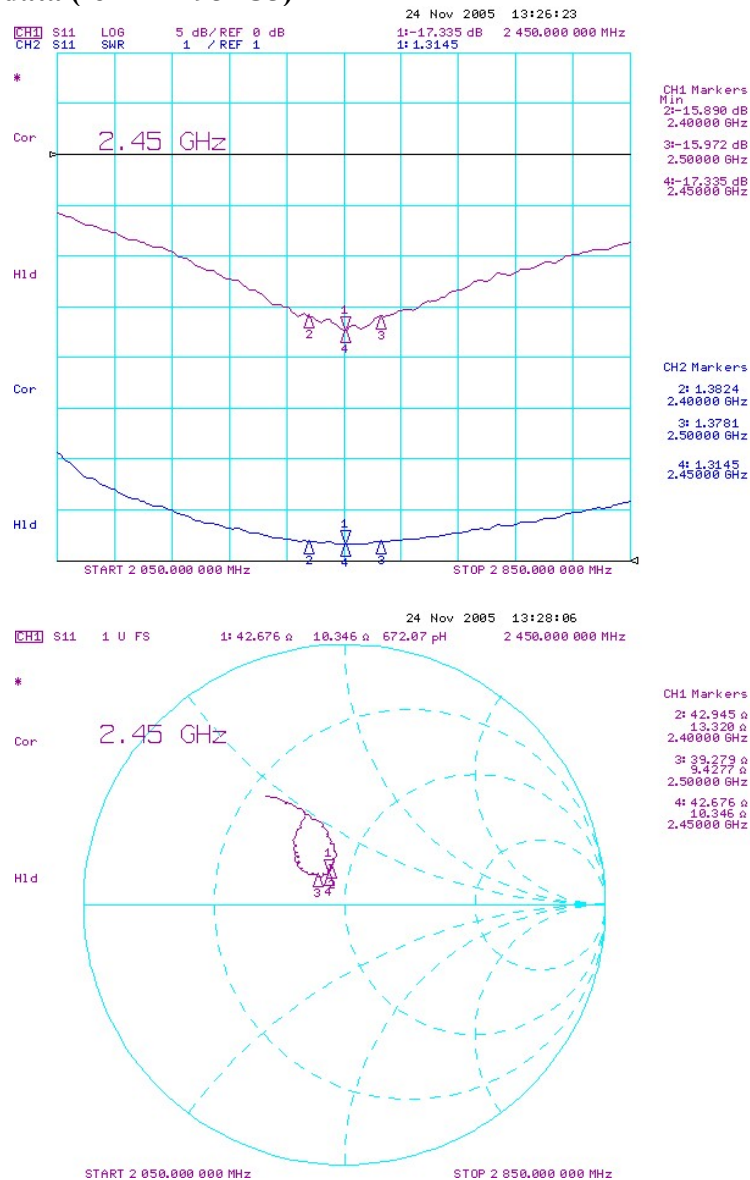
3. MEASUREMENT RESULT

3.1 VSWR & Smithchart

A. Matching Value (recommend for reference testboard only)



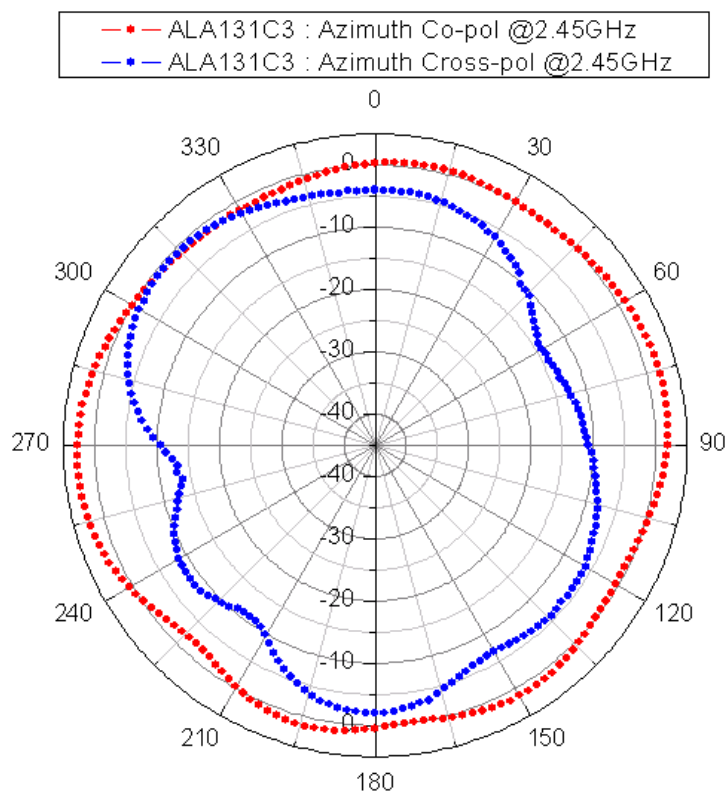
B. Measured data (for ALA931C5)



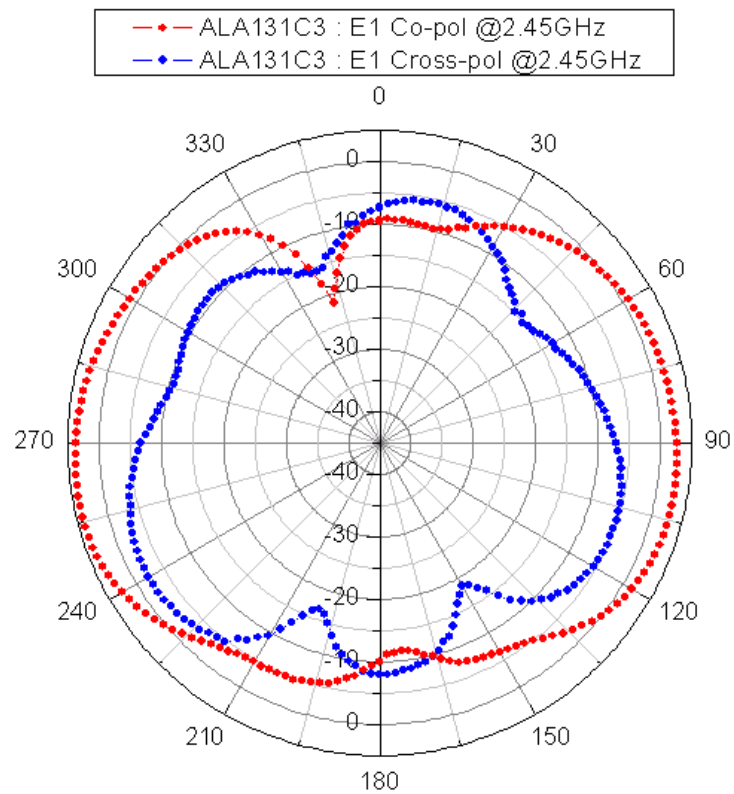
3.2 Radiation Gain and Pattern

[Measured data table]

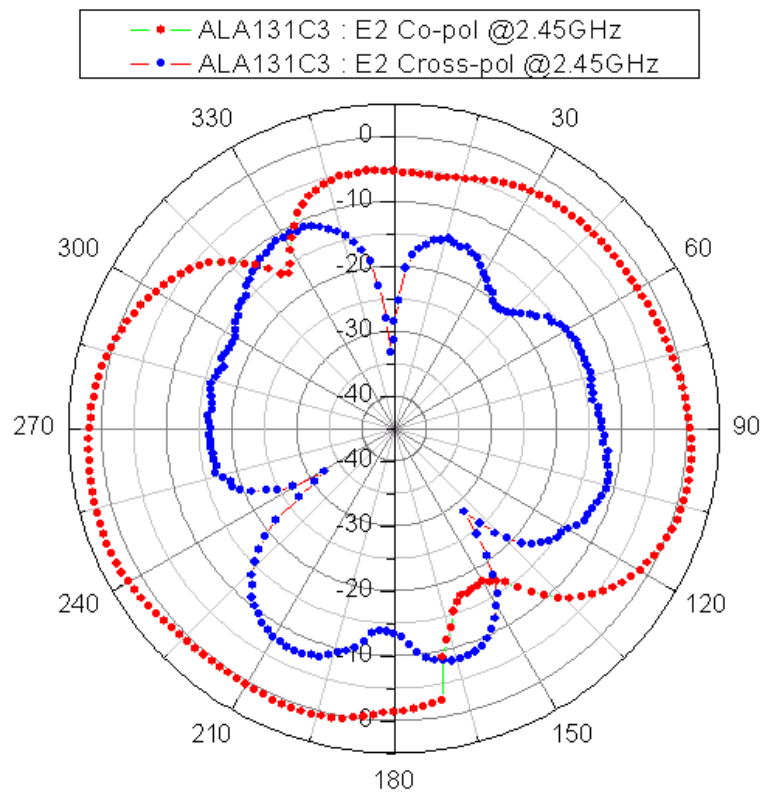
| | Peak Gain (dBi) | Average Gain (dBi) | Remark |
|------------|-----------------|--------------------|-----------|
| Azimuth | 2.8 | -0.7 | @2.45 GHz |
| Elevation1 | 4.0 | -0.3 | @2.45 GHz |
| Elevation2 | 2.6 | -1.3 | @2.45 GHz |



[ALA131C3 radiation pattern : Azimuth@2.45GHz]



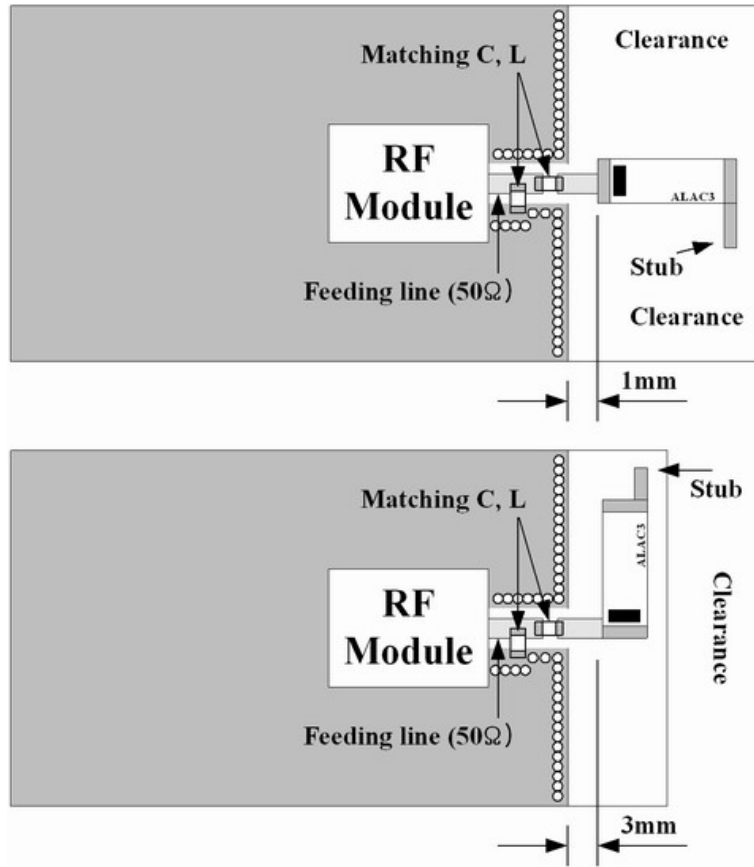
[ALA131C3 radiation pattern : Elevation1@2.45GHz]



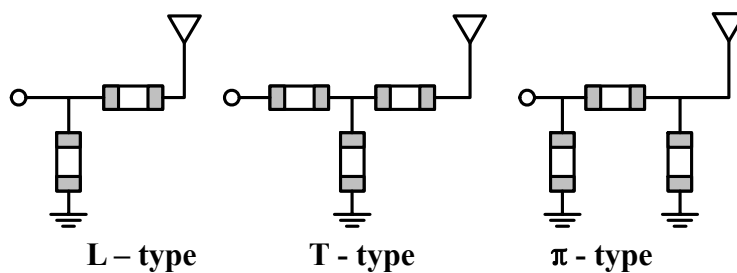
[ALA131C3 Radiation Pattern : Elevation2@2.45GHz]

4. SUGGESTED LAYOUT & MATCHING CIRCUIT

4.1 Layout (recommend only)

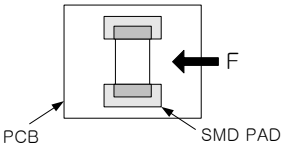
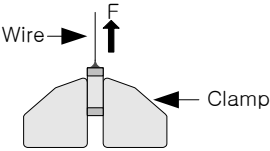


4.2 Matching Circuit (recommend only)



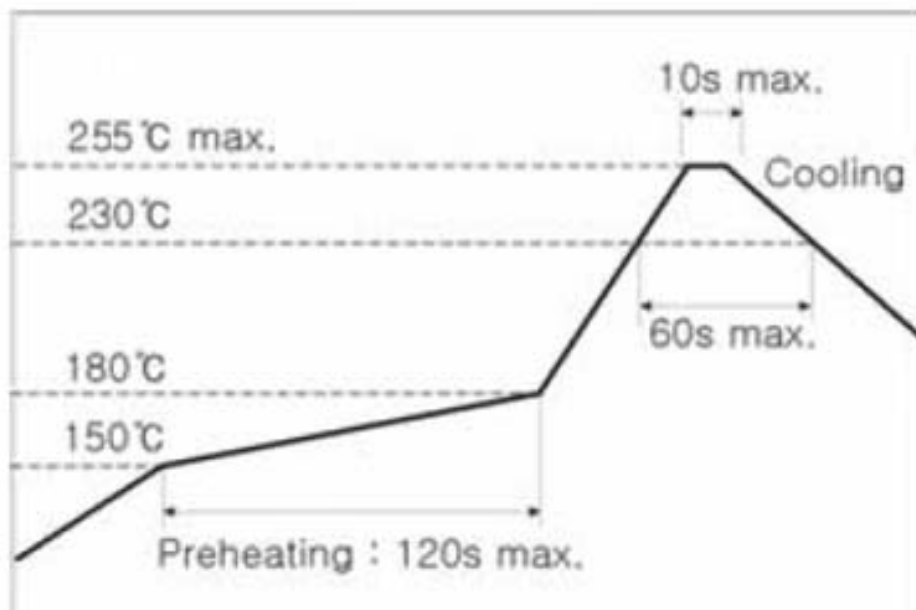
For usable matching, the **ground stability** must be guaranteed with **sufficient via holes** and the **case effects** should be considered. Finally, using one or more lumped chip elements and a tuning stub are recommended for better results.

5. RELIABILITY TEST

| No | ITEM | TEST CONDITION | TEST REQUIREMENTS |
|----|-----------------------------------|--|---|
| 1 | Adhesive Strength of Termination | <p>1. Applied force on SMD chip till detached point from PCB.</p>  | <p>1. No mechanical damage by forces applied on the right. 2. Strength (F) > 7 kgf</p> |
| 2 | Tensile Strength | <p>1. Wire : 0.6~0.8 tined Cu wire</p>  | <p>1. No mechanical damage by forces applied on the right. 2. Strength (F) > 3 kgf</p> |
| 3 | Thermal Shock (Temperature Cycle) | <p>1. 1 cycle / step 1 : $-40 \pm 3^{\circ}\text{C}$, 30 min step 2 : $+125 \pm 3^{\circ}\text{C}$, 30 min 2. Number of cycle : 30 3. Measure after left for 48 hrs min. at room temperature</p> | <p>1. No visual damage 2. Within electric spec (VSWR)</p> |
| 4 | High Temperature Resistance | <p>1. Temperature : $+125 \pm 5^{\circ}\text{C}$ 2. Time : 1000 ± 24 hrs 3. Measure f_c after left for 24 hrs min. at room temperature</p> | <p>1. No visual damage 2. Within electric spec (VSWR)</p> |
| 5 | Low Temperature Resistance | <p>1. Temperature : $-40 \pm 5^{\circ}\text{C}$ 2. Time : 1000 ± 24 hrs 3. Measure f_c after left for 48 hrs min. at room temperature</p> | <p>1. No visual damage 2. Within electric spec (VSWR)</p> |
| 6 | Humidity (Steady Condition) | <p>1. Humidity : 85 % RH 1. Temperature : $+85 \pm 3^{\circ}\text{C}$ 2. Time : 1000 ± 24 hrs 3. Measure f_c after left for 48 hrs min. at room temperature</p> | <p>1. No visual damage 2. Within electric spec (VSWR)</p> |

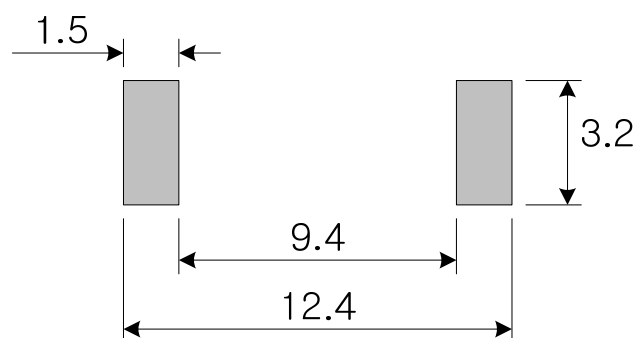
6. SOLDERING RECOMMENDATIONS

6.1 Reflow Soldering Profile



[Soldering Reflow Profile for Pb-free]

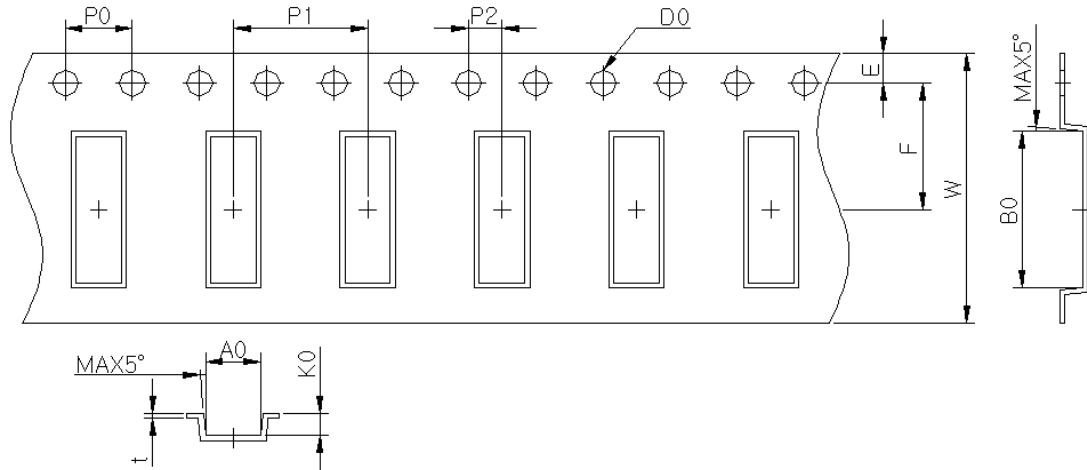
6.2 Soldering Land Pattern



(unit : mm)

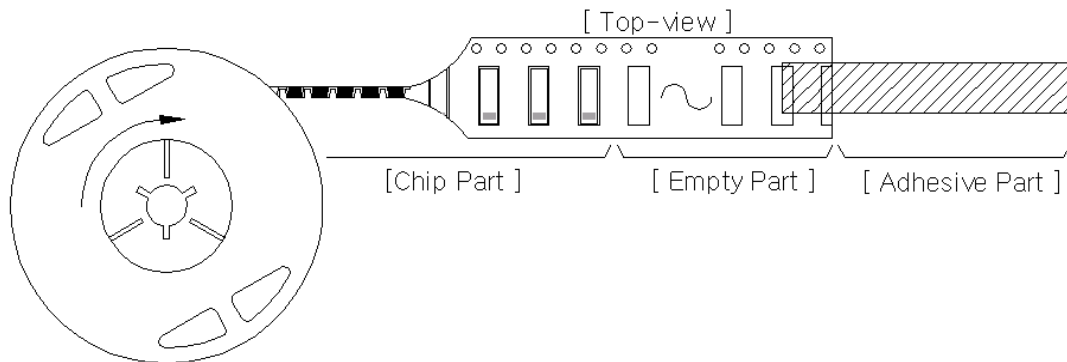
7. PACKING

7.1 Tape Dimension (unit : mm)



| | | | | | |
|----|------------------|----|-----------------|---|------------------|
| A0 | 3.30 ± 0.10 | P0 | 4.00 ± 0.10 | E | 1.75 ± 0.10 |
| B0 | 11.30 ± 0.10 | P1 | 8.00 ± 0.10 | F | 11.5 |
| K0 | 1.50 ± 0.10 | P2 | 2.00 ± 0.10 | W | 24.00 ± 0.30 |
| D0 | 1.55 ± 0.05 | | | t | 0.30 ± 0.05 |

7.2 Taping Style



7.3 Packing Unit

| | Quantity | Size |
|-----------|---|---|
| Reel | 4,000 ea | $\Phi 13'' \times 24\text{mm}$ |
| Small Box | 8,000 ea (2 reel*4,000ea/reel) | $350 * 350 * 90 \text{ (mm}^3\text{)}$ |
| Large Box | 42,000 ea (3 small box*8,000ea/small box) | $390 * 390 * 280 \text{ (mm}^3\text{)}$ |

7.4 Description of Packing Label



AMOTECH CO., LTD.

Name of Company

617 5B 1LT, Namchon-Dong, Namdong-Gu, Incheon, Korea

Address of Manufacture

Multilayer Chip Antenna

Name of Component

Type : ALA131C3

ALA : Amotech LTCC Antenna
131 : Chip Size
C3 : Version & Frequency index

Lot No : MA13A3060501

MA : Mass-product Antenna
13 : Chip Size
A3 : Version & Frequency index
0605 : Date (year/month)
01 : Order of production

Quantity : 4,000 pcs

Quantity : 4,000 pcs

Date : 2006/05/24

Date : 2006 /05 /24

8. STORAGE CONDITION

- A. Storage environment must be at an ambient temperature of 15~35℃ and an ambient humidity of 45~75 % RH. (MSL Level 2)
- B. Chip antenna can experience degradation of termination solderability when subjected to high temperature of humidity, or if exposed to sulfur or chlorine gases.
- C. Avoid mechanical shock (ex. falling) to the chip antenna to prevent mechanical cracking inside of the ceramic dielectric due to its own weight.

