

Data Sheet

MULTILAYER CHIP ANTENNA

Part No. : ALA931C4
ALA931C5

WRITTEN	CHECKED	APPROVED

February 14, 2006

AMOTECH Co., LTD.

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	

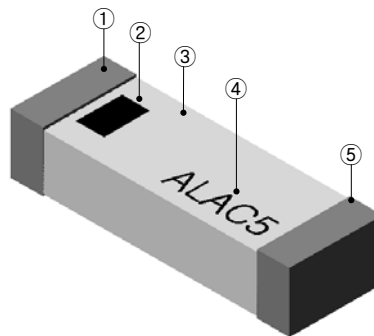
※ These values are measured on the matched reference test board.

※ ALA931C5 has higher self-frequency than ALA931C4.

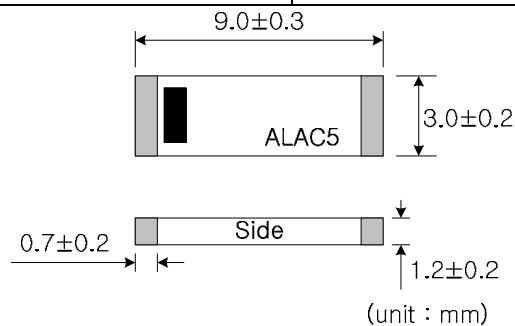
1.2 Mechanical Specifications

No	Internal Electrode	Ag	Pb-free
1	External Electrode	Ag/Ni/Sn	Pb-free
2	Dimensions (L x W x H)	9.0 x 3.0 x 1.2	mm
3	Unit Weight	97 ± 9	mg
4	Operating Temperature	-35 ~ +85	°C

1.3 Appearance and Dimensions

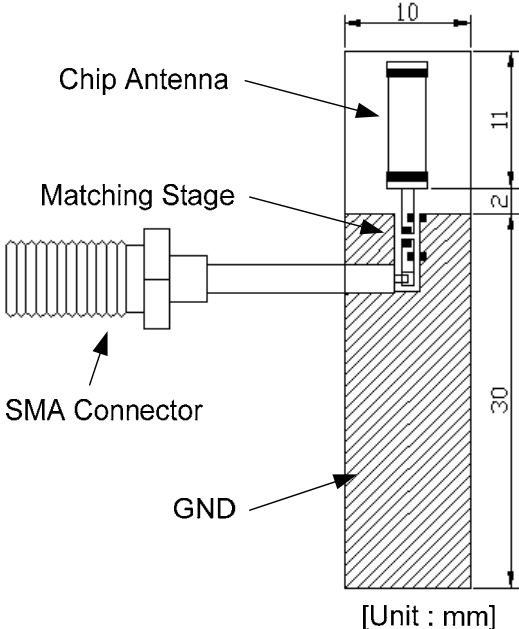


	Name	Function
1	External Electrode	Soldering, Input Port
2	Direction index	Indication of Input Port
3	Ceramic Body	-
4	Model No. index	-
5	External Electrode	Soldering

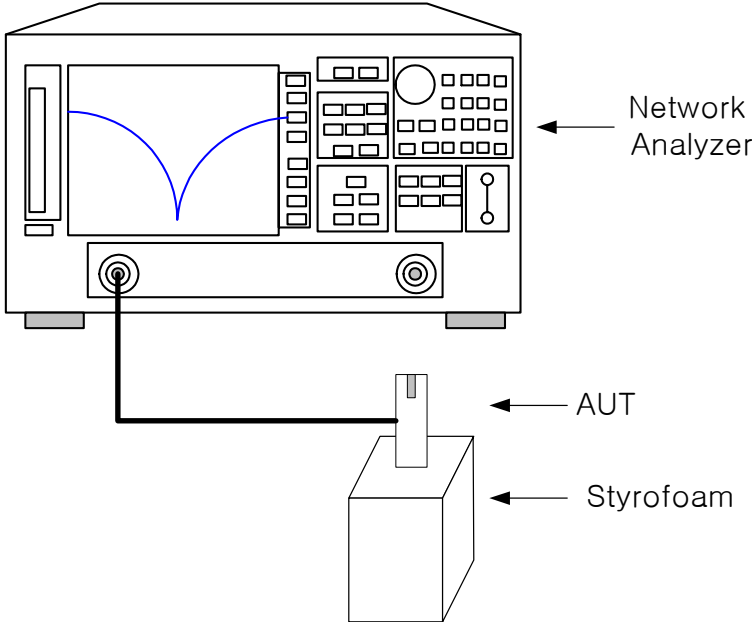


2. MEASUREMENT

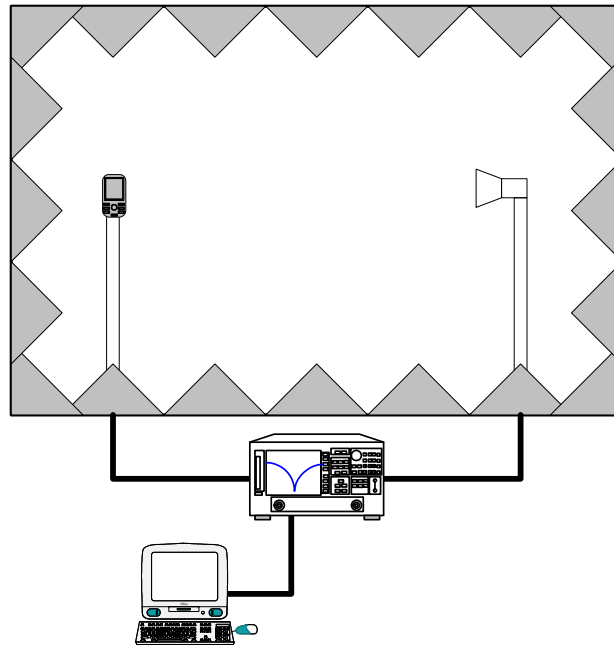
2.1 Reference Test Board for Measurement



2.2 Diagram for VSWR measurement



2.3 Diagram for radiation gain and pattern measurements

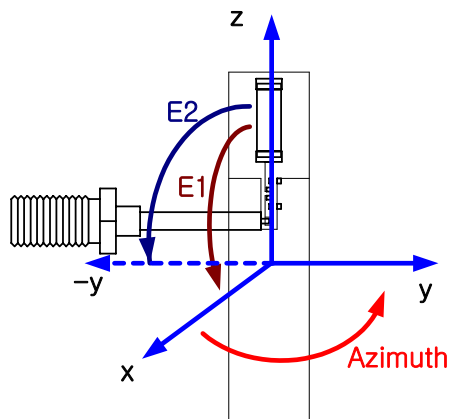


A. Anechoic chamber spec.

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

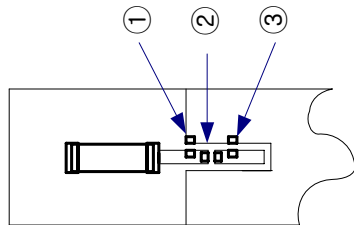
Measurement Plane	Symbol	Rotating direction
Azimuth	Azimuth	$x \rightarrow y$
Elevation1	E1	$z \rightarrow x$
Elevation2	E2	$z \rightarrow -y$



3. MEASUREMENT RESULT

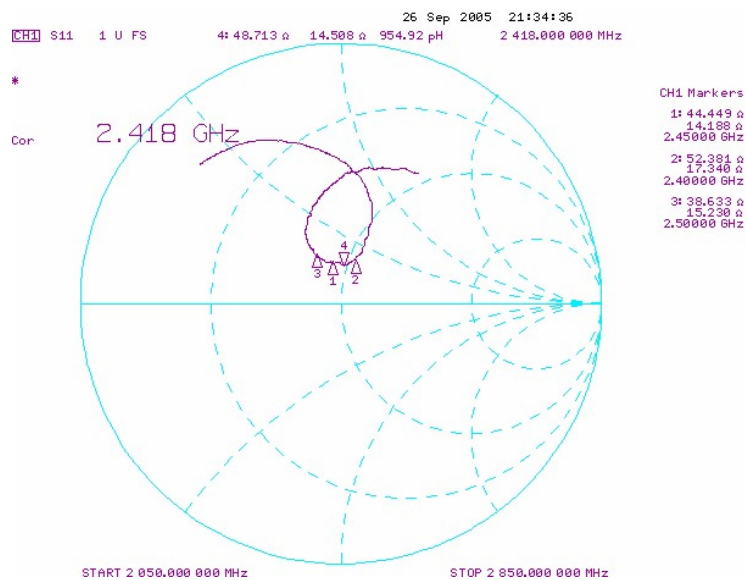
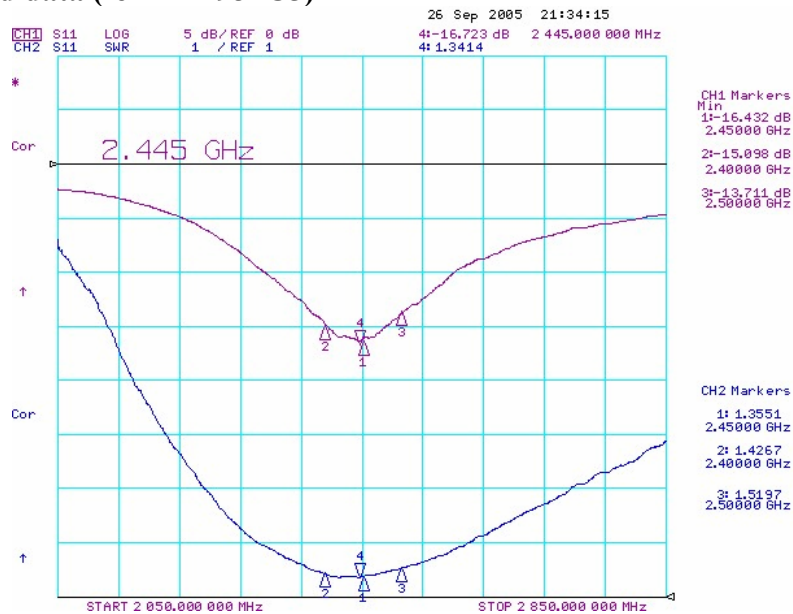
3.1 VSWR & Smithchart

A. Matching Value (recommend for reference testboard only)



①	N/C
②	2.7 nH
③	1.2 nH

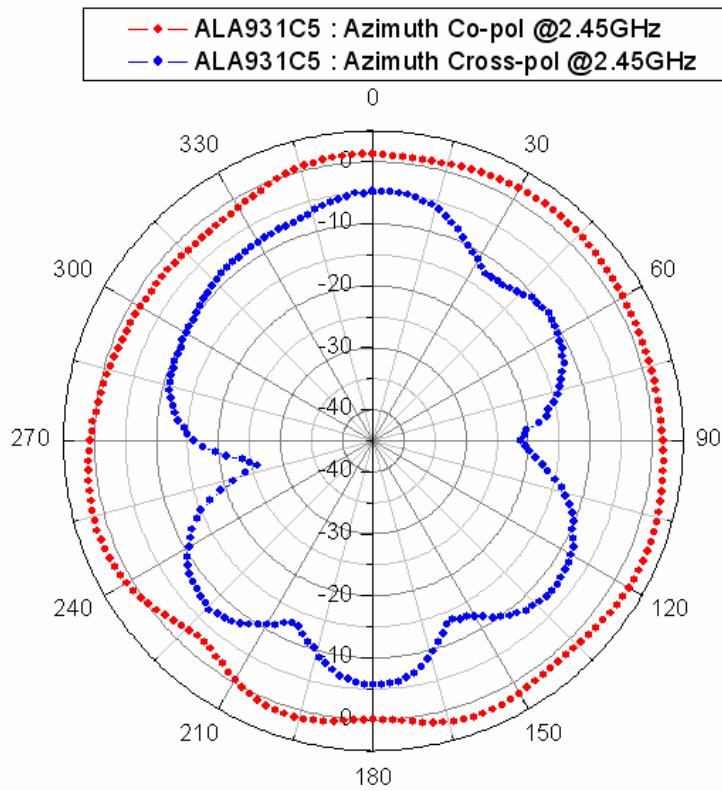
B. Measured data (for ALA931C5)



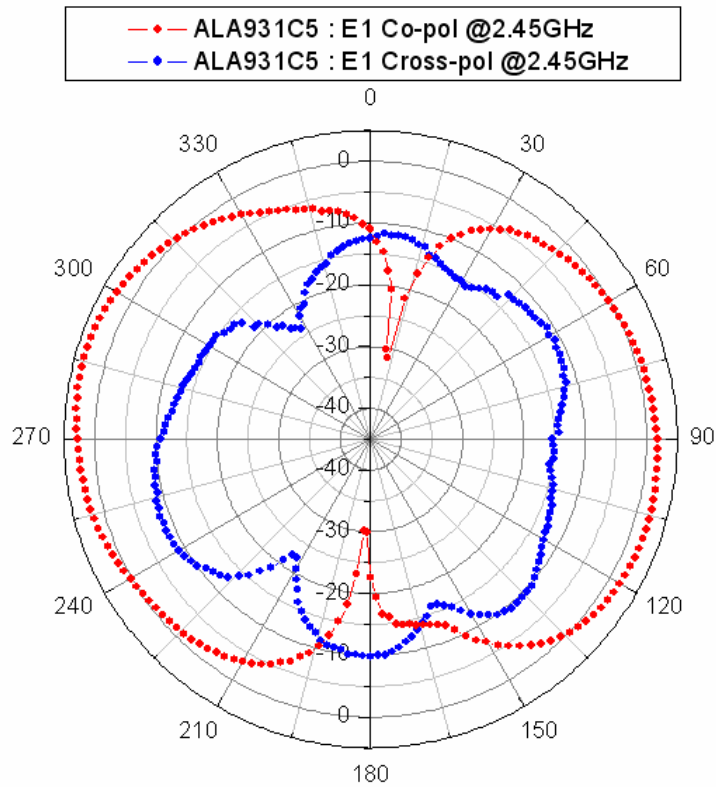
3.2 Radiation Gain and Pattern

[Measured data table]

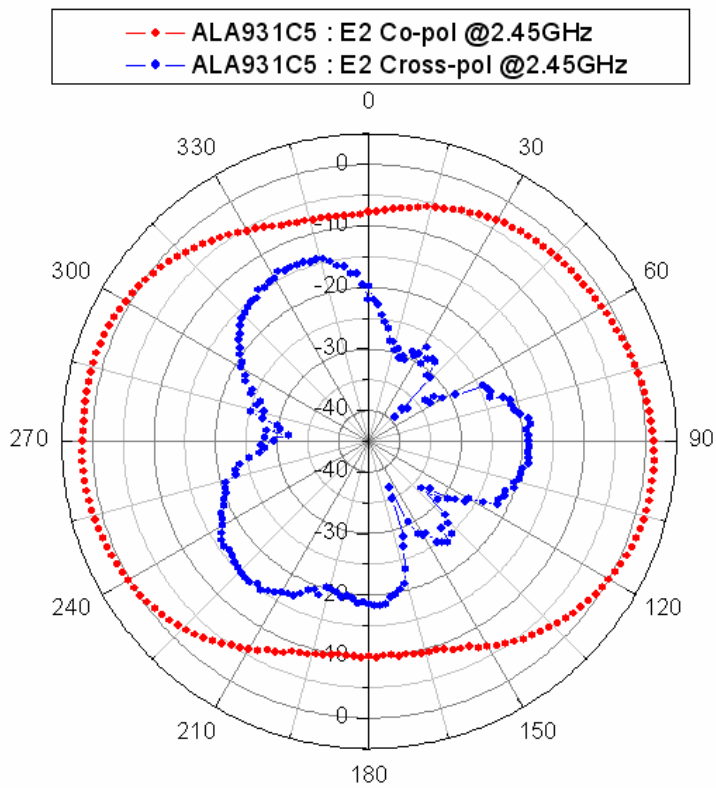
	Peak Gain (dBi)	Average Gain (dBi)	Remark
Azimuth	2.8	1.0	@2.45 GHz
Elevation1	3.5	-0.7	@2.45 GHz
Elevation2	1.7	-1.6	@2.45 GHz



[ALA931C5 radiation pattern : Azimuth@2.45GHz]



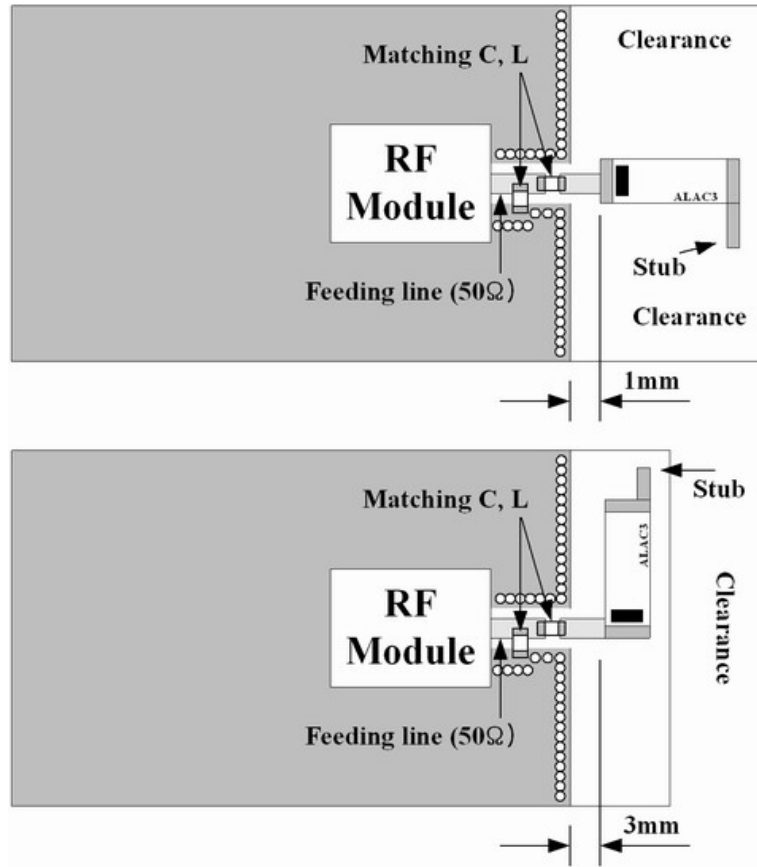
[ALA931C5 radiation pattern : Elevation1@2.45GHz]



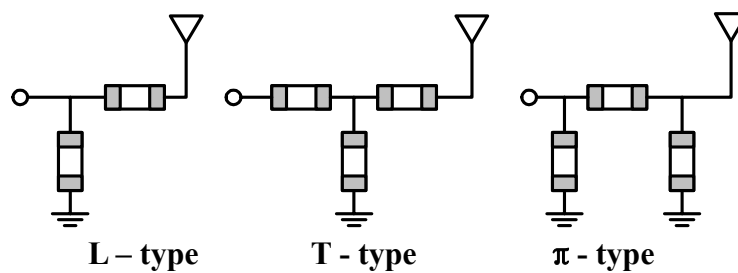
[ALA931C5 Radiation Pattern : Elevation2@2.45GHz]

4. SUGGESTED LAYOUT & MATCHING CIRCUIT

4.1 Layout (recommend only)

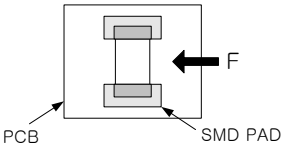
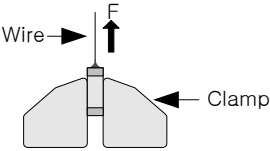


4.2 Matching Circuit (recommend only)



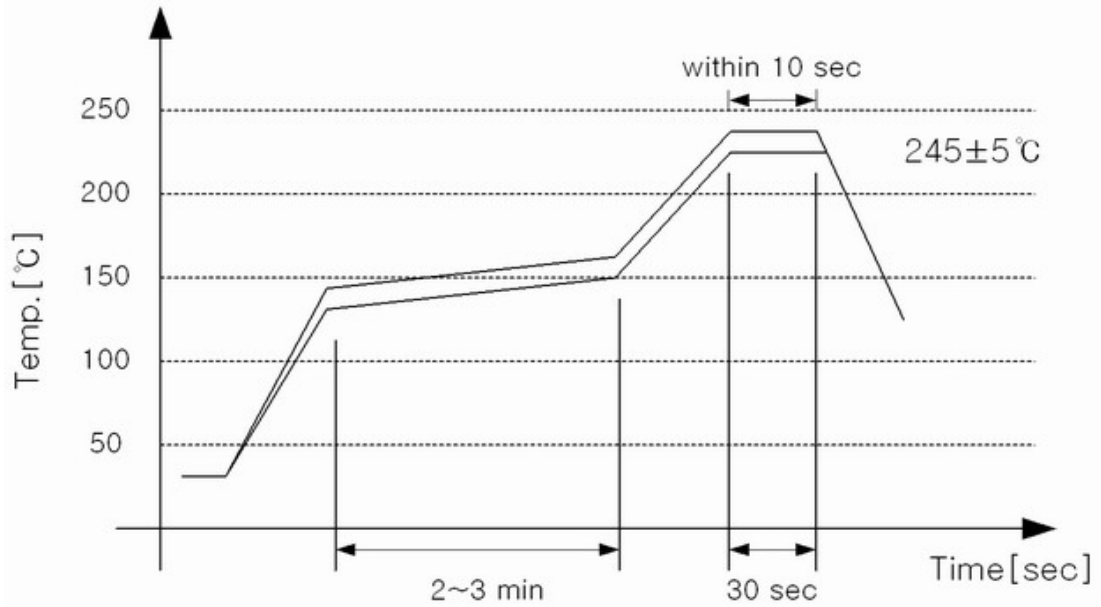
For usable matching, the **ground stability** must be guaranteed with **sufficient via holes** and the **case effects** should be considered. Finally, using one or more lumped chip elements and a tuning stub are recommended for better results.

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>

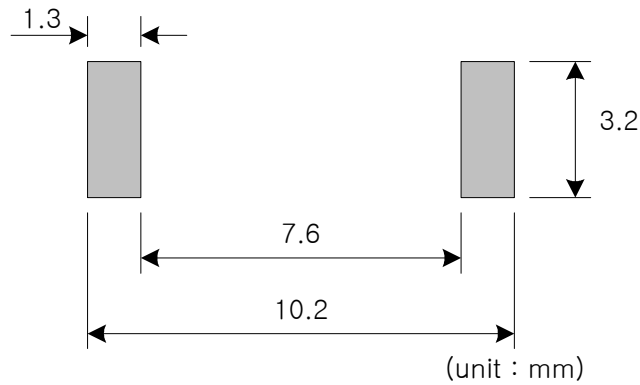
6. SOLDERING RECOMMENDATIONS

6.1 Reflow Soldering Profile



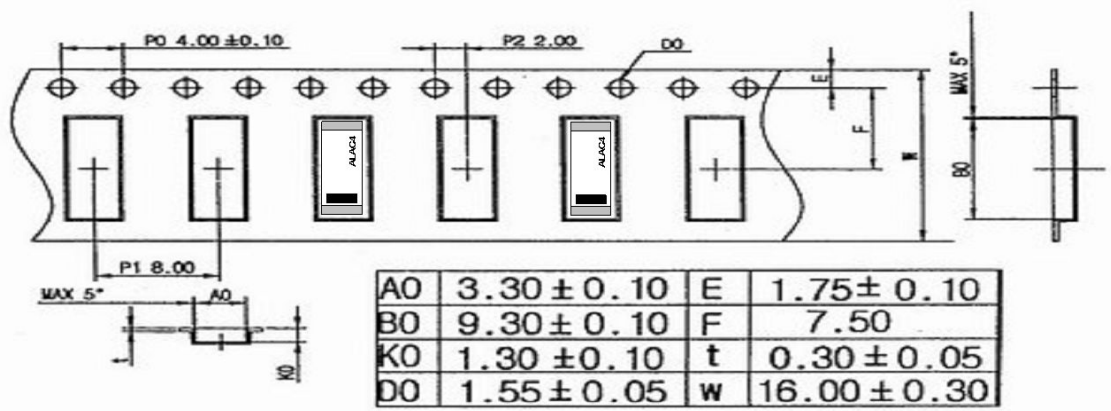
[Soldering Reflow Profile for Pb-free]

6.2 Soldering Land Pattern

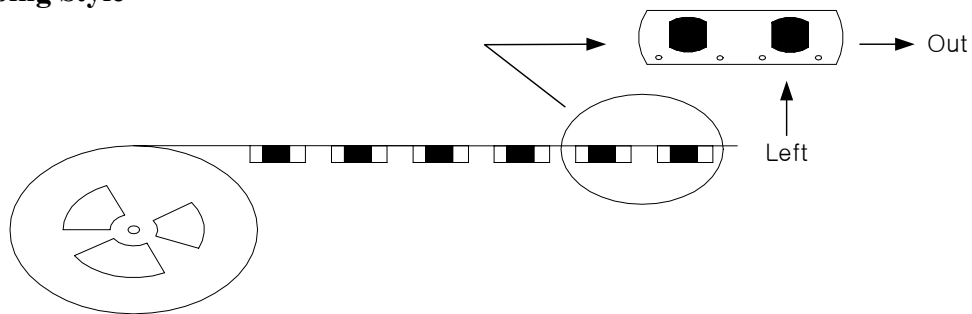


7. PACKING

7.1 Tape Dimension (unit : mm)



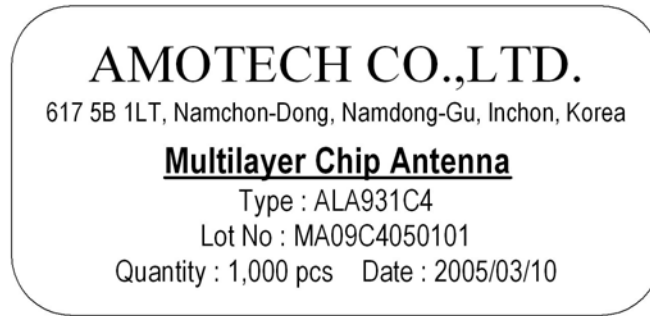
7.2 Taping Style



7.3 Packing Unit

	수량	치수
Reel	1,000 ea	Φ7" x 16mm
소 Box	3,000 ea (3 reel*1,000ea/reel)	185 * 185 * 68 (mm ³)
중 Box	15,000 ea (5 small box*3,000ea/small box)	365 * 200 * 200 (mm ³)
대 Box	42,000 ea (14 small box*3,000ea/small box)	390 * 390 * 280 (mm ³)

7.4 Description of Packing Label



AMOTECH CO., LTD.

Name of Company

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

Address of Manufacture

Multilayer Chip Antenna

Name of Component

Type : ALA931C4

ALA : Amotech LTCC Antenna
931 : Chip Size
C4 : Version & Frequency index

Lot No : MA09C4050101

MA : Mass-product Antenna
09 : Chip Size
C4 : Version & Frequency index
0501 : Date
01 : Order of production

Quantity : 1,000 pcs

Quantity : 1,000 pcs

Date : 2005/03/10

Date : 2005 /03 /10

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.

