

# CHIP ANTENNAS



REFLOW

## FEATURES

- Compact and Low-profile
- Wide bandwidth and High Gain
- Stable temperature characteristics

## APPLICATIONS

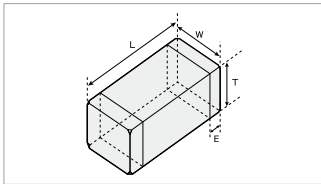
- Bluetooth®, Wireless LAN, GPS, WiMAX, ZigBee, UWB

## ORDERING CODE

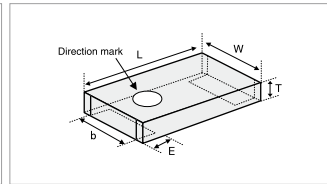
A	F	△	2	1	6	M	2	4	5	0	0	1	—	T
①Type		③Dimensions (case size) [mm]			④Special Code		⑤Frequency [MHz]		⑥Spec Code		⑦Packaging			
AH	Multilayer Antenna	212	2.0×1.25		F	Inverted F	example		01~		—T Tape & Reel			
AF	Helical Antenna	216	2.5×1.6		M	Mono Pole	1575	1574.397~1576.443	S1~	Applicable to AH104F				
②Electrode Code		816	8.0×1.6		N	Mono Pole (Dual)	2450	2400~2500						
△ With Plating		316	3.2×1.6				5550	3100~8000						
△=Blank space		083	8.0×3.0											
		104	10.0×4.0											
		086	8.0×6.0											

## EXTERNAL DIMENSIONS/STANDARD QUANTITY

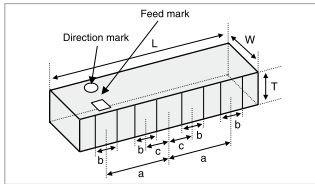
AH 212M Type, AF 216M Type, AF 816M Type, AF 116M Type



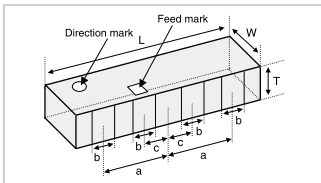
AH 316M Type



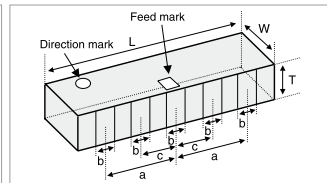
AH 083F Type



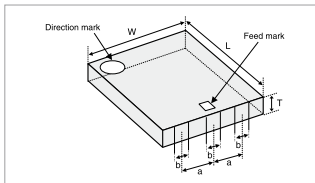
AH 104F Type



AH 104N Type



AH 086M Type



Type	L	W	T	E	a	b	c	Standard Quantity (pcs) Embossed Tape
AF 216M	2.5±0.2	1.6±0.2	1.6±0.2	0.5±0.3	—	—	—	2000
AF 816M	8±0.2	1.6±0.2	1.6±0.2	0.5±0.3	—	—	—	
AH212M	2 <sup>+0.3</sup>	1.25±0.2	0.85±0.2	0.5±0.3	—	—	—	
AH 316M	3.2±0.15	1.6±0.15	0.5±0.1	0.5±0.2	—	1.0 min.	—	3000
AH 083F	8±0.3	3±0.3	1±0.3	—	3.1±0.3	1±0.3	1.15±0.3	1000
AH 104F	10±0.3	4±0.3	1±0.3	—	2.5±0.3	1±0.3	1±0.3	2000
AH 104N	10±0.3	4±0.3	1±0.3	—	3±0.3	0.8±0.3	1.5±0.3	
AH 086M	8±0.3	6±0.3	1±0.3	—	1.8±0.2	1±0.3	—	

Unit : mm (inch)

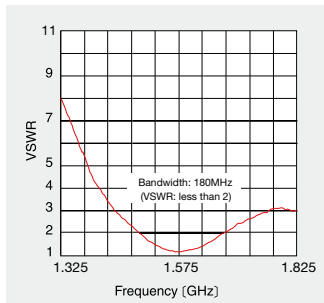
## PART NUMBERS

Applications	Ordering Code	External Dimensions (mm)	Center Frequency (MHz)
GPS	AF 816M157502	8.0×1.6×1.6	1575
	AH 316M157501	3.2×1.6×0.5	1575
W-LAN (2.4GHz) Bluetooth® WiMAX (2.5GHz) ZigBee	AF 216M245001	2.5×1.6×1.6	2450
	AH 212M245001	2.0×1.25×0.85	2450
	AH 316M245001	3.2×1.6×0.5	2450
	AH 083F245001	8.0×3.0×1.0	2450
	AH 104F2450S1	10.0×4.0×1.0	2450
	AH 104F2650S1	10.0×4.0×1.0	2650
W-LAN (2.4GHz/5GHz)	AH 104N2450D1	10.0×4.0×1.0	2450/5400
UWB & WiMAX (3.5GHz)	AH 086M555003	8.0×6.0×1.0	5550

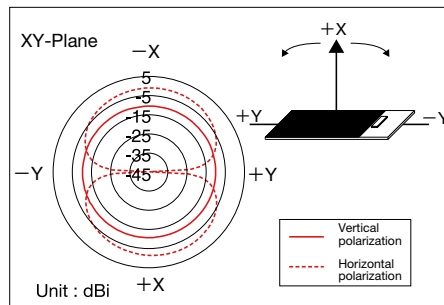
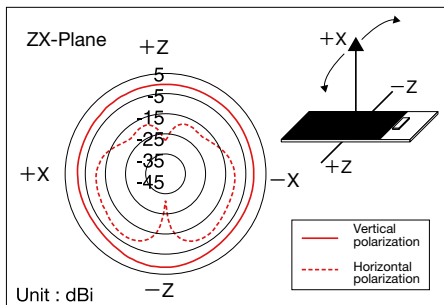
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Typical Characteristics on Taiyo Yuden evaluation board

## ●AF 816M157502

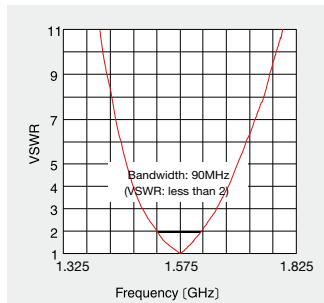


Typical characteristics of VSWR

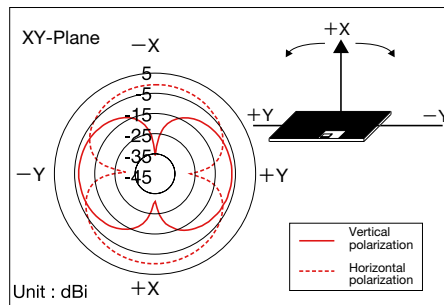
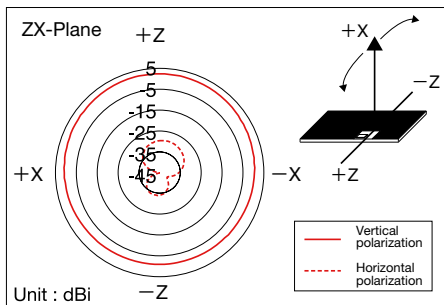


Typical characteristics of radiation pattern (@1.575GHz)

## ●AH 316M157501

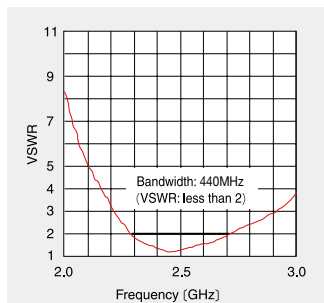


Typical characteristics of VSWR

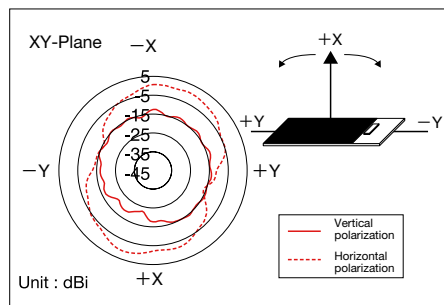
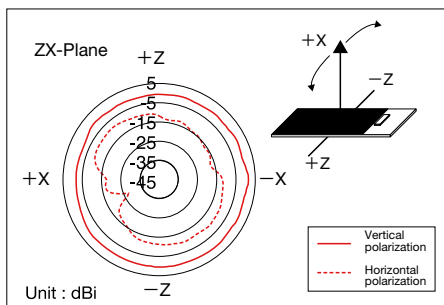


Typical characteristics of radiation pattern (@1.575GHz)

## ●AF 216M245001

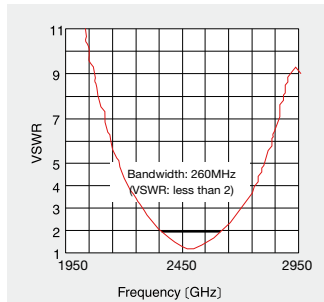


Typical characteristics of VSWR

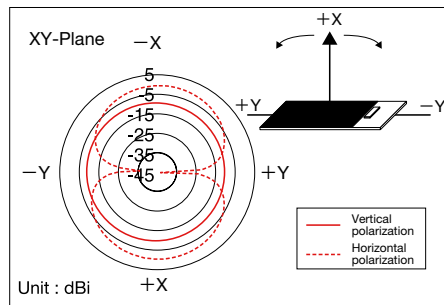
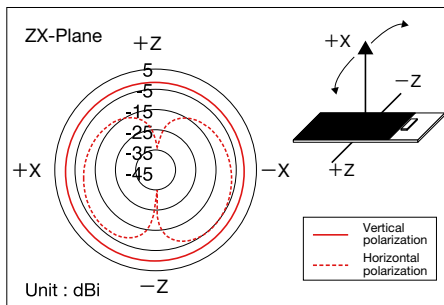


Typical characteristics of radiation pattern (@2.45GHz)

## ●AH 212M245001



Typical characteristics of VSWR

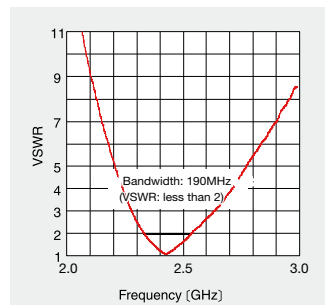


Typical characteristics of radiation pattern (@2.45GHz)

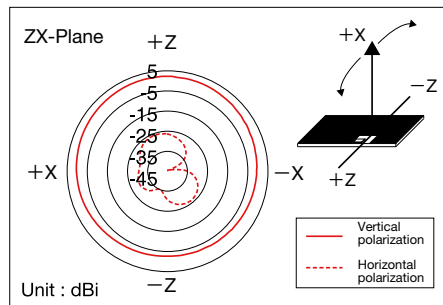
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Typical Characteristics on Taiyo Yuden evaluation board

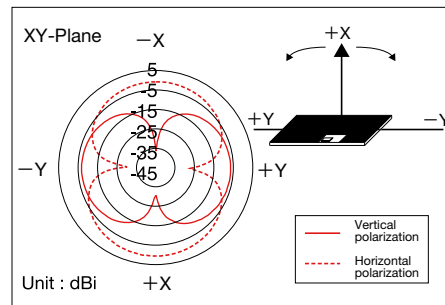
## ● AH 316M245001



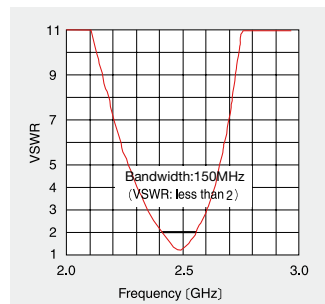
Typical characteristics of VSWR



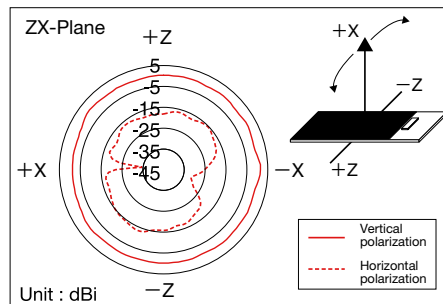
Typical characteristics of radiation pattern (@2.45GHz)



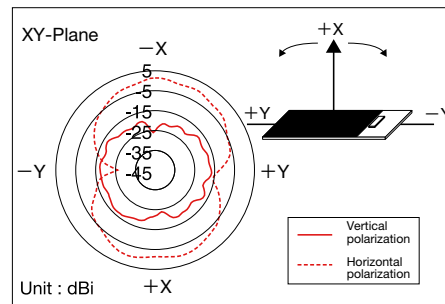
## ● AH 083F245001



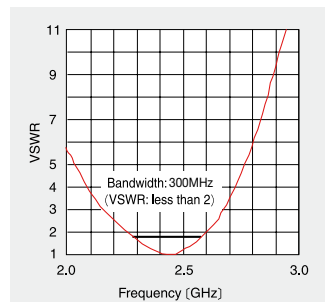
Typical characteristics of VSWR



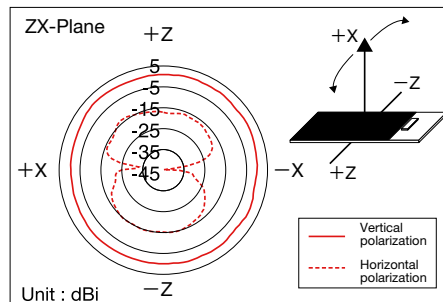
Typical characteristics of radiation pattern (@2.45GHz)



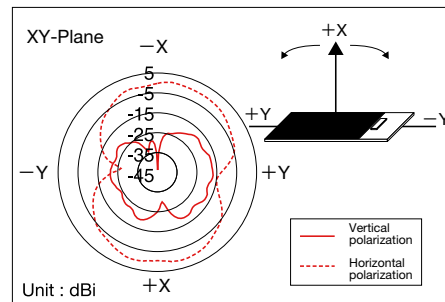
## ● AH 104F2450S1



Typical characteristics of VSWR



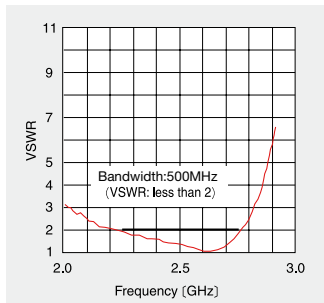
Typical characteristics of radiation pattern (@2.45GHz)



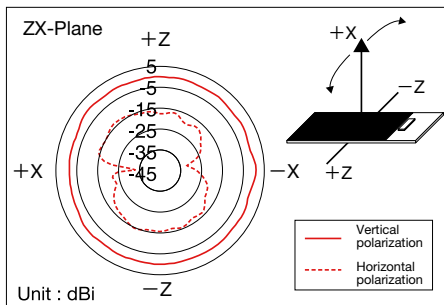
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Typical Characteristics on Taiyo Yuden evaluation board

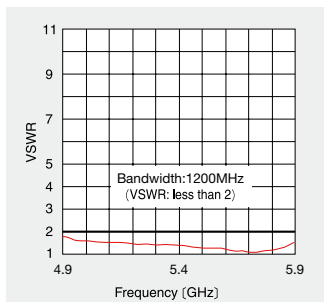
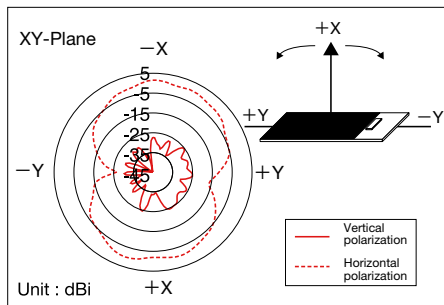
●AH 104N2450D1



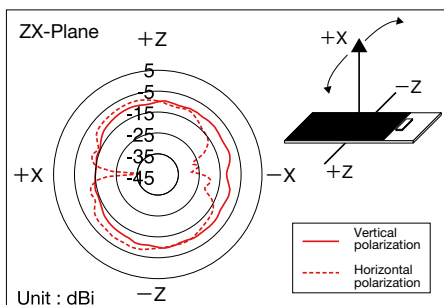
Typical characteristics of VSWR (2GHz band)



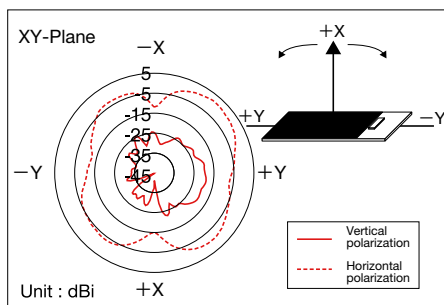
Typical characteristics of radiation pattern (@2.45GHz)



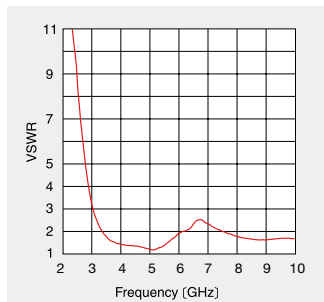
Typical characteristics of VSWR (5GHz band)



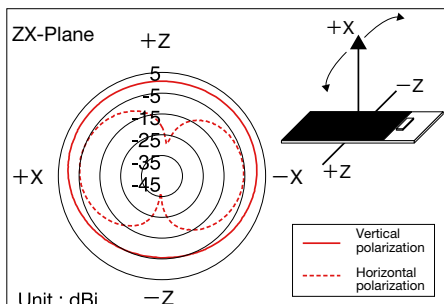
Typical characteristics of radiation pattern (@5.25GHz)



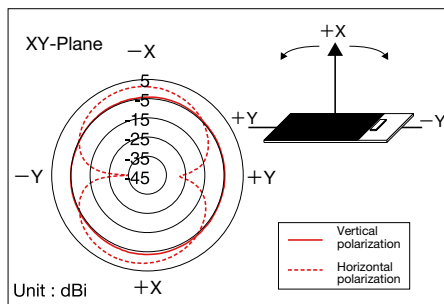
●AH 086M555003



Typical characteristics of VSWR



Typical characteristics of radiation pattern (@3.96GHz)



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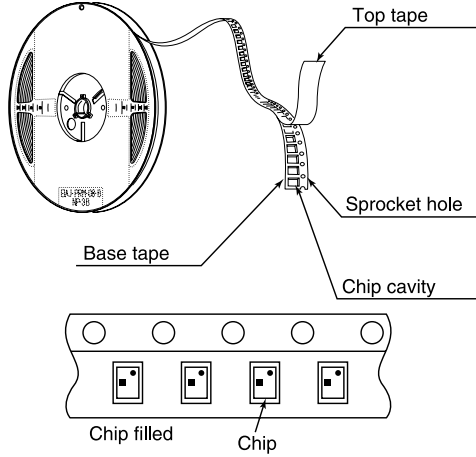
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① Minimum Quantity

Type	Standard Quantity (pcs) Embossed Tape
AF216M, AF816M, AH104F, AH104N	2000
AH316M	3000
AH083F, AH086M	1000
AH212M	4000

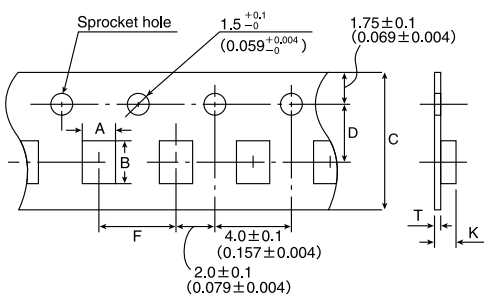
② Tape Material

Embossed Tape

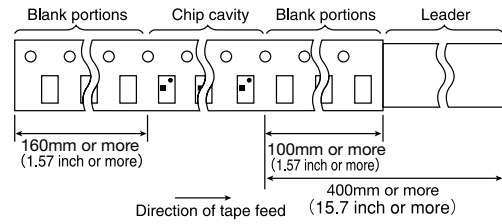


③ Taping Dimensions

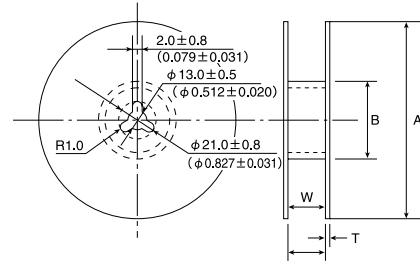
● Embossed Tape



④ Leader and Blank Portion



⑤ Reel size

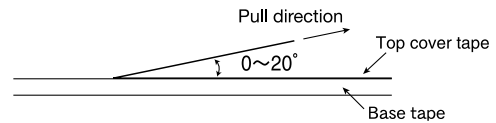


Type	A	B	W	T
AF216M, AH212M	178±2.0 (7.0±0.08)	50 min. (2.0 min.)	10.0±1.5 (0.394±0.06)	3.0 max. (0.12 max.)
AH316M	178±2.0 (7.0±0.08)	50 min. (2.0 min.)	17.0±1.0 (0.67±0.04)	2.5 max. (0.1 max.)
AF816M	178±2.0 (7.0±0.08)	50 min. (2.0 min.)	25.5±1.0 (1.0±0.04)	3.0 max. (0.12 max.)
AH083F	330±2.0 (13.0±0.08)	100±1.0 (3.94±0.04)	17.0 ± 1.0 (0.67±0.04)	2.5 max. (0.1 max.)
AH104F	330±2.0 (13.0±0.08)	100±1.0 (3.94±0.04)	17.0 ± 1.0 (0.67±0.04)	2.5 max. (0.1 max.)
AH104N	330±2.0 (13.0±0.08)	100±1.0 (3.94±0.04)	17.0 ± 1.0 (0.67±0.04)	2.5 max. (0.1 max.)
AH086M	330±2.0 (13.0±0.08)	100±1.0 (3.94±0.04)	17.0 ± 1.0 (0.67±0.04)	2.5 max. (0.1 max.)

Unit : mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1~0.7N in the direction of the arrow as illustrated below.



Type	Chip Cavity		Tape Widthness		Insertion Pitch	Tape Thickness MAX.	
	A	B	C	D	F	K	T
AF216M	1.85±0.2 (0.073±0.008)	2.75±0.2 (0.108±0.008)	8±0.2 (0.315±0.008)	3.5±0.1 (0.138±0.004)	4±0.1 (0.157±0.004)	1.95 (0.077)	0.3 (0.012)
AF816M	1.95±0.2 (0.077±0.008)	8.4±0.2 (0.331±0.008)	16±0.3 (0.630±0.012)	7.5±0.1 (0.296±0.004)	4±0.1 (0.157±0.004)	2.05 (0.081)	0.35 (0.014)
AH316M	1.9±0.2 (0.075±0.008)	3.5±0.2 (0.138±0.008)	8±0.2 (0.315±0.012)	3.5±0.1 (0.138±0.004)	4±0.1 (0.157±0.004)	0.85 (0.033)	0.3 (0.012)
AH083F	3.35±0.2 (0.132±0.008)	8.35±0.2 (0.329±0.008)	16±0.3 (0.630±0.012)	7.5±0.1 (0.295±0.004)	8±0.1 (0.315±0.004)	1.55 (0.061)	0.3 (0.012)
AH104F, AH104N	4.35±0.2 (0.171±0.008)	10.35±0.2 (0.407±0.008)	24±0.3 (0.945±0.012)	11.5±0.1 (0.435±0.004)	8±0.1 (0.315±0.004)	1.55 (0.061)	0.3 (0.012)
AH086M	6.25±0.2 (0.246±0.008)	8.26±0.2 (0.325±0.008)	16±0.3 (0.630±0.012)	7.5±0.1 (0.296±0.004)	12±0.1 (0.473±0.004)	1.3 (0.051)	0.3 (0.012)
AH212M	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	8±0.3 (0.315±0.012)	3.5±0.1 (0.138±0.004)	4±0.1 (0.157±0.004)	1.5 (0.059)	0.3 (0.012)

Unit : mm (inch)

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## RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	−20~+80°C
2. Storage Temperature Range	
Specified Value	−40~+85°C
【Test Methods and Remarks】 ※with being taped, −20~+40°C	
3. Solderability	
Specified Value	At least 90% of immersed terminal surface is covered by new solder.
【Test Methods and Remarks】 Solder temperature : 230±5°C Duration : 3±1 sec. Preconditioning : Preheating at 150°C after immersion into flux.	
4. Thermal Shock	
Specified Value	Shall satisfy required VSWR value of individual specifications for each item.
【Test Methods and Remarks】 1 hour of recovery after 10 times of 30min.immersion alternately at −40°C and 85°C of temperature,followed by evaluating electrical characteristics.	
5. High Temperature Storage Test	
Specified Value	Shall satisfy required VSWR value of individual specifications for each item.
【Test Methods and Remarks】 1 hour of recovery under standard condition after 96 hours recovery with 85°C of temperature, followed by evaluating electrical characteristics.	
6. Low Temperature Storage Test	
Specified Value	Shall satisfy required VSWR value of individual specifications for each item.
【Test Methods and Remarks】 1 hour of recovery under standard condition after 96 hours recovery with −40°C of temperature, followed by evaluating electrical characteristics.	
7. Humidity Storage Test	
Specified Value	Shall satisfy required VSWR value of individual specifications for each item.
【Test Methods and Remarks】 1 hour of recovery under standard condition after 96 hours recovery with 60°C of temperature, 90~95% relative humidity followed by evaluating electrical characteristics.	
8. Resistance to Reflow	
Specified Value	Shall satisfy required VSWR value of individual specifications for each item.
【Test Methods and Remarks】 Two times of reflow soldering by recommended profile attached, followed by evaluating electrical characteristics.	

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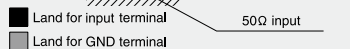
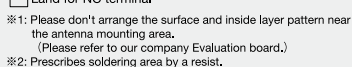
## 1. PCB Design

## Precautions

- ◆Land pattern design  
Please do not arrange the surface and inside layer pattern near the antenna mounting area.

◆ Land pattern design

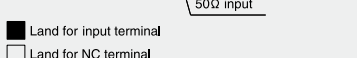
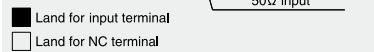
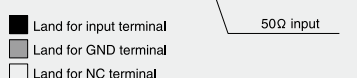
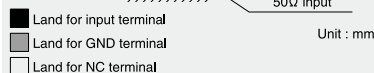
Land pattern dimension examples and recommended antenna land pattern



Type	Dimensions		
	L	P	a
AF216M	2.5	1.5	3
AF816M	8	7	5
AH212M	2	1	3

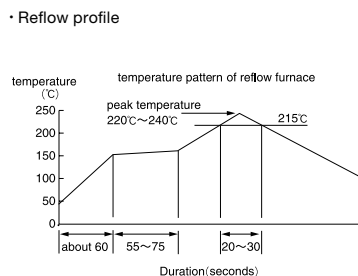
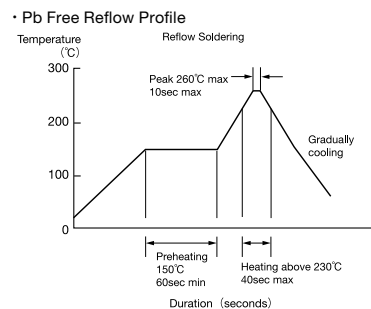
Unit : mm

## Technical Considerations



## 2. Soldering

- |   |
|---|
| ◆Conditions of Reflow soldering (for reference) |
|---|



- ※ Components should be preheated to within 100 to 130°C from soldering temperature.
- ※ Assured to be reflow soldering for 2 times.

Note : The above profiles are the maximum allowable soldering condition, therefore these profiles are not always recommended.

### 3. Storage Conditions

- ◆ Storage conditions

1. The Products should not be used in the following environments :

- exposure to special gases such as (C12, NH3, SOx, NOx)
  - exposure to volatile gas or inflammable gas
  - exposure to a lot of dust
  - exposure to water or condensation
  - exposure to direct sunlight or freezing
2. The Products should be kept in the following conditions :
- Temperature :  $-10 \sim +40^{\circ}\text{C}$
  - Humidity : 70%RH max.

3. The products should be used within 6 months after delivery. In case of storage over 6 months, solderability shall be checked before actual usage.

■ Please contact our offices for further details of specifications.  
All of the standard values listed here are subject to change without notice due to technical improvements.  
Therefore, please check the specifications carefully before use.

\* This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>) or CD catalogs.