



# 承認書

## Approval Sheet

PAO No:PAO-2100075

Page : 1 of 1

Date :1/6/2021

Part No :617211FFWS	REV:0	Where use: XBBL
Maker:Walsin Technology Corporation	Maker P/N :RFECA3216060A4T	REV:
Part Name:ANTENNA	Vendor : Walsin	Place/Origin : CHINA
Part Description :ANTENNA RFECA3216060A4T,2.4GHz SMD (HF) WTC	Green Related	RoHS

Contents or Instructions :

Detailed specification is shown as the attachments.

中磊電子股份有限公司

Jan.06.2021

文件管制中心發行章

\* 任何變更須事前經協調並承認後始可變更. Any change must be negotiated in advance, and execute the revision after SerComm's Approval.

Disposition	Countersign	In Charge (Name/Date)	Checked By (Name/Date)
Final Approval :	~ Component	Carol Wang	PS Yang
<input checked="" type="checkbox"/> electrical <input checked="" type="checkbox"/> dimensional <input checked="" type="checkbox"/> visual <input checked="" type="checkbox"/> function			
Conditional Approval :	PM		
<input type="checkbox"/> electrical <input type="checkbox"/> dimensional <input type="checkbox"/> visual <input type="checkbox"/> function	EMI/Safety		
Temporary Approval :	~ H/W EE	Jerry Ko	Dennis Huang
<input type="checkbox"/> electrical <input type="checkbox"/> dimensional <input type="checkbox"/> visual <input type="checkbox"/> function			
Attachments :	~ Mechanical	Tony Chang	Tony Chang
<input type="checkbox"/> sample <input checked="" type="checkbox"/> specification <input type="checkbox"/> drawing <input type="checkbox"/> other	PE		
Final disposition :	Change history ( 變更記錄 )		
<input checked="" type="checkbox"/> Approved	REV.	Related Document ( 相關文件 )	FILE No. ( 編號 )
<input type="checkbox"/> Conditional Approved :			
For purchasing to by _____ pcs, for pilot			
production test.			
<input type="checkbox"/> Temporary approved :			
Vendor is requested to supply samples again before			
_____ (mm)/_____ (dd)/_____ (yy)			

DISTRIBUTION :  CHUNAN  SERNET  VENDOR  R/D

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# APPROVAL SHEET

## **RFECA Series – RoHS Compliance**

MULTILAYER CERAMIC ANTENNA

## **Halogens Free Product**

2.4 GHz ISM Band Working Frequency

**P/N: RFECA3216060A4T**

**Weight:**

Provide By : Walsin Technology Corp

Address : No.7, South 4th Street, Kaohsiung Export Processing Zone.806

Phone NO. : +886-7-8218171

FAX NO. : +886-7-8230976

E-mail : info@passivecomponent.com

Customer : Sercomm Corporation

Approval No : 617211FFWS

Issue Date : \_\_\_\_\_

\*Contents in this sheet are subject to change without prior notice..

**Approval sheet**

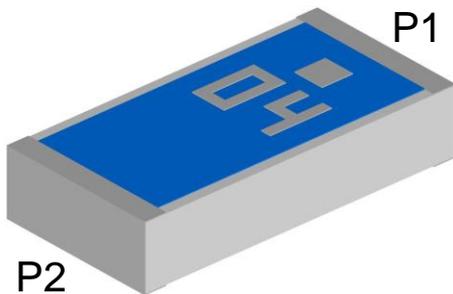
**FEATURES**

1. Surface Mounted Devices with a small dimension of 3.2 X 1.6 X 0.6 mm<sup>3</sup> meet future miniaturization trend.
2. LTCC process.
3. High stability in Temperature / Humidity Change.
4. Superb performance to place on the middle of PCB edge and excellent peak/ average gain observed by field test application.

**APPLICATIONS**

1. ISM Band 2.4GHz applications.
2. Bluetooth..

**CONSTRUCTION**



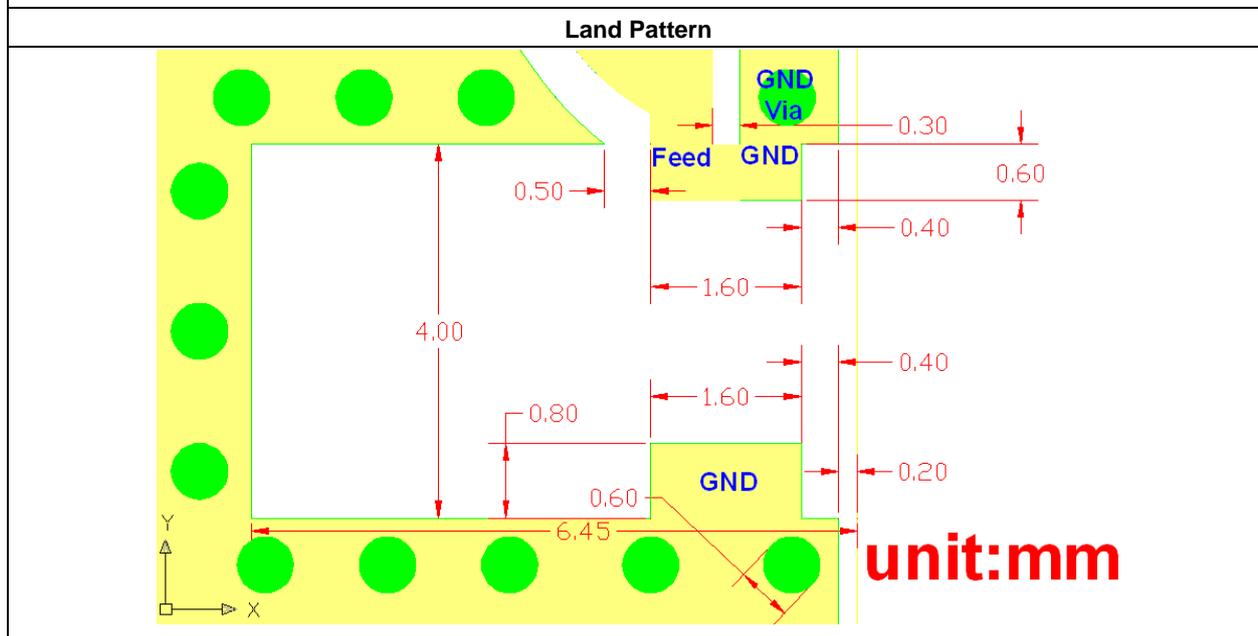
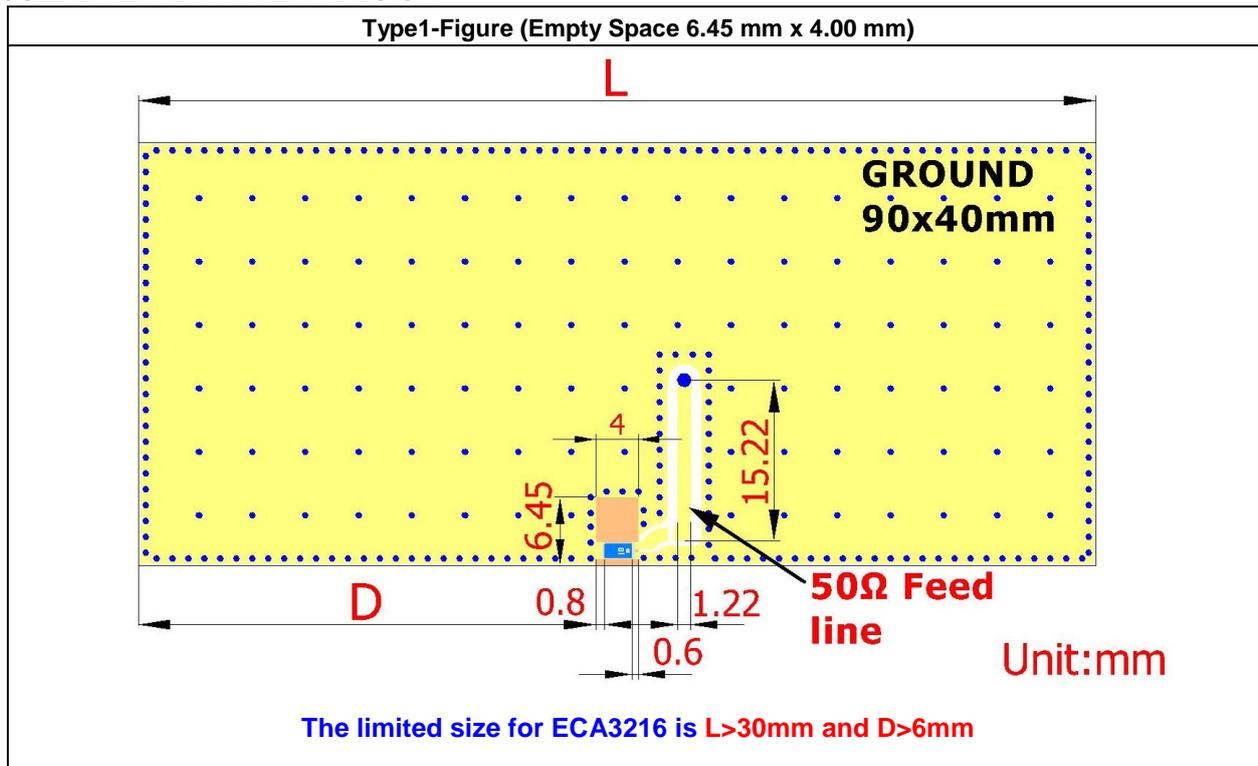
PIN	Connection
1	Feeding
2	Soldering terminal

**DIMENSIONS**

Figure	Symbol	Dimension (mm)
	L	3.10 ± 0.20
	W	1.60 ± 0.20
	T	0.60 ± 0.10
	A	0.25 ± 0.20



**SOLDER LAND PATTERN DESIGN**



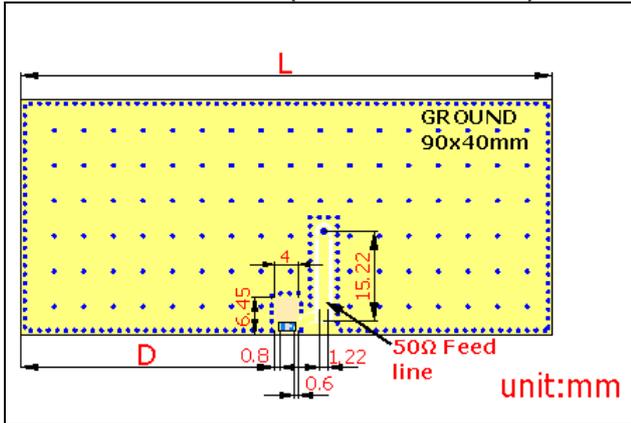
**TYPE 1 ELECTRONIC CHARACTERISTICS**

Item	Specification
Working Frequency Range	2.4GHz~2.4835GHz (Note-1)
Gain	2 dBi (Typical)
VSWR	2.1 max.
Polarization	Linear
Azimuth Beamwidth	Omni-directional
Impedance	50Ω

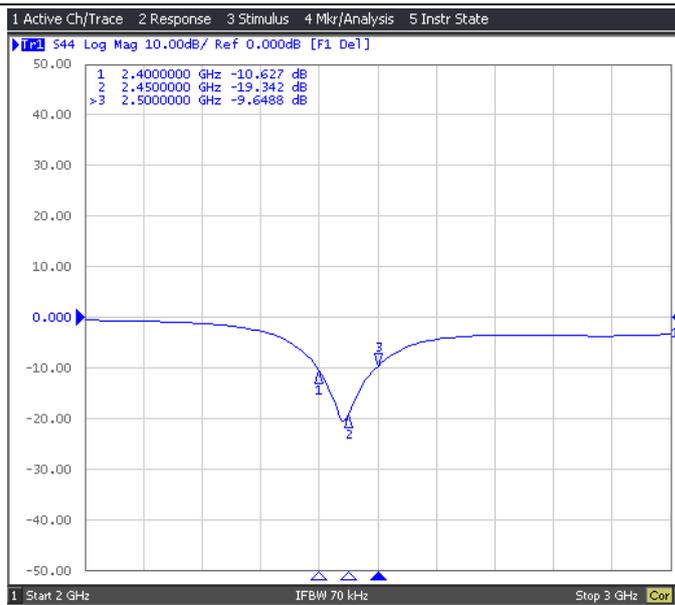
\*Note 1. Central Frequency should be defined after customers' application approval.

Approval sheet

Antenna on Test Board ( Thickness 0.8mm)



Antenna S11 on Test Board



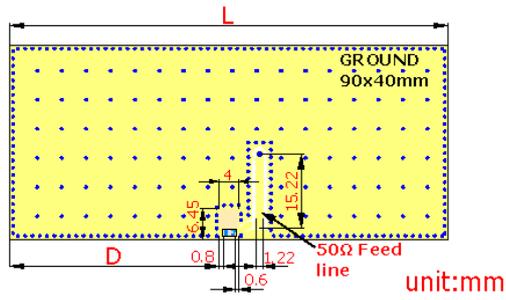
Antenna VSWR on Test Board



Approval sheet

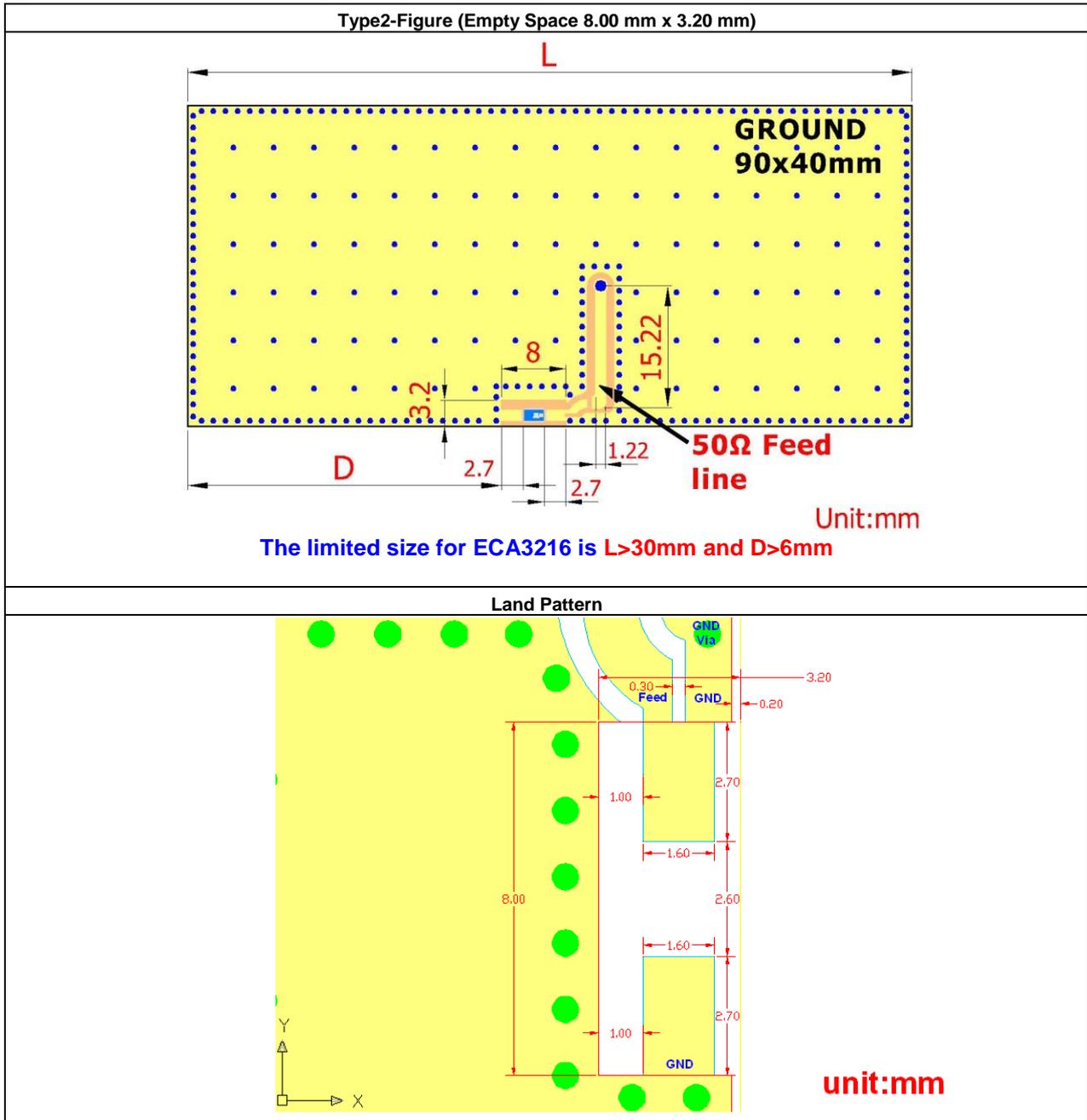
**RADIATION PATTERN**

Radiation Pattern and Gain were dependent on measurement board design. The specification of RFECA3216060A4T antenna was measured based on the PCB size and installation position as shown in the below figure Test Board.



	Vertical	Horizontal
<b>Y - Z Plane</b>  Average Gain= 0.997 dBi	<p>Peak Gain = 3.37 dBi Average Gain = -0.65 dBi</p>	<p>Peak Gain= -4.62 dBi Average Gain=-10.42 dBi</p>
<b>X - Z Plane</b>  Average Gain= 0.510 dBi	<p>Peak Gain= 0.83 dBi Average Gain= -1.35 dBi</p>	<p>Peak Gain= 0.51 dBi Average Gain= -4.07 dBi</p>
<b>X - Y Plane</b>  Average Gain= -1.873 dBi	<p>Peak Gain= -9.59 dBi Average Gain= -15.40 dBi</p>	<p>Peak Gain= 1.39 dBi Average Gain= -2.07 dBi</p>

**SOLDER LAND PATTERN DESIGN**



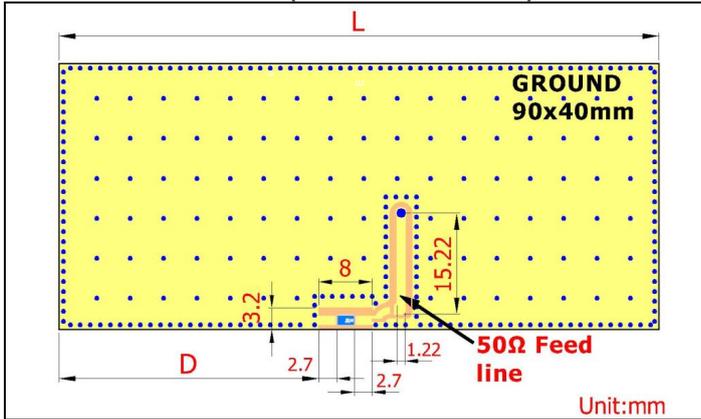
**TYPE 2 ELECTRONIC CHARACTERISTICS**

Item	Specification
Working Frequency Range	2.4GHz~2.4835GHz (Note-1)
Gain	2 dBi (Typical)
VSWR	2.1 max.
Polarization	Linear
Azimuth Beamwidth	Omni-directional
Impedance	50Ω

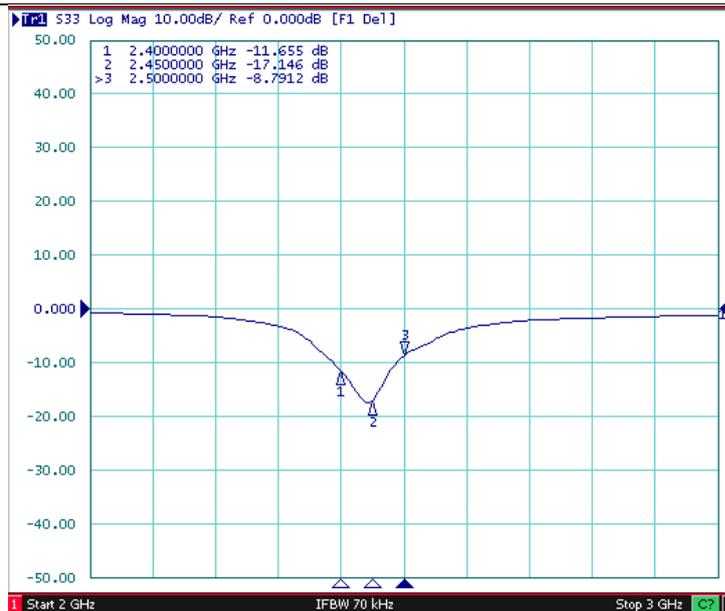
\*Note 1. Central Frequency should be defined after customers' application approval.

Approval sheet

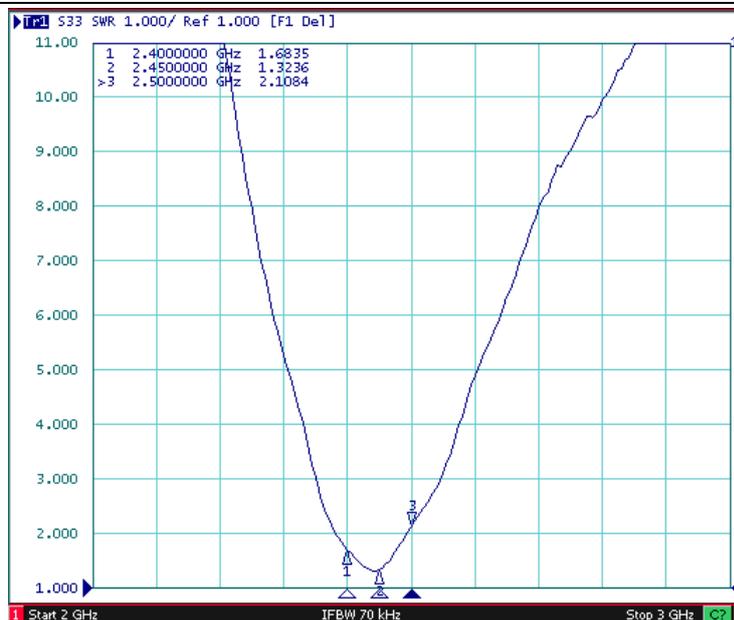
Antenna on Test Board ( Thickness 0.8mm)



Antenna S11 on Test Board



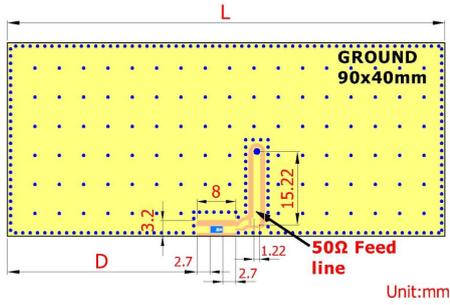
Antenna VSWR on Test Board



Approval sheet

**RADIATION PATTERN**

Radiation Pattern and Gain were dependent on measurement board design. The specification of RFECA3216060A4T antenna was measured based on the PCB size and installation position as shown in the below figure Test Board.



	Vertical	Horizontal
<b>Y - Z Plane</b> Average Gain= 0.795 dBi	<p>Peak Gain = 3.14 dBi Average Gain = 0.05 dBi</p>	<p>Peak Gain= -0.35 dBi Average Gain=-7.23 dBi</p>
<b>X - Z Plane</b> Average Gain= -1.510 dBi	<p>Peak Gain= -2.29 dBi Average Gain= -7.03 dBi</p>	<p>Peak Gain= 1.08 dBi Average Gain= -2.94 dBi</p>
<b>X - Y Plane</b> Average Gain= -1.052 dBi	<p>Peak Gain= 3.32 dBi Average Gain= -1.42 dBi</p>	<p>Peak Gain= -7.02 dBi Average Gain= -11.95 dBi</p>

## RELIABILITY TEST

Test item	Test condition / Test method	Specification
Solderability JIS C 0050-4.6 JESD22-B102D	*Solder bath temperature : $235 \pm 5^{\circ}\text{C}$ *Immersion time : $2 \pm 0.5$ sec Solder : Sn3Ag0.5Cu for lead-free	At least 95% of a surface of each terminal electrode must be covered by fresh solder.
Resistance to soldering heat JIS C 0050-5.4	*Preheating temperature : $120\sim 150^{\circ}\text{C}$ , 1 minute. *Solder temperature : $270\pm 5^{\circ}\text{C}$ *Immersion time : $10\pm 1$ sec Solder : Sn3Ag0.5Cu for lead-free Measurement to be made after keeping at room temperature for $24\pm 2$ hrs	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40\sim 85^{\circ}\text{C}$ . Loss of metallization on the edges of each electrode shall not exceed 25%.
Drop Test JIS C 0044 Customer's specification.	*Height : 75 cm *Test Surface : Rigid surface of concrete or steel. *Times : 6 surfaces for each units ; 2 times for each side.	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40\sim 85^{\circ}\text{C}$ .
Vibration JIS C 0040	*Frequency : 10Hz~55Hz~10Hz(1min) *Total amplitude : 1.5mm *Test times : 6hrs.(Two hrs each in three mutually perpendicular directions)	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40\sim 85^{\circ}\text{C}$ .
Adhesive Strength of Termination JIS C 0051- 7.4.3	*Pressurizing force : 5N (LGA terminal series) ; $5\text{N}(\leq 0603)$ ; 10N(>0603) *Test time : $10\pm 1$ sec	No remarkable damage or removal of the termination.
Bending test JIS C 0051- 7.4.1	The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm/s per second until the deflection becomes 1mm/s and then pressure shall be maintained for $5\pm 1$ sec. Measurement to be made after keeping at room temperature for $24\pm 2$ hours	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-40\sim 85^{\circ}\text{C}$ .

Approval sheet

<p>Temperature cycle JIS C 0025</p>	<p>1. 30±3 minutes at -40°C±3°C, 2. 10~15 minutes at room temperature, 3. 30±3 minutes at +85°C±3°C, 4. 10~15 minutes at room temperature, Total 100 continuous cycles Measurement to be made after keeping at room temperature for 24±2 hrs</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>High temperature JIS C 0021</p>	<p>*Temperature : 85°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>Humidity (steady conditions) JIS C 0022</p>	<p>*Humidity : 90% to 95% R.H. *Temperature : 40±2°C *Time : 1000+24/-0 hrs. Measurement to be made after keeping at room temperature for 24±2 hrs ※ 500hrs measuring the first data then 1000hrs data</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>
<p>Low temperature JIS C 0020</p>	<p>*Temperature : -40°C±2°C *Test duration : 1000+24/-0 hours Measurement to be made after keeping at room temperature for 24±2 hrs</p>	<p>No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within -40 ~ 85°C.</p>

**SOLDERING CONDITION**

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 2  
This product could sustain by reflow process three times, and the temperature below 260°C .

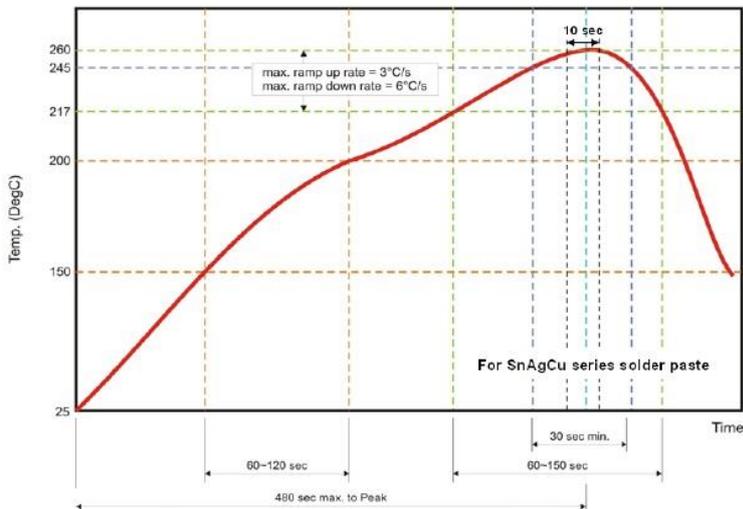


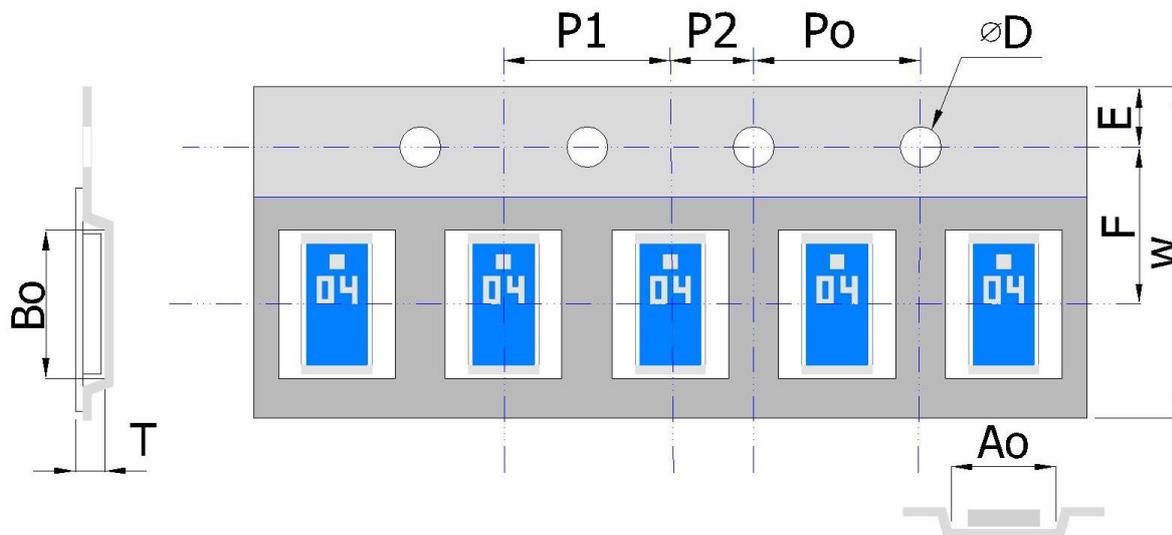
Fig 2. Infrared soldering profile

**ORDERING CODE**

<b>RF</b> Walsin RF device	<b>ECA</b> Product code ECA : Antenna	<b>321606</b> Dimension code Per 2 digits of Length, Width, Thickness : e.g. : 321612 = Length 32, Width 16, Thickness 06	<b>0</b> Unit of dimension 0 : 0.1 mm 1 : 1.0 mm	<b>A</b> Application A : 2.4GHz ISM Band	<b>4</b> Specification Design Code	<b>T</b> Packing T : Reeled
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Minimum Ordering Quantity: 2000 pcs per reel.

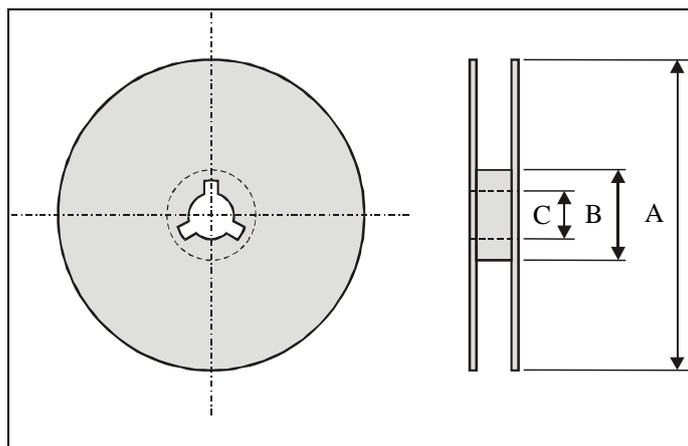
**PACKAGING**



**Plastic Tape specifications (unit :mm)**

Index	Ao	Bo	ΦD	T	W
Dimension (mm)	1.85 ± 0.10	3.50 ± 0.10	1.55 ± 0.05	0.73 ± 0.10	8.00 ± 0.10
Index	E	F	Po	P1	P2
Dimension (mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05

**Reel dimensions**



Index	A	B	C
Dimension (mm)	Φ178.0	Φ60.0	Φ13.0

Taping Quantity:2000 pieces per 7" reel

**CAUTION OF HANDLING**

**Limitation of Applications**

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Disaster prevention / crime prevention equipment
- (6) Traffic signal equipment
- (7) Transportation equipment (vehicles, trains, ships, etc.)
- (8) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

**Storage condition**

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection.
- (2) Storage environment condition.
  - Products should be storage in the warehouse on the following conditions.
  - Temperature : +5 to +40°C
  - Humidity : 30 to 70% relative humidity
  - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability.
  - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on.
  - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
  - Products should be storage under the airtight packaged condition.