APPROVAL SHEET

MULTILAYER CERAMIC ANTENNA

RFANT Series

2.4 GHz ISM Band Working Frequency

P/N: RFANT5220110A0T

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

REVISION HISTORY

Rev	P/N	Description	Date
V01	RFANT5220110A0T	First Version	2004-07-13
V05	RFANT5220110A0T	Increase the condition of Infrared soldering profile.	2004-11-25
V06	RFANT5220110A0T	Delete Original Approval Sheet "P8~P14" of RFANT5220110A0T. Please refer to Application Note of RFANT5220110A0T for identical information.	2005-01-20

FEATURES

- ☐ Surface Mounted Devices with a small dimension of 5.2 x 2.0 x 1.1 mm^3 meet future miniaturization trend.
- ☐ Embedded and LTCC (Low Temperature Co-fired Ceramic) technology is able to future integrate with system design as well as beautifying the housing of final product.
- ☐ High Stability in Temperature / Humidity Change

APPLICATIONS

- ☐ Bluetooth
- ☐ Wireless LAN
- ☐ HormRF
- ☐ ISM band 2.4GHz wireless applications

DESCRIPTION

Walsin Technology Corporation develops a new ceramic embedded antenna specified for 2.4 GHz ISM Band application, as shown in below "CONSTRUCTION". Both of Wireless LAN IEEE 802.11b and Bluetooth™ typically located on this unlicensed frequency band which range covers from 2.4GHz to 2.4835GHz. To fulfil the friendly usage for antenna, this antenna has been designed to a typical 150MHz bandwidth through Walsin's advanced LTCC (Low Temperature Co-fired Ceramic) technology and superior product design via 3D EM Simulation Skill.

This antenna has a rectangular ceramic body with a tiny dimension of 5.2x 2.0 x 1.1 mm^3 meet the future SMT automation and miniaturization requirements on modern portable devices.

CONSTRUCTION

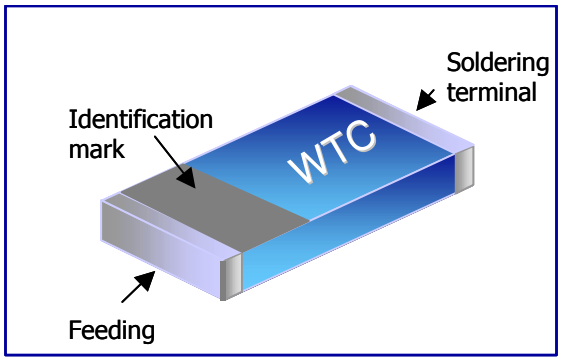


Fig 1. Outline of 2.4GHz Antenna – RFANT5220110A0T

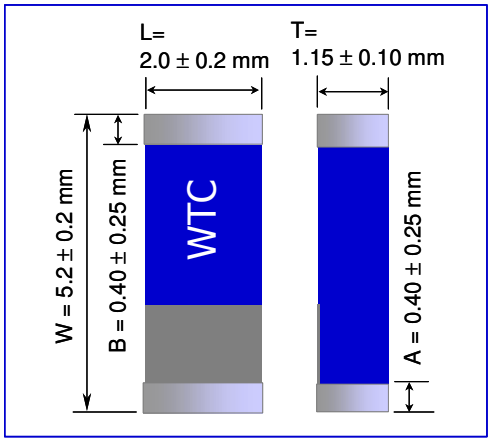
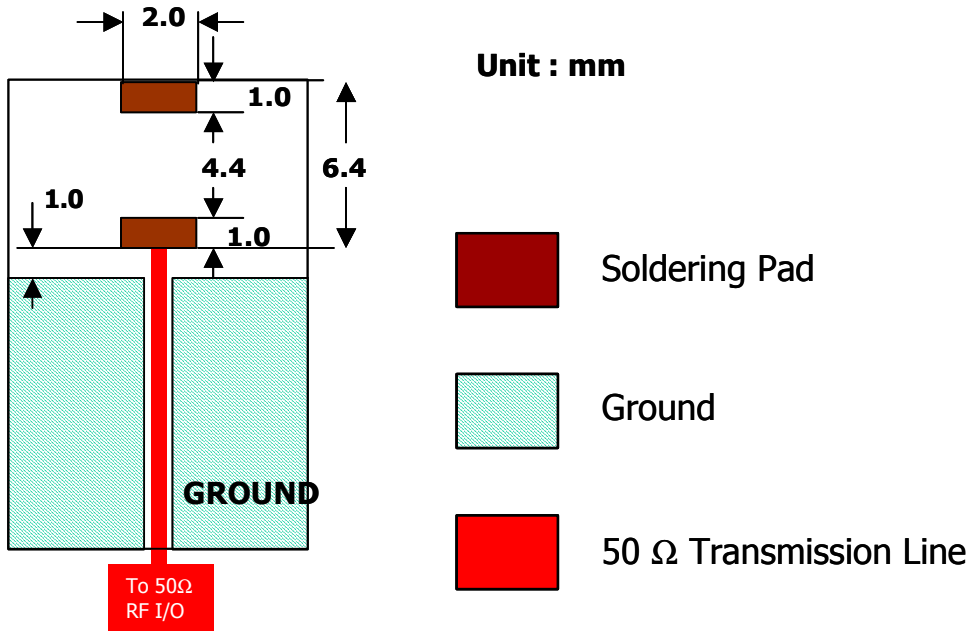


Fig 2. Dimension

SOLDER LAND PATTERN DESIGN

Figure

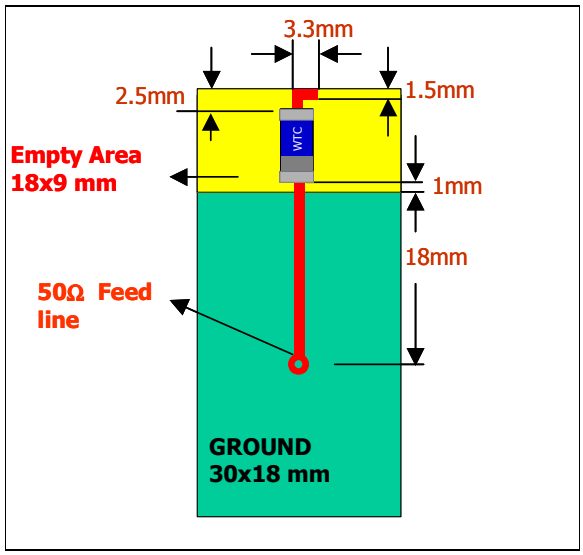


ELECTRICAL CHARACTERISTICS

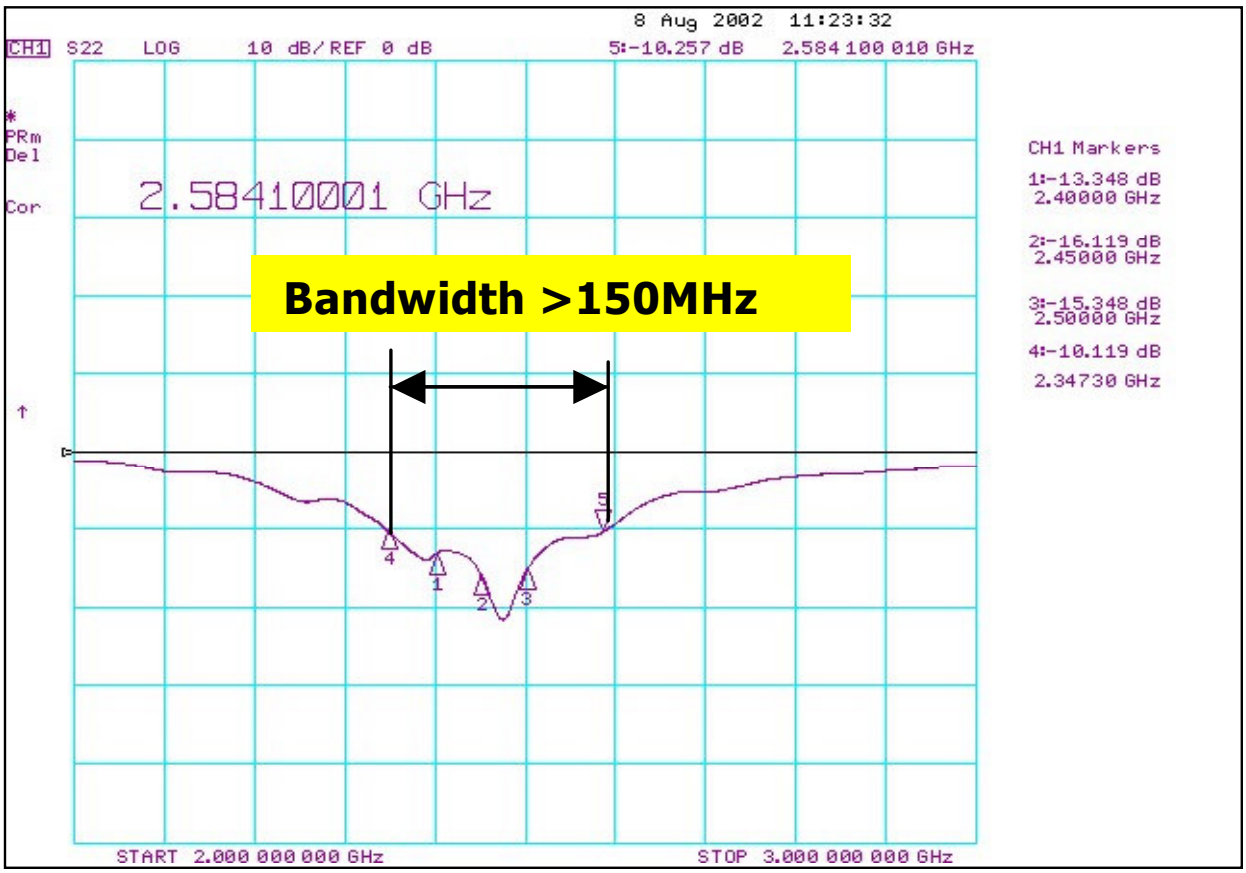
Item	Specification
Working Frequency Range	2.4 GHz ～ 2.5GHz
Gain	2 dBi (Typical)
VSWR	2 max.
Polarization	Linear
Azimuth Beamwidth	Omni-directional
Impedance	50Ω
Rated Power (max.)	3 Watts
Maximum Input Power	5 Watts for 5 minutes
Operation Temperature	-40˚C ~ +85˚C

Remark: The specification is defined based on the test board dimension as in below

Antenna on Test Board (FR4 Thickness 0.8mm)

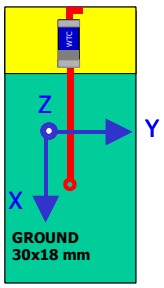


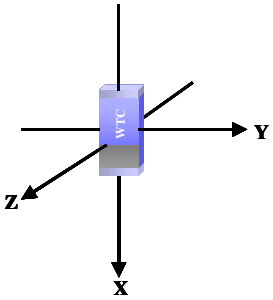
Antenna S11 on Test Board

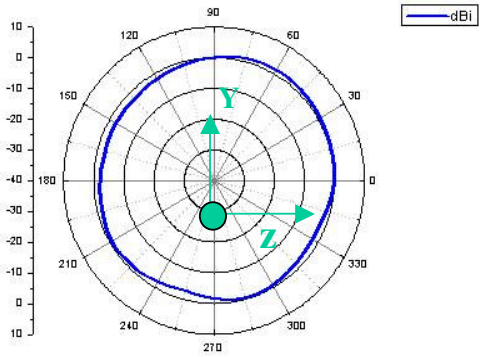
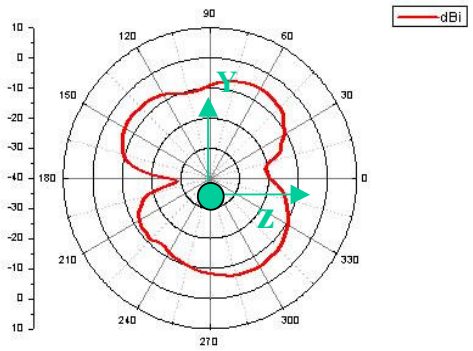
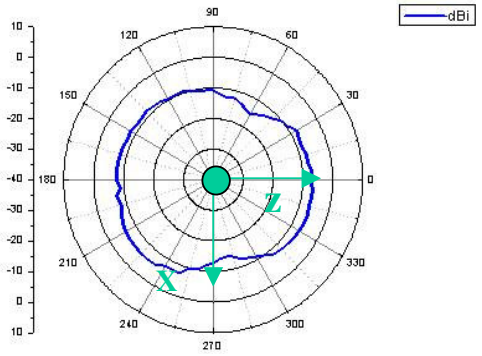
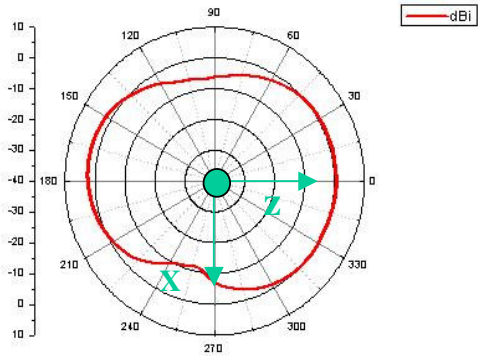
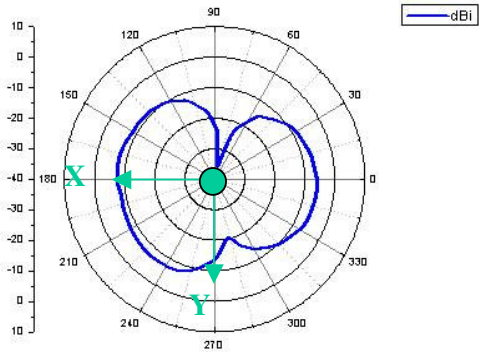
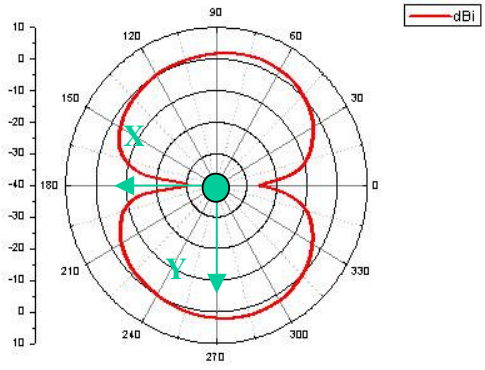


RADIATION PATTERN

Radiation Pattern and Gain were dependent on measurement board design. The specification of RFANT5220110A0T antenna was measured based on the PCB size and installation position as shown in the below figure Test Board





	Vertical	Horizontal
Y - Z Plane Average Gain= -3.22 dBi	 Peak Gain = 1.69 dBi Average Gain = -0.82 dBi	 Peak Gain= -5.42 dBi Average Gain=-8.98 dBi
X - Z Plane Average Gain= -3.24 dBi	 Peak Gain= -5.97 dBi Average Gain= -8.61dBi	 Peak Gain= 2.66 dBi Average Gain= -0.91 dBi
X - Y Plane Average Gain= -3.12 dBi	 Peak Gain= -5.97 dBi Average Gain= -9.24dBi	 Peak Gain= 2.59 dBi Average Gain= -0.68 dBi

■ RELIABILITY TEST

■ Mechanical performance

Test item	Test condition / Test method	Specification
Solderability	Solder temp. : 235 ± 5°C Immersion time: 2 ± 1 sec Solder: SN63	95% min. coverage of all metabolised area
Resistance to soldering heat	Solder: Sn63 Preheating temperature: 150 ± 10°C Solder Temperature: 260 ± 5°C Immersion time: 10 ± 1 sec Measurement to be made after keeping at room temp. for 24±2 hrs.	No mechanical damage. Ceramic surface shall not be exposed in the middle of the termination or on the terminated product edge by leaching.
Drop test	Height : 75 cm Direction : 3 directions Times : 3 times.	No mechanical damage. Samples shall satisfy electrical specification after test..

Environmental characteristics

Test item	Test condition / Test method	Specification
Humidity Resistance	Humidity:90% to 95% R.H. Tempertaure:40±2°C Time: 500±24 hours. Measurement: After placing for 24 hours Minimum.	No mechanical damage. Samples shall satisfy electrical specification after test.
Temperature cycle	1. 30±3 minutes at -40°C±3°C, 2. 10~15 minutes at room temperature, 3. 30±3 minutes at +85°±3°C, 4. 10~15 minutes at room temperature, Total 100 continuous cycles Measurement after placing for 48±2 hrs min.	No mechanical damage. Samples shall satisfy electrical specification after test.
High temperature	Temperature: 85°C±2°C Test duration: 24 hours Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.	No mechanical damage. Samples shall satisfy electrical specification after test.
Low temperature	Temperature: -40°C±3°C Test duration: 24 hours Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.	No mechanical damage. Samples shall satisfy electrical specification after test.

SOLDERING CONDITION

Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 2

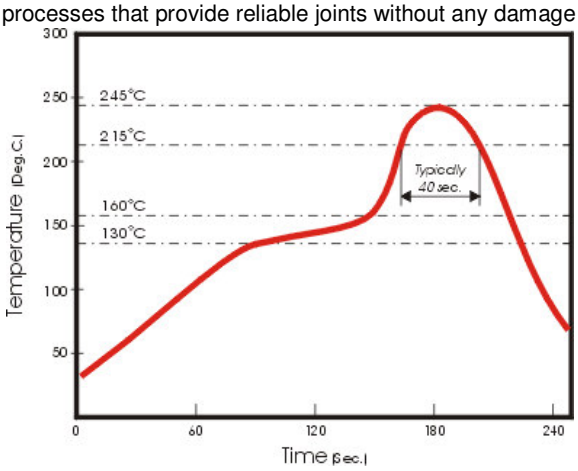


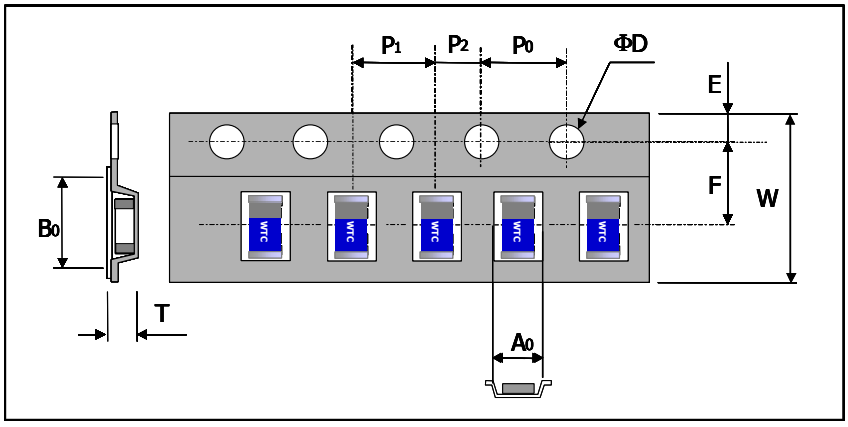
Fig 2. Infrared soldering profile

ORDERING CODE

RF	ANT	522011	0	A	0	-	T
Walsin RF device	**Product code** ANT : Antenna	**Dimension code** Per 2 digits of Length, Width, Thickness : e.g. : 522011 = Length 52, Width 20, Thickness 11	**Unit of dimension** 0 : 0.1 mm 1 : 1.0 mm	**Application** A : 2.4GHZ ISM Band	**Specification** Code from 0 ~ 9 dependent on different electrical specification		**Packing** T : 7" Reeled G : 10" Reeled B : Bulk X : SFC product

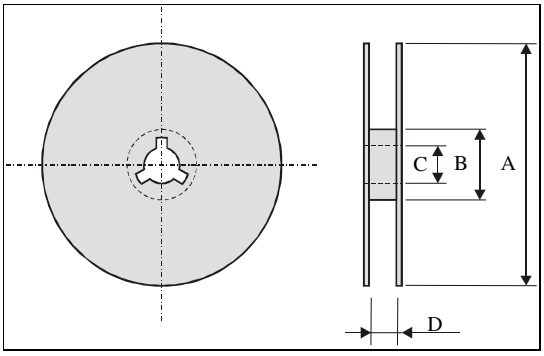
PACKAGING

Plastic Tape specifications (unit :mm)



Index	Ao	Bo	ΦD	T	W
Dimension (mm)	2.40 ± 0.10	5.50 ± 0.10	1.55 ± 0.05	1.20 ± 0.10	12.0 ± 0.10
Index	E	F	Po	P1	P2
Dimension (mm)	1.75 ± 0.10	5.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10

Reel dimensions



Index	A	B	C	D
Dimension (mm)	Φ178	Φ60.0	Φ13.5	12.4±0.1

Typing 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, which can be confirmed.
(2) Storage environment condition.

- Products should be storage in the warehouse on the following conditions.
- Temperature : -10 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.