

# APPROVAL SHEET

MULTILAYER CERAMIC ANTENNA

**RFANT Series – RoHS Compliance**

2.4 GHz ISM Band Working Frequency

**P/N: RFANT3216120A5T Series**

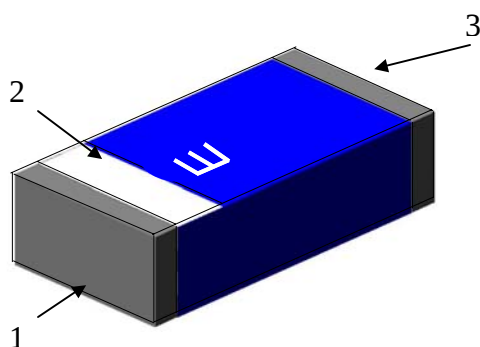
\*Contents in this sheet are subject to change without prior notice.

**FEATURES**

1. Surface Mounted Devices with a small dimension of 3.2 X 1.6 X1.2 mm<sup>3</sup> meet future miniaturization trend.
2. LTCC process
3. High stability in Temperature / Humidity Change

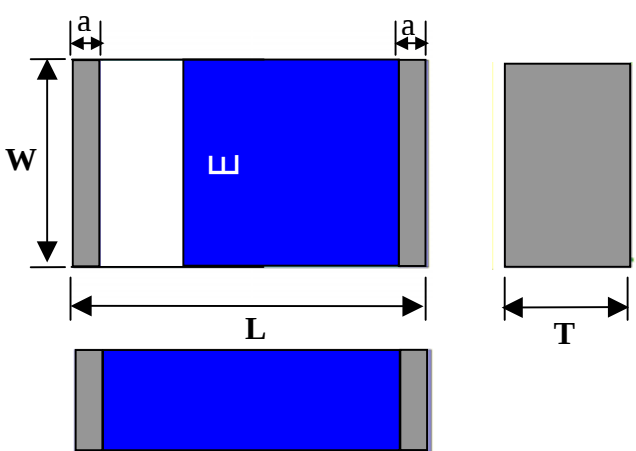
**APPLICATIONS**

1. 2.4GHz ISM band RF applications
2. Bluetooth, Wireless, HomeRF

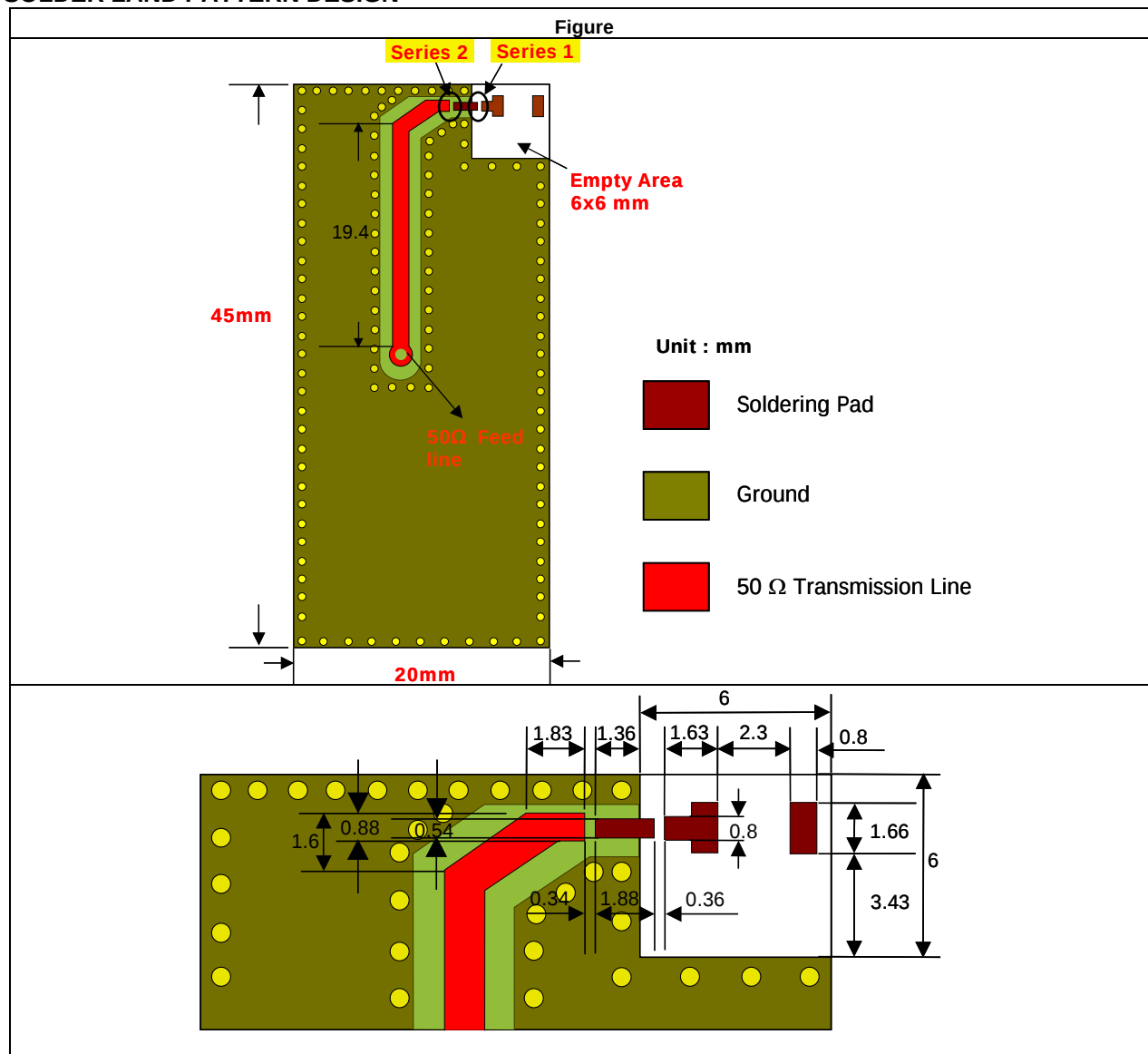
**CONSTRUCTION**

1. Feeding
2. Identification Mark
3. Soldering terminal

**DIMENSIONS**

| Figure                                                                              | Symbol | Dimension (mm) |
|-------------------------------------------------------------------------------------|--------|----------------|
|  | L      | 3.20 ± 0.20    |
|                                                                                     | W      | 1.60 ± 0.10    |
|                                                                                     | T      | 1.20 ± 0.10    |
|                                                                                     | a      | 0.25 ± 0.15    |

## SOLDER LAND PATTERN DESIGN

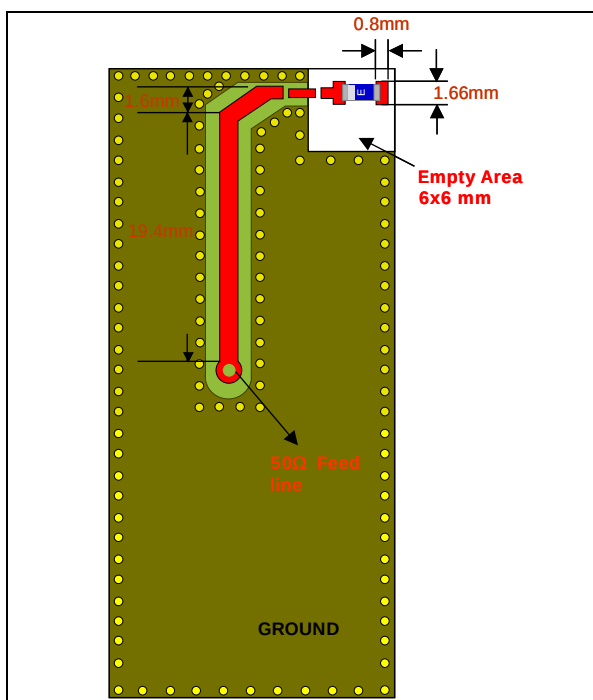


## ELECTRICAL CHARACTERISTICS

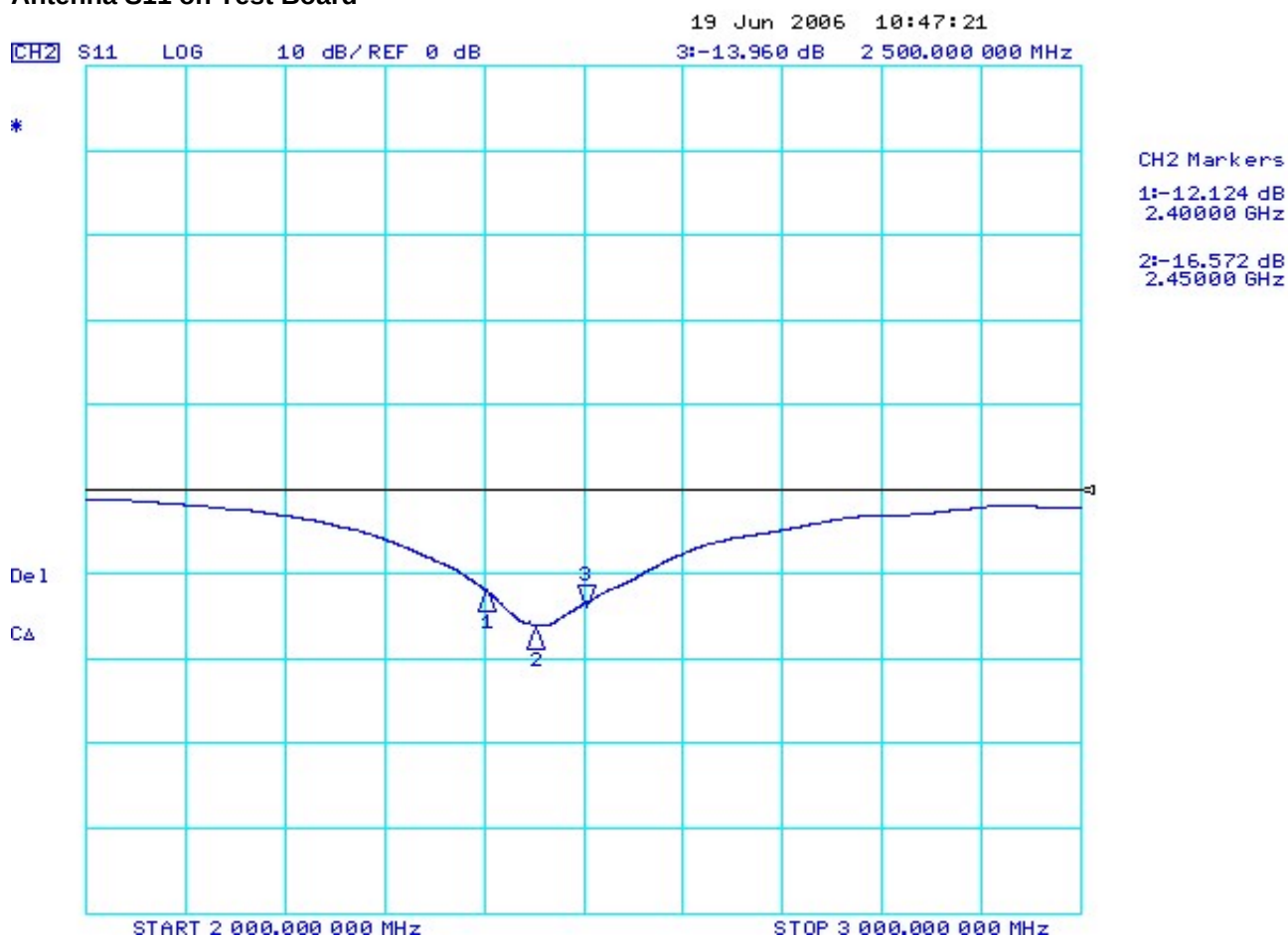
| Product code             |          | Specification |
|--------------------------|----------|---------------|
| Working Frequency Range  |          | 2450 ± 50 MHz |
| Fc (GHz)                 |          | 2.9           |
| Gain (dBi)               |          | 2 (Typical)   |
| Matching component valve | Series 1 | 6.8nH         |
|                          | Series 2 | -             |

\* This frequency must be adjusted to 2.45GHz with matching circuit.

# Antenna on Test Board ( Thickness 1.2mm)

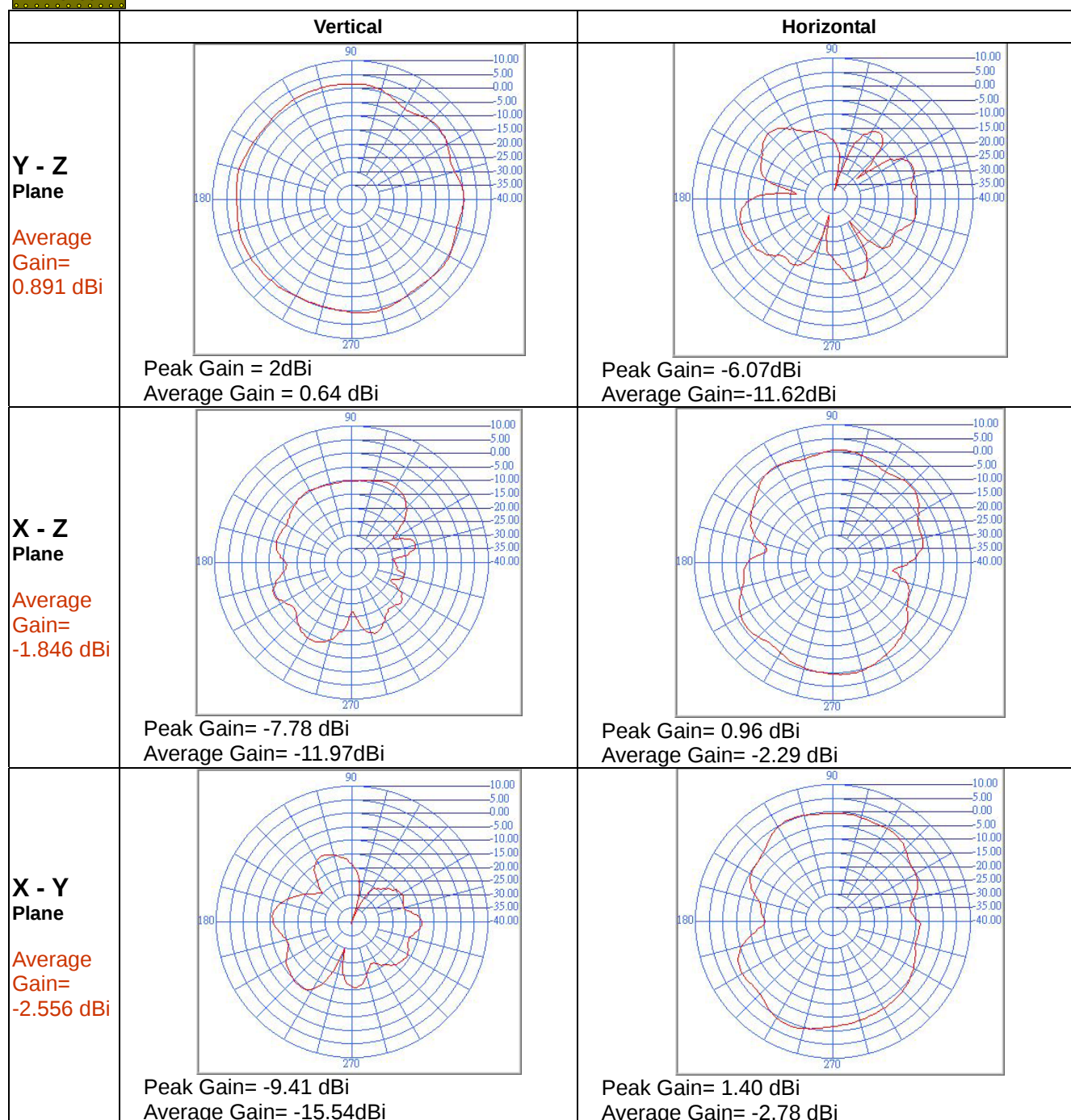
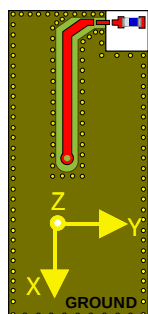


## Antenna S11 on Test Board



### RADIATION PATTERN

Radiation Pattern and Gain were dependent on measurement board design. The specification of RFANT3216120A5T antenna was measured based on the PCB size and installation position as shown in the below figure Test Board



## RELIABILITY TEST

### ■ Mechanical performance

| Test item                    | Test condition / Test method                                                                                                                                                                                                        | Specification                                                                                                                                 |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Solderability                | Solder temp. : $235 \pm 5^{\circ}\text{C}$<br>Immersion time: $2 \pm 1$ sec<br>Solder: SN63                                                                                                                                         | At least 95% of a surface of each terminal electrode must be covered by fresh solder.                                                         |
| Resistance to soldering heat | Solder: Sn63<br>Preheating temperature: $150 \pm 10^{\circ}\text{C}$<br>Solder Temperature: $260 \pm 5^{\circ}\text{C}$<br>Immersion time: $10 \pm 1$ sec<br>Measurement to be made after keeping at room temp. for $24 \pm 2$ hrs. | No mechanical damage.<br>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<br>Times : 3 times                                                                                                                                                                                                   | No mechanical damage.<br>Samples shall satisfy electrical specification after test.                                                           |

### ■ Environmental characteristics

| Test item                    | Test condition / Test method                                                                                                                                                                                                                                                                                           | Specification                                                                       |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Humidity (steady conditions) | Humidity: 90% to 95% R.H.<br>Temperature: $40 \pm 2^{\circ}\text{C}$<br>Time: $1000 \pm 24$ hours.<br>Measurement: After placing for 24 hours Minimum.                                                                                                                                                                 | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| Temperature cycle            | 1. $30 \pm 3$ minutes at $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ,<br>2. 10~15 minutes at room temperature,<br>3. $30 \pm 3$ minutes at $+85^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ,<br>4. 10~15 minutes at room temperature,<br>Total 100 continuous cycles<br>Measurement after placing for $48 \pm 2$ hrs min. | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| High temperature             | Temperature: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br>Test duration: 1000+48/-0 hours<br>Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.                                                                                           | No mechanical damage.<br>Samples shall satisfy electrical specification after test. |
| Low temperature              | Temperature: $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$<br>Test duration: 1000+48/-0 hours<br>Measurement must be taken after subjection to the above conditions, followed by exposure in room environment for 1 to 2 hours.                                                                                          | No mechanical damage.<br>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

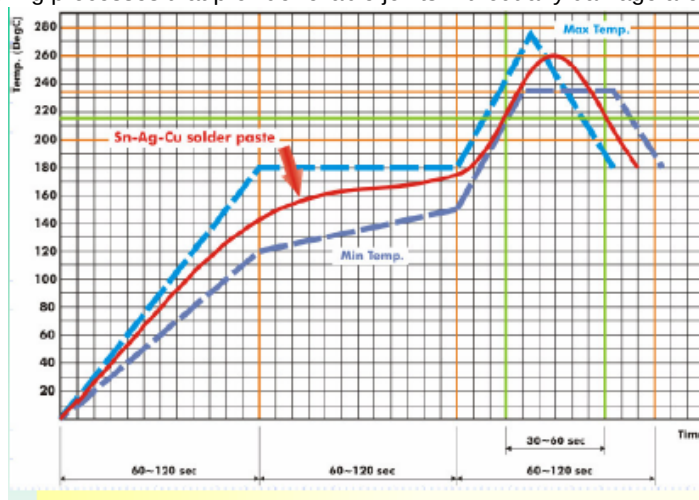
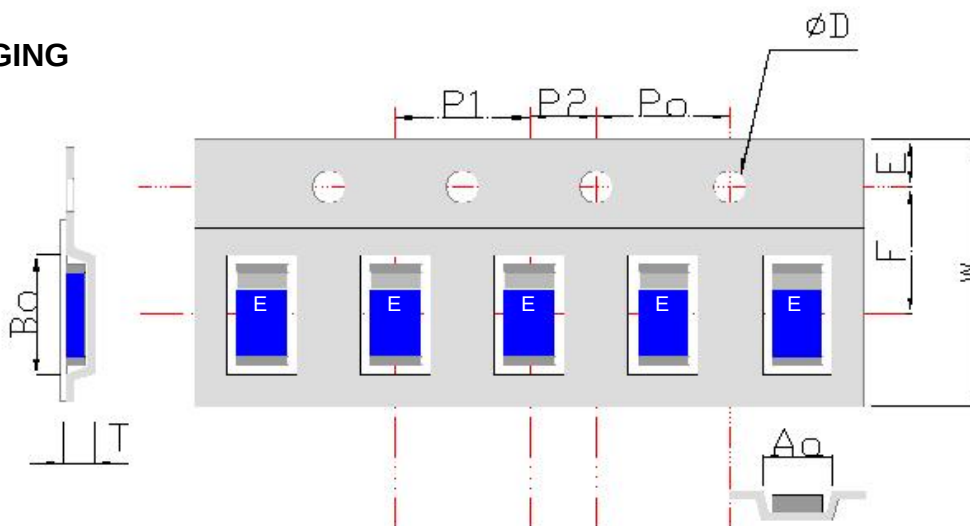


Fig 2. Infrared soldering profile

## ORDERING CODE

| RF                         | ANT                                     | 321612                                                                                                                                  | 0                                                    | A                                            | 5                                   | T                                                                                |
|----------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------|
| <b>Walsin</b><br>RF device | <b>Product code</b><br>ANT :<br>Antenna | <b>Dimension code</b><br>Per 2 digits of<br>Length, Width,<br>Thickness :<br>e.g. :<br>321612 = Length<br>32, Width 16,<br>Thickness 12 | <b>Unit of dimension</b><br>0 : 0.1 mm<br>1 : 1.0 mm | <b>Application</b><br>A : 2.4GHZ ISM<br>Band | <b>Specification</b><br>Design Code | <b>Packing</b><br>T : 7" Reeled<br>G : 10" Reeled<br>B : Bulk<br>X : SFC product |

## PACKAGING

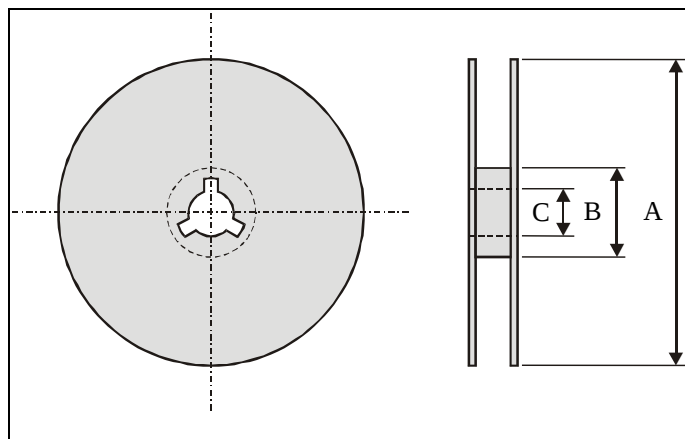


Plastic Tape specifications (unit :mm)

| Index          | A0          | B0          | ΦD          | T           | W                   |
|----------------|-------------|-------------|-------------|-------------|---------------------|
| Dimension (mm) | 1.95 ± 0.10 | 3.45 ± 0.10 | 1.55 ± 0.05 | 1.30 ± 0.10 | 8.20 +0.10<br>-0.30 |
| Index          | E           | F           | P0          | P1          | P2                  |
| Dimension (mm) | 1.75 ± 0.10 | 3.50 ± 0.05 | 4.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.10         |



## Reel dimensions



| Index          | A    | B     | C     |
|----------------|------|-------|-------|
| Dimension (mm) | Φ178 | Φ60.0 | Φ13.5 |

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.