

# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)



AMCA31-2R450G-S1F-T3



3.2 x 1.6 x 1.2mm  
RoHS/RoHS II Compliant  
MSL = 1

## Features

- 2450MHz, Bandwidth  $\geq 90$ MHz
- Suitable for RoHS compliant reflow
- Gain 0.5dBi (Peak) / -1dBi (Average)
- VSWR  $< 2:1$
- Small size – 3.2 x 1.6 x 1.2mm (0.125 x 0.62 x 0.047 inch)
- Non Ground Mounting type.
- Power Handling 3W Max
- Matched to 50 Ohm.

## Applications

- Wireless application - Bluetooth / WiFi (2.445GHz)
- High density applications
- Bluetooth headsets or ear pieces
- Computer mouse and keyboards
- PROFINET – Industrial automation
- Video Game systems
- Alternative to larger PCB solution

## Electrical Specifications

| Parameter        | Min. | Typ.  | Max. | Units    | Note |
|------------------|------|-------|------|----------|------|
| Frequency        |      | 2450  |      | MHz      |      |
| Bandwidth        | 100  |       |      | MHz      |      |
| Peak Gain        |      | -3.53 |      | dBi      |      |
| Average Gain     |      | -1    |      | dBi      |      |
| VSWR             |      |       | 2    |          |      |
| Impedance        |      | 50    |      | $\Omega$ |      |
| Power Capability |      |       | 3    | W        |      |

## Environmental Characteristics

| Parameters             | Specification     |
|------------------------|-------------------|
| Environmental friendly | Pb-free           |
| MSL                    | 1                 |
| Operating Temperature  | -40 °C to + 85 °C |
| Storage Temperature    | -10 °C to +40 °C  |
| Relative Humidity      | 70%               |

# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)

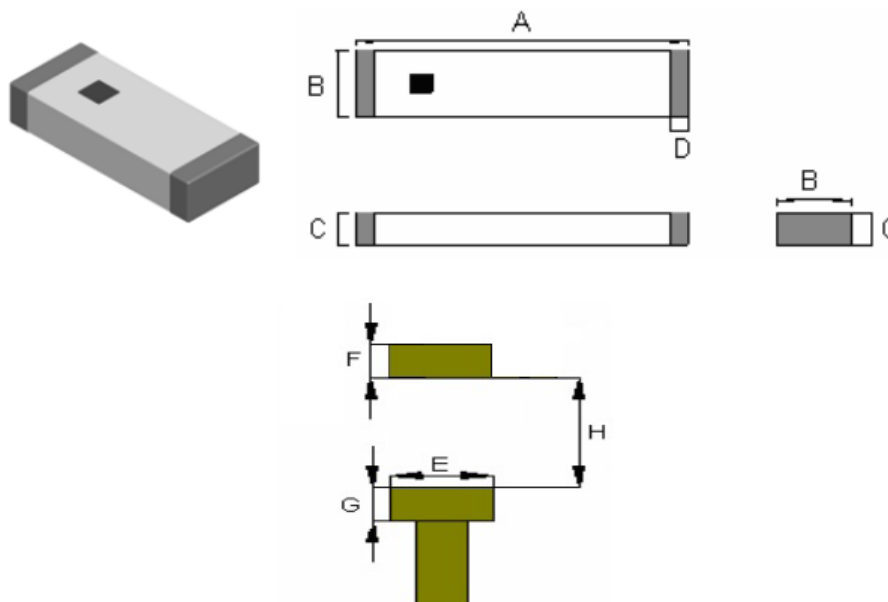


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## Product Dimensions and PCB Land Drawing (Unit: mm)



This is the feed-line to the Antenna and should be matched to 50 Ohms based upon the PCB dielectric parameters.

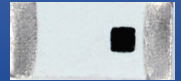
| Series | A       | B       | C       | D       | E       | F       | G       | H       |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| AMCA31 | 3.2±0.2 | 1.6±0.2 | 1.2±0.2 | 0.5±0.2 | 1.6±0.2 | 0.8±0.2 | 0.8±0.2 | 2.6±0.2 |

## Terminal Configurations



| No.   | Terminal Name | No.   | Terminal Name |
|-------|---------------|-------|---------------|
| Pad 1 | Feed Point    | Pad 2 | NC            |

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## Application Test Circuit & PCB layouts – Default Layouts

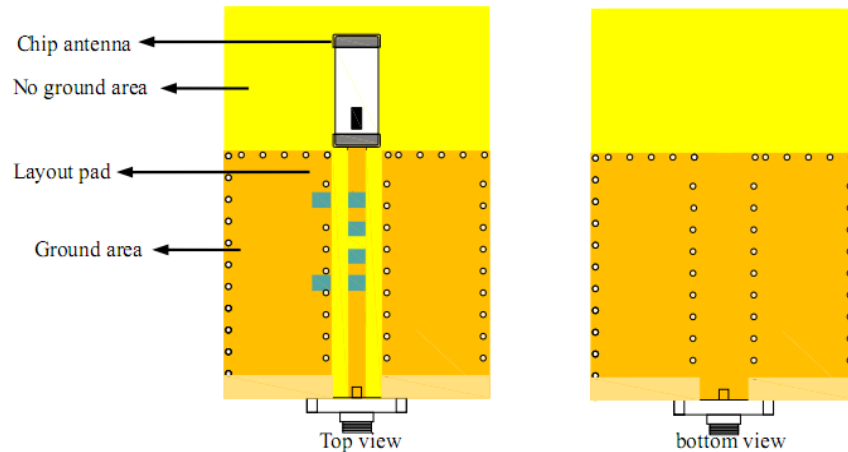
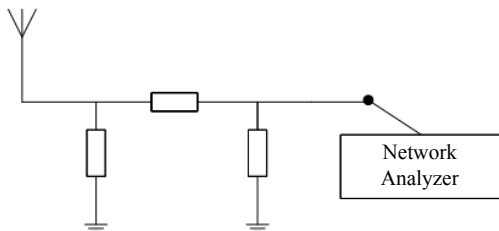


Figure shows the PCB layout highlighting the Ground and No Ground areas and trace feed line to the chip antenna.

## Matching Circuit and Reference Values

Electrical Performance with matching circuit:



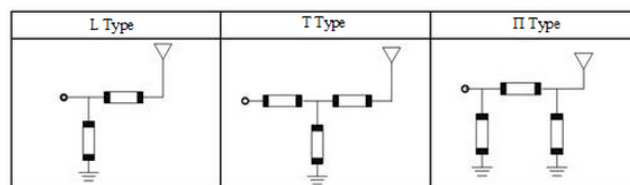
Passive Test with Network Analyzer

| Component | Description          | Value        |
|-----------|----------------------|--------------|
| Antenna   | AMCA31-2R450G-S1F-T3 | ----         |
| Capacitor | *Series C            | 0.5 ~ 10 pF  |
|           | *Shunt C             | 33pF, 100 pF |
| Inductor  | Series L             | 1.0 ~ 6nH    |
|           | Shunt L              | 1.0 ~ 6nH    |

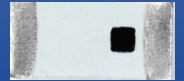
\*Series: Connected between antenna and feeding line in series.

\*Shunt: Connected between antenna and feeding line in parallel

Note: Recommendation is to pre-place the  $\pi$ -type circuit layout circuit which will offer full flexibility to match the antenna to 50 Ohm in the final product layout with one of the match configurations below. Depending on matching, NC will apply to certain components.



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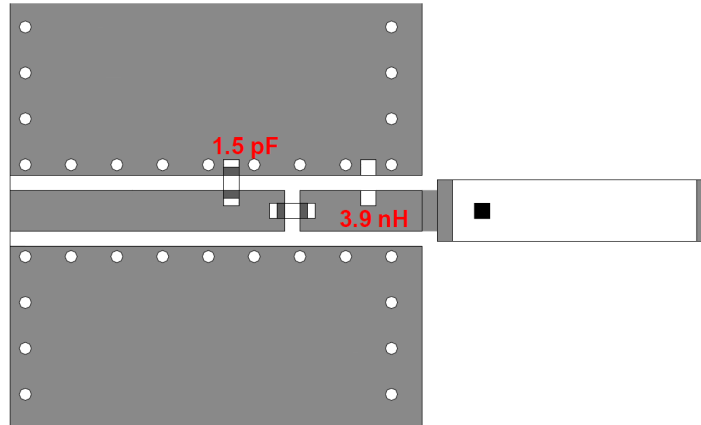


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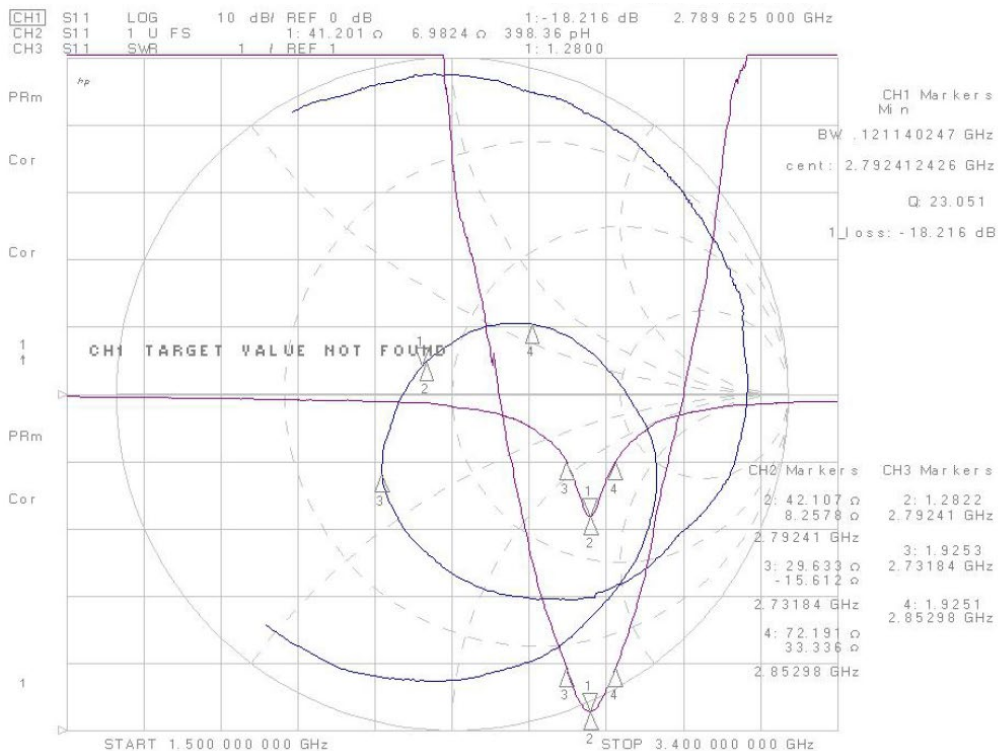
## Matching Circuit on Evaluation Board



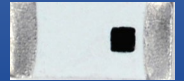
- Line width should be designed to match 50  $\Omega$  characteristic impedance, depending on PCB material and thickness.
- The component values given above will vary based on the PCB layout

## Return Loss, VSWR and Impedance Characteristics

### Before Matching



# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)



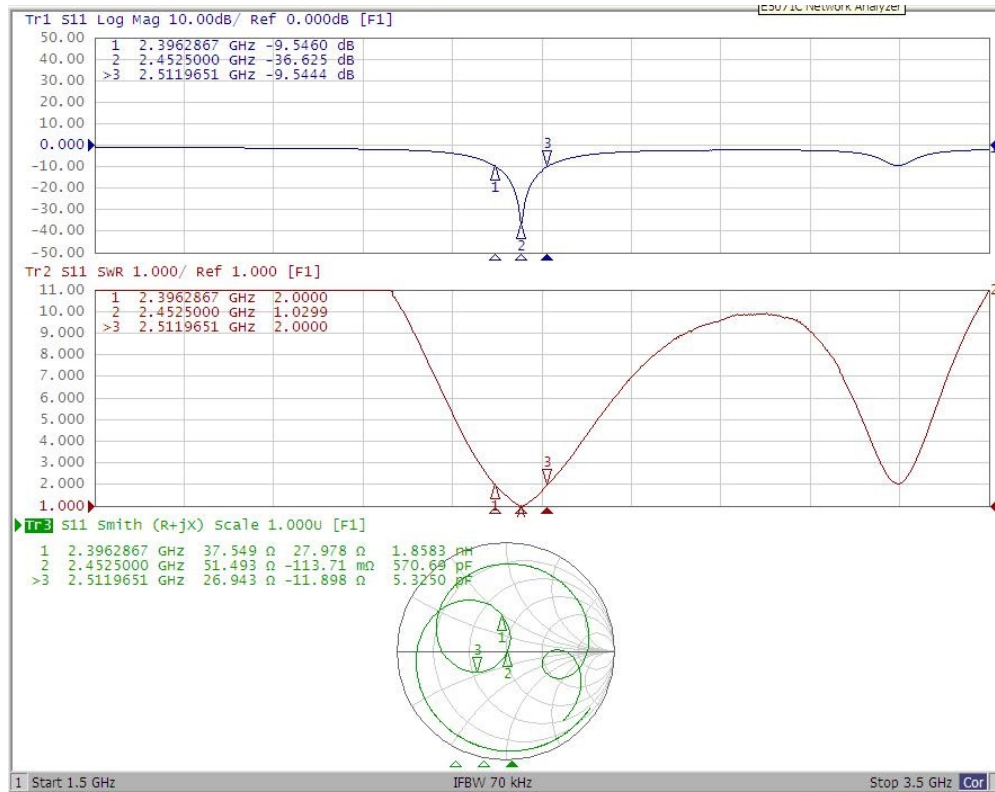
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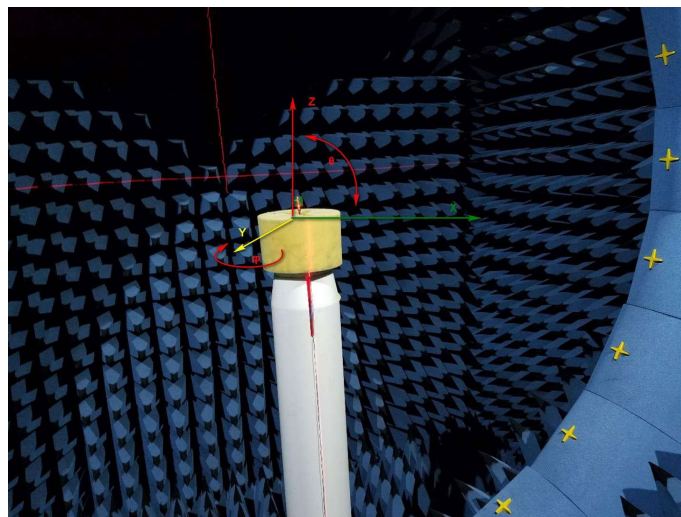
## Return Loss, VSWR and Impedance Characteristics Cont.

### After Matching



## Radiation Pattern and Gain

### Test Setup



# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)



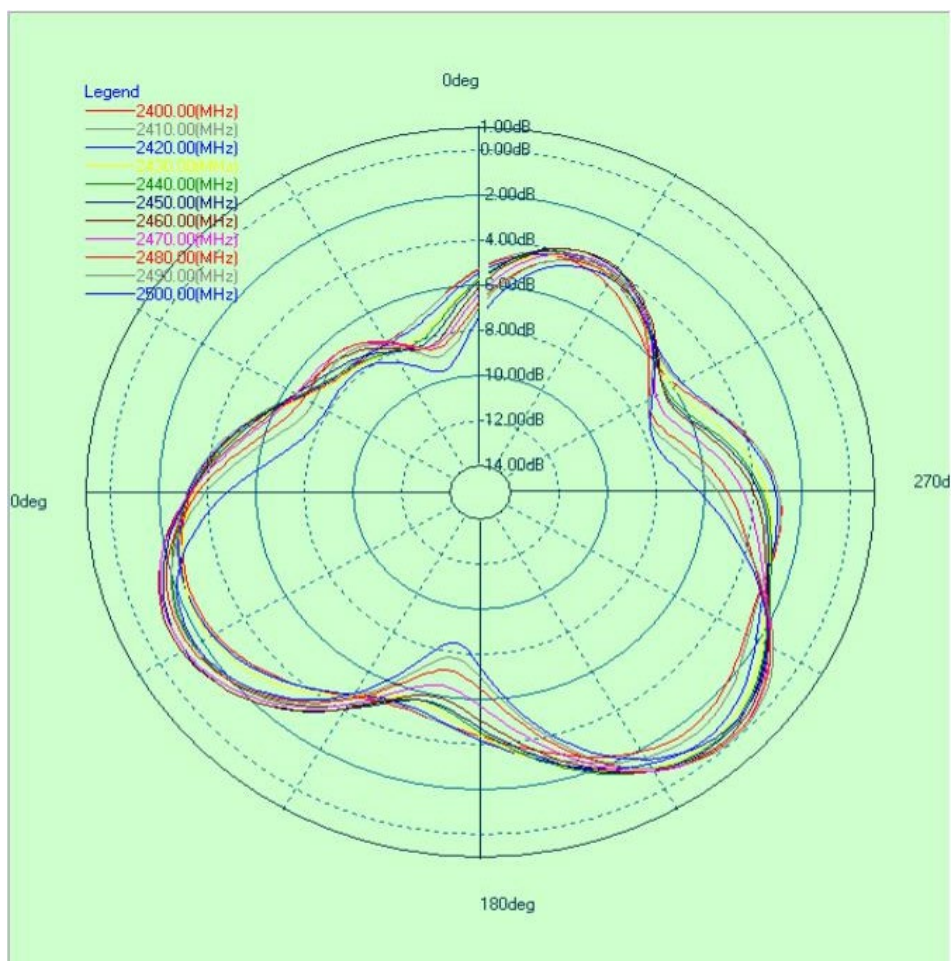
AMCA31-2R450G-S1F-T3



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## Radiation Pattern and Gain

### XY Plane



# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)



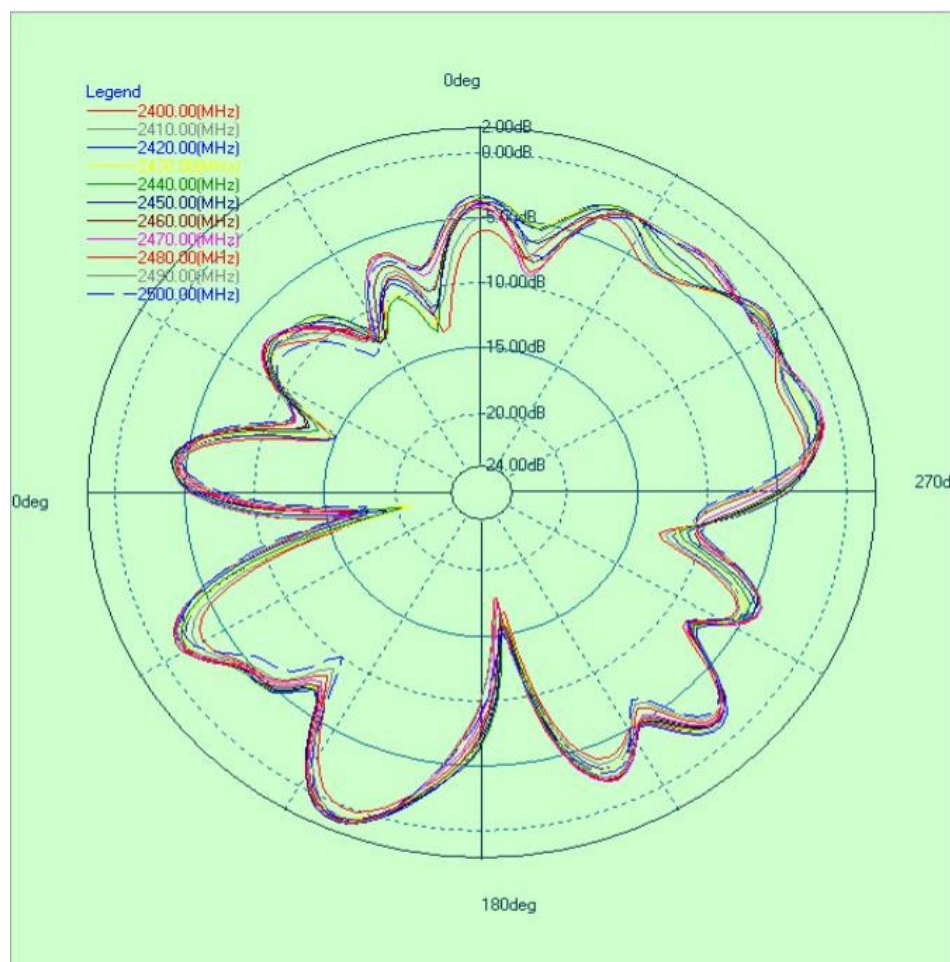
AMCA31-2R450G-S1F-T3



3.2 x 1.6 x 1.2mm  
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## Radiation Pattern and Gain

### XZ Plane



# Surface Mount WLAN / Bluetooth Chip Antenna (2450MHz)



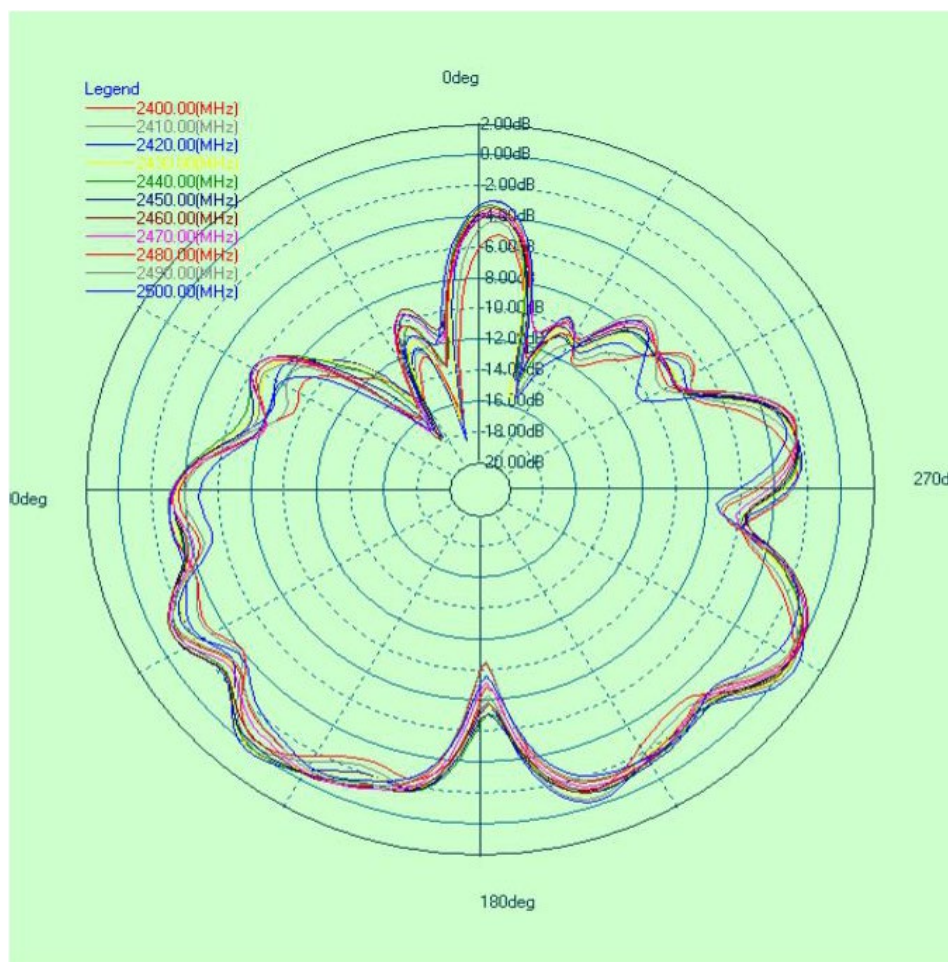
AMCA31-2R450G-S1F-T3



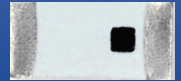
3.2 x 1.6 x 1.2mm  
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## Radiation Pattern and Gain

### YZ Plane



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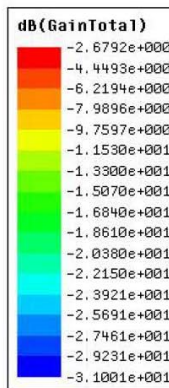
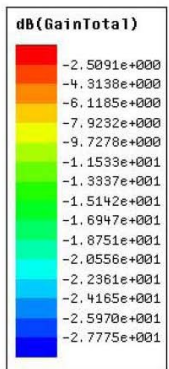
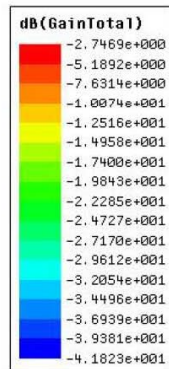


3.2 x 1.6 x 1.2mm  
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## Radiation Pattern and Gain

### 3D – Pattern | (2400 MHz, 2450 MHz, 2500 MHz)

### Gain



| Frequency (MHz) | Gain (dBi)   |
|-----------------|--------------|
| 2400            | -4.125434820 |
| 2410            | -4.180958401 |
| 2420            | -3.877599807 |
| 2430            | -3.930632294 |
| 2440            | -3.676540694 |
| 2450            | -3.582882743 |
| 2460            | -3.534294730 |
| 2470            | -3.598055402 |
| 2480            | -3.690017588 |
| 2490            | -3.876259790 |
| 2500            | -3.918544199 |

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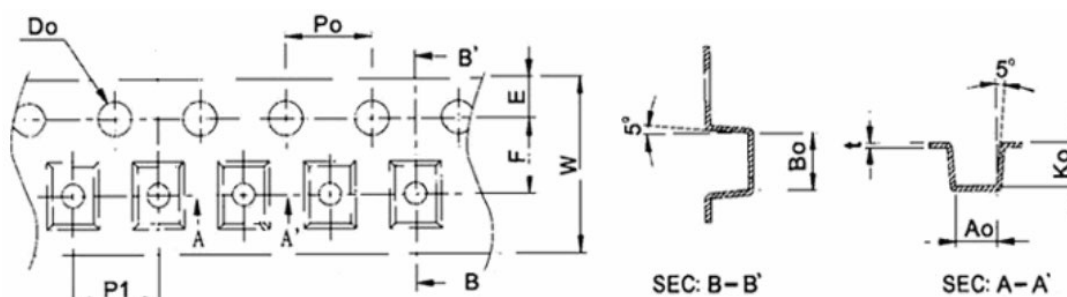


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## Packaging

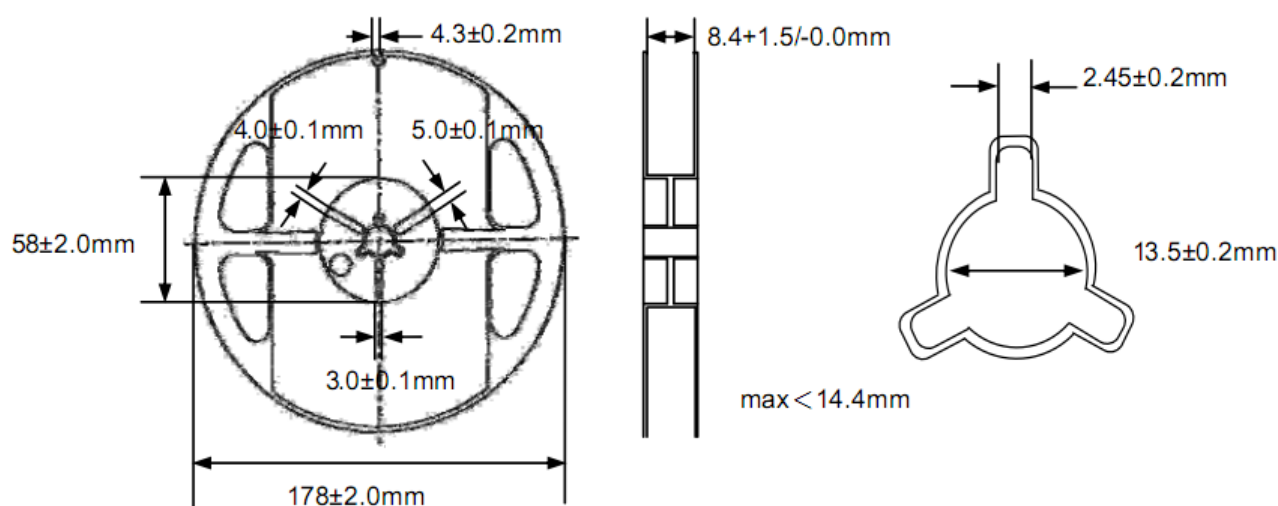
T3=3000 Units per reel

## Tape Dimensions (Unit: mm)

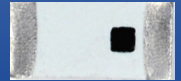


|    |           |    |                   |
|----|-----------|----|-------------------|
| W  | 8.00±0.10 | D0 | 1.50 +0.10 / -0.0 |
| P1 | 4.00±0.10 | P0 | 4.00±0.10         |
| E  | 1.75±0.10 | K0 | 1.50±0.10         |
| F  | 3.50±0.15 | A0 | 1.80±0.10         |
| B0 | 3.50±0.10 | t  | 0.22±0.05         |

## Reel Dimensions (Unit: mm)



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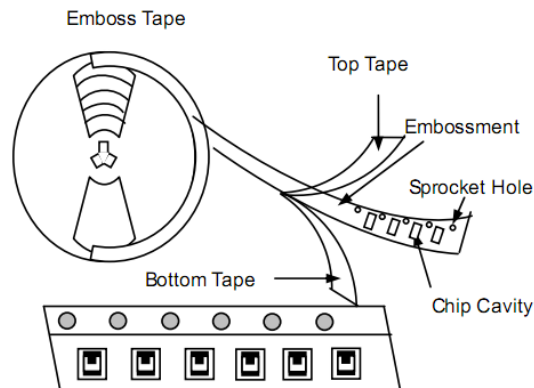
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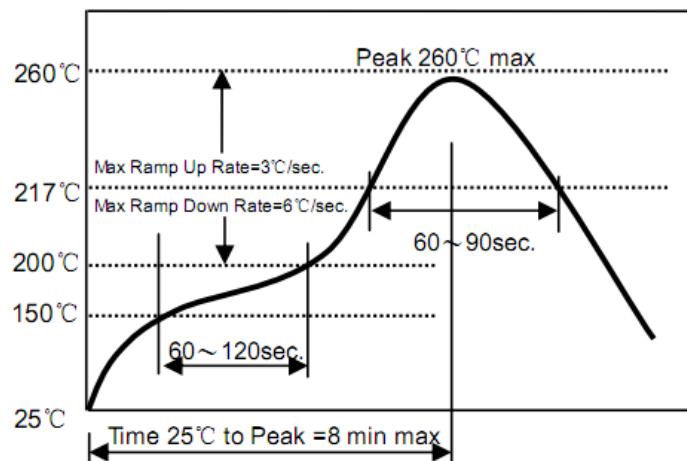
## Packaging

### Tape Drawing



Note: The sprocket holes are to the right as the tape is pulled toward the user.

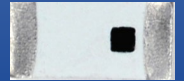
## Reflow Profile



- Preheat condition: 150 ~200 °C / 60~120 sec
- Allowed time above 217 °C : 60~90sec
- Max temp: 260 °C
- Max time at max temp: 10 sec
- Solder paste: Sn/3.0Ag/0.5Cu
- Allowed Reflow time: 2x max

[Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.]

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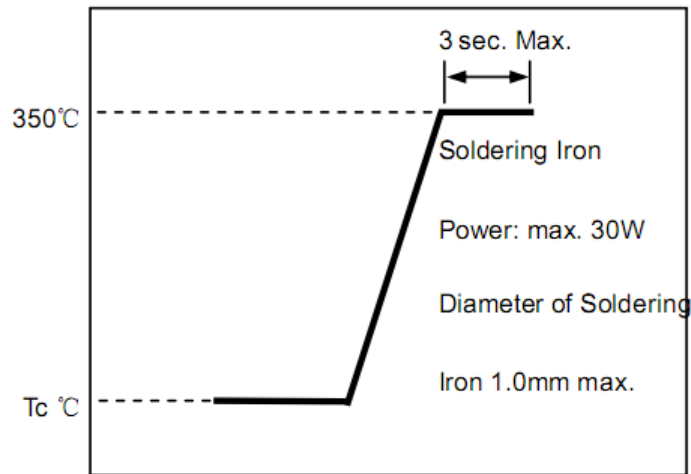


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## Manual Soldering



- Iron soldering power: Max.30 W
- Pre-heating: 150 °C / 60 sec
- Soldering Tip temperature: 350 °C max.
- Soldering time: 3 sec Max.
- Solder paste: Sn/3.0Ag/0.5Cu
- Max. 1 time for iron soldering

[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]

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