

# 4G/LTE Ceramic Chip Antenna



ACAR3705-S698



37.0 x 5.0 x 5.0 mm  
RoHS/RoHS II Compliant  
MSL = NA

## Features

- 4G/LTE full band coverage (700~960 MHz, 1710~2170 MHz, 2500~2700MHz)
- 2G/3G/GSM support
- Compact size
- Linear polarization

## Applications

- IoT
- M2M
- 4G/LTE/3G/2G/GSM applications
- Telecommunications
- Networking
- Wireless modules
- Mobile devices
- Consumer electronics
- Broadband cellular connectivity
- Video and surveillance

## Electrical Characteristics

Item	Spec*	Comments
Working Frequency Range	700~960 MHz / 1710~2170 MHz / & 2500~2700 MHz	Covers 4G LTE
VSWR	4.5 : 1 max	Depends on the environment
Peak Gain	1.07 / 4.03 / 3.76 dBi	
Efficiency	700~960 MHz	55%
	1710~ 2170MHz	70%
	2500~2700MHz	50%
Polarization	Linear	
Impedance	50 $\Omega$	
Terminations	Ag	Environmentally Friendly Pb Free
Operating Temperature	-40°C ~ 85°C	
Storage Temperature	-40°C ~ 85°C	

\* Data collected per Table on standard evaluation board size 45 x 120 mm, and under the environmental conditions of +40°C and 0-95% relative humidity.

\*\* Actual Electrical value will depend on customer ground plane size

# 4G/LTE Ceramic Chip Antenna

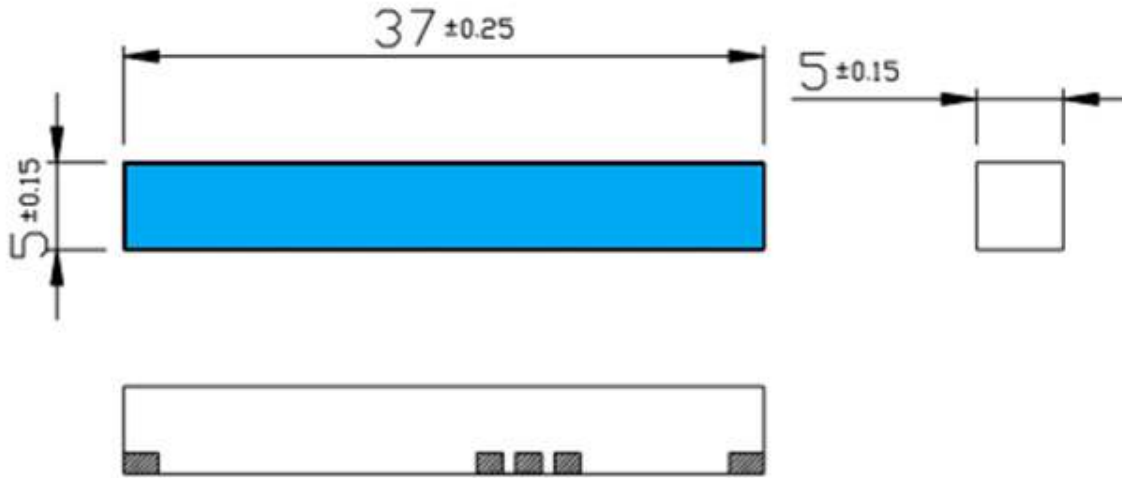


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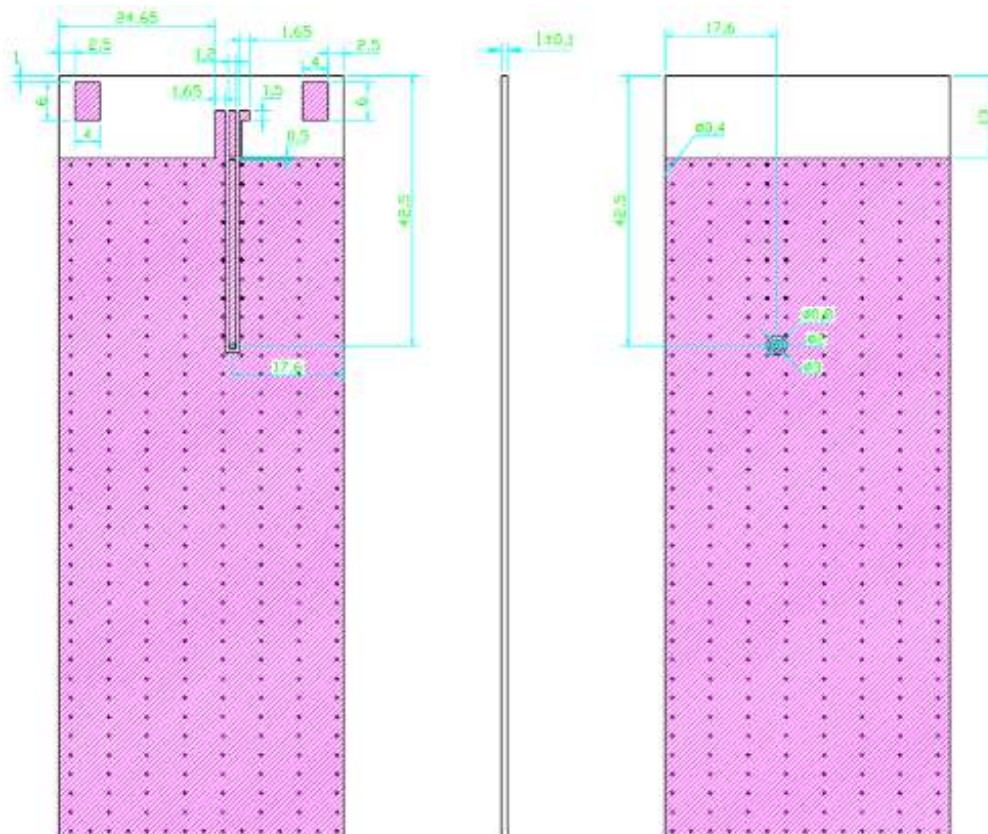
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## Dimensions



Unit:mm

## Evaluation Board and Dimensions



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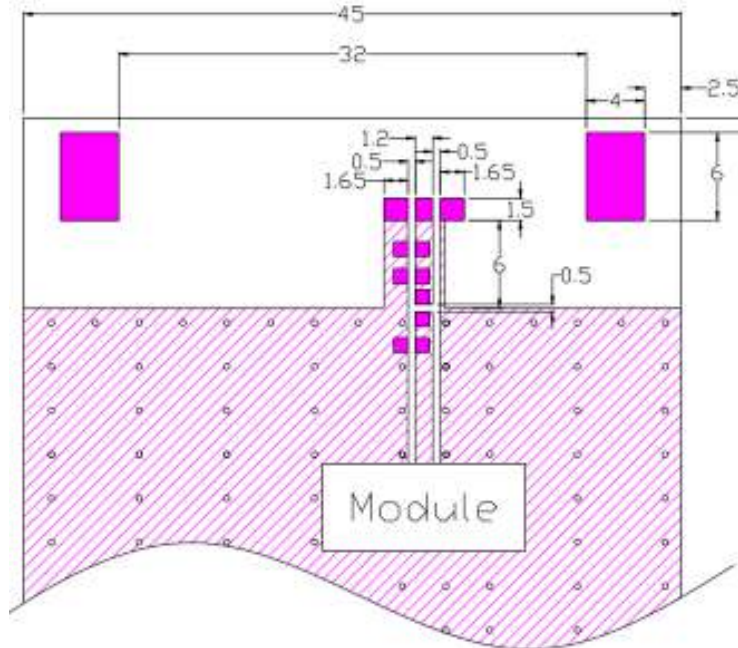


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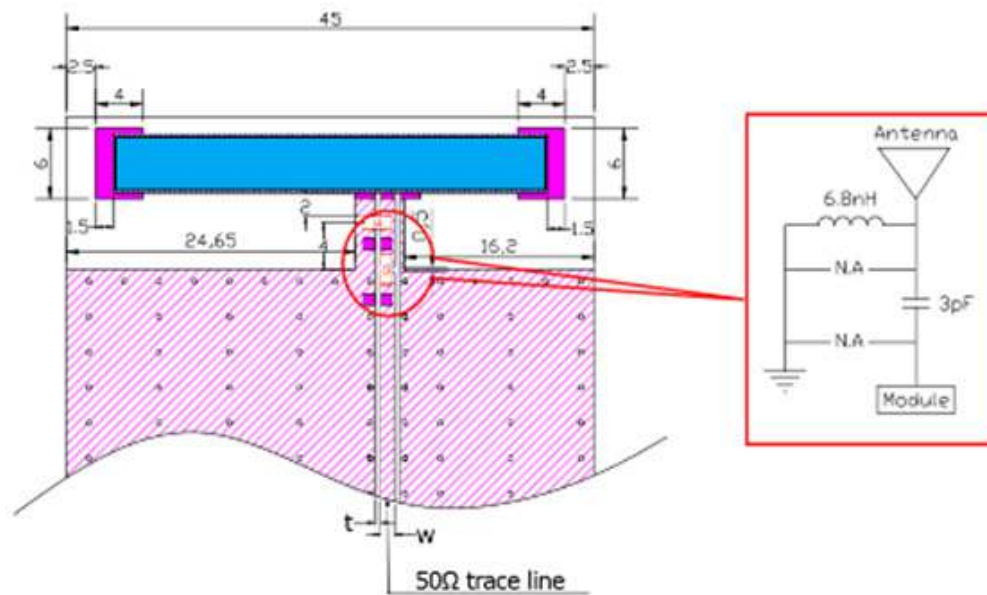
37.0 x 5.0 x 5.0 mm  
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## Recommended Layout Dimensions



Unit: mm

## Recommended Layout from Evaluation Board



T and w = Unique dimensioning according to your PCB design.

Unit: mm



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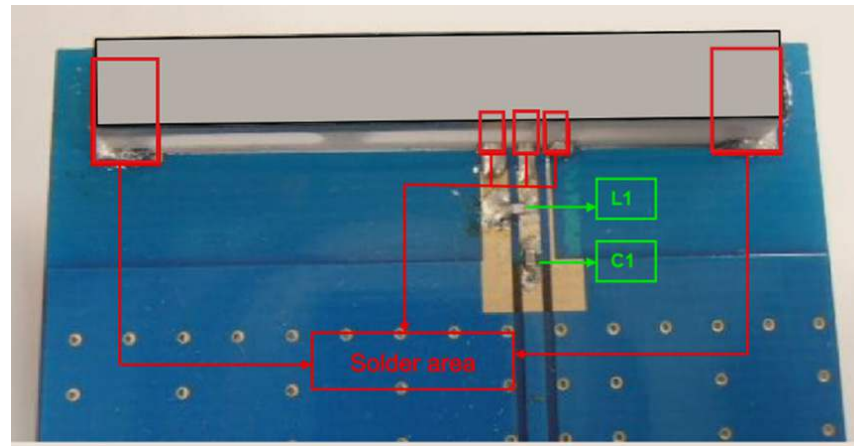


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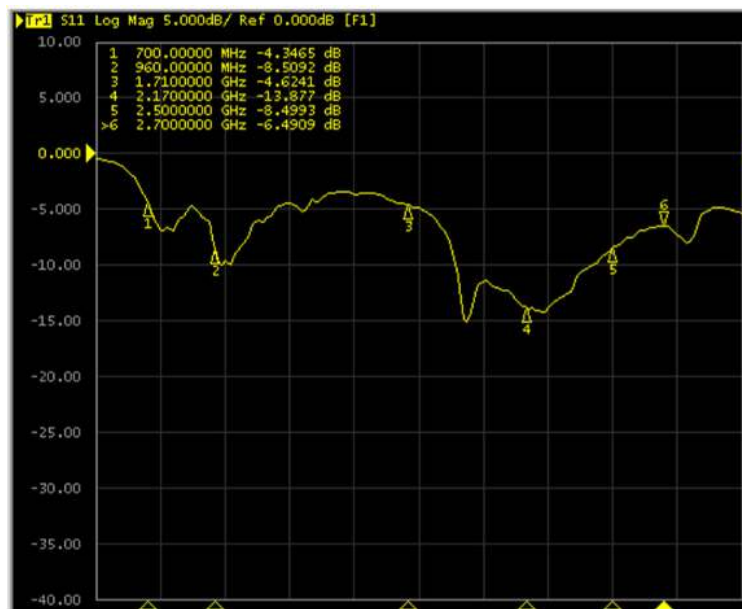
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Evaluation Board showing position of match components and solder pads



Circuit Symbol	Size	Description
L1	0402	6.8nH
C1	0402	3pF Capacitor

## Antenna Response – Return Loss S11



# 4G/LTE Ceramic Chip Antenna

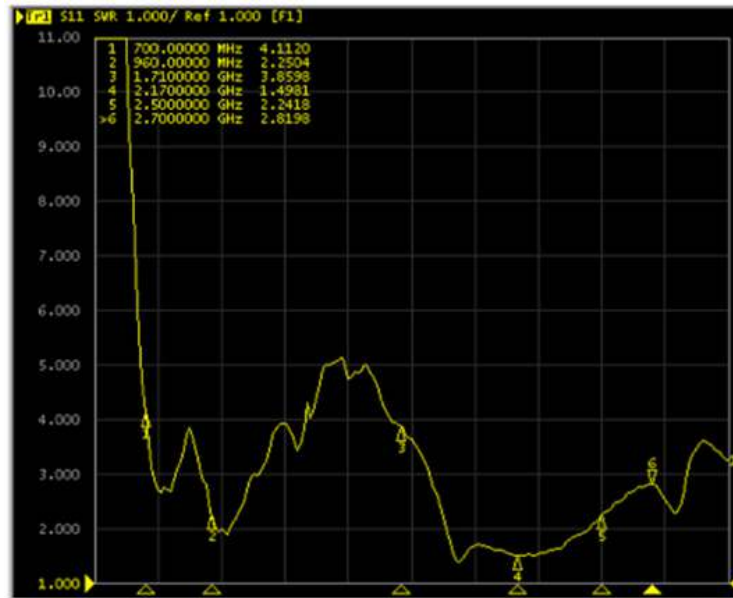


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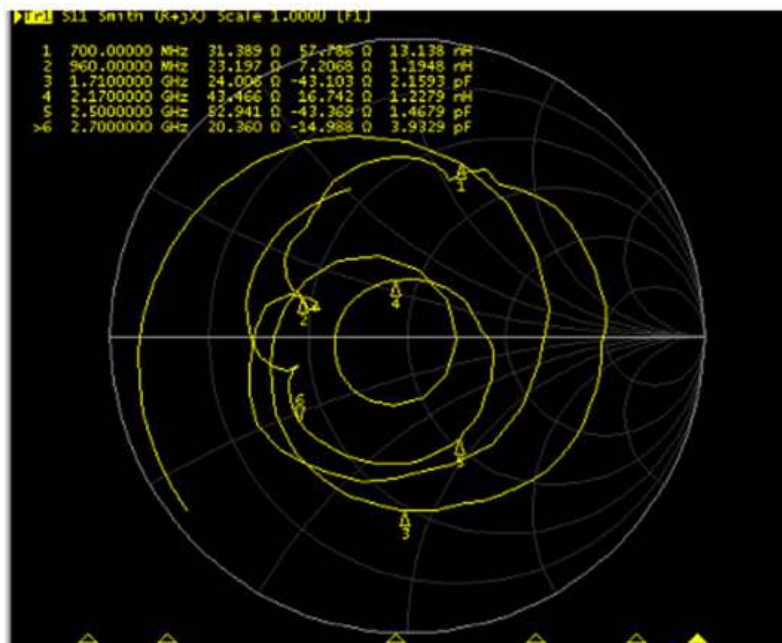


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## Antenna SWR



## Antenna Smith Chart



# 4G/LTE Ceramic Chip Antenna



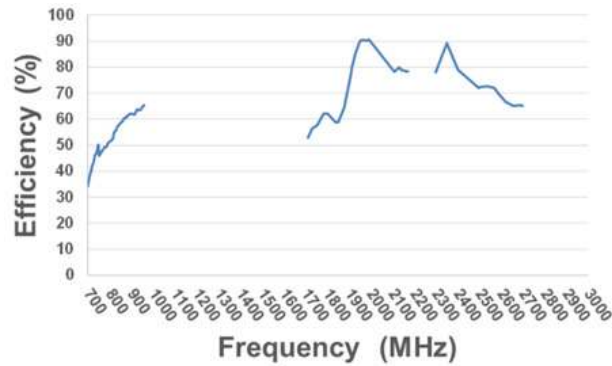
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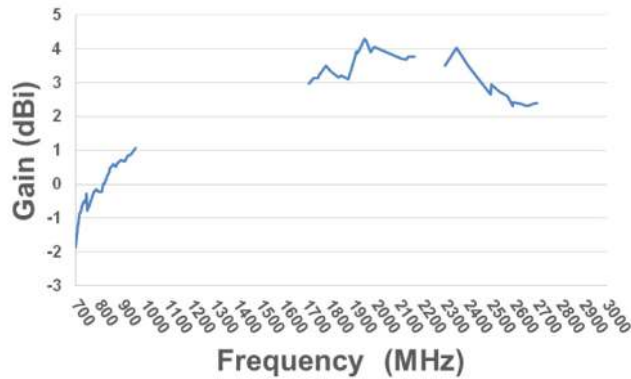
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## Measurements on Standard Evaluation Board

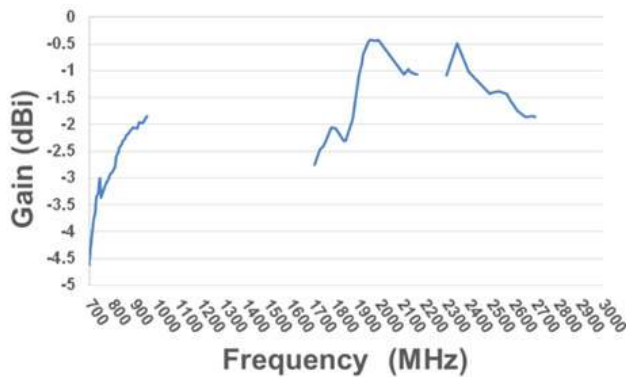
### Antenna Efficiency



### Peak Gain



### Average Gain



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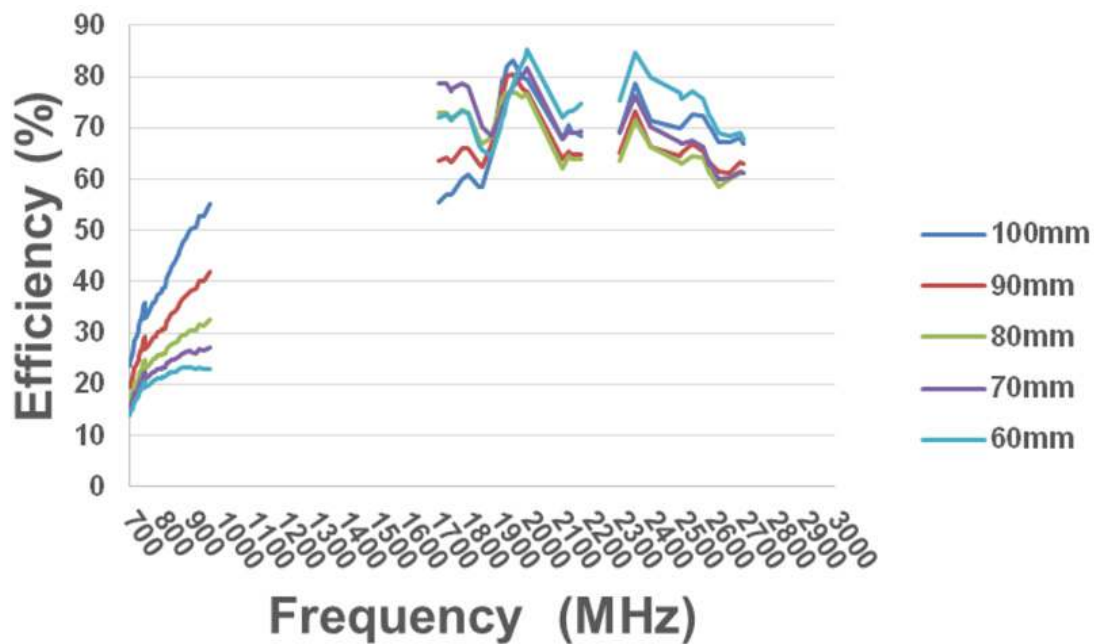
## Antenna Performance

Antenna Performance Summary on the 45 x 120 mm Evaluation Board

Frequency Band (MHz)	700	824	960	1710	1850	1990	2170	2500	2700
Efficiency (%)	35.12	54.26	65.49	53.03	58.87	90.53	78.19	72.31	65.10
Average Gain (dBi)	-4.54	-2.57	-1.83	-2.75	-2.30	-0.43	-1.06	-1.40	-1.86
Peak Gain (dBi)	-1.80	0.016	1.07	2.97	3.21	4.03	3.76	2.96	2.38

## Antenna Efficiency Versus Ground Plane Length

Reference Efficiency vs Ground Plane Length



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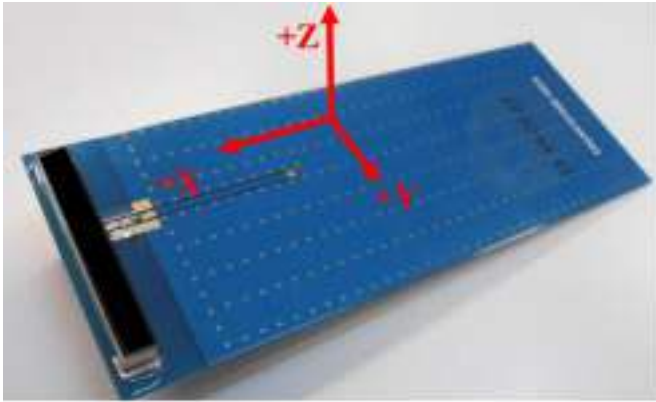
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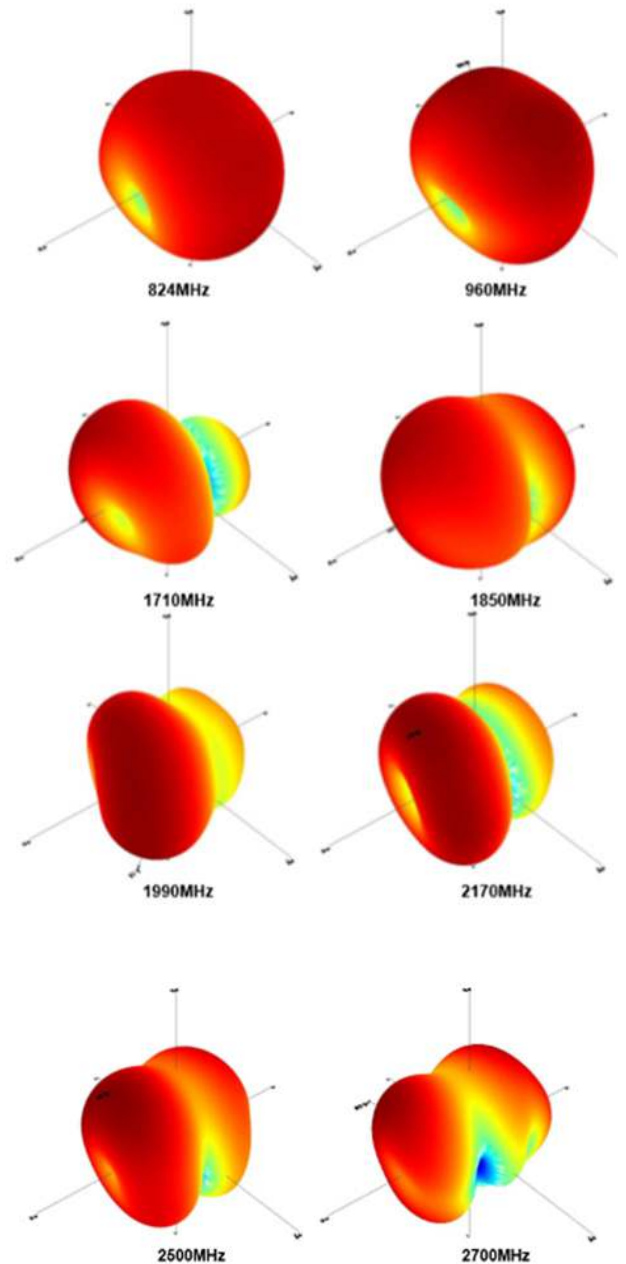
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## Antenna 3D Radiation Patterns – Evaluation Board

Coordinates



Radiation patterns (3D)





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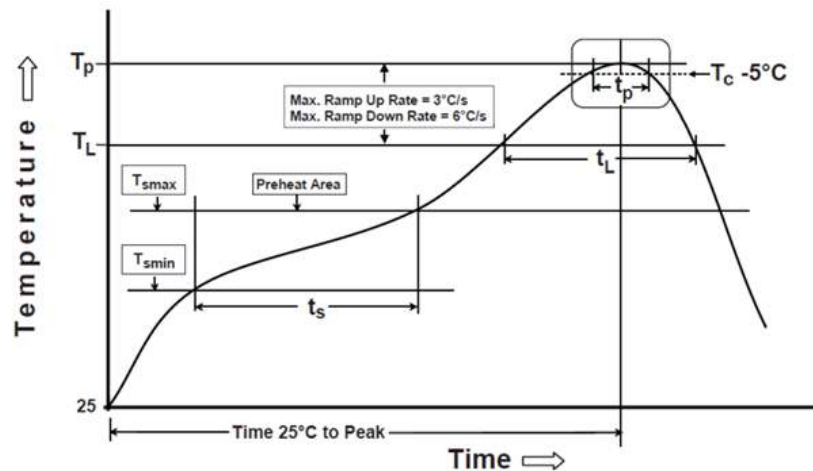
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## Reflow Soldering Standard Condition

ACAR3705-S698 can be assembled as per the Pb-free assembly given below.

Phase	Profile Features	Pb-Free Assembly (SnAgCu)
Preheat	-Temperature Min (T <sub>smin</sub> ) -Temperature Max (T <sub>smax</sub> ) -Time (T <sub>smin</sub> to T <sub>smax</sub> )	150°C 200°C 60-120 seconds
Ramp-Up	Avg Ramp-Up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C /second(max)
Reflow	-Temperature (T <sub>L</sub> ) -Total Time above T <sub>L</sub> (t <sub>L</sub> )	217°C 60-150 seconds
Peak	-Temperature (T <sub>p</sub> ) -Time(t <sub>p</sub> )	260°C 20 - 30 second
Ramp-Down	Rate	6°C / second max.
Time from 25°C to Peak Temperature		8 minutes max.
Composition of solder plate		96.5Sn/3Ag/0.5Cu
Solder Paste Model		SHENMAO PF606-P26

According to the Standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follow:



**Note:** All the temperature measurement points are on the component's top surface. If the applied temperature is over recommended, the component's surface will start to peel or damage.

### Soldering with Iron:

Soldering iron temperature : 270±10 °C

Apply preheating at 120 C for 2-3 minutes and complete the soldering for each terminal within 3 seconds.

**Note:** If the applied temperature is over recommended or if the time exceeds the stated, the component's surface will start to peel or damage.

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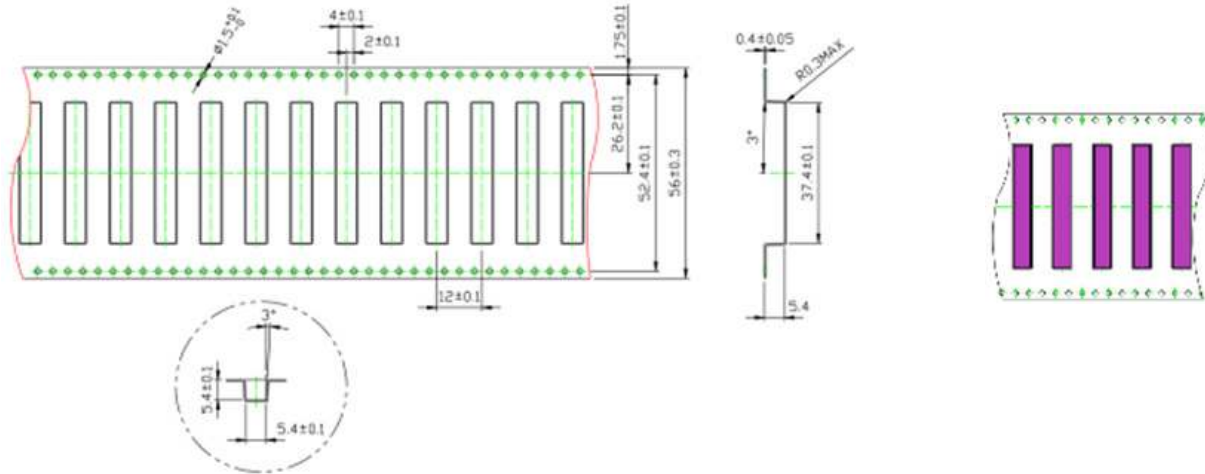
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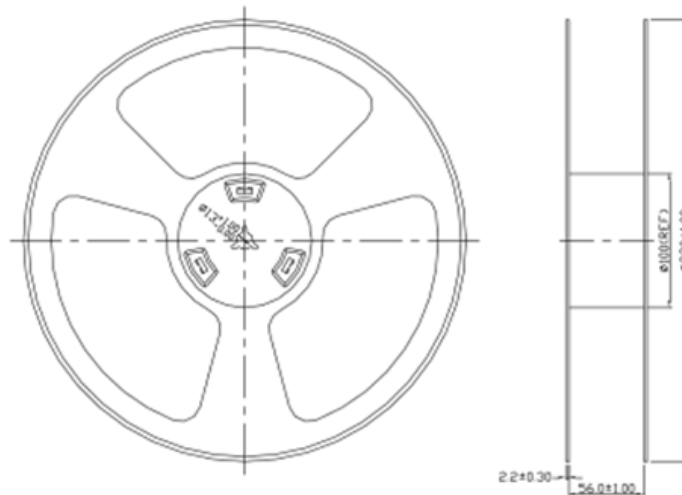
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## Packaging

Tape Dimensions (mm)



Reel Dimensions (mm)



1. Blister tape to IEC 286-3, polyester.
2. Pieces per tape /reel: 450pcs

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