

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 Ω | |
| 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

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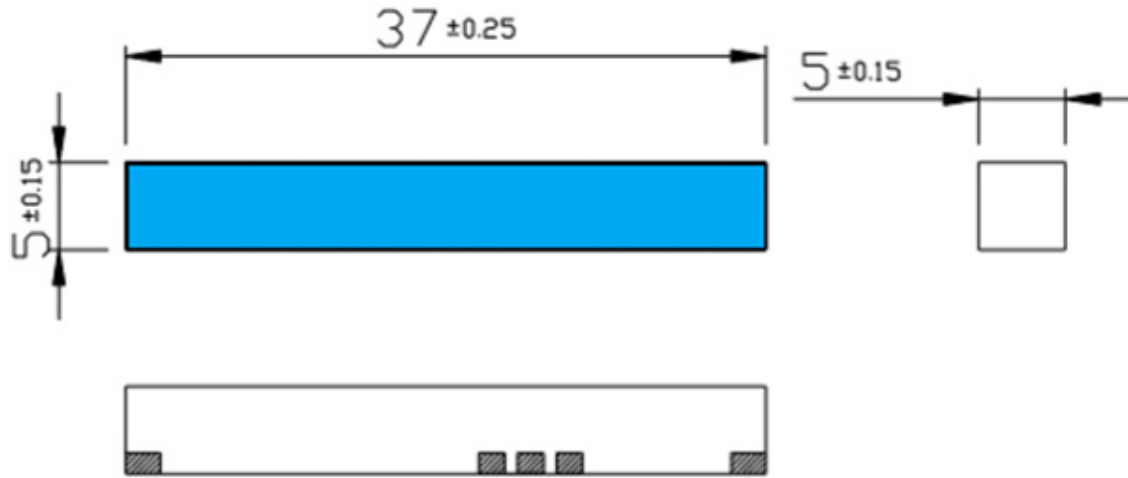


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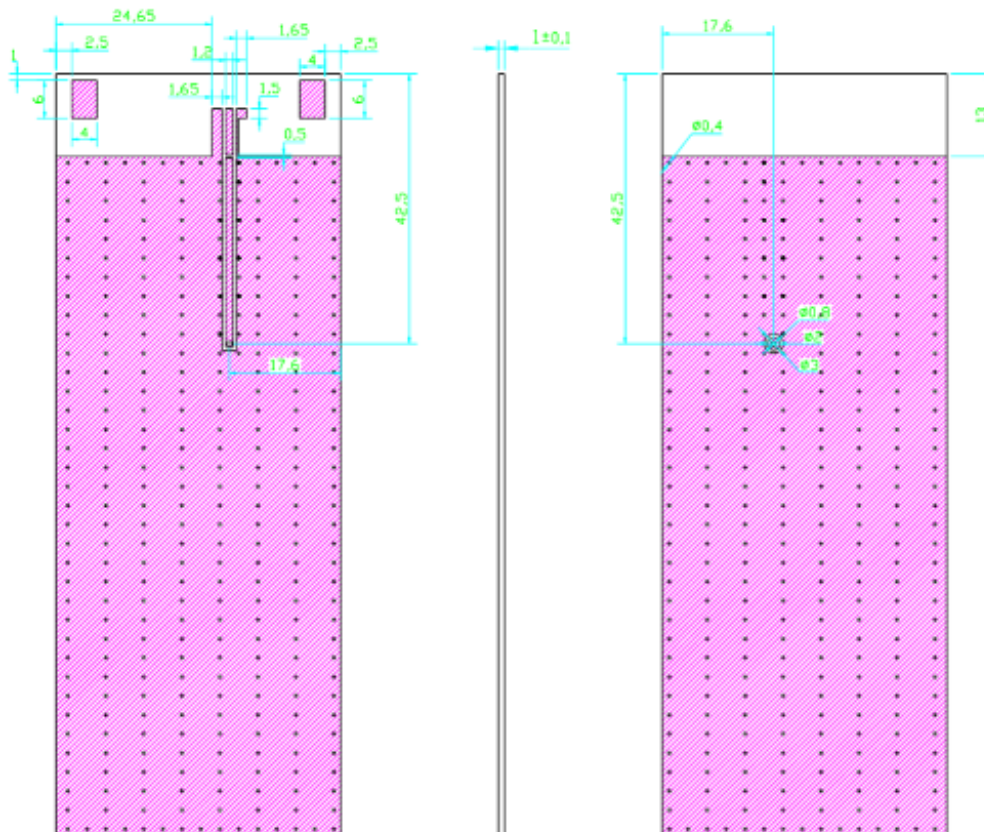
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Dimensions



Unit:mm

Evaluation Board and Dimensions



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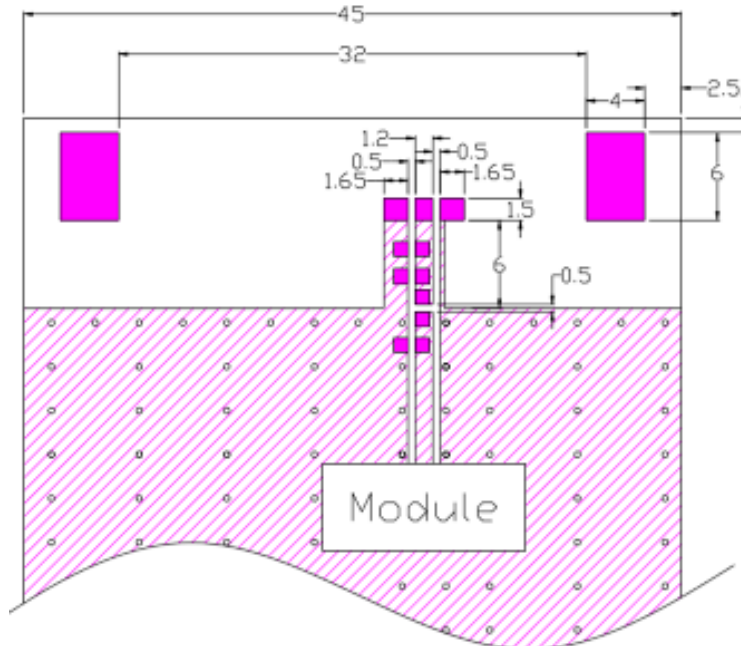


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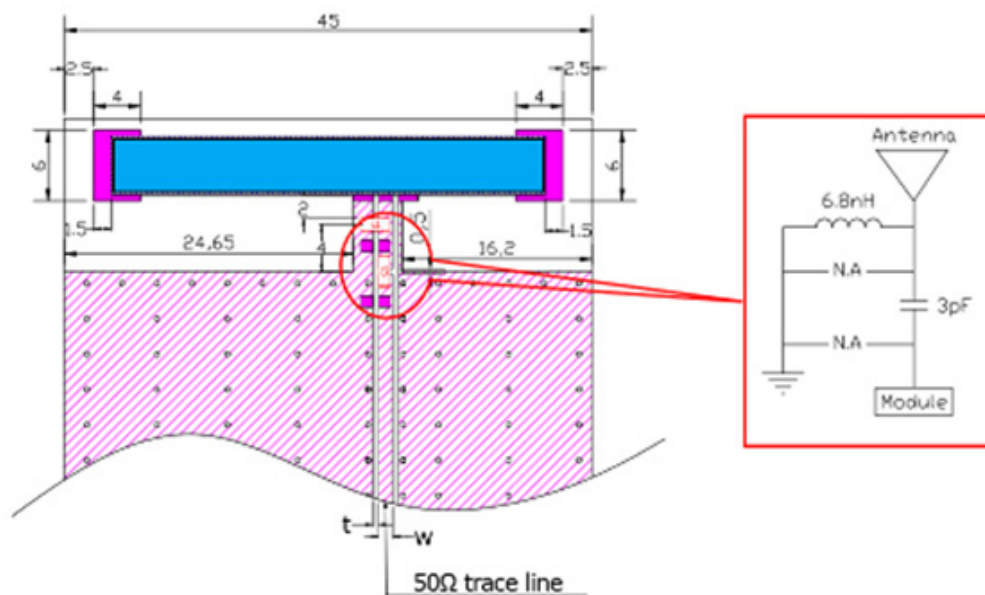
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Recommended Layout Dimensions



Unit: mm

Recommended Layout from Evaluation Board



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

Unit: mm

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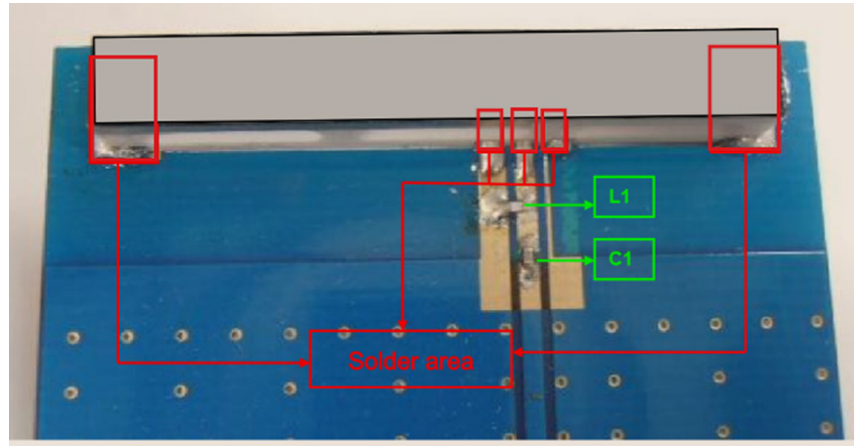


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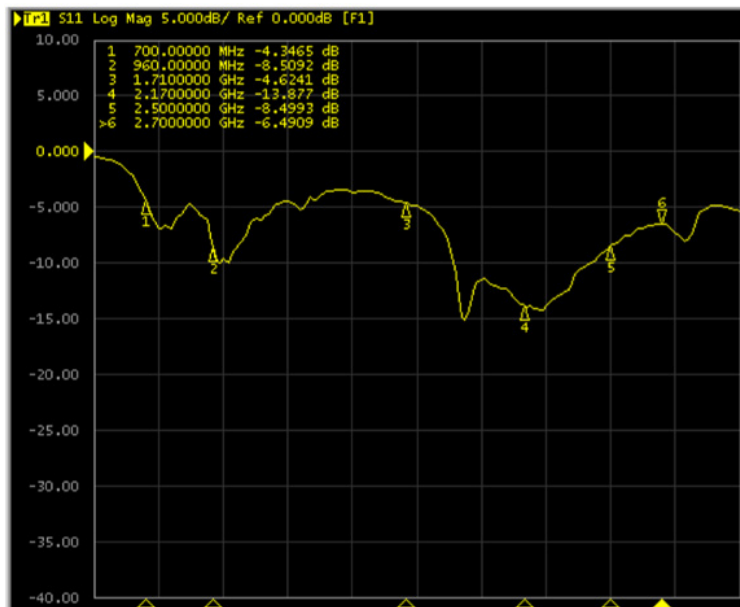
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Evaluation Board showing position of match components and solder pads



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

Antenna Response – Return Loss S11



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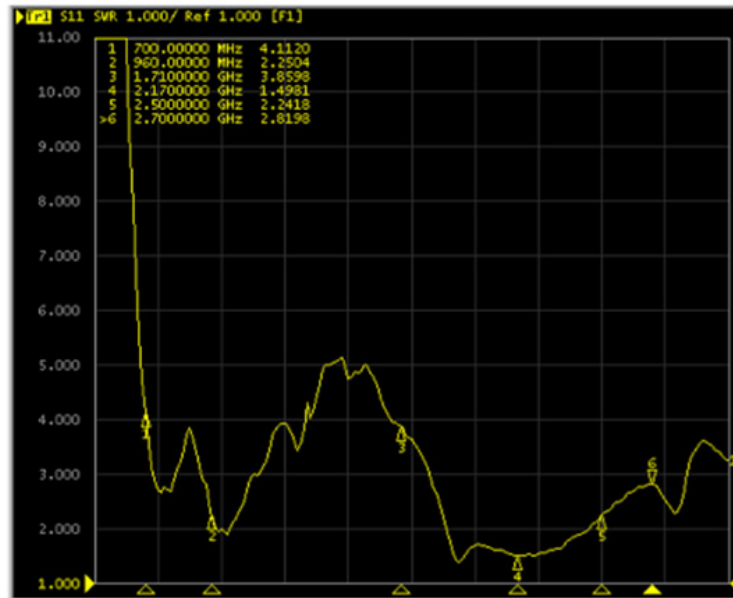


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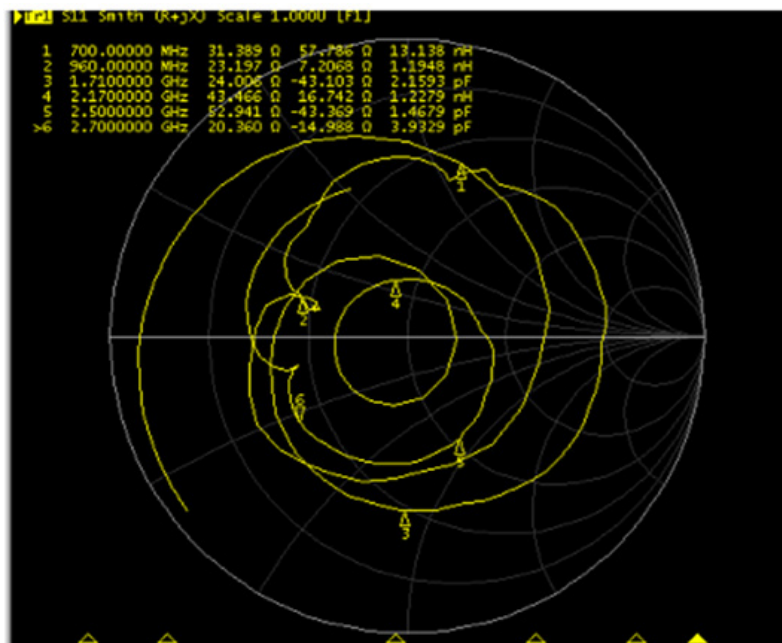


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Antenna SWR



Antenna Smith Chart



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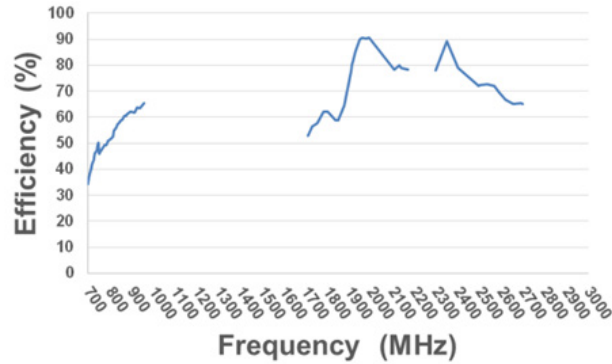
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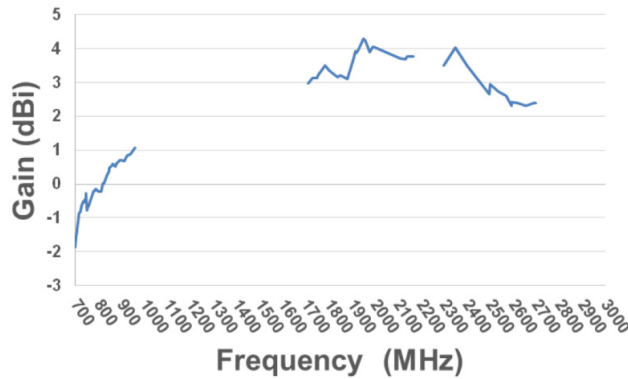
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Measurements on Standard Evaluation Board

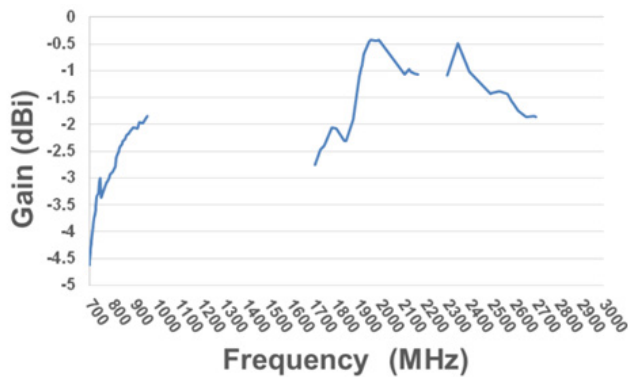
Antenna Efficiency



Peak Gain



Average Gain



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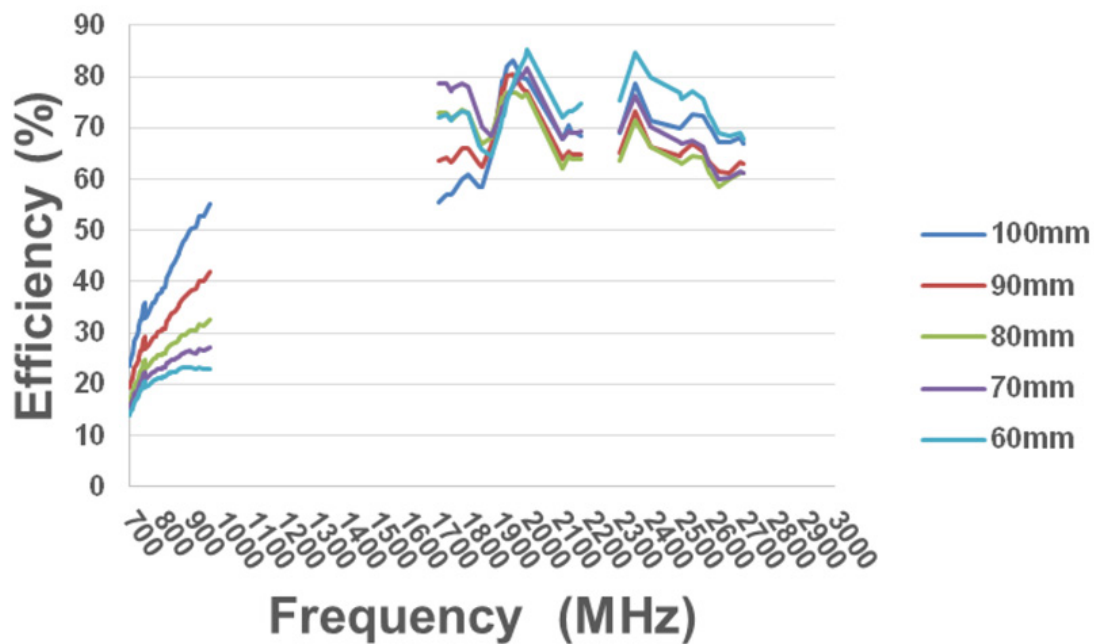
Antenna Performance

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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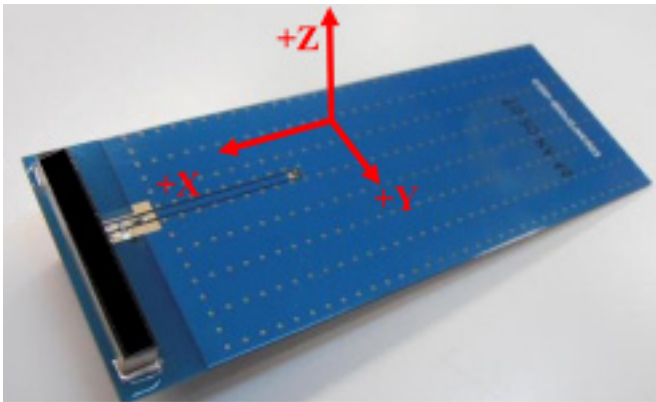
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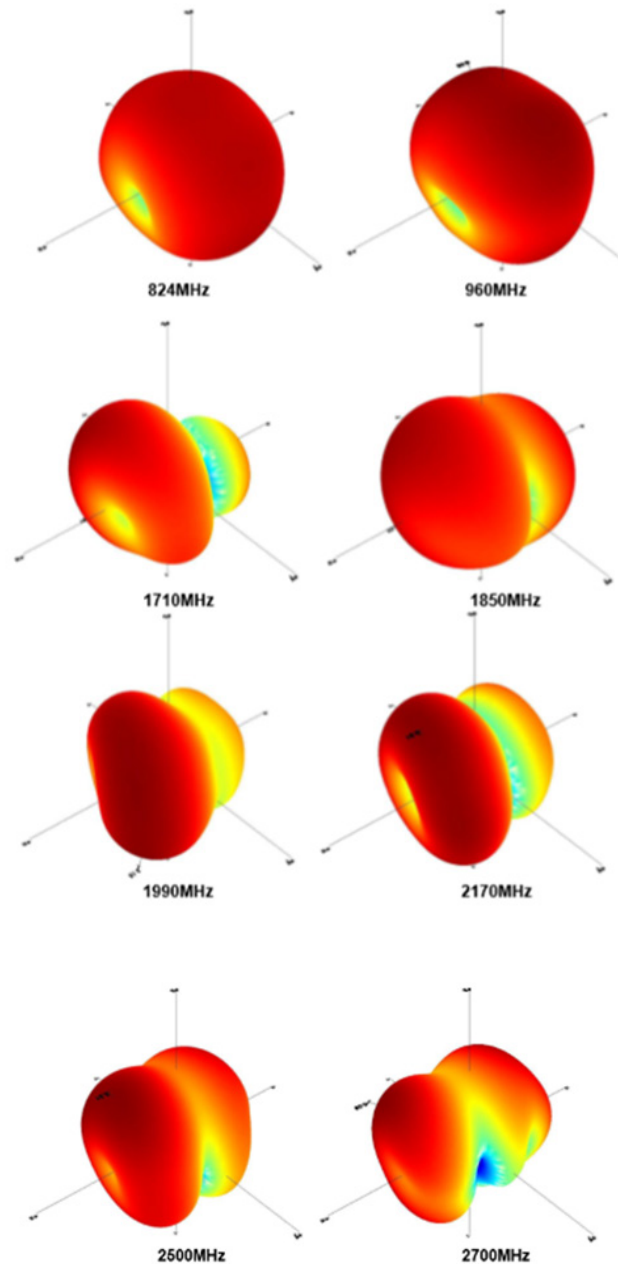
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Antenna 3D Radiation Patterns – Evaluation Board

Coordinates



Radiation patterns (3D)



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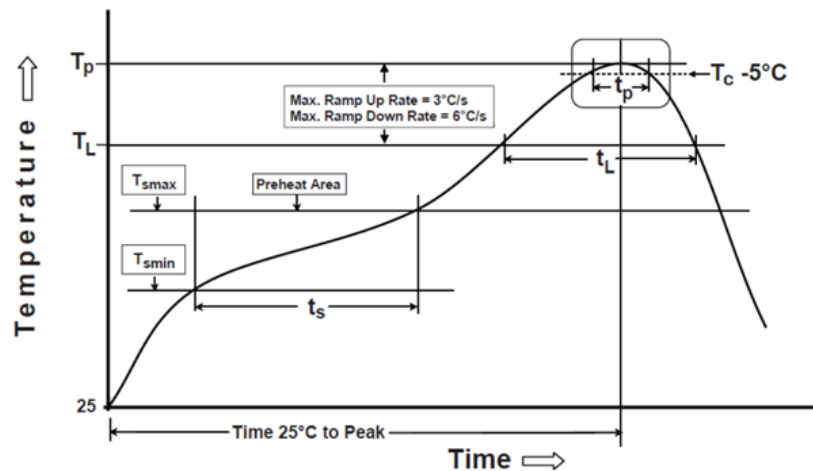
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Reflow Soldering Standard Condition

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

| Phase | Profile Features | Pb-Free Assembly (SnAgCu) |
|------------------------------------|---|----------------------------------|
| Preheat | -Temperature Min (T _{smin}) -Temperature Max (T _{smax}) -Time (T _{smin} to T _{smax}) | 150°C 200°C 60-120 seconds |
| Ramp-Up | Avg Ramp-Up Rate (T _{smax} to T _P) | 3°C /second(max) |
| Reflow | -Temperature (T _L) -Total Time above T _L (t _L) | 217°C 60-150 seconds |
| Peak | -Temperature (T _P) -Time(t _p) | 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.