2G/3G/GSM Ceramic Chip Antenna

ACAR3005-S824

Features
- 824–960 MHz, 1710–2170 MHz band support
- Covering GSM850, GSM900, DCS, PCS, & UMTS
- 2G/3G/GSM support
- Omnidirectional pattern
- Linear polarization

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

Electrical Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Spec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Frequency</td>
<td>824–960 MHz, 1710–2170 MHz</td>
</tr>
<tr>
<td>Dimension</td>
<td>30.0 × 5.0 × 5.0 mm</td>
</tr>
<tr>
<td>VSWR</td>
<td>3 max (depends on the special environment)</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40–85°C</td>
</tr>
<tr>
<td>Termination</td>
<td>Ag (Environmentally-Friendly Pb Free)</td>
</tr>
<tr>
<td>Efficiency(%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>824–960 MHz</td>
</tr>
<tr>
<td></td>
<td>1710–2170 MHz</td>
</tr>
</tbody>
</table>

* Evaluation board size 40.0 x 120.0 mm²
* Actual electrical value will depend on customer ground plane size
2G/3G/GSM Ceramic Chip Antenna

ACAR3005-S824

Return Loss Characteristics

![Graph 1](image1.png)

![Graph 2](image2.png)
Gain and Efficiency

(Ground length: 107mm)

<table>
<thead>
<tr>
<th>Band</th>
<th>GSM (MHz)</th>
<th>DCS (MHz)</th>
<th>PCS (MHz)</th>
<th>WCDMA (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>824</td>
<td>890</td>
<td>880</td>
<td>960</td>
</tr>
<tr>
<td>Peak Gain (dBi)</td>
<td>0.77</td>
<td>0.10</td>
<td>0.55</td>
<td>-0.18</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>59.4</td>
<td>53.15</td>
<td>54.12</td>
<td>54.57</td>
</tr>
</tbody>
</table>

3D Radiation Pattern
3D Radiation Pattern

- 824MHz
- 890MHz
- 960MHz
- 1710MHz
- 1990MHz
- 2170MHz
2G/3G/GSM Ceramic Chip Antenna

ACAR3005-S824

30.0 x 5.0 x 5.0 mm
RoHS/RoHS II Compliant
MSL = N/A

Drawings

Shape and Dimensions

Recommended Foot Print for Evaluation Board
Antenna Environment on Demo Board

Matching Circuit

A pi type matching circuit is needed between antenna and module.

Pi type matching

<table>
<thead>
<tr>
<th>Circuit Symbol</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>0402</td>
<td>4.7nH Inductor</td>
</tr>
<tr>
<td>R1</td>
<td>0402</td>
<td>0 Ω</td>
</tr>
</tbody>
</table>
2G/3G/GSM Ceramic Chip Antenna

ACAR3005-S824

Test Board Dimensions

![Test Board Dimensions Diagram]

Environmental Conditions

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature Range</td>
<td>-40°C ~ +85°C</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>0 ~ 95% RH @ +40°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-40°C ~ +85°C</td>
</tr>
</tbody>
</table>

Unit: mm
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ACAR3005-S824

Precautions

- Antenna pattern use an Ag electrode.
- Please don’t use the corrosion gas (sulfur gas, chlorine gas) in the atmosphere.
- Please don’t direct solder onto the gold electrode of Antenna pattern.

Packaging

1. 450pcs/reel
2. 350.0 x 340.0 x 67.0 mm (450pcs/Carton-Inside)
3. 370.0 x 360.0 x 275.0 mm (1,350pcs/Carton-Outside)
4. GW - 6.19KG

Unit: mm
Transmission Line and Matching

Typical config.1

Typical config.2

Component types

- Inductor
- Capacitor

Module

Stripline

Component

DC Block

The matching network has to be individually designed using one, two, or three components.

Recommended Reflow Soldering Profile

Abracon products can be assembled following Pb-free assembly. According to the Standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follow:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Profile Features</th>
<th>Sn-Pb Assembly</th>
<th>Pb-Free Assembly (SnAgCu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREHEAT</td>
<td>Avg. Ramp-up Rate (Tmax to TP)</td>
<td>3°C/second (max)</td>
<td>3°C/second (max)</td>
</tr>
</tbody>
</table>
| RAMP-UP      | - Temperature Min(TSmin)  
                  - Temperature Max(TSmin)  
                  - Time(tsmin to tsmax) | 100°C  
                    150°C  
                    60-120 seconds | 100°C  
                    150°C  
                    60-120 seconds |
| REFLOW       | - Temperature(TL)  
                  - Total Time above TL (t L) | 183°C  
                    60-150 seconds | 217°C  
                    60-150 seconds |
| PEAK         | - Temperature(TP)  
                  - Time(tp) | 235°C  
                    10-30 second | 260°C  
                    20-40 second |
| RAMP-DOWN    | Rate | 6°C/ second max. | 6°C/ second max. |
|              | Time from 25°C to Peak Temperature | 6 minutes max. | 8 minutes max. |
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ACAR3005-S824

Next graphic shows temperature profile (gray zone) for the antenna assembly process in reflow ovens.

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