# SPECIFICATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>DSGP.1575.12.4.A.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>GPS L1 / GALILEO E1 1575MHz 12<em>12</em>4mm Ceramic Patch SMT Antenna</td>
</tr>
<tr>
<td>Features</td>
<td>2.73 dBi Peak Gain for GPS/GALILEO Band</td>
</tr>
<tr>
<td></td>
<td>Dims: 12<em>12</em>4mm</td>
</tr>
<tr>
<td></td>
<td>SMT Direct Mount Ceramic Patch Antenna</td>
</tr>
<tr>
<td></td>
<td>Automotive TS16949 Approved</td>
</tr>
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<td></td>
<td>RoHS compliant</td>
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</tbody>
</table>
1. Introduction

The DSGP.1575.12.4.A.02 is a ceramic GPS L1 / GALILEO E1 passive patch antenna. 12mm square and with a height of just 4mm, this antenna is perfect for applications in compact telematics devices, vehicle tracking/fleet management systems, wearables and navigation devices.

The antenna has been tuned on a 50*50mm ground plane, working at 1575.42MHz with a 2.73dBi gain. The ceramic patch is mounted via SMT process, suitable for high volume low cost assembly.

The antenna is manufactured and tested in a TS16949 first tier automotive approved facility.

Small antennas should ideally be custom tuned for the device environment, Taoglas offers this service subject to NRE and MOQ. For more details please contact your regional Taoglas sales office.
2. Specification

<table>
<thead>
<tr>
<th>ELECTRICAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Bands</td>
<td>GPS/GALILEO</td>
</tr>
<tr>
<td>Operation Frequency</td>
<td>1575.42 ±1.023MHz</td>
</tr>
<tr>
<td>Return Loss</td>
<td>&lt; -10dB @ Center Frequency</td>
</tr>
<tr>
<td>Gain at Zenith</td>
<td>2.73dBi</td>
</tr>
<tr>
<td>Efficiency</td>
<td>62.36%</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 ohms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MECHANICAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic Dimension</td>
<td>12<em>12</em>4mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3.3g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENVIRONMENTAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Temperature</td>
<td>-40°C to 85°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>Non-condensing 65°C 95% RH</td>
</tr>
</tbody>
</table>

* Antenna properties were measured with the antenna mounted on 50*50mm Ground Plane Taoglas Part # DSGPD.12A
3. Antenna Characteristics

3.1. Return Loss

3.2. Efficiency
3.3. Average Gain

3.4. Peak Gain
4. Antenna Radiation Pattern

4.1. Measurement Setup

The DSGP.1575.12.4 antenna is tested with 50*50mm ground plane in a CTIA certified ETS-Lindgren Anechoic Chamber. The test setup is shown below.
4.2. 2D Radiation Pattern

XY Plane

XZ Plane

YZ Plane

(dB)

(dB)

(dB)

1575.42 MHz

1575.42 MHz
4.3. 3D Radiation Pattern

1575.42MHz

Azimuth = 111.5
Elevation = -37.3
Roll = -57.0
5. Mechanical Drawing (Unit: mm)
6. Evaluation Board DSGPD.12A (Unit: mm)

<table>
<thead>
<tr>
<th>Name</th>
<th>Material</th>
<th>Finish</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PCB SMA(F) ST</td>
<td>Brass</td>
<td>Gold</td>
<td>1</td>
</tr>
<tr>
<td>2 DSGP.1575.12.4.A.02 Antenna</td>
<td>Ceramic</td>
<td>Clear</td>
<td>1</td>
</tr>
<tr>
<td>3 PCB (50x50x1mm)</td>
<td>FR4 1.0t</td>
<td>Black</td>
<td>1</td>
</tr>
</tbody>
</table>
7. PCB Footprint Recommendation

7.1. Footprint Copper Keepout Area (Unit: mm)

Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size. They should be connected to GND

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NOTE:
1. Ag Plated area
2. Solder Mask area
3. Copper area
4. Paste area
5. Copper Keepout Area
6. Copper keepout should extend through all PCB layers.
7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.
8. The dimension tolerances should follow standard PCB manufacturing guidelines

Connected to 50 ohm transmission line.
7.2. Paste Area (Unit: mm)

Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size.

![Diagram showing paste area dimensions]

NOTE:
1. Ag Plated area
2. Solder Mask area
3. Copper area
4. Paste area
5. Copper Keepout Area
6. Copper keepout should extend through all PCB layers.
7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.
8. The dimension tolerances should follow standard PCB manufacturing guidelines.
7.3. Top Solder Mask (Unit: mm)

Pads 1, 2, 3, 4, 5, 6, 7 and 9 are the same size. This drawing is a negative of solder mask. Black regions are anti-mask.

NOTE:
1. Ag Plated area
2. Solder Mask area
3. Copper area
4. Paste area
5. Copper Keepout Area
6. Copper keepout should extend through all PCB layers.
7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.
8. The dimension tolerances should follow standard PCB manufacturing guidelines
7.4. Composite Diagram (Unit: mm)

NOTE:
1. Ag Plated area
2. Solder Mask area
3. Copper area
4. Paste area
5. Copper Keepout Area
6. Copper keepout should extend through all PCB layers.
7. Any vias in pads should be either filled or tented to prevent solder from wicking away from the pad during reflow.
8. The dimension tolerances should follow standard PCB manufacturing guidelines
8. Recommended Reflow Soldering Profile

DSGP.12 can be assembled following Pb-free assembly. According to the Standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follows:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Profile Features</th>
<th>Pb-Free Assembly (SnAgCu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREHEAT</td>
<td>Temperature Min(Tsmin)</td>
<td>150°C</td>
</tr>
<tr>
<td></td>
<td>Temperature Max(Tsmax)</td>
<td>200°C</td>
</tr>
<tr>
<td></td>
<td>Time(ts) from (Tsmin to Tsmax)</td>
<td>60-120 seconds</td>
</tr>
<tr>
<td>RAMP-UP</td>
<td>Avg. Ramp-up Rate (Tsmax to TP)</td>
<td>3°C/second(max)</td>
</tr>
<tr>
<td>REFLOW</td>
<td>Temperature(TL)</td>
<td>217°C</td>
</tr>
<tr>
<td></td>
<td>Total Time above TL (tL)</td>
<td>30-100 seconds</td>
</tr>
<tr>
<td>PEAK</td>
<td>Temperature(TP)</td>
<td>260°C</td>
</tr>
<tr>
<td></td>
<td>Time(tp)</td>
<td>2-5 seconds</td>
</tr>
<tr>
<td>RAMP-DOWN</td>
<td>Rate</td>
<td>3°C/second(max)</td>
</tr>
<tr>
<td>Time from 25°C to Peak Temperature</td>
<td>8 minutes max.</td>
<td></td>
</tr>
<tr>
<td>Composition of solder paste</td>
<td>96.5Sn/3Ag/0.5Cu</td>
<td></td>
</tr>
<tr>
<td>Solder Paste Model</td>
<td>SHENMAO PF606-P26</td>
<td></td>
</tr>
</tbody>
</table>

The graphic shows temperature profile for component assembly process in reflow ovens.

Soldaring Iron condition: Soldaring iron temperature 270°C±10°C. Apply preheating at 120°C for 2-3 minutes. Finish soldering for each terminal within 3 seconds, if soldering iron temperature over 270°C±10°C or 3 seconds, it will make cause component surface pooling or damage.
9. Packaging

9.1. Inner Tray

500 pc DSGP.1575.12.4.A.02 per reel
Dimensions - Ø335*40mm
Weight - 1.86Kg
1 pc reel in small inner box
Dimensions - 350*340*70mm
Weight - 2.0Kg

4 Reels / 2000 pcs in one carton
Carton Dimensions - 370*370*300mm
Weight - 7.94Kg

Pallet Dimensions 1100*1100*1270mm
36 Cartons per Pallet
9 Cartons per layer
4 Layers

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