TAOGLAS

Datasheet

Part No:
DSGP124B

Description

GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42MHz Ceramic SMD Patch Antenna

Features:

SMD Mount Ceramic Patch Antenna
GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42MHz
Includes Additional Solder Mask
Dimension: 12 x 12 x 4mm
RoHS & Reach Compliant

1. Introduction

The DSGP124B is a compact ceramic GPS L1 / GALILEO E1 / BEIDOU B1C 1575.42 MHz passive patch antenna, measuring just 12mm x 12mm with a low-profile height of 4mm. Its small form factor makes it ideal for space-constrained applications such as compact telematics devices, vehicle tracking and fleet management systems, wearables, and navigation devices.

The antenna is optimized for a 50mm x 50mm ground plane, operating at 1575.42 MHz with a peak gain of 1.01dBi. Designed for SMT mounting, the ceramic patch includes an additional solder mask to enhance durability and prevent cracking due to heat expansion during high-volume, cost-sensitive assembly processes.

Typical applications include:

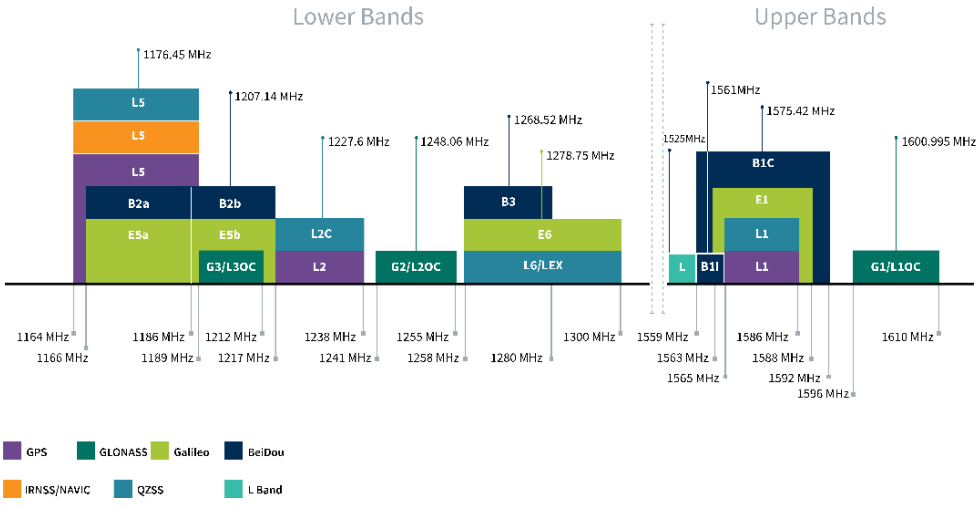
- Vehicle Tracking and Fleet Management Systems
- Wearables
- Navigation Devices

The DSGP Series can be manufactured in a TS16949 first-tier automotive-approved facility and tested to AEC-Q200 certification if required. Further to this, full PPAP and IMDS documentation can be provided upon request. Please discuss your quality and reliability requirements with our team prior to ordering.

Taoglas also offers custom tuning services based on minimum order quantities, contact your regional Taoglas customer support team for further information.

2. Specification

GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	□	□		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	□	□	□		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	□	□	□	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	□	□	□	□
L-Band	L-Band 1542 MHz				
	□				
QZSS (Regional)	L1 1575.42 MHz	L2C 1227.6 MHz	L5 1176.45 MHz	L6 1278.75e6	
	■	□	□	□	
IRNSS (Regional)	L5 1176.45 MHz				
	□				
SBAS	L1/E1/B1 1575.42 MHz	L5/B2a/E5a 1176.45 MHz	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz
	■	□	□	□	□



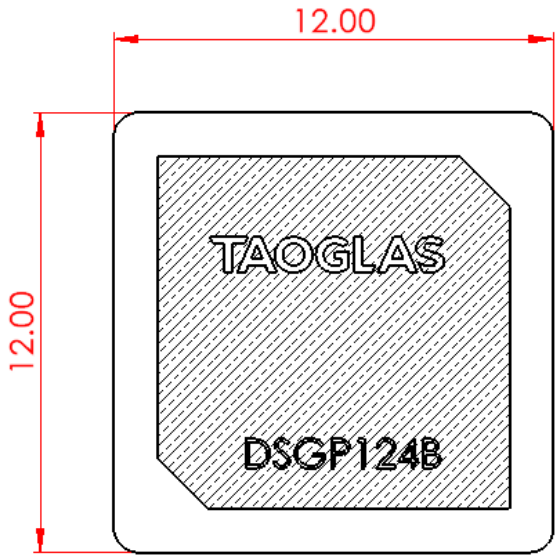
GNSS Bands and Constellations

GNSS Electrical	
Frequency (MHz)	L1 - 1575.42
	1565-1586
Efficiency (%)	36.0
Average Gain (dB)	-4.44
Peak Gain (dBi)	1.01
Axial Ratio (dB)	2.34
Polarization	RHCP
Impedance	50 Ω
*Antenna tested on 50x50mm Ground Plane	

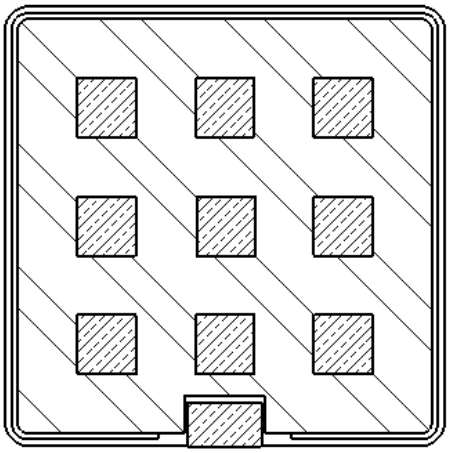
Mechanical	
Dimensions	12mm x 12mm x 4mm
Weight	2.3g ± 3%
Material	Ceramic

Environmental	
Operation Temperature	-40°C to 105°C
Storage Temperature	-40°C to 105°C
Relative Humidity	Non-condensing 65°C 95% RH
Moisture Sensitivity	3 (168 Hours)

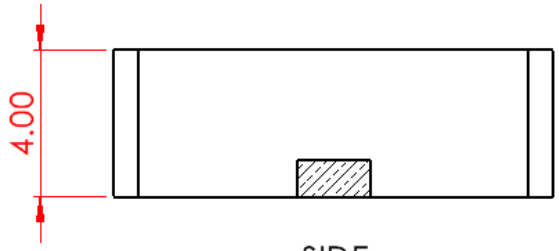
3. Mechanical Drawing



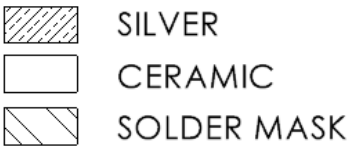
TOP



BOTTOM



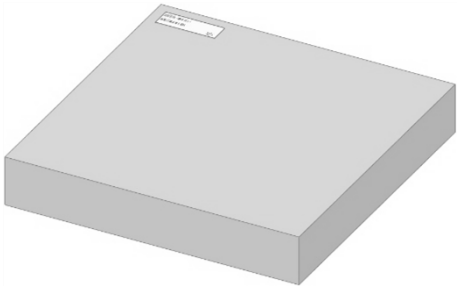
SIDE



4. Packaging

500 pcs/ Reel/ Vacuum bag

500 pcs / Box
Box: 350x340x67mm
Weight: 2.4 ±3% Kg



2000 pcs / Carton
Carton: 370x370x300mm
Weight: 10.5 ±3% Kg

5. Antenna Integration Guide

The following is an example on how to integrate the DSGP124B into a design. This antenna has 10 pins, where one pin is used for the RF Feed. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.

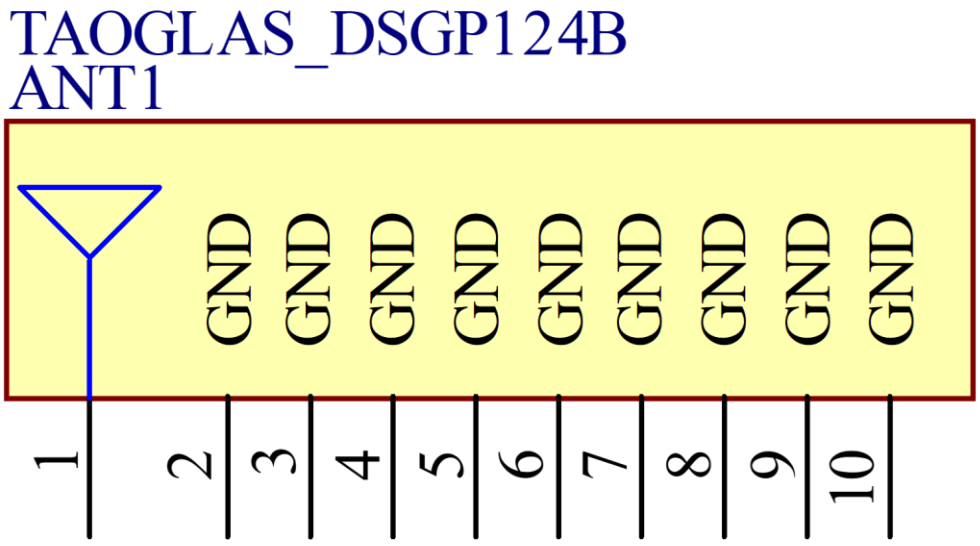
Top view of PCB reference design.

5.1 Schematic and Symbol Definition

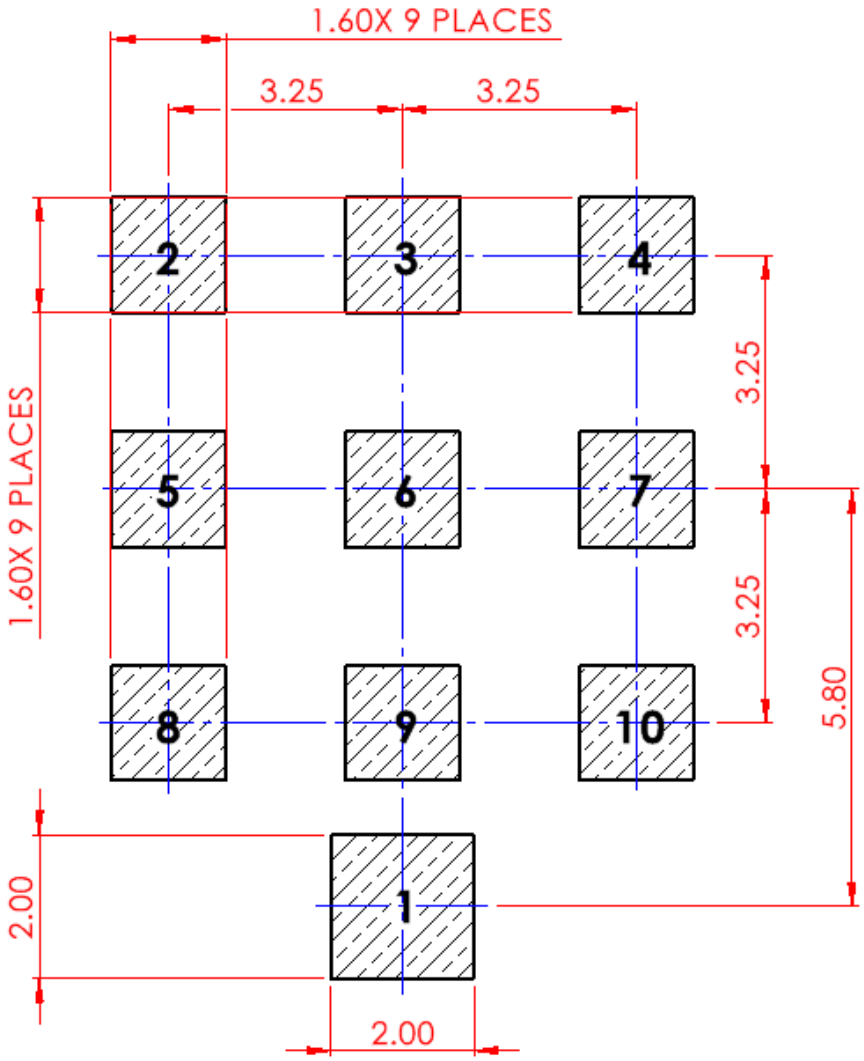
Above is a 3D model of the DSGP124B on a PCB.

The circuit symbol for the DSGP124B is shown below. The antenna has 10 pins as indicated below.

Pin	Description
1	RF Feed
2-10	Ground

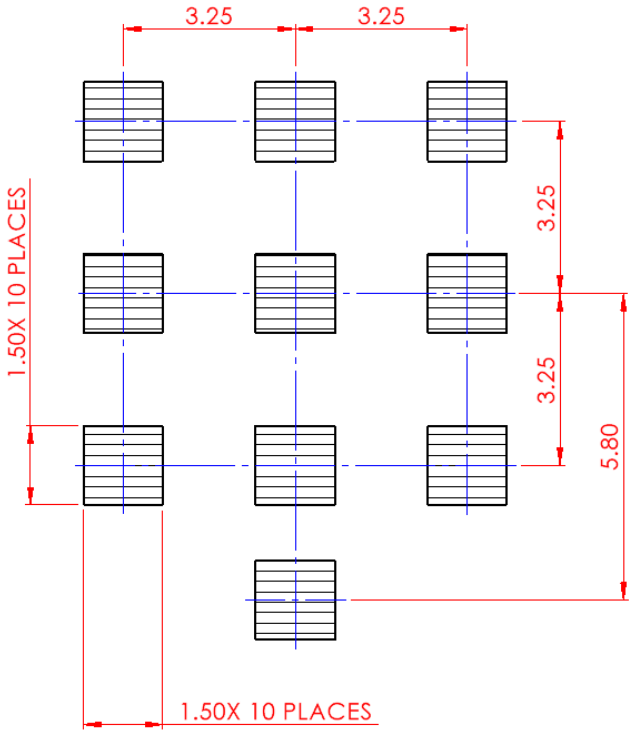


5.2 Antenna Footprint

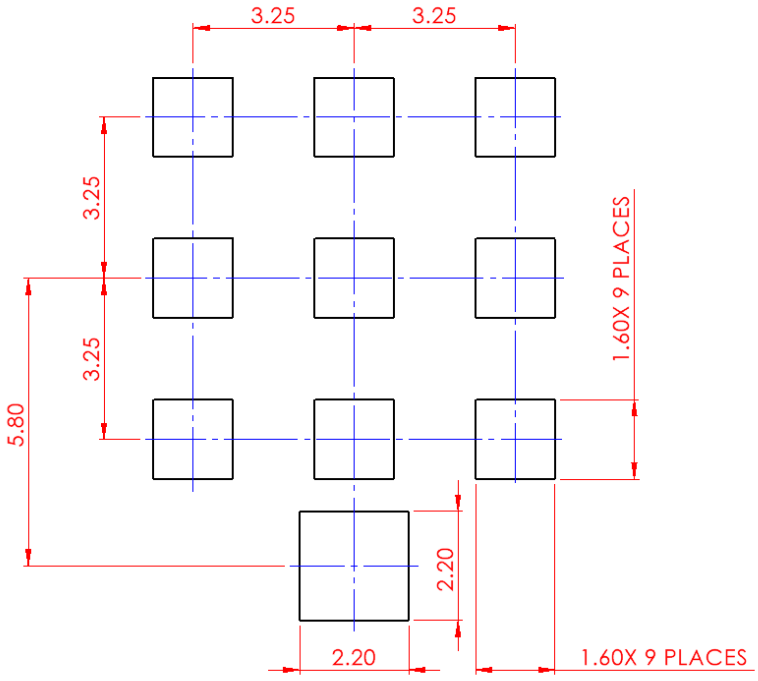


Pin	Description
1	RF Feed
2-10	Ground

5.3 Top Solder Paste



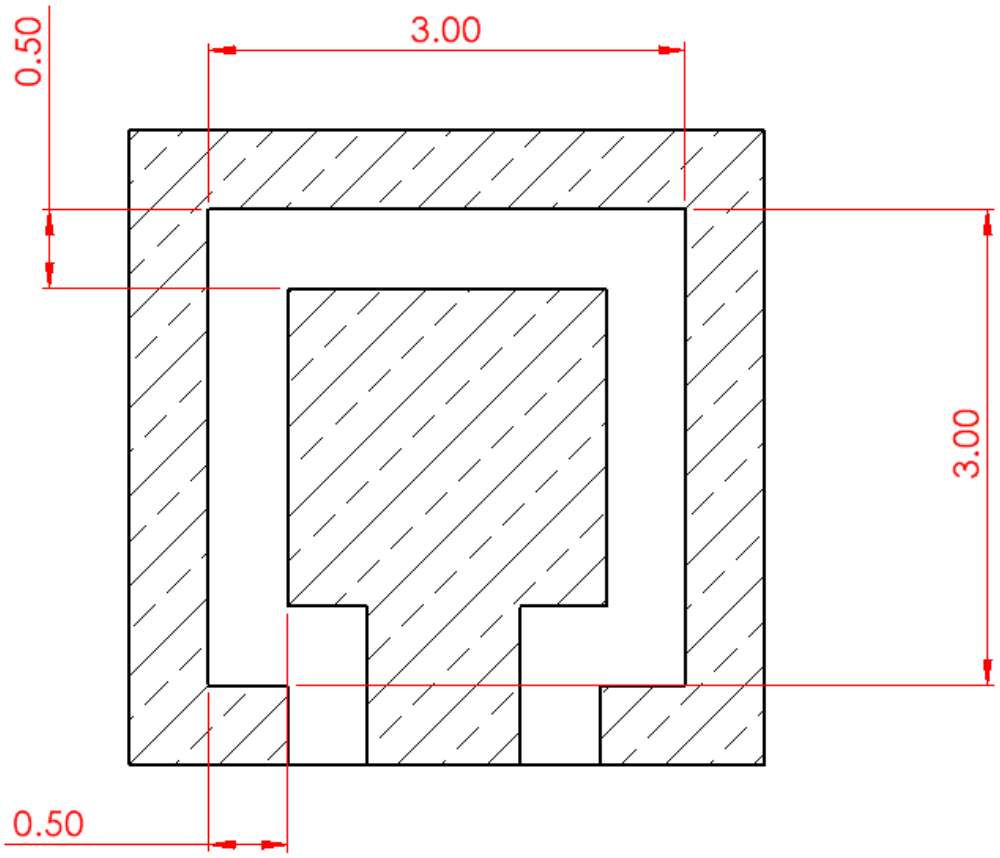
5.4 Top Solder Mask



5.5 Copper Clearance for DSGP124B

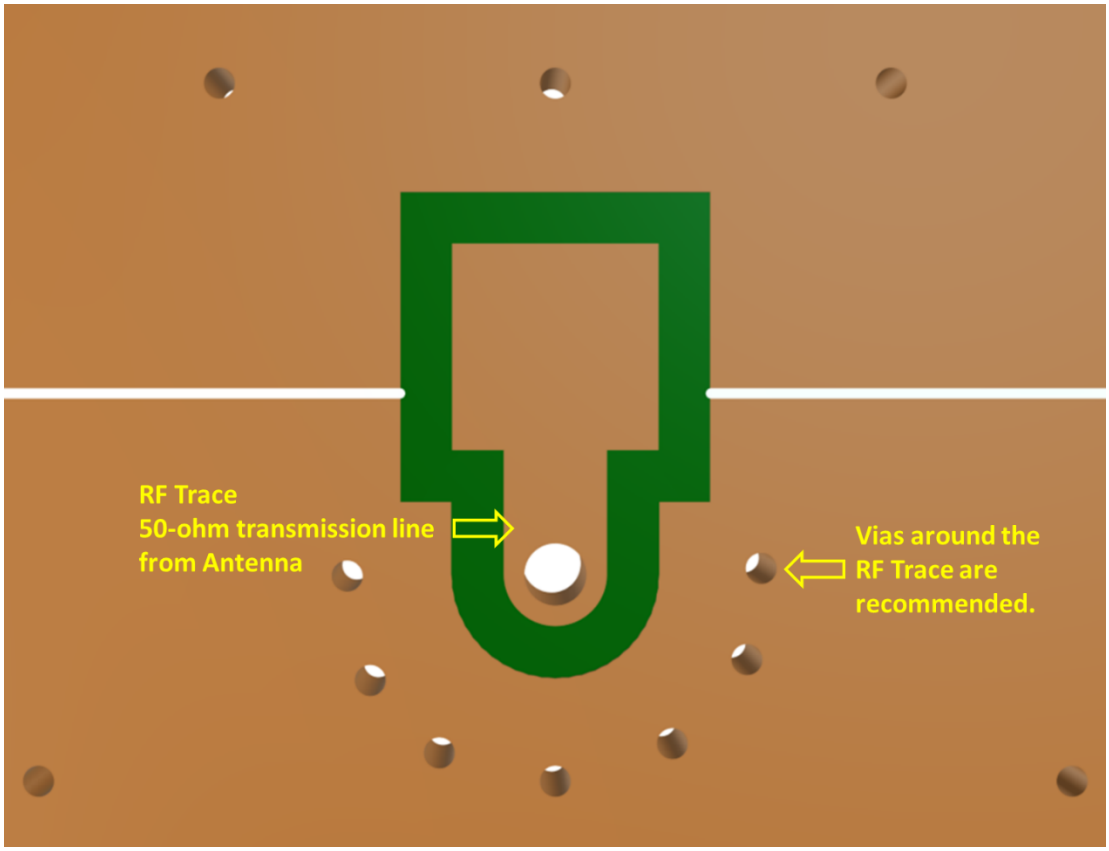
The footprint and clearance on the PCB must comply with the antenna's specification. The PCB layout shown in the diagrams below demonstrates the DSGP124B clearance area. The copper keep out area applies to the top layer and all internal layers.

There should be a 3mm copper clearance area around RF Feed pad.



5.6 Antenna Integration

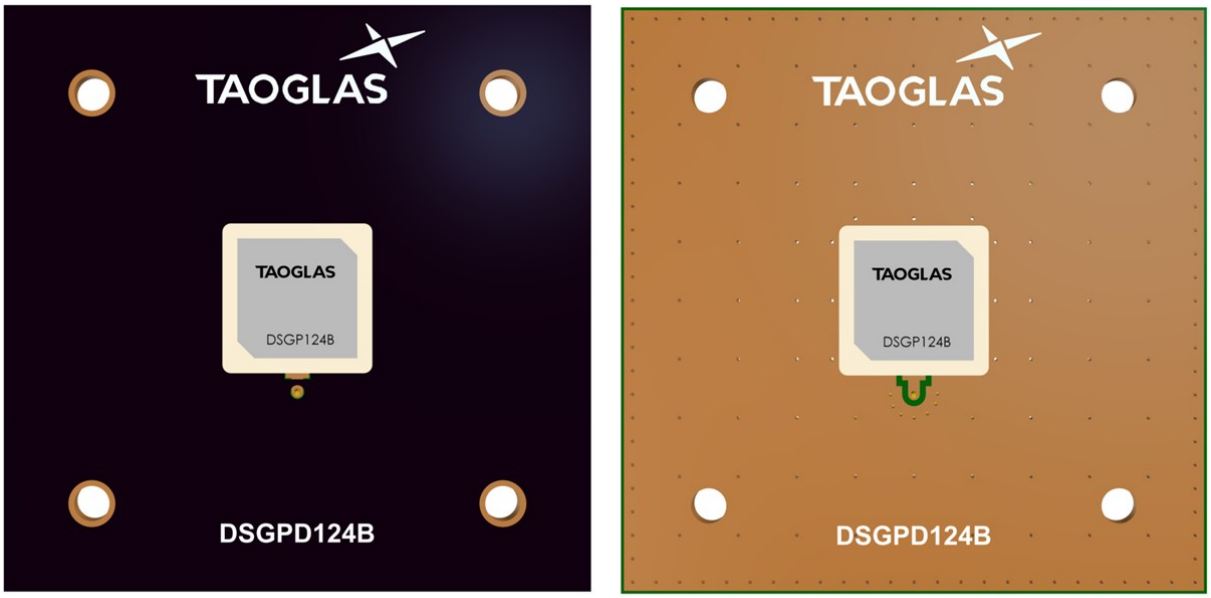
The DSGP124B should be placed at the centre of the PCB, to take advantage of the ground plane. The RF trace must maintain a 50 Ohm transmission line. Ground vias should be placed around the RF trace.



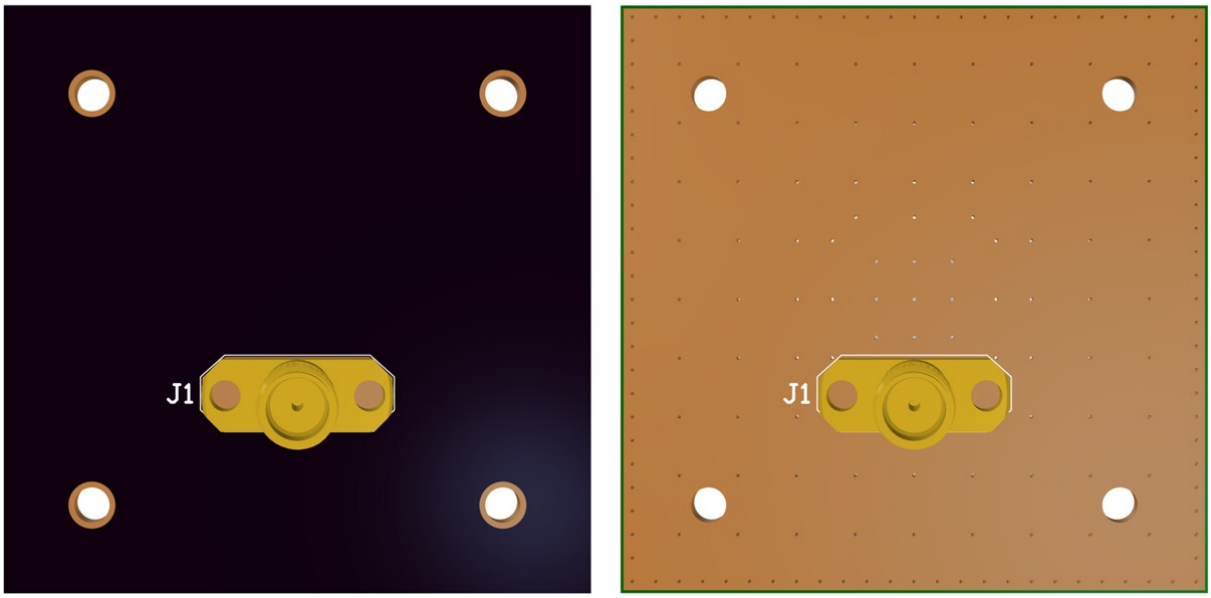
DSGP124B antenna mounted on a PCB reference design, showing transmission lines and integration notes.

5.7 Final Integration

The top side image shown below highlights the antenna transmission line. Taoglas recommends using a minimum of 50x50mm ground plane (PCB) to ensure optimal performance.



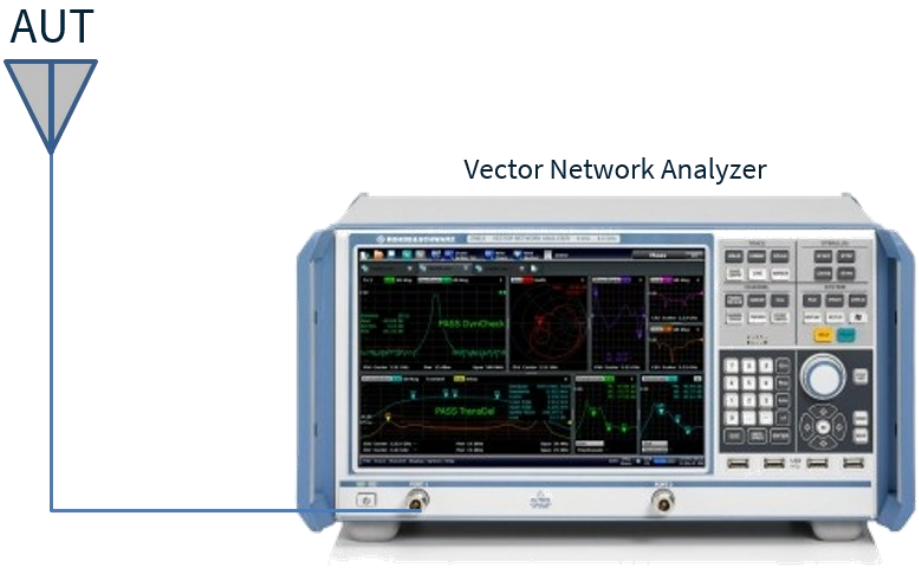
Top Side (DSGP124B placement on 50x50mm PCB reference design)

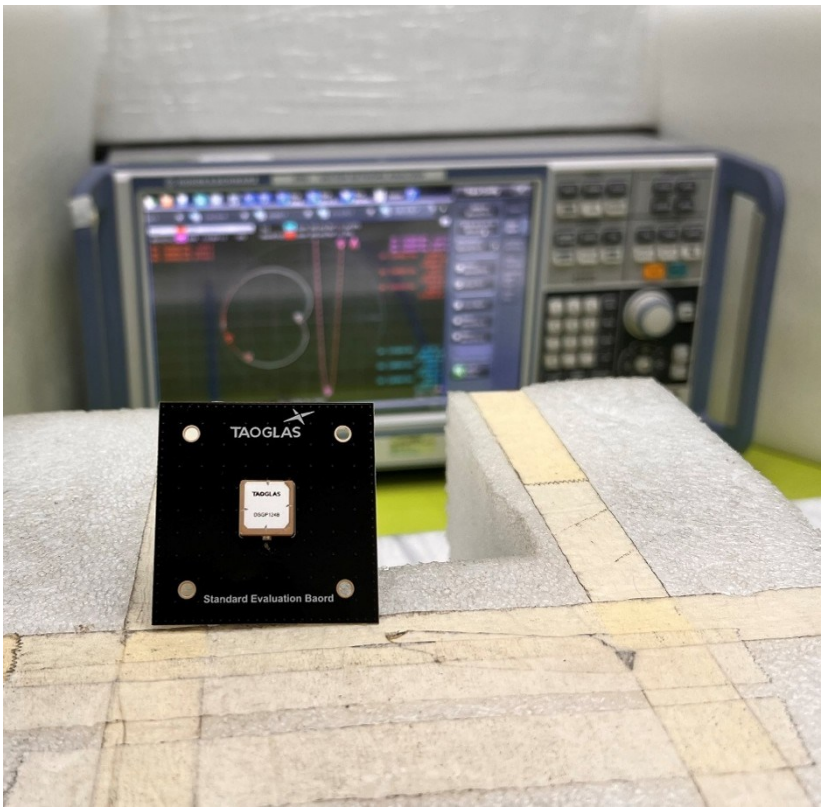


Bottom Side

6. Antenna Characteristics

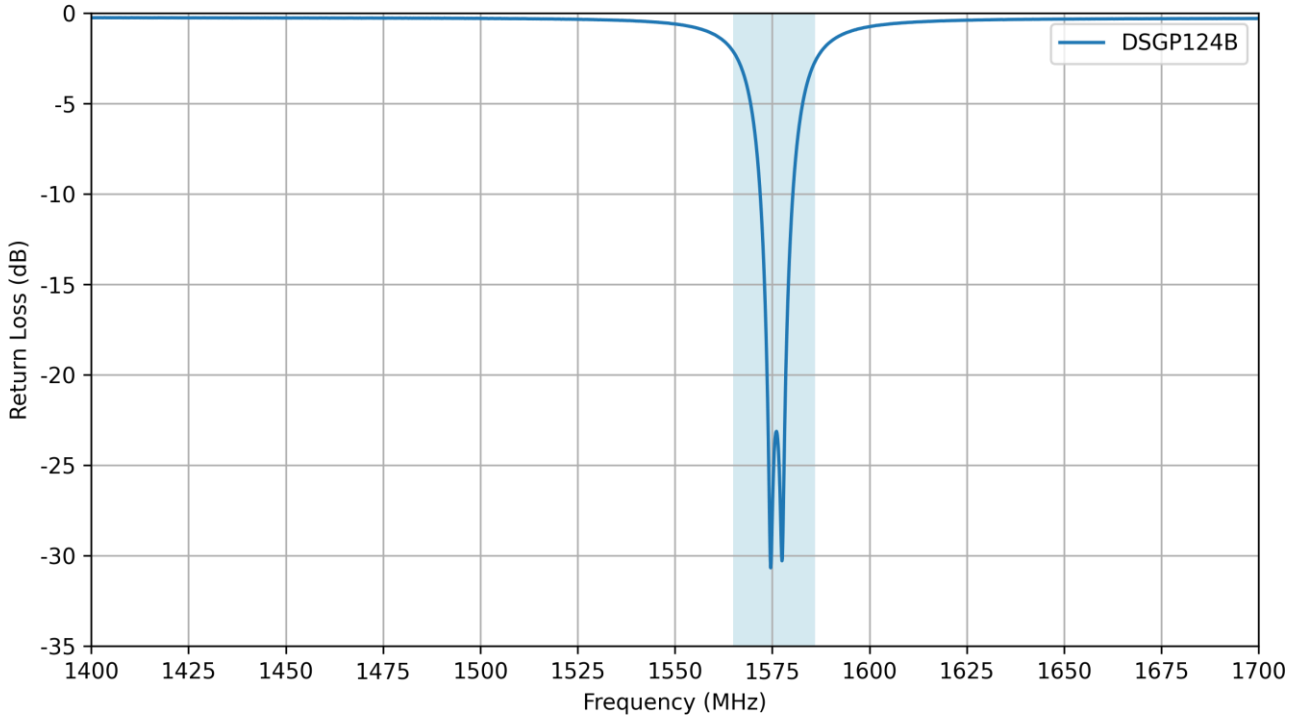
6.1 Test Setup



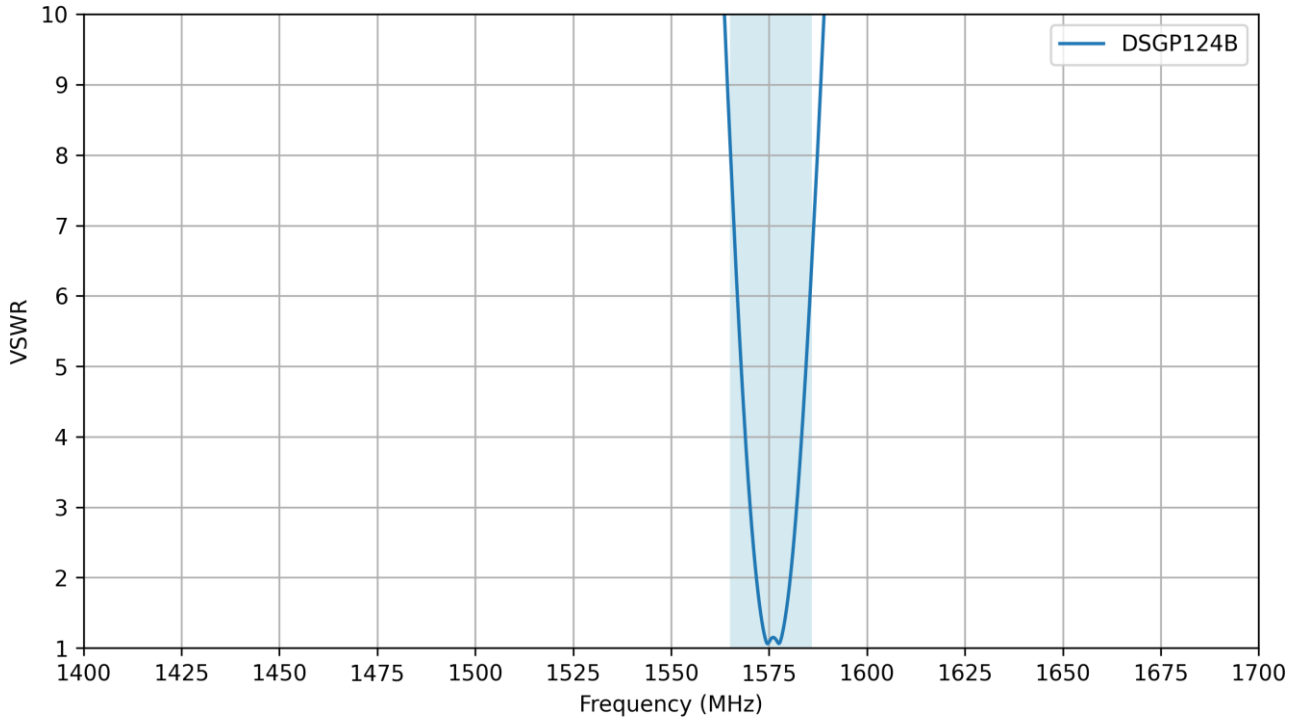


VNA Test Set-up

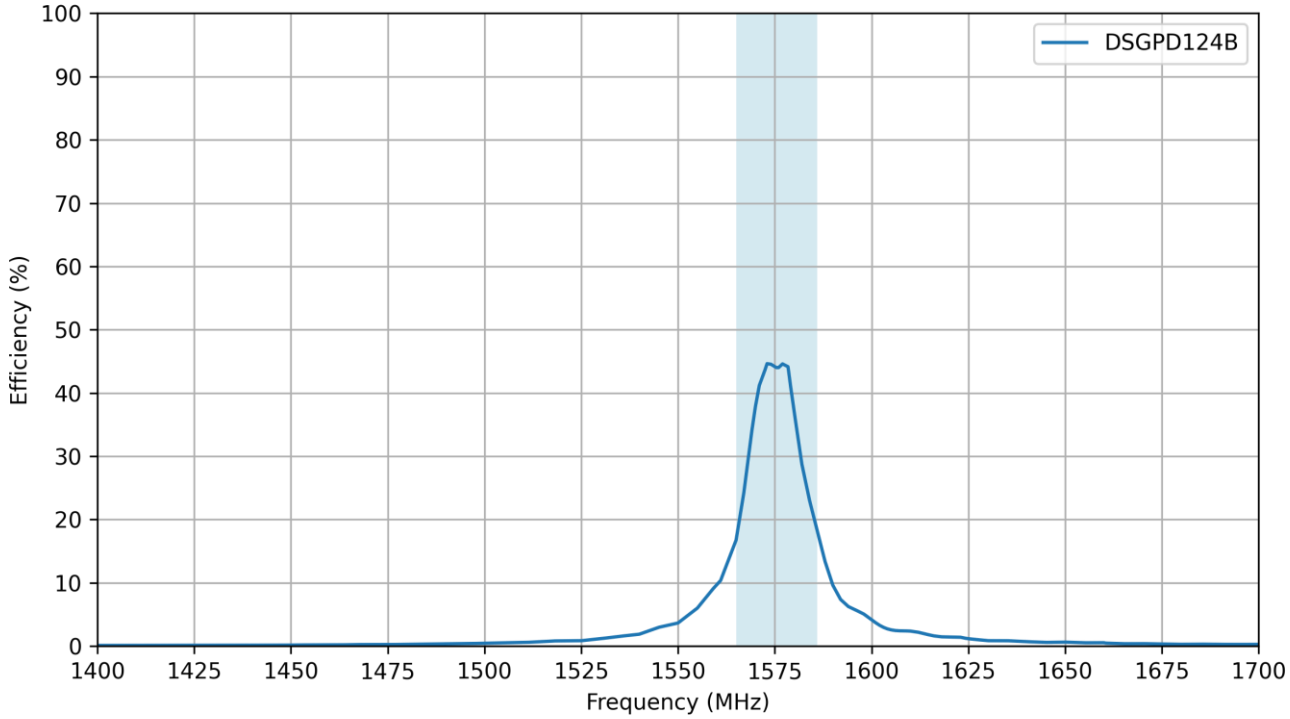
6.2 Return Loss



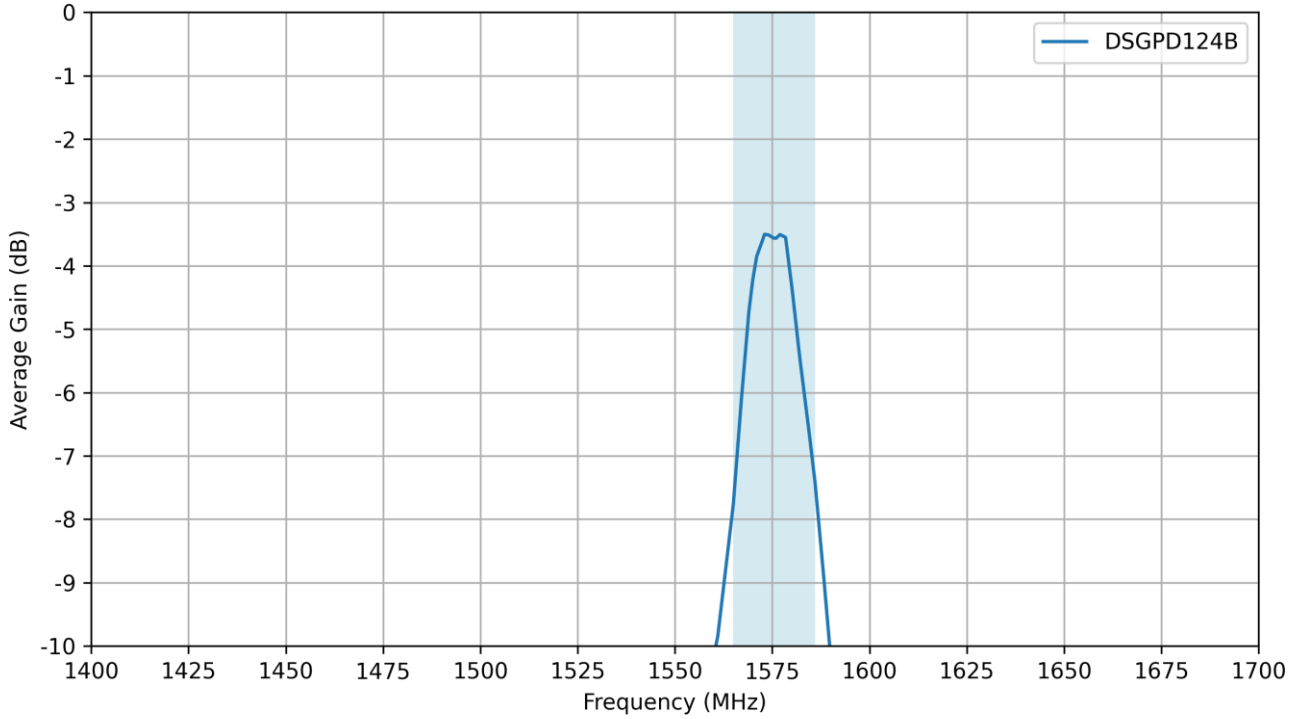
6.3 VSWR



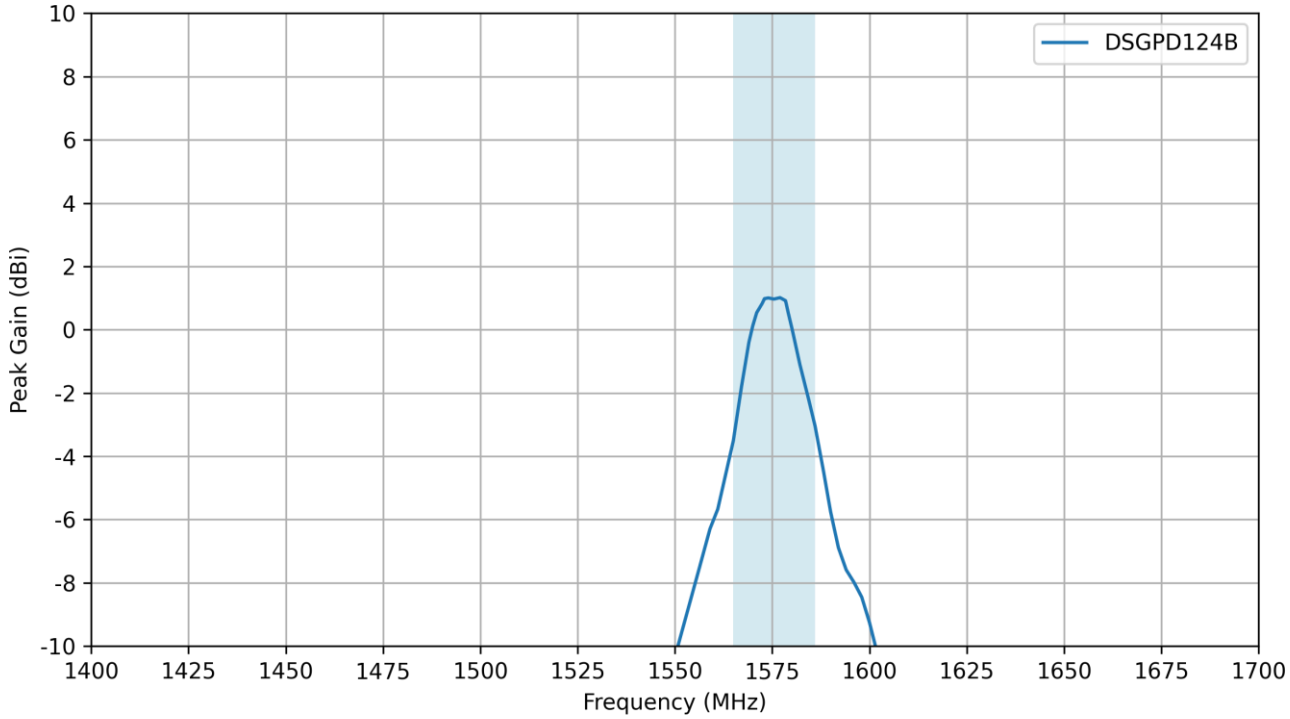
6.4 Efficiency



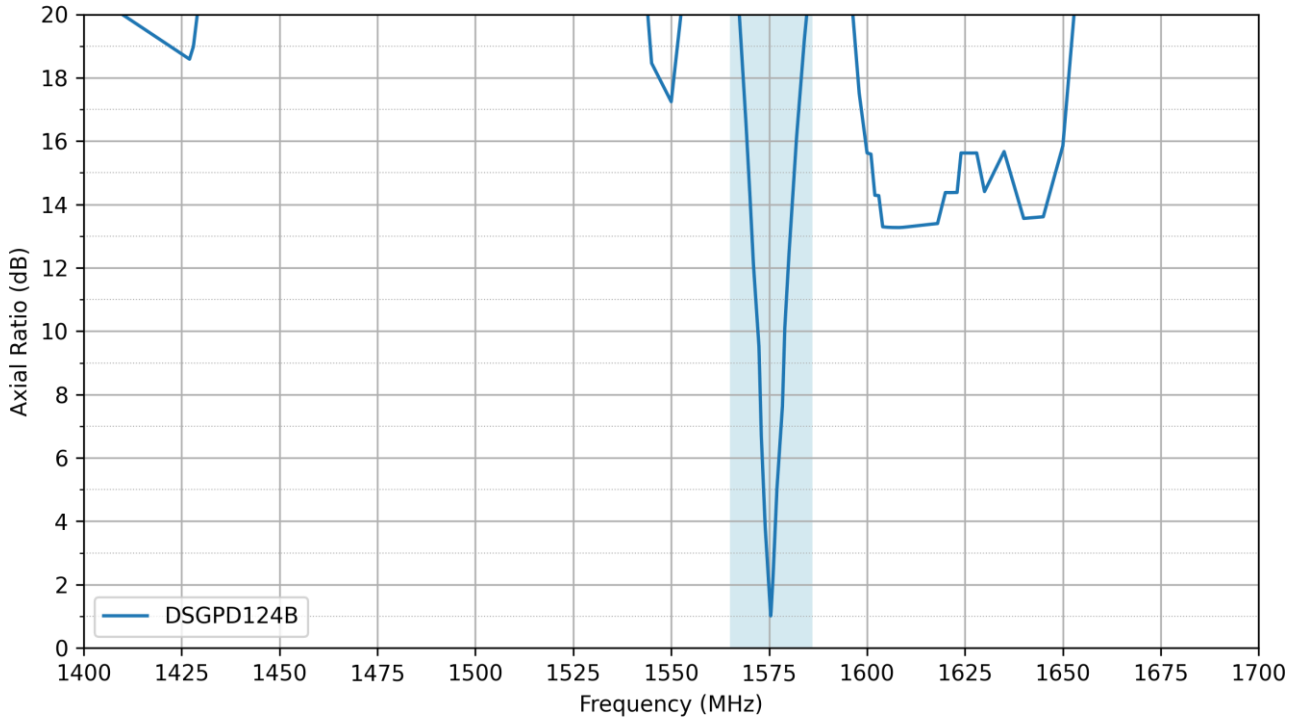
6.5 Average Gain



6.6 Peak Gain

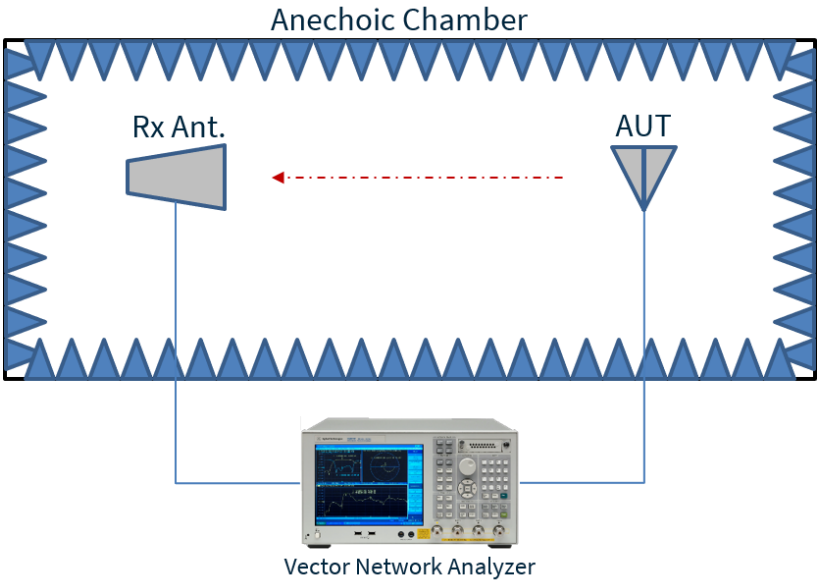


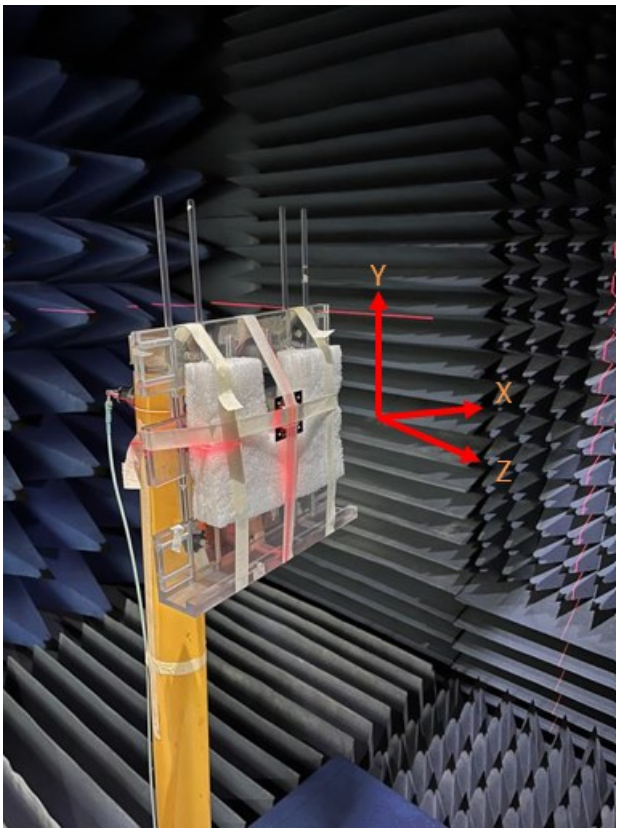
6.7 Axial Ratio



7. Radiation Patterns

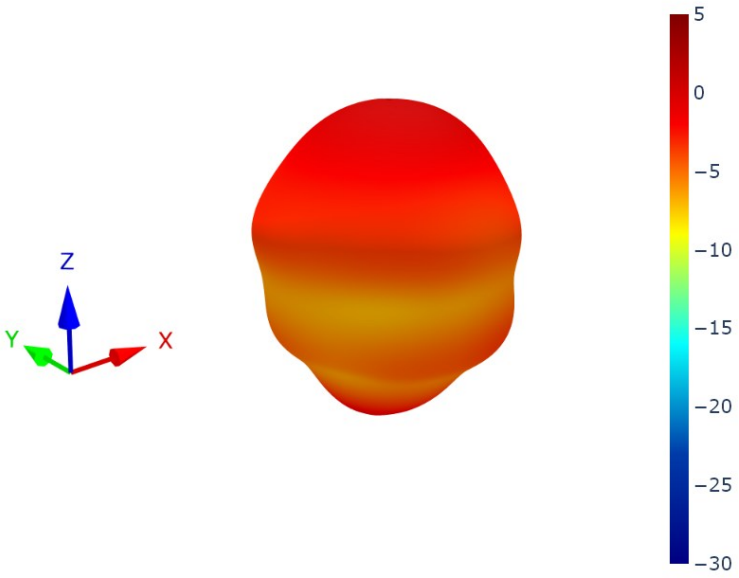
7.1 Test Setup



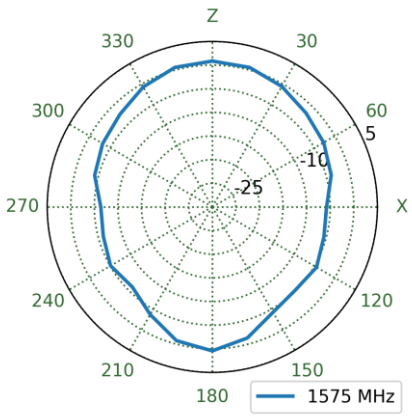


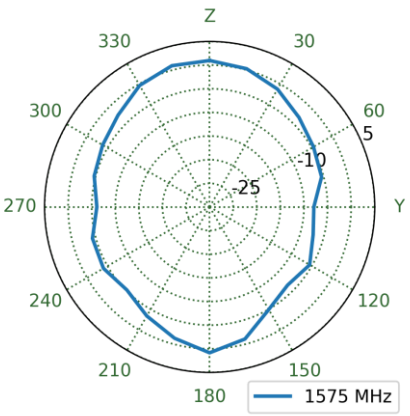
Chamber Test Set-up

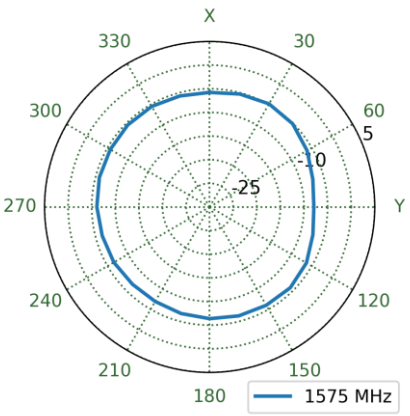
7.2 Patterns at 1575 MHz



XZ Plane	YZ Plane	XY Plane

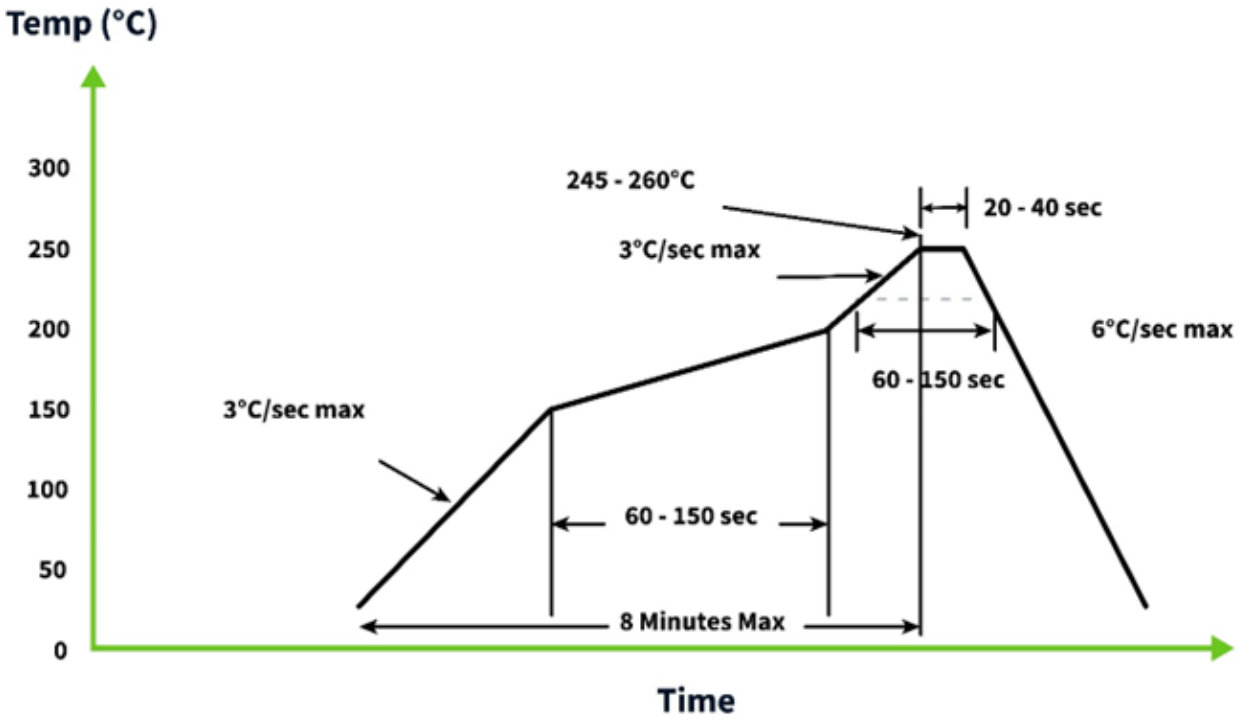






8. Solder Reflow Profile

The DSGP124B can be assembled by following the recommended soldering temperatures are as follows:



*Temperatures listed within a tolerance of +/- 10º C

Smaller components are typically mounted on the first pass, however, we do advise mounting the DSGP124B when placing larger components on the board during subsequent reflows.

Note: Soldering flux classified ROL0 under IPC J-STD-004 is recommended.

Changelog for the datasheet

SPE-25-8-110 – DSGP124B

Revision: A (Original First Release)	
Date:	2025-04-04
Notes:	Initial Release
Author:	Gary West

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