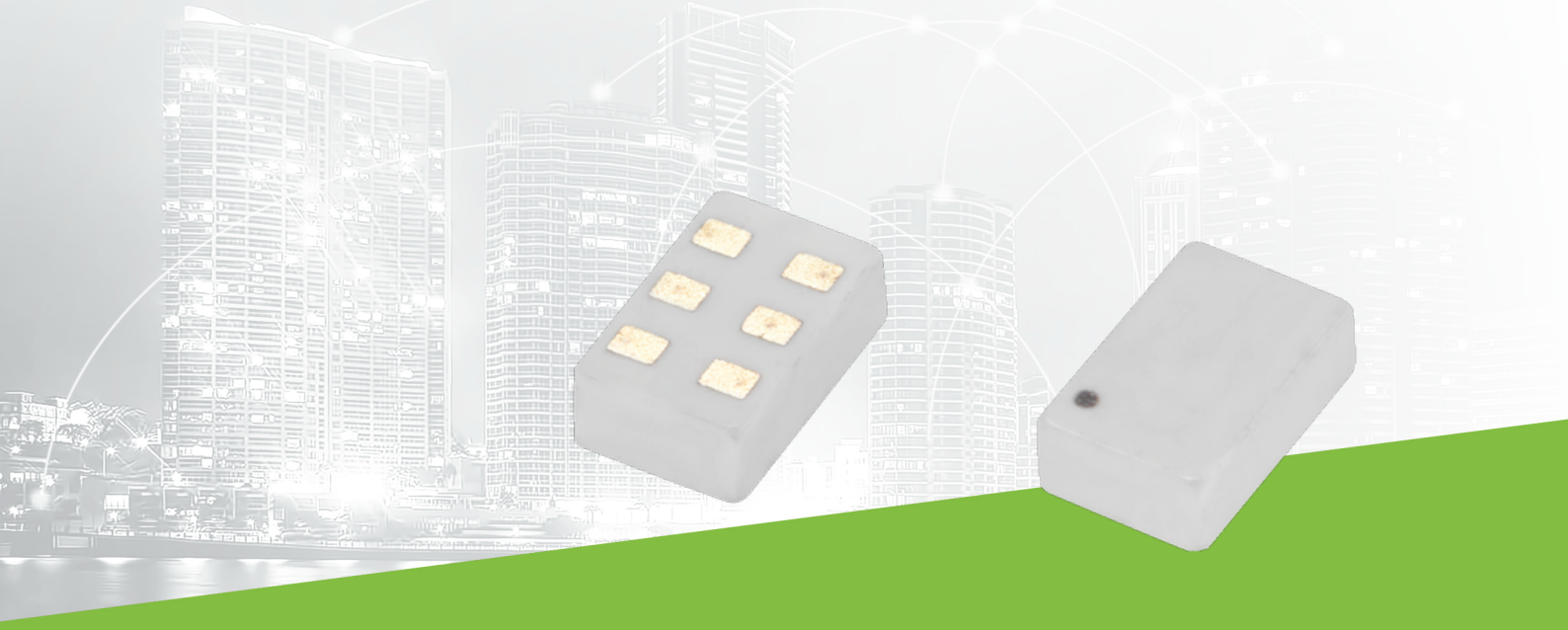
TAOGLAS®



Datasheet

High Performance Multiband GNSS Mini-Hybrid Coupler

Part No:
MHC125A

Description

Ultra Low Profile, High-performance 3dB SMD Mini-Hybrid Coupler

Features:

Frequencies Covered: 1100-1700 MHz
Low Insertion Loss
Tight amplitude balance and high isolation
Low VSWR
Au surface plated to prevent oxidation
Supplied on Tape & Reel
Dimensions: 2 x 1.25 x 0.6mm
RoHS & Reach Compliant

1. Introduction

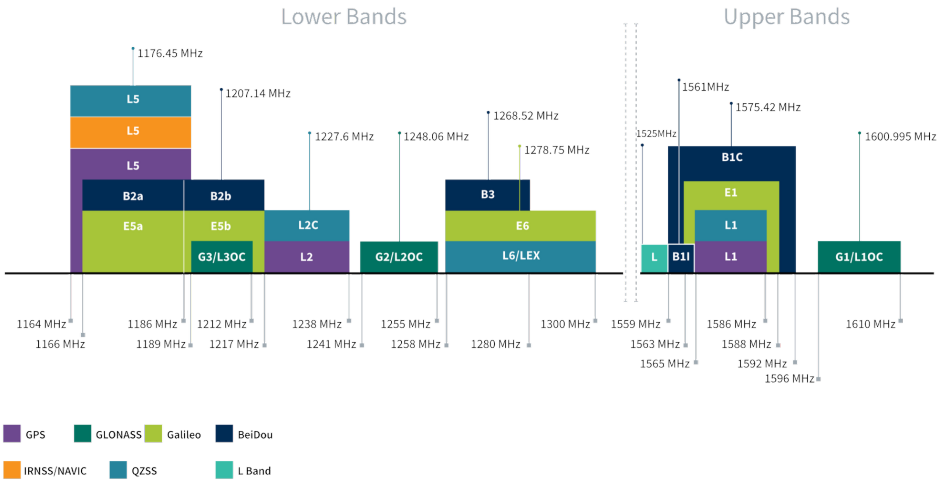
The Taoglas MHC125A is a super low profile (0.6mm height), high performance, 3dB hybrid coupler in an easy to integrate surface mount package. It is designed for multi-feed GNSS applications. The MHC125A is particularly used for applications where balanced power and low noise amplifiers are required. It has low insertion loss and tight amplitude and can be used in power applications up to 5 Watts. It has been engineered to cover the full GNSS bandwidth of 1100 – 1700MHz.

The MHC125A has been subjected to rigorous qualification testing, and it is manufactured using materials with coefficients of thermal expansion (CTE) compatible with common substrates such as FR4, G-10, RF-35, RO4003C and polyimide.

The MHC125A is the perfect companion to ensure successful integration of multi feed high performance, high precision GNSS patches from Taoglas such as the full band GPDF5012.A or the dual L1 feed GPDF254.A. Integration details are included in specific product datasheets but for further information regarding the MHC125A or it's integration with any of our antennas, please contact your regional Taoglas customer support team.

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

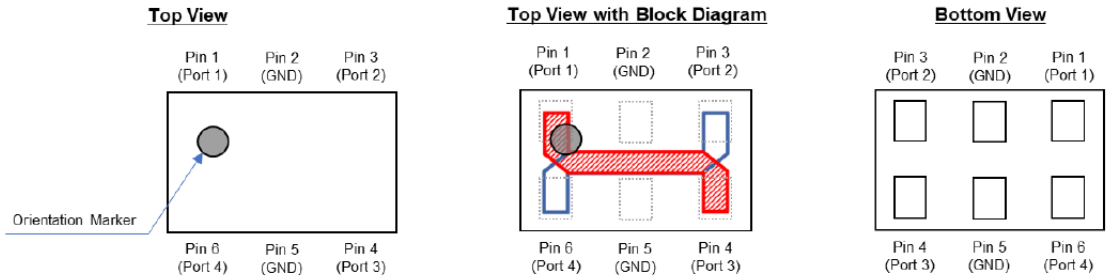
Electrical Specifications	
Parameter	**Value**
Frequency	1150 – 1630MHz
Isolation	20 dB Min
Insertion Loss	0.5 dB Max
Return Loss	> 20 dB
Amplitude Balance	+/- 0.5 dB Max
Phase Balance	90 +/- 5 Degrees
Power	5 Watts Avg.

Mechanical	
Dimensions	2mm x 1.25mm x 0.6mm
Weight	0.005 g
Mount	SMT

Environmental	
Operation Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RoHS & REACH Compliant	Yes
Moisture Sensitivity Level (MSL)	1

3. Pin Configuration

The MHC125A has an orientation marker to denote Pin 1. Once port one has been identified the other ports are known automatically. Please see the chart below for clarification:



※ It has an orientation marker to denote Pin1

※ It is designed with a symmetrical structure, so the input port can be configured the below table.

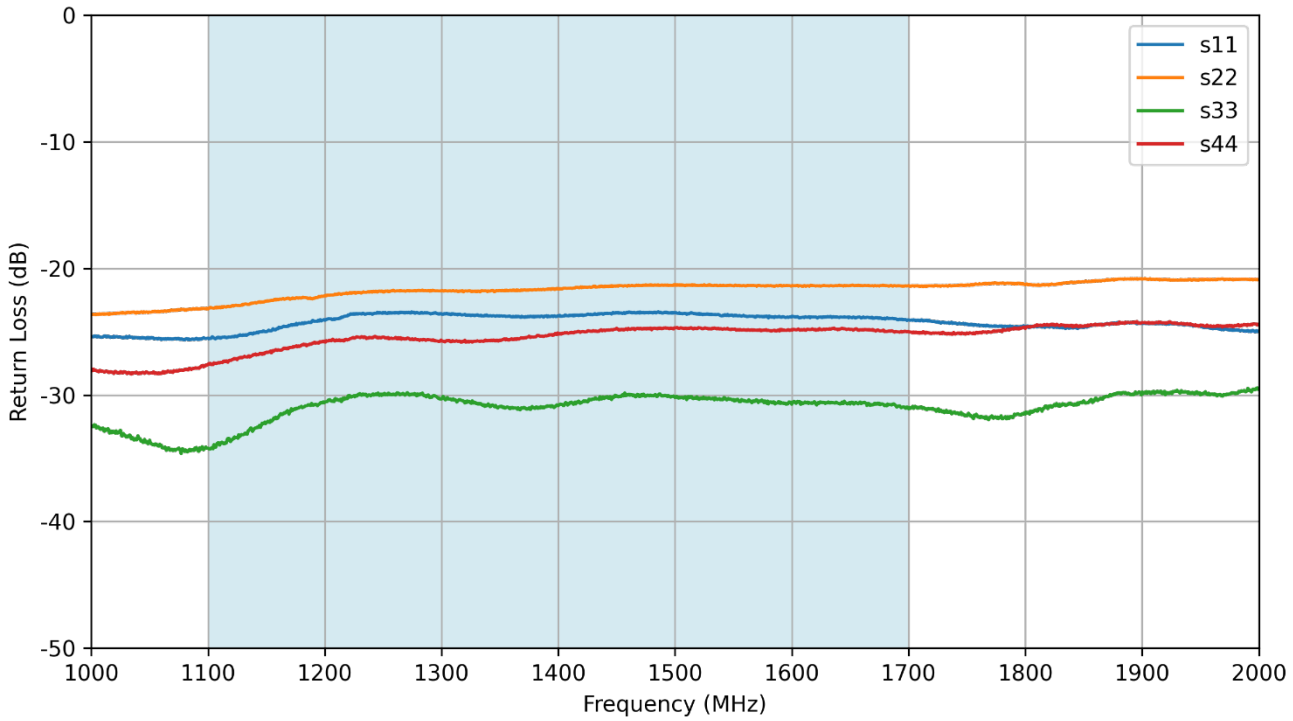
Port Configuration	Application							
	Splitter				Combiner			
	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
Pin 1(port 1)	Input	Isolated	-3dB, -90°	-3dB, 0°	Amplitude -90°	Amplitude 0°	Isolated	Output
Pin 2(GND)	GND	GND	GND	GND	GND	GND	GND	GND
Pin 3(port 2)	Isolated	Input	-3dB, 0°	-3dB, -90°	Amplitude 0°	Amplitude -90°	Output	Isolated
Pin 4(port 3)	-3dB, -90°	-3dB, 0°	Input	Isolated	Isolated	Output	Amplitude -90°	Amplitude 0°
Pin 5(GND)	GND	GND	GND	GND	GND	GND	GND	GND
Pin 6(port 4)	-3dB, 0°	-3dB, -90°	Isolated	Input	Output	Isolated	Amplitude 0°	Amplitude -90°

Note:
The “A” is the amplitude of the applied signals. When two quadrature signals with equal amplitudes are applied to the coupler as described in the table, they will combine at the output port. If the amplitudes are not equal, some of the applied energy will be directed to the isolated port.

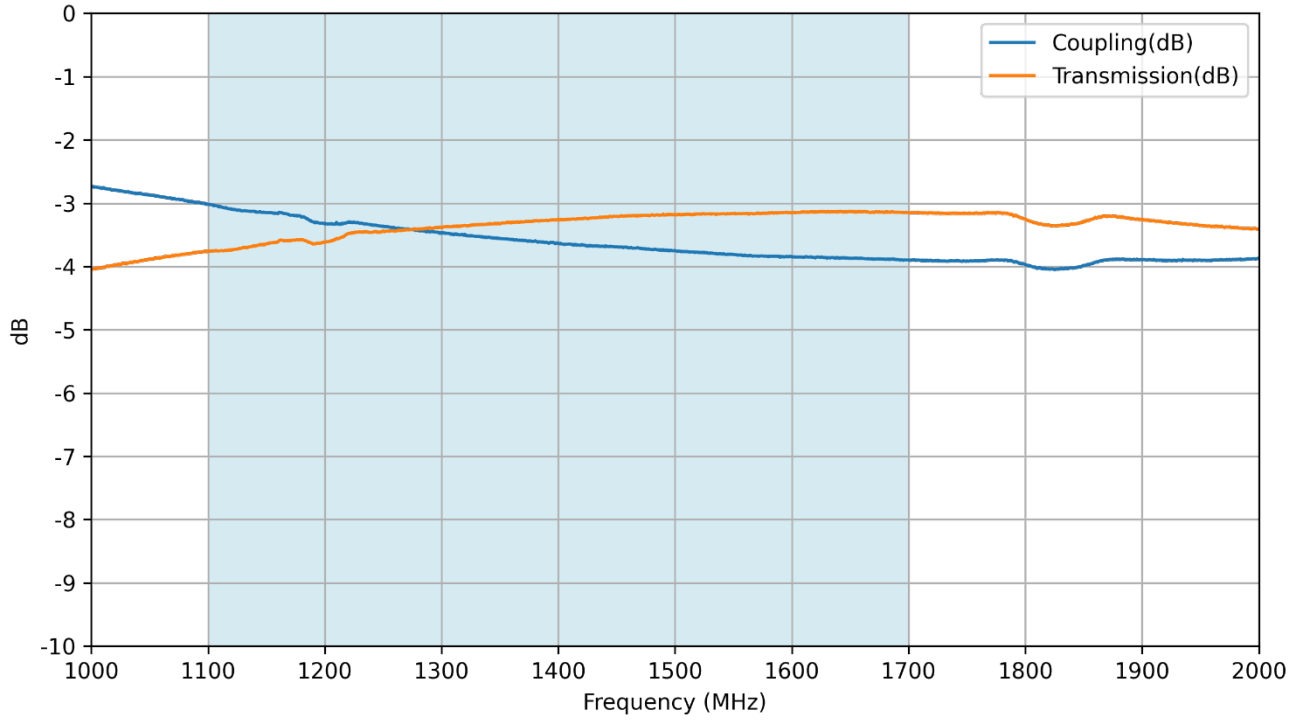
4. Typical Performance (Port 1 Feed)

Typical Performance (25°C: 1100-1700 MHz)

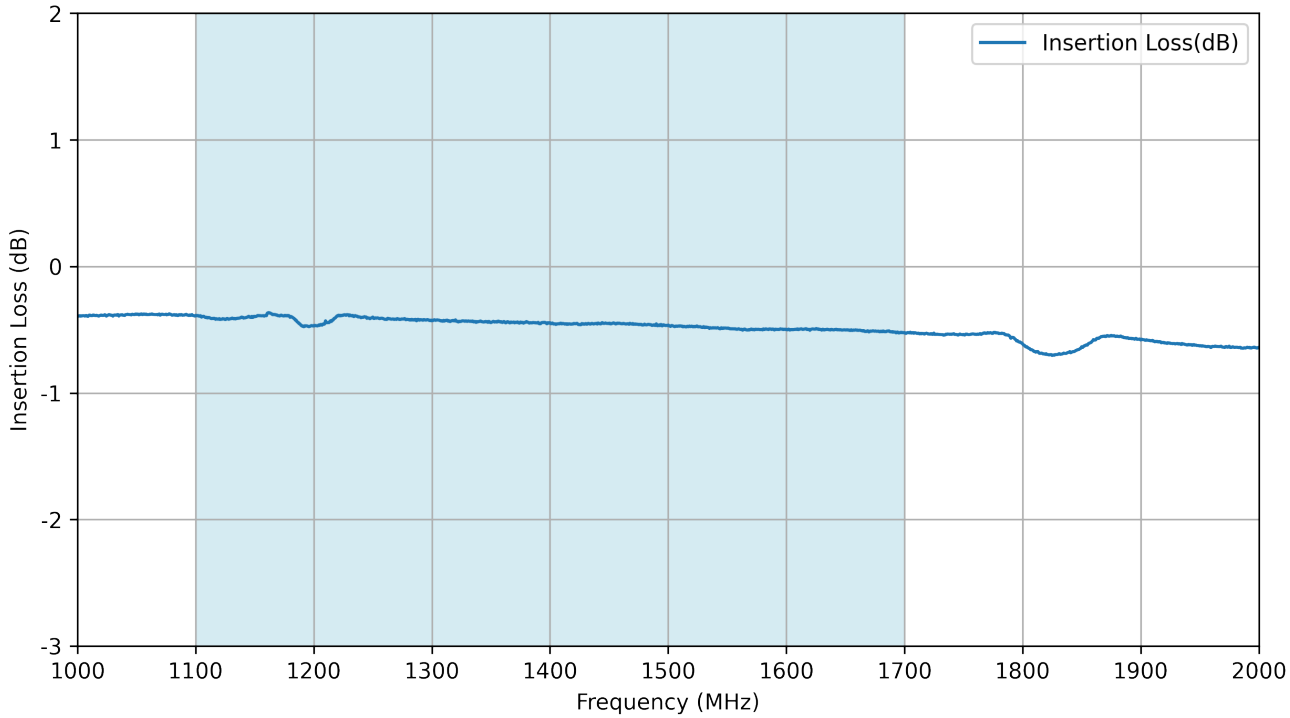
4.1 Return Loss



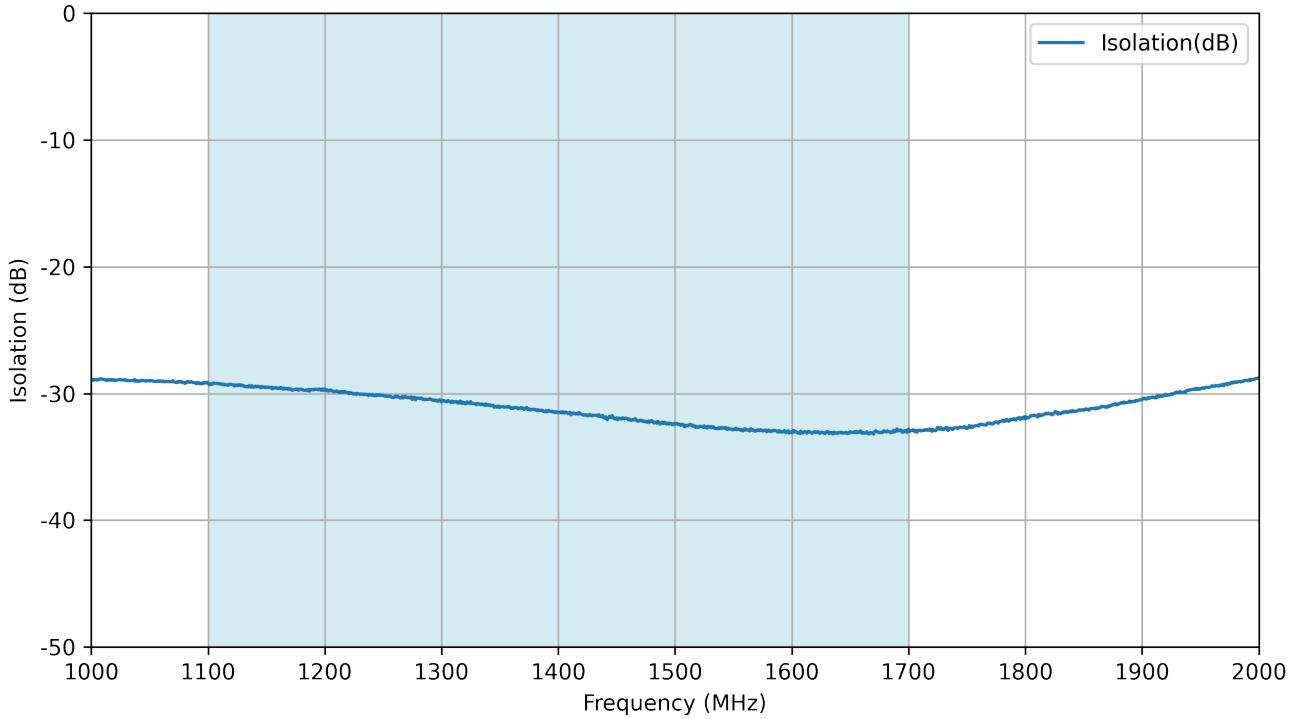
4.2 Coupling and Transmission



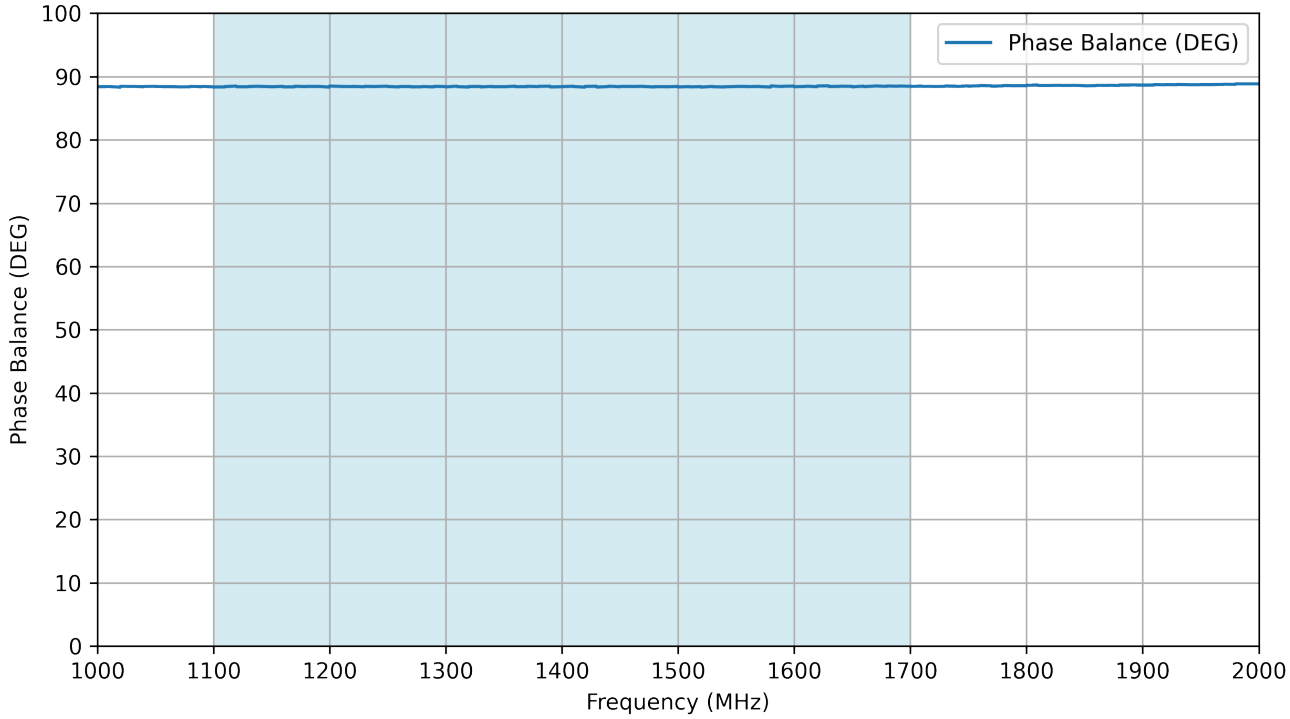
4.3 Insertion Loss



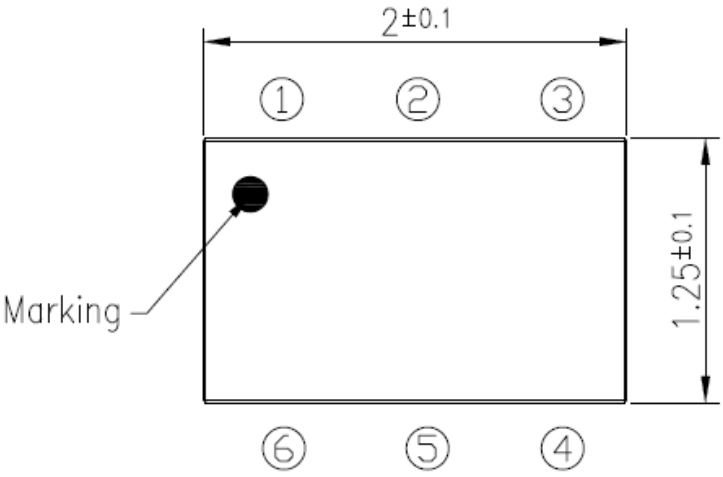
4.4 Isolation

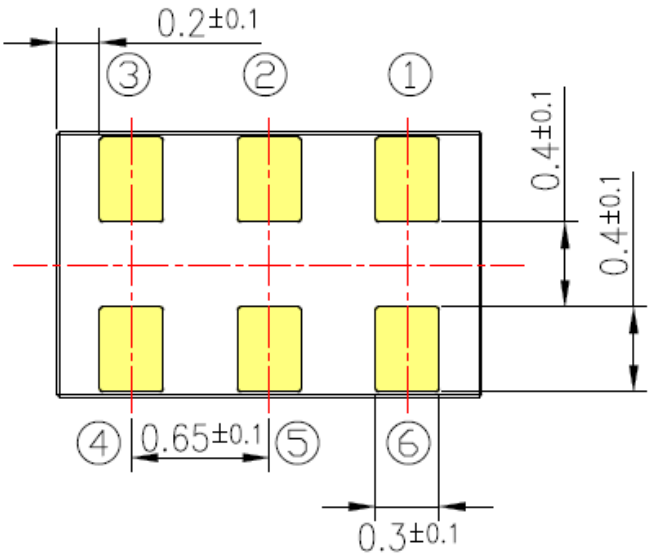


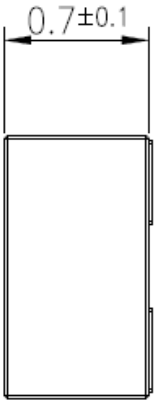
4.5 Phase


Phase Balance (DEG)
Phase Balance (DEG)
100
90
80
70
60
50
40
30
20
10
0
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Frequency (MHz)

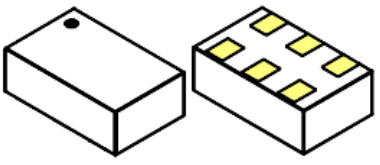
5. Mechanical Drawing







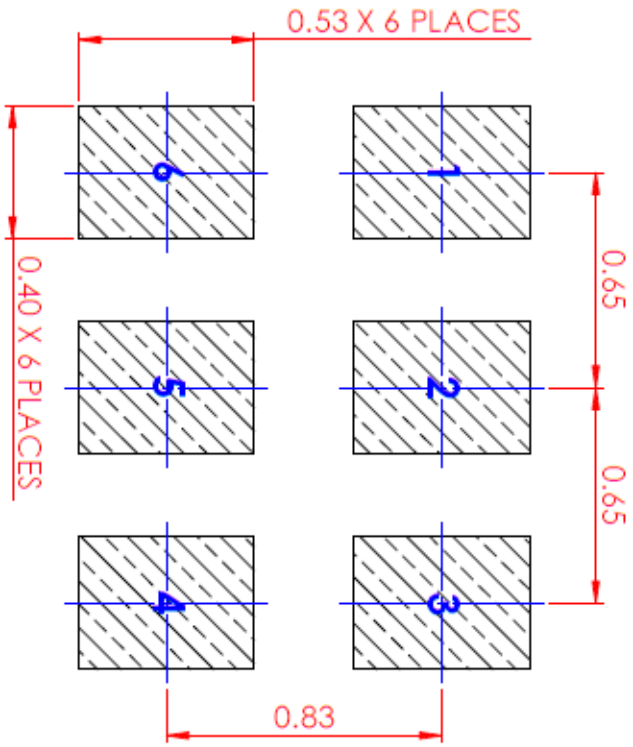
Number	Pin#	Terminal function
1	Pin 1	Port 1
2	Pin 2	GND
3	Pin 3	Port 2
4	Pin 4	Port 3
5	Pin 5	GND
6	Pin 6	Port 4

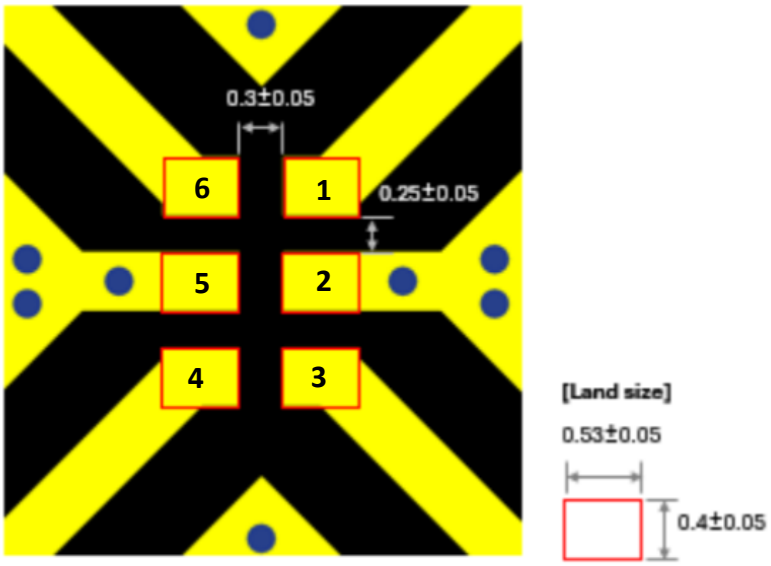


3D VIEW

6. Recommended PCB Layout

6.1 Footprint

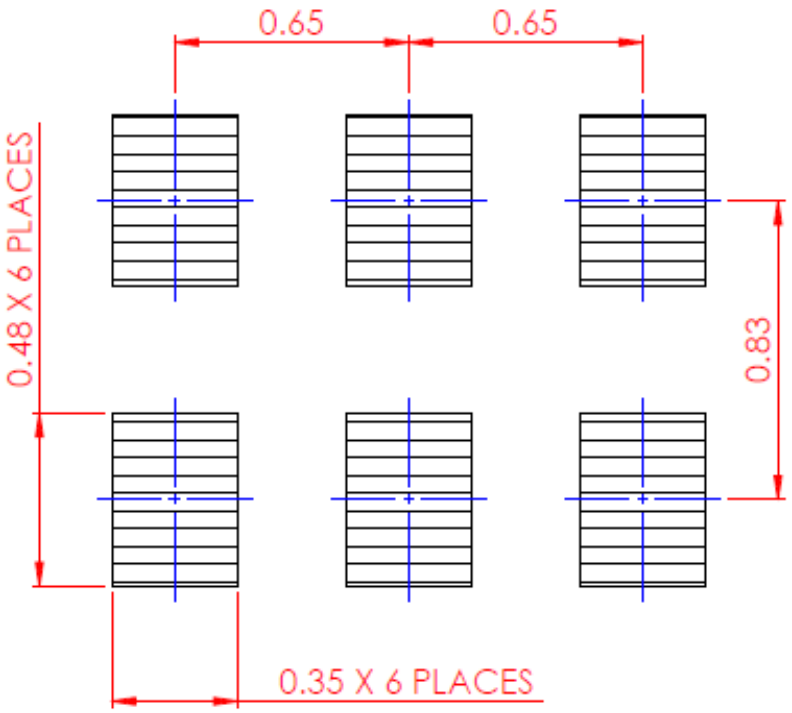




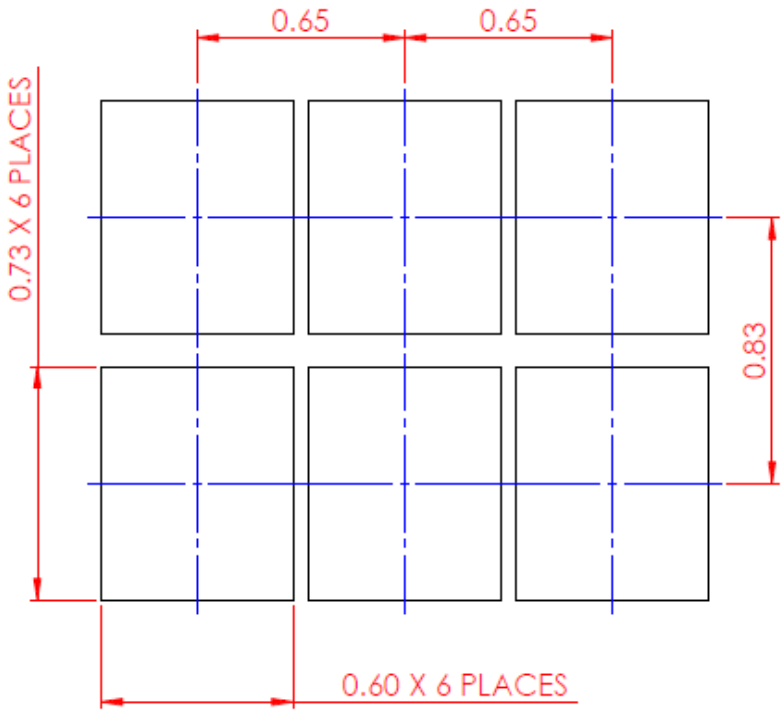
Notes:

1. 50Ω line width is shown above designing from RO4003C 0.2T copper Half OZ + FR4 0.8T, Total 1.0T
2. Bottom side of the PCB is continuous ground plane.
3. All dimensions shown in mm.

6.2 Top Solder Paste

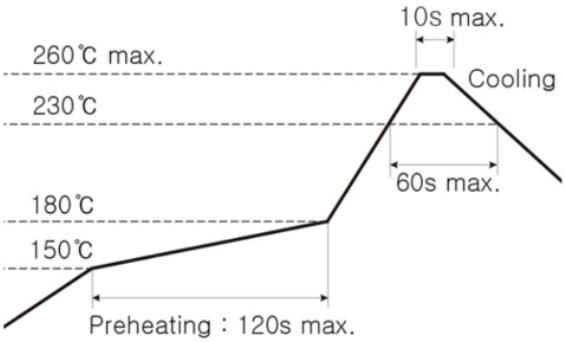


6.3 Top Solder Mask



7. Solder Reflow Profile

The MHC125A can be assembled by following the recommended soldering temperatures are as follows:



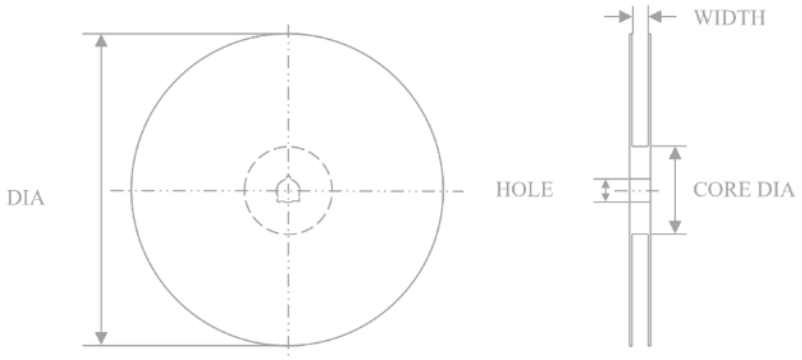
- Lead Free Solder paste
  : Sn / Ag / Cu : 96.5 / 3.0 / 0.5

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

Follow the recommended soldering conditions to avoid degradation of performance.
- This product is designed for reflow soldering only. Do not use flow soldering.
- Use non-activated flux. (Max. Cl content is less than 0.2%)
- Reflow cycle times should be done less than 3 times.

8. Packaging

4,000pcs per Reel
5 Reels per inner box
10 inner boxes per carton
Reel dimension shown below



Item	DIA	WIDTH	CORE DIA	HOLE
Size (mm)	178.0±0.5	9.0±0.5	60.0±1.0	13.2±0.3

Changelog for the datasheet

SPE-25-8-262 – MHC125A

Revision: A (Original First Release)	
Date:	2025-11-07
Notes:	Initial Release
Author:	Paul Liu

Previous Revisions

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