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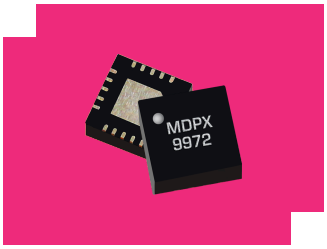
MDPX-00006PSM

Passive MMIC 11GHz Diplexer/Reflectionless Filter

DEVICE OVERVIEW

General Description

The MDPX-00006PSM is a MMIC surface mount diplexer capable of multiplexing low frequency DC to 10 GHz and high frequency 12 to 28 GHz signals. Passive GaAs MMIC technology allows production of smaller filter constructions that replace larger form factor circuit board constructions. Tight fabrication tolerances allow for less unit-to-unit variation than traditional filter technologies. The MDPX-00006PSM is available as a 4x4mm QFN and connectorized evaluation board. Low unit to unit variation allows for accurate simulations using the provided S3P file taken from measured production units.



Download s-parameters here

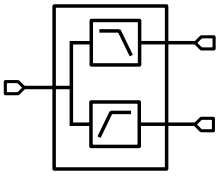
Features

- Excellent ≤1dB Insertion Loss
- 11 GHz Crossover Point
- High Stop Band Suppression
- Reflectionless Filter

Applications

- SATCOM
- Reflectionless Filter Applications
- Electronic Warfare

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MDPX-00006PSM	Passive MMIC 11GHz Diplexer/Reflectionless Filter	QFN	RoHS REACH	Released	EAR99
EVB-MDPX-00006P	Evaluation Board, Passive MMIC 11 GHz Diplexer/Reflectionless Filter	EVB	RoHS REACH	Released	EAR99

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Table Of Contents

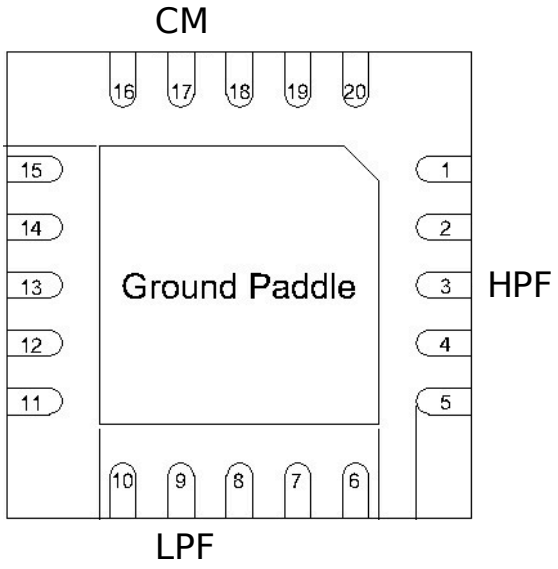
Revision History

Revision Code	Revision Date	Comment
-	2024-12-04	Initial Release

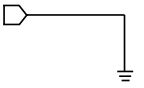
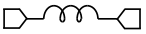
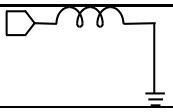
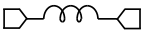
Port Configuration and Functions

Port Diagram

A top-down x-ray view of the MDPX-00006PSM's PSM package outline drawing is shown below. Input to the diplexer is on Pin 17, Pin 3 will be the output after passing through a high pass filter and Pin 9 will be the output after passing through the low pass filter.



Port Functions

Port	Function	Description	DC Equivalent Circuit
Ground Paddle	Ground	PSM package ground path is provided through the ground paddle and should be connected to RF ground.	
Pin 17	Common/Input	Pin 17 is DC short to Pin 9 and open to GND and Pin 3.	
Pin 3	High Pass Filter	Pin 3 is DC short to GND and open to the other ports.	
Pin 9	Low Pass Filter	Pin 9 is DC short to Pin 17 and open to GND and Pin 3.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded or met simultaneously the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	100	°C
Minimum Operating Temperature	-65	°C
Minimum Storage Temperature	-65	°C
RF Power Handling	30	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	4 x 4 mm
Moisture Sensitivity Level	-	MSL 1

Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the filter in a PSM package with a sine wave input applied to Pin 17. Min and Max limits are guaranteed at TA=+25°C.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
1 dBc High Passband	-	-	-	12.63	-	28	GHz
1 dBc Low Passband	-	-	-	0	-	9.3	GHz
30 dBc High Pass Rejection Point	-	10.36	10.36	-	-	-	dB
30 dBc Low Pass Rejection Point	-	11.95	11.95	-	-	-	GHz
3 dBc High Passband	-	11.7	28	-	-	-	GHz
3 dBc Low Passband	-	0	10.87	-	-	-	GHz
Common Port Return Loss	-	0	28	-	22	-	dB
Cross Over Frequency	-	11.34	11.34	-	-	-	GHz
Crossover Isolation	-	9.3	12.63	-	16	-	dB
Group Delay, High Band	-	-	-	-	62	-	ps
Group Delay, Low Band	-	-	-	-	95	-	ps
High Band Center Frequency	-	20.32	20.32	-	-	-	GHz
High Pass Filter, Pass Band Insertion Loss	-	-	-	-	0.4	-	dB
High Pass Filter, Pass Band Return Loss	-	12.63	28	-	18	-	dB
High Pass Isolation	-	12.63	28	-	52	-	dB
Impedance	-	-	-	-	50	-	Ω
Low Band Center Frequency	-	4.66	4.66	-	-	-	GHz
Low Pass Filter, Pass Band Insertion Loss	-	-	-	-	0.4	-	dB
Low Pass Filter, Pass Band Return Loss	-	0	9.3	-	26	-	dB
Low Pass Isolation	-	0	9.3	-	44	-	dB

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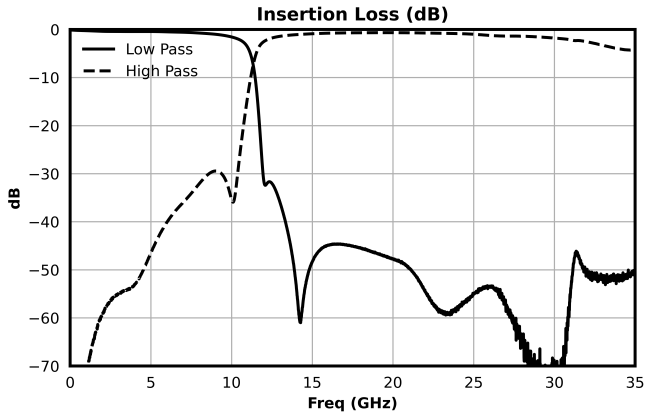
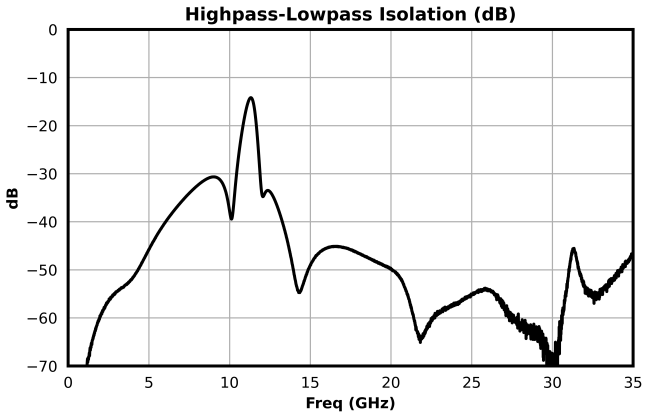
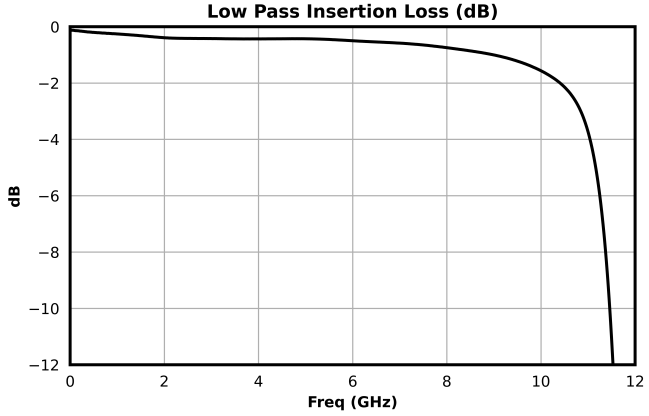
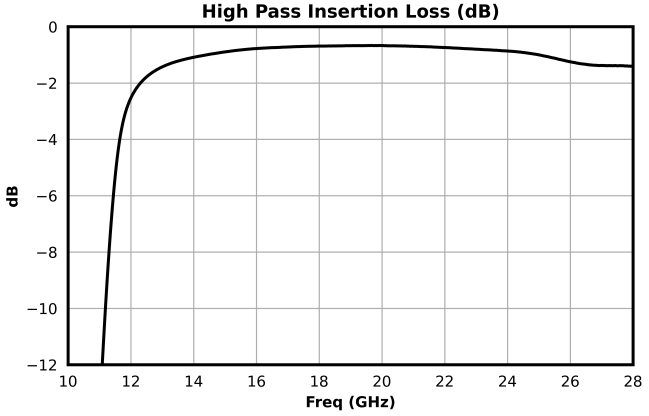
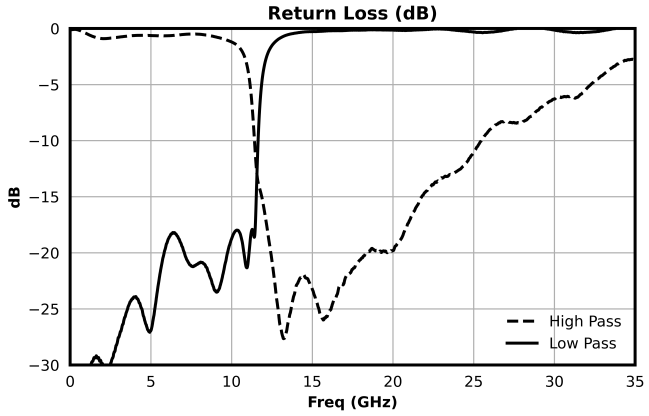
Typical Performance Plot

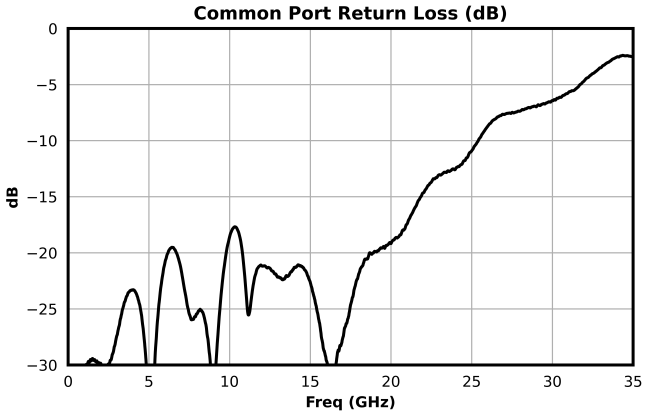


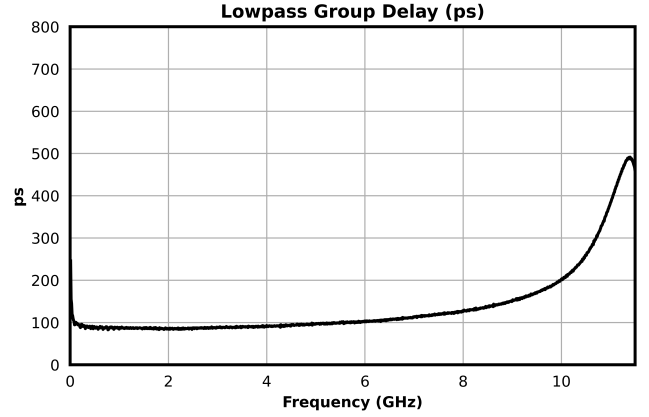


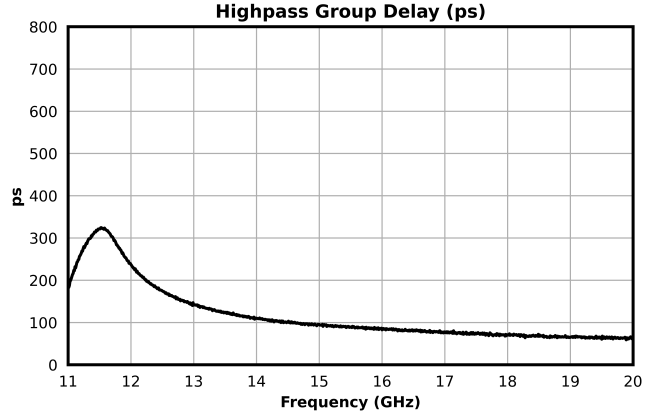










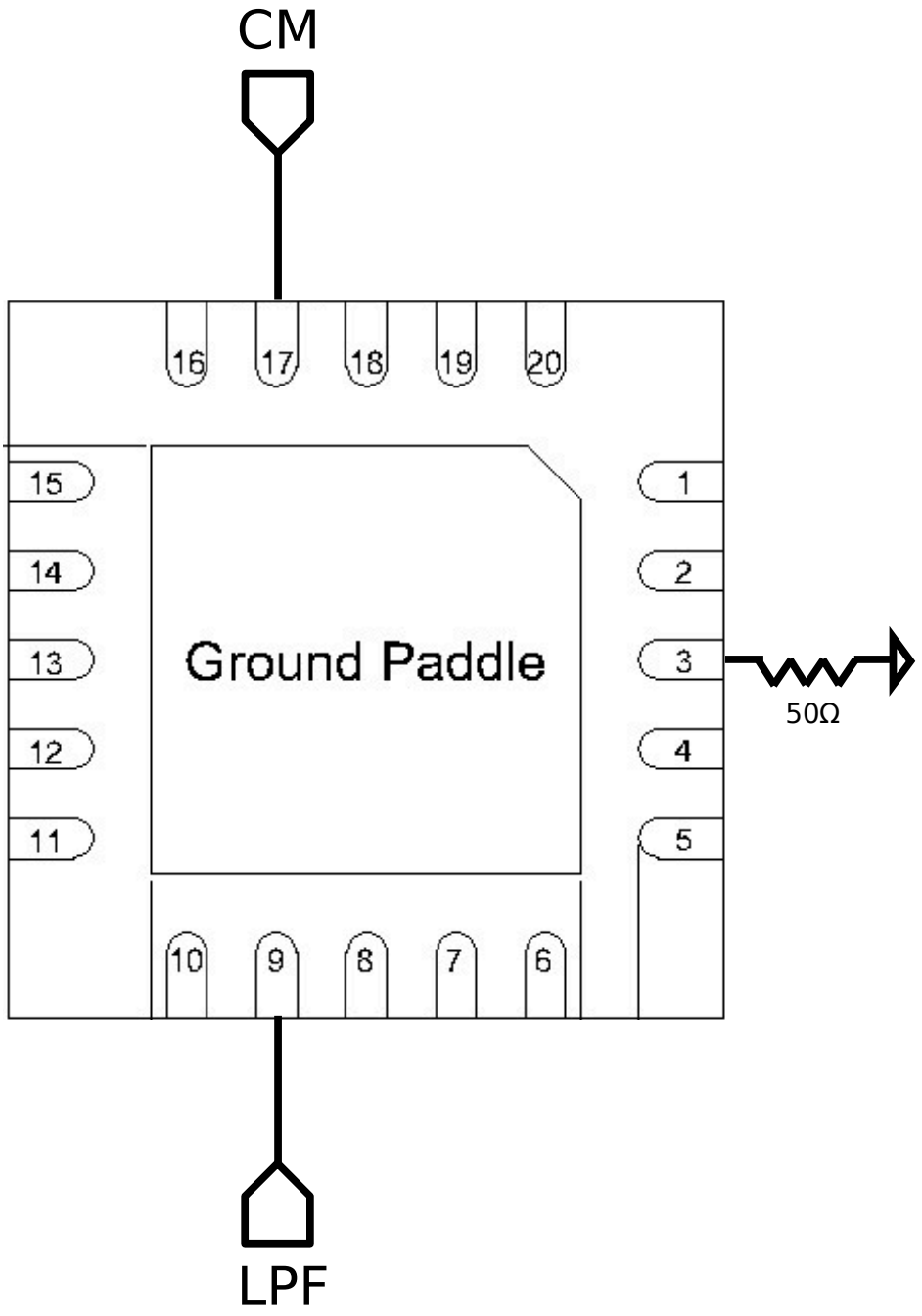


Application Information

Example Reflectionless Filter

Terminating the High-Pass port (Pin 3) with 50 Ω enables one-way reflectionless low-pass filtering from the Common port (Pin 17) to the Low-Pass port (Pin 9).

Terminating the Low-Pass port (Pin 9) with 50 Ω enables one-way reflectionless high-pass filtering from the Common port (Pin 17) to the High-Pass port (Pin 3).



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Mechanical Data

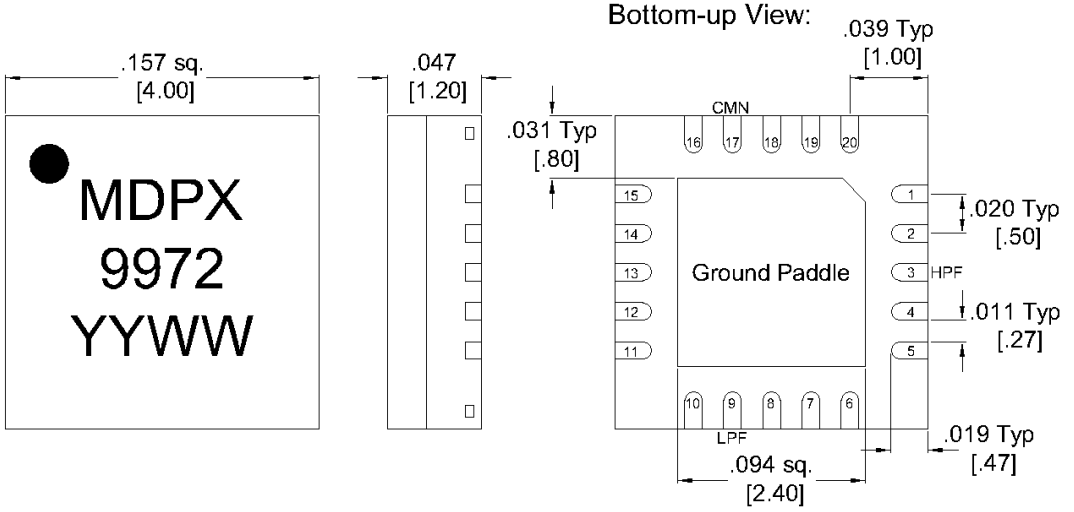
Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP

All measurements are typical

PROJECTION	REVISIONS			
INCH [MM]	REV.	DESCRIPTION	DATE	APPROVALS
	A	Initial Release	1/30/25	AT

Bottom-up View:



Pin #	Port
1	GND
2	GND
3	HPF
4	GND
5	GND
6	GND
7	GND
8	GND
9	LPF
10	GND
11	GND
12	GND
13	GND
14	GND
15	GND
16	GND
17	CMN
18	GND
19	GND
20	GND

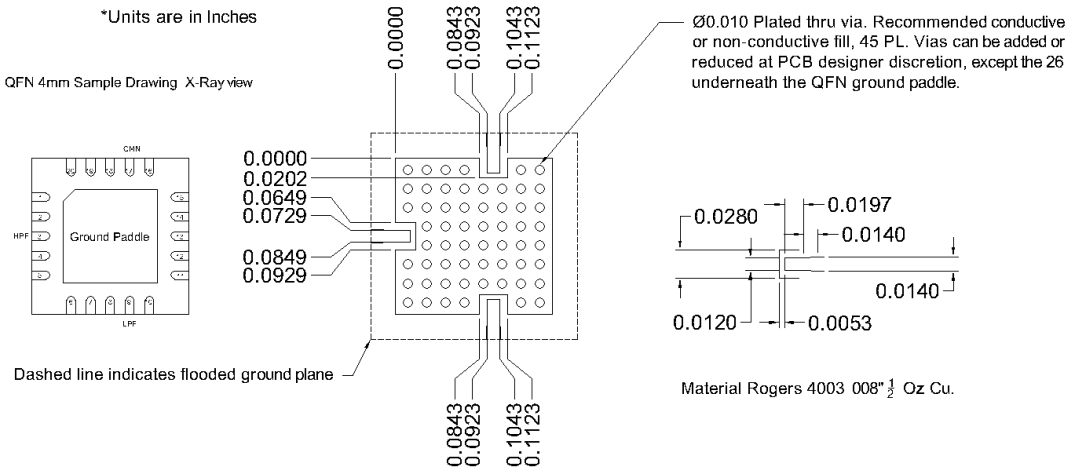
Notes (unless otherwise specified):

1. Substrate material is LCP.
2. I/O Leads and Die Paddle is (from base to finish):
   Ni: 0.5um MIN
   Pd: 0.02um MIN
   Au: 0.05um MAX
3. All unconnected pins should be connected to PCB RF ground.

NOTES:		Marki microwave www.markimicrowave.com
	DRAWN BY / DATE	Outline 4mm QFN Diplexer
MATERIAL: Note 1	AT 8/7/24	SIZE A | CAGE CODE 0UC32 | DWG. NO. MDPX-00006PSM
FINISH: Note 2		SCALE 15/1 SHEET 1 OF 1
DO NOT SCALE DRAWING		

Footprint Image

Download : Footprint Drawing



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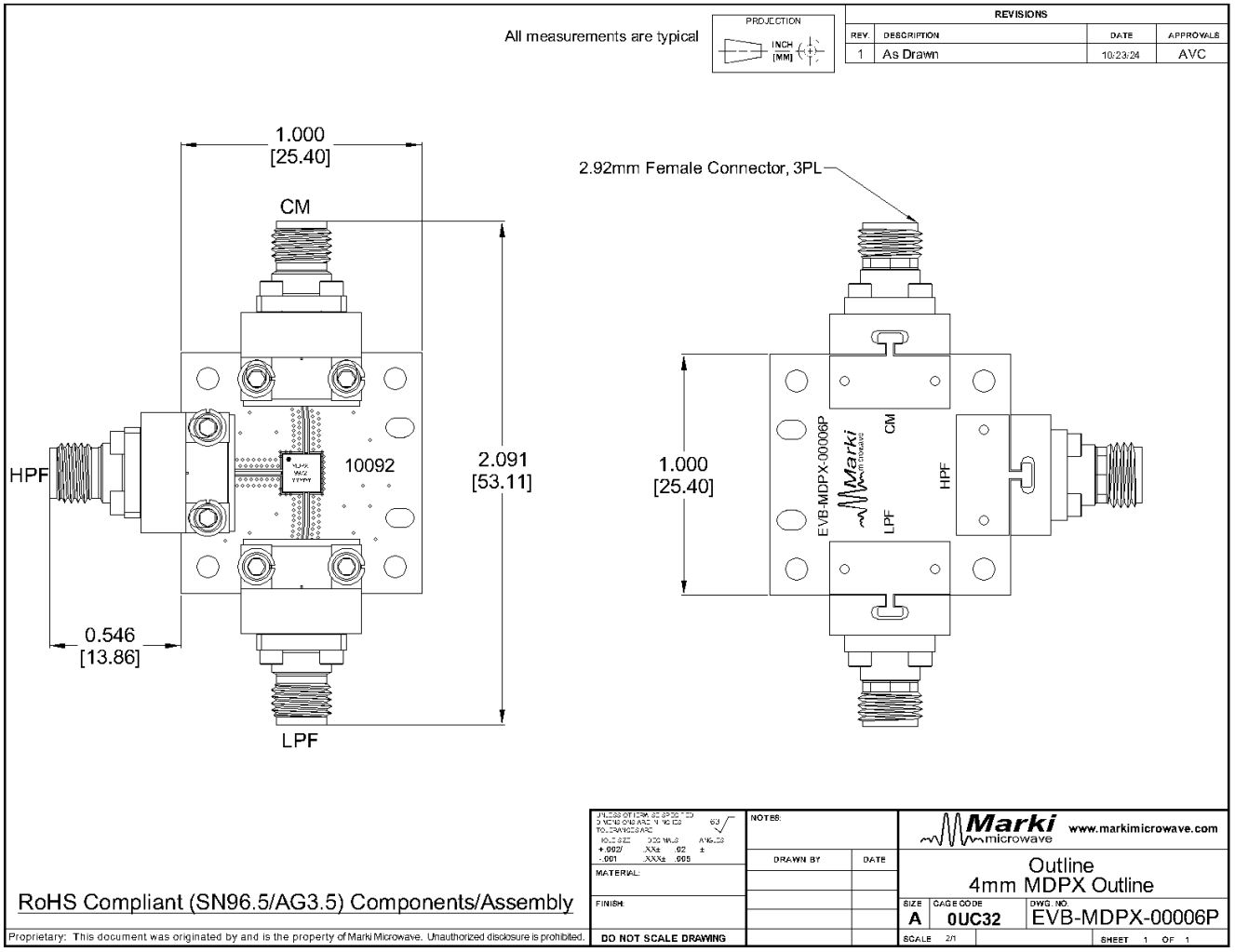
Evaluation Board - Outline Drawing



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