

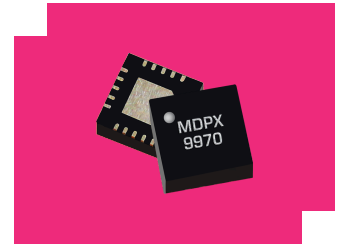
MDPX-00004PSM

Passive MMIC 7GHz Diplexer/Reflectionless Filter

DEVICE OVERVIEW

General Description

The MDPX-00004PSM is a MMIC surface mount diplexer capable of multiplexing low frequency DC to 6 GHz and high frequency 8 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-00004PSM 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](#)

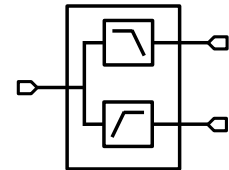
Features

- Excellent ≤ 1 dB Insertion Loss
- 7 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-00004PSM | Passive MMIC 7GHz Diplexer/Reflectionless Filter | QFN | RoHS REACH | Released | EAR99 |
| EVB-MDPX-00004P | Evaluation Board, Passive MMIC 7 GHz Diplexer/Reflectionless Filter | EVB | RoHS REACH | Released | EAR99 |

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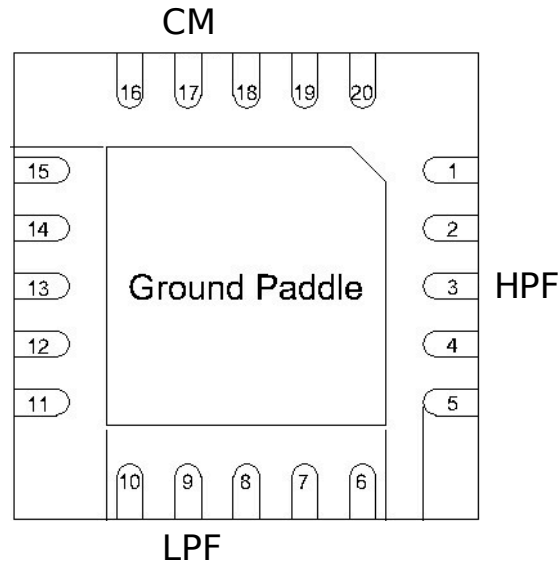
Revision History

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

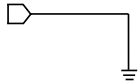
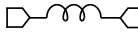
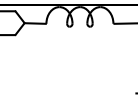
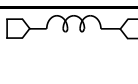
Port Configuration and Functions

Port Diagram

A top-down x-ray view of the MDPX-00004PSM'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

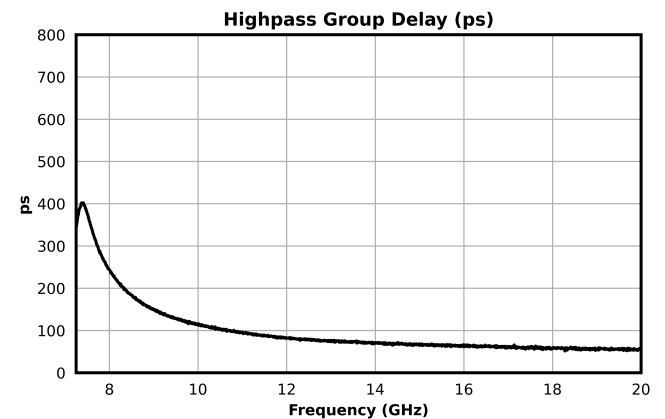
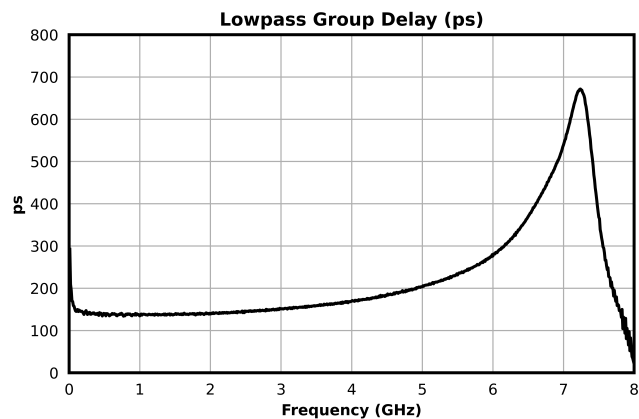
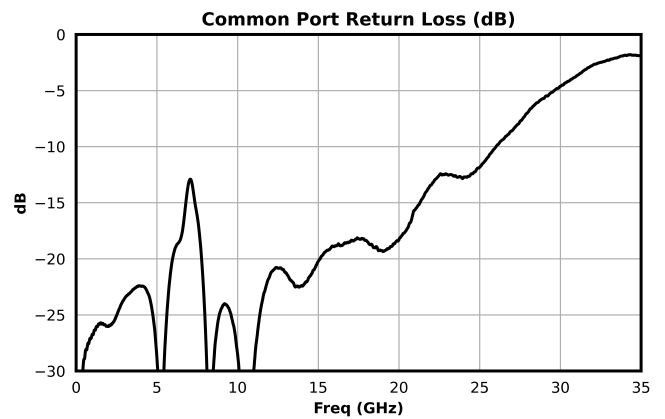
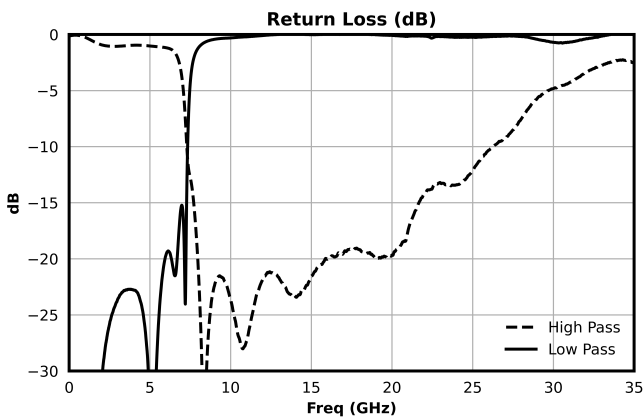
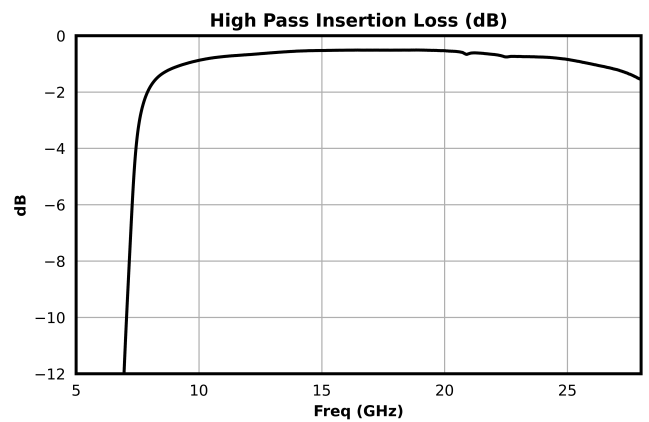
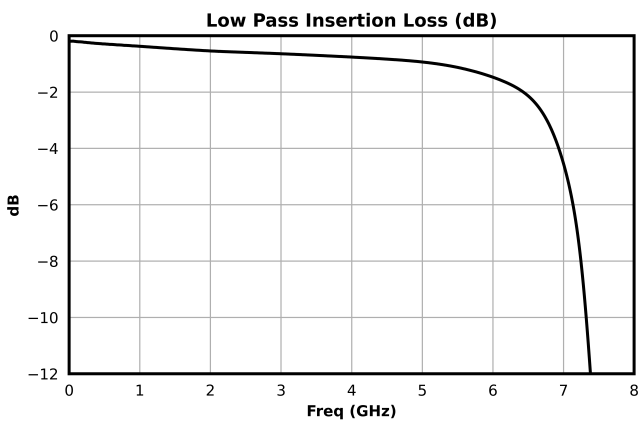
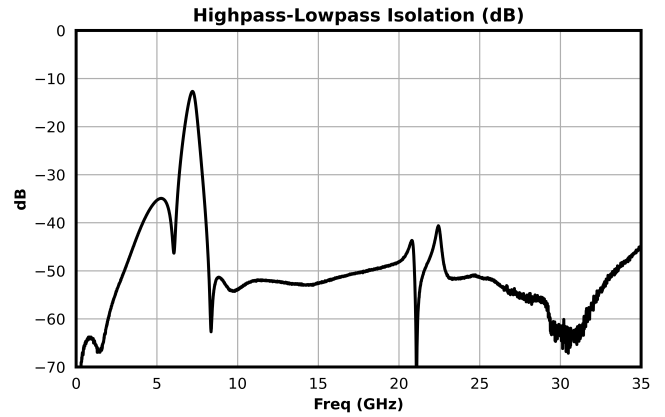
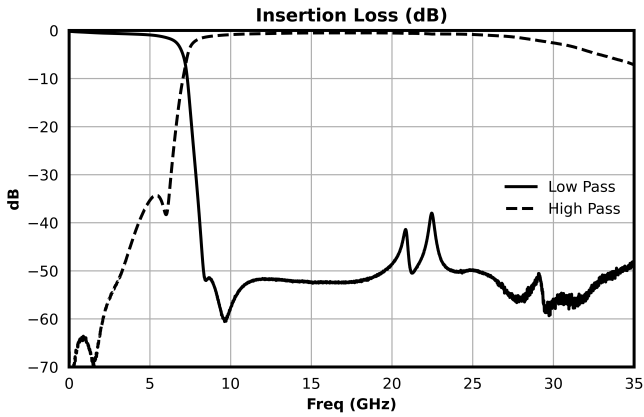
| Parameter | Details | Rating |
|----------------------------|---------|----------|
| Dimensions | - | 4 x 4 mm |
| Moisture Sensitivity Level | - | MSL 1 |

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 | - | - | - | 8.29 | - | 27.87 | GHz |
| 1 dBc Low Passband | - | - | - | 0 | - | 5.61 | GHz |
| 30 dBc High Pass Rejection Point | - | 6.31 | 6.31 | - | - | - | dB |
| 30 dBc Low Pass Rejection Point | - | 7.85 | 7.85 | - | - | - | GHz |
| 3 dBc High Passband | - | 7.5 | 28 | - | - | - | GHz |
| 3 dBc Low Passband | - | 0 | 6.8 | - | - | - | GHz |
| Common Port Return Loss | - | 0 | 28 | - | 20 | - | dB |
| Cross Over Frequency | - | 7.21 | 7.21 | - | - | - | GHz |
| Crossover Isolation | - | 5.61 | 8.29 | - | 15 | - | dB |
| Group Delay, High Band | - | - | - | - | 59 | - | ps |
| Group Delay, Low Band | - | - | - | - | 149 | - | ps |
| High Band Center Frequency | - | 18.08 | 18.08 | - | - | - | GHz |
| High Pass Filter, Pass Band Insertion Loss | - | - | - | - | 0.5 | - | dB |
| High Pass Filter, Pass Band Return Loss | - | 8.29 | 27.87 | - | 19 | - | dB |
| High Pass Isolation | - | 8.29 | 27.87 | - | 52 | - | dB |
| Impedance | - | - | - | - | 50 | - | Ω |
| Low Band Center Frequency | - | 2.81 | 2.81 | - | - | - | GHz |
| Low Pass Filter, Pass Band Insertion Loss | - | - | - | - | 0.6 | - | dB |
| Low Pass Filter, Pass Band Return Loss | - | 0 | 5.61 | - | 31 | - | dB |
| Low Pass Isolation | - | 0 | 5.61 | - | 47 | - | dB |

Typical Performance Plot

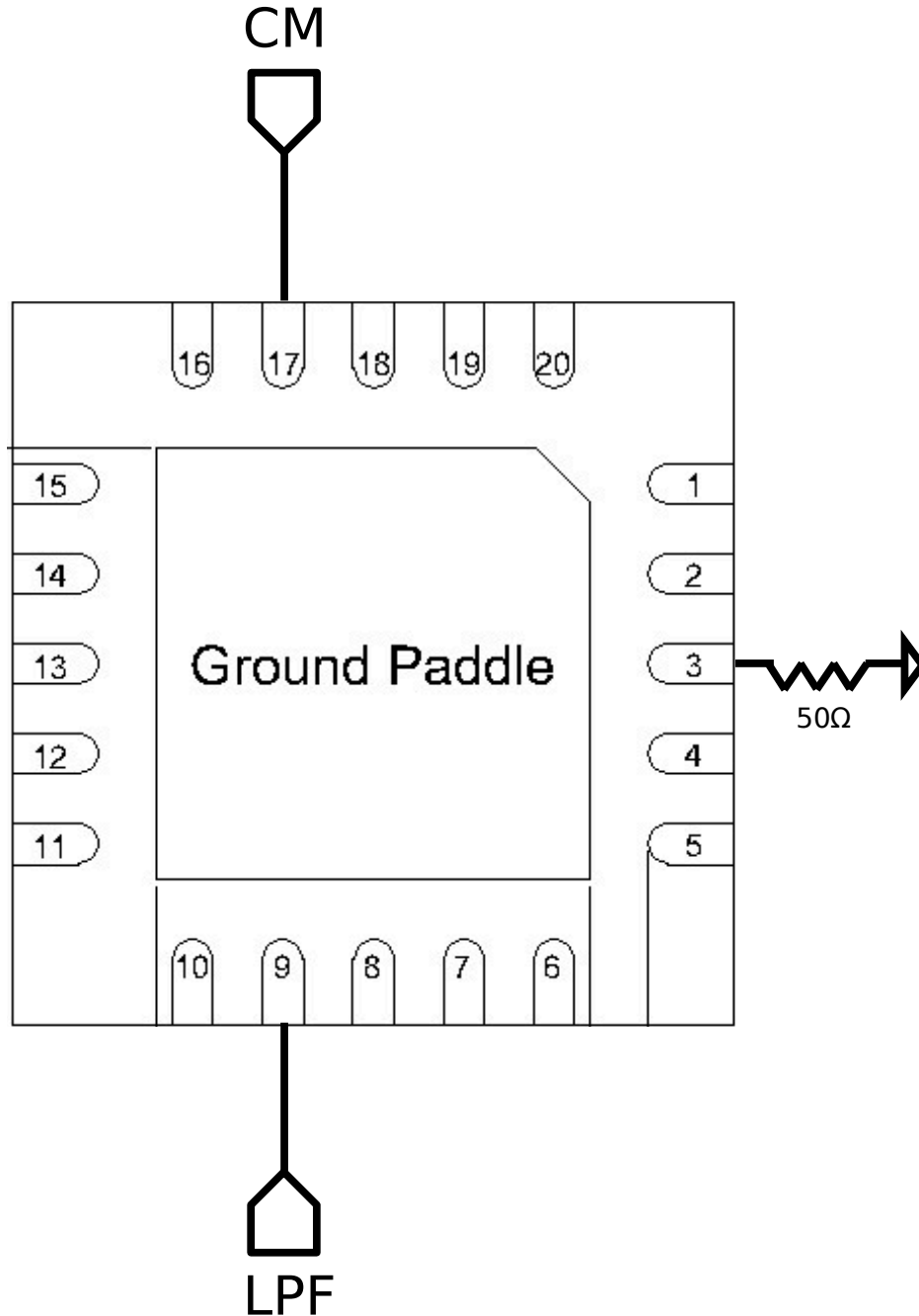


Application Information

Example Reflectionless Filter

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



MDPX-00004PSM

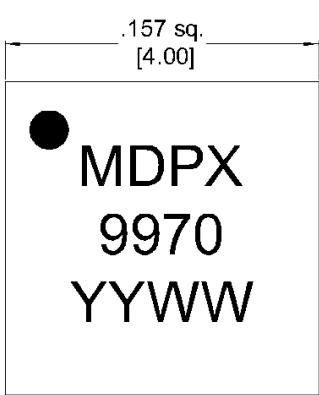
Passive MMIC 7GHz Diplexer/Reflectionless Filter

Mechanical Data

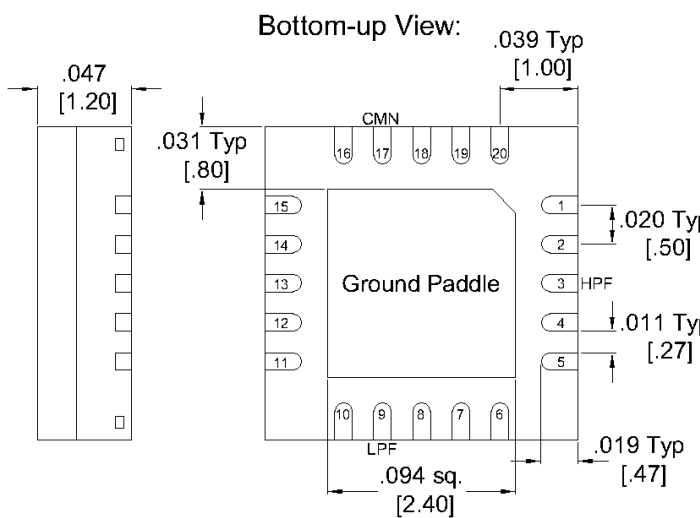
Outline Drawing

Download : [Outline 2D Drawing](#) | [Outline 3D Drawing](#) | [Outline 3D STP](#)

All measurements are typical




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):

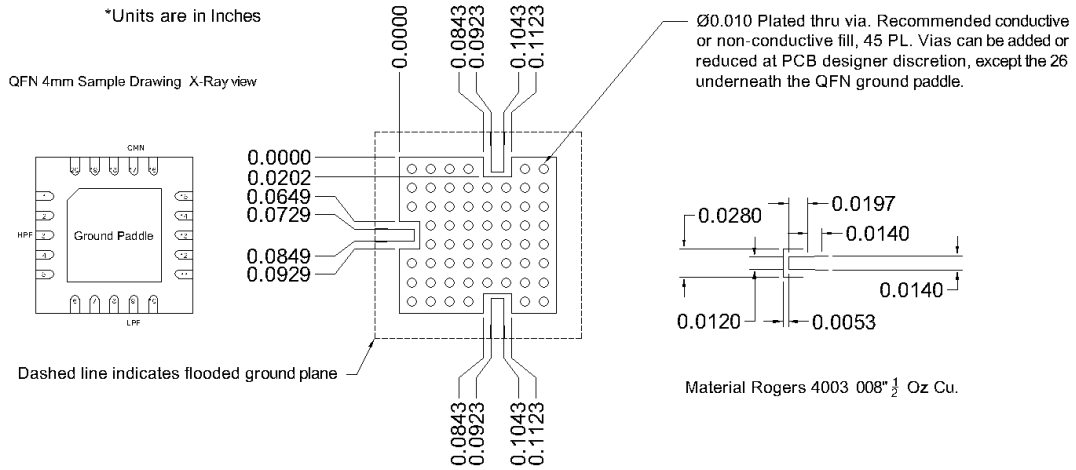
- Substrate material is LCP.
- I/O Leads and Die Paddle is (from base to finish):
 Ni: 0.5um MIN
 Pd: 0.02um MIN
 Au: 0.05um MAX
- All unconnected pins should be connected to PCB RF ground.

| | | |
|---|--|---|
| JUL 23 09:16:52 AM '24 2025 08/01/24 11:40:03 10.1.0.20 255.255.255.0 .004 .004 .004 .004 .004 .004 | NOTES: DRAWN BY: AT DATE: 8/7/24 |  www.markimicrowave.com Outline 4mm QFN Diplexer SIZE: A CAGE CODE: 0UC32 DWG. NO: MDPX-00004PSM SCALE: 15X SHEET: 1 OF 1 |
|---|--|---|

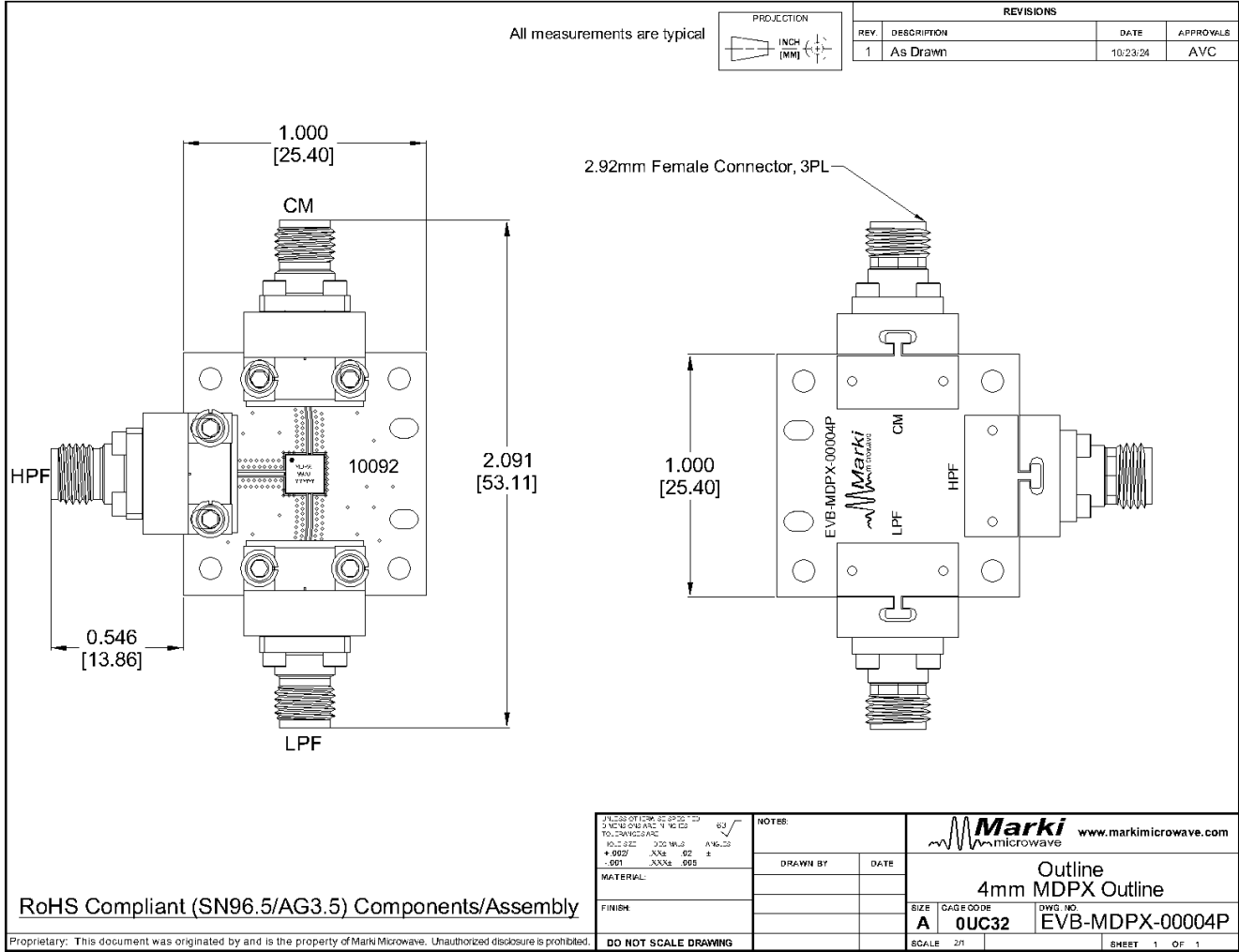
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Footprint Image

Download : [Footprint Drawing](#)



Evaluation Board - Outline Drawing



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