Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

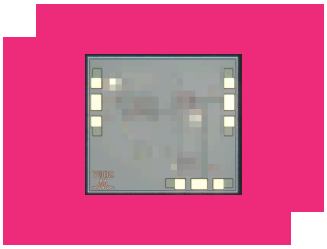
MDPX-0710CH

Passive MMIC DC-7 GHz / 10-26.5 GHz Diplexer/Reflectionless Filter

DEVICE OVERVIEW

General Description

The MDPX-0710 is a broadband passive MMIC diplexer, a combination high pass and loss pass filter, capable of multiplexing low frequency DC to 7 GHz and high frequency 10 to 26.5 GHz signals. It can also be used as a reflectionless high pass or low pass filter when terminated with an internal/external 50 Ohm load. 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-0710 is available as a connectorized module and as wire bondable die. Low unit to unit variation allows for accurate simulations using the provided S3P file taken from measured production units.



Download s-parameters here

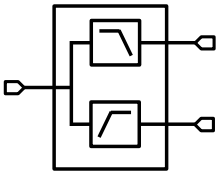
Features

- 8.5 GHz Crossover Point
- Low <1dB typical Insertion Loss in Pass band
- High Stop Band Suppression
- Reflectionless Filter
- RoHS Compliant

Applications

N/A

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MDPX-0710CH	Passive MMIC DC-7 GHz / 10-26.5 GHz Diplexer/Reflectionless Filter	CH	REACH RoHS	Released	EAR99

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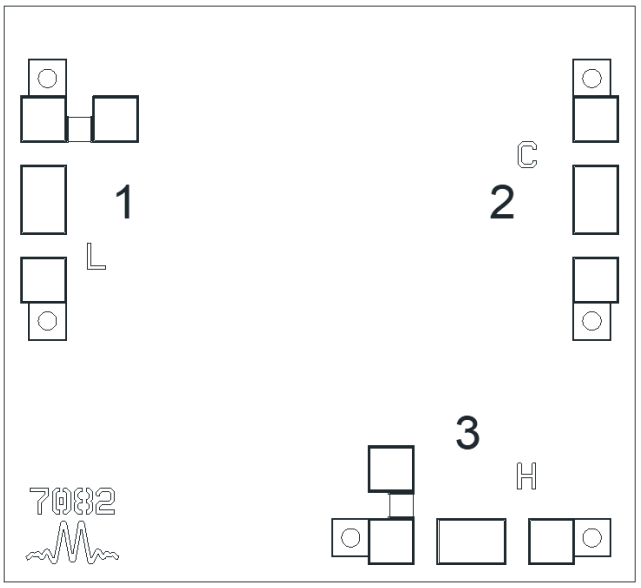
Table Of Contents

Revision History

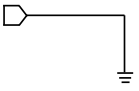
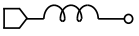
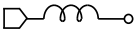
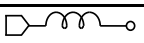
Revision Code	Revision Date	Comment
-	2024-04-22	Initial Datasheet Release

Port Configuration and Functions

Port Diagram



Port Functions

Port	Function	Description	Equivalent Circuit for Package
GND	Ground	CH package ground path is provided through the substrate and ground bond pads.	
Pad 1	Low Pass Filter	Pad 1 is DC short to Pad 2 and open to Pad 3 and ground.	
Pad 2	Input/common	Pad 2 is DC short to Pad 1 and open to Pad 3 and ground.	
Pad 3	High Pass Filter	Pad 3 is DC open to ground and all other pads.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Storage Temperature	125	°C
Maximum Survivable Operating Temperature	100	°C
Minimum Storage Temperature	-65	°C
Minimum Survivable Operating Temperature	-55	°C
Spec Guaranteed Operating Temperature	25	°C

Package Information

Parameter	Details	Rating
Dimensions	-	1.38 x 1.25 mm

Electrical Specifications

Specifications guaranteed +25°C for bare die, measured in a 50Ω system.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
30 dBc Low Pass Rejection Point	-	0	4	-	51	-	dB
30 dBc Low Pass Rejection Point	-	4	7	-	19	-	dB
Common Port Return Loss	-	0	7	-	22	-	dB
Common Port Return Loss	-	10	26.5	-	21	-	dB
High Frequency Passband	-	-	-	10	-	26.5	GHz
High Pass Filter, Pass Band Insertion Loss	-	10	26.5	-	0.9	-	dB
High Pass Filter, Pass Band Return Loss	-	10	26.5	-	21	-	dB
Impedance	-	-	-	-	50	-	Ω
Isolation	-	0	5	-	38	-	dB
Isolation	-	5	7	-	20	-	dB
Isolation	-	10	14	-	28	-	dB
Isolation	-	14	26.5	-	45	-	dB
Low Frequency Passband	-	-	-	0	-	7	GHz
Low Pass Filter, Pass Band Insertion Loss	-	0	7	-	0.85	-	dB
Low Pass Filter, Pass Band Return Loss	-	0	7	-	22	-	dB
Low Pass Filter, Stop Band Rejection	-	12	14	-	36	-	dB
Low Pass Filter, Stop Band Rejection	-	14	26.5	-	45	-	dB

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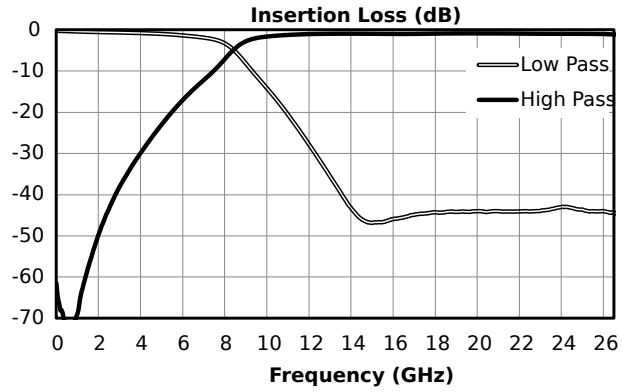
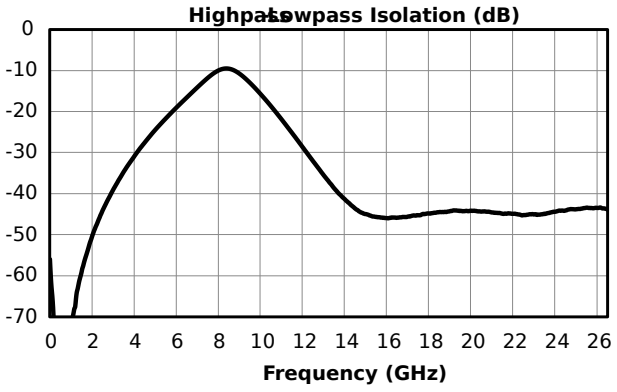
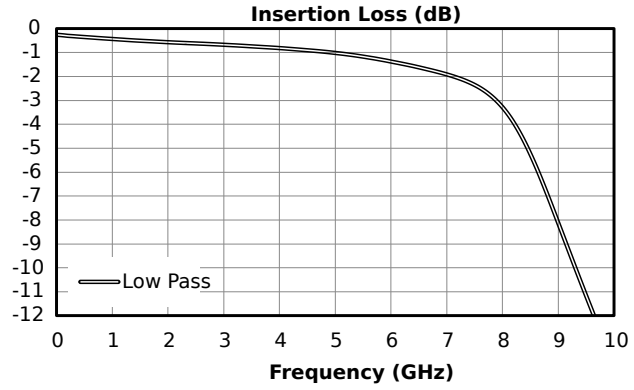
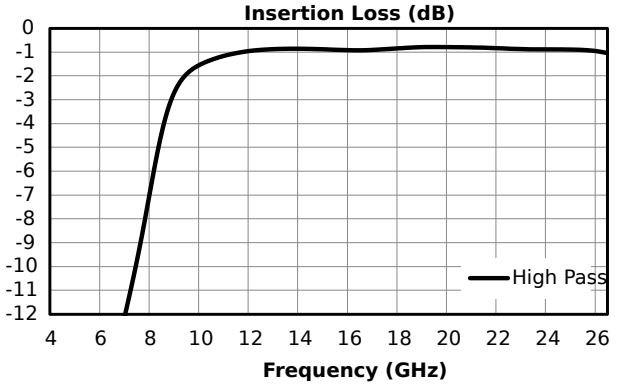
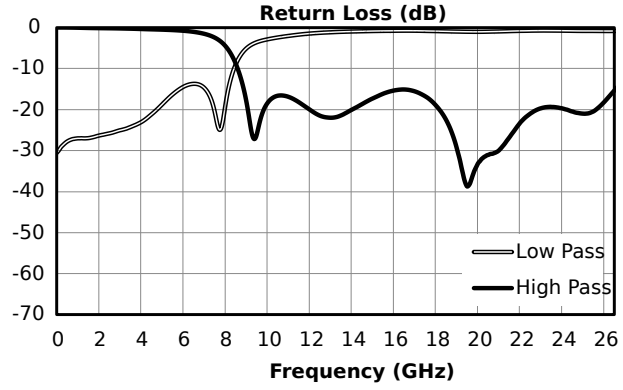
Typical Performance Plots

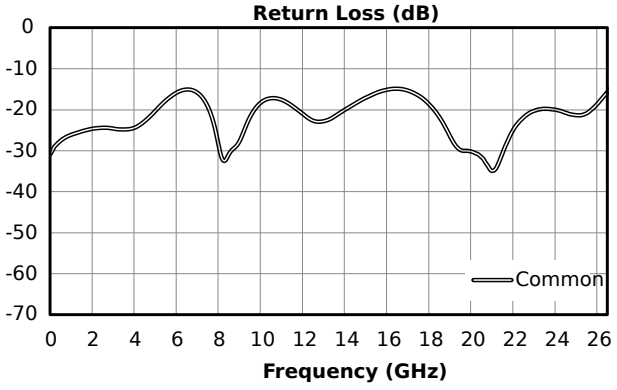


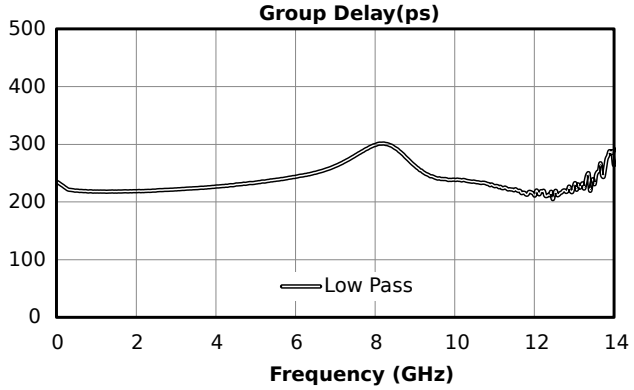


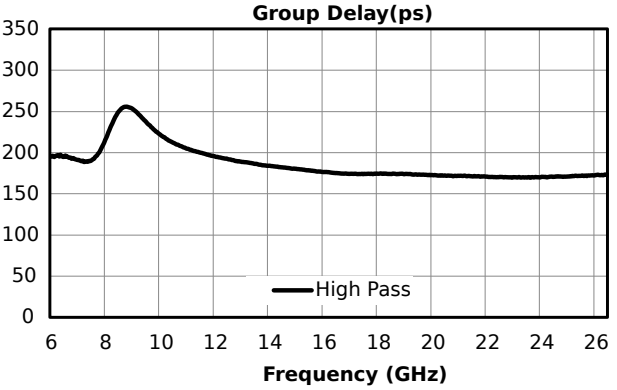












Die Mounting Recommendations

Mounting and Bonding Recommendations

Marki MMICs should be attached directly to a ground plane with conductive epoxy. The ground plane electrical impedance should be as low as practically possible. This will prevent resonances and permit the best possible electrical performance. Datasheet performance is only guaranteed in an environment with a low electrical impedance ground.

Mounting - To epoxy the chip, apply a minimum amount of conductive epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip. Cure epoxy according to manufacturer instructions.

Wire Bonding - Ball or wedge bond with 0.025 mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package or substrate. All bonds should be as short as possible <0.31 mm (12 mils).

Circuit Considerations – 50 Ω transmission lines should be used for all high frequency connections in and out of the chip. Wirebonds should be kept as short as possible, with multiple wirebonds recommended for higher frequency connections to reduce parasitic inductance. In circumstances where the chip more than .001” thinner than the substrate, a heat spreading spacer tab is optional to further reduce bondwire length and parasitic inductance.

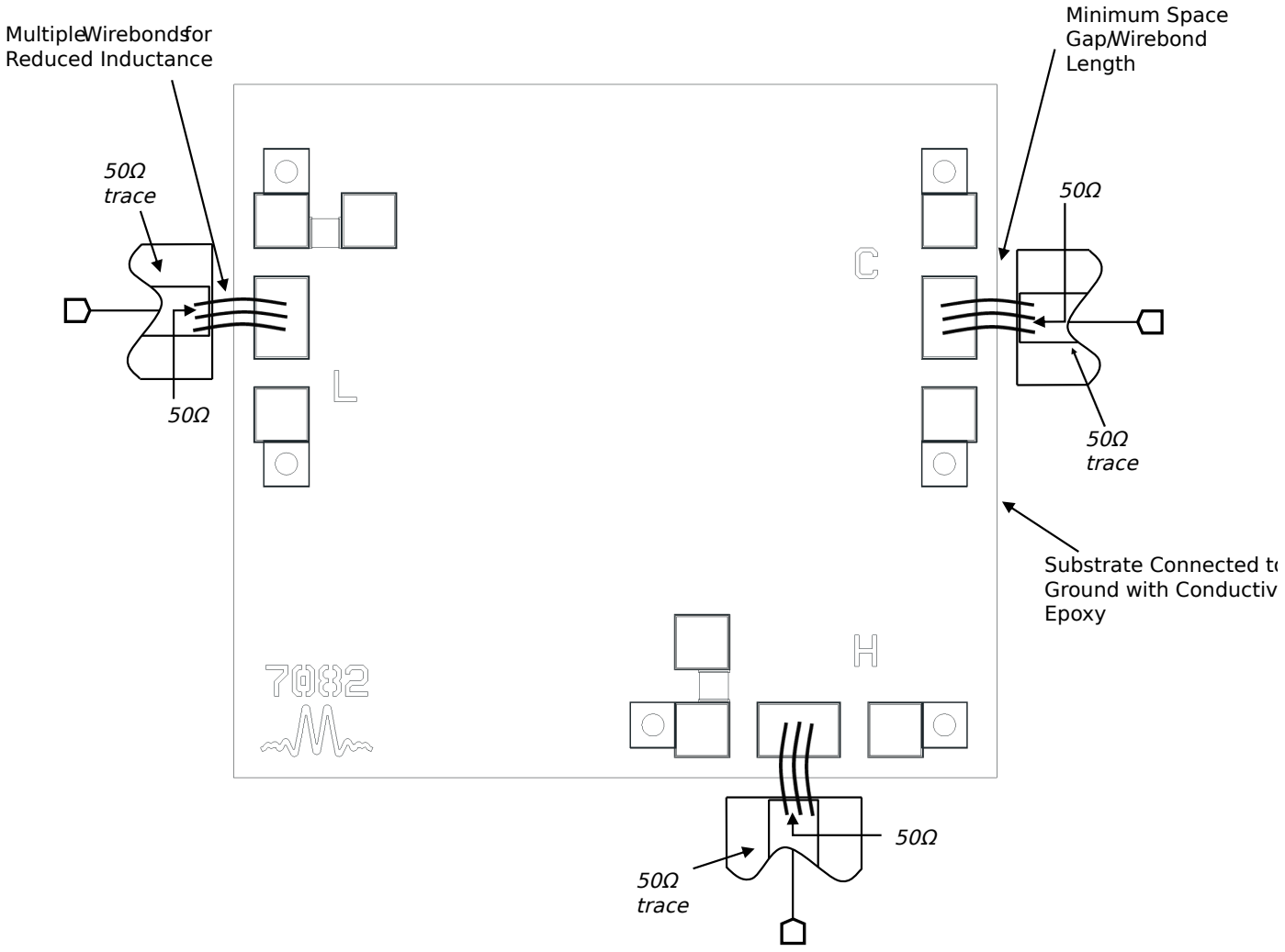
Handling Precautions

General Handling
Chips should be handled with care using tweezers or a vacuum collet. Users should take precautions to protect chips from direct human contact that can deposit contaminants, like perspiration and skin oils on any of the chip's surfaces.

Static Sensitivity
GaAs MMIC devices are sensitive to ESD and should be handled, assembled, tested, and transported only in static protected environments.

Cleaning and Storage: Do not attempt to clean the chip with a liquid cleaning system or expose the bare chips to liquid. Once the ESD sensitive bags the chips are stored in are opened, chips should be stored in a dry nitrogen atmosphere

Bonding Diagram



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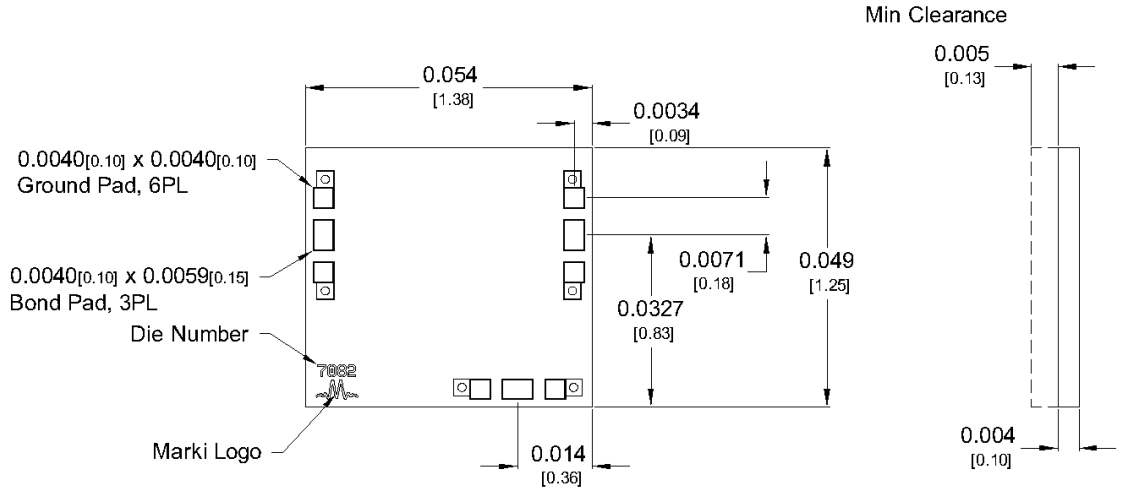
Mechanical Data

Outline Drawing

Download : Outline 2D Drawing

PROJECTION: INCH [MM]

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
A	ECN 24096 remove gel-pak info.	9/20/24	AT



Notes:

1. CH substrate is .004 in Thick GaAs.
2. Traces are 5 microns Au.
3. Tolerance for X, Y dimensions is ± 0.002 in.
   Tolerance for Z dimension is ± 0.0005 in.
   Tolerance for pad location is ± 0.0001 in.

NOTES:

DRAWN BY	DATE
AT	3/3/21

MATERIAL: Die # 7082

FINISH:

DO NOT SCALE DRAWING

Marki microwave www.markimicrowave.com

Outline
Chip Diplexer

SIZE	CAGE CODE	DWG. NO.
A	0UC32	MDPX-0710CH

SCALE None SHEET 1 OF 1

Notes

1. Group delay calculated using wrapped phase response.

2. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.

3. Catalog circuits are continually improved. Configuration control requires custom model numbers and specifications.

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.