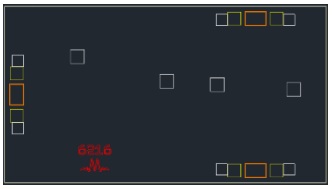
Passive MMIC High Frequency Diplexer

MDPX-2330

The MDPX-2330 is a broadband passive MMIC diplexer, a combination high pass and loss pass filter, capable of multiplexing low frequency DC to 23GHz and high frequency 30 to 60GHz 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-2330 is available as a wire bondable chip. Low unit to unit variation allows for accurate simulations using the provided S3P file taken from measured production units.



Features

- 26GHz Crossover Point
- Low <1dB typical Insertion Loss in Passband
- High Stop Band Suppression
- RoHS Compliant
- MDPX-2330.S3P

Electrical Specifications - Specifications guaranteed +25°C for chip (CH) package, measured in a 50Ω system.

Parameter	Frequency Range (GHz)	Min	Typ	Max
Low Pass Filter				
Pass Band Insertion Loss (dB)	DC to 23		0.5	
Stop Band Rejection (dB)	39 to 60	26	35	
Pass Band Return Loss (dB)	DC to 23	10	18	
High Pass Filter				
Pass Band Insertion Loss (dB)	30 to 60		0.8	
Stop Band Rejection (dB)	DC to 15	23	45	
Pass Band Return Loss (dB)	30 to 60	8	14	
Common Port Return Loss (dB)	DC to 23	10	24	
	30 to 60	8	14	
Isolation (dB)	DC to 13	27	36	
	13 to 23		20	
	30 to 40		21.5	
	40 to 60	30	32	
Impedance (Ω)			50	

Part Number Options

Please specify package style by adding to model number.			
Package Styles		**Examples**	
Chip[1-2] (RoHS)	CH	MDPX-2330CH	
		MDPX-2330 (Model)	CH (Package)

[1]Chip package connects to external circuit through wire bondable gold pads.
[2]Note: For port locations and I/O designations, refer to the drawings on page 2 of this document.

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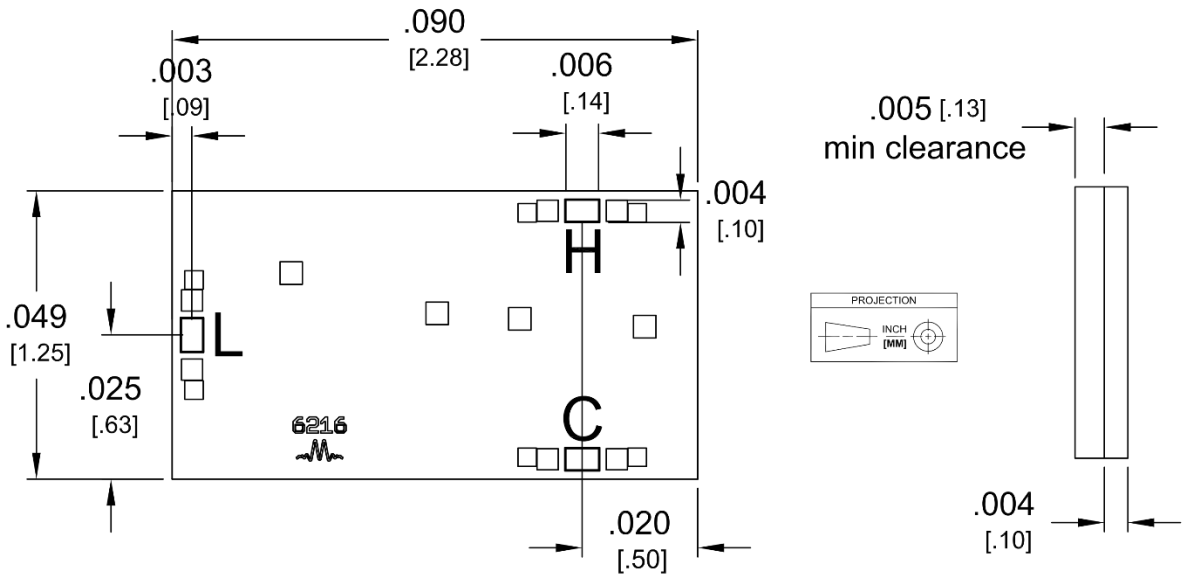

1. CH Substrate material is .004 thick GaAs.
2. I/O traces finish is 5 microns Au. Ground plane finish is 4 microns Au.
3. Wire Bonding - Ball or wedge bond with 0.025 mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C and a ball bonding force of 40 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).

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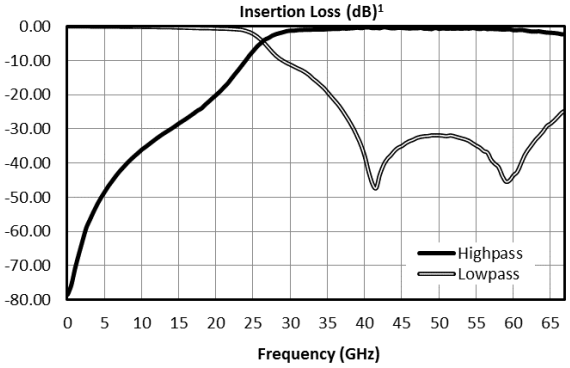
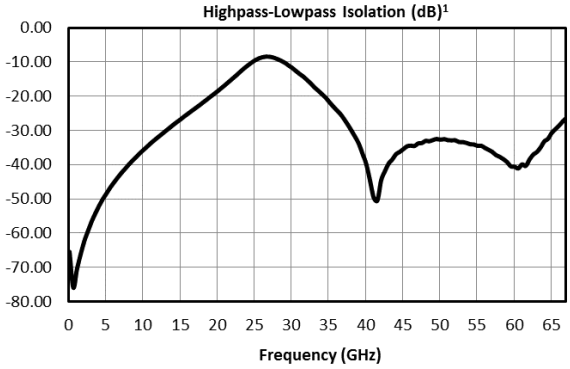
Typical Performance

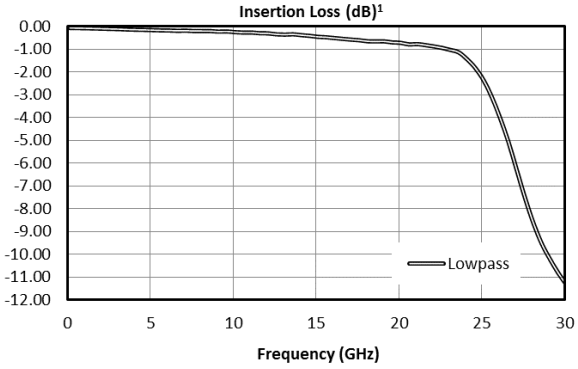
Insertion Loss (dB)[1]



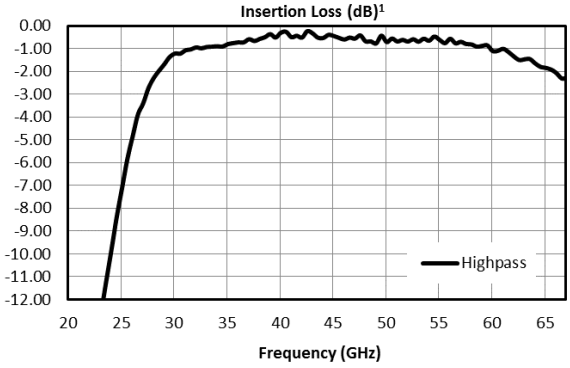
Highpass-Lowpass Isolation (dB)[1]



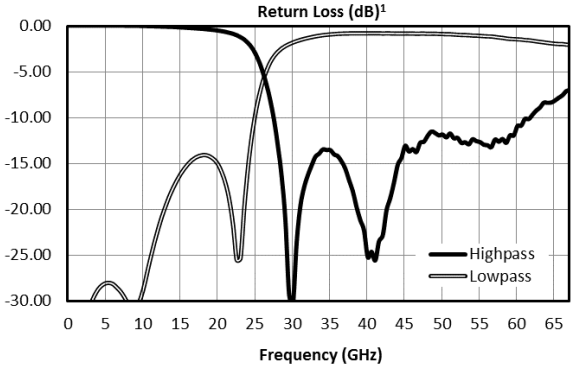
Insertion Loss (dB)[1]



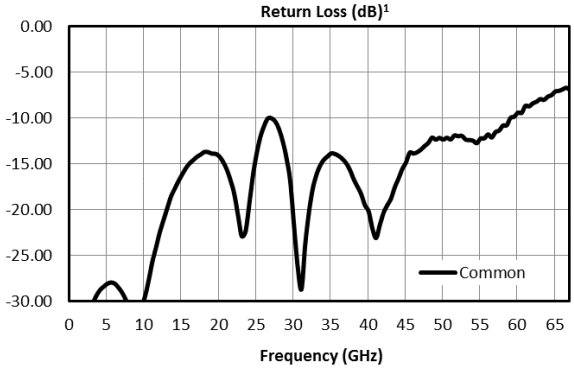
Insertion Loss (dB)[1]



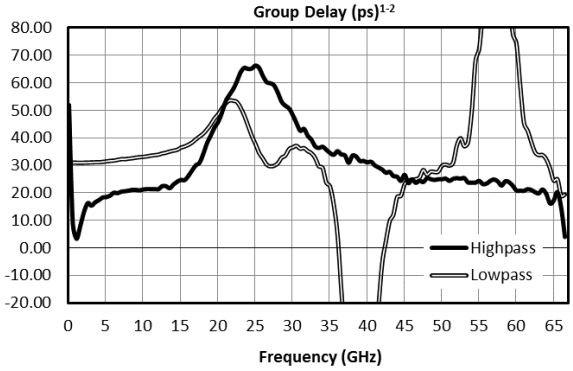
Return Loss (dB)[1]



Return Loss (dB)[1]



Group Delay (ps)[1-2]



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.

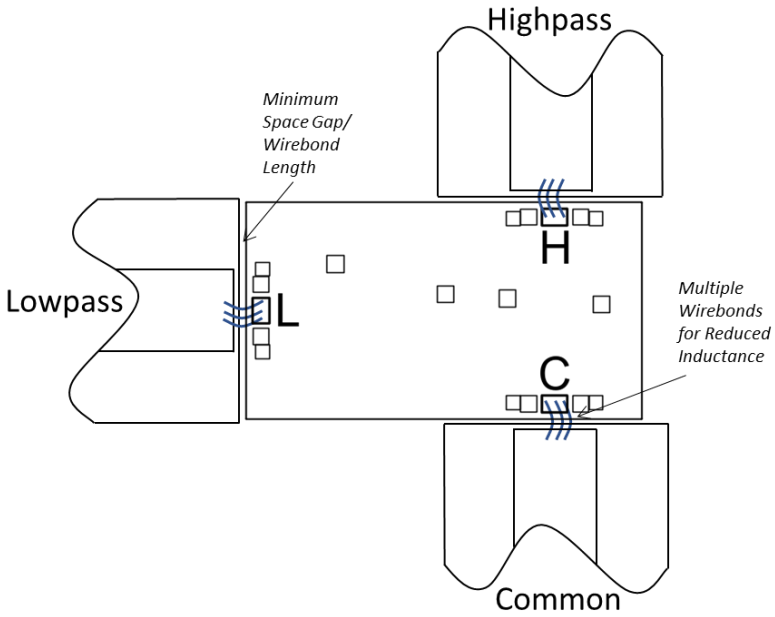
Handling Precautions

General Handling: Chips should be handled with a vacuum collet when possible, or with sharp tweezers using well trained personnel. The surface of the chip is fragile and should not be contacted if possible.

Static Sensitivity: GaAs MMIC devices are subject to static discharge, 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



Absolute Maximum Ratings	
Parameter	**Maximum Rating**
Highpass Port DC Current	N/A
Lowpass Port DC Current	N/A
Common Port DC Current	N/A
RF Power Handling	+30 dBm
Spec Guaranteed Operating Temperature	+25°C
Survivable Operating Temperature	-65ºC to +125ºC
Storage Temperature	-65ºC to +125ºC

DATA SHEET NOTES:
1. Measured typical data available for chip only.
2. Group delay calculated using wrapped phase response.
3. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.
4. 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.

Revision History

Revision code	Revision Date	Comment
-	Feb 2017	Datasheet initial Release
A	May 2019	Added more Insertion Loss charts

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