

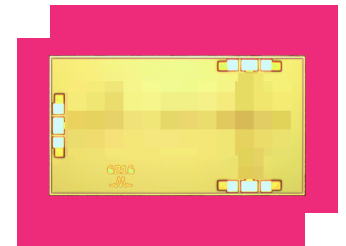
MDPX-2330CH

Passive MMIC 23 GHz High Frequency Diplexer

DEVICE OVERVIEW

General Description

The MDPX-2330 is a broadband passive MMIC diplexer, a combination high pass and low 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.



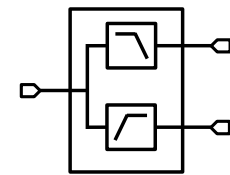
Features

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

Applications

N/A

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MDPX-2330CH	Passive MMIC 23 GHz High Frequency Diplexer	CH	REACH RoHS	Released	EAR99

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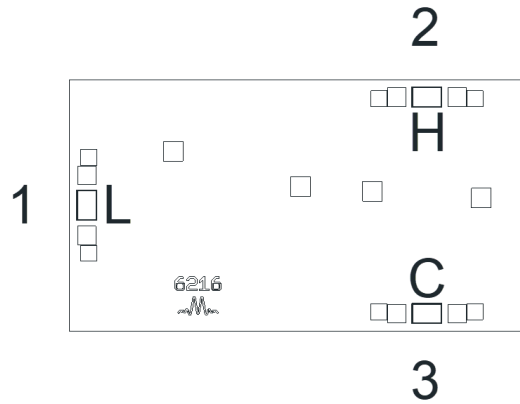
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Revision History

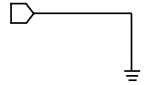
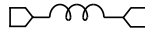
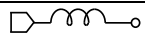
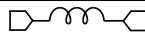
Revision Code	Revision Date	Comment
-	2017-02-01	Datasheet initial Release
A	2019-05-01	Added more Insertion Loss charts

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 3 and open to Pad 2.	
Pad 2	High Pass Filter	Pad 2 is DC open to Pad 1 and Pad 3.	
Pad 3	Common/Input	Pad 3 is DC short to Pad 1 and open to Pad 2.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Storage Temperature	125	°C
Maximum Survivable Operating Temperature	125	°C
Minimum Storage Temperature	-65	°C
Minimum Survivable Operating Temperature	-65	°C
RF Power Handling	30	dBm
Spec Guaranteed Operating Temperature	25	°C

Package Information

Parameter	Details	Rating
Dimensions	-	2.28x1.25 mm

Electrical Specifications

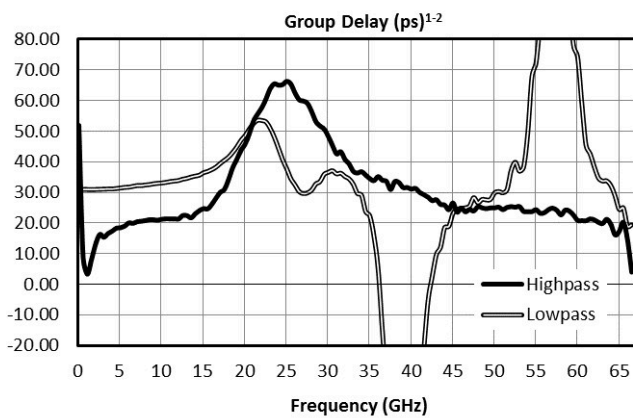
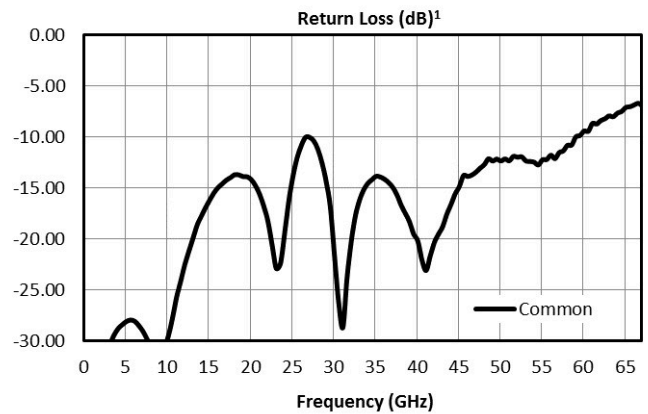
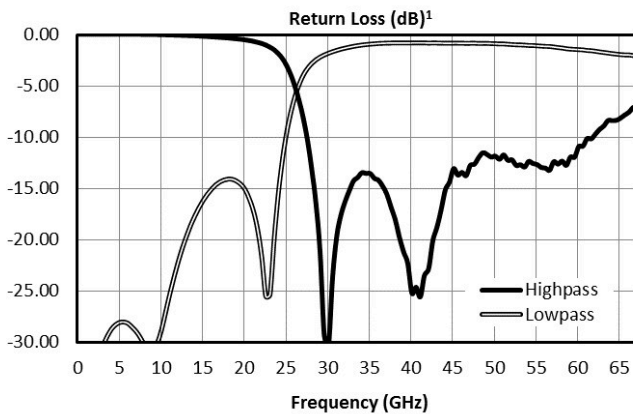
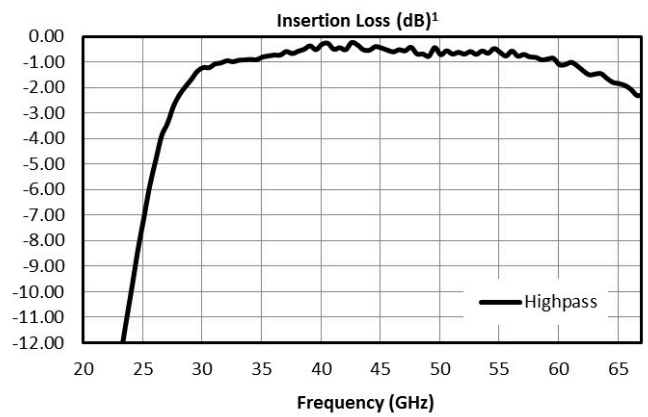
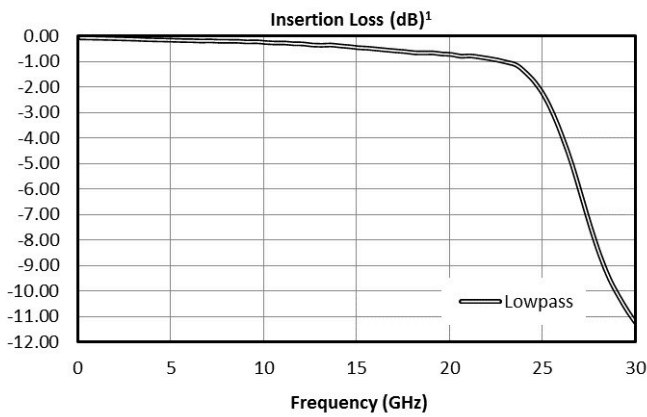
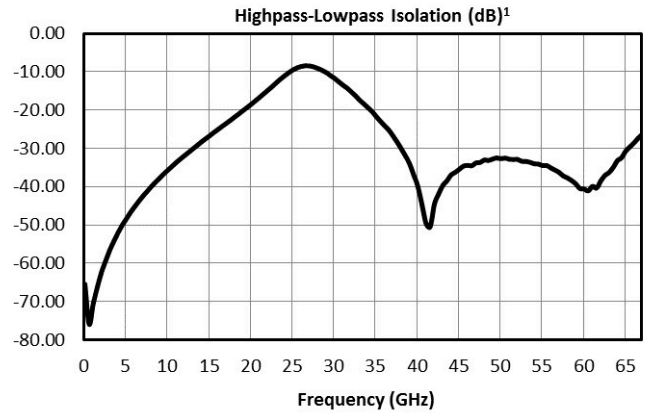
Specifications guaranteed +25°C for chip (CH) package, measured in a 50Ω system.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
30 dBc Low Pass Rejection Point	DC to 15 GHz	0	15	23	45	-	dB
Common Port Return Loss	30 to 60 GHz	30	60	8	14	-	dB
Common Port Return Loss	DC to 23 GHz	0	23	10	24	-	dB
High Pass Filter, Pass Band Insertion Loss	30 to 60 GHz	30	60	-	0.8	-	dB
High Pass Filter, Pass Band Return Loss	30 to 60 GHz	30	60	8	14	-	dB
Impedance	-	-	-	-	50	-	Ω
Isolation	13 to 23 GHz	13	23	-	20	-	dB
Isolation	30 to 40 GHz	30	40	-	22	-	dB
Isolation	40 to 60 GHz	40	60	30	32	-	dB
Isolation	DC to 13 GHz	0	13	27	36	-	dB
Low Pass Filter, Pass Band Insertion Loss	DC to 23 GHz	0	23	-	0.5	-	dB
Low Pass Filter, Pass Band Return Loss	DC to 23 GHz	0	23	10	18	-	dB
Low Pass Filter, Stop Band Rejection	39 to 60 GHz	39	60	26	35	-	dB
High Frequency Passband	-	-	-	30	-	60	GHz
Low Frequency Passband	-	-	-	0	-	23	GHz

MDPX-2330CH

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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.

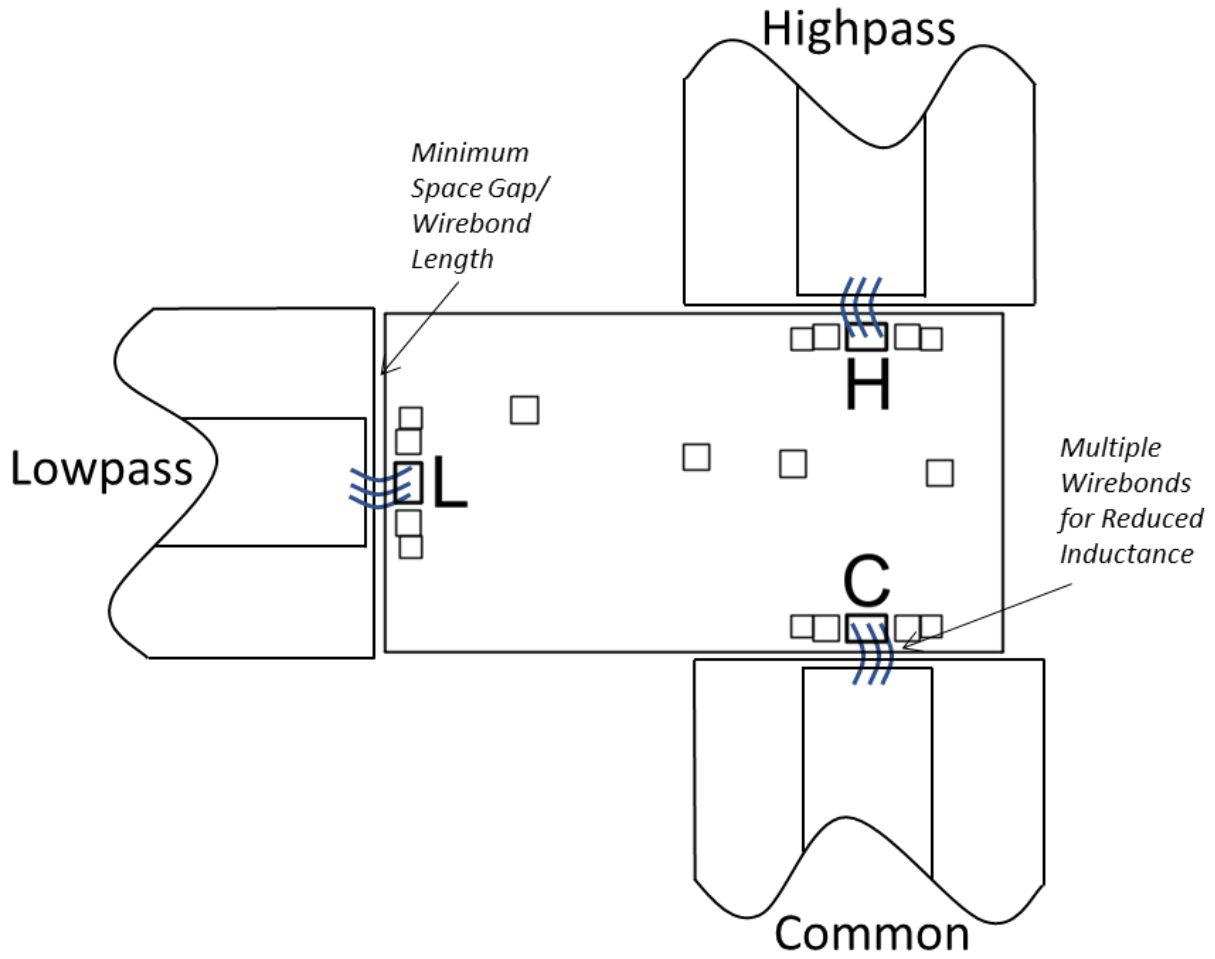
Handling Precautions

General Handling: Chips should be handled with 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.

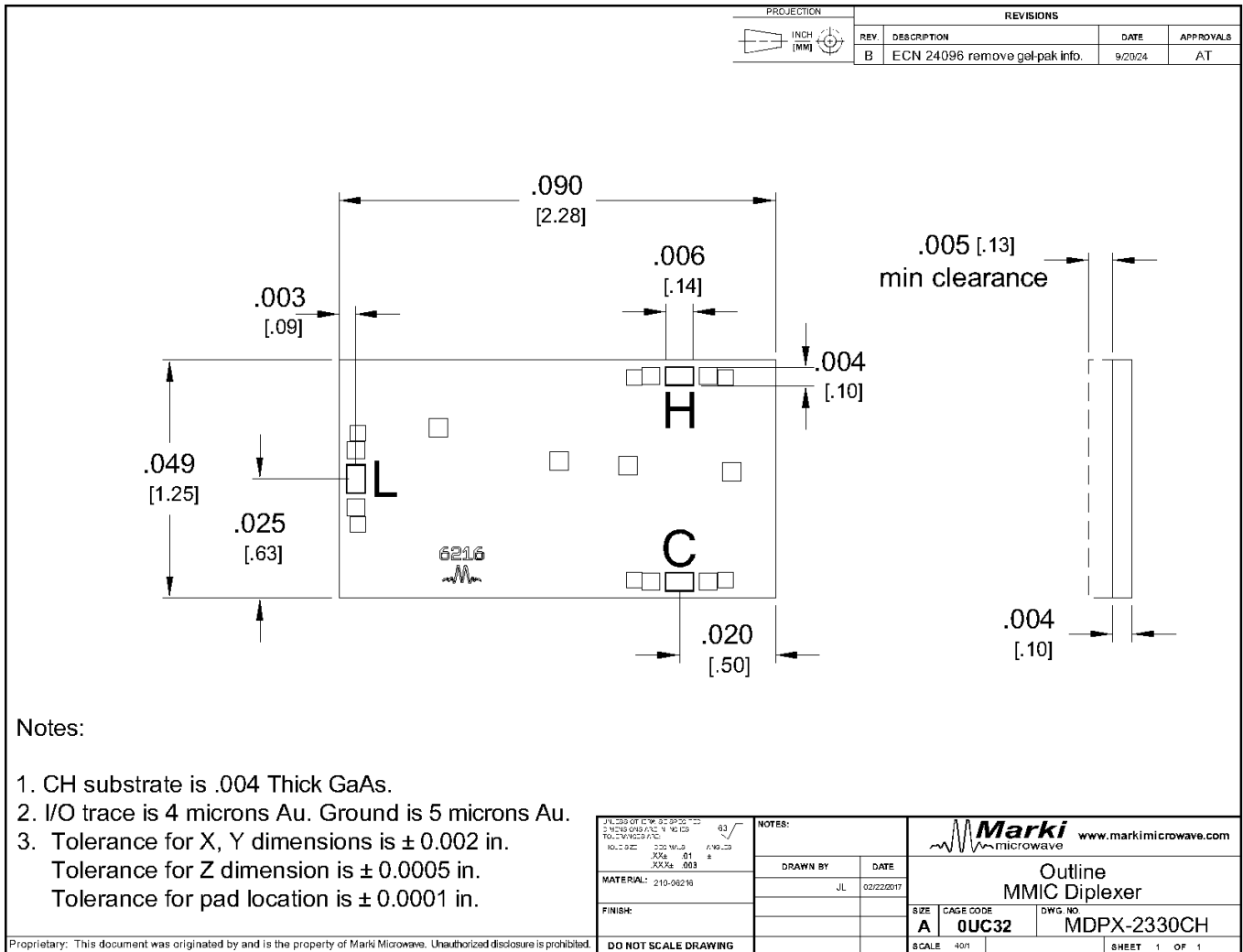
Bonding Diagram



Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#)



Notes:

- CH substrate is .004 Thick GaAs.
- I/O traces and ground plane finish is 2 microns Au.

Notes

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.

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