

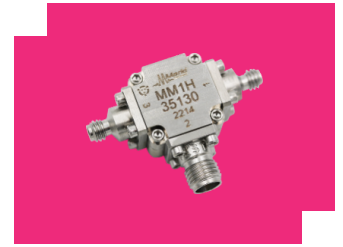
MM1-35130HM

GaAs MMIC Double Balanced mmWave Mixer

DEVICE OVERVIEW

General Description

MM1-35130H is a GaAs MMIC double balanced mixer that features excellent conversion loss, superior isolations, and spurious performance across an incredibly broad bandwidth. The MM1-35130H works well as both an up and down converter from the Ka band through mmWave/G band. The MM1-35130H is recommended for mmWave frequency conversion applications that require high linearity. It is available as both wire bondable die and as a connectorized module.



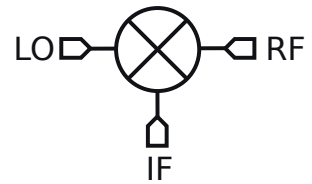
Features

- Ultra broadband, high linearity mmWave frequency conversion
- High LO to RF isolation
- Up or down conversion

Applications

- mmWave Frequency Conversion
- Test and Measurement Equipment
- Automotive Radar
- 5G Test Receivers
- mmWave Tuner Mixer

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MM1-35130HM	GaAs MMIC Double Balanced mmWave Mixer	M	<u>Standard</u>	REACH RoHS	Released	EAR99

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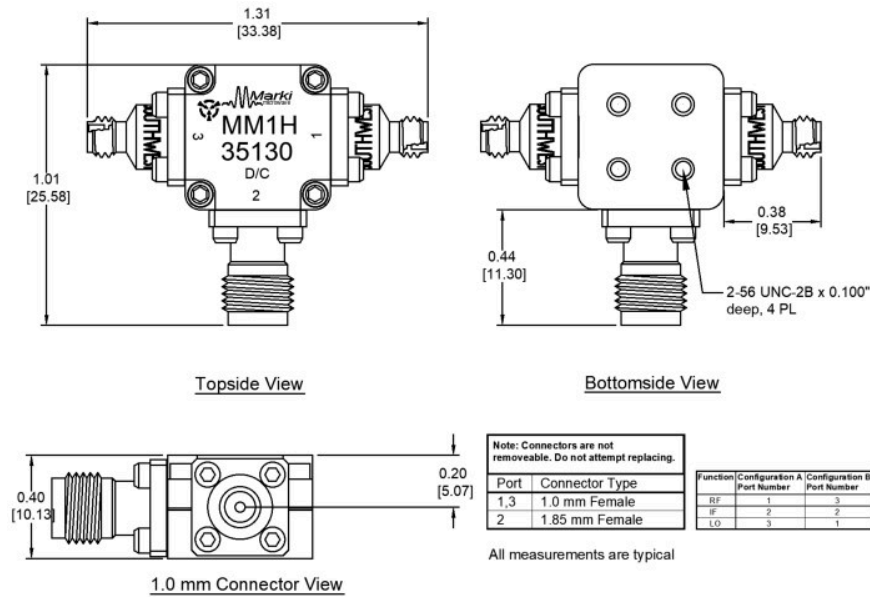
Revision History

Revision Code	Revision Date	Comment
-	2022-05-01	Datasheet Initial Release

Port Configuration and Functions

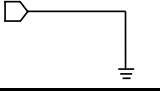
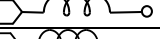
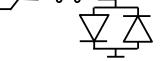
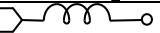
Port Diagram

A top-down view of the MM1-35130H's CH package outline drawing is shown below. The MM1-35130H has the input and output ports given in Port Functions. The MM1-35130H can be used in either an up or down conversion. For configuration A, input the LO into port 3, use port 1 for the RF, and port 2 for the IF. For configuration B, input the LO into port 1, use port 3 for the RF, and port 2 for the IF.



Port Functions

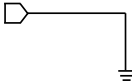
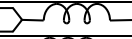


Configuration A

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	M package ground provided through metal housing and outer coax conductor.	
Port 1	RF	1.0F	Port 1 is DC open for the CH and M packages.	
Port 2	IF	1.85F	Port 2 is diode connected for the CH and M package.	
Port 3	LO	1.0F	Port 3 is DC open for the CH and M packages	

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Configuration B

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	M package ground provided through metal housing and outer coax conductor.	
Port 1	LO	1.0F	Port 1 is DC open for the CH and M packages.	
Port 2	IF	1.85F	Port 2 is diode connected for the CH and M package.	
Port 3	RF	1.0F	Port 3 is DC open for the CH and M packages.	

Specifications

Absolute Maximum Ratings

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

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Power Handling, at any Port	30	dBm

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: M	21g
Dimensions	-	33.38 x 25.58 mm

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications. Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Ambient Temperature	-55	25	100	°C
LO Input Power	12	14	-	dBm

Sequencing Requirements

There is no requirement to apply power to the ports in a specific order. However, it is recommended to provide a 50Ω termination to each port before applying power. This is a passive diode mixer that requires no DC bias.

Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized M package mixer used in the forward direction with a sine wave LO input. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C. All bare die are 100% DC tested and visually inspected.

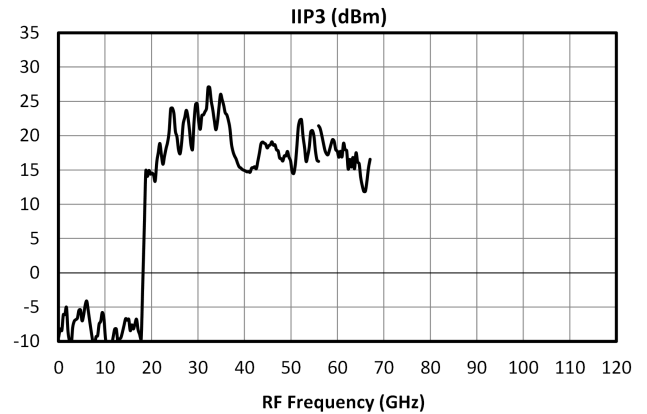
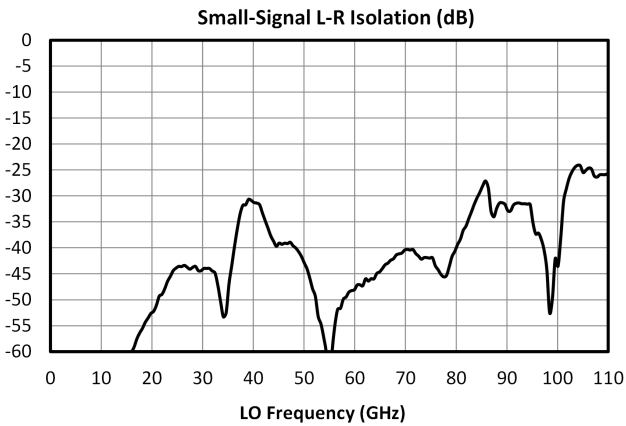
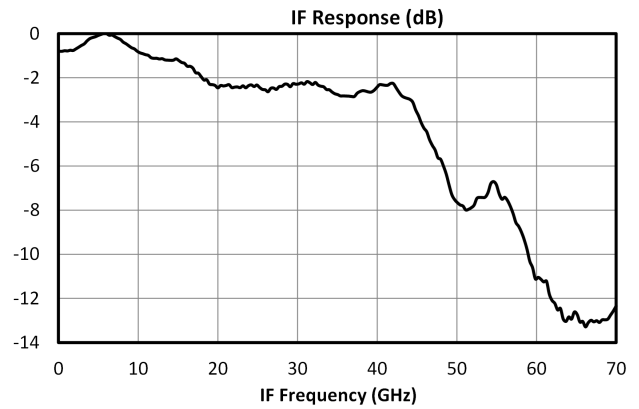
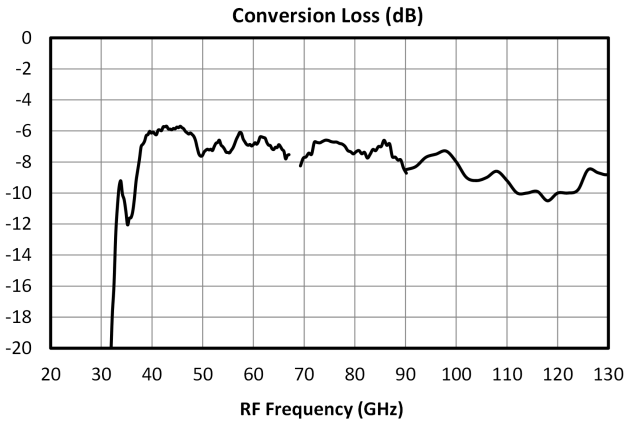
Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss ¹	-	RF/LO = 35 - 130 GHz I = DC - 0.2 GHz	-	8	-	dB
IF Frequency Range	-	-	0	-	50	GHz
LO Frequency Range	-	-	35	-	130	GHz
Noise Figure ²	-	RF/LO = 35 - 130 GHz I = DC - 0.2 GHz	-	8	-	dB
RF Frequency Range	-	-	35	-	130	GHz

^[1] Measured as a down converter to a fixed 91MHz IF.

^[2] Mixer Noise Figure typically measures within 0.5 dB of conversion loss for IF frequencies greater than 5 MHz.

Typical Performance Plots

Due to difficulty generating strong LO signals at mmWave frequencies LR Isolation is measured with a small signal LO. Isolation will improve with a stronger LO signal. Discontinuity in conversion loss measurement is due to splitting the measurement into multiple bands. IIP3 is only measured up to 67GHz due to limitations in measurement setup. Conversion loss will extend to 135GHz with sufficient LO drive.



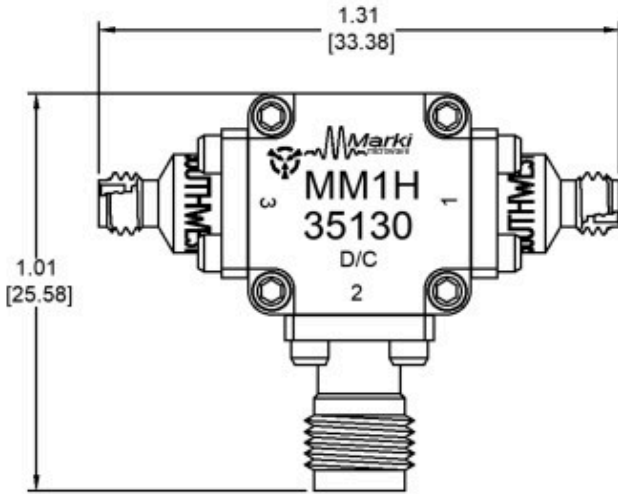
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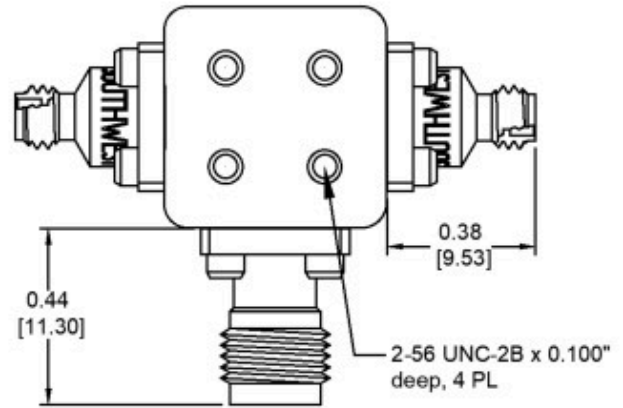
Mechanical Data

Outline Drawing

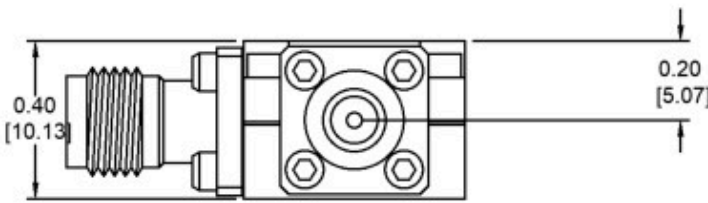
Download : [Outline 2D Drawing](#) | [Outline 3D Drawing](#) | [Outline 3D STP](#)



Topside View



Bottomside View



1.0 mm Connector View

Note: Connectors are not removable. Do not attempt replacing.

Port	Connector Type
1,3	1.0 mm Female
2	1.85 mm Female

Function	Configuration A Port Number	Configuration B Port Number
RF	1	3
IF	2	2
LO	3	1

All measurements are typical

1. All measurements are typical.
2. Attach 1.0mm connectors with 45 N-cm (4 in-lb) torque wrench.

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