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

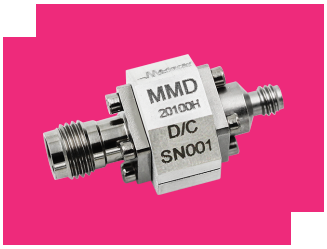
MMD-20100HM

GaAs MMIC Millimeter Wave Doubler

DEVICE OVERVIEW

General Description

MMD-20100H is a MMIC millimeter wave 2x multiplier fabricated with GaAs Schottky diodes. MMD-20100H operates over a 10 to 50 GHz input frequency range or a doubled output frequency range of 20 to 100 GHz. MMD-20100H is available as a connectorized coaxial module using 1.0 mm connectors on the output. Wire bondable die are also available.



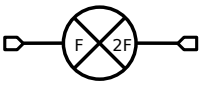
Features

- Low input power requirement
- Low loss die and package
- Up to 100GHz 2nd harmonic output tone
- Coax connector module

Applications

- mmWave frequency synthesis
- LO signal chain for mmWave mixers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MMD-20100HM	GaAs MMIC Millimeter Wave Doubler	M	Standard	REACH RoHS	Released	EAR99

Table Of Contents

- **Device Overview**
  - General Description
  - Features
  - Applications
  - Functional Block Diagram
- **Port Configuration and Functions**
  - Port Diagram
  - Port Functions
- **Revision History**
- **Specifications**
  - Absolute Maximum Ratings
  - Package Information
  - Recommended Operating Conditions
  - Electrical Specifications
  - Typical Performance Plots
- **Mechanical Data**
  - Outline Drawing

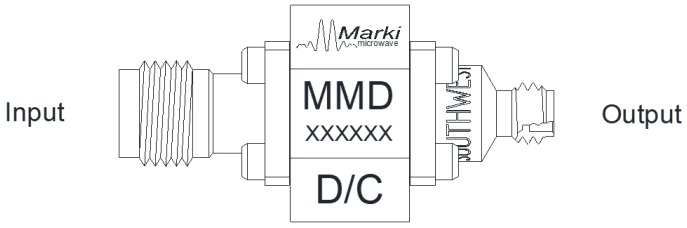
Revision History

Revision Code	Revision Date	Comment
-	2020-10-01	Initial Datasheet Release
A	2024-03-14	Export Classification Update

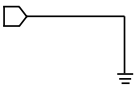
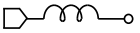
Port Configuration and Functions

Port Diagram

The MMD-20100H should only be used in the forward direction, with the input and output ports given in Port Functions.



Port Functions

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	M package ground provided through metal housing and outer coax conductor.	
Port 1	Input	1.85F	Input 1x Frequency Port. Port 1 is DC coupled to the diodes for the M packages. Blocking capacitor is optional.	
Port 2	Output	1.0F	2x Input Frequency output port. Port 2 is DC open for the M package.	

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
Port 1 DC Current	25	mA
Power Handling, at any Port	23	dBm

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: M	15g
Dimensions	-	7.87x14.30 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
Input Power	-	10	15	dBm

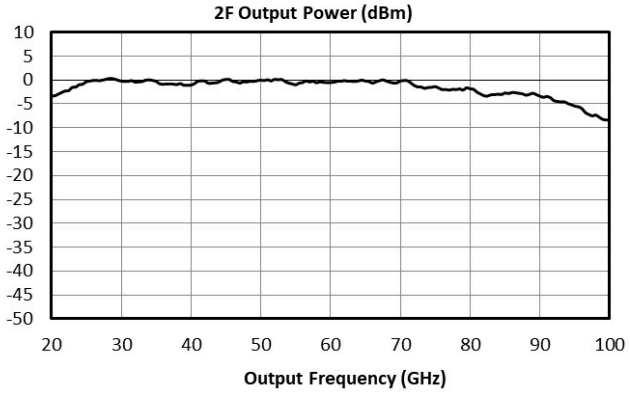
Electrical Specifications

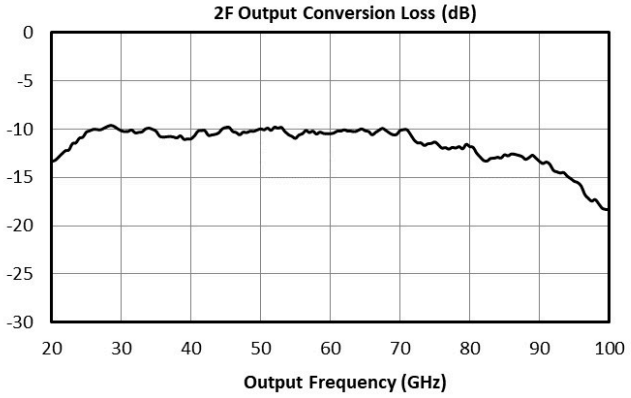
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized M package doubler used in the forward direction with a nominal +10 dBm sine wave input. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C. RF testing of our die is performed on a sample basis to verify conformance to datasheet guaranteed specifications.

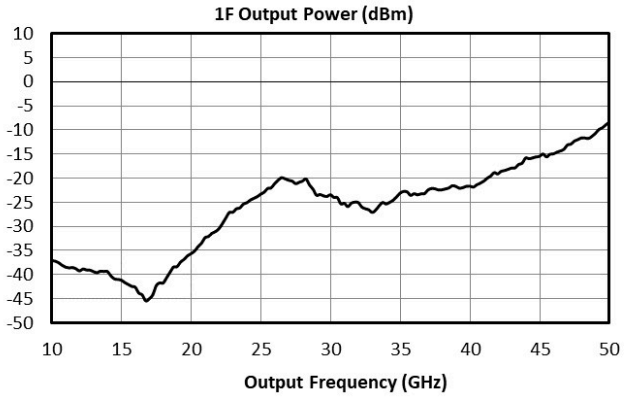
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Conversion Loss	Second Harmonic Output	20	25	-	13	-	dB
Conversion Loss	Second Harmonic Output	25	70	-	10	13	dB
Conversion Loss	Second Harmonic Output	70	90	-	13	-	dB
Conversion Loss	Second Harmonic Output	90	100	-	16	-	dB
Input Power	-	-	-	-	10	15	dBm
Input Frequency Range	-	-	-	10	-	50	GHz
Output Frequency Range [1]	-	-	-	20	-	100	GHz
Isolation, 1F [2]	Input = 10 – 50 GHz Output = 10 – 50 GHz	10	50	-	36	-	dB
Isolation, 3F [3]	Input = 10 – 33.3 GHz Output = 30 – 100 GHz	30	100	-	44	-	dB
Isolation, 4F [4]	Input = 10 – 25 GHz Output = 40 – 100 GHz	40	100	-	25.5	-	dB
Suppression, 1F [5]	Input = 10 – 50 GHz Output = 10 – 50 GHz	10	50	-	24.5	-	dBc
Suppression, 3F [6]	Input = 10 – 33.3 GHz Output = 30 – 100 GHz	30	100	-	33	-	dBc
Suppression, 4F [7]	Input = 10 – 25 GHz Output = 40 – 100 GHz	40	100	-	14	-	dBc

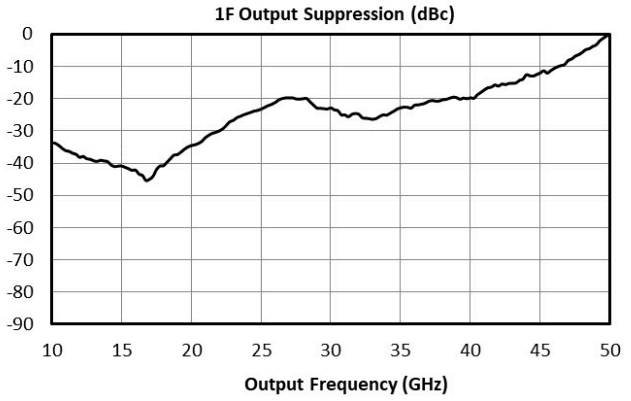
[1] Output return loss measured with a fixed frequency large signal 17.2 GHz input.
[2][3][4] Isolation is defined as the harmonic power relative to the 1F fundamental input power.
[5][6][7] Suppressions and isolations measured with an input source with >60dBc (relative to fundamental input) harmonic suppression. Suppression is defined as the harmonic power relative to the 2F doubled output power.

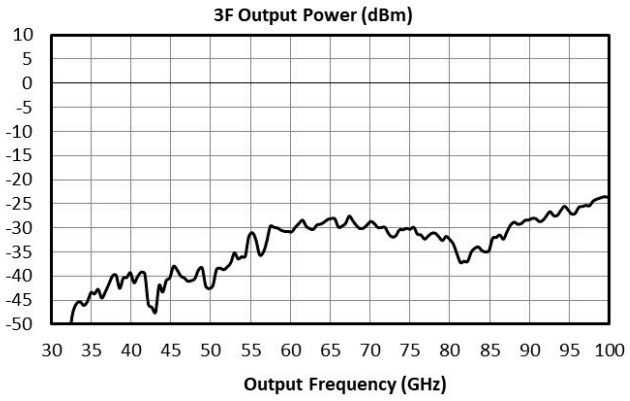
Typical Performance Plots

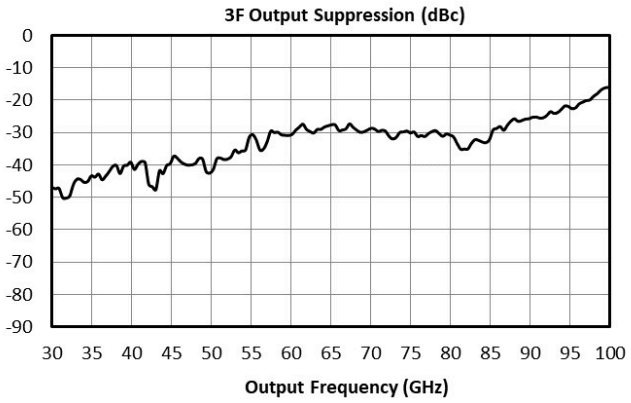


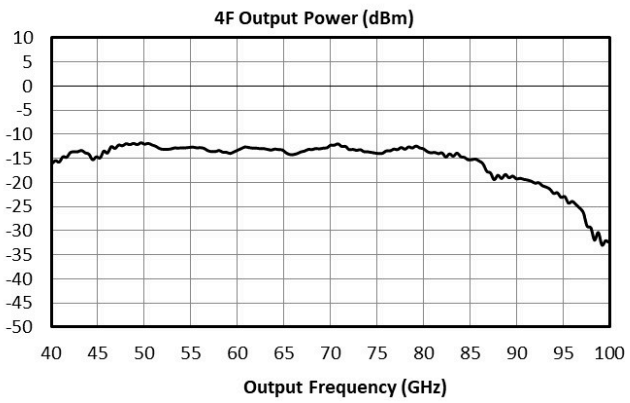


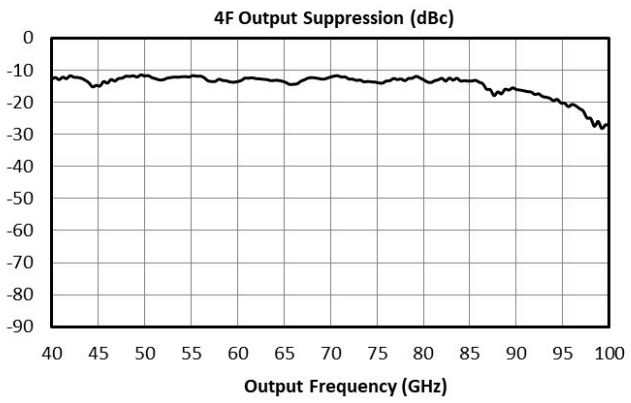


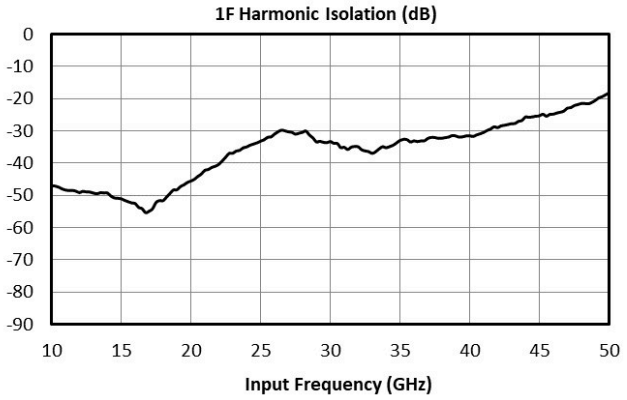


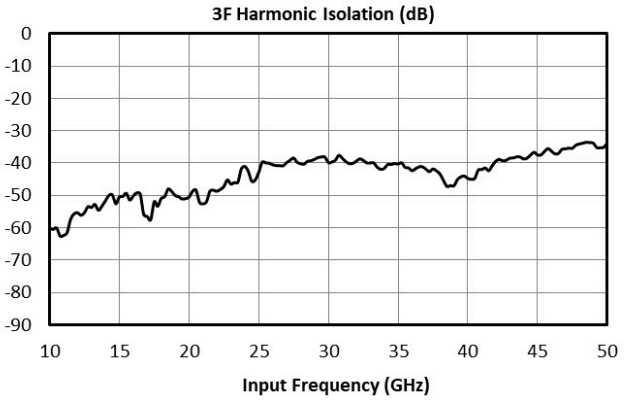


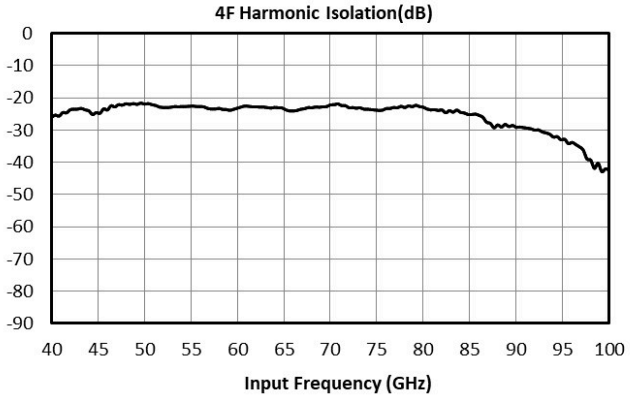


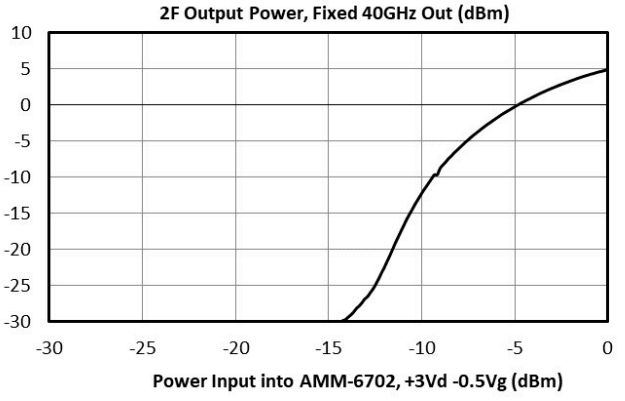


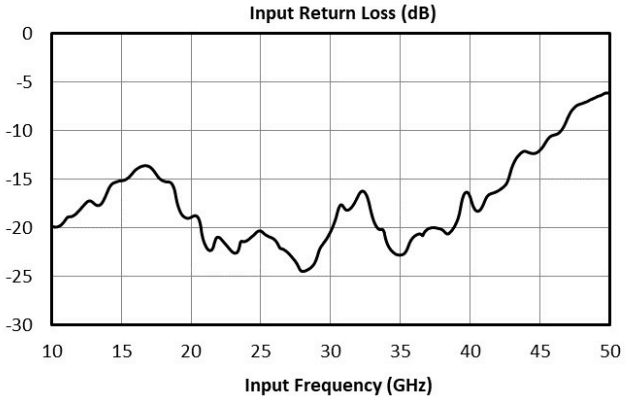


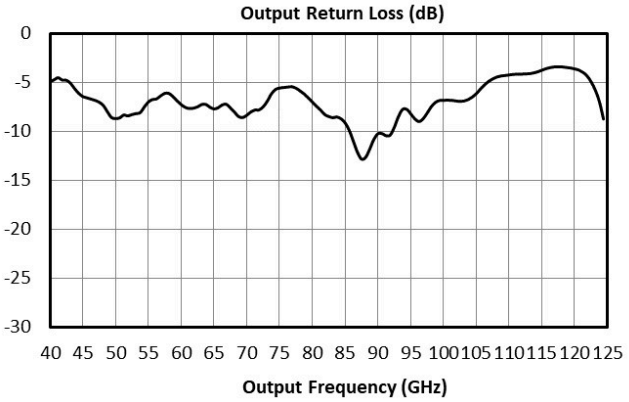








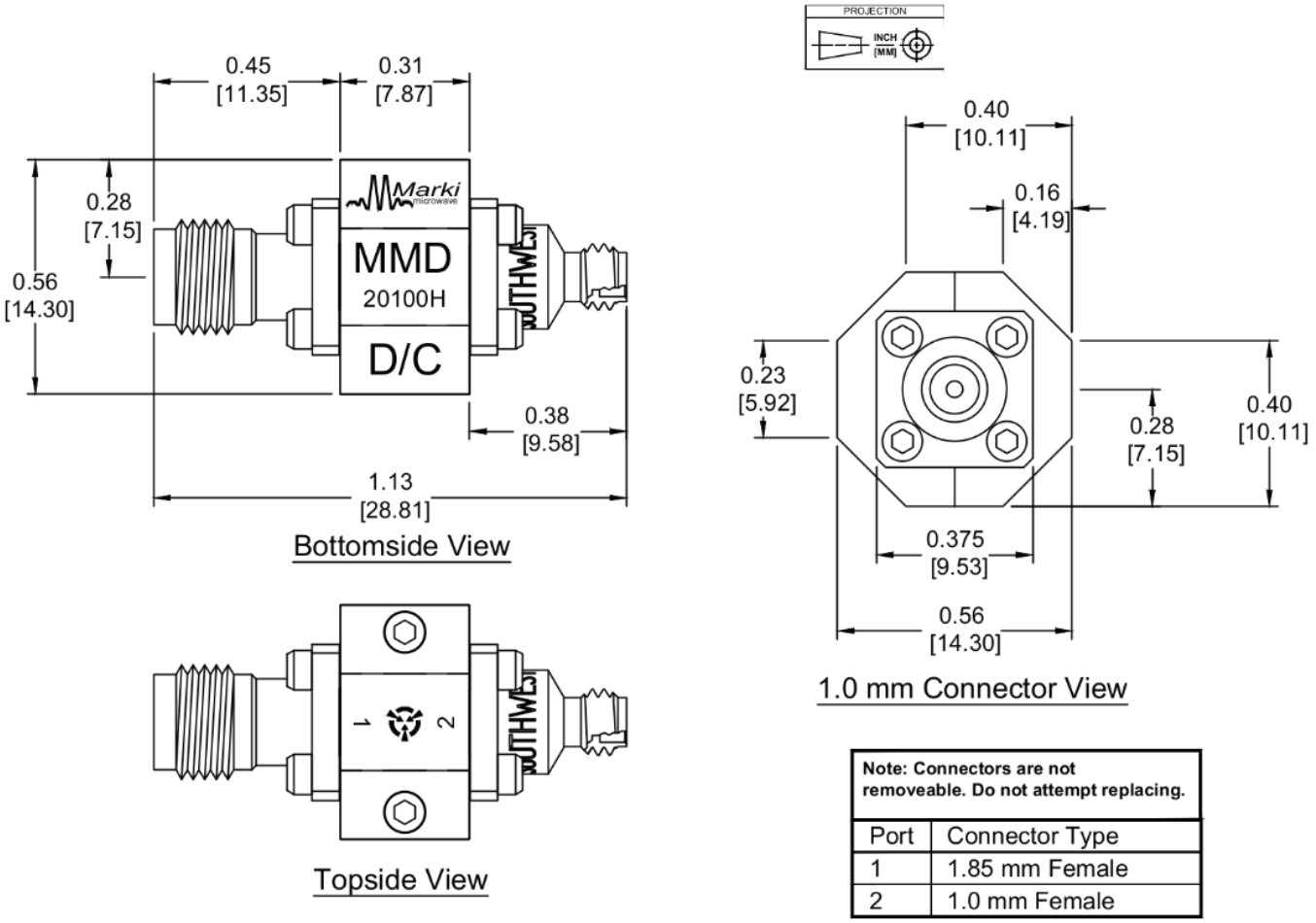




Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP



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

Port	Connector Type
1	1.85 mm Female
2	1.0 mm Female

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

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