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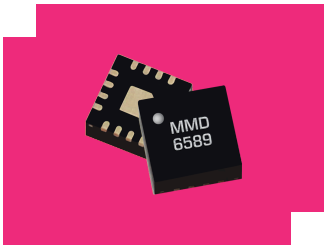
MMD-2050HSM

GaAs MMIC Millimeter Wave Doubler

DEVICE OVERVIEW

General Description

The MMD-2050HSM is a passive MMIC millimeter wave doubler fabricated with GaAs Schottky diodes. This operates over a guaranteed 10 to 25 GHz input frequency range or a doubled output frequency range of 20 to 50 GHz. It features excellent conversion loss, superior isolations, and high harmonic suppressions across a broad bandwidth. Both surface mount QFN and evaluation boards are available.



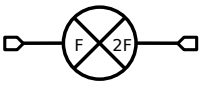
Features

- High fundamental rejection
- Millimeter wave output frequencies
- RoHS Compliant
- +10dBm to +15dBm LO drive

Applications

- High frequency synthesis
- LO signal chain

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MMD-2050HSM	GaAs MMIC Millimeter Wave Doubler	QFN	REACH RoHS	Released	EAR99
EVAL-MMD-2050H	Evaluation Board, GaAs MMIC 20 - 50 GHz Millimeter Wave Doubler	EVAL	REACH RoHS	Released	EAR99

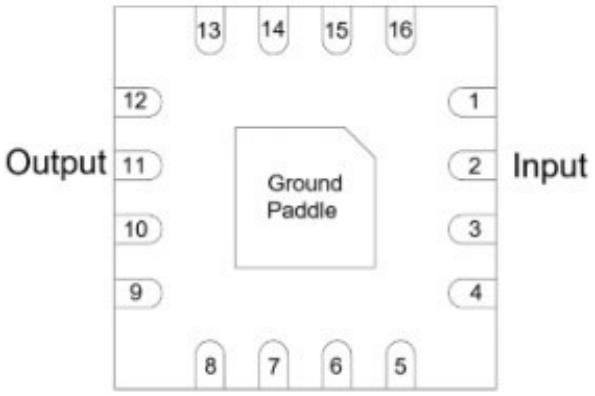
Table Of Contents

Revision History

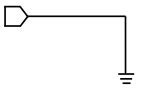
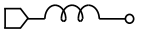
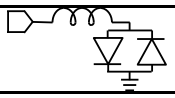
Revision Code	Revision Date	Comment
-	2020-02-01	Initial Release

Port Configuration and Functions

Port Diagram



Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	SM package ground path is provided through the ground paddle.	
Pin 11	2F Output	2x Input Frequency output port. Pin 11 is DC open and AC matched to 50 Ohms from 20-50GHz	
Pin 2	1F Input	Input 1x Frequency Port. Pin 2 is diode coupled and AC matched to 50 Ohms from 10-25GHz	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
RF Maximum Power	29	dBm

Package Information

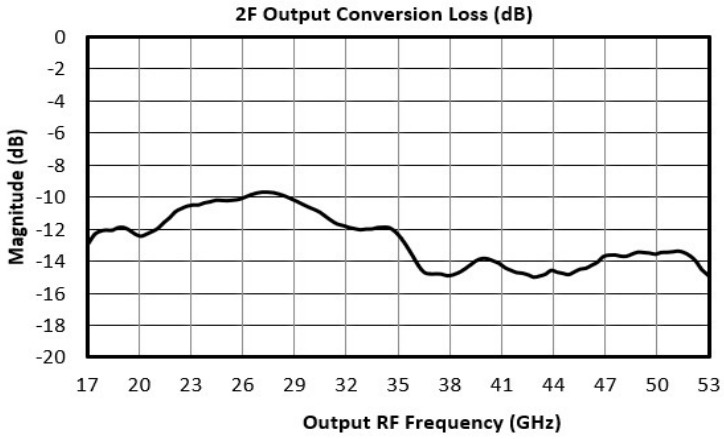
Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	3 x 3 mm
Moisture Sensitivity Level	-	MSL 1

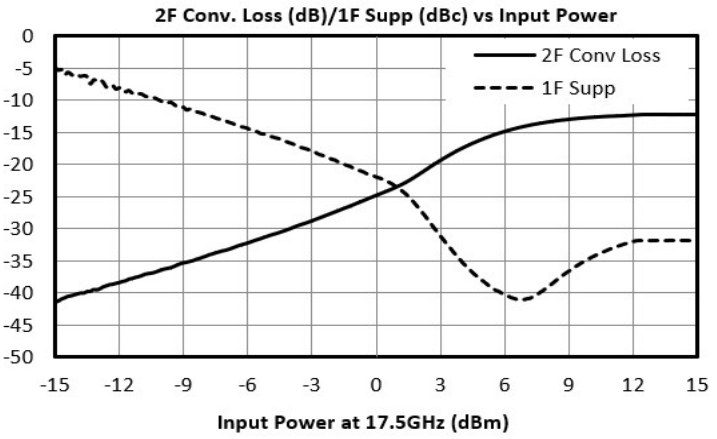
Electrical Specifications

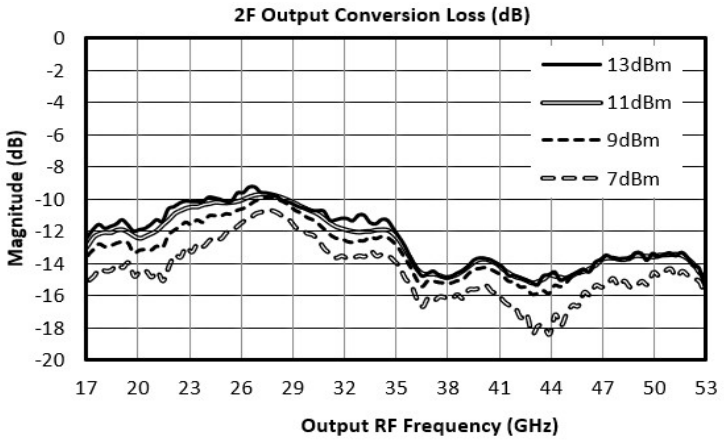
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Conversion Loss	Second Harmonic Output	10	25	-	12.5	16	dB
Input Frequency Range	-	-	-	10	-	25	GHz
Input Power	-	-	-	10	-	15	dBm
Isolation, 1F [1]	Input=10-25 GHz Output=10-25 GHz	10	25	40	45	-	dB
Isolation, 3F [2]	Input=10–17 GHz Output=30-51 GHz	30	51	42	53	-	dB
Isolation, 4F [3]	Input=10–12.5 GHz Output=40-50 GHz	40	50	22	24.5	-	dB
Output Frequency Range	-	-	-	20	-	50	GHz
Suppression, 1F [4]	Input=10–25 GHz Output=10-25 GHz	10	25	25	33	-	dBc
Suppression, 3F [5]	Input=10–17 GHz Output=30-51 GHz	30	51	30	40	-	dBc
Suppression, 4F [6]	Input=10–12.5 GHz Output=40-50 GHz	40	50	8	10.5	-	dBc

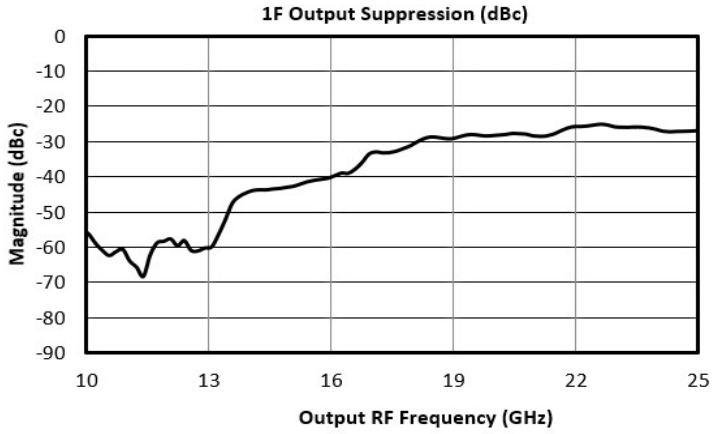
[1][2][3] Isolation is defined as the harmonic power relative to the 1F fundamental input power.
[4][5][6] Suppressions and isolations measured with an input source with >60dBc (relative to fundamental input) harmonic suppression. Suppression is defined as the harmonic power relative to the 2F doubled output power.

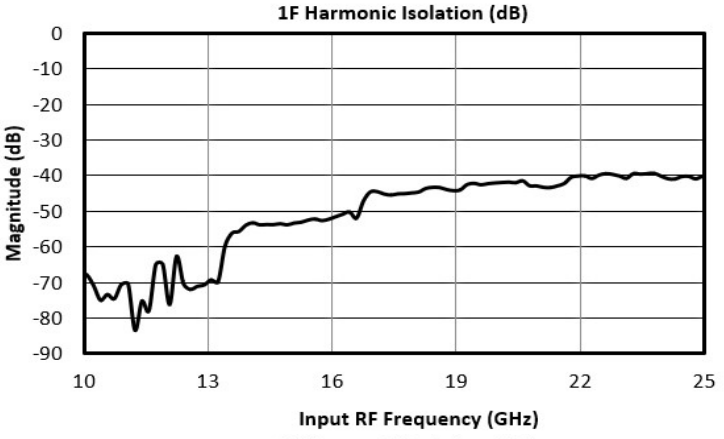
Typical Performance Plots

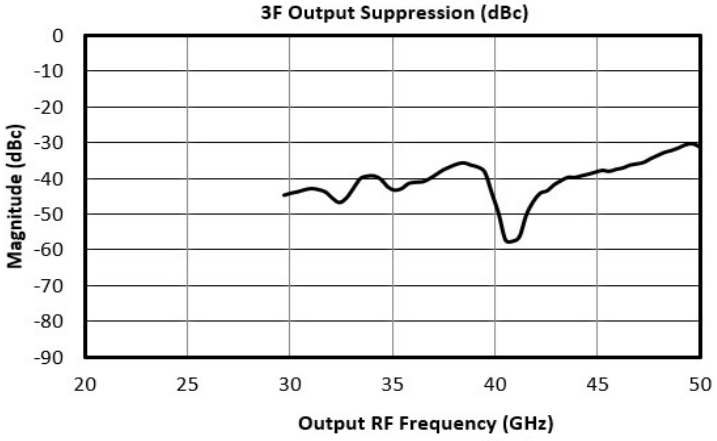


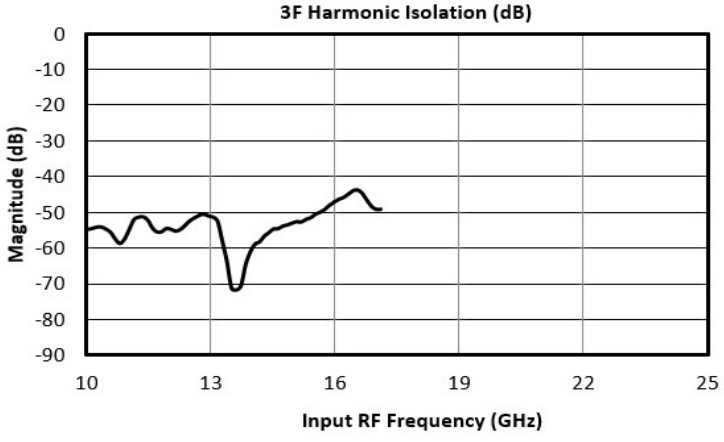


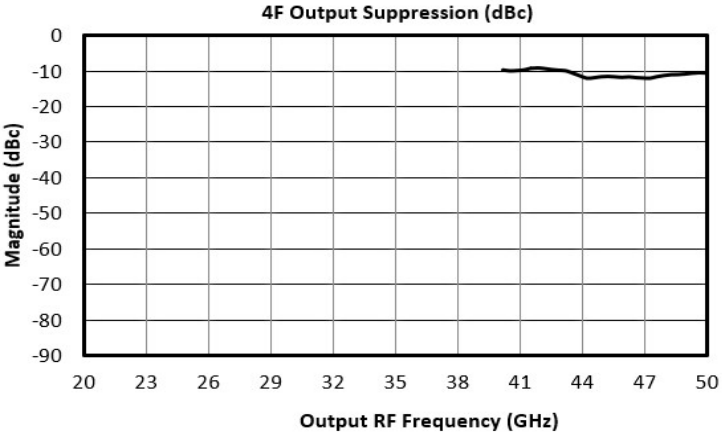


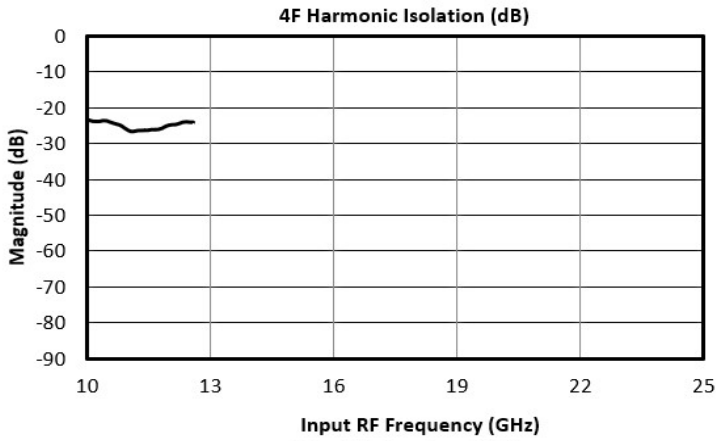


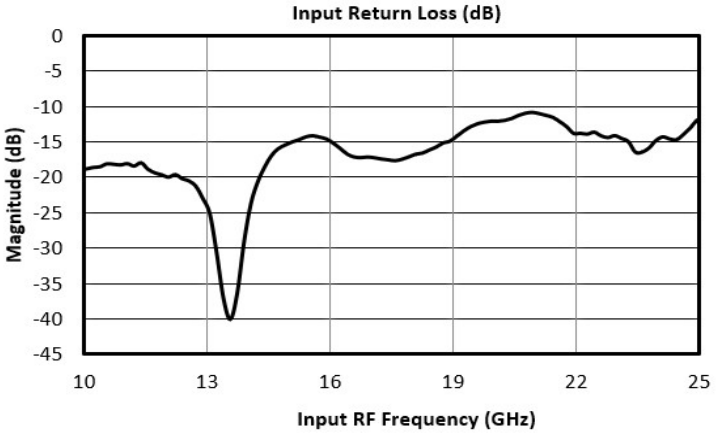


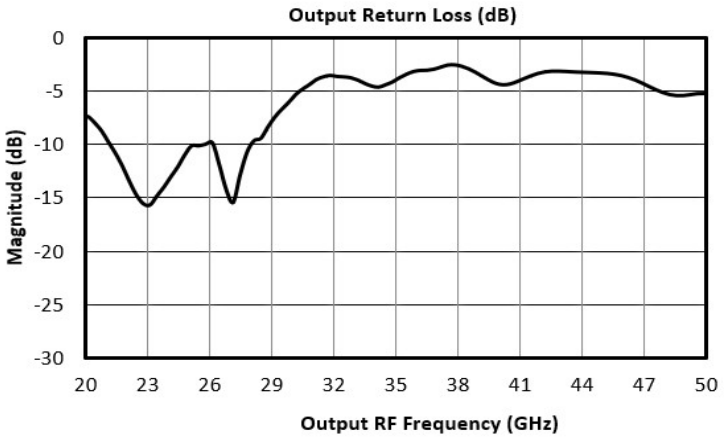










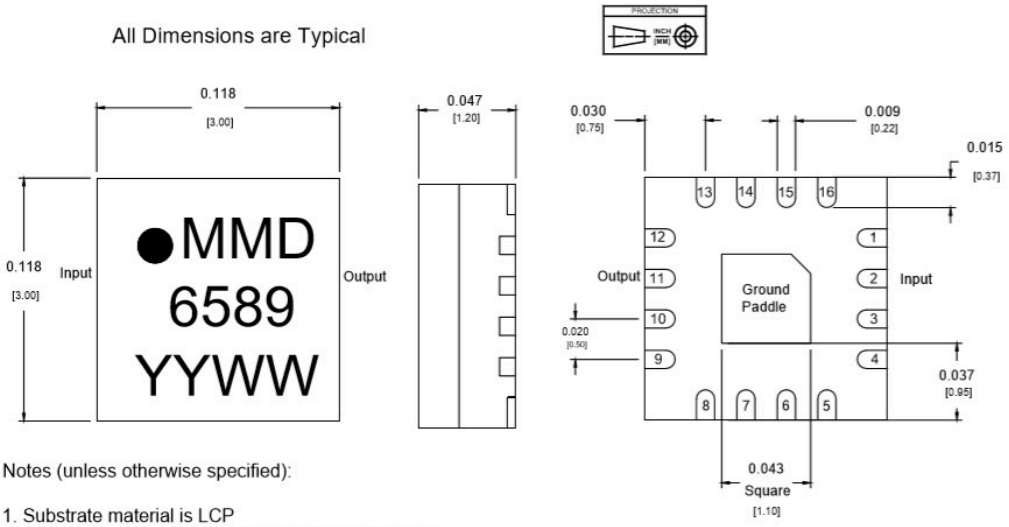


Mechanical Data

Outline Drawing

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

Pin #	Connection
1	N/C
2	Input
3	N/C
4	N/C
5	N/C
6	N/C
7	N/C
8	N/C
9	N/C
10	N/C
11	Output
12	N/C
13	N/C
14	N/C
15	N/C
16	N/C

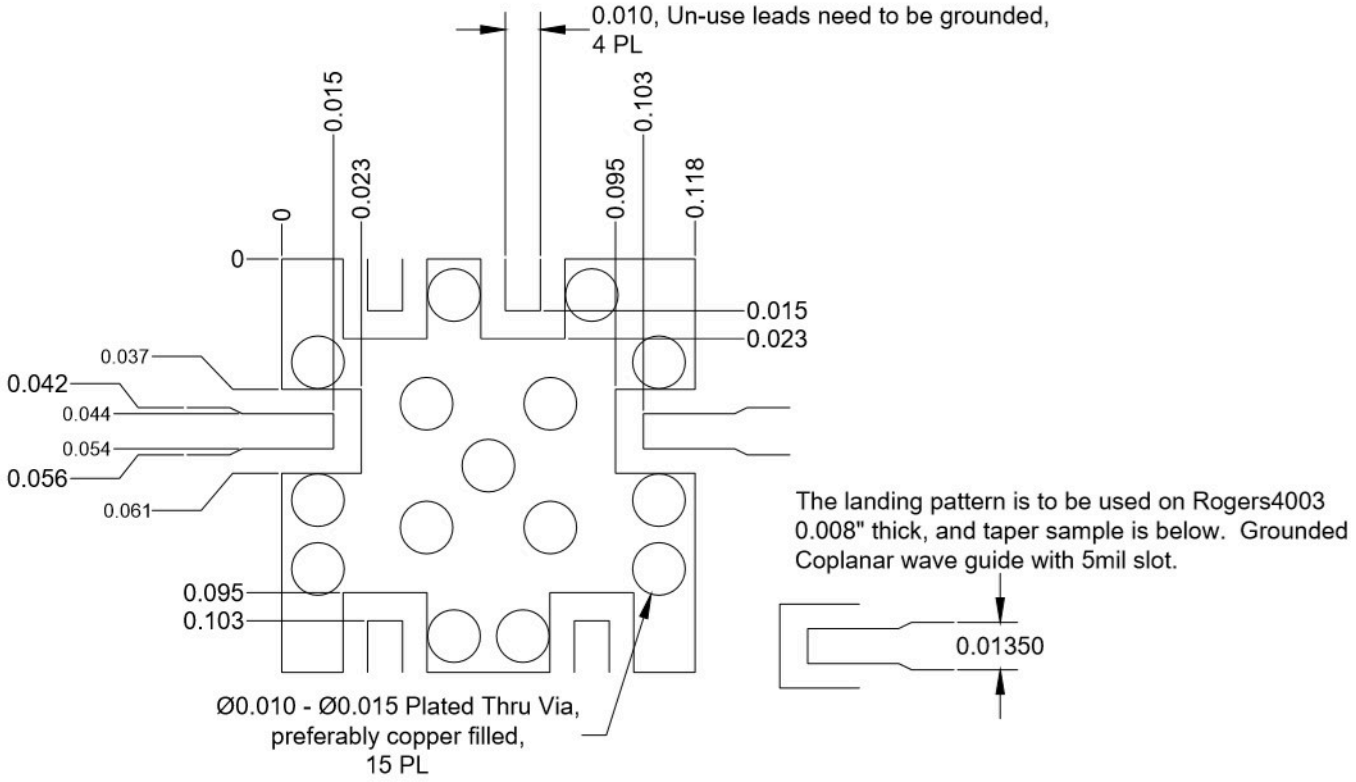


Notes (unless otherwise specified):

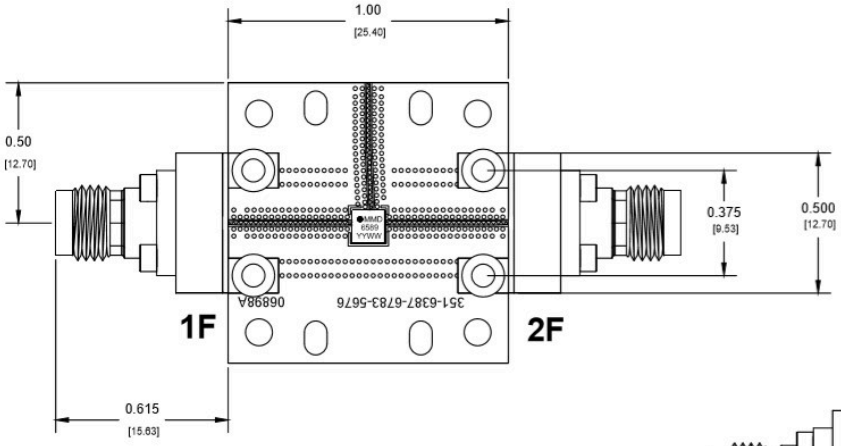
1. Substrate material is LCP
2. I/O Leads and Die Paddle is (from base to finish):
   Ni: 0.5um MIN
   Pd: 0.02um MIN
   Au: 0.05um MAX
3. All unconnected pins should be connected to PCB RF ground.

Footprint Image

Download : Footprint Drawing



Evaluation Board - Outline Drawing

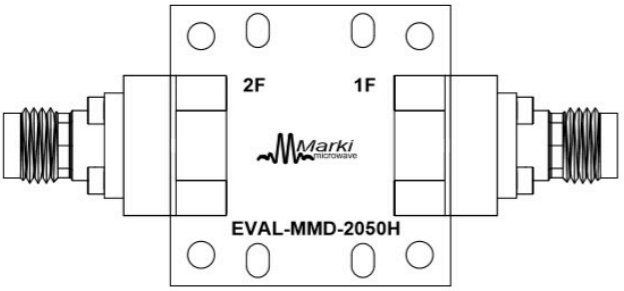


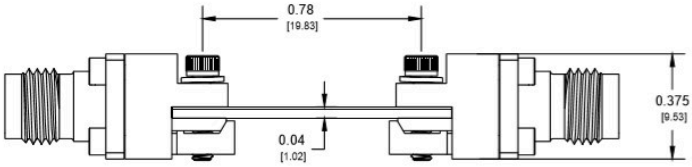
All measurements are typical

Port	Connector Type
1F	2.92mm Female
2F	2.40mm Female

Port	DC Voltage
1F	0.691 V
2F	DC Open

Backside Label





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