Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
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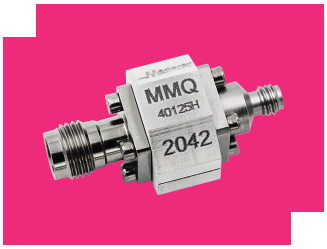
MMQ-40125HM

GaAs MMIC Millimeter Wave 4x Multiplier

DEVICE OVERVIEW

General Description

Q-40125H is a MMIC millimeter wave 4x multiplier fabricated with GaAs Schottky diodes. MMQ-40125H operates over a 10 to 31.25 GHz input frequency range or a quadrupled output frequency range of 40 to 125 GHz. Operation past 125GHz is pending verification. Contact factory for information. MMQ-40125H is available as a connectorized coaxial module using 1.0 mm connectors on the output. Wire bondable die are also available.



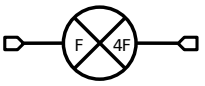
Features

- Low loss die and package
- Up to 125GHz 4th harmonic output tone
- Convenient +0 dBm output level
- 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
MMQ-40125HM	GaAs MMIC Millimeter Wave 4x Multiplier	M	Standard	REACH RoHS	Released	EAR99

Table Of Contents

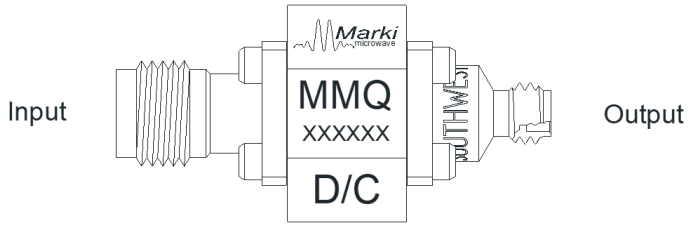
Revision History

Revision Code	Revision Date	Comment
-	2020-10-01	Initial Datasheet Release
A	2021-06-01	Export Classification Updated
B	2024-03-14	Export Classification Updated

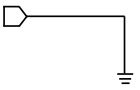
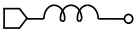
Port Configuration and Functions

Port Diagram

The MMQ-40125H 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 CH and M packages. Blocking capacitor is optional.	
Port 2	Output	1.0F	2x Input Frequency output port. Port 2 is DC open for the CH and 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	25	dBm

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: M	15g
Dimensions	-	28.81 x 14.30 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	-	20	23	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 doubler that requires no DC bias.

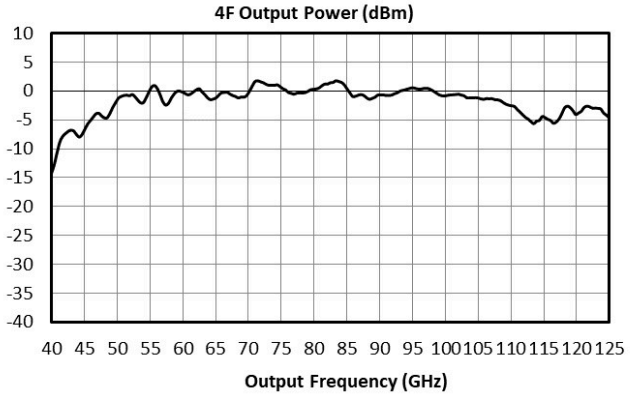
Electrical Specifications

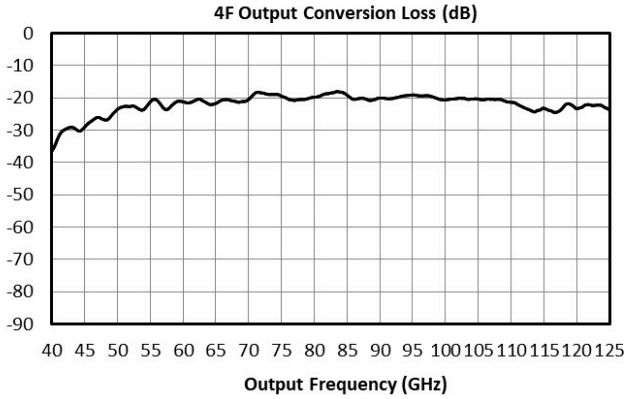
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized M package quadrupler used in the forward direction with a nominal +20 dBm sine wave input. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C. RF testing of our die is performed on a sample basis to verify conformance to datasheet guaranteed specifications.

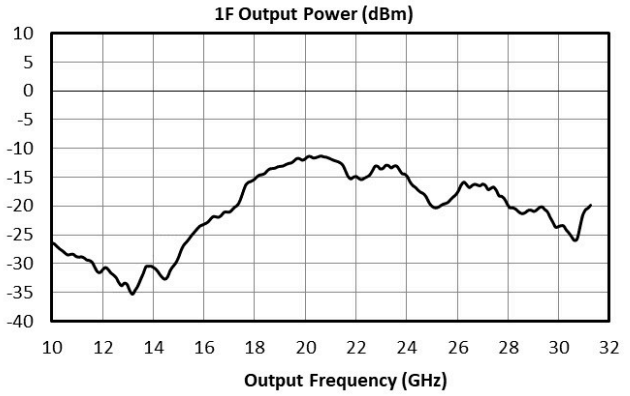
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Conversion Loss	Input = 10 – 12.5 GHz Output = 40 - 50 GHz	-	-	-	28	-	dB
Conversion Loss	Input = 12.5 - 15 GHz Output = 50 - 60 GHz	-	-	-	23	-	dB
Conversion Loss	Input = 15 - 27.5 GHz Output = 60 - 110 GHz	-	-	-	20	23	dB
Conversion Loss	Input = 27.5 - 31.25 GHz Output = 110 - 125 GHz	-	-	-	25	-	dB
Input Frequency Range	-	-	-	10	-	31.25	GHz
Input Power	-	-	-	-	20	23	dBm
Isolation, 1F [1]	Input = 10 – 31.25 GHz Output = 10 – 31.25 GHz	-	-	-	41	-	dB
Isolation, 2F [2]	Input = 10 – 31.25 GHz Output = 20 – 62.5 GHz	-	-	-	38	-	dB
Isolation, 3F [3]	Input = 10 – 31.25 GHz Output = 30 – 93.75 GHz	-	-	-	34.5	-	dB
Output Frequency Range [4]	-	-	-	40	-	125	GHz
Suppression, 1F [5]	Input = 10 – 31.25 GHz Output = 10 – 31.25 GHz	-	-	-	19	-	dBc
Suppression, 2F [6]	Input = 10 – 31.25 GHz Output = 20 – 62.5 GHz	-	-	-	17	-	dBc
Suppression, 3F [7]	Input = 10 – 31.25 GHz Output = 30 – 93.75 GHz	-	-	-	12	-	dBc

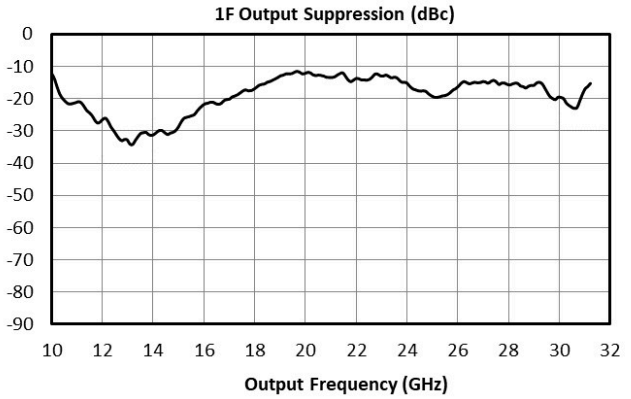
[1][2][3] Isolation is defined as the harmonic power relative to the 1F fundamental input power.
[4] Output return loss measured with a fixed frequency large signal 31.25 GHz input.
[5] Suppressions and isolations figures reported include measurement amplifier's harmonic's leakage tones. Suppression is defined as the harmonic power relative to the 4F quadrupled output power
[6][7] Suppressions and isolations figures reported include measurement amplifier's harmonic's leakage tones. Suppression is defined as the harmonic power relative to the 4F quadrupled output power.

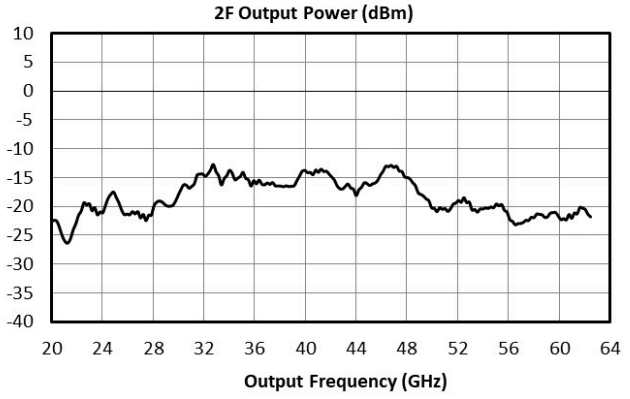
Typical Performance Plots

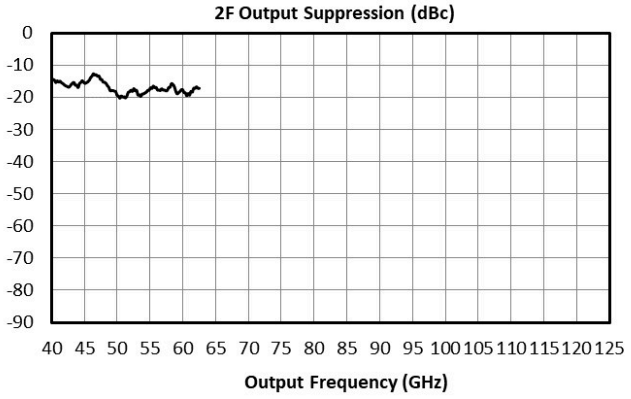


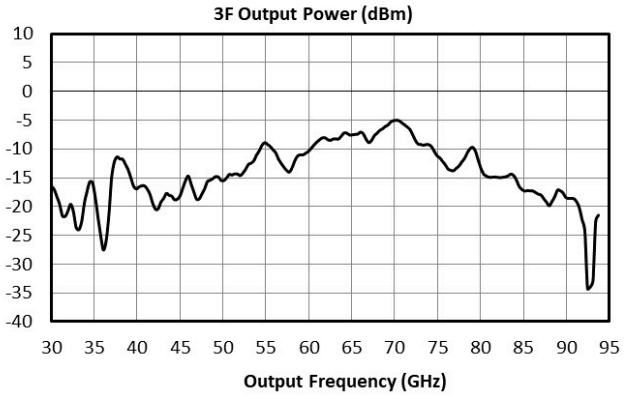


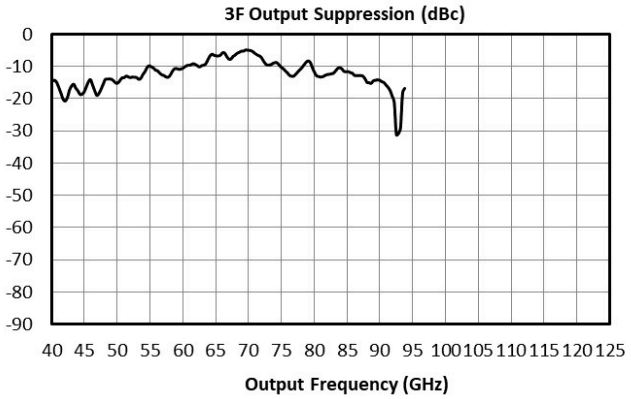


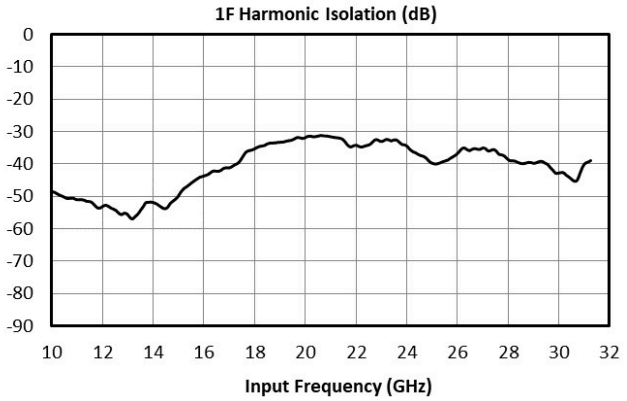


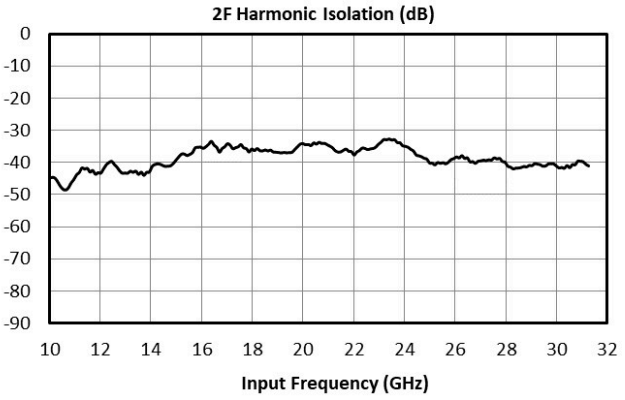


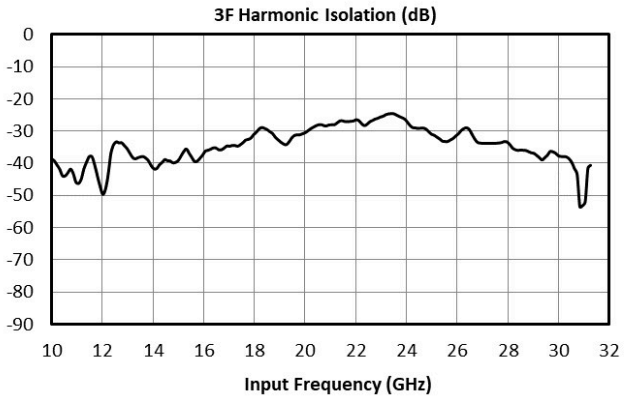


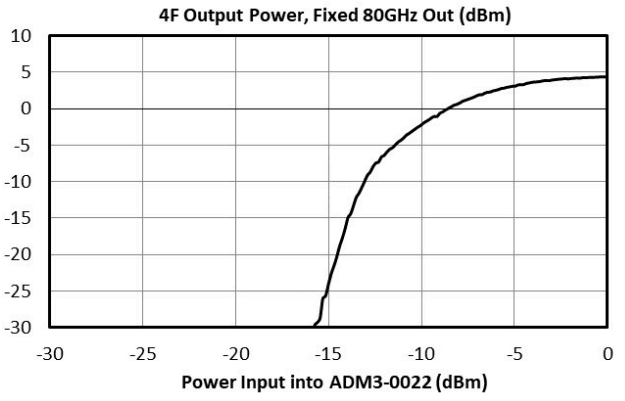


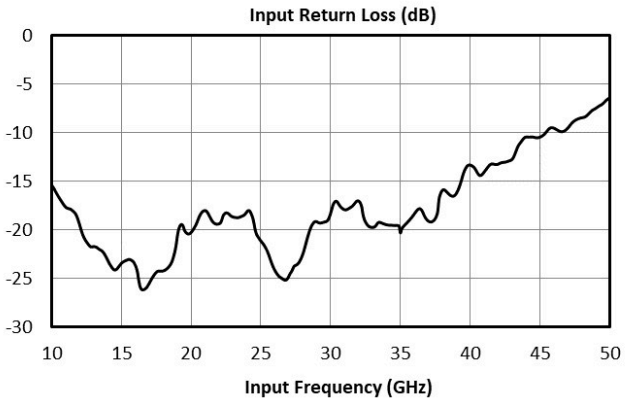


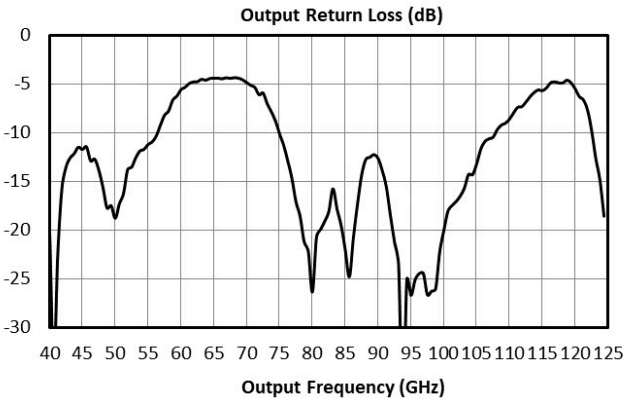


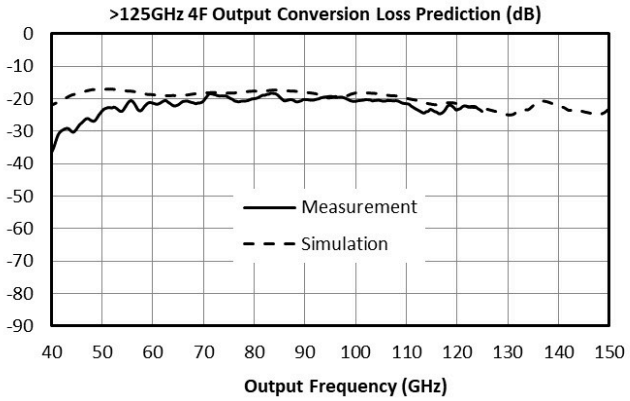








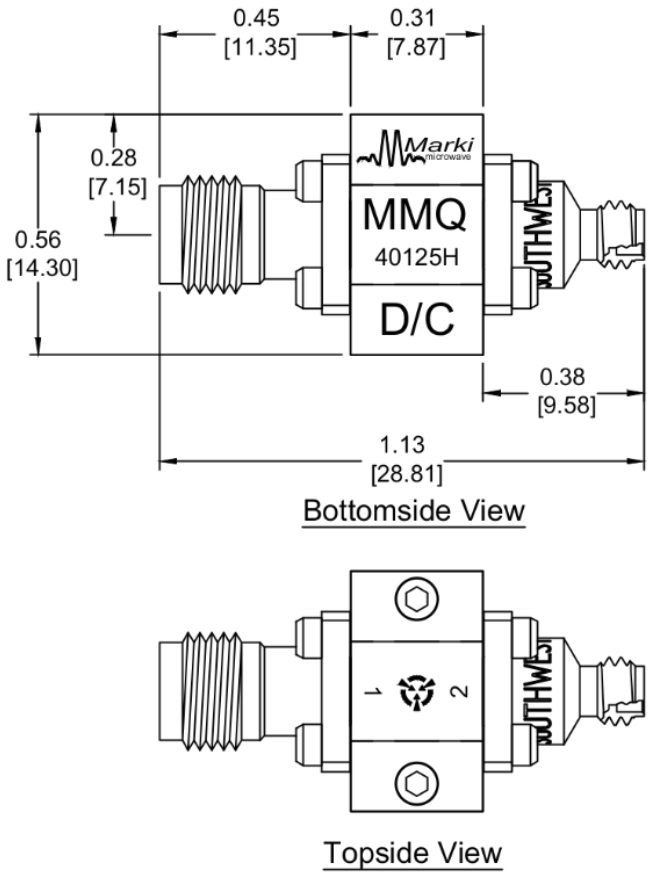


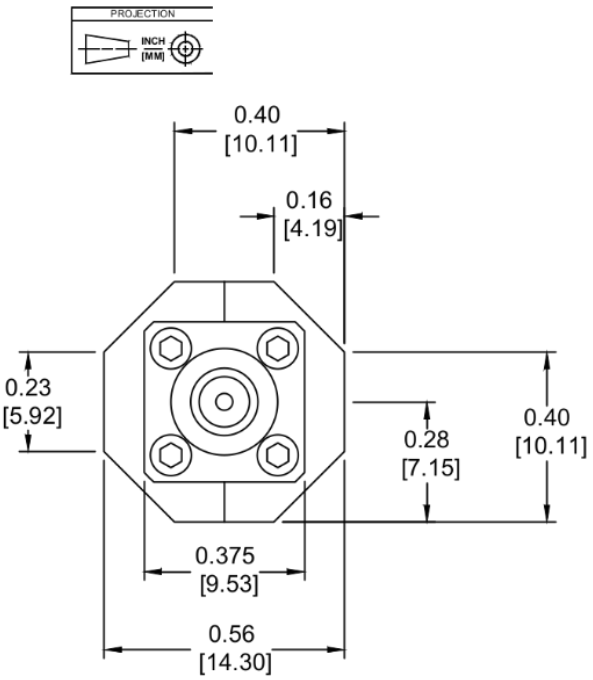


Mechanical Data

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

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