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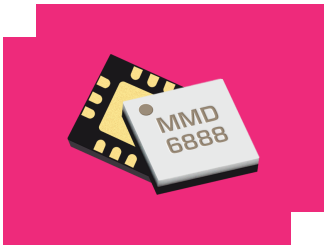
MMD-1030LCSM

GaAs MMIC Doubler

DEVICE OVERVIEW

General Description

The MMD-1030LCSM is a MMIC doubler fabricated with GaAs Schottky diodes. This part operates over a 5 to 15 GHz input frequency range or a doubled output frequency range of 10 to 30 GHz. It features excellent conversion loss, superior isolations, and harmonic suppressions across a broad bandwidth. It is available as a 3x3mm QFN and connectorized evaluation board.



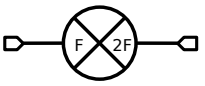
Features

- High Fundamental Rejection
- Low 2F Conversion Loss
- Low Input Drive

Applications

- Test and Measurement Equipment
- LO signal chain
- High frequency synthesis

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MMD-1030LCSM	GaAs MMIC Doubler	QFN	REACH RoHS	Released	EAR99
EVB-MMD-1030LC	Evaluation Board, GaAs MMIC 10 - 30 GHz Doubler	EVB	REACH RoHS	Released	EAR99

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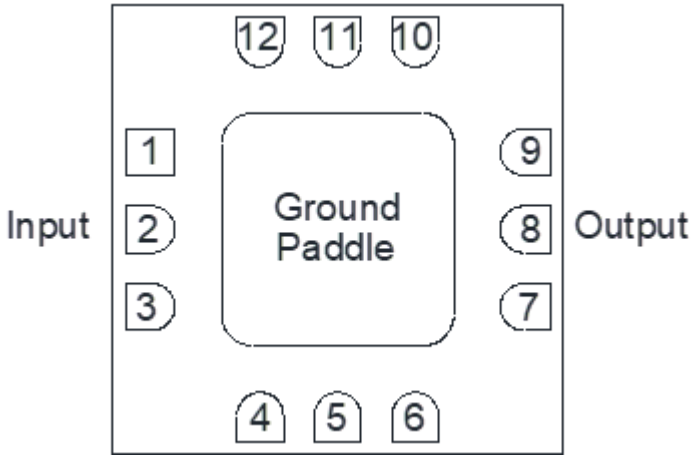
Revision History

Revision Code	Revision Date	Comment
-	2023-02-01	Datasheet Initial Release
A	2026-02-26	ESD Class Added

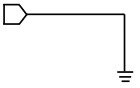
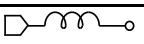
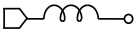
Port Configuration and Functions

Port Diagram

A top-down x-ray view of the MMD-1030LCSM's CSM package outline drawing is shown below. The MMD-1030LCSM should only be used in the forward direction, with the input and output ports given in Port Functions.



Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	CSM Package ground path is provided through the ground paddle.	
Pin 2	1F Input	Input 1x Frequency Port. Pin 2 is DC open, and AC matched to 50 Ohms from 5 to 15 GHz for the CSM Package.	
Pin 8	2F Output	2x Input Frequency output port. Pin 8 is DC open, and AC matched to 50 Ohms from 10 to 30 GHz for the CSM package.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. All Absolute Maximum Ratings are individual and should not be met in parallel. 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 (100°C)	20	dBm
Power Handling, at any Port (25°C)	25	dBm

Package Information

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

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
Operating Temperature	-55	25	100	°C
Input Power	5	7	11	dBm

Electrical Specifications

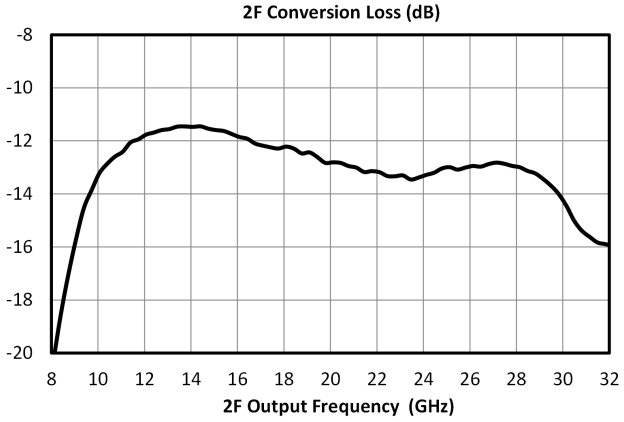
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized EVB package doubler used in the forward direction with a +7 dBm sine wave input. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Conversion Loss	Second Harmonic Output	10	30	-	12.5	16	dB
Input Frequency Range	-	-	-	5	-	15	GHz
Input Power	-	-	-	5	7	11	dBm
Isolation, 1F [1]	Input = 5 - 15 GHz Output = 5 - 15 GHz	5	15	-	44	-	dB
Isolation, 3F [2]	Input = 5 – 10 GHz Output = 15 - 30 GHz	15	30	-	56	-	dB
Isolation, 4F [3]	Input = 5 – 7.5 GHz Output = 20 - 30 GHz	20	30	-	31	-	dB
Output Frequency Range	-	-	-	10	-	30	GHz
Suppression, 1F [4]	Input = 5 – 15 GHz Output = 5 - 15 GHz	5	15	-	31	-	dBc
Suppression, 3F [5]	Input = 5 – 10 GHz Output = 15 - 30 GHz	15	30	-	43	-	dBc
Suppression, 4F [6]	Input = 5 – 7.5 GHz Output = 20 - 30 GHz	20	30	-	17	-	dBc

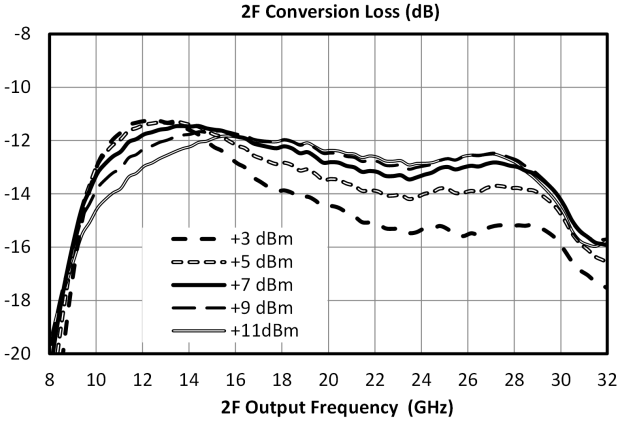
[1][2][3] Isolation is defined as the harmonic power relative to the 1F fundamental input power.
[4][5][6] Suppressions and isolations measured with an input source with >60dBc (relative to fundamental input) harmonic suppression. Suppression is defined as the harmonic power relative to the 2F doubled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

Typical Performance Plots

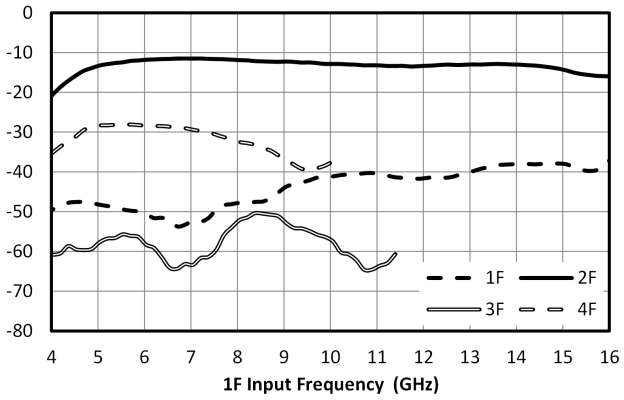
2F Conversion Loss (dB)



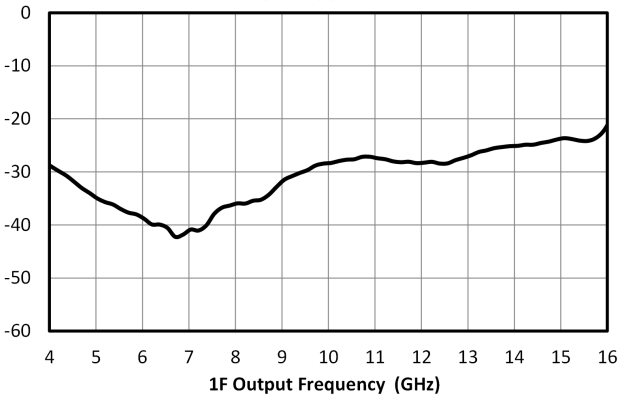
2F Conversion Loss (dB)



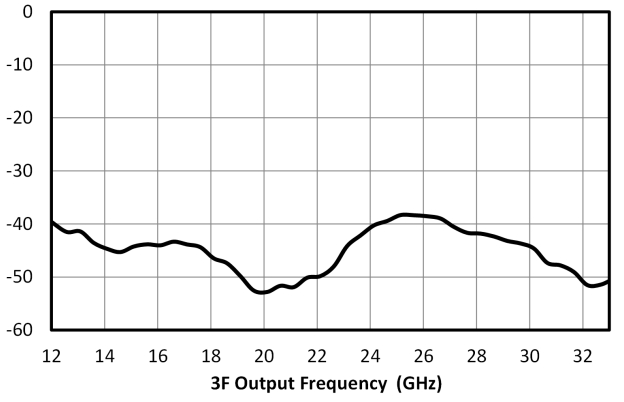
Harmonic Isolations Relative to 1F Input (dB)



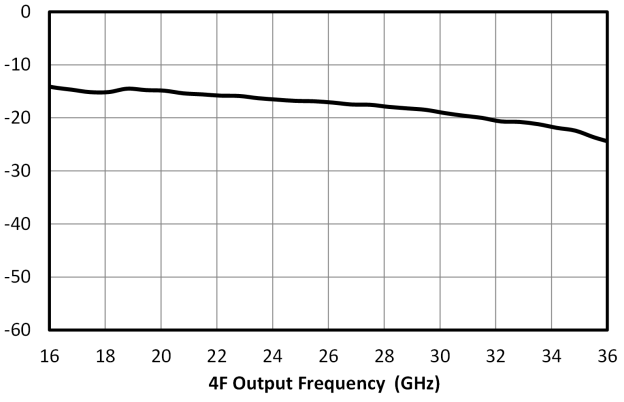
1F Output Suppression (dBc)



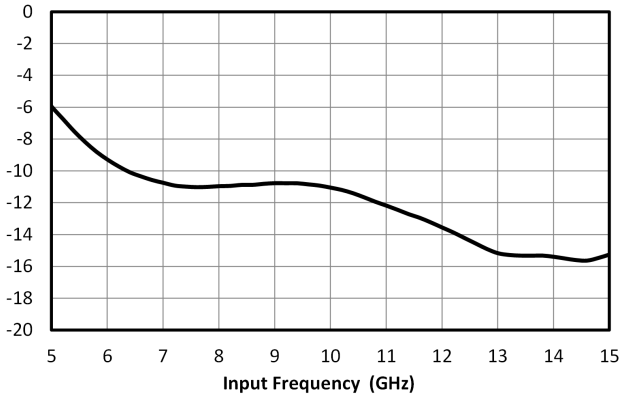
3F Output Suppression (dBc)



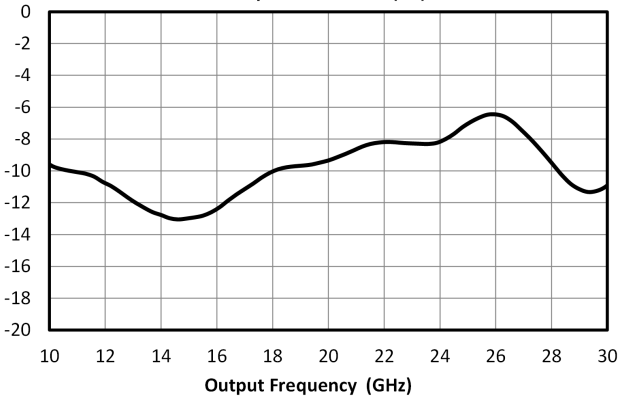
4F Output Suppression (dBc)



Input Return Loss (dB)



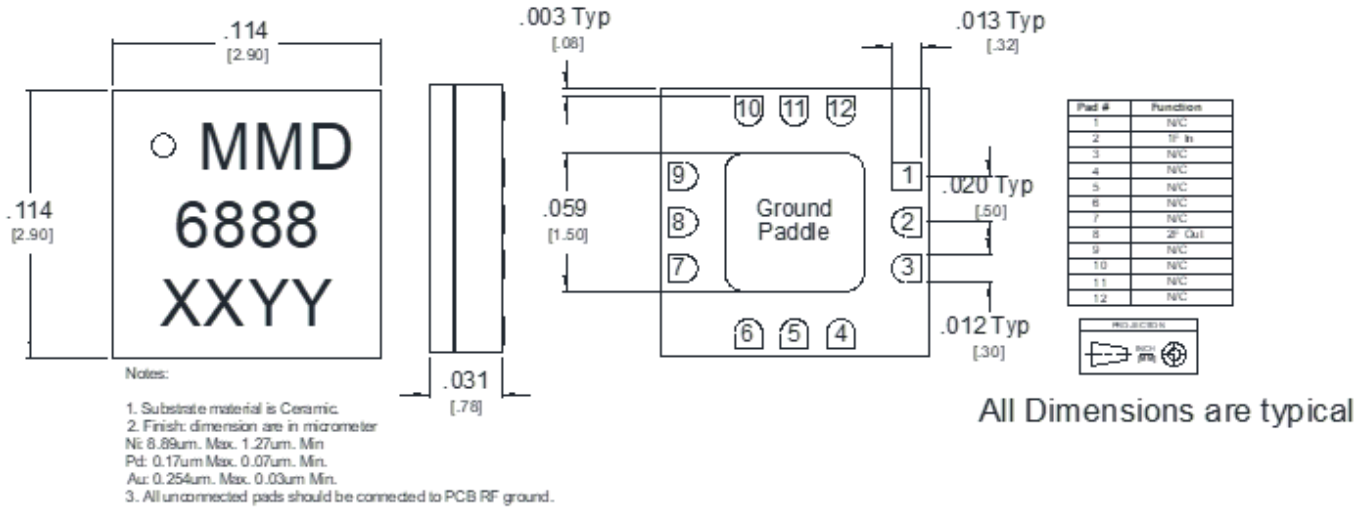
Output Return Loss (dB)



Mechanical Data

Outline Drawing

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

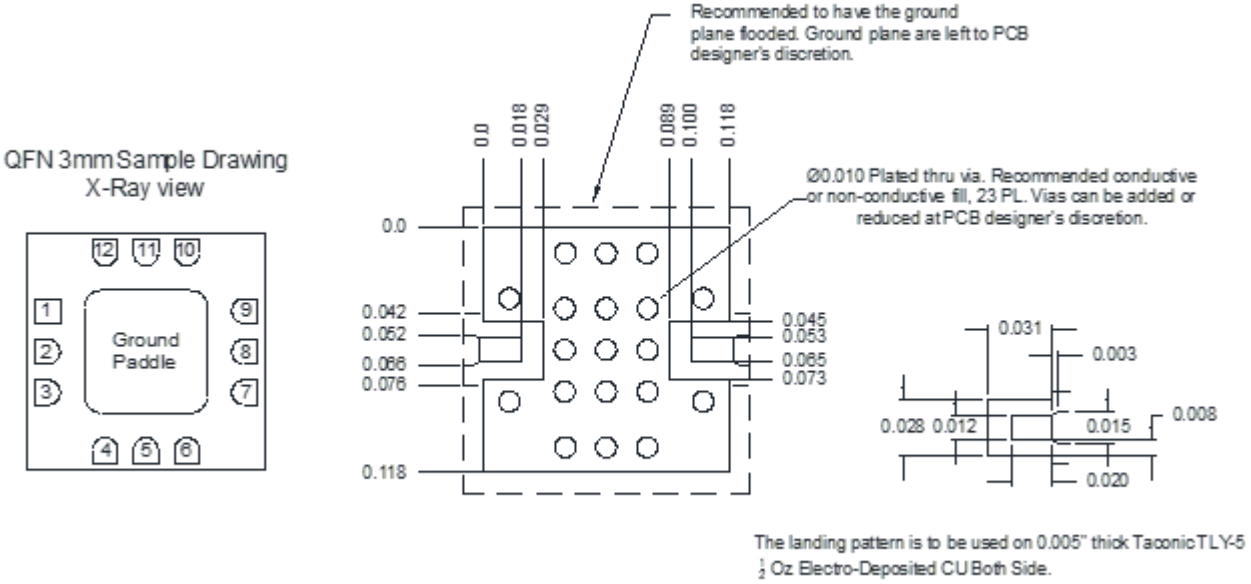


Notes:

1. Substrate material is Ceramic.
2. Finish: dimension are in micrometer
Ni: 8.89um. Max. 1.27um. Min
Pd: 0.17um Max. 0.07um. Min.
Au: 0.254um. Max. 0.03um Min.
3. All unconnected pads should be connected to PCB RF ground.

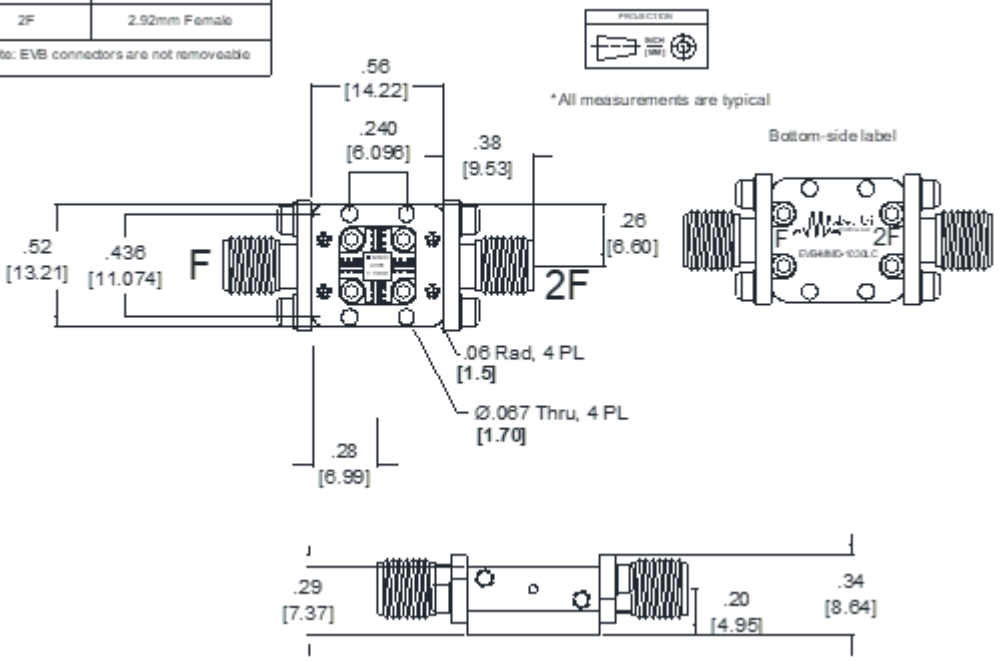
Footprint Image

Download : Footprint Drawing



Evaluation Board - Outline Drawing

Ports	Connector Type
F	SMA Female
2F	2.92mm Female
Note: EVB connectors are not removeable	



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