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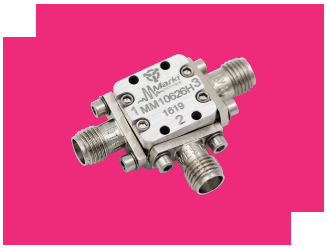
MM1-0626HS

GaAs MMIC Double Balanced Mixer

DEVICE OVERVIEW

General Description

The MM1-0626H is a passive double balanced MMIC mixer. It features excellent conversion loss, superior isolations and spurious performance across a broad bandwidth, in a highly miniaturized form factor. Accurate, nonlinear simulation models are available for Microwave Office® through the Marki Microwave PDK. The MM1-0626H is available as a wire bondable chip or an SMA connectorized package. The MM1-0626H is a superior alternative to Marki Microwave carrier and packaged M1 and M3 mixers.



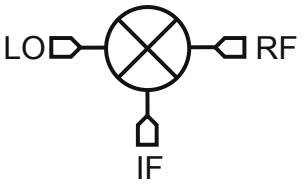
Features

- CAD Optimized for Superior Isolation and Spurious Response
- Broadband Performance
- Excellent Unit-to-Unit Repeatability
- Fully nonlinear software models available with Marki PDK for Microwave Office®
- RoHS Compliant

Applications

- Test and Measurement Equipment
- SATCOM
- Radar

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MM1-0626HS	GaAs MMIC Double Balanced Mixer	S	Standard	REACH RoHS	Released	EAR99

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Table Of Contents

Revision History

Revision Code	Revision Date	Comment
A	2017-11-01	Die shrunk from 1.48 x 1.18 mm2 to 1.37 x 1.17 mm2. CH package tolerance added.
B	2021-12-01	CH Package Outline Drawing Updated to include die number and logo

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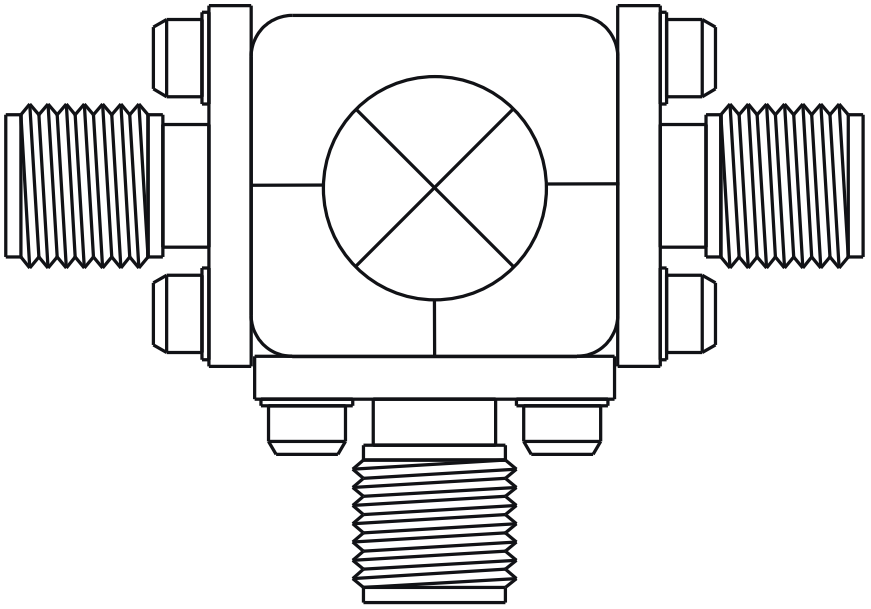
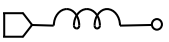
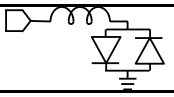
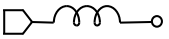
Port Configuration and Functions

Port Diagram



Port Functions

Configuration A

Port	Function	Connector Type	Description	Equivalent Circuit for Package
Port 1	LO	SMAF	Port 1 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	
Port 2	IF	SMAF	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	RF	SMAF	Port 3 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	

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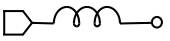
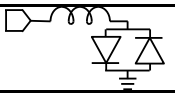
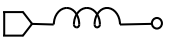
Configuration B

Port	Function	Connector Type	Description	Equivalent Circuit for Package
Port 1	RF	SMAF	Port 1 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	
Port 2	IF	SMAF	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	LO	SMAF	Port 3 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	

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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
Port 2 DC Current	15	mA
RF Power Handling (RF+LO), 100°C	20	dBm
RF Power Handling (RF+LO), 25°C	32	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	14.22 x 13.21mm

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	13	-	20	-

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Electrical Specifications

pecifications guaranteed from -55 to +100°C, measured in a 50Ω system. All bare die are 100% DC tested and 100% visually inspected. RF testing is performed on a sample basis to verify conformance to datasheet guaranteed specifications. Consult factory for more information.

Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	A	LO/RF=6-26.5 IF=DC-9GHz LO drive level=15dBm	-	7.5	-	dB
Input 1 dB Compression	A	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	9	-	dBm
Input IP3	A	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	21	-	dBm
Conversion Loss	B	LO/RF=6-26.5GHZ IF=DC-9GHz LO drive level=15dBm	-	9	-	dB
Input 1 dB Compression	B	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	9	-	dBm
Input IP3	B	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	23	-	dBm
IF Frequency Range	-	-	0	-	9	GHz
Isolation, LO to IF	-	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	34	-	dB
Isolation, LO to RF	-	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	47	-	dB
Isolation, RF to IF	-	LO/RF=6-26.5GHz IF=DC-9GHz LO drive level=13-20dBm	-	35	-	dB
LO Frequency Range	-	-	6	-	26.5	GHz
RF Frequency Range	-	-	6	-	26.5	GHz
RF Frequency Range	-	-	6	-	26	GHz

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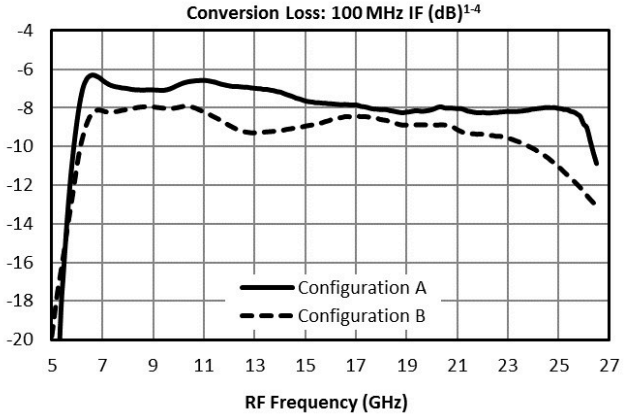
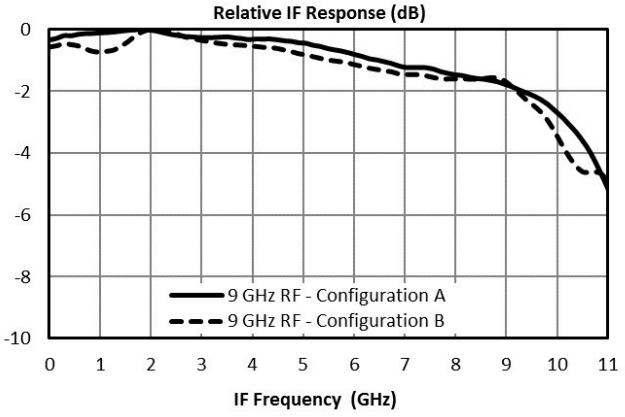
Typical Performance

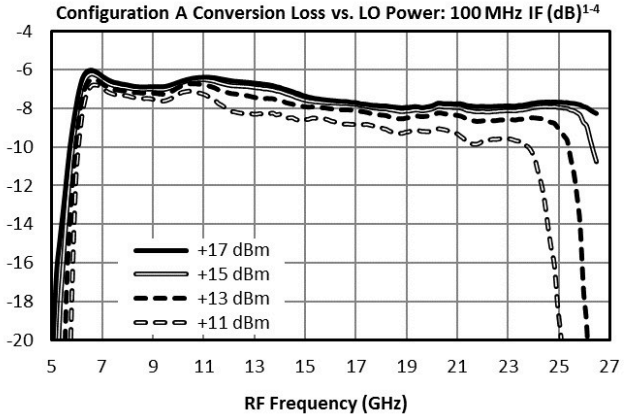
Conversion Loss: 100 MHz IF (dB)[1-4]



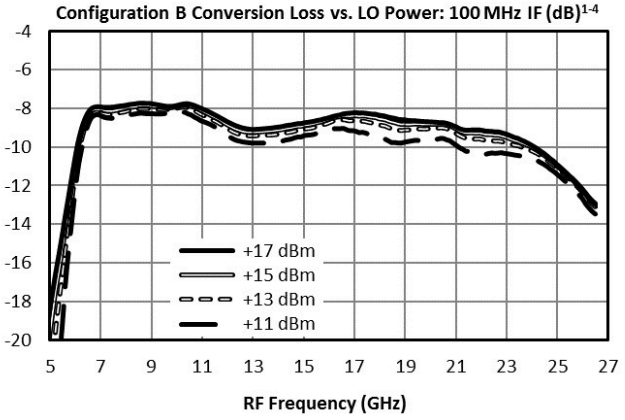
Relative IF Response (dB)



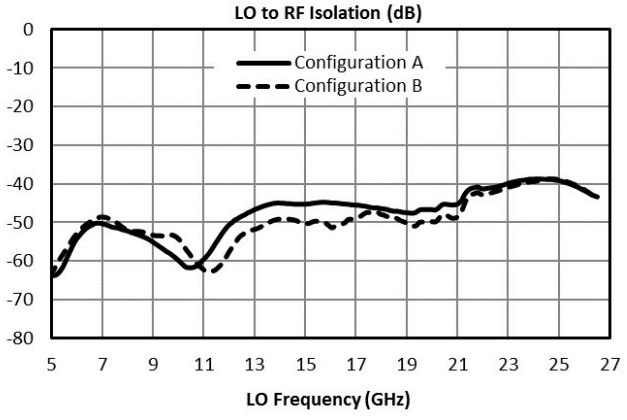
Configuration A Conversion Loss vs. LO Power: 100 MHz IF (dB)[1-4]



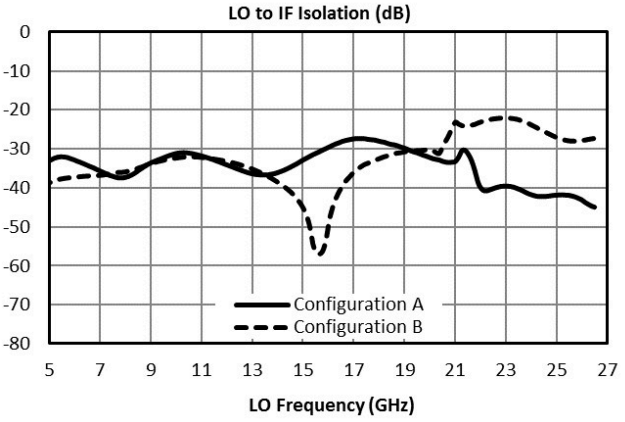
Configuration B Conversion Loss vs. LO Power: 100 MHz IF (dB)[1-4]



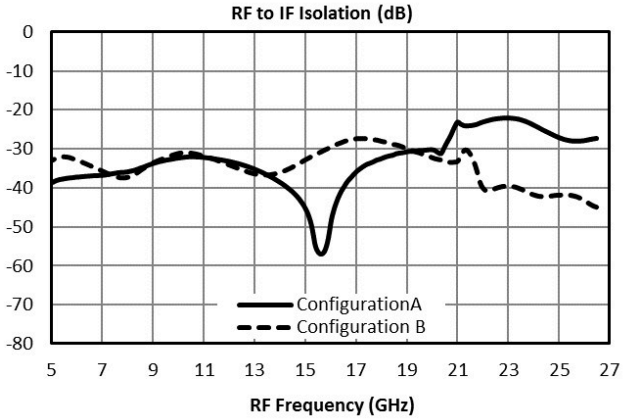
LO to RF Isolation (dB)



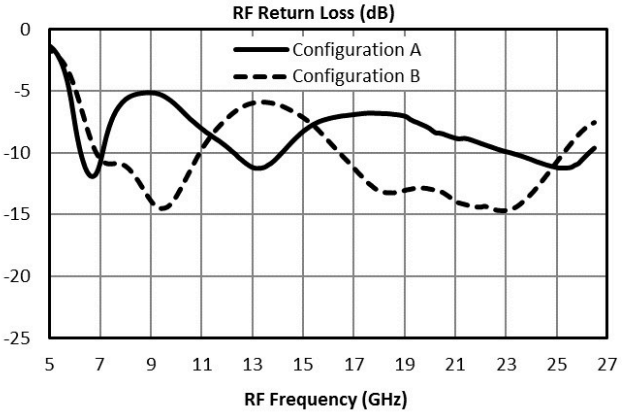
LO to IF Isolation (dB)



RF to IF Isolation (dB)



RF Return Loss (dB)



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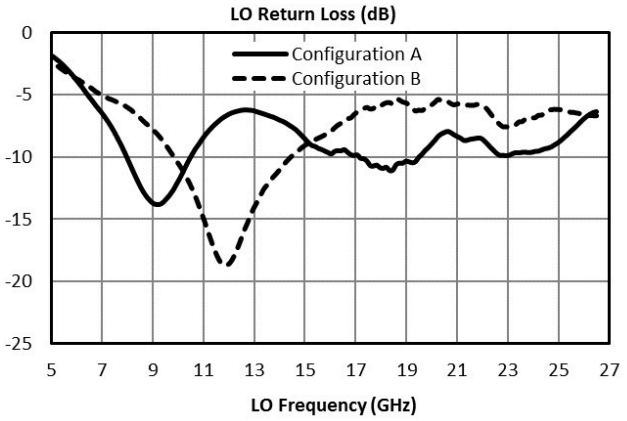

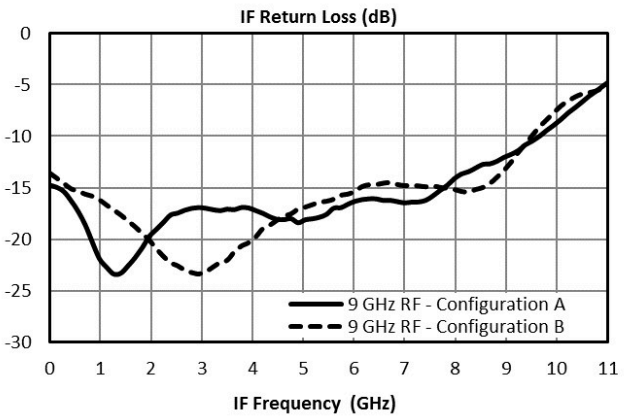

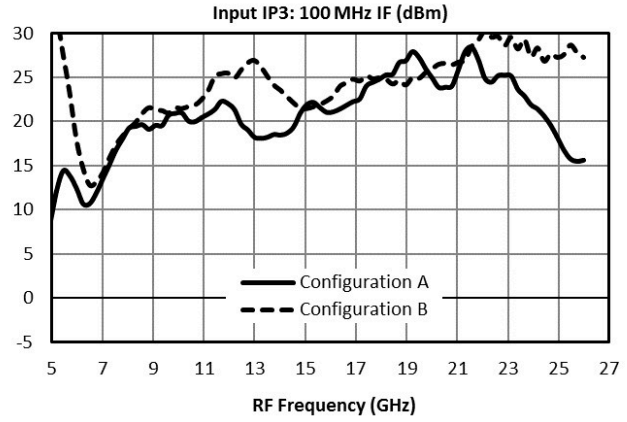

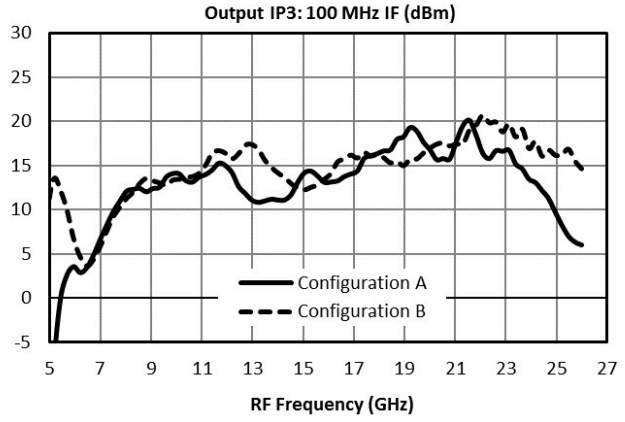

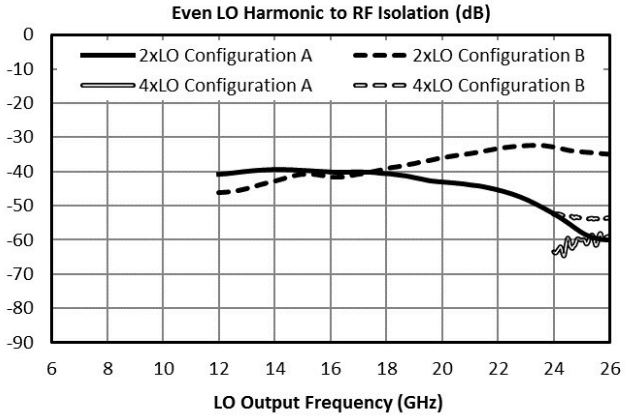

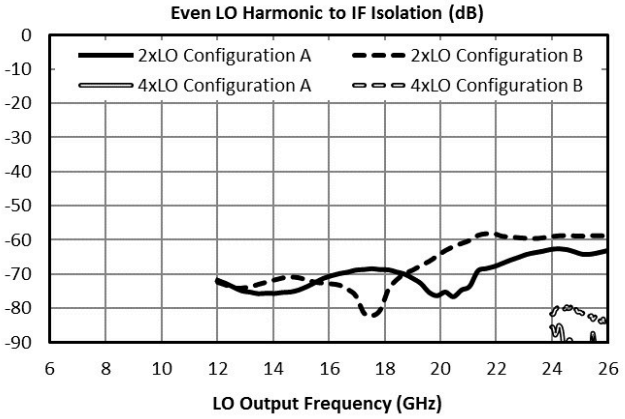

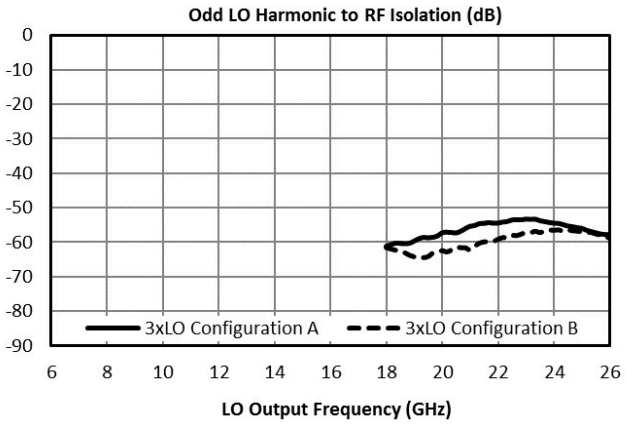

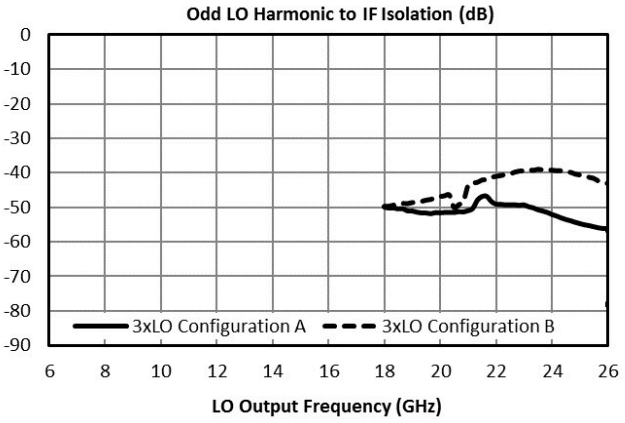

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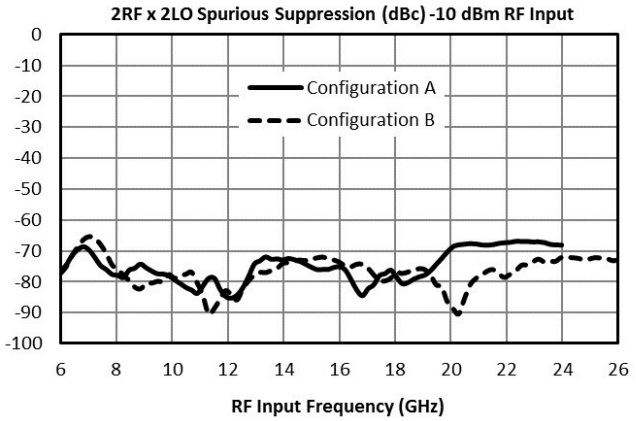

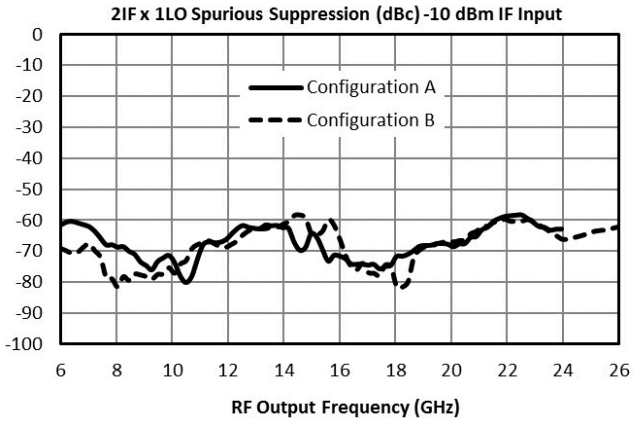

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Spur Table

Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the 6 to 26 GHz RF/LO bands, which create a91 MHz IF spurious output. The mixer is swept across the full spurious band and the mean is calculated. The numbers shown in the table below are for a -10 dBm RF input. Spurious suppression is scaled for different RF power levels by (n-1), where "n" is the RF spur order. For example, the 2RFx2LO spur is 75 dBc for the A configuration for a -10 dBm input, so a -20 dBm RF input creates a spur that is (2-1) x (-10 dB) dB lower, or 85 dBc.

Typical Downconversion Spurious Suppression (dBc): A Configuration (B Configuration), Sine Wave LO

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	25 (26)	Reference	31 (45)	13 (12)	34 (47)	15 (18)
2xRF	76 (77)	70 (54)	75 (77)	68 (58)	74 (78)	69 (67)
3xRF	112 (112)	62 (64)	86 (95)	72 (81)	82 (96)	68 (73)
4xRF	136 (139)	116 (100)	117 (118)	118 (108)	115 (119)	116 (107)
5xRF	N/A	114 (134)	126 (134)	117 (125)	128 (132)	115 (126)

Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.

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Upconversion Spurious Suppression

Spurious data is taken by mixing a91 MHz IF with LO frequencies (+mLO+nIF), which creates an RF within the 6 to 26 GHz RF band. The mixer is swept across the full spurious output band and the mean is calculated. The numbers shown in the table below are for a -10 dBm IF input. Spurious suppression is scaled for different IF input power levels by (n-1), where "n" is the IF spur order. For example, the 2IFx1LO spur is typically67 dBc for the A configuration for a -10 dBm input, so a -20 dBm IF input creates a spur that is (2-1) x (-10 dB) dB lower, or 77 dBc.

Typical Upconversion Spurious Suppression (dBc): A Configuration (B Configuration), Sine Wave LO

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	29 (24)	Reference	32 (47)	10 (10)	31 (55)	22 (25)
2xIF	71 (59)	67 (68)	66 (56)	68 (72)	62 (59)	68 (67)
3xIF	111 (112)	69 (70)	78 (91)	60 (64)	78 (92)	66 (68)
4xIF	125 (103)	117 (116)	108 (100)	114 (118)	105 (103)	113 (115)
5xIF	130 (144)	113 (116)	122 (130)	112 (119)	120 (133)	110 (111)

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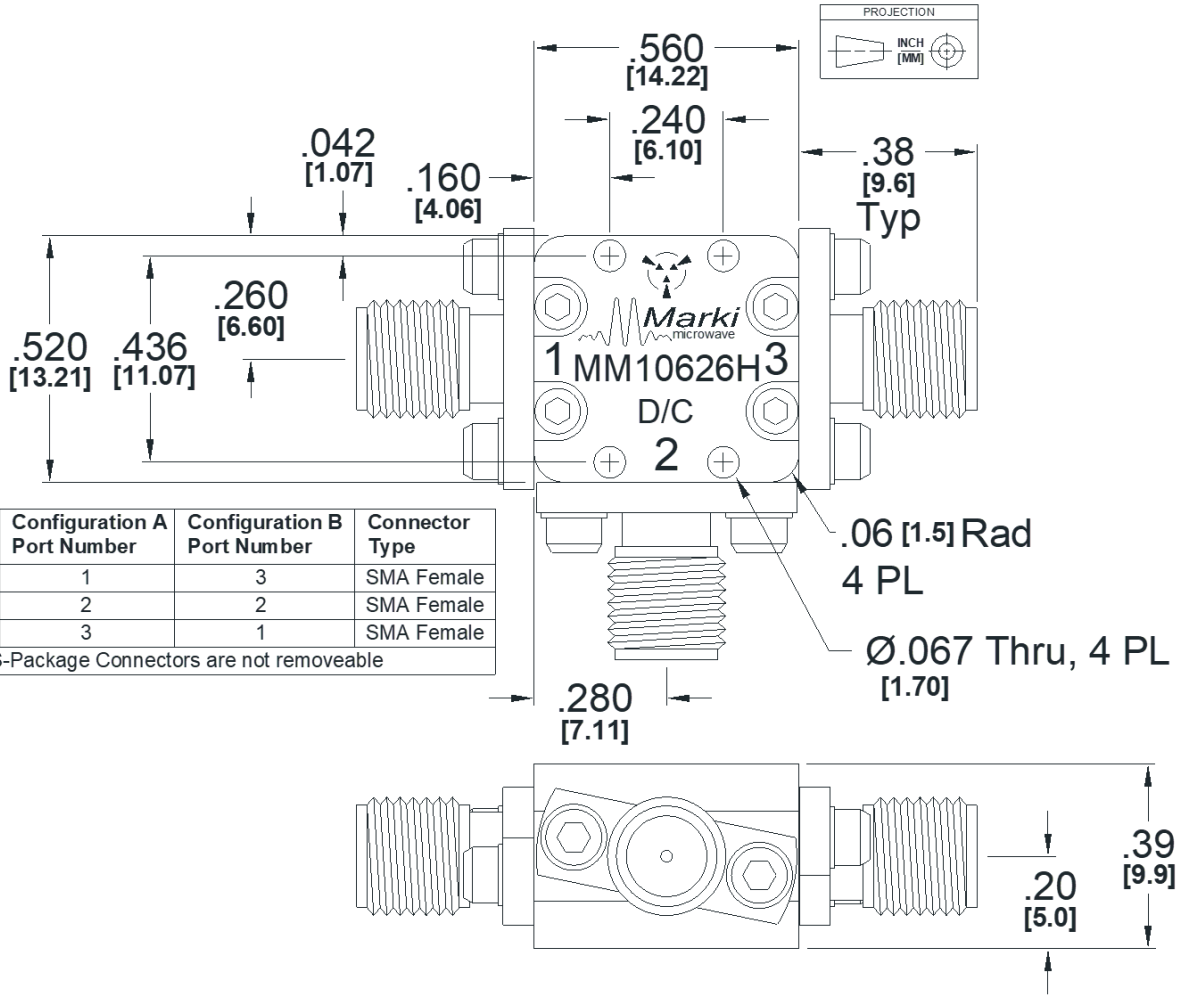
Mechanical Data

Outline Drawing

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



Function	Configuration A Port Number	Configuration B Port Number	Connector Type
LO	1	3	SMA Female
IF	2	2	SMA Female
RF	3	1	SMA Female
Note: S-Package Connectors are not removeable			

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Notes

DATA SHEET NOTES:

1. Mixer Conversion Loss Plot IF frequency is 100 MHz.
2. Mixer Noise Figure typically measures within 0.5 dB of conversion loss for IF frequencies greater than 5 MHz.
3. Conversion Loss typically degrades less than 0.5 dB at +100°C and improves less than 0.5 dB at -55°C.
4. Unless otherwise specified, data is taken with +15 dBm lowside LO drive.
5. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.
6. Catalog mixer circuits are continually improved. Configuration control requires custom mixer model numbers and specifications.

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

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