

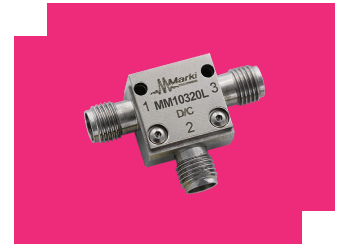
MM1-0320LBH

GaAs MMIC Double Balanced Mixer

DEVICE OVERVIEW

General Description

The MM1-0320L is a passive double balanced MMIC mixer. It delivers excellent 7 dB conversion loss, superior isolations and spurious performance across a broad 3 to 20 GHz RF/LO bandwidth. Low LO drive requirement allows operation at as low as +5 dBm inputs. The MM1-0320L is available both as a wire bondable chip or in a 2.92mm connectorized BH package. The MM1-0320LBH is a superior alternative to Marki Microwave's MM1-0320LS, providing improved conversion loss across band in a smaller form factor. The MM1-0320L is a low barrier diode version of the MM1-0320H. If higher LO power is available, the MM1-0320H is recommended for higher mixer linearity.



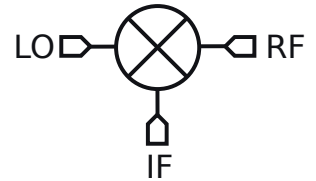
Features

- RF/LO Bandwidth, 3 to 20 GHz
- IF Bandwidth, DC to 4 GHz
- LO Drive Requirement, +5 dBm Minimum
- High Performance BH Package
- CAD Optimized for Superior Isolation and Spurious Response
- Excellent Unit-to-Unit Repeatability

Applications

- Test and Measurement Equipment
- SATCOM
- Radar
- Electronic Warfare
- Aerospace and Defense

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MM1-0320LBH	GaAs MMIC Double Balanced Mixer	BH	-	REACH RoHS	Released	EAR99
<u>MM1-0320LS</u>	GaAs MMIC Double Balanced Mixer	S	<u>Standard</u>	REACH RoHS	Released	EAR99

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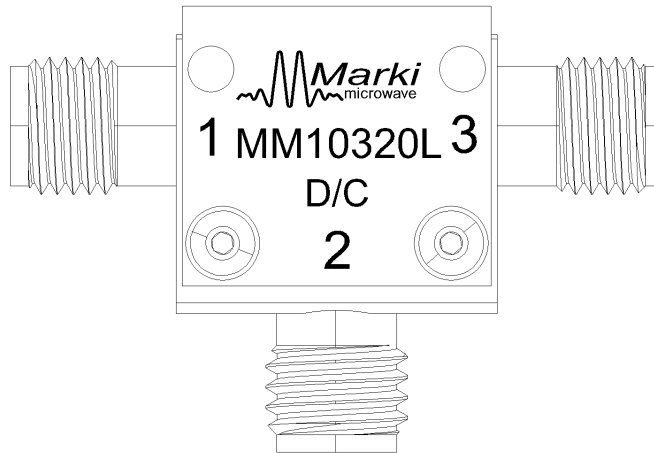
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Revision History

Revision Code	Revision Date	Comment
-	2026-06-04	Initial Release

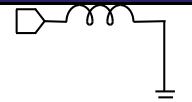
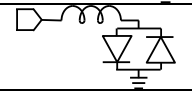
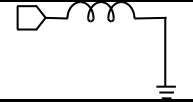
Port Configuration and Functions

Port Diagram

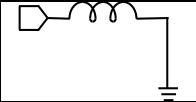
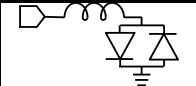
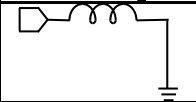


Port Functions

Configuration A

Port	Function	Connector Type	Description	DC Equivalent Circuit
Port 1	LO	2.92F	Port 1 is DC short and AC matched to 50 Ω from 3 to 20 GHz. Blocking capacitor is optional.	
Port 2	IF	2.92F	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	RF	2.92F	Port 3 is DC short and AC matched to 50 Ω from 3 to 20 GHz. Blocking capacitor is optional.	

Configuration B

Port	Function	Connector Type	Description	DC Equivalent Circuit
Port 1	RF	2.92F	Port 1 is DC short and AC matched to 50 Ω from 3 to 20 GHz. Blocking capacitor is optional.	
Port 2	IF	2.92F	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	LO	2.92F	Port 3 is DC short and AC matched to 50 Ω from 3 to 20 GHz. Blocking capacitor is optional.	

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 1 DC Current	15	mA
Port 2 DC Current	15	mA
Port 3 DC Current	30	mA
RF Power Handling (RF+LO), 100°C	20	dBm
RF Power Handling (RF+LO), 25°C	25	dBm

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	5	-	9	-

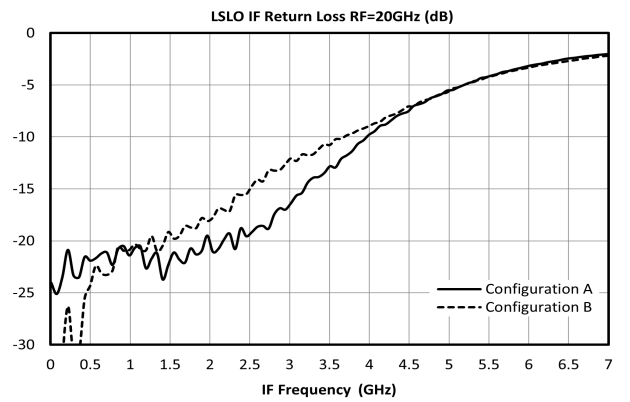
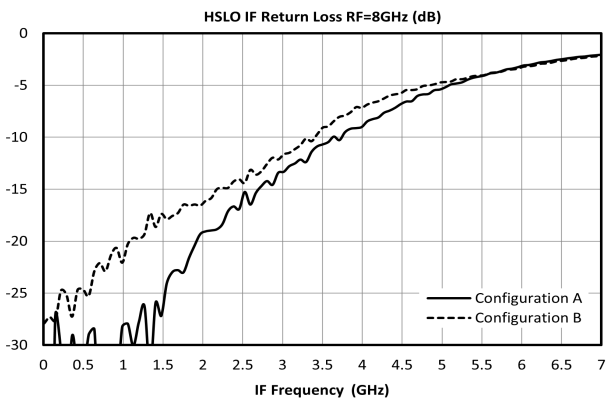
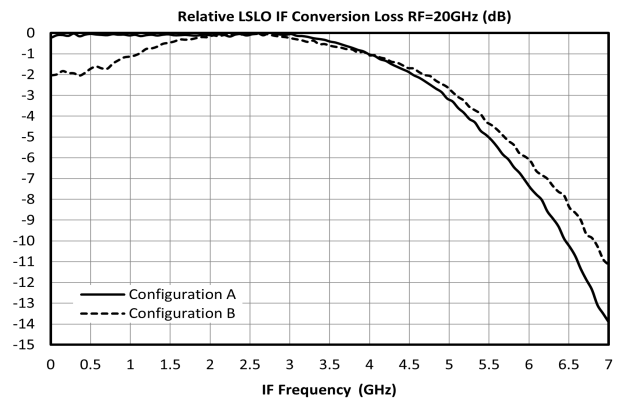
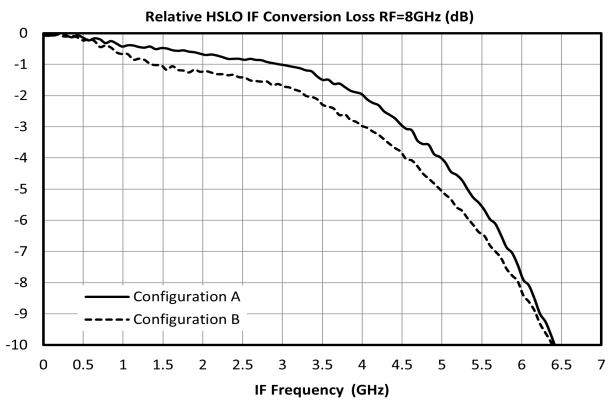
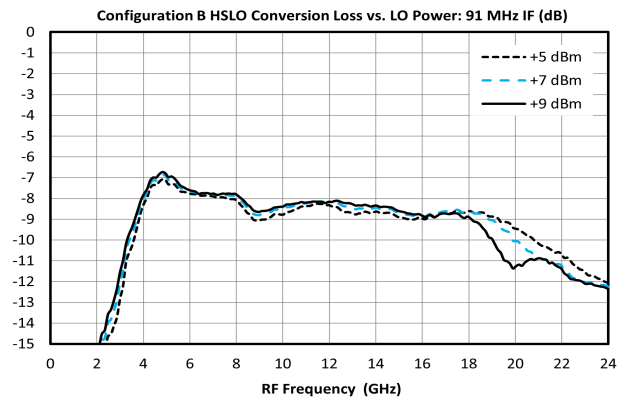
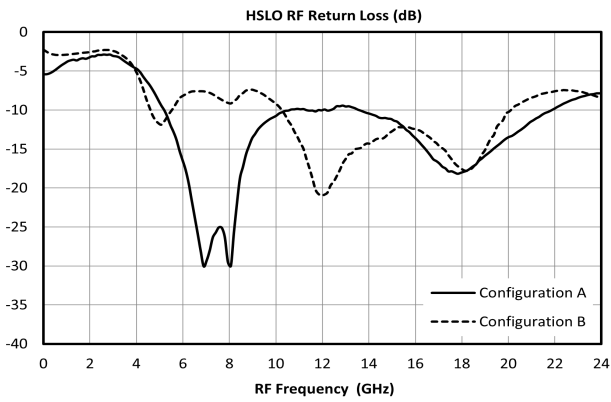
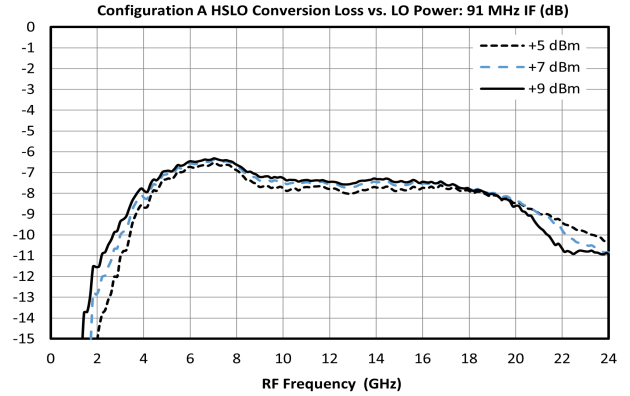
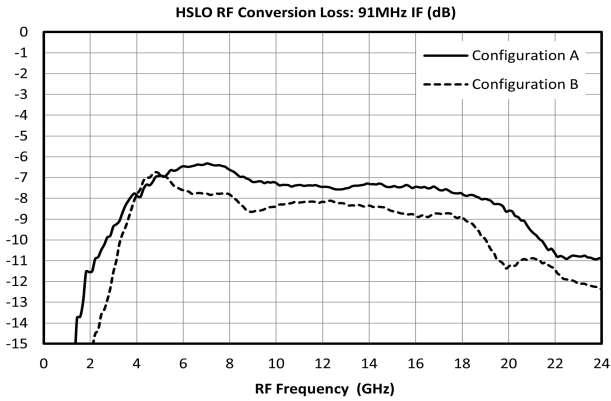
Electrical Specifications

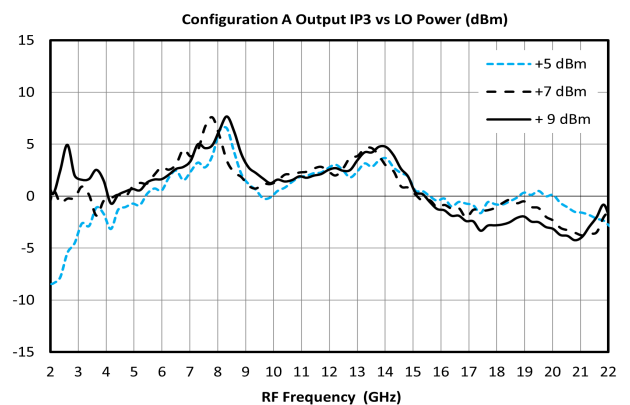
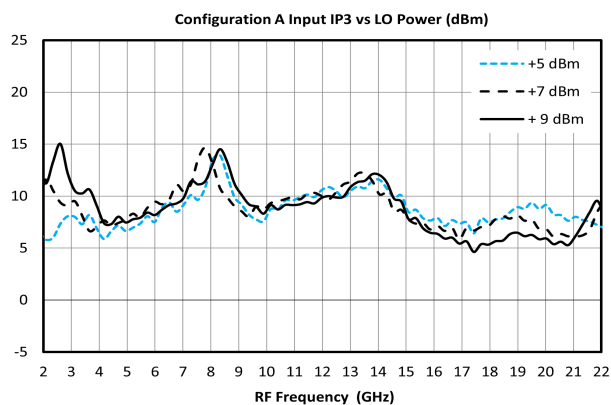
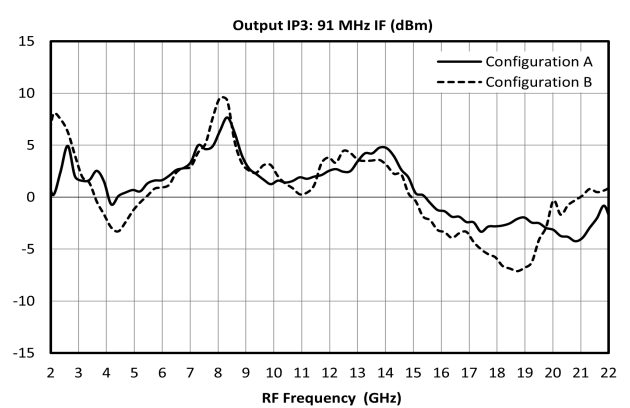
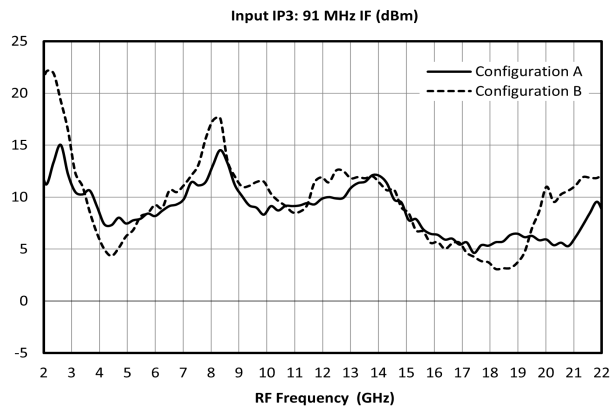
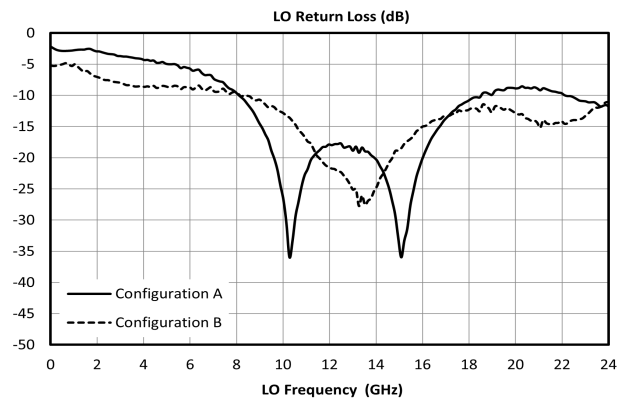
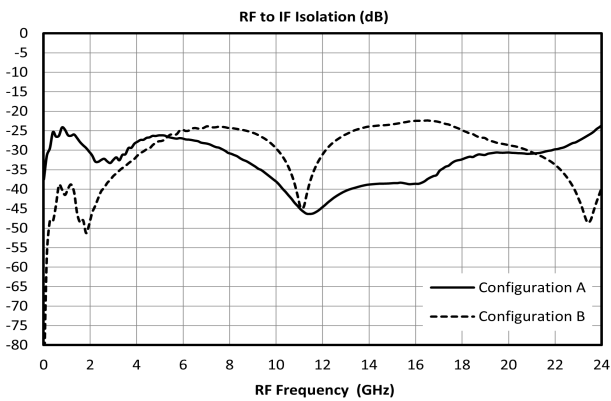
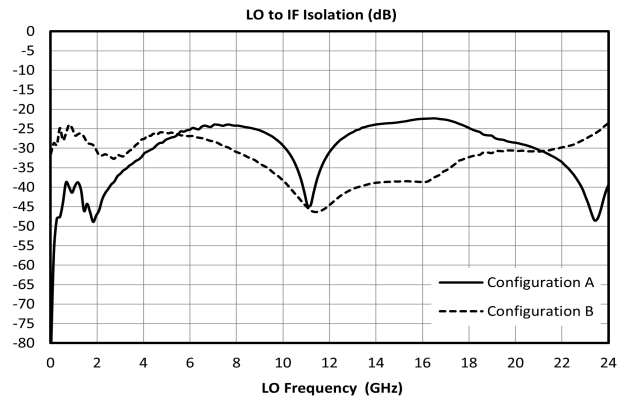
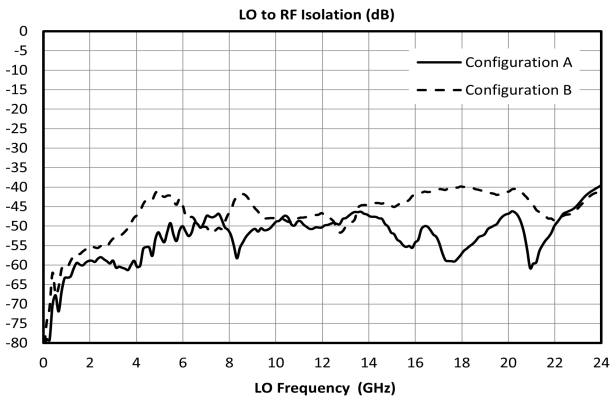
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized BH package mixer used in the forward direction with a sine wave LO of +9 dBm and RF input power of -10 dBm. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C.

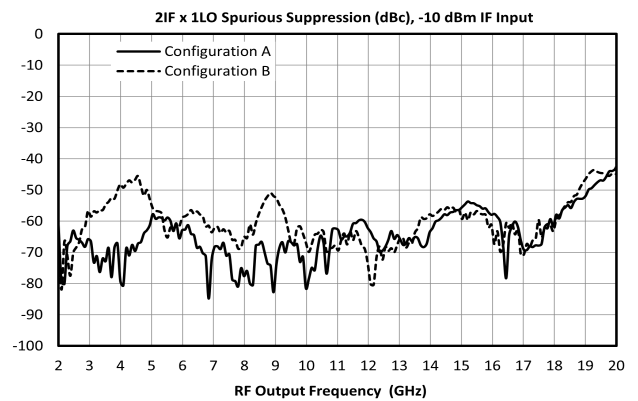
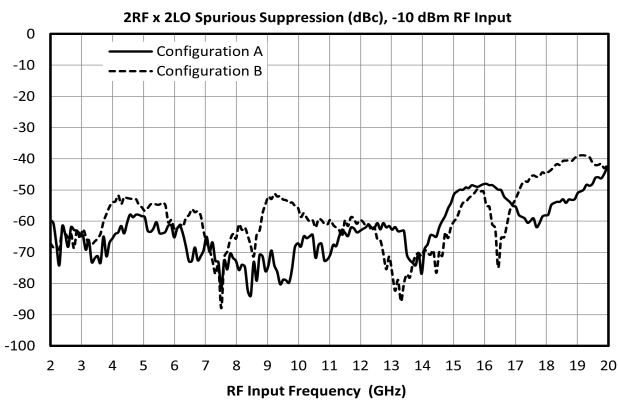
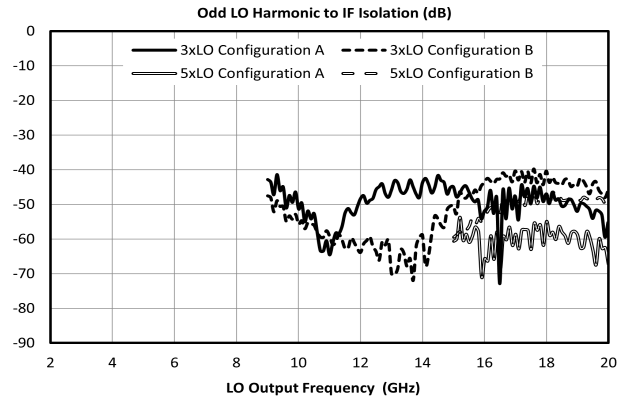
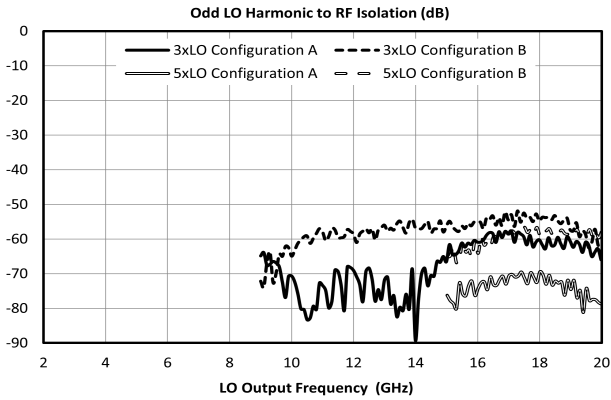
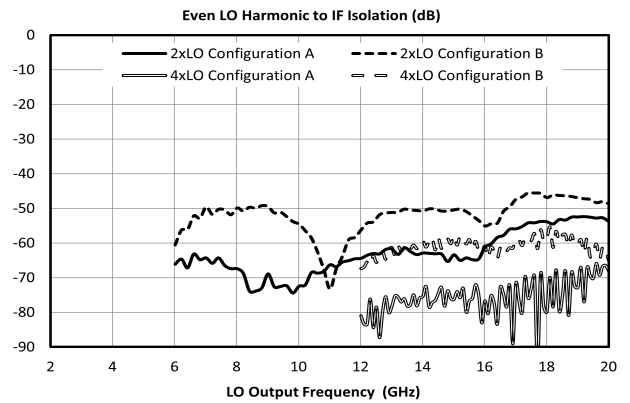
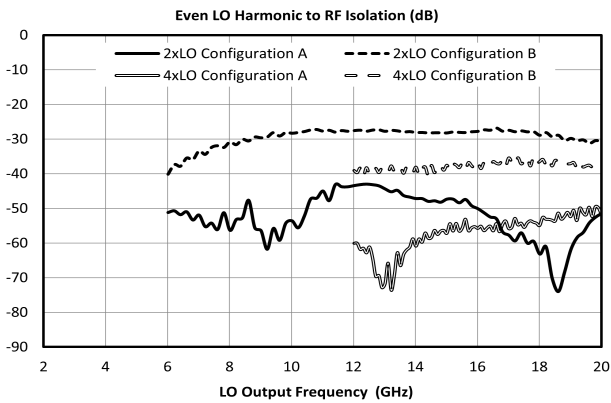
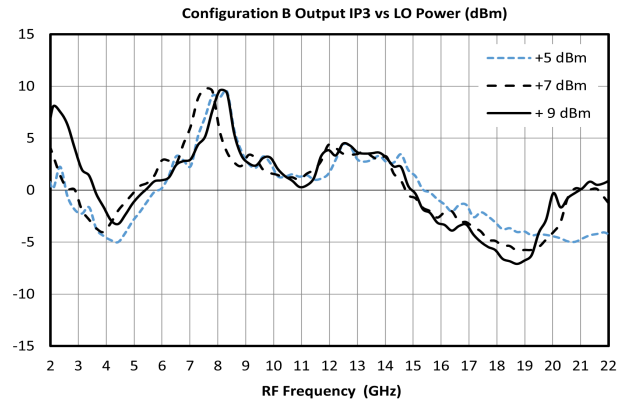
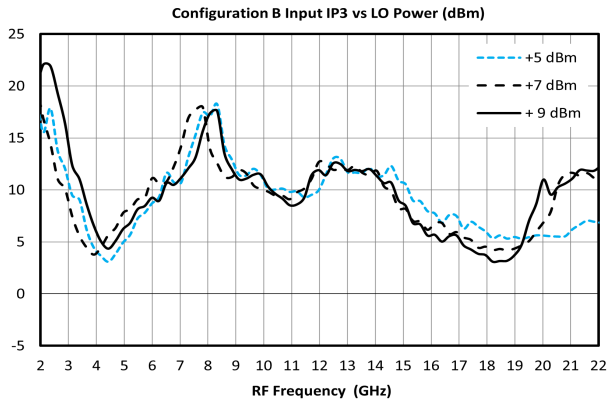
Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
RF Frequency Range	-	-	3	-	20	GHz
LO Frequency Range	-	-	3	-	20	GHz
IF Frequency Range	-	-	0	-	4	GHz
Conversion Loss	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	7	-	dB
Conversion Loss	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	8.5	-	dB
Input IP3	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	8.5	-	dBm
Input IP3	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	9	-	dBm
Input P1dB	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	0	-	dBm
Input P1dB	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	3	-	dBm
Isolation, LO to RF	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	52	-	dB
Isolation, LO to RF	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	45	-	dB
Isolation, LO to IF	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	27	-	dB
Isolation, LO to IF	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	34	-	dB
Isolation	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	34	-	dB
Isolation	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	27	-	dB
Noise Figure ¹	A	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	7	-	dB
Noise Figure ²	B	LO/RF=3-20GHz IF=91MHz LO drive level=9dBm	-	8.5	-	dB

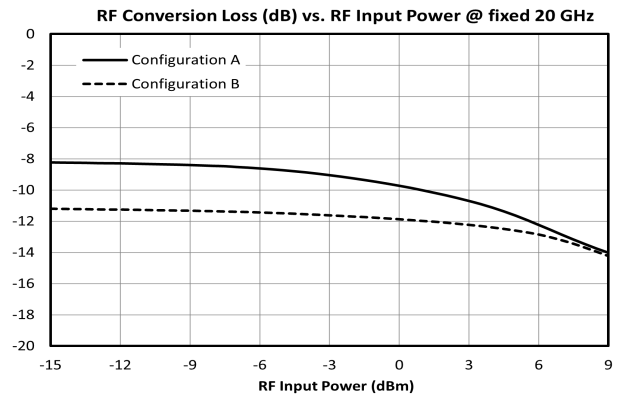
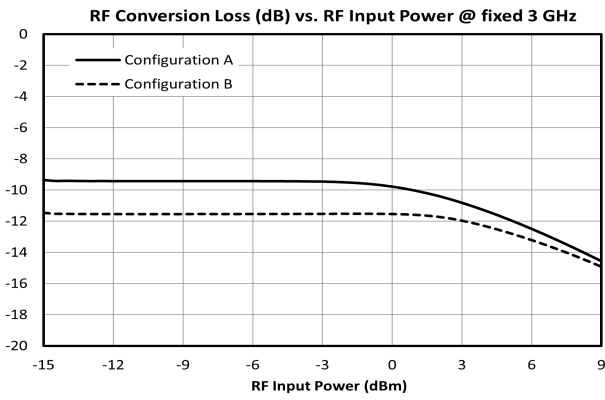
[1][2] Mixer Noise Figure typically measures within 0.5 dB of conversion loss for IF frequencies greater than 5 MHz.

Typical Performance Plots









Spur Table

Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the 3 to 20 GHz RF/LO bands, which create a 91 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 62 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 72 dBc.

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

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	23 (17)	Reference	21 (33)	11 (11)	43 (39)	29 (25)
2xRF	51 (55)	47 (40)	62 (58)	55 (42)	70 (62)	61 (44)
3xRF	55 (59)	44 (40)	59 (68)	53 (51)	62 (68)	52 (53)
4xRF	87 (82)	79 (77)	85 (85)	88 (83)	90 (89)	87 (81)
5xRF	117 (125)	118 (113)	117 (1118)	115 (113)	120 (120)	119 (116)

Upconversion Spurious Suppression

Spurious data is taken by mixing a 91 MHz IF with LO frequencies (+mLO+nIF), which creates an RF within the 3 to 20 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 typically 66 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 76 dBc.

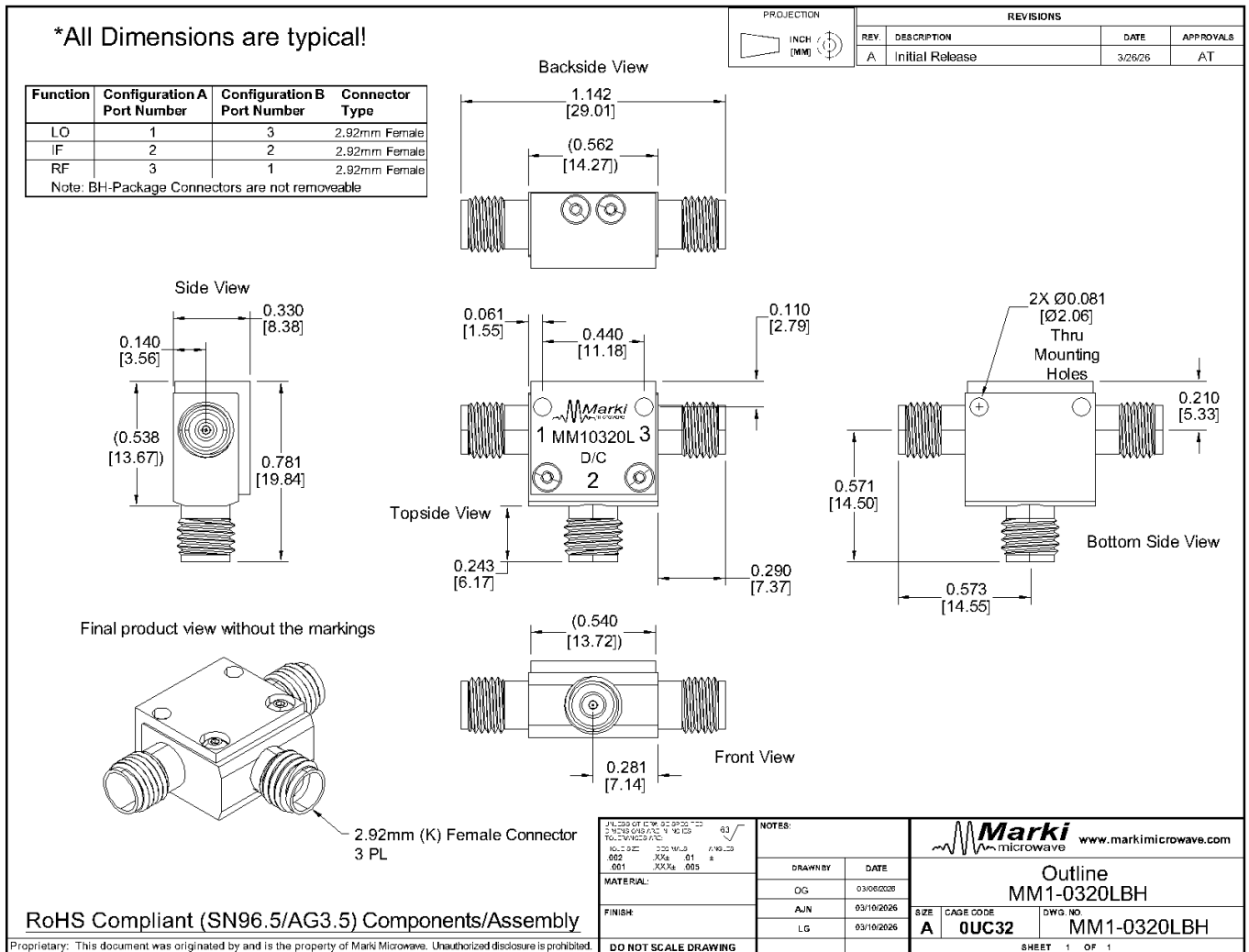
Typical Upconversion Spurious Suppression (dBc): Configuration A (Configuration B), Sine Wave LO

-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	23 (18)	Reference	48 (70)	44 (61)	39 (64)	44 (62)
2xIF	43 (44)	66 (78)	62 (40)	70 (57)	56 (56)	63 (54)
3xIF	38 (42)	56 (55)	60 (69)	51 (54)	66 (65)	48 (43)
4xIF	76 (69)	94 (95)	90 (81)	94 (89)	90 (76)	93 (84)
5xIF	99 (107)	123 (122)	123 (123)	118 (116)	124 (122)	120 (109)

Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#)



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