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Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

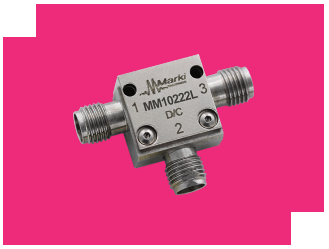
MM1-0222LBH

GaAs MMIC 2-22 GHz Double Balanced Mixer

DEVICE OVERVIEW

General Description

The MM1-0222L is a passive double balanced MMIC mixer. It delivers excellent 7.4 dB conversion loss, superior isolations and spurious performance across a broad 2 to 22 GHz RF/LO bandwidth. Low LO drive requirement allows operation at as low as +6 dBm inputs. The MM1-0222L is available both as a wire bondable chip or in a 2.92mm connectorized BH package. The MM1-0222L is a low barrier diode version of the MM1-0222H. If higher LO power is available, the MM1-0222H is recommended for higher mixer linearity.



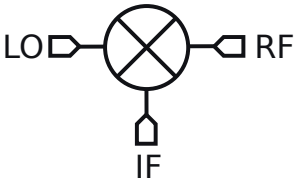
Features

- RF/LO Bandwidth, 2 to 22 GHz
- IF Bandwidth, DC to 3.5 GHz
- LO Drive Requirement, +6 dBm Minimum
- High Performance BH Package
- CAD Optimized for Superior Isolation and Spurious Response
- Excellent Unit-to-Unit Repeatability

Applications

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

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MM1-0222LBH	GaAs MMIC 2-22 GHz Double Balanced Mixer	BH	-	REACH RoHS	Released	EAR99

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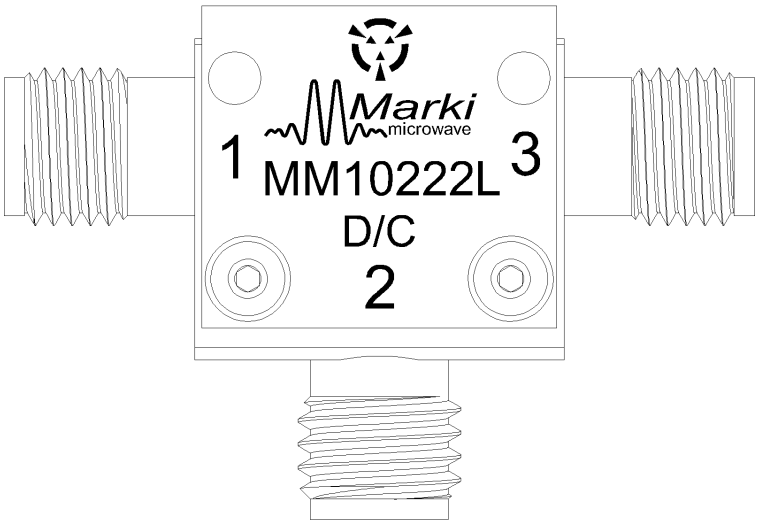
Revision History

Revision Code	Revision Date	Comment
-	2026-11-10	Initial Release

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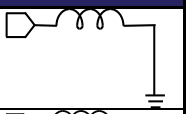
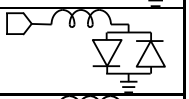
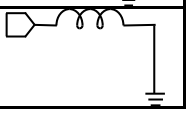
Port Configuration and Functions

Port Diagram



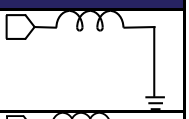
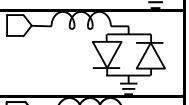
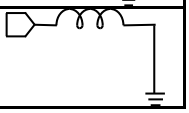
Port Functions

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 2 to 22 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 2 to 22 GHz. Blocking capacitor is optional.	

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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 2 to 22 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 2 to 22 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 1 DC Current	30	mA
Port 2 DC Current	30	mA
Port 3 DC Current	30	mA

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: BH	12g
Dimensions	-	29.01 x 19.84 mm

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	6	12	15	dBm

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Electrical Specifications

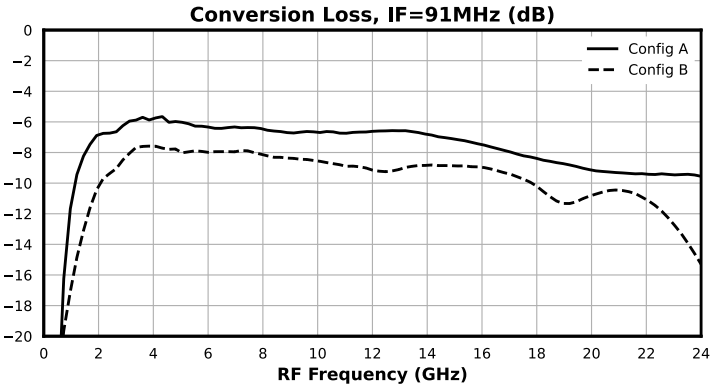
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized BH package mixer used in the forward direction with a sine wave LO of +12 dBm and RF input power of -10 dBm, aside from linearity measurements. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C.

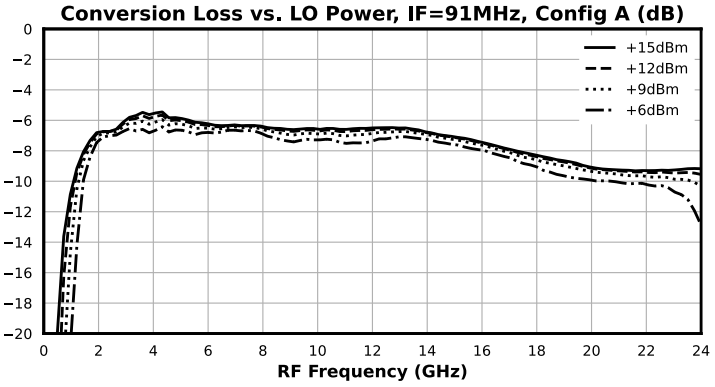
Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
RF Frequency Range	-	-	2	-	22	GHz
LO Frequency Range	-	-	2	-	22	GHz
IF Frequency Range	-	-	0	-	3.5	GHz
Conversion Loss [1]	A	LO/RF=2-22GHz IF=91MHz LO Drive=+12dBm	-	7.4	-	dB
Conversion Loss [2]	B	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	9.3	-	dB
LO-RF Isolation	A	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	51	-	dB
LO-IF Isolation	-	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	27	-	dB
RF-IF Isolation	-	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	32	-	dB
Input IP3	A	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm Tone Spacing=1MHz Tone Power=-10dBm	-	11.3	-	dBm
Input IP3	B	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm Tone Spacing=1MHz Tone Power=-10dBm	-	13.0	-	dBm
Input P1dB	A	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	3.5	-	dBm
Input P1dB	B	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	6	-	dBm
Noise Figure [3]	A	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	7.4	-	dB
Noise Figure [4]	B	RF/LO=2-22GHz IF=91MHz LO Drive=+12dBm	-	9.3	-	dB

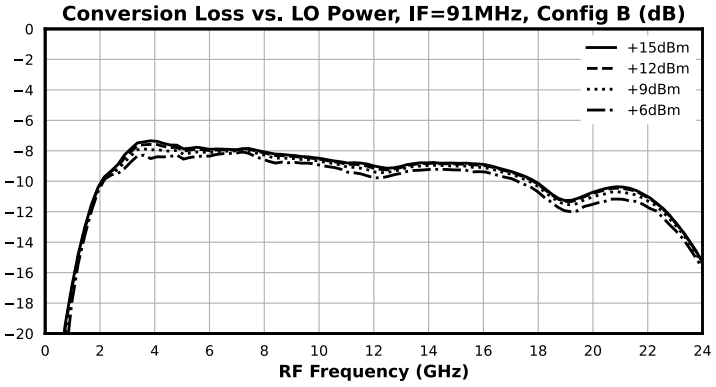
[1][2] Measured as a down converter to a fixed 91MHz IF.
[3][4] Mixer Noise Figure typically measures within 0.5 dB of conversion loss for IF frequencies greater than 5 MHz.

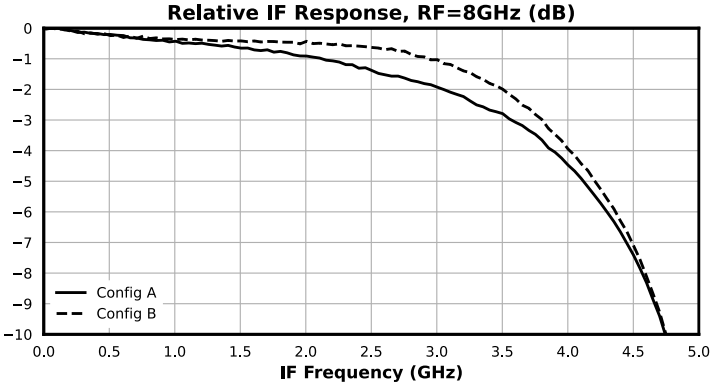
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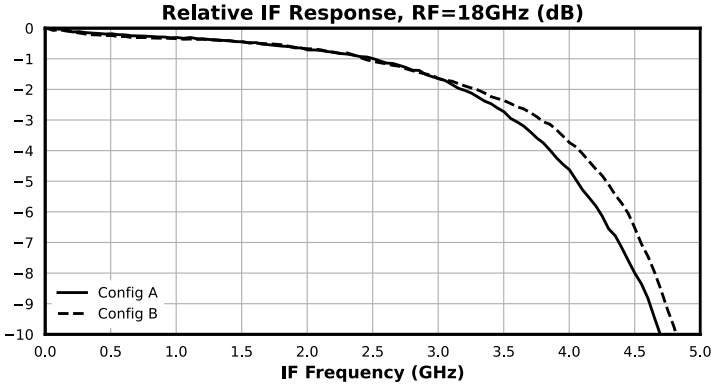
Typical Performance Plots

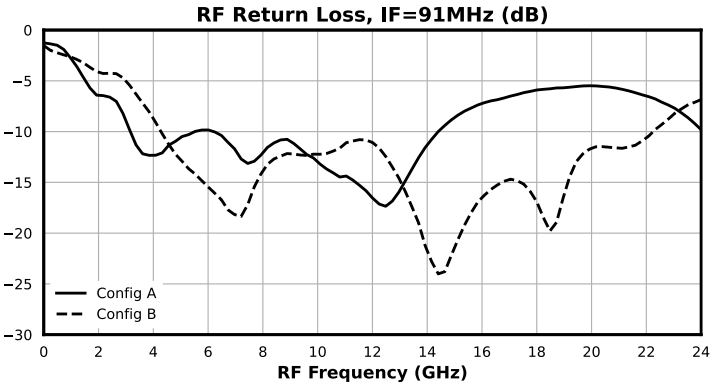


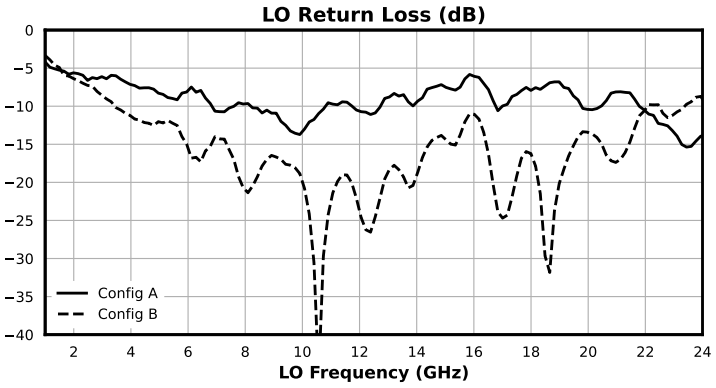




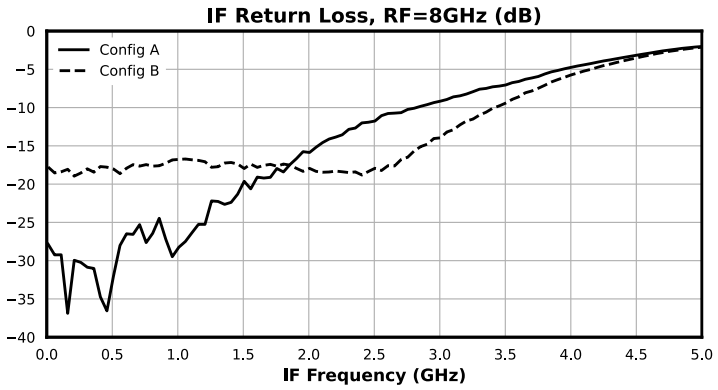


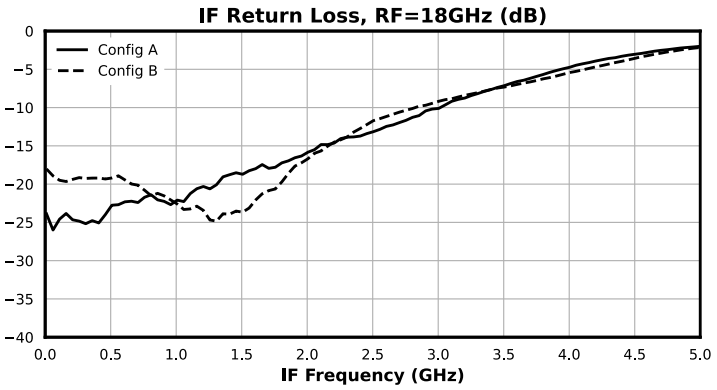


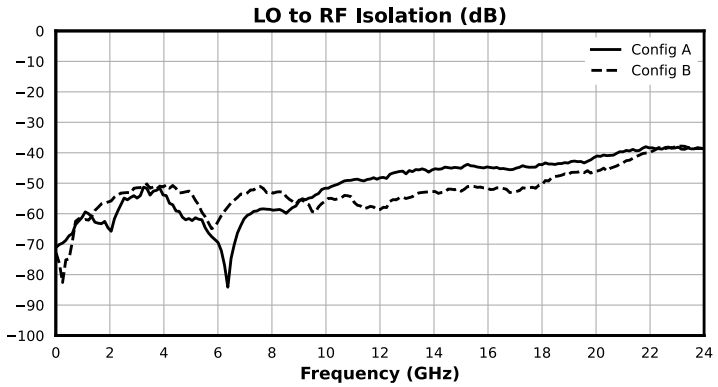


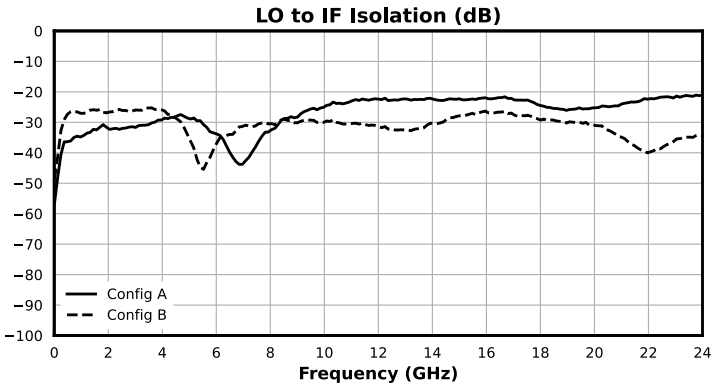


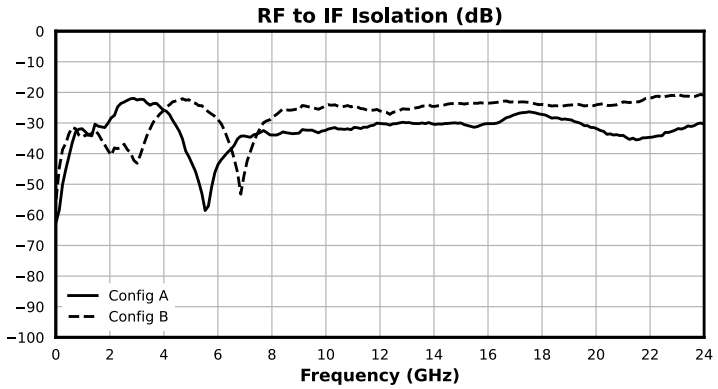
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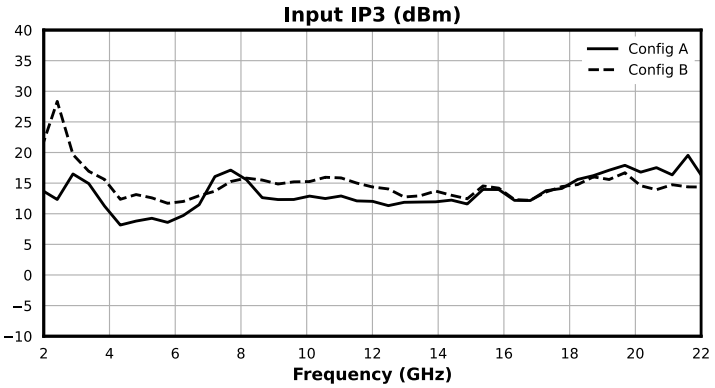


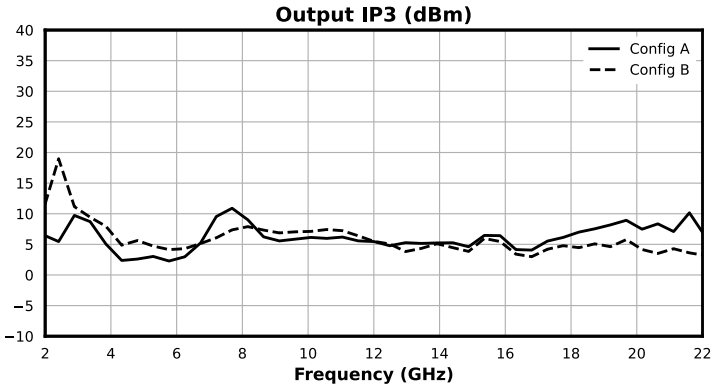


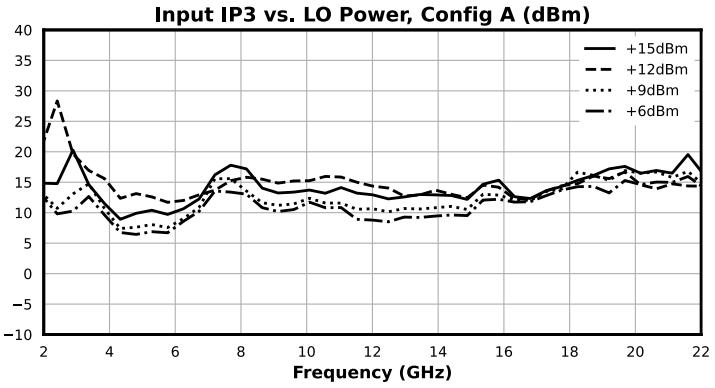


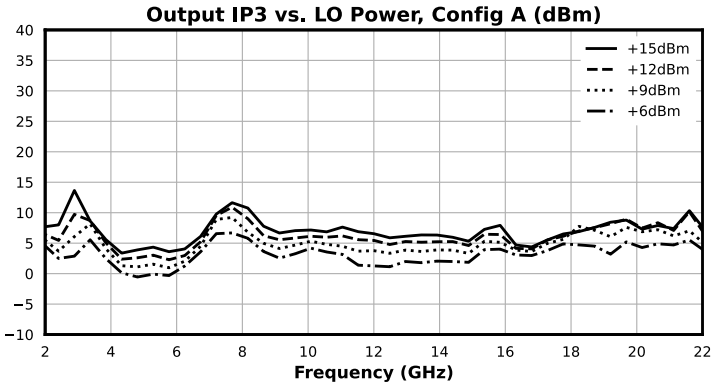
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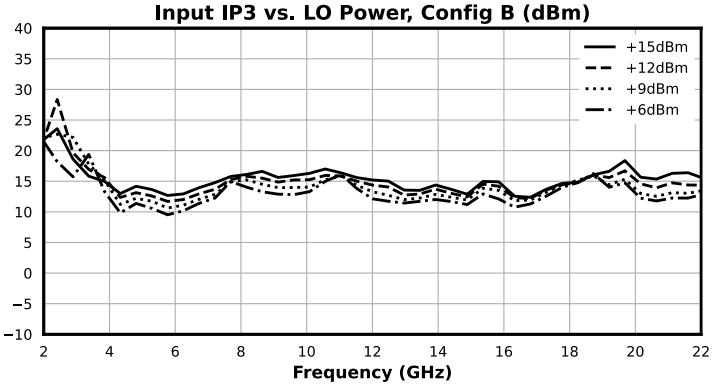
Typical Performance Plots: IP3

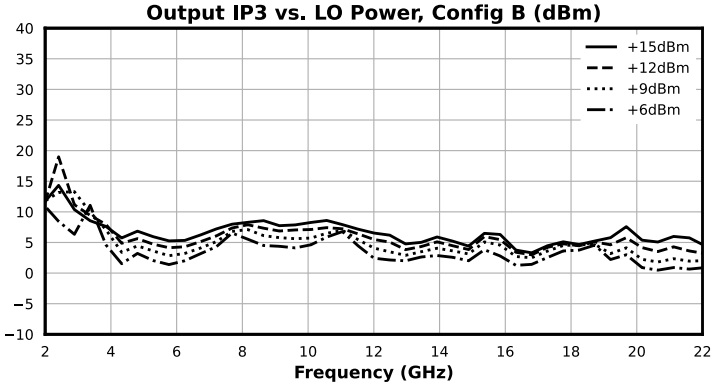






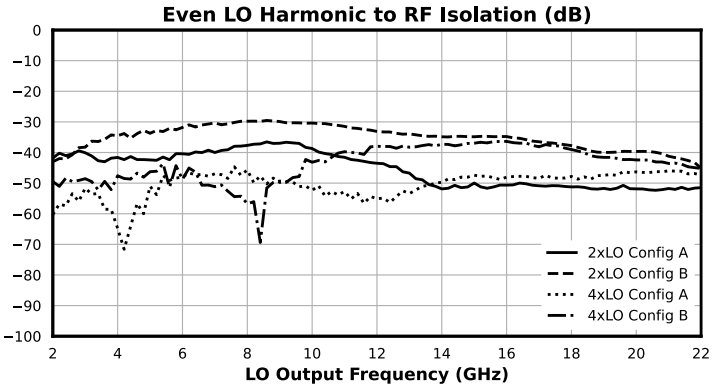


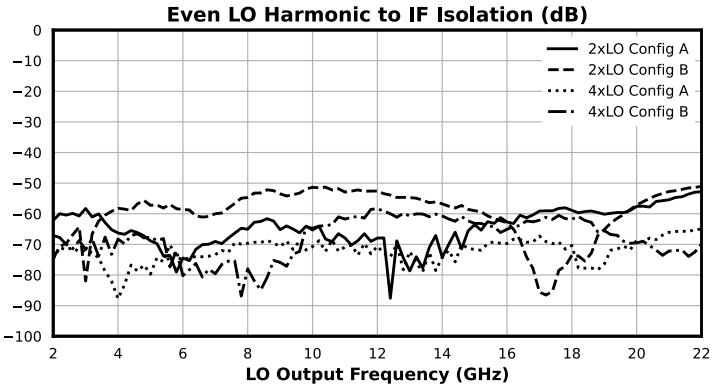


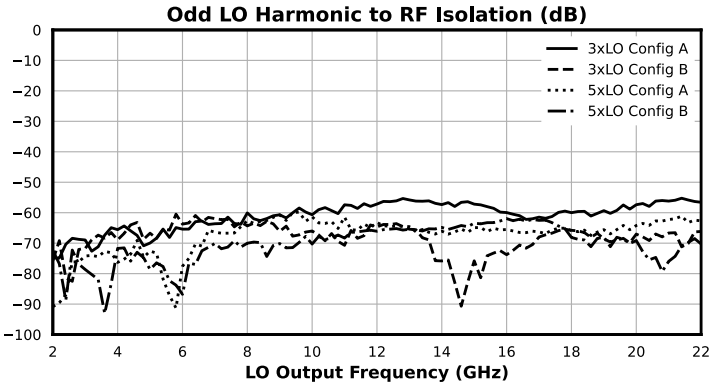


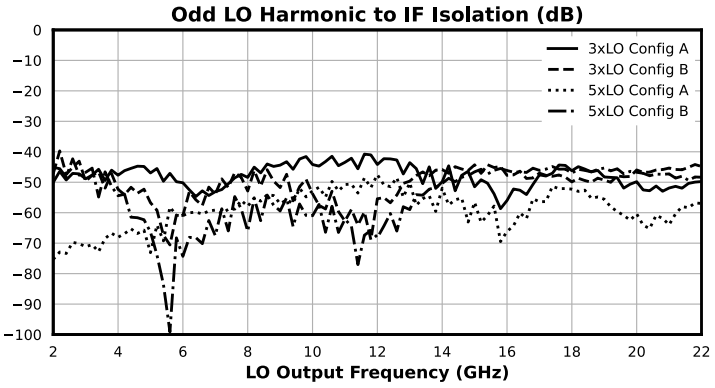
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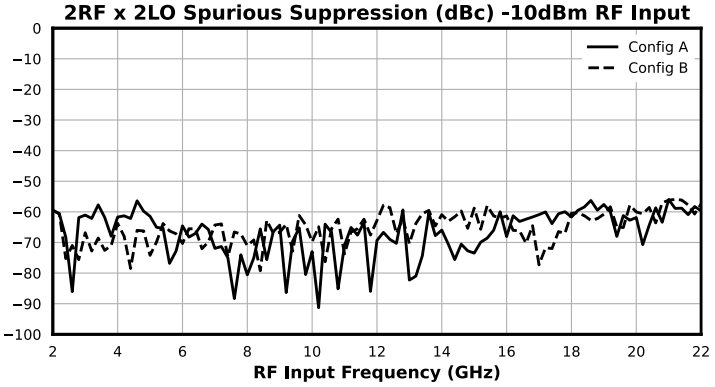
Typical Performance Plots: LO Harmonic Isolation

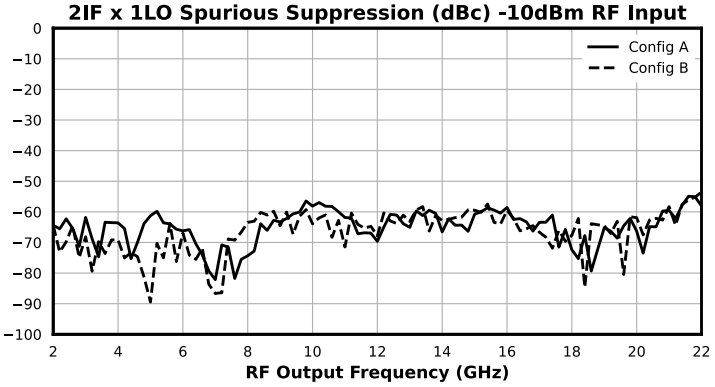












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Spur Table

Typical Downconversion Spurious Suppression

Typical spurious data is provided by selecting RF and LO frequencies (± m*LO ± n*RF) within the RF/LO bands, to create a spurious output within the IF band. 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 2RF x 2LO spur is 76 dBc for a -10 dBm input, so a -20 dBm RF input creates a spur that is (2-1) x (-10 dB) lower, or 86 dBc.

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

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	-27 (-17)	Reference	-27 (-37)	-11 (-10)	-35 (-40)	-19 (-17)
2xRF	-71 (-65)	-55 (-55)	-76 (-75)	-67 (-64)	-79 (-77)	-69 (-61)
3xRF	-74 (-81)	-60 (-71)	-86 (-91)	-79 (-82)	-88 (-90)	-77 (-81)
4xRF	-98 (-97)	-90 (-95)	-102 (-103)	-103 (-100)	-105 (-102)	-104 (-99)
5xRF	-106 (-110)	-102 (-110)	-115 (-113)	-111 (-113)	-111 (-112)	-113 (-112)

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Typical Upconversion Spurious Suppression

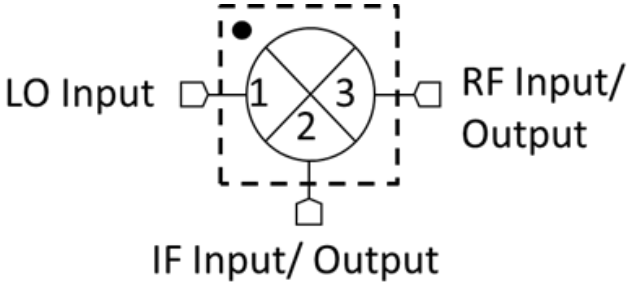
Typical spurious data is taken by mixing an input within the IF band, with LO frequencies (± m*LO ± n*IF), to create a spurious output within the RF output band. The mixer is swept across the full spurious output band and the mean is calculated. The numbers shown in the table below are for a -10 dBm 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 76 dBc for a -10 dBm input with a sine-wave LO, so a -20 dBm IF input creates a spur that is (2-1) x (-10 dB) lower, or 86 dBc.

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

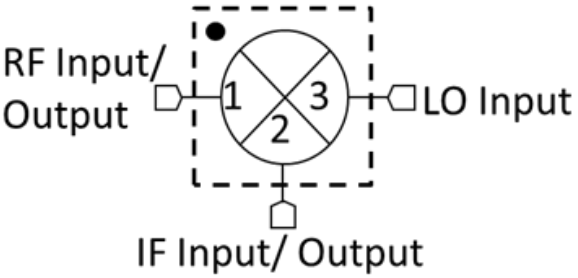
-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	-38 (-21)	Reference	-27 (-38)	-11 (-10)	-34 (-40)	-19 (-17)
2xIF	-58 (-51)	-76 (-75)	-65 (-63)	-70 (-76)	-57 (-56)	-70 (-71)
3xIF	-77 (-81)	-76 (-82)	-85 (-93)	-68 (-73)	-82 (-90)	-69 (-69)
4xIF	-95 (-89)	-106 (-105)	-103 (-101)	-104 (-105)	-96 (-100)	-99 (-104)
5xIF	-105 (-107)	-114 (-112)	-114 (-114)	-111 (-113)	-112 (-116)	-105 (-110)

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Application Circuit



Configuration A



Configuration B

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Application Circuit Description

Configuration A/B refer to the same part number (MM1-0222L) used in one of two different ways for optimal spurious performance. For the lowest conversion loss, use the mixer in Configuration A (port 1 as the LO input, port 3 as the RF input or output). If you need to use a lower LO drive, use the mixer in Configuration B (port 1 as the RF input or output, port 3 as the LO input). For optimal spurious suppression, experimentation or simulation is required to choose between Configuration A and B.

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Mechanical Data

Outline Drawing

Download : Outline 2D Drawing

*All Dimensions are typical!

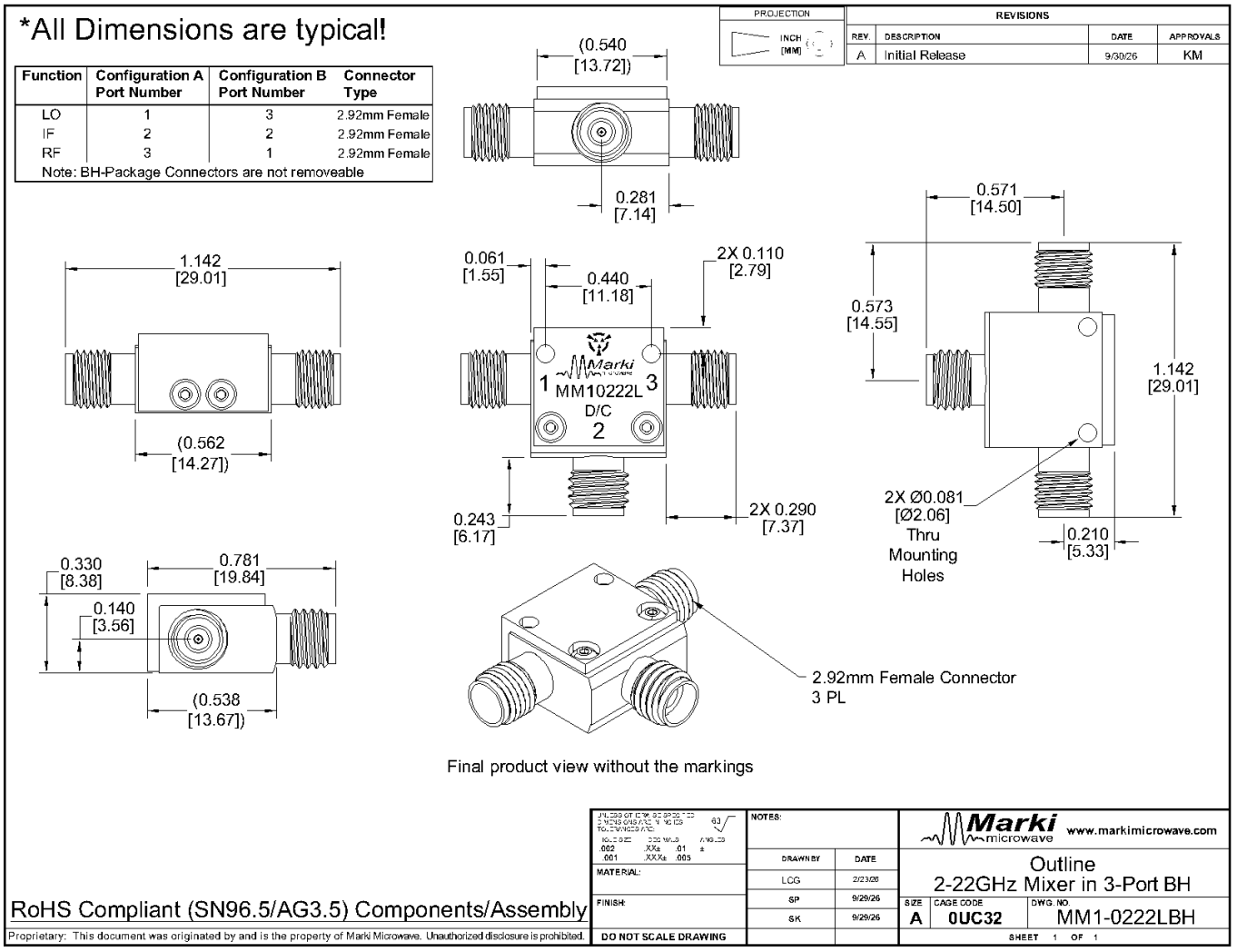
Function	Configuration A Port Number	Configuration B Port Number	Connector Type
LO	1	3	2.92mm Female
IF	2	2	2.92mm Female
RF	3	1	2.92mm Female

Note: BH-Package Connectors are not removeable

PROJECTION: INCH [MM]

REVISIONS

REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	9/30/26	KM



Final product view without the markings

RoHS Compliant (SN96.5/AG3.5) Components/Assembly

NOTES:	DRAWN BY	DATE
MATERIAL:	LCG	2/23/26
FINISH:	SP	9/29/26
DO NOT SCALE DRAWING	SK	9/29/26

Marki microwave www.markimicrowave.com

Outline
2-22GHz Mixer in 3-Port BH

SIZE	CAGE CODE	DWG. NO.
A	0UC32	MM1-0222LBH

SHEET 1 OF 1

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