Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

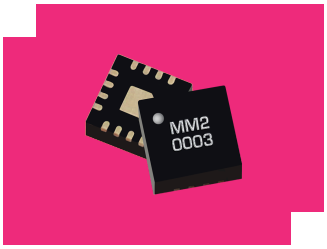
MM2-0432HPSM-1

GaAs MMIC Triple Balanced Mixer

DEVICE OVERVIEW

General Description

The MM2-0432HPSM-1 is a passive GaAs MMIC triple-balanced mixer designed with broadband operation from 4 to 32 GHz. It delivers low conversion loss, high linearity, and excellent port-to-port isolation. The device supports a wide LO input power range of +15 to +21 dBm (nominal +18 dBm), providing flexibility across system implementations. Packaged in a 3 × 3 mm QFN, the MM2-0432HPSM-1 enables compact, repeatable implementations in space-constrained RF assemblies. Evaluation boards are available.



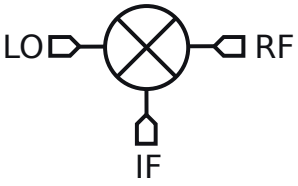
Features

- Broadband Operation from 4 to 32 GHz
- Low Conversion Loss, 6 dB Typical
- High Input IP3, +24 dBm Typical
- High RF to LO Isolation, 45 dB Typical
- Small 3x3mm QFN Style Package

Applications

- Electronic Warfare
- Test and Measurement Equipment
- Radar and satellite communications

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MM2-0432HPSM-2	GaAs MMIC Triple Balanced Mixer	PSM	REACH RoHS	Released	EAR99
MM2-0432HPSM-1	GaAs MMIC Triple Balanced Mixer	PSM	REACH RoHS	Released	EAR99
EVB-MM2-0432HP	Evaluation Board, GaAs MMIC Mixer	EVB	RoHS REACH	Released	EAR99

Table Of Contents

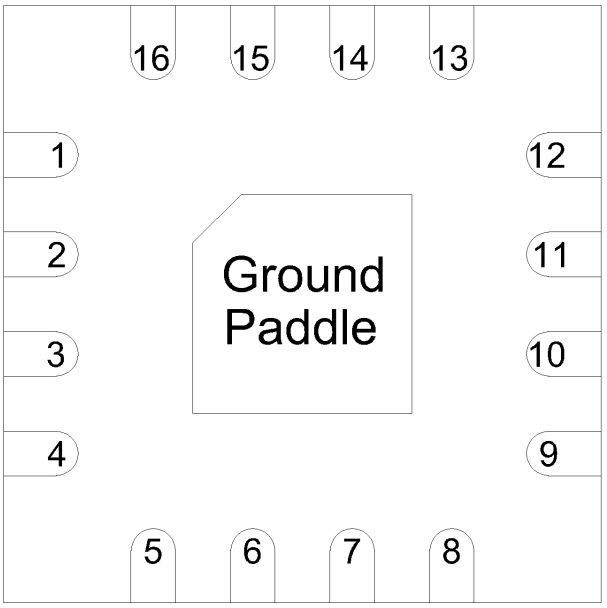
Revision History

Revision Code	Revision Date	Comment
-	2026-05-04	Initial Release

Port Configuration and Functions

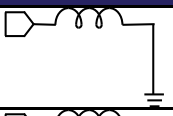
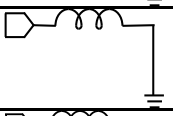
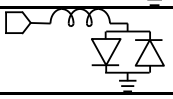
Port Diagram

A top-down x-ray view of the package is shown below.

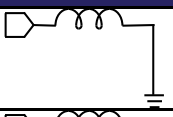
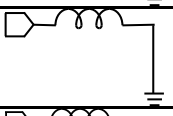
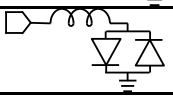


Port Functions

Configuration A

Port	Function	Description	DC Equivalent Circuit
Pin 10	LO	Pin 10 is DC short and AC matched to 50 Ω from 2 to 34 GHz. Blocking capacitor is optional.	
Pin 3	RF	Pin 3 is DC short and AC matched to 50 Ω from 4 to 32 GHz. Blocking capacitor is optional.	
Pin 6	IF	Pin 6 is DC coupled to the diodes. Blocking capacitor is optional.	

Configuration B

Port	Function	Description	DC Equivalent Circuit
Pin 10	RF	Pin 10 is DC short and AC matched to 50 Ω from 4 to 32 GHz. Blocking capacitor is optional.	
Pin 3	LO	Pin 3 is DC short and AC matched to 50 Ω from 2 to 34 GHz. Blocking capacitor is optional.	
Pin 6	IF	Pin 6 is DC coupled to the diodes. 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
Pin 10 DC Current	24	mA
Pin 3 DC Current	21	mA
Pin 6 DC Current	15	mA

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

Parameter	Min	Nominal	Max	Unit
LO Input Power	15	18	21	dBm

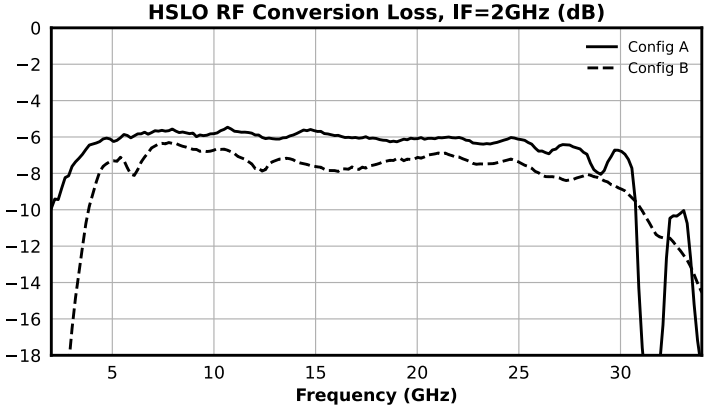
Electrical Specifications

Specifications guaranteed from -55 to +100°C, measured in a 50Ω system. Specifications are shown for Configurations A (B). RF testing is performed on a sample basis to verify conformance to datasheet guaranteed specifications. Consult factory for more information.

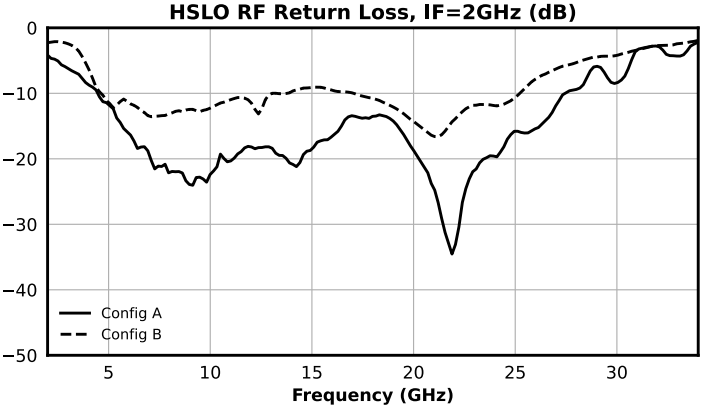
Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	A	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	6	-	dB
Input IP3	A	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	22	-	dBm
Input P1dB	A	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	21	-	dBm
Conversion Loss	B	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	7	-	dB
Input IP3	B	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	24	-	dBm
Input P1dB	B	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	24	-	dB
RF-IF Isolation	-	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	40	-	dB
LO-RF Isolation	-	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	45	-	dB
LO-IF Isolation	-	RF=4-32GHz LO=6-34GHz IF=2GHz LO Drive Level=+18dBm	-	40	-	dB
RF Frequency Range	-	-	4	-	32	GHz
LO Frequency Range	-	-	2	-	34	GHz
IF Frequency Range	-	-	2	-	8	GHz

Typical Performance

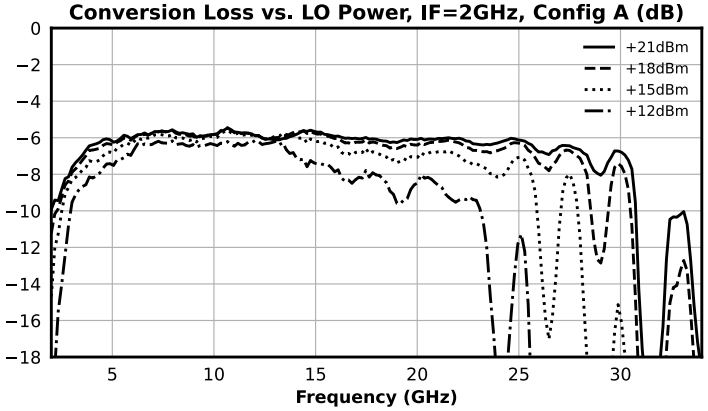
HSLO RF Conversion Loss, IF=2GHz (dB)



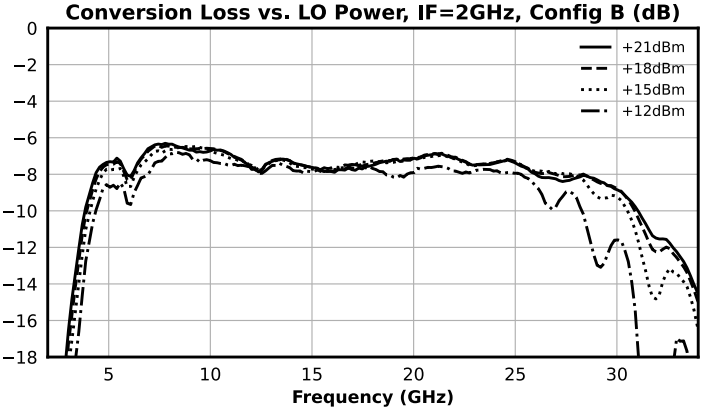
HSLO RF Return Loss, IF=2GHz (dB)



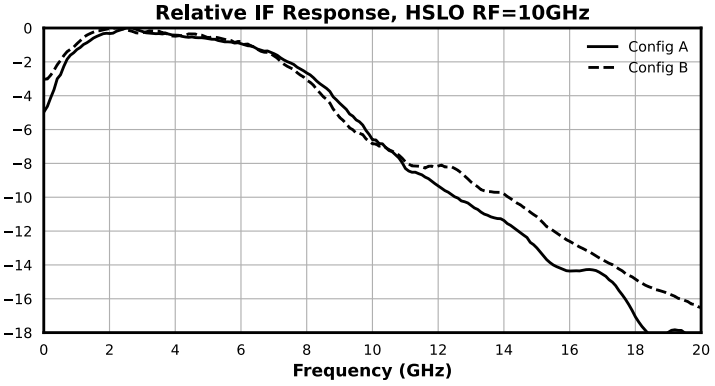
Conversion Loss vs. LO Power, IF=2GHz, Config A (dB)



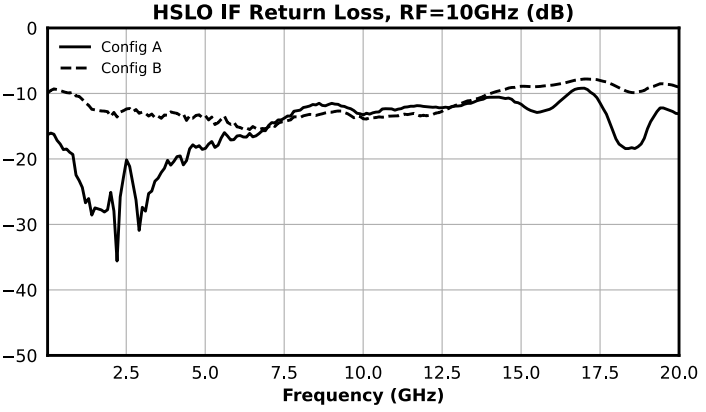
Conversion Loss vs. LO Power, IF=2GHz, Config B (dB)



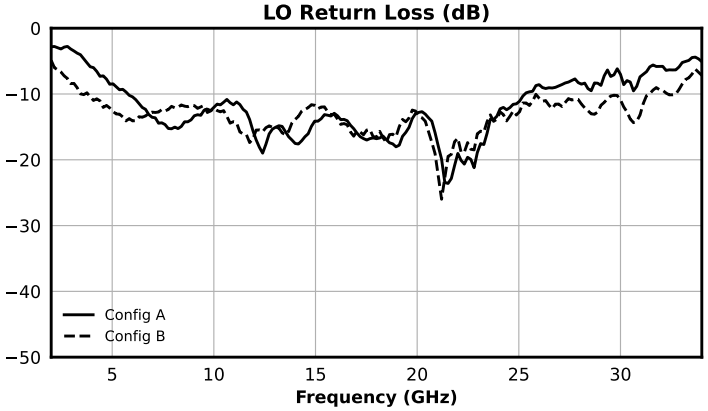
Relative IF Response, HSLO RF=10GHz



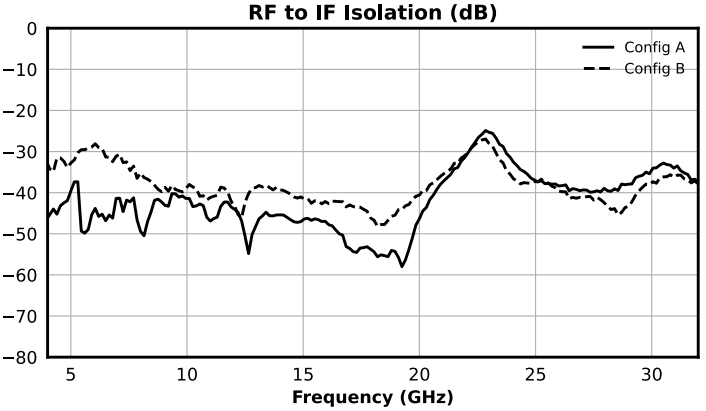
HSLO IF Return Loss, RF=10GHz (dB)



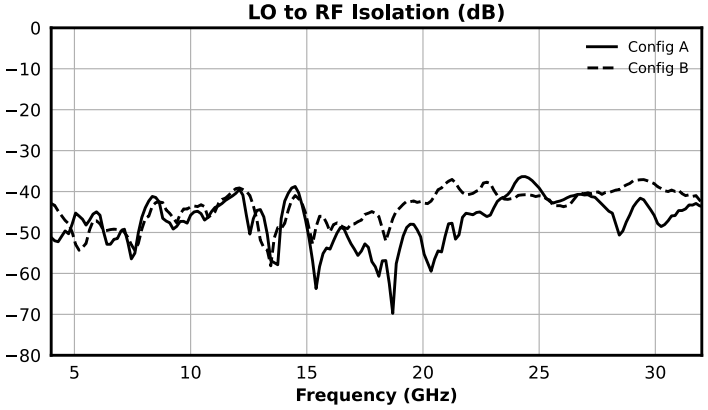
LO Return Loss (dB)



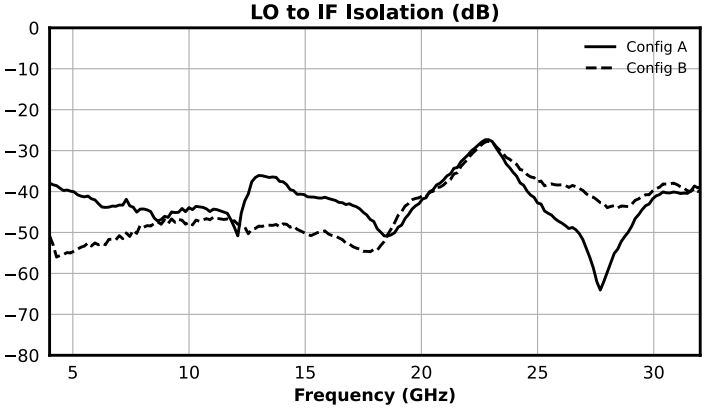
RF to IF Isolation (dB)



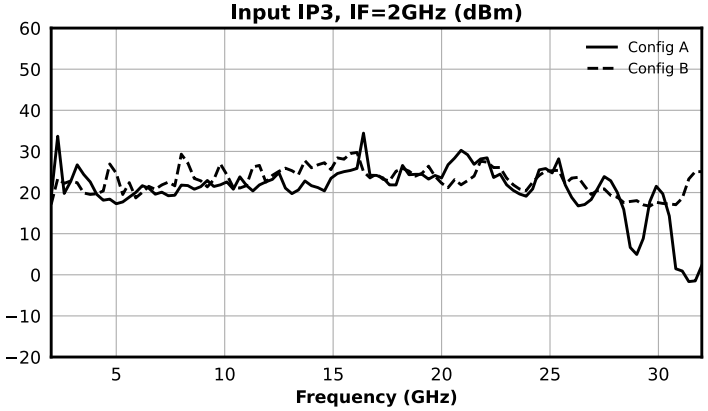
LO to RF Isolation (dB)



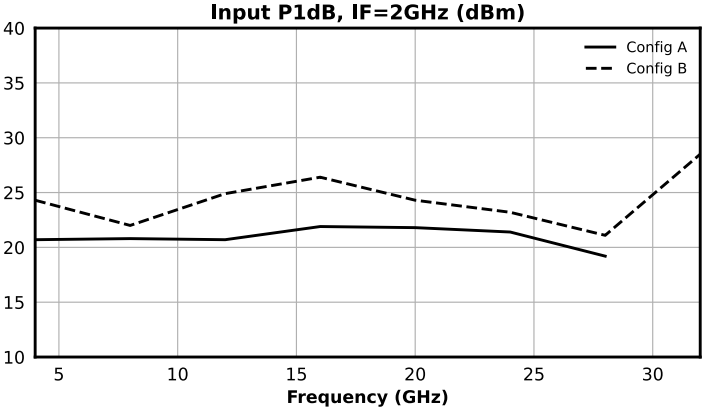
LO to IF Isolation (dB)



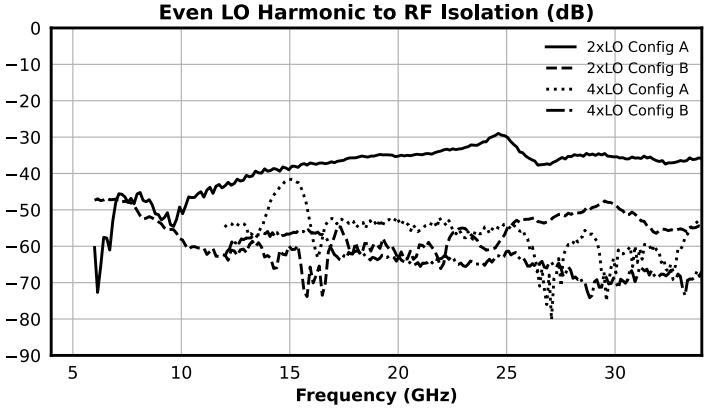
Input IP3, IF=2GHz (dBm)



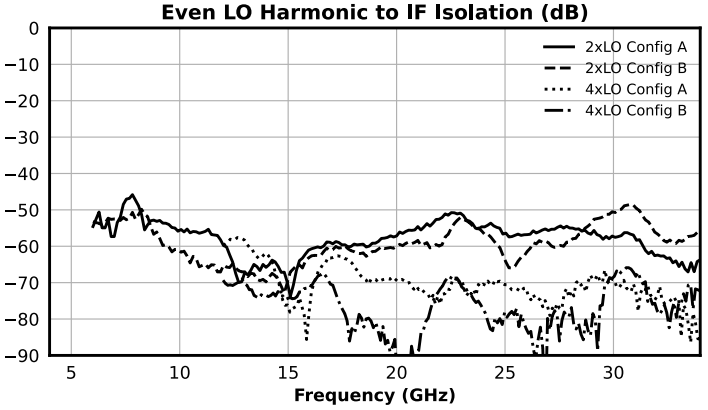
Input P1dB, IF=2GHz (dBm)



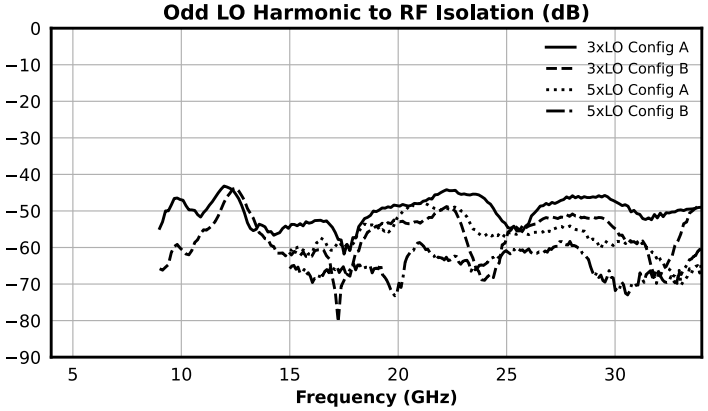
Even LO Harmonic to RF Isolation (dB)



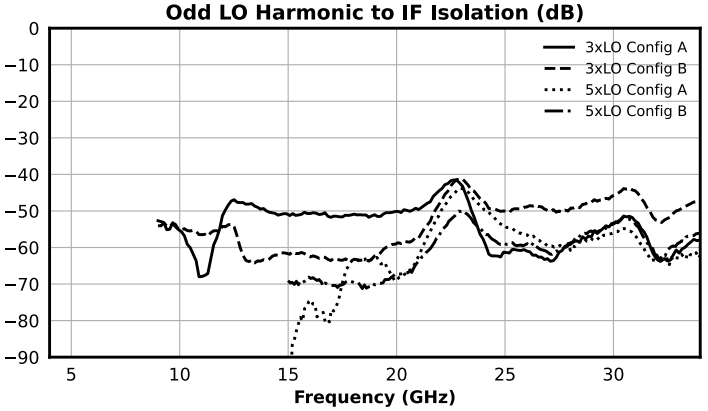
Even LO Harmonic to IF Isolation (dB)

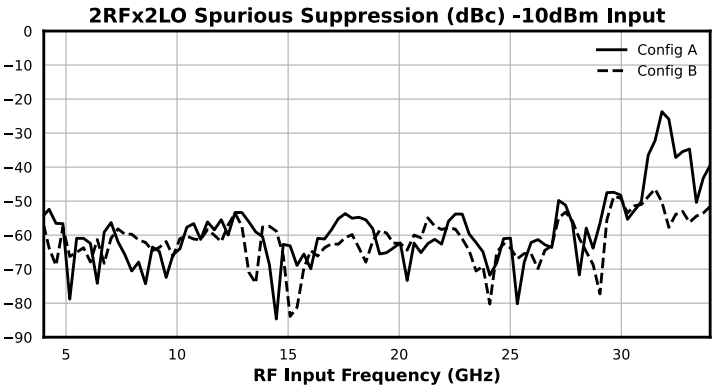


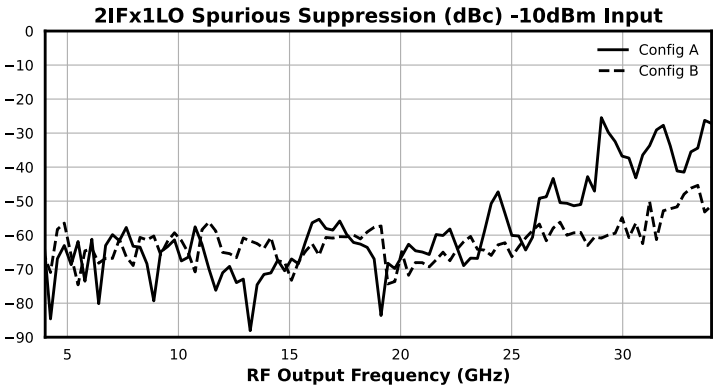
Odd LO Harmonic to RF Isolation (dB)



Odd LO Harmonic to IF Isolation (dB)







Spur Table

Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (±mLO±nRF) within the 2 to 34GHz RF/LO bands, which create a 2 GHz 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 -66 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 -76 dBc.

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

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	-35 (-31)	Reference	-36 (-25)	-19 (-14)	-38 (-32)	-24 (-20)
2xRF	-76 (-77)	-59 (-69)	-66 (-68)	-59 (-65)	-66 (-71)	-60 (-65)
3xRF	-86 (-88)	-81 (-87)	-84 (-88)	-81 (-86)	-90 (-86)	-82 (-85)
4xRF	-98 (-96)	-98 (-100)	-99 (-102)	-101 (-101)	-101 (-99)	-99 (-99)
5xRF	-104 (-104)	-109 (-112)	-111 (-110)	-107 (-109)	-111 (-110)	-111 (-109)

Upconversion Spurious Suppression

Spurious data is taken by mixing a 2 GHz IF with LO frequencies (±mLO±nIF), which creates an RF within the 2 to 34 GHz RF/LO 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 2IFx2LO spur is typically -82dBc 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 -92 dBc.

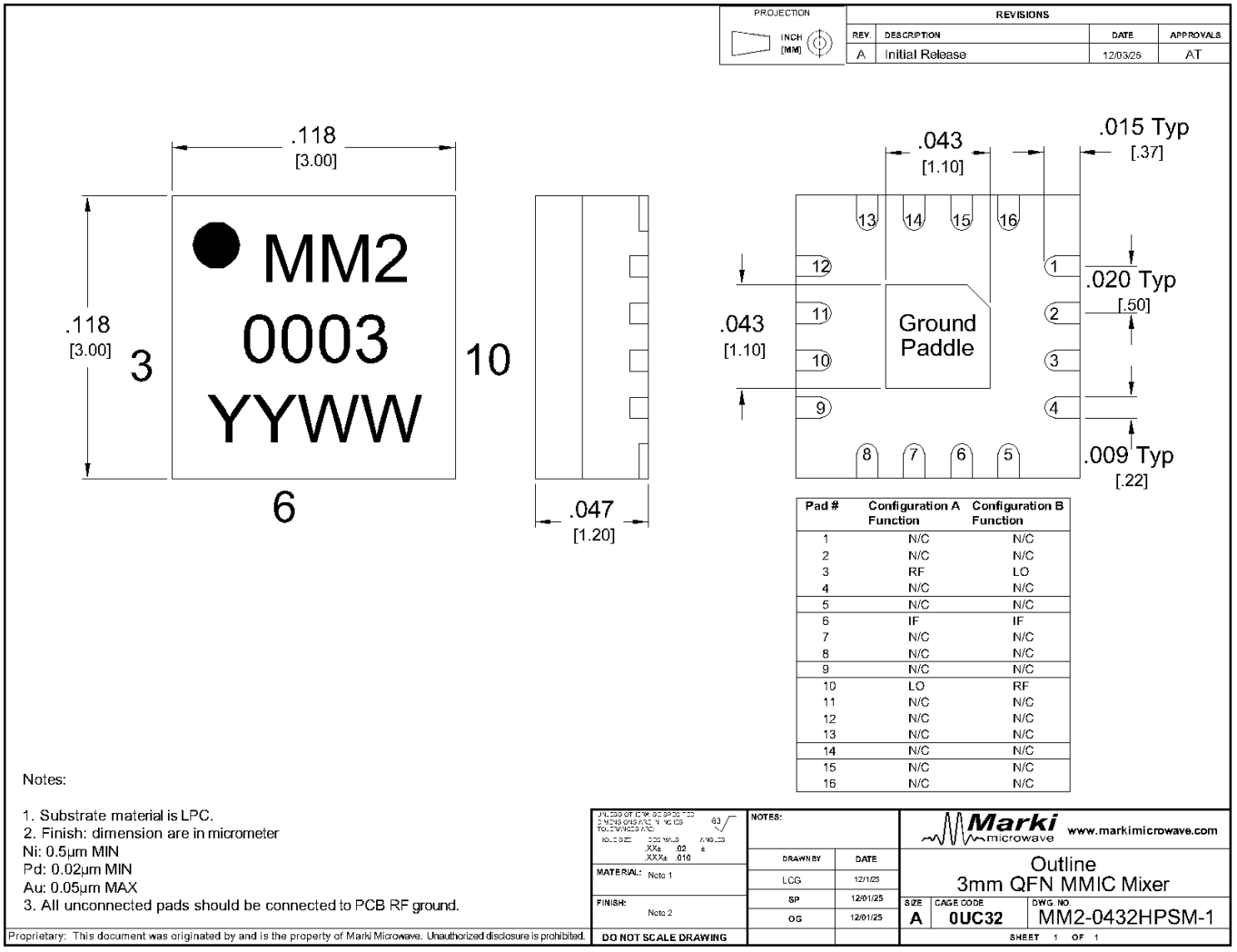
Typical Upconversion Spurious Suppression (dBc): Configuration A (Configuration B), Sine Wave LO

-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	-35 (-31)	Reference	-37 (-26)	-18 (-14)	-38 (-32)	-23 (-20)
2xIF	-82 (-83)	-79 (-81)	-82 (-82)	-79 (-79)	-79 (-70)	-80 (-79)
3xIF	-90 (-90)	-91 (-93)	-89 (-89)	-88 (-89)	-81 (-87)	-75 (-77)
4xIF	-98 (-101)	-93 (-92)	-101 (-102)	-97 (-97)	-100 (-99)	-96 (-100)
5xIF	-112 (-110)	-110 (-110)	-109 (-109)	-111 (-112)	-110 (-108)	-108 (-108)

Mechanical Data

Outline Drawing

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



Pad #	Configuration A Function	Configuration B Function
1	N/C	N/C
2	N/C	N/C
3	RF	LO
4	N/C	N/C
5	N/C	N/C
6	IF	IF
7	N/C	N/C
8	N/C	N/C
9	N/C	N/C
10	LO	RF
11	N/C	N/C
12	N/C	N/C
13	N/C	N/C
14	N/C	N/C
15	N/C	N/C
16	N/C	N/C

Notes:

1. Substrate material is LPC.
2. Finish: dimension are in micrometer
Ni: 0.5µm MIN
Pd: 0.02µm MIN
Au: 0.05µm MAX
3. All unconnected pads should be connected to PCB RF ground.

Proprietary: This document was originated by and is the property of Marki Microwave. Unauthorized disclosure is prohibited.

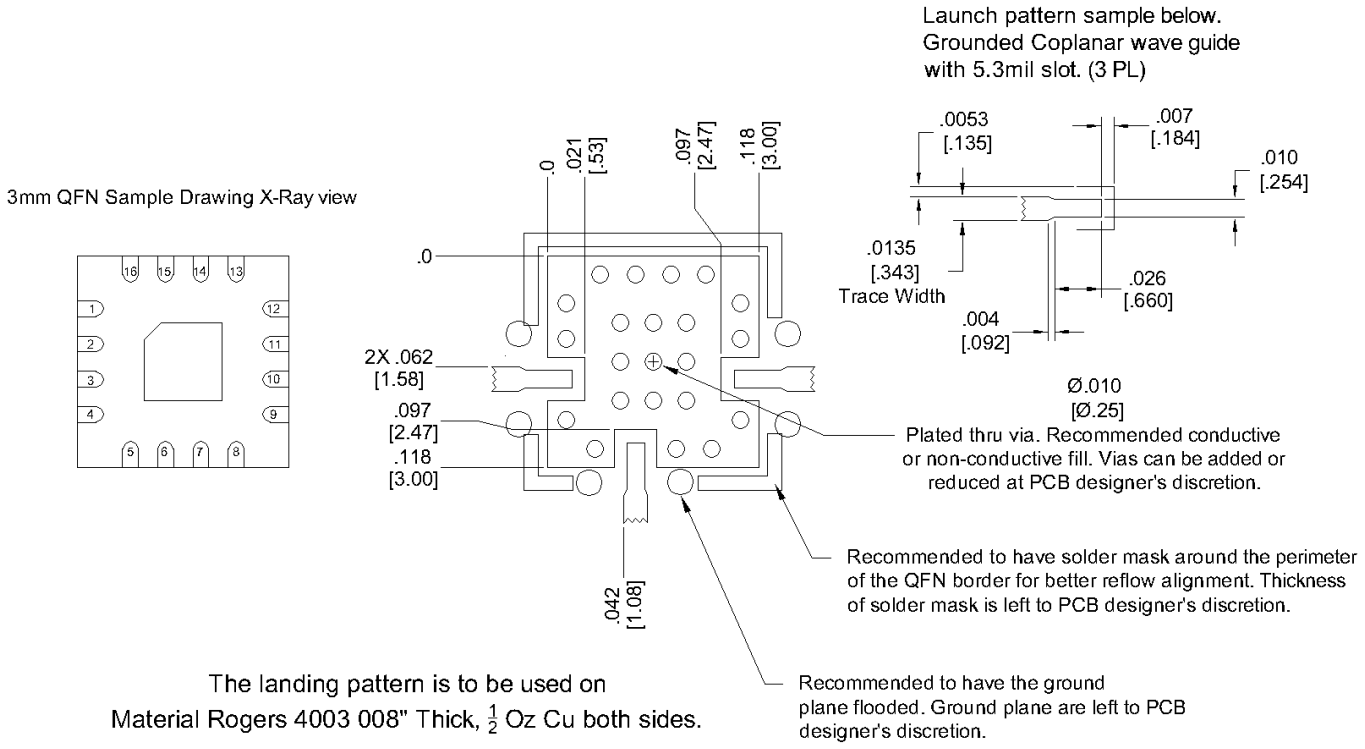
MATERIAL: Note 1
FINISH: Note 2
DO NOT SCALE DRAWING

NOTES:

DRAWN BY	DATE
LCG	12/1/25
SP	12/01/25
OG	12/01/25

Marki microwave www.markimicrowave.com
Outline
3mm QFN MMIC Mixer
SIZE A | CAGE CODE 0UC32 | DWG. NO. MM2-0432HPSM-1
SHEET 1 OF 1

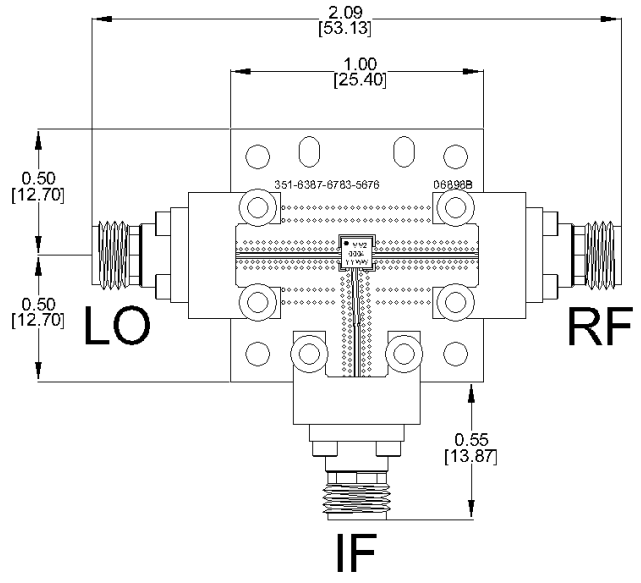
Footprint Image

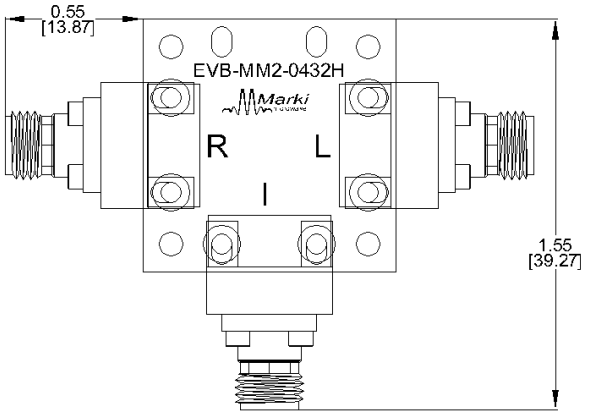


Evaluation Board - Outline Drawing

*All dimensions are typical

PROJECTION	REVISIONS			
INCH [MM]	REV.	DESCRIPTION	DATE	APPROVALS
	A	Initial Release	12/03/25	AT





Port	Connector Type
LO	2.92mm Female
RF	2.92mm Female
IF	2.92mm Female
Note: Eval Connectors are not removeable.	

Note: RoHS Compliant Assembly

NOTES:	DRAWN BY	DATE
MATERIAL:	LCG	12/1/25
FINISH:	SP	12/01/25
DO NOT SCALE DRAWING	OG	12/01/25

Marki microwave www.markimicrowave.com

Outline
3mm QFN Mixer Eval Board

SIZE	CAGE CODE	DWG. NO.
A	0UC32	EVB-MM2-0432H

SHEET 1 OF 1

DISCLAIMER

MARKI MICROWAVE, LLC., (“MARKI”) PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES “AS IS” AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.

Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.

MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, LLC. All other trademarks used are the property of their respective owners.