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

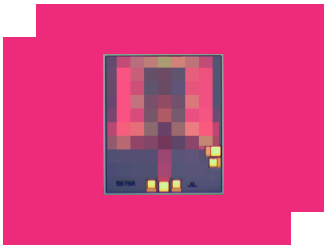
MM1-2567LCH-2

GaAs Double-Balanced Mixer

DEVICE OVERVIEW

General Description

The MM1-2567LS is a passive GaAs double balanced MMIC mixer suitable for both up and down-conversion applications. As with all Marki Microwave mixers, it features excellent conversion loss, isolation and spurious performance across a broad bandwidth and in a small form factor. The MM1-2567LS is available in a connectorized package. Owing to its passive balun circuitry, the mixer can be used in two different configurations: Configuration A for highest efficiency and Configuration B for the best spurious performance and lowest LO drive.



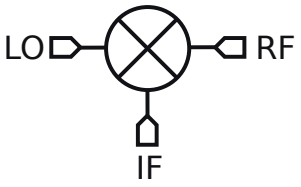
Features

- Connectorized Package
- Broadband Performance
- Excellent Unit-to-Unit Repeatability
- Extremely Low LO Drive Operation

Applications

N/A

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
MM1-2567LS	GaAs DOUBLE-BALANCED MIXER	S	Standard	REACH RoHS	Released	EAR99
MM1-2567LCH-2	GaAs Double-Balanced Mixer	CH	-	REACH RoHS	Released	EAR99

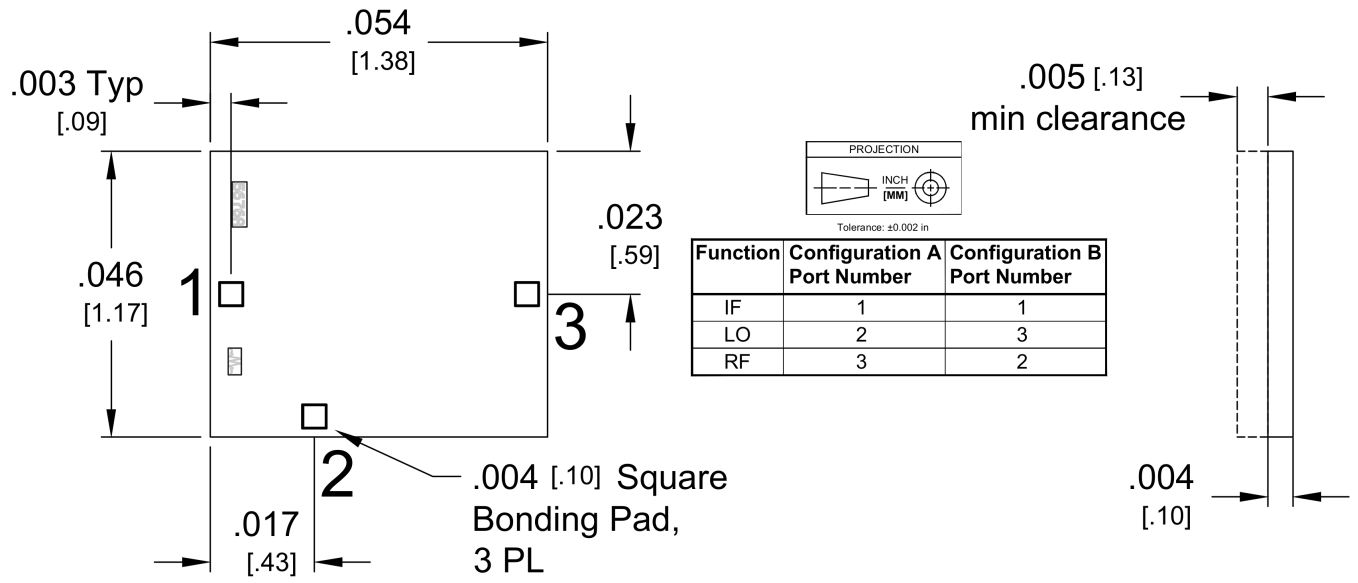
Table Of Contents

Revision History

Revision Code	Revision Date	Comment
-	2020-05-05	Datasheet Initial Release
A	2025-11-06	MSL information added

Port Configuration and Functions

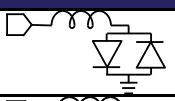
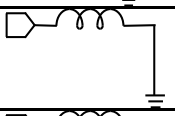
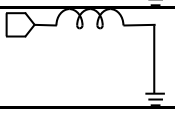
Port Diagram



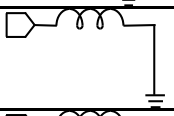
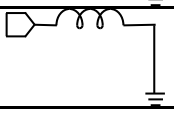
Function	Configuration A Port Number	Configuration B Port Number
IF	1	1
LO	2	3
RF	3	2

Port Functions

Configuration A

Port	Function	Description	DC Equivalent Circuit
Port 1	IF	Port 1 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 2	LO	Port 2 is DC short to ground and AC matched to 50 Ohms from 25 to 67 GHz. Blocking capacitor is optional.	
Port 3	RF	Port 3 is DC short to ground and AC matched to 50 Ohms from 25 to 67 GHz. Blocking capacitor is optional.	

Configuration B

Port	Function	Description	DC Equivalent Circuit
Port 1	IF	Port 1 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 2	RF	Port 2 is DC short to ground and AC matched to 50 Ohms from 25 to 67 GHz. Blocking capacitor is optional.	
Port 3	LO	Port 3 is DC short to ground and AC matched to 50 Ohms from 25 to 67 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	30	mA
Port 2 DC Current	21	mA
Port 3 DC Current	30	mA
RF Power Handling (RF+LO), 100°C	23	dBm
RF Power Handling (RF+LO), 25°C	28	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	1.38 x 1.17 mm
Moisture Sensitivity Level	-	MSL 1

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	6	-	16	-

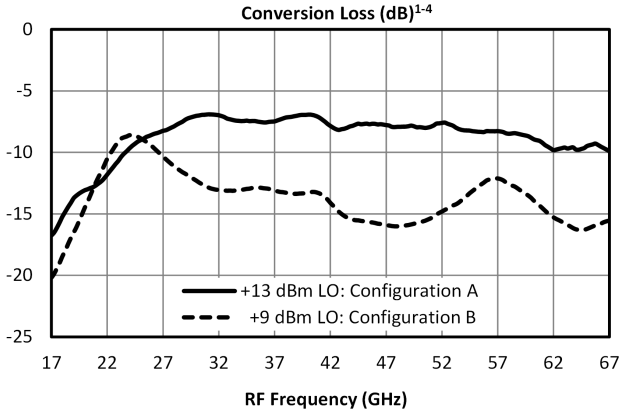
Electrical Specifications

Specifications guaranteed from -55 to +100°C, measured in a 50Ω system

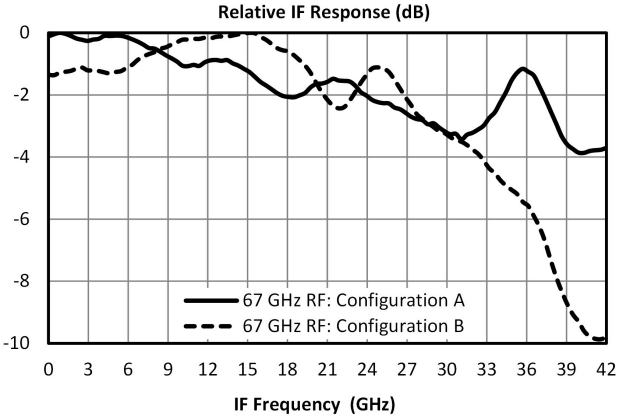
Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	A	LO/RF=25-60 GHz IF=DC-30 GHz	-	9	16	dB
Input 1 dB Compression	A	LO/RF=25-67 GHz IF=DC-30 GHz LO Drive Level=10-16dBm	-	1	-	dBm
Input IP3	A	LO/RF=25-67 GHz IF=DC-30 GHz LO Drive Level=10-16 dBm	-	9	-	dBm
Isolation, LO to RF	A	-	-	33	-	dB
Conversion Loss	B	LO/RF=25-60 GHz IF=DC-30 GHz	-	15	21	dB
Input 1 dB Compression	B	LO/RF=25-67 GHz IF=DC-30 GHz LO Drive Level=6-12 dBm	-	5	-	dBm
Input IP3	B	LO/RF=25-67 GHz IF=DC-30 GHz LO Drive Level=6-12 dBm	-	15	-	dBm
IF Frequency Range	-	-	0	-	30	GHz
LO Frequency Range	-	-	25	-	67	GHz
RF Frequency Range	-	-	25	-	67	GHz

Typical Performance

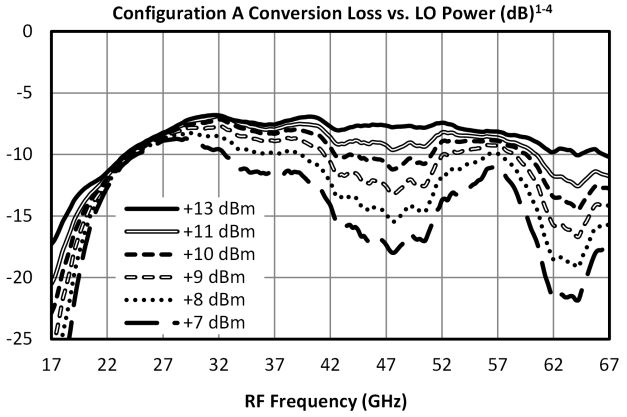
Conversion Loss (dB)[1-4]



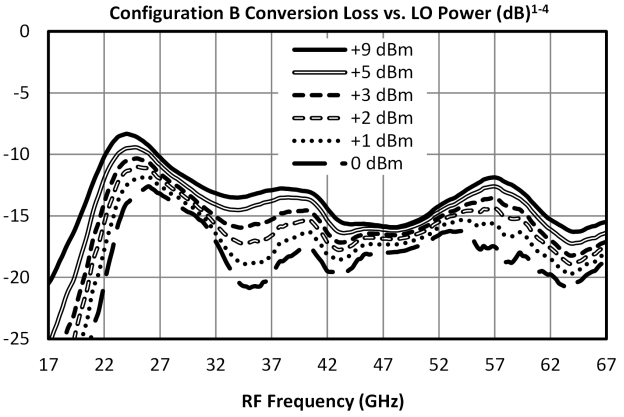
Relative IF Response (dB)



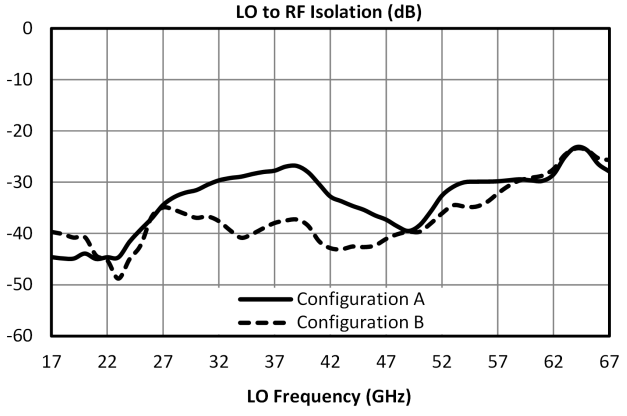
Configuration A Conversion Loss vs. LO Power (dB)[1-4]



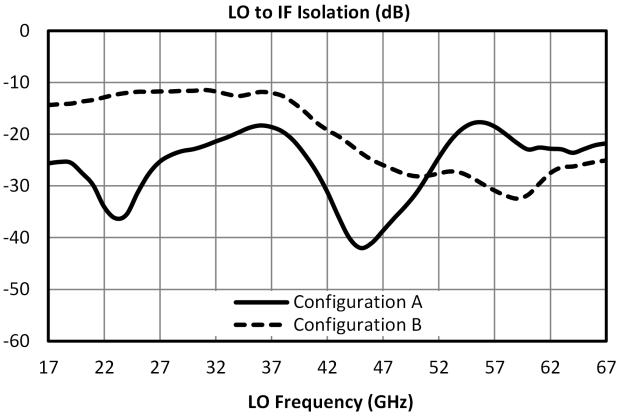
Configuration B Conversion Loss vs. LO Power (dB)[1-4]



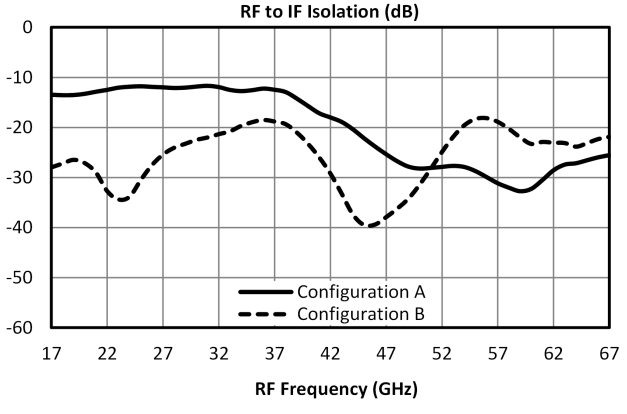
LO to RF Isolation (dB)



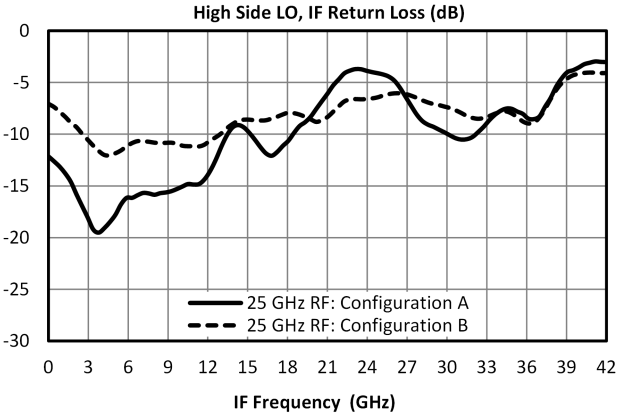
LO to IF Isolation (dB)



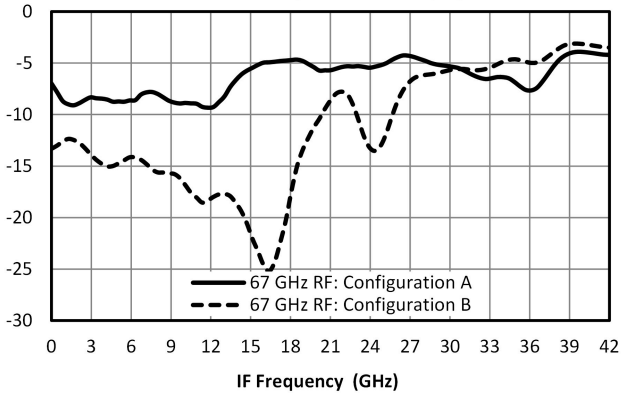
RF to IF Isolation (dB)



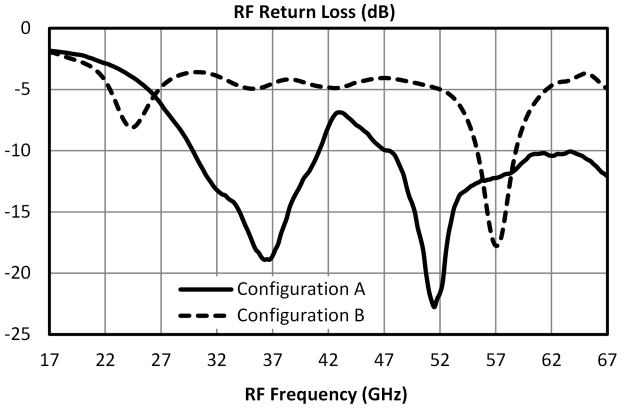
High Side LO, IF Return Loss (dB)



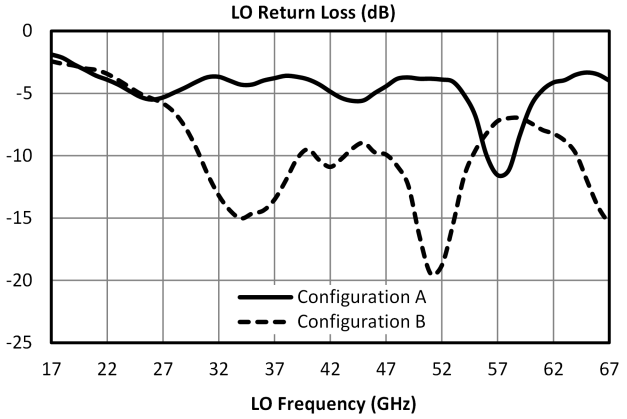
Low Side LO, IF Return Loss (dB)



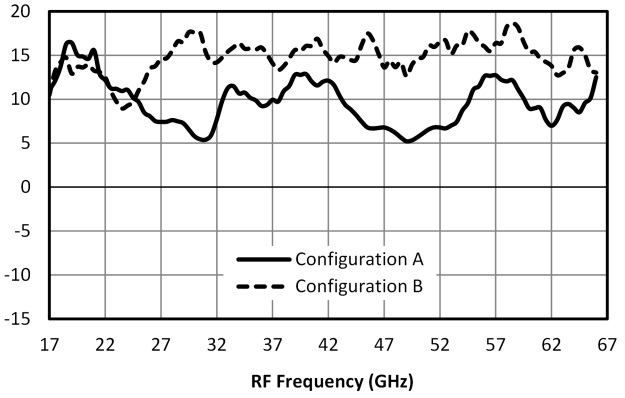
RF Return Loss (dB)



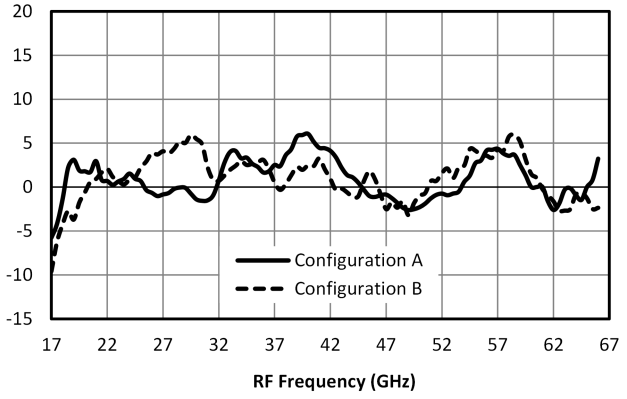
LO Return Loss (dB)



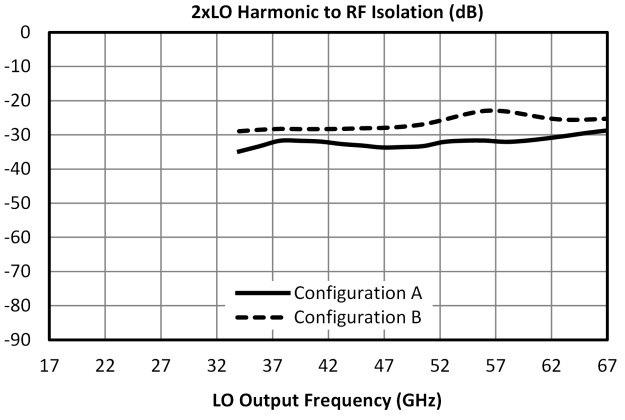
Input IP3 (dBm)



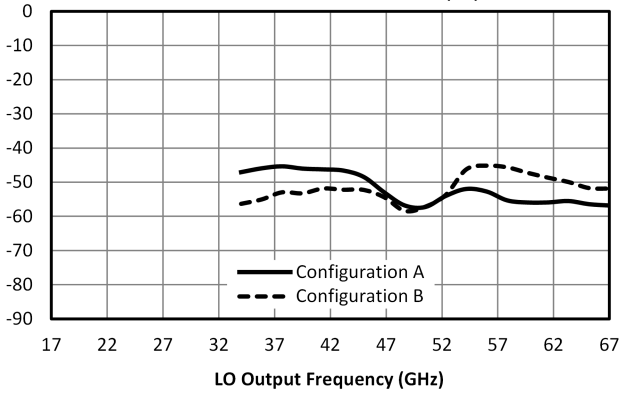
Output IP3 (dBm)



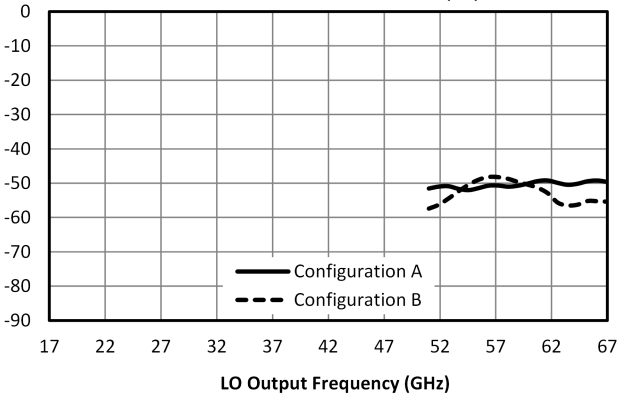
2xLO Harmonic to RF Isolation (dB)

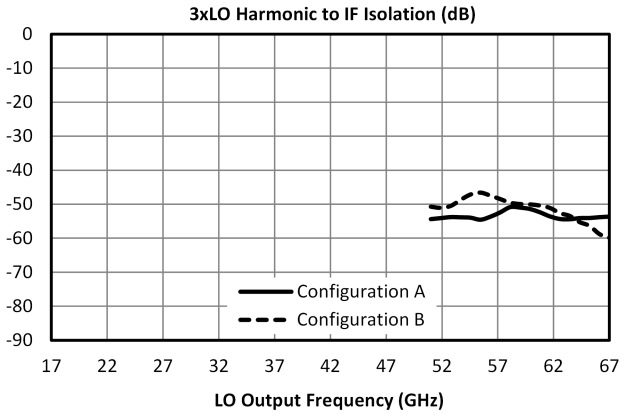


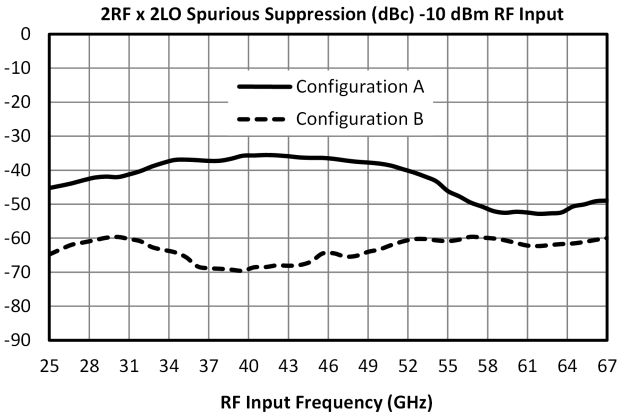
2xLO Harmonic to IF Isolation (dB)

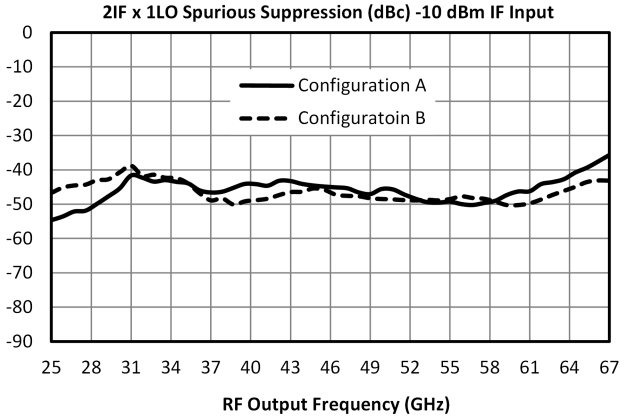


3xLO Harmonic to RF Isolation (dB)



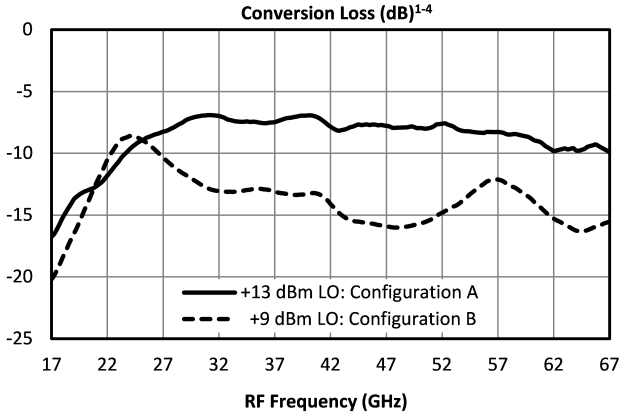


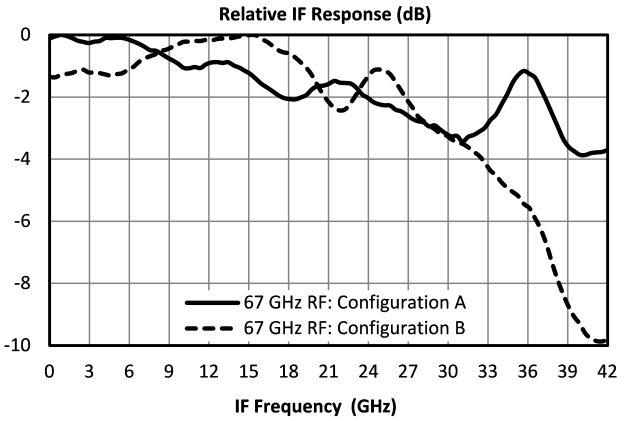


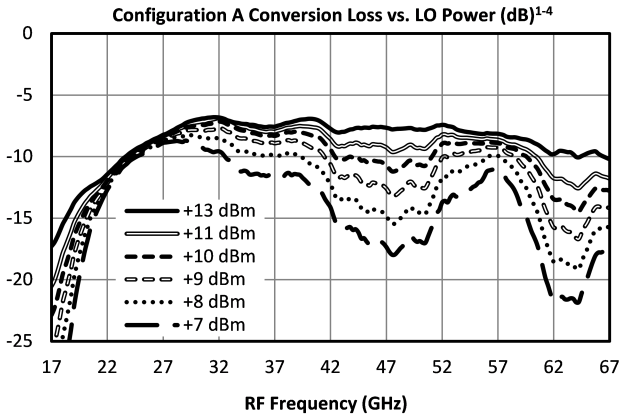


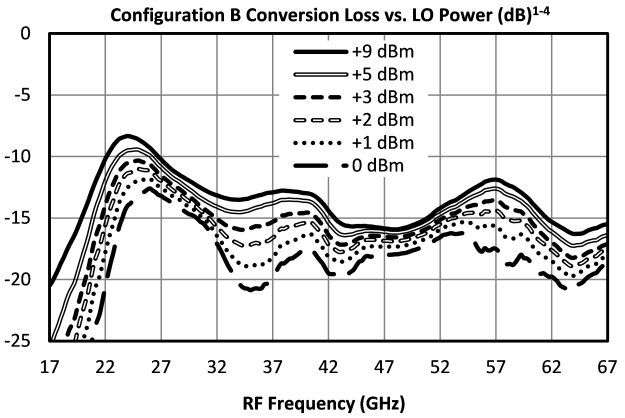
MM1-2567LS - Typical Performance

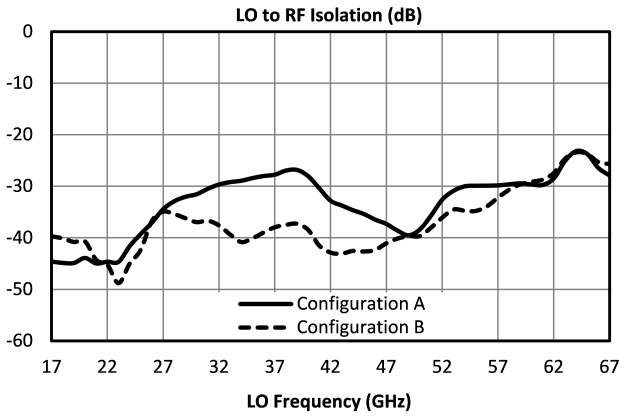
Performance plots for the connectorized module are shown for measurements where directly probed measurements of the die are unavailable. Note that the following measurements include losses from connectors and microstrip traces.

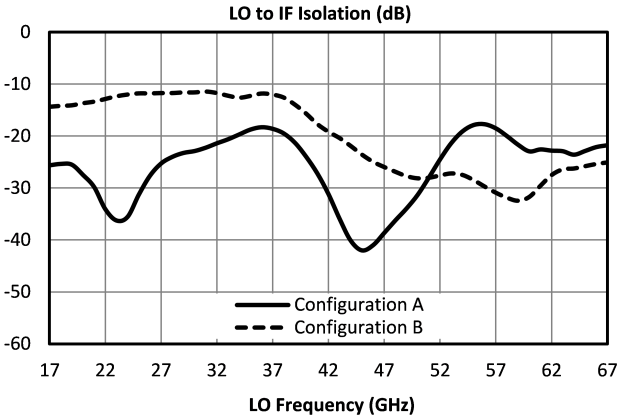


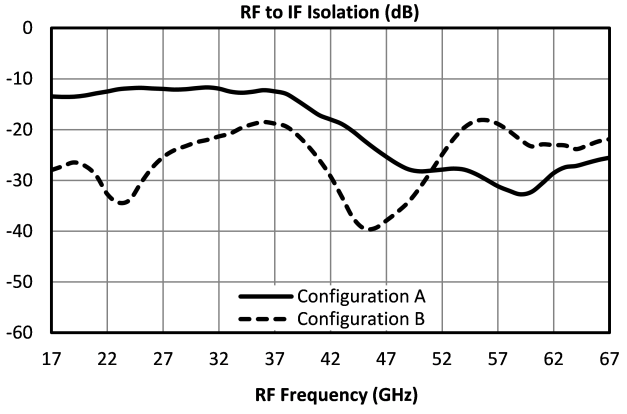


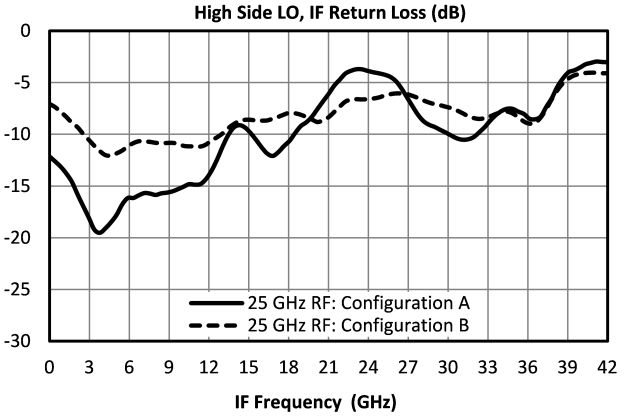




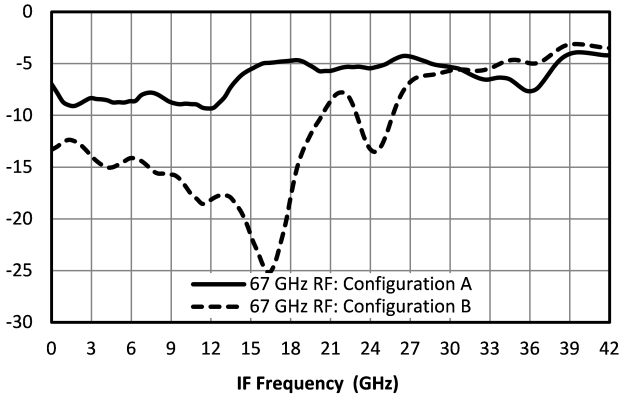




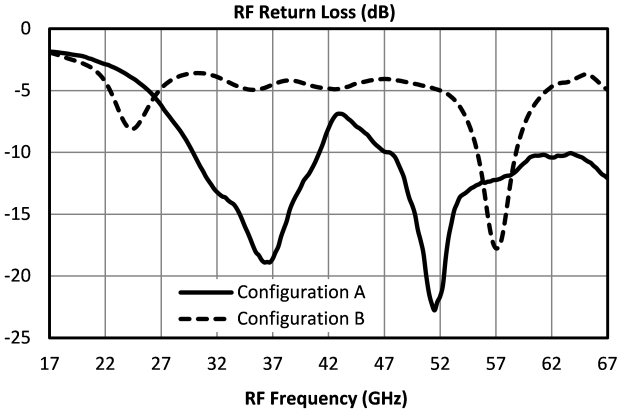




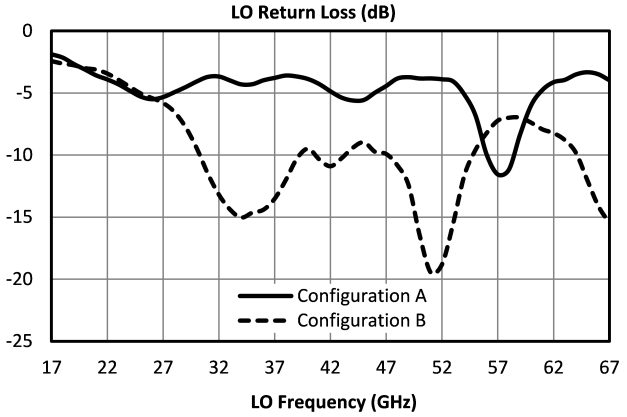
Low Side LO, IF Return Loss (dB)



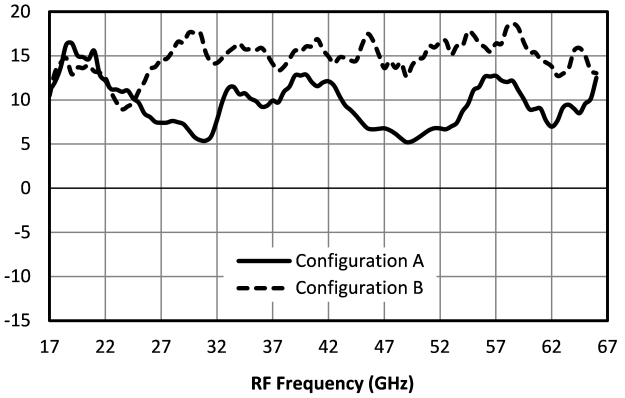
RF Return Loss (dB)



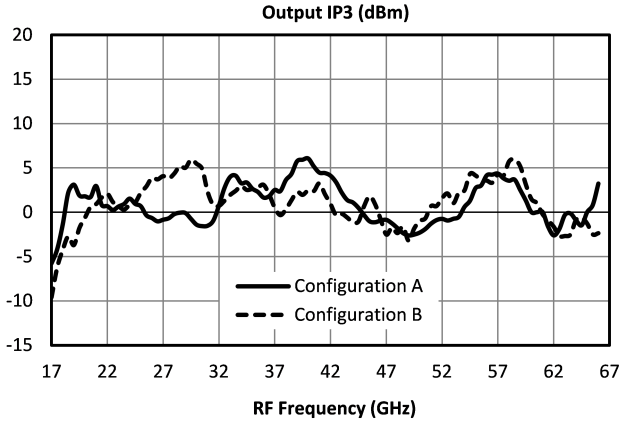
LO Return Loss (dB)



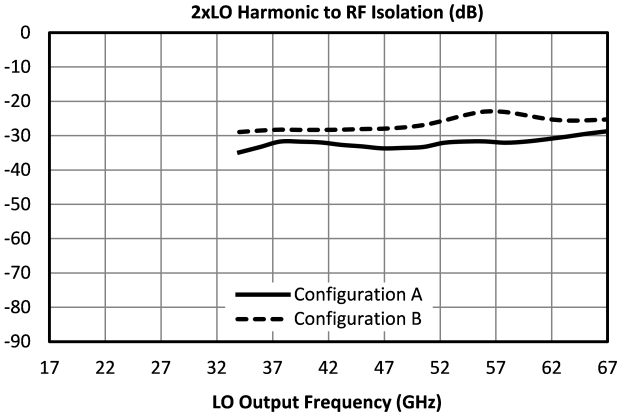
Input IP3 (dBm)



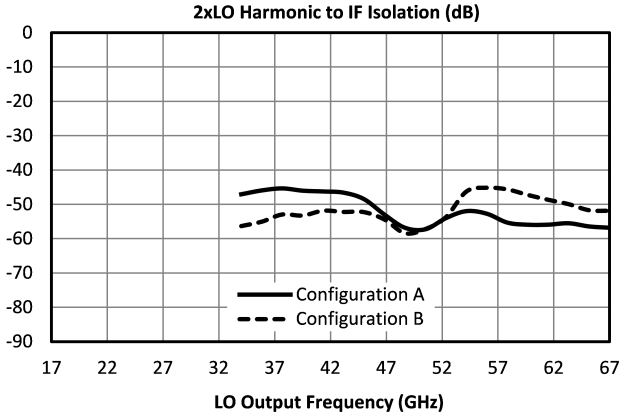
Output IP3 (dBm)



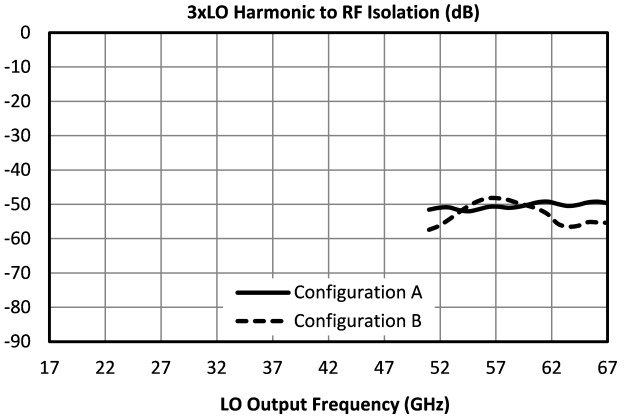
2xLO Harmonic to RF Isolation (dB)

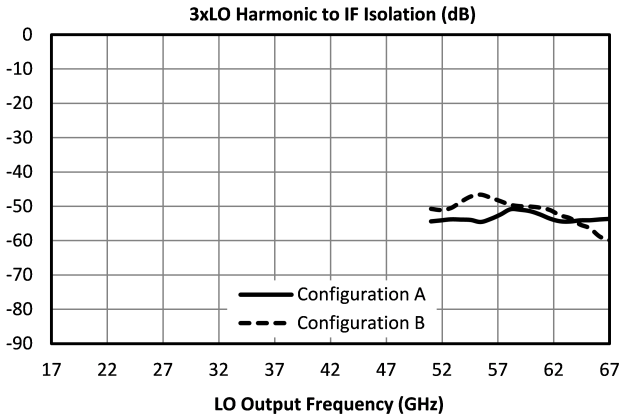


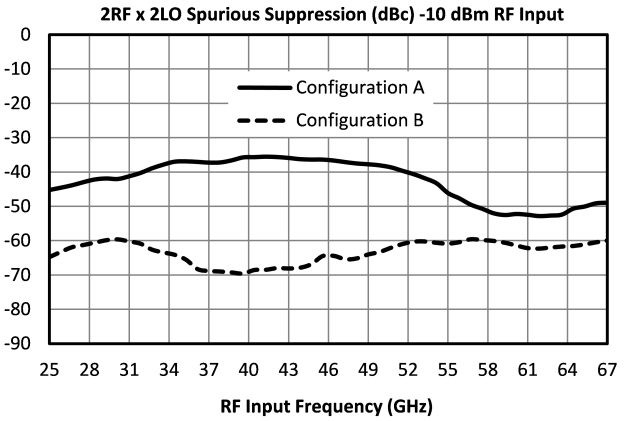
2xLO Harmonic to IF Isolation (dB)

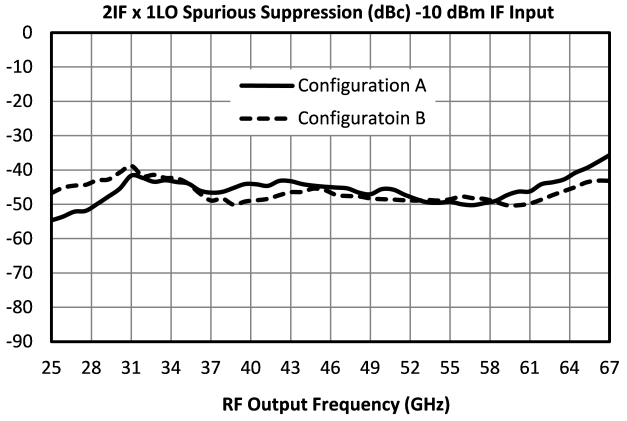


3xLO Harmonic to RF Isolation (dB)









Spur Table

Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the RF/LO bands, to create a spurious output within the IF output 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 2RFx2LO spur is 53 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 53 dBc.

Typical Downconversion Spurious Suppression (dBc): L Diode, A Configuration (B Configuration) [4]

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	14 (13)	Reference	24 (27)	11 (16)	35 (36)	26 (29)
2xRF	57 (60)	36 (42)	43 (63)	31 (50)	41 (52)	38 (49)
3xRF	83 (77)	51 (49)	48 (73)	50 (69)	53 (73)	51 (68)
4xRF	107 (105)	94 (85)	80 (104)	78 (108)	79 (103)	73 (101)
5xRF	120 (116)	114 (108)	103 (108)	105 (123)	90 (119)	91 (118)

Upconversion Spurious Suppression

Spurious data is taken by mixing an input within the IF band, with LO frequencies (+mLO+nIF), 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 46 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 56 dBc.

Typical Upconversion Spurious Suppression (dBc): L Diode, A Configuration (B Configuration)[4]

-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	12 (19)	Reference	16 (28)	10 (14)	38 (50)	29 (29)
2xIF	39 (45)	46 (48)	40 (37)	50 (44)	41 (39)	51 (52)
3xIF	62 (67)	54 (53)	53 (61)	58 (57)	54 (63)	44 (51)
4xIF	95 (96)	95 (92)	82 (83)	91 (88)	76 (75)	84 (85)
5xIF	113 (111)	109 (106)	102 (102)	105 (105)	101 (103)	91 (92)

Mechanical Data

Outline Drawing

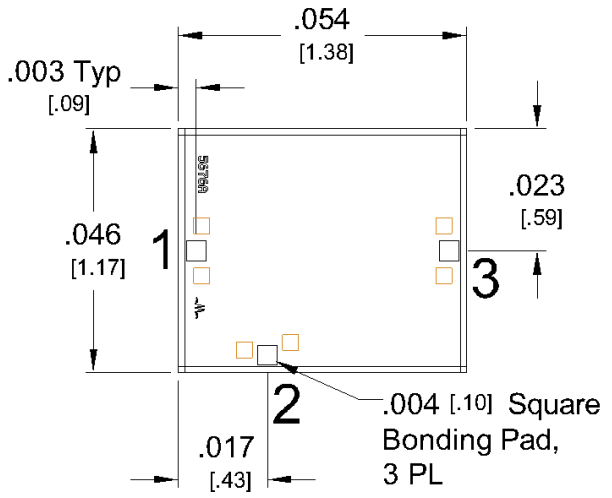
Download : Outline 2D Drawing

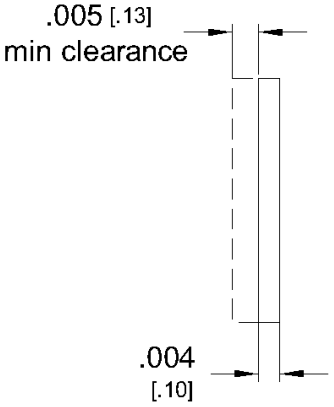
Function	Configuration A Port Number	Configuration B Port Number
IF	1	1
LO	2	3
RF	3	2

PROJECTION: INCH [MM]

REVISIONS

REV.	DESCRIPTION	DATE	APPROVALS
C	ECN 24096 remove gel-pak info.	10/18/24	AT





Notes:

1. CH substrate is .004 Thick GaAs.
2. I/O traces finish is 4 microns Au. Ground plane finish is 5 microns Au.
3. Tolerance for X, Y dimensions is ± 0.002 in.
   Tolerance for Z dimension is ± 0.0005 in.
   Tolerance for pad location is ± 0.0001 in.

NOTES:

DRAWN BY	DATE
STR	8/25/06

MATERIAL: 210-05676-R25

FINISH:

DO NOT SCALE DRAWING

Marki microwave www.markimicrowave.com

Outline
MMIC Mixer

SIZE	CAGE CODE	DWG. NO.
A	0UC32	MM1-2567LCH-2

SCALE 40/1 SHEET 1 OF 1

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 for LO drives 2 dB below the lowest and 3 dB above highest nominal LO drive levels.

4. Conversion Loss typically degrades less than 0.5 dB at +100°C and improves less than 0.5 dB at -55°C.

5. Unless otherwise specified, Configuration A data is taken with +13 dBm LO drive, and Configuration B is taken with +9 dBm drive

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

7. Catalog mixer circuits are continually improved. Configuration control requires custom mixer model numbers and specifications.