

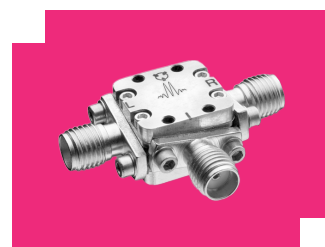
M2-0250LNVT

Triple-Balanced Mixers

DEVICE OVERVIEW

General Description

M2 triple balanced mixers are hybrid assemblies that have been hand-tuned to feature low conversion loss and high isolations. M2 mixers offer ultrabroadband overlapping frequency coverage on all 3 ports. Many M2 mixers have replaced with MM2 mixers with superior performance, repeatability, and availability. M2 mixers suitable for systems where an MM2 mixer is not available.



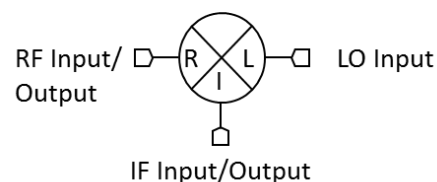
Features

- LO/RF 2.0 to 50.0 GHz
- IF 0.4 to 50.0 GHz
- 10 dB Typical Conversion Loss
- Ultra-Broadband RF, LO, and IF
- 2.40 mm Connectors

Applications

N/A

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
M2-0250LNVT	Triple-Balanced Mixers	NVT	<u>Standard</u>	<u>Consult Factory</u>	Not Recommended for New Design	EAR99

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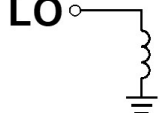
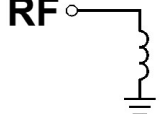
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Port Configuration and Functions

Port Functions

Port	Function	Connector Type	Description	Equivalent Circuit for Package
Port 1	IF	2.4F	The IF port is DC coupled to the diodes and AC matched to 50 Ohms from 0.4 to 50 GHz. Blocking capacitor is optional.	
Port 2	LO	2.4F	The LO port is DC coupled to ground and AC matched to 50 Ohms from 2 to 50 GHz. Blocking capacitor is optional.	
Port 3	RF	2.4F	The RF port is DC coupled to ground and AC matched to 50 Ohms from 2 to 50 GHz. Blocking capacitor is optional.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
IF DC Current	50	mA
LO DC Current	1	Amp
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
RF DC Current	1	Amp
RF Power Handling (RF+LO), 100°C	20	dBm
RF Power Handling (RF+LO), 25°C	23	dBm

Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Weight	Package name: NVT	10g
Dimensions	-	11.94 x 11.94 mm

Recommended Operating Conditions

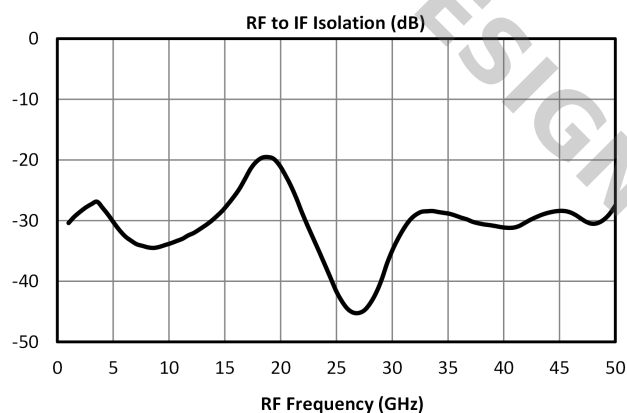
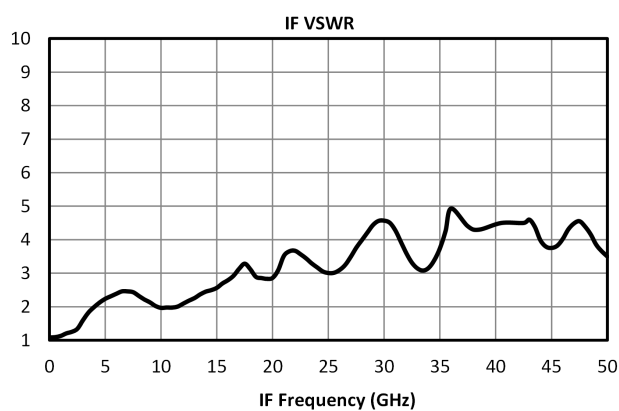
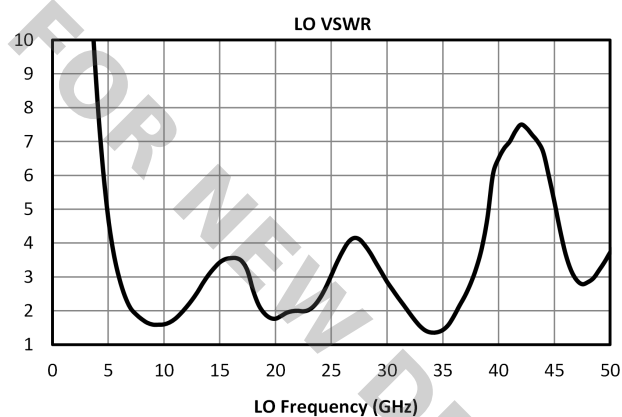
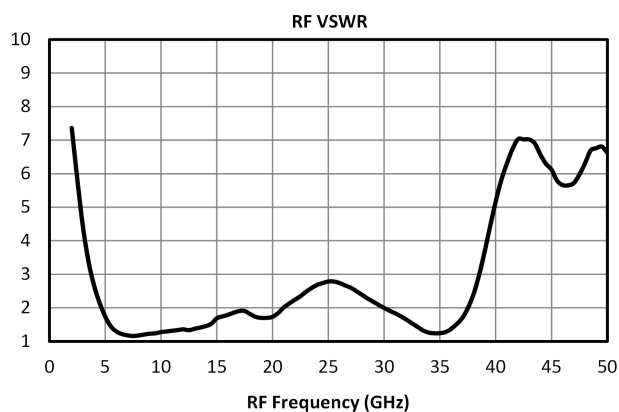
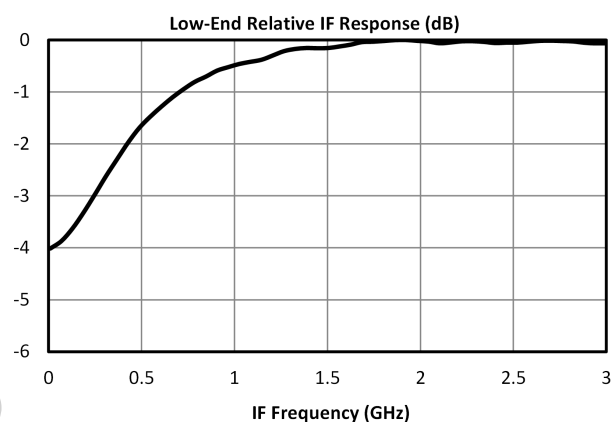
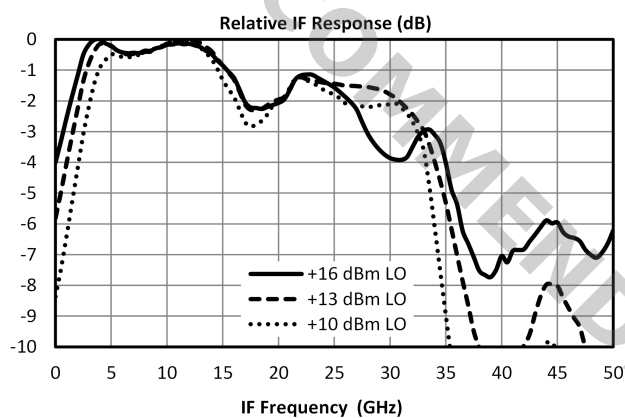
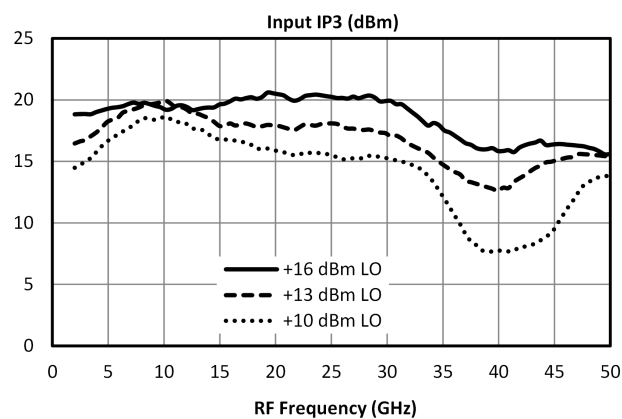
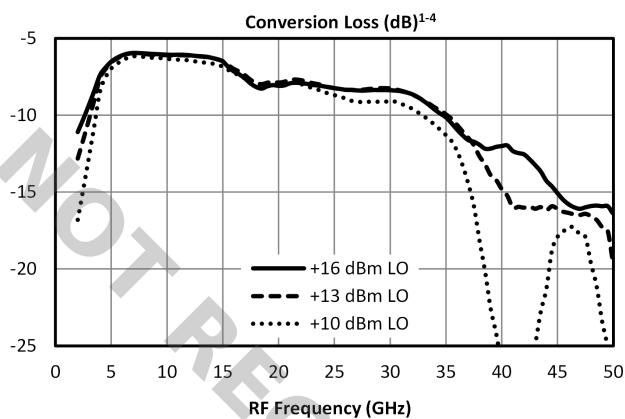
Parameter	Min	Nominal	Max	Unit
LO Input Power	10	-	20	dBm

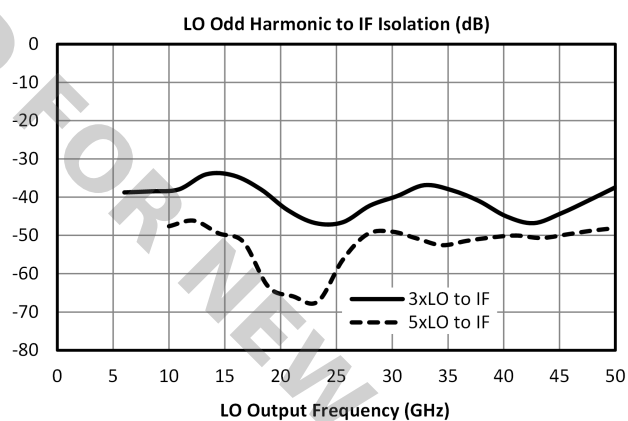
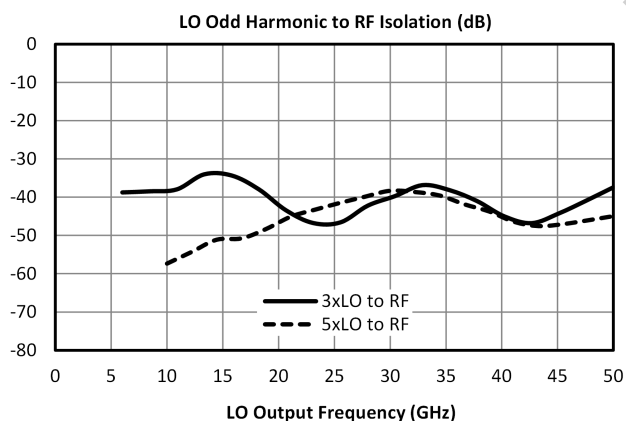
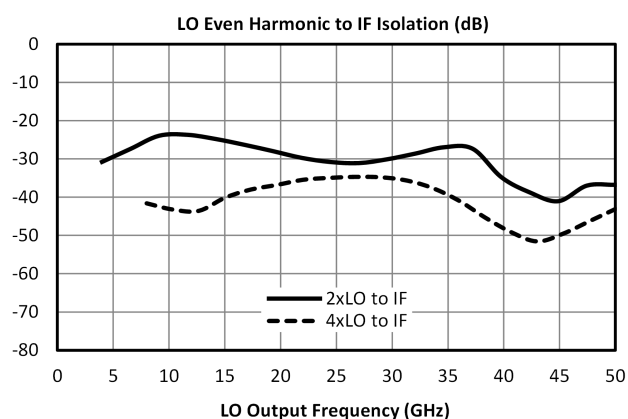
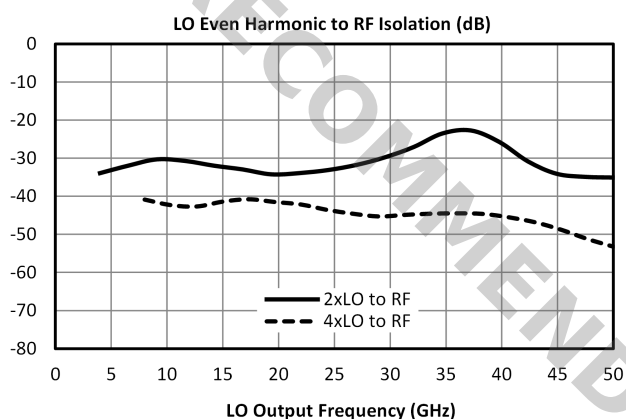
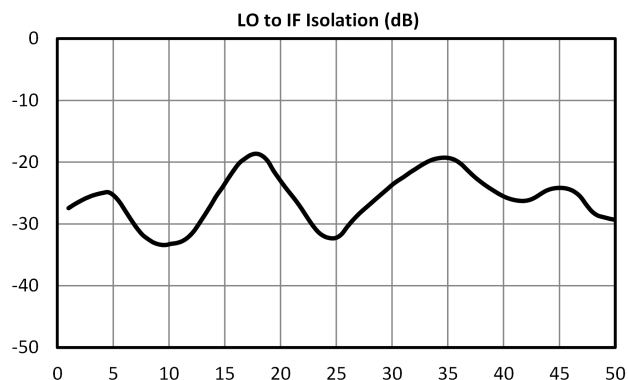
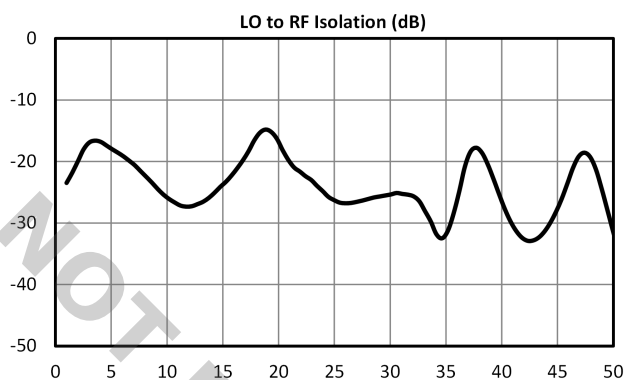
Electrical Specifications

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

Parameter	Test Conditions	Min	Typ	Max	Unit
RF Frequency Range	-	2	-	50	GHz
Conversion Loss	LO/RF=2-50 GHz IF=.4-50 GHz	-	10	-	dB
Isolation, LO to RF	LO/RF=2-50 GHz	-	25	-	dB
Isolation, LO to IF	LO/RF=2-50 GHz	-	-	-	dB
Isolation, RF to IF	LO/RF=2-50 GHz	-	-	-	dB
Input IP3	-	-	18	-	dBm
IF Frequency Range	-	0.4	-	50	GHz
Input 1 dB Compression	LO/RF=2-50 GHz LO drive level, L Diode Option=10-20 dBm	-	5	-	dBm

Typical Performance Plots





Spur Table

Downconversion Spurious Suppression

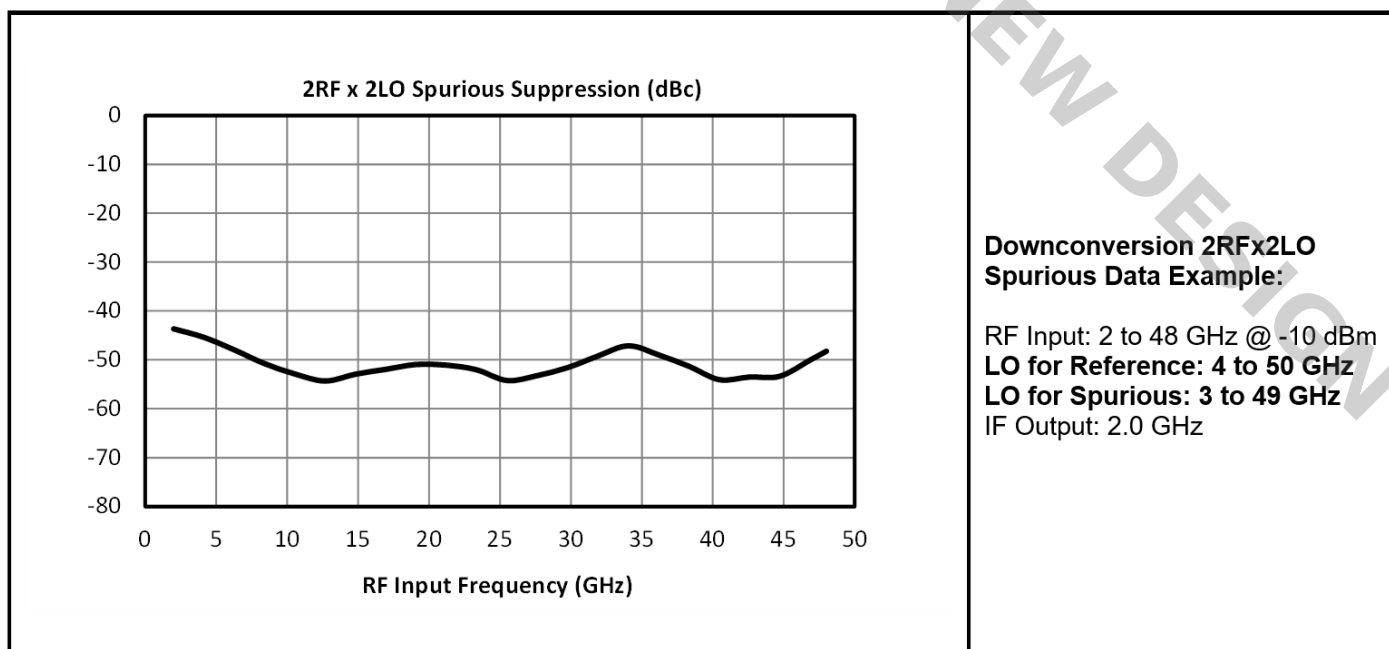
Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the 2 to 50 GHz RF/LO bands, which create a 2.0 GHz IF spurious output. The mixer is swept across the spurious band and the mean is calculated. The numbers shown in the table below are for a -10 dBm RF input. Spurious suppression is scaled for different RF power levels by (n-1), where “n” is the RF spur order. For example, the 2RFx2LO spur is 52 dBc for a -10 dBm input, so a -20 dBm RF input creates a spur that is (2-1) x (-10 dB) dB lower, or 62 dBc.

Typical Downconversion Spurious Suppression (dBc): L-Diode

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
0xRF	-----	See LO to IF Isolation and LO Harmonic to IF Isolation Plots				
1xRF	22	Reference	29	13	36	24
2xRF	61	48	52	52	51	50
3xRF	89	62	73	70	78	72
4xRF	110	95	94	95	96	98
5xRF	127	108	112	110	114	118

Unless otherwise specified, L-diode data is taken with +16 dBm LO drive.

A sample downconversion spurious sweep is shown below. An LO which is 2.0 GHz higher than the RF is used to create a 2.0 GHz reference IF. A second LO is used to create a 2x2 spurious IF, also at 2.0 GHz (1.0 GHz fundamental IF). The difference between these two output levels is the spurious suppression in dBc. The mean value across the 2 to 48 GHz RF input band is the number shown in the table above.



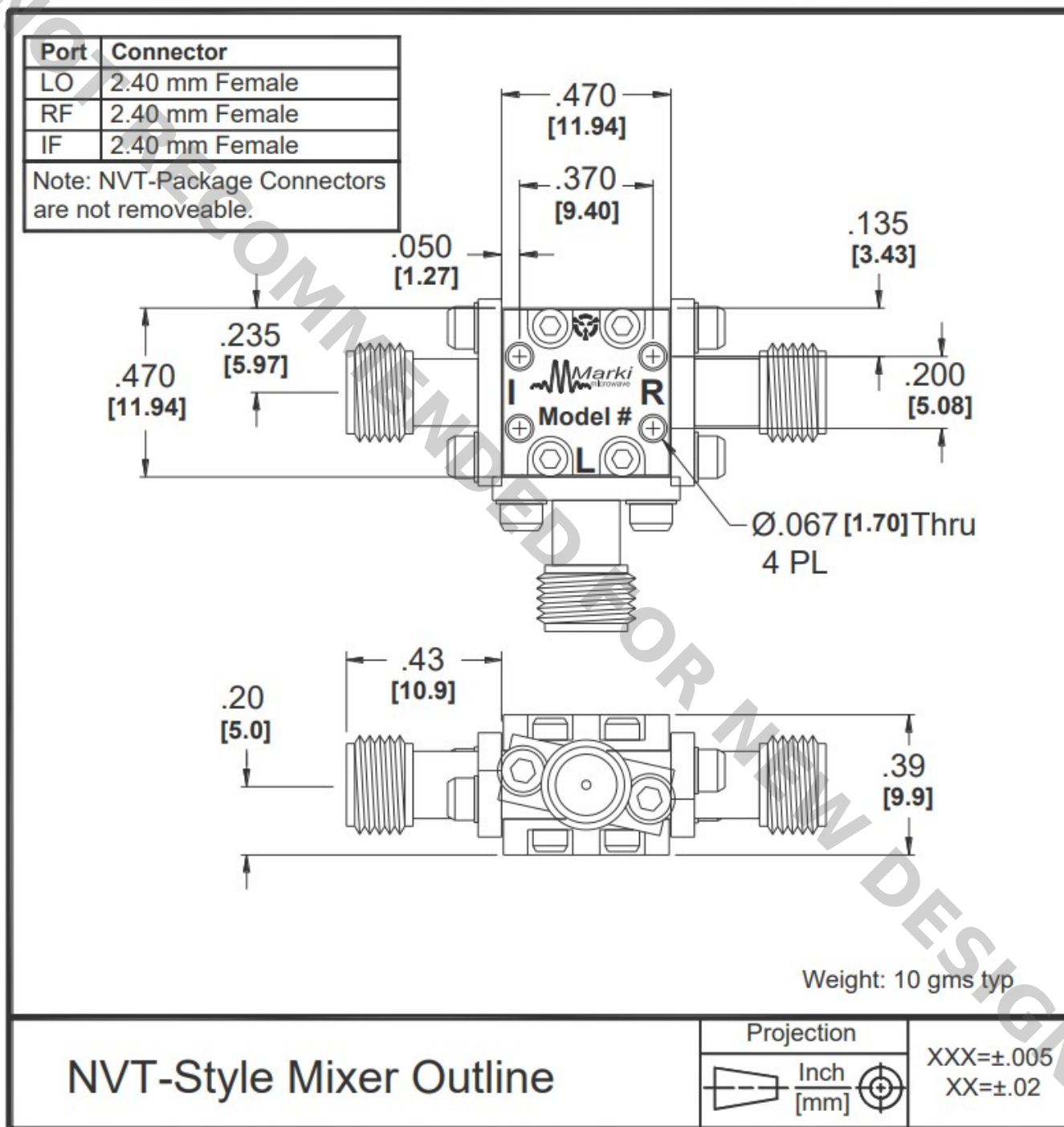
Upconversion Spurious Suppression

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Mechanical Data

Outline Drawing

Download : [Outline 3D Drawing](#) | [Outline 3D STP](#)



Notes

1. Mixer Conversion Loss Plot IF frequency is 2.0 GHz.
2. Mixer Noise Figure typically measures within 0.5 dB of conversion loss.
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, L-diode data is taken with +16 dBm LO 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.

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