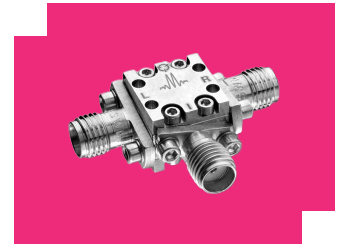


## T3-1040GLN High-Linearity Triple-Balanced Mixers

### DEVICE OVERVIEW

#### General Description

The T3-1040G is a high performance mixer featuring LO/RF from 10 to 40 GHz and IF from 1 to 18 GHz. As with all T3 mixers, this mixer offers unparalleled nonlinear performance in terms of IIP3, P1dB, and spurious performance with a flexible LO drive requirement from +13 dBm to +25 dBm. The T3-1040G is offered in connectorized and drop-in style packaging, suitable for any type of system level integration. The T3-1040G is a form fit function replacement for the obsolete T3-1040, built with GaAs diodes instead of Si.



#### Features

- LO/RF 10.0 to 40.0 GHz
- IF 1.0 to 18.0 GHz
- 8 dB Typical Conversion Loss
- Ultra-Broadband RF, LO, and IF
- 2.92 mm Connectors

#### Applications

N/A

#### Functional Block Diagram

N/A

#### Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
T3-1040GLN	High-Linearity Triple-Balanced Mixers	N	<u>Standard</u>	Non-RoHS	Released	EAR99

**Table Of Contents**

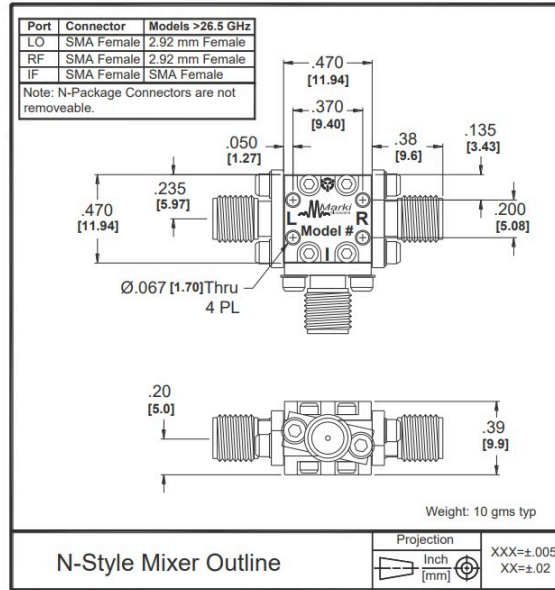
- **Device Overview**
  - General Description
  - Features
  - Applications
- **Port Configuration and Functions**
  - Port Diagram
  - Port Functions
- **Revision History**
- **Specifications**
  - Absolute Maximum Ratings
  - Package Information
  - Recommended Operating Conditions
  - Electrical Specifications
  - Typical Performance
  - Spur Tables
- **Mechanical Data**
  - Outline Drawing
- **Notes**

**Revision History**

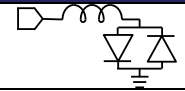
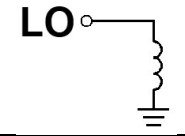
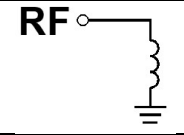
Revision Code	Revision Date	Comment
-	2021-01-01	Datasheet Initial Release

### Port Configuration and Functions

#### Port Diagram



### Port Functions

Port	Function	Connector Type	Description	Equivalent Circuit for Package
IF	IF	SMAF	The IF port is DC coupled to the diodes and AC matched to 50 Ohms from 1.0 to 18 GHz. Blocking capacitor is optional.	
LO	LO	2.92F	The LO port is DC coupled to ground and AC matched to 50 Ohms from 10 to 40 GHz. Blocking capacitor is optional.	
RF	RF	2.92F	The RF port is DC coupled to ground and AC matched to 50 Ohms from 10 to 40 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), (L -Version)	25	dBm

**Package Information**

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: N	10g
Dimensions	-	11.94 x 11.94 mm

**Recommended Operating Conditions**

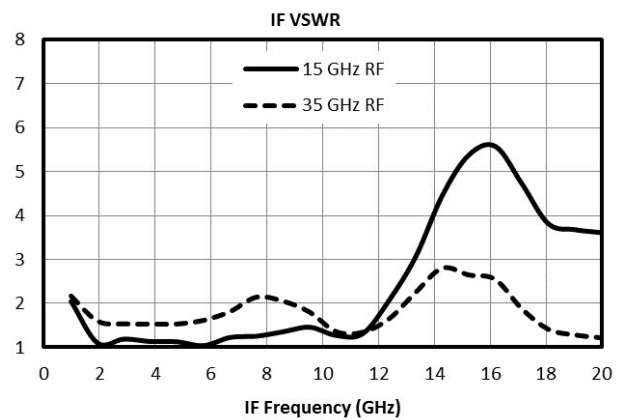
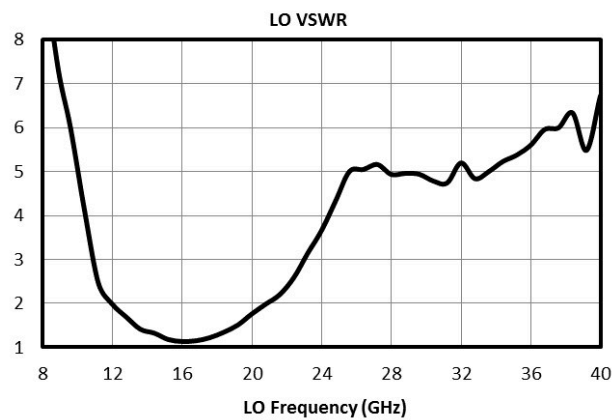
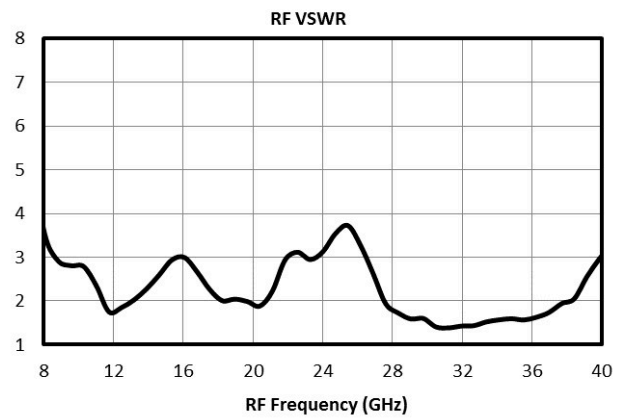
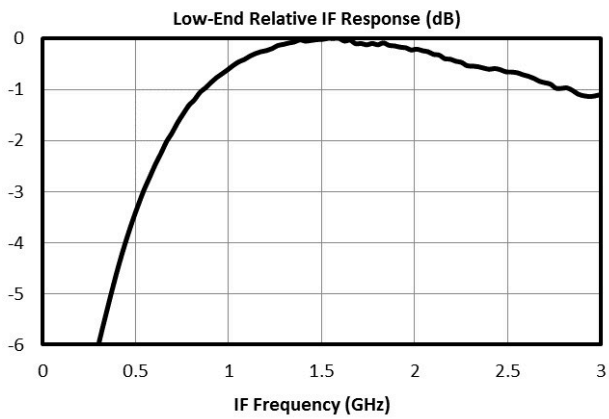
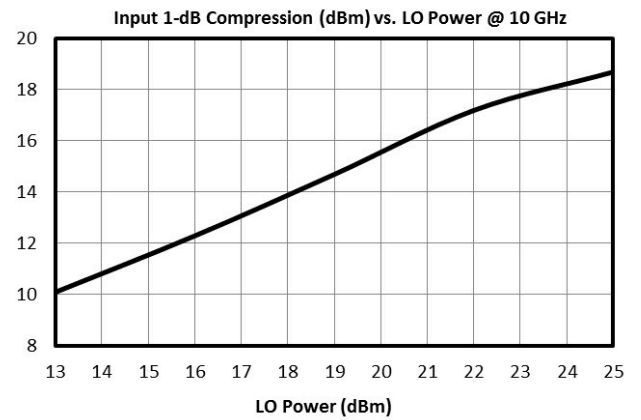
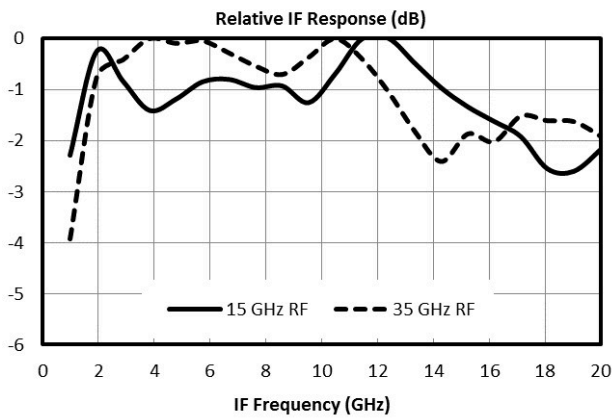
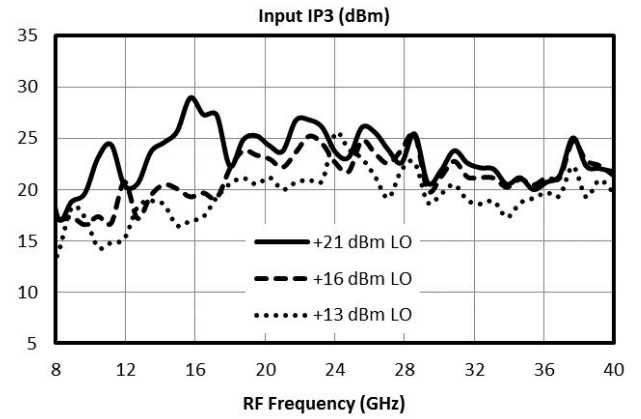
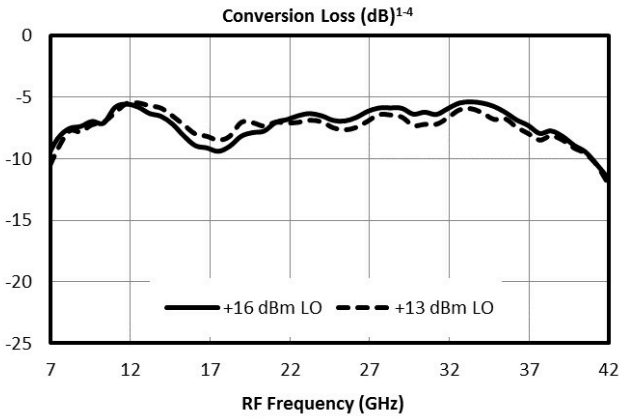
Parameter	Min	Nominal	Max	Unit
LO Input Power	13	-	25	-

**Electrical Specifications**

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

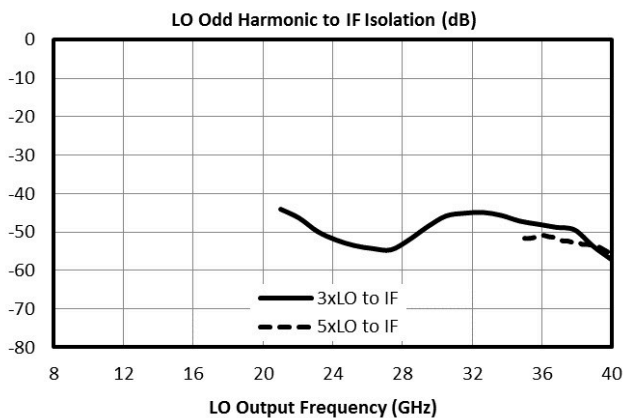
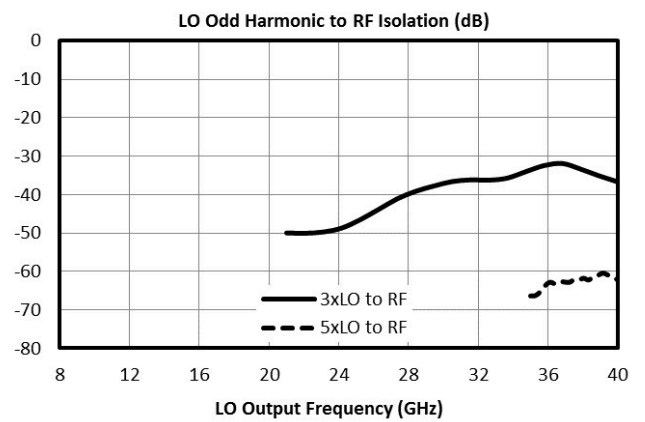
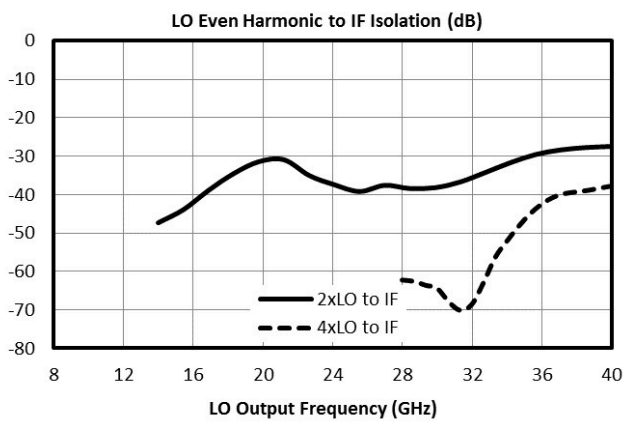
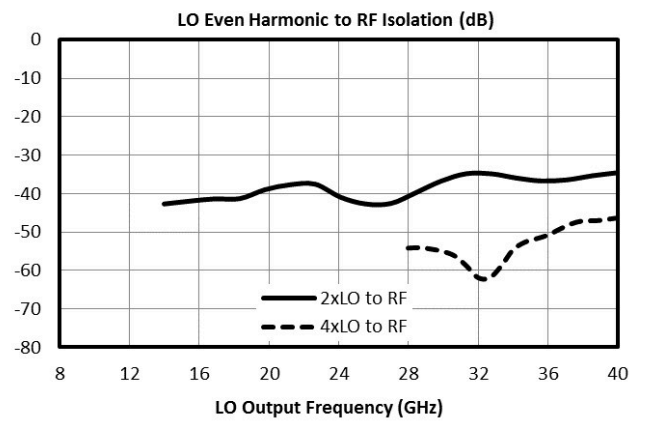
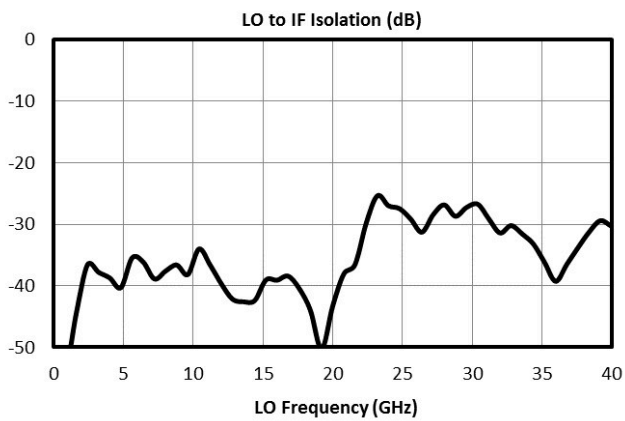
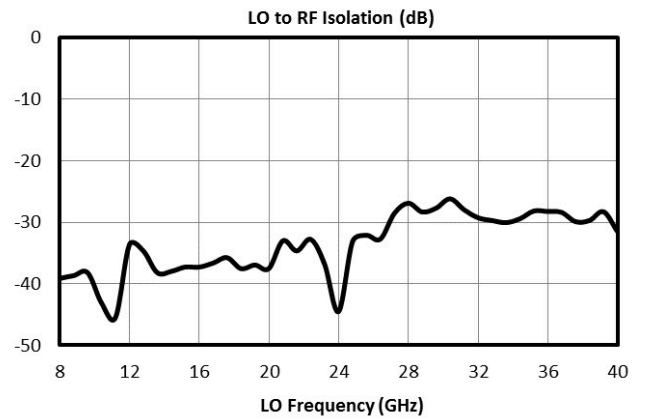
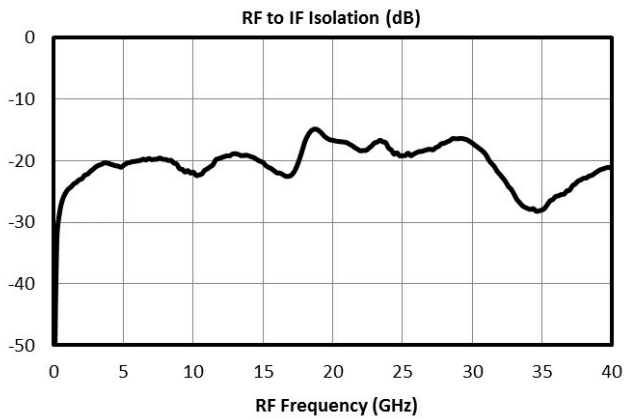
Parameter	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	LO/RF=10-40GHz IF=1-15	-	8	15	dB
Conversion Loss	LO/RF=10-40GHz IF=15-18	-	13	17	dB
IF Frequency Range	-	1	-	18	GHz
LO Frequency Range	-	10	-	40	GHz
RF Frequency Range	-	10	-	40	GHz
Input IP3	-	-	25	-	dBm
Isolation, LO to RF	-	-	32	-	dB

### Typical Performance



# T3-1040GLN

## High-Linearity Triple-Balanced Mixers



**Spur Table**

**Downconversion Spurious Suppression**

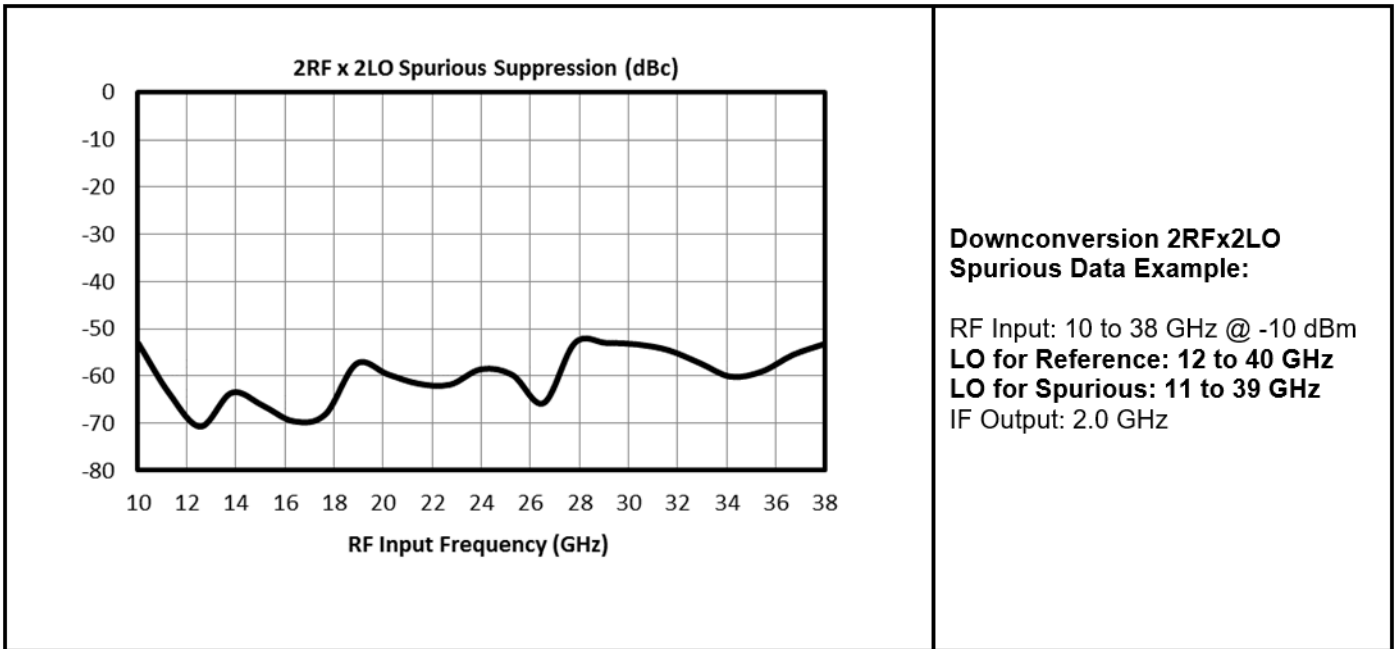
Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the 10 to 40 GHz RF/LO bands, which create a 2.0 GHz IF spurious output. The mixer is swept across the spurious band and the mean is calculated. The numbers shown in the table below are for a -10 dBm RF input. Spurious suppression is scaled for different RF power levels by (n-1), where “n” is the RF spur order. For example, the 2RFx2LO spur is 62 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 72 dBc.

**Typical Downconversion Spurious Suppression (dBc): L-Diode<sup>1</sup>**

<b>-10 dBm RF Input</b>	<b>0xLO</b>	<b>1xLO</b>	<b>2xLO</b>	<b>3xLO</b>	<b>4xLO</b>	<b>5xLO</b>
0xRF	-----	See LO to IF Isolation and LO Harmonic to IF Isolation Plots (Page 3)				
1xRF	13	Reference	23	25	31	18
2xRF	67	62	62	59	61	68
3xRF	98	65	80	73	83	74
4xRF	135	110	113	116	113	114
5xRF	152	130	146	143	138	133

Unless otherwise specified, L-diode data is taken with +20 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 10 to 38 GHz RF input band is the number shown in the table above.



**Upconversion Spurious Suppression**

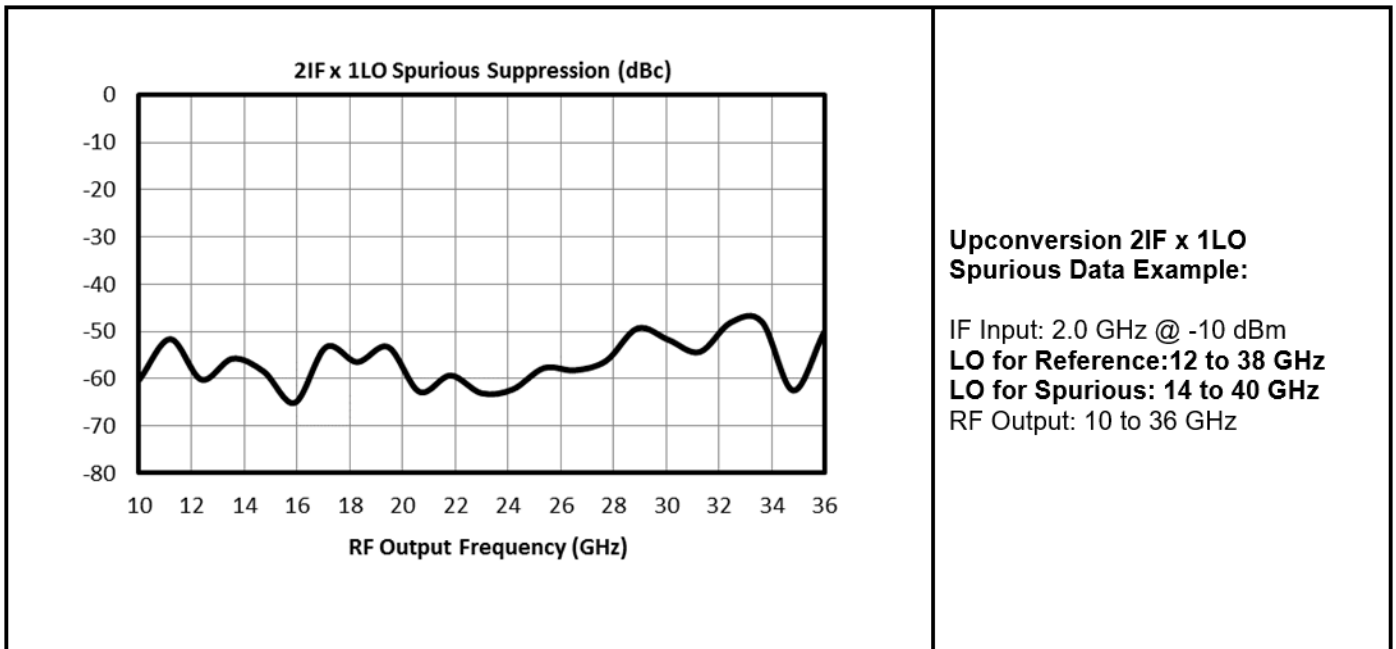
Spurious data is taken by mixing a 2.0 GHz IF with LO frequencies (+mLO+nIF) which create an RF within the 10 to 40 GHz RF band. The mixer is swept across the spurious output band and the mean is calculated. The numbers shown in the table below are for a -10 dBm IF input. Spurious suppression is scaled for different IF input power levels by (n-1), where “n” is the IF spur order. For example, the 2IFx1LO spur is typically 56 dBc for a -10 dBm input, so a -20 dBm IF input creates a spur that is (2-1) x (-10 dB) dB lower, or 66 dBc.

**Typical Upconversion Spurious Suppression (dBc): L-Diode**

<b>-10 dBm IF Input</b>	<b>0xLO</b>	<b>1xLO</b>	<b>2xLO</b>	<b>3xLO</b>	<b>4xLO</b>	<b>5xLO</b>
0xIF	-----	See LO to RF Isolation and LO Harmonic to RF Isolation Plots (Page 3)				
1xIF	11	Reference	20	21	36	22
2xIF	53	56	65	55	75	70
3xIF	70	70	82	74	89	85
4xIF	96	92	112	103	123	125
5xIF	110	104	128	120	139	135

Unless otherwise specified, L-diode data is taken with +20 dBm LO drive.

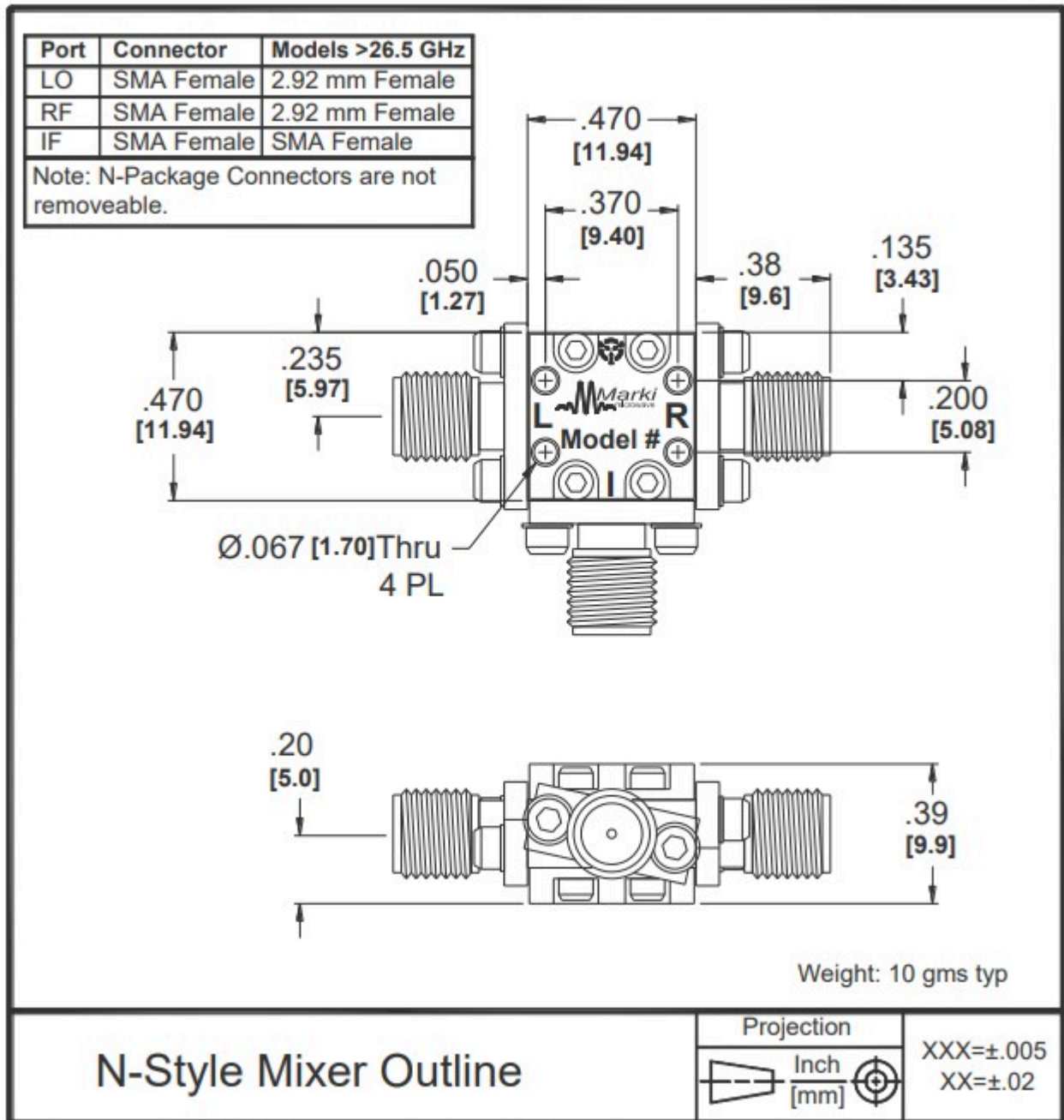
A sample downconversion spurious sweep is shown below. An LO which is 2.0 GHz higher than the RF is used to create a 2.0 GHz reference IF. A second LO is used to create a 2x2 spurious IF, also at 2.0 GHz (1.0 GHz fundamental IF). The difference between these two output levels is the spurious suppression in dBc. The mean value across the 10 to 38 GHz RF input band is the number shown in the table above.



**Mechanical Data**

**Outline Drawing**

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



## Notes

### DATA SHEET 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 +20 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.

## DISCLAIMER

MARKI MICROWAVE, INC., ("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, Inc. All other trademarks used are the property of their respective owners.

© 2021, Marki Microwave, Inc