

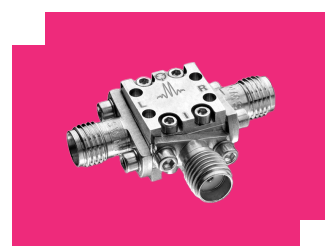
T3-1040GLN

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 REACH REACH	Released	EAR99

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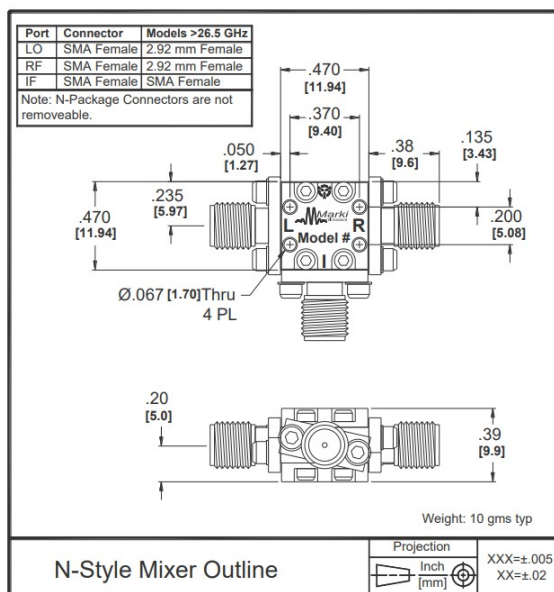
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Revision History

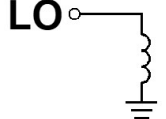
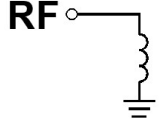
Revision Code	Revision Date	Comment
-	2021-01-01	Datasheet Initial Release

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.	

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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

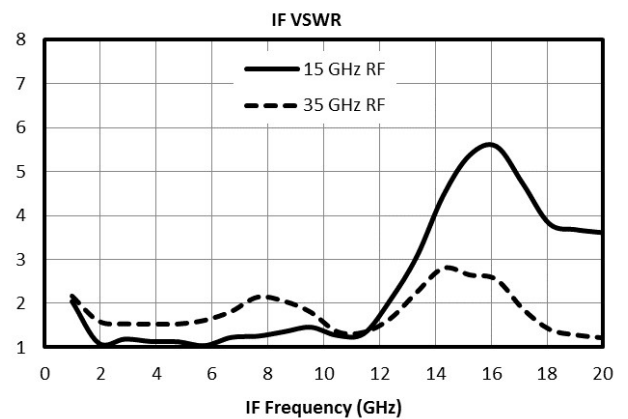
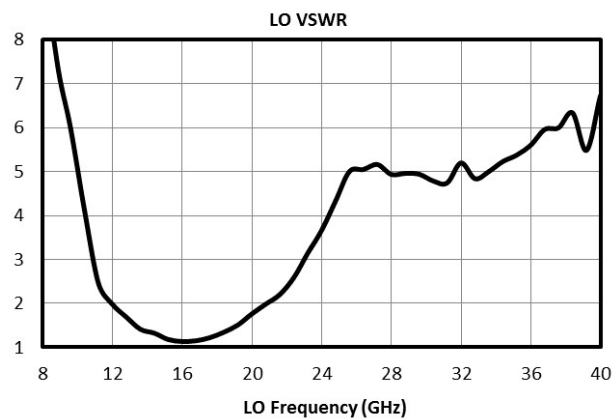
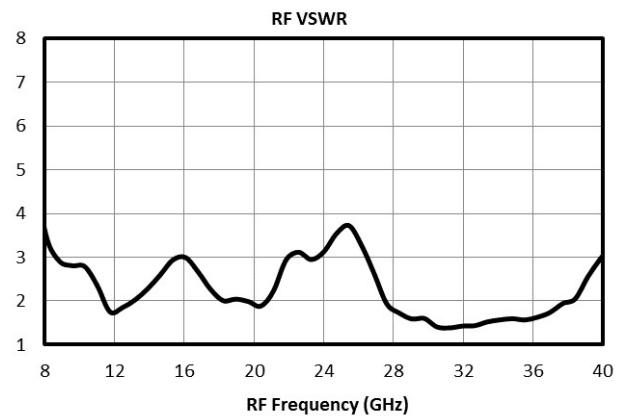
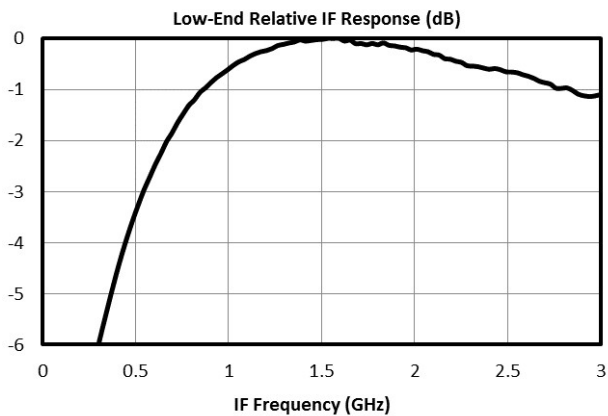
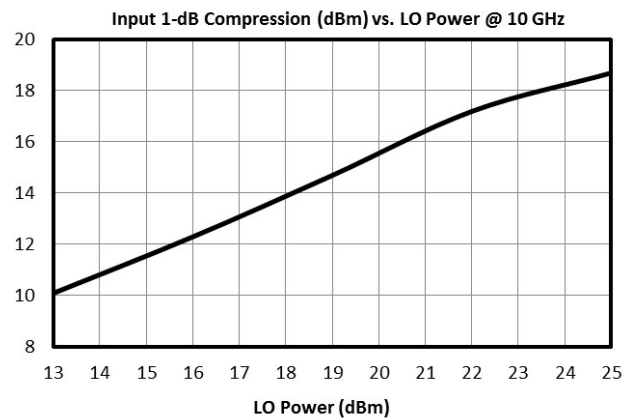
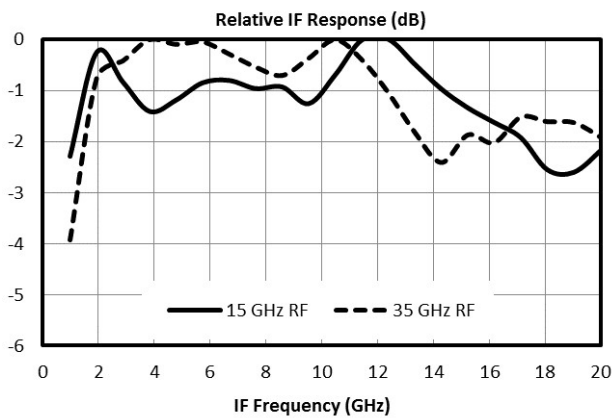
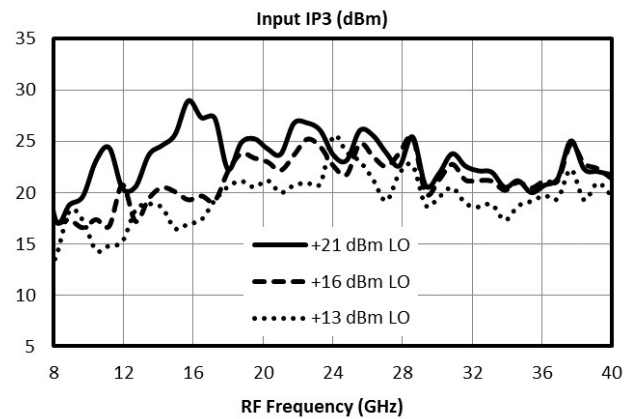
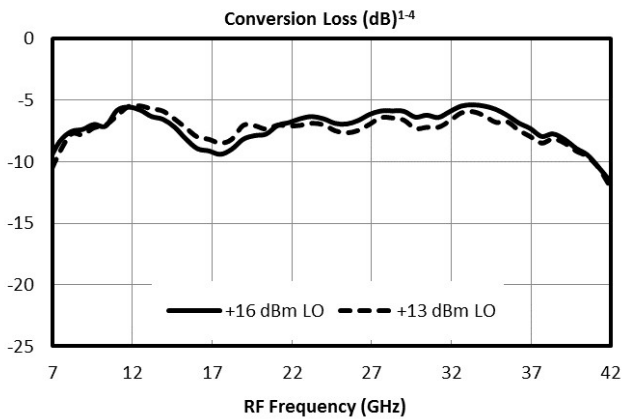
Parameter	Min	Nominal	Max	Unit
LO Input Power	13	-	25	dBm

Electrical Specifications

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

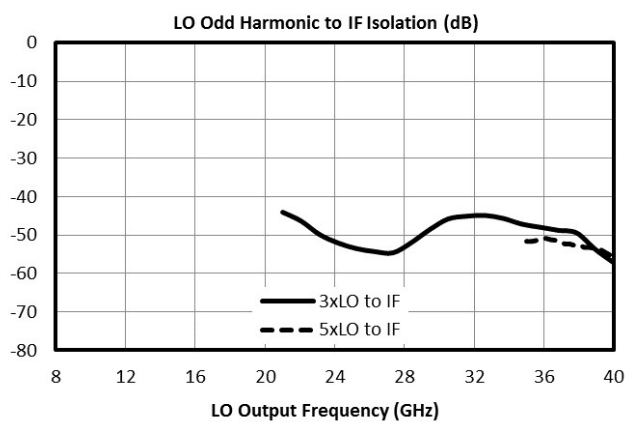
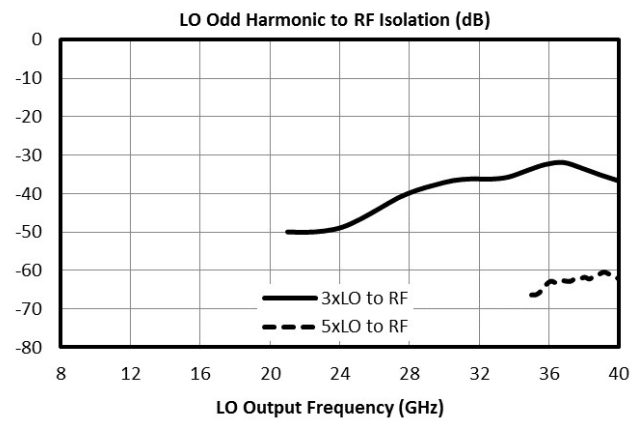
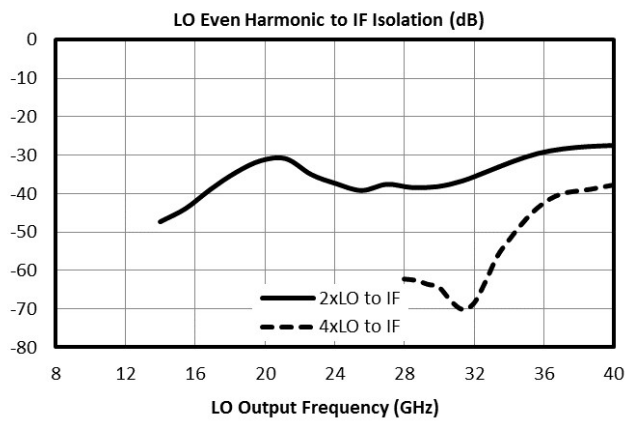
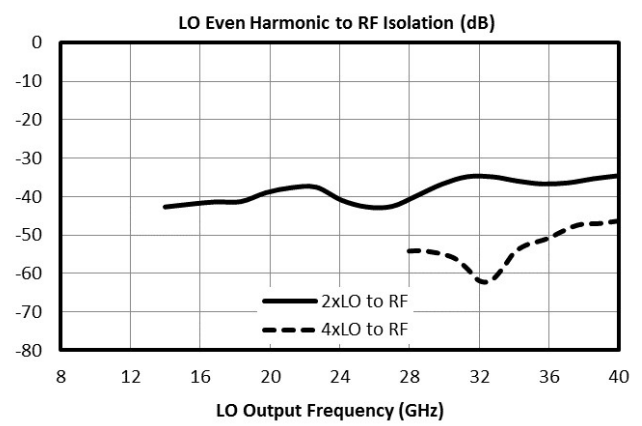
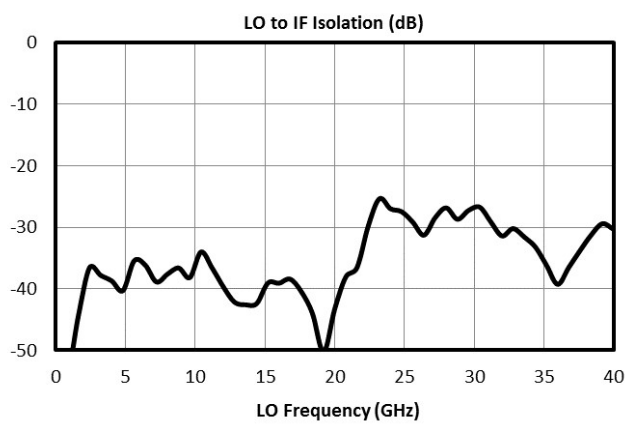
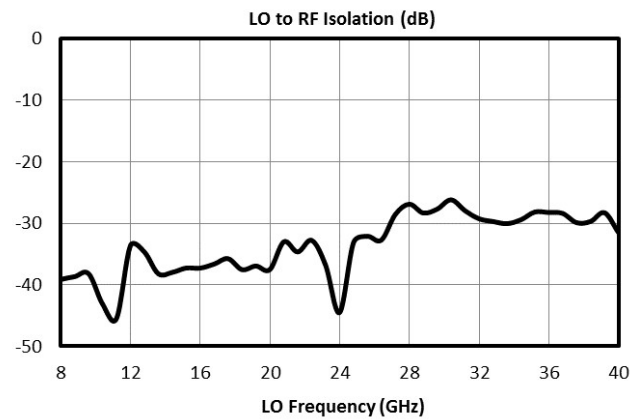
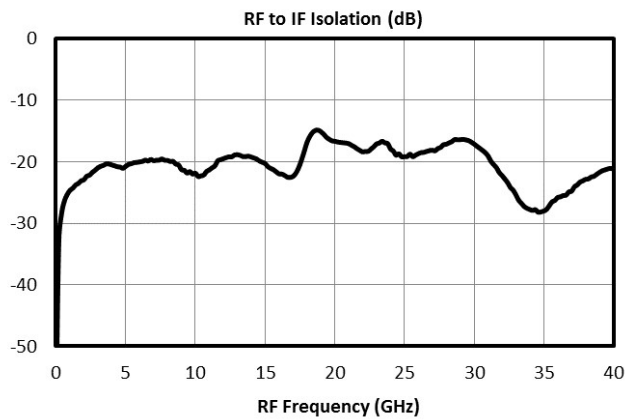
Parameter	Test Conditions	Min	Typ	Max	Unit
RF Frequency Range	-	10	-	40	GHz
LO Frequency Range	-	10	-	4	GHz
Conversion Loss	LO/RF=10-40GHz IF=1-15	-	8	15	dB
Conversion Loss	LO/RF=10-40GHz IF=15-18	-	13	17	dB
Isolation, LO to RF	-	-	32	-	dB
Input IP3	-	-	25	-	dBm
IF Frequency Range	-	1	-	18	GHz

Typical Performance



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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 $2RF \times 2LO$ spur is 62 dBc for a -10 dBm input, so a -20 dBm RF input creates a spur that is $(2-1) \times (-10 \text{ dB})$ dB lower, or 72 dBc.

 T3 1040 Gln Typical Downconversion Spurious Suppression L Diode

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 2×2 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.

 T3 1040 Gln 2 Rf X 2 Lo Spurious Suppression

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 $2IF \times 1LO$ spur is typically 56 dBc for a -10 dBm input, so a -20 dBm IF input creates a spur that is $(2-1) \times (-10 \text{ dB})$ dB lower, or 66 dBc.

 T3 1040 Gln Typical Upconversion Spurious Suppression L Diode

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 2×2 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.

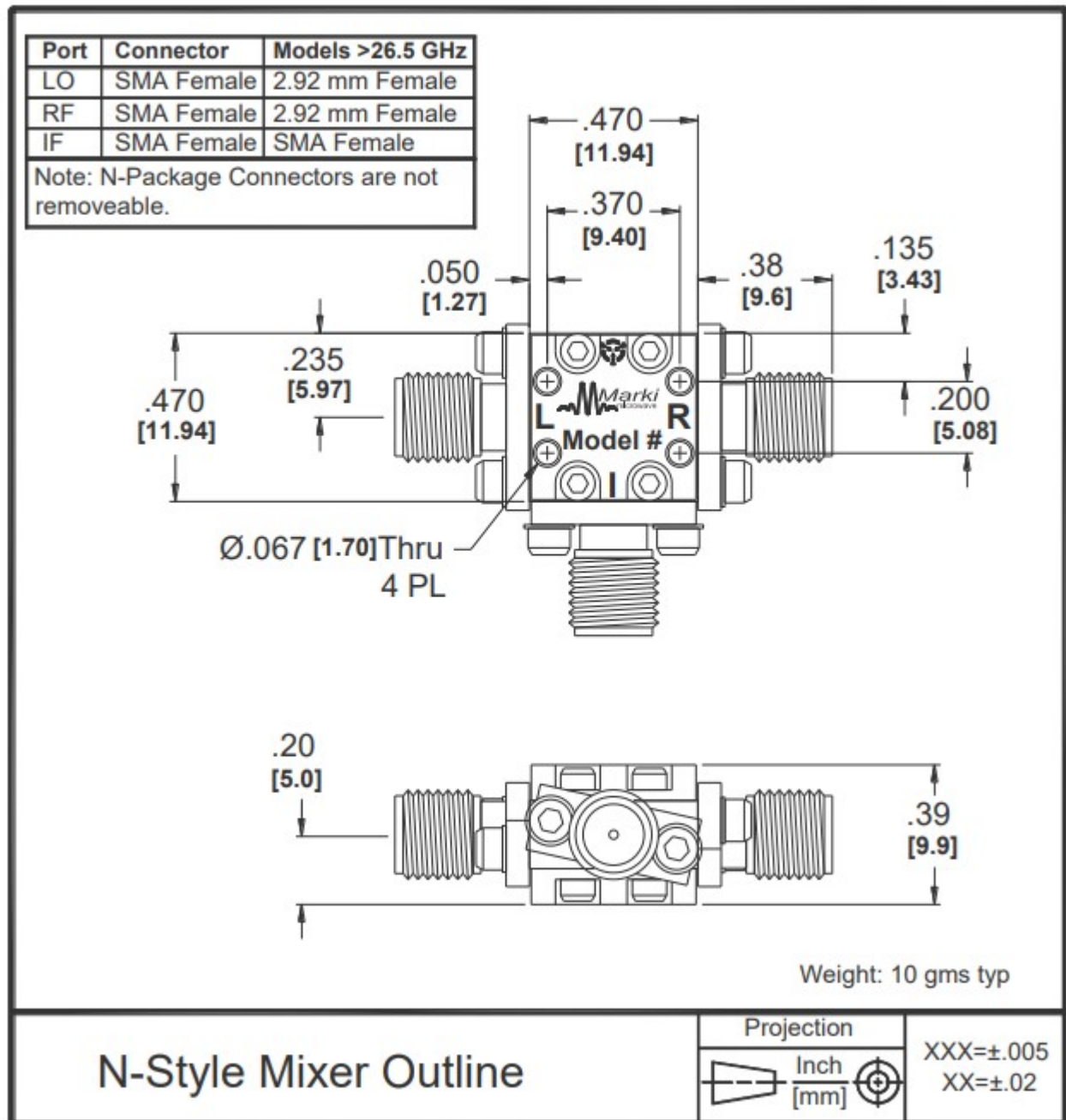
 T3 1040 Gln 2 if X 1 Lo Spurious Suppression

T3-1040GLN

High-Linearity Triple-Balanced Mixers

Mechanical Data

Outline Drawing



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.

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