Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
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General Support: info@markimicrowave.com

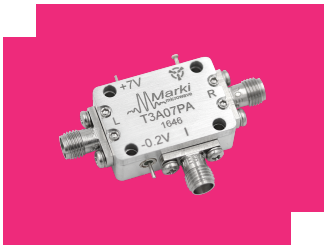
T3A-07PA

Two-Tone-Terminator Mixer/LO-Amplifier

DEVICE OVERVIEW

General Description

The T3A-07PA is a versatile, robust, and broadband Two-Tone-Terminator mixer integrated with a sub 10 ps risetime square wave amplifier. The T3A-07PA employs the most sophisticated mixer on the market today and offers unparalleled performance when compared to all other mixer technologies. The T3A-07PA delivers exceptional IMD suppression with low conversion loss.



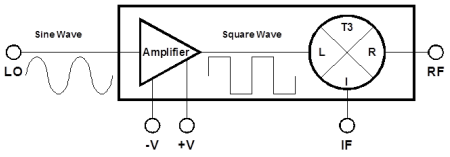
Features

- Ultra-Broadband RF, LO, and IF
- Integrated Square-Wave LO Amplifier
- Industry Leading Spurious, IP3, and P1dB Performance for low LO Drive

Applications

N/A

Functional Block Diagram



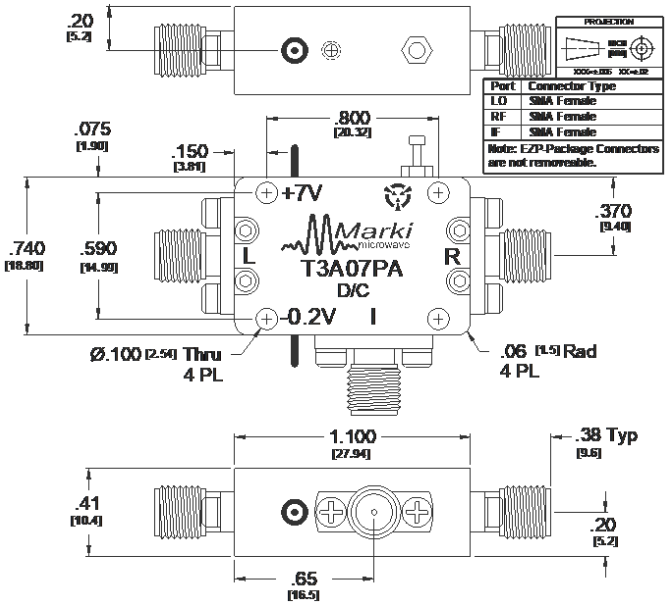
Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
T3A-07PA	Two-Tone-Terminator Mixer/LO-Amplifier	PA	Standard	RoHS REACH REACH	Released	EAR99

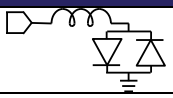
Table Of Contents

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 blocked and AC matched to 50 Ohms from 1 MHz to 4 GHz.	
LO	LO	SMAF	The LO port is DC blocked and AC matched to 50 Ohms from 10 MHz to 7 GHz.	
RF	RF	SMAF	The RF port is DC short to ground and AC matched to 50 Ohms from 10 MHz to 7 GHz. Blocking capacitor is optional.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
LO Power Handling	17	dBm
Maximum Operating Temperature	70	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	0	°C
Minimum Storage Temperature	-65	°C
RF DC Current	1	Amp
RF Power Handling	25	dBm

Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Dimensions	-	20.32 x 18.80 mm

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	10	-	15	dBm

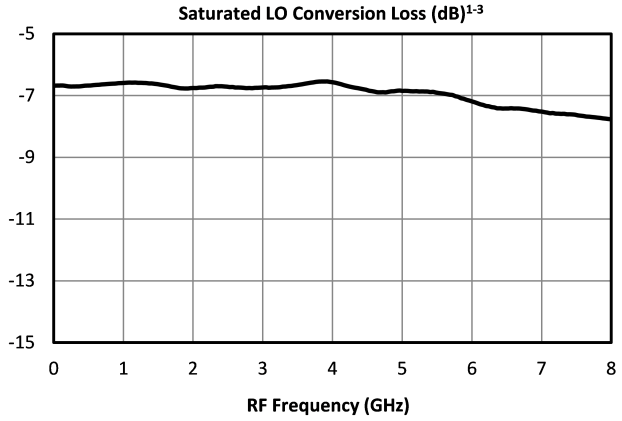
Electrical Specifications

Specifications guaranteed from 0 to +70°C, measured in a 50Ω system.

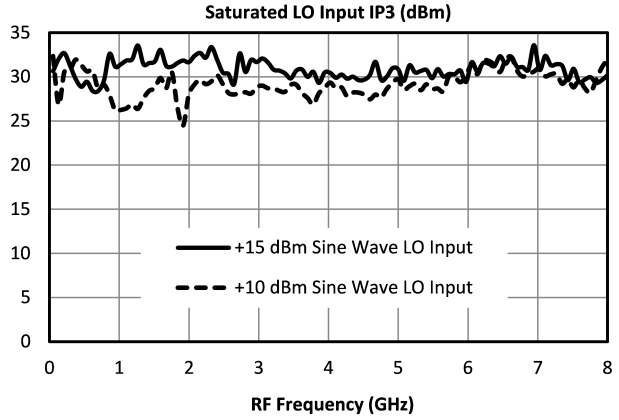
Parameter	Test Conditions	Min	Typ	Max	Unit
RF Frequency Range	-	0.01	-	7	GHz
LO Frequency Range	-	0.01	-	7	GHz
Conversion Loss	LO/RF=0.01-7 GHz IF=.001-0.5 GHz	-	6.5	9	dB
Conversion Loss	LO/RF=0.01-7 GHz IF=.001-4.0 GHz	-	8	10.5	dB
Input IP3	-	-	31	-	dBm
Bias Requirements (+7 V max) 0 to -0.2 Volts DC	-	-	-	0.5	mA
Bias Requirements (mA) +5.0 Volts DC	-	-	250	300	mA
IF Frequency Range	-	0.001	-	4	GHz
LO Drive Level (Square wave)	-	10	-	15	dBm
Input 1 dB Compression	LO/RF=0.01-7 GHz	-	16	-	dBm

Typical Performance Plots

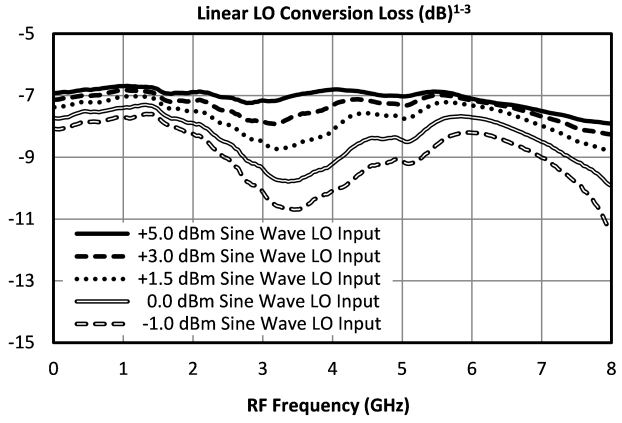
Saturated LO Conversion Loss (dB)[1-3]



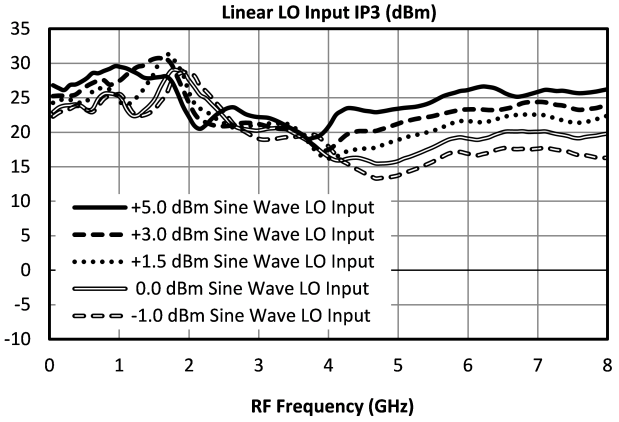
Saturated LO Input IP3 (dBm)



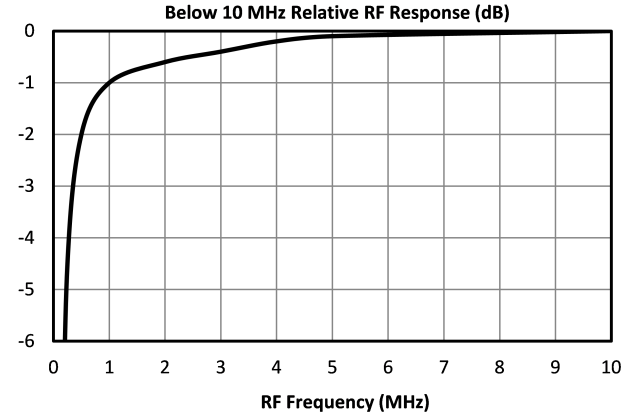
Linear LO Conversion Loss (dB)[1-3]



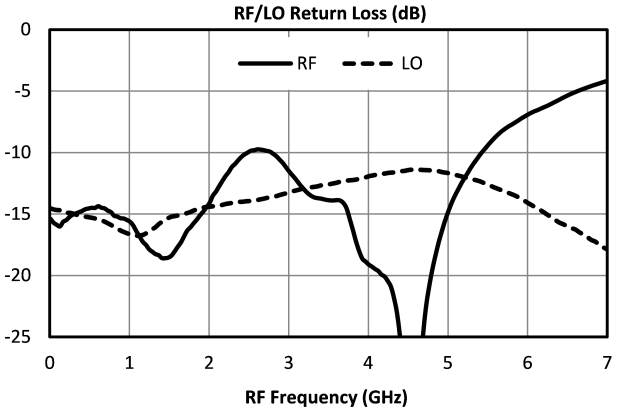
Linear LO Input IP3 (dBm)



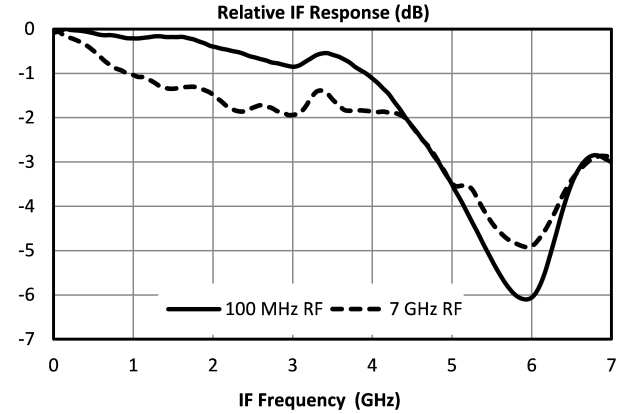
Below 10 MHz Relative RF Response (dB)



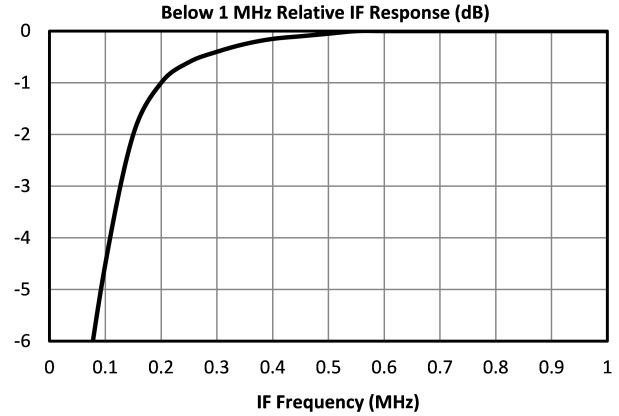
RF/LO Return Loss (dB)



Relative IF Response (dB)



Below 1 MHz Relative IF Response (dB)



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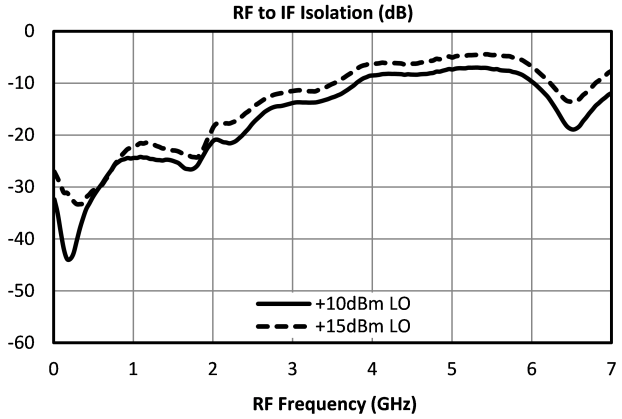
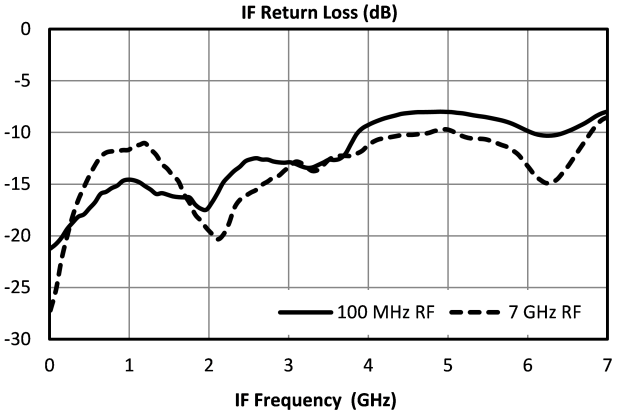
Two-Tone-Terminator Mixer/LO-Amplifier

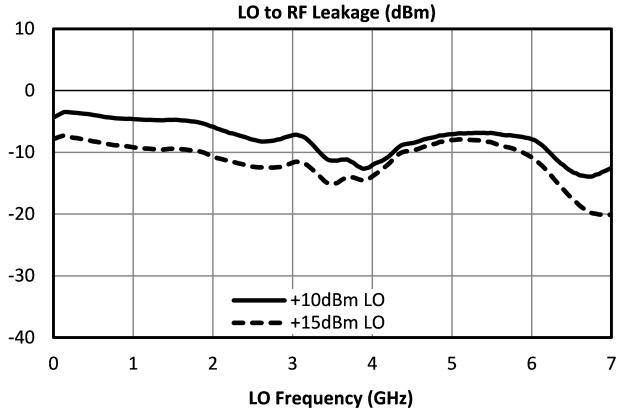
RF to IF Isolation (dB)



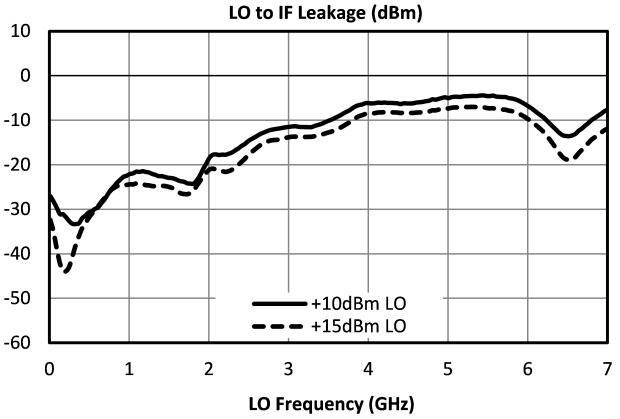
IF Return Loss (dB)



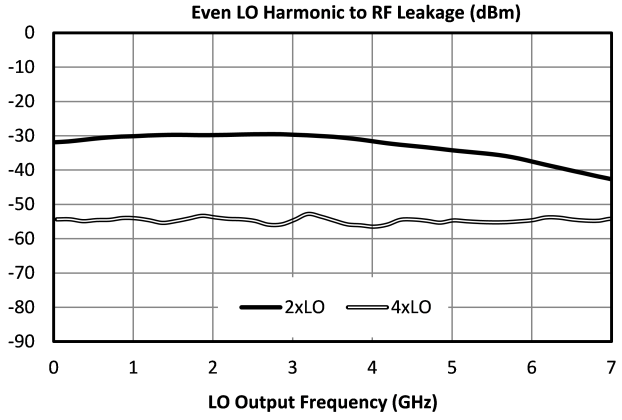
LO to RF Leakage (dBm)



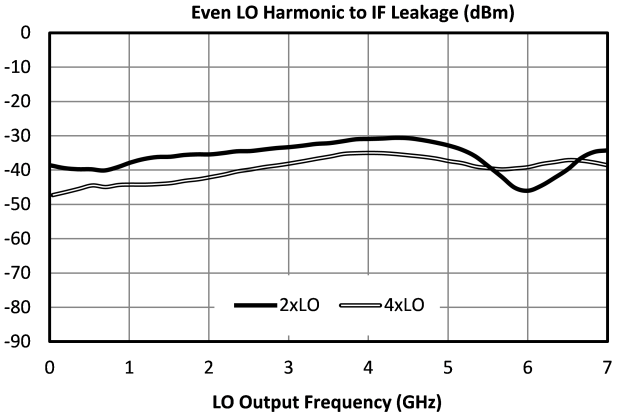
LO to IF Leakage (dBm)



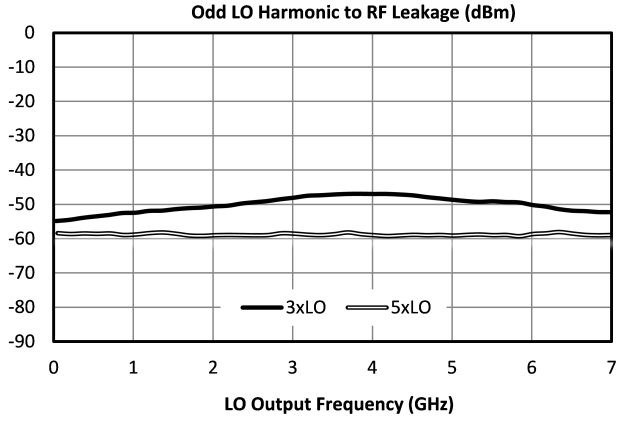
Even LO Harmonic to RF Leakage (dBm)



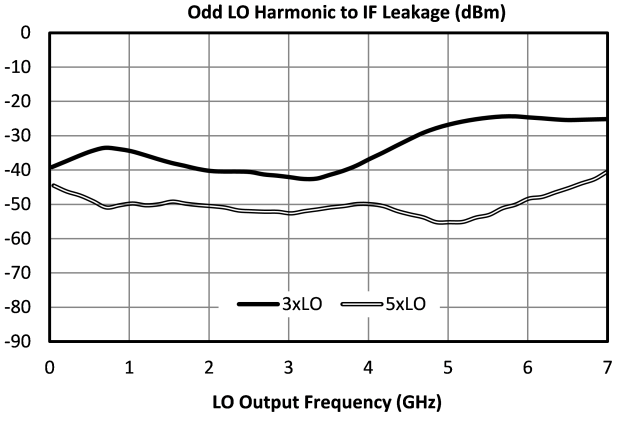
Even LO Harmonic to IF Leakage (dBm)



Odd LO Harmonic to RF Leakage (dBm)



Odd LO Harmonic to IF Leakage (dBm)



Spur Table

Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (+mLO+nRF) within the 10 MHz to 7 GHz RF/LO bands, which create a 100 MHz 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 65 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 75 dBc.

A sample downconversion spurious sweep is shown below. An LO 100 MHz higher than the RF is used to create a 100 MHz reference IF. A second LO is used to create a 2x2 spurious IF, also at 100 MHz (50 MHz fundamental IF). The difference between these two output levels is the spurious suppression in dBc. The mean value across the full 10 MHz to 7 GHz RF input band is the number shown in the table above.

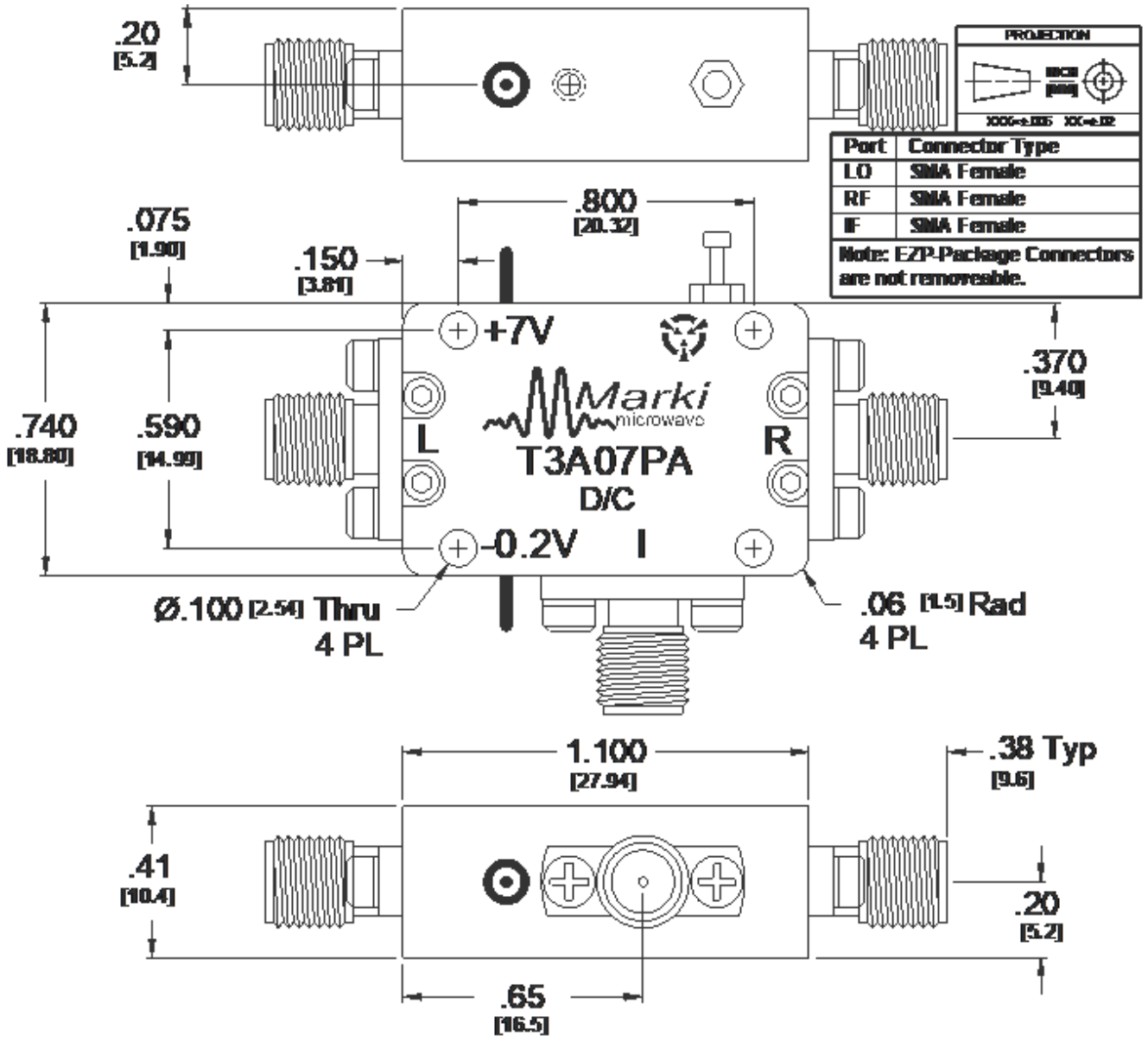
Upconversion Spurious Suppression

Spurious data is taken by mixing a 100 MHz IF with LO frequencies (+mLO+nIF), which creates an RF within the 10 MHz to 7 GHz RF 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 74 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 84 dBc.

A sample upconversion spurious sweep is shown below. A 100 MHz reference IF input is used to create an RF output that is 100 MHz below the LO input (LO-IF=RF). A second LO (100 MHz higher) is combined with the same 100 MHz IF input (LO-2xIF=RF) to create the same 10 MHz to 7 GHz RF output band. The difference between these two output levels is the spurious suppression in dBc. The mean value across the full RF output band is the number shown in the table above.

Mechanical Data

Outline Drawing



Notes

DATA SHEET 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 at +100°C and improves less than 0.5 dB at -55°C.

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

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