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

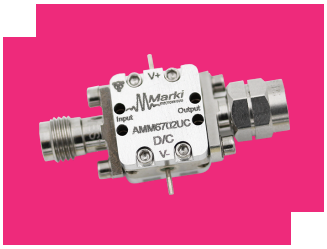
AMM-6702UC

20-55 GHz GaAs LO Driver Amplifier

DEVICE OVERVIEW

General Description

The AMM-6702 is a broadband MMIC LO buffer amplifier that efficiently provides high gain and output power over a 20-55 GHz frequency band. It is designed to provide a strong, flat output power response when driven with an input power at 0 dBm. It has built-in DC blocking capacitors on the input and output.



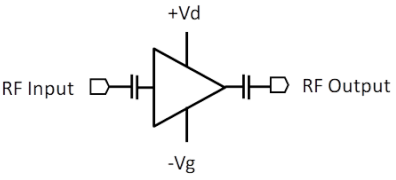
Features

- High 25+ dB gain
- Broadband performance
- +20 dBm output power
- 20%+ PAE

Applications

- SATCOM
- 5G
- Radar
- Optimal LO driver amp for Marki S-diode and H-diode mixers and millimeter-wave multipliers
- Test and Measurement Equipment

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
AMM-6702UC5	20-55 GHz GaAs LO Driver Amplifier	UC5	Standard	REACH RoHS	Released	EAR99
AMM-6702UC	20-55 GHz GaAs LO Driver Amplifier	UC	Standard	REACH RoHS	Released	EAR99

Table Of Contents

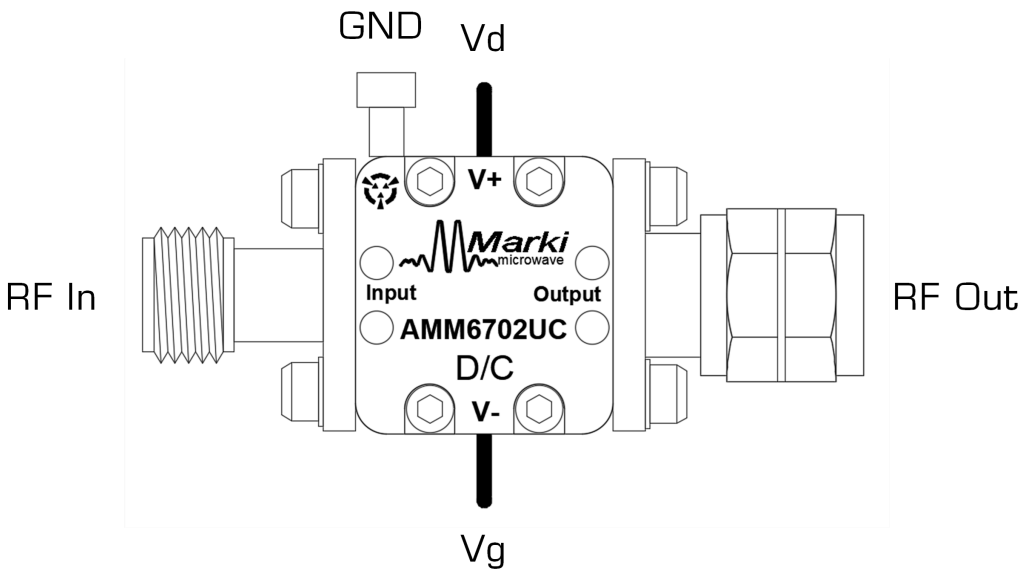
Revision History

Revision Code	Revision Date	Comment
-	2018-10-01	Datasheet Initial Release
A	2019-01-01	AMM-6702UC Release, additional data
B	2019-02-01	Updated Export Classification
C	2019-03-01	Updated Module Production Specs
D	2019-08-01	Updated Module Production Specs
E	2019-09-01	Updated Absolute Maximum Ratings
F	2020-01-01	Added .s2p Files Link
G	2020-02-01	Updated Datasheet Format, Expanded Performance Plots, Expanded Electrical Specs, Added Sequencing Procedure, Added AMM-6702UC5 Package
H	2020-04-01	Updated AMM-6702UC5 Specs and Performance Plots
I	2020-06-01	Corrected AMM-6702UC Outline Drawing to include Ground Screw
J	2020-06-01	Updated Absolute Maximum Ratings
L	2020-07-01	Revised Max Operating Temperature
K	2020-07-01	Update AMM-6702UC5 Saturated Output Power Min Spec
M	2020-09-01	Updated Ground Pin Location on AMM 6702UC5 Module
N	2020-10-01	Updated Thermal Specs, Updated OIP3 Spec
O	2020-11-01	Updated Min Frequency Spec
P	2020-12-01	Updated Electrical Specifications Table
Q	2023-11-07	Updated maximum power dissipation, indicating typical operation
R	2024-07-26	Reduced Power Supply Voltage to 3V
S	2026-02-13	MTTF Table Added.

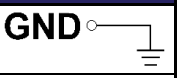
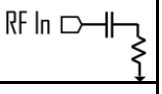
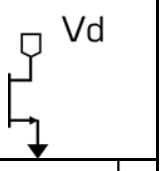
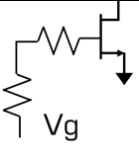
Port Configuration and Functions

Port Diagram

A top-down view of the AMM-6702UC's outline drawing is shown below. The port functions are detailed below.



Port Functions

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	Exterior housing must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	
RF In	RF Input	1.85F	This is the RF Input port of the amplifier die. It is internally DC blocked and RF matched to 50 Ω.	
RF Out	RF Output	1.85M	This is the RF Output port of the amplifier die. It is internally DC blocked and RF matched to 50 Ω.	
Vd	Drain Supply Pin	-	The Vd pin supplies drain voltage to the amplifier IC. Apply gate voltage Vg before applying drain voltage.	
Vg	Gate Supply Pin	-	The Vg pin supplies negative control voltage to the amplifier and controls the amplifier gain. Lower (more negative) voltages on a Vg pad will result in lower drain current and lower small signal gain.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Continuous Power Dissipation (PDISS)	1.2	W
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	150	°C
Minimum Operating Temperature	-40	°C
Minimum Storage Temperature	-65	°C
Negative Bias Current (Pin 4)	10	µA
Negative Bias Voltage (Pin4)	-2	V
Positive Bias Current (Pin1) [1]	400	mA
Positive Bias Voltage (Pin1)	4.5	V
RF Input Power	22	dBm

Maximum Continuous Power Dissipation indicates power that will maintain an MTTF > 1E6 hours under typical operating conditions at max operating temperature. Specific use cases may differ, contact support for more detailed information.

[1] Maximum current draw is 400 mA when not limited by continuous power dissipation rating

FIT and MTTF Table

T (°C)	λ (TIF)	MTTF (hr)	MTTF (yr)
105	2,441.45	4.10E+05	47
85	310.48	3.22E+06	368
55	8.79	1.14E+08	12,992
25	0.12	8.24E+09	941,063

Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Weight	Package name: UC	12.3g
Dimensions	-	13.21 x 14.21 mm

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications. Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the Electrical Specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Ambient Temperature	-55	25	85	°C
Positive DC Current	100	180	350	mA
Negative DC Voltage	-0.4	-0.5	-0.6	V
Positive DC Voltage	2	3	3	V

Sequencing Requirements

Turn-on Procedure:
1. Apply <-0.4V to Vg (Pin 4)
2. Apply Vd (Pin 1)

Turn-off Procedure:
1. Turn off Vd (Pin 1)
2. Turn off Vg (Pin 4)

Electrical Specifications

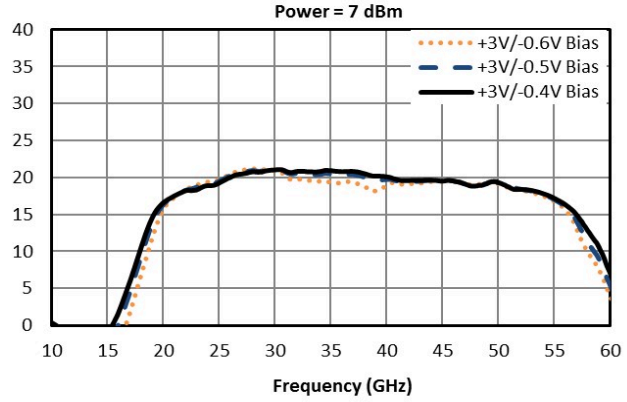
The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Current Consumption [1]	3V/-0.5V	-	-	-	180	-	mA
Input IP3	3V/-0.5V bias, -25 dBm Input Power	21	55	-	3	-	dBm
Input Power for Saturation	3V/-0.5V bias	21	55	-	3	-	dBm
Input Return Loss	3V/-0.5V bias	21	55	-	8	-	dB
Noise Figure	3V/-0.5V bias	21	55	-	6.5	-	dB
Output IP3	3V/-0.5V bias, -25 dBm Input Power	21	55	-	27	-	dBm
Output P1dB	3V/-0.5V bias	21	55	-	14.8	-	dBm
Output Return Loss	3V/-0.5V bias	21	55	-	9	-	dB
Reverse Isolation	3V/-0.5V bias	21	55	-	45	-	dB
Saturated Output Power	3.0V/-0.5V Bias	21	55	-	19	-	dBm
Small Signal Gain	3.0V/-0.5V Bias	21	55	-	24	-	dB

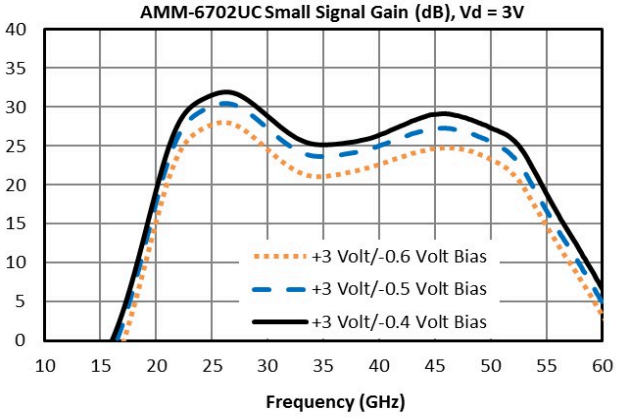
[1] Bias conditions tested with no RF input power. See section 3.6 for DC current vs. RF power

Typical Performance Plots

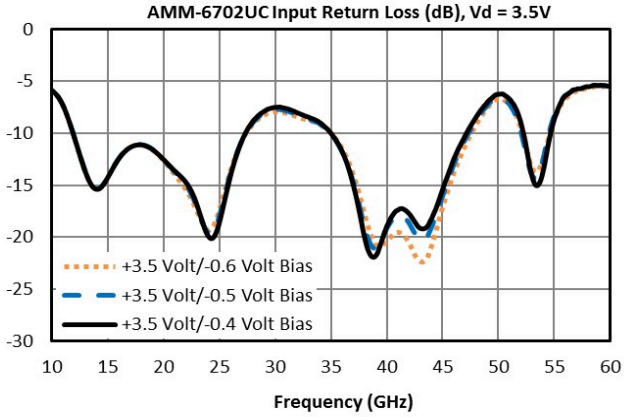
AMM-6702UC Saturated Output Power (dBm), Vd = 3V, Input Power = 7 dBm



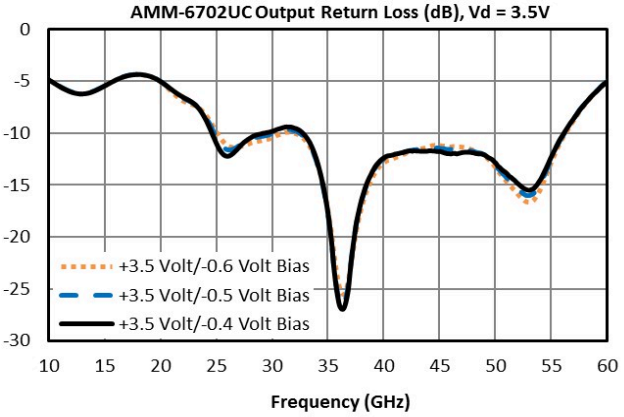
AMM-6702UC Small Signal Gain (dB), Vd = 3V



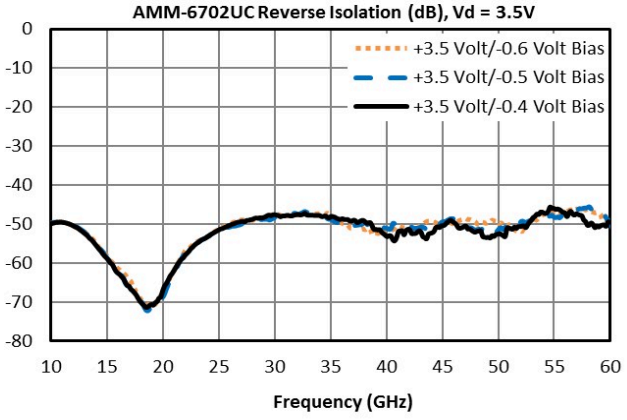
AMM-6702UC Input Return Loss (dB), Vd = 3.5V



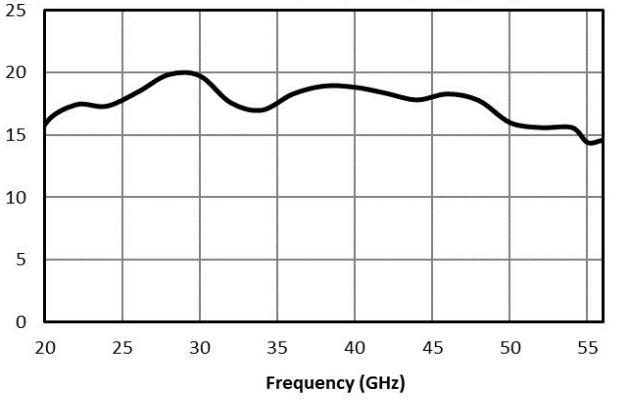
AMM-6702UC Output Return Loss (dB), Vd = 3.5V



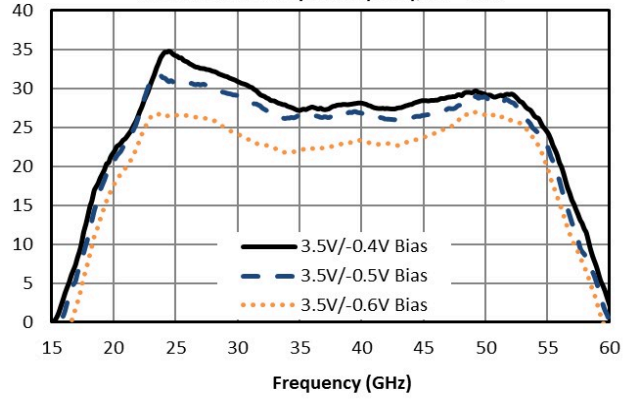
AMM-6702UC Reverse Isolation (dB), Vd = 3.5V



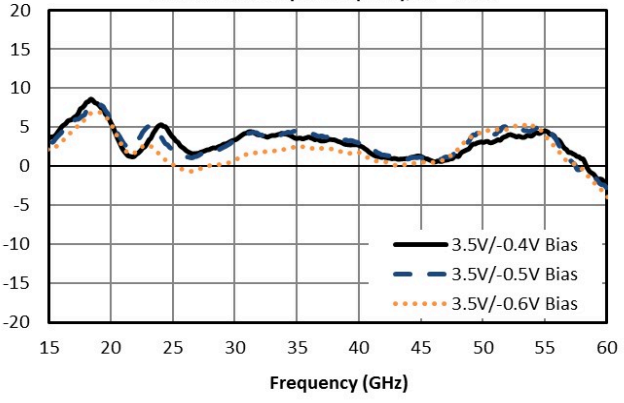
AMM-6702UC P1dB (dBm) vs Frequency, 3.5V/-0.5V

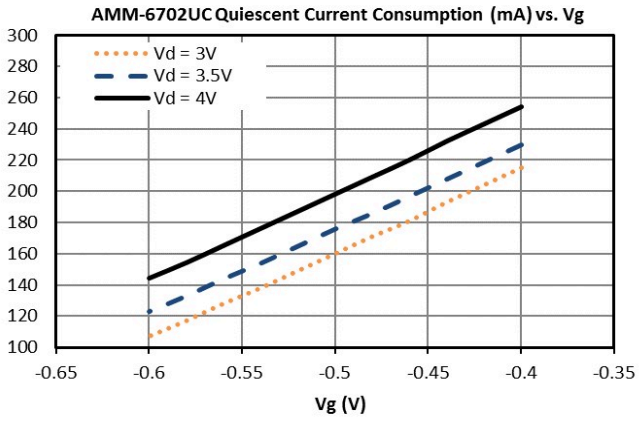


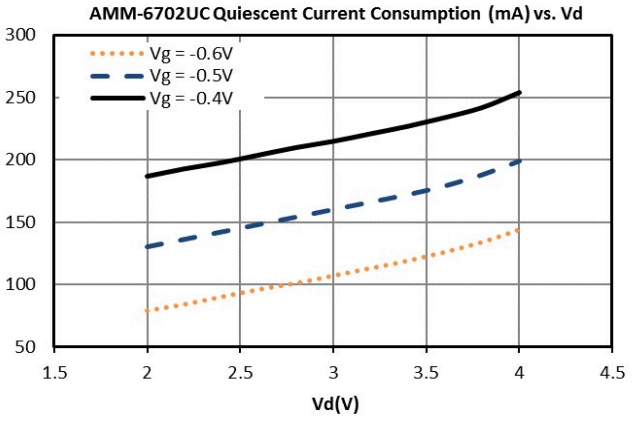
AMM-6702UC Output IP3 (dBm), Vd = 3.5V

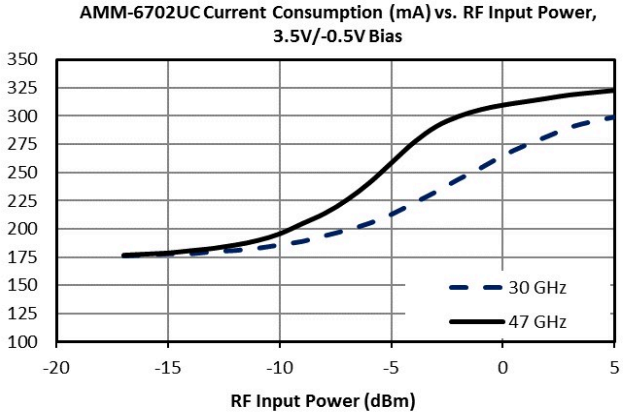


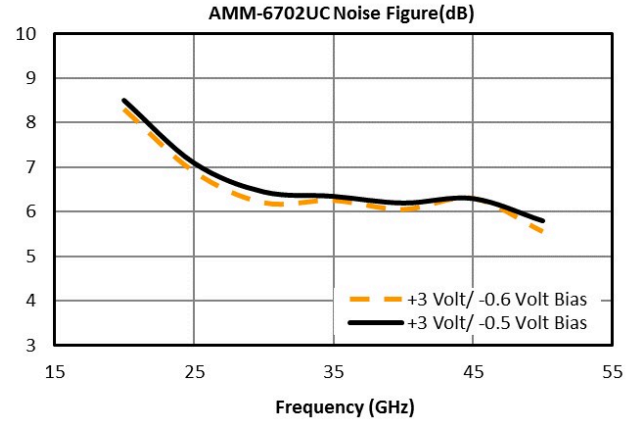
AMM-6702UC Input IP3 (dBm), Vd = 3.5V





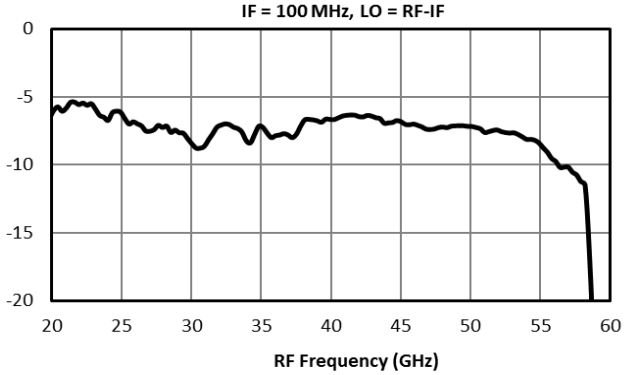




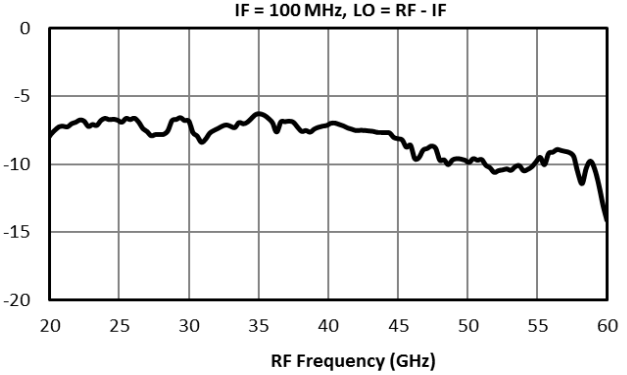


Conversion Loss of Marki Mixers Using AMM-6702UC as LO Driver

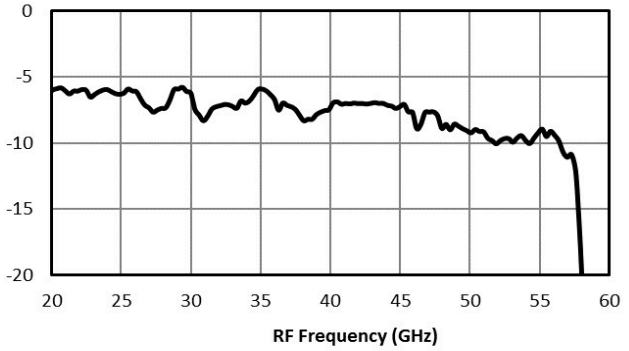
Conversion Loss of Marki MM1-1857H Mixer using AMM-6702UC as LO Driver Amplifier (dB), 3.5V/-0.4V Bias Condition, 3dBm Input, IF = 100 MHz, LO = RF-IF



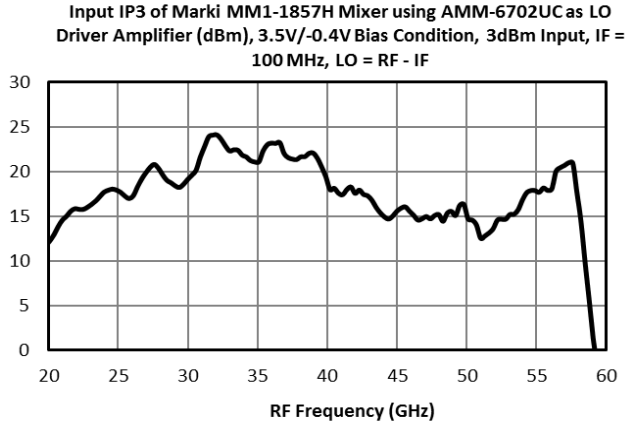
Conversion Loss of Marki MMIQ-1865L Mixer using AMM-6702UC as LO Driver Amplifier (dB), 3.5V/-0.4V Bias Condition, 3dBm Input, IF = 100 MHz, LO = RF - IF

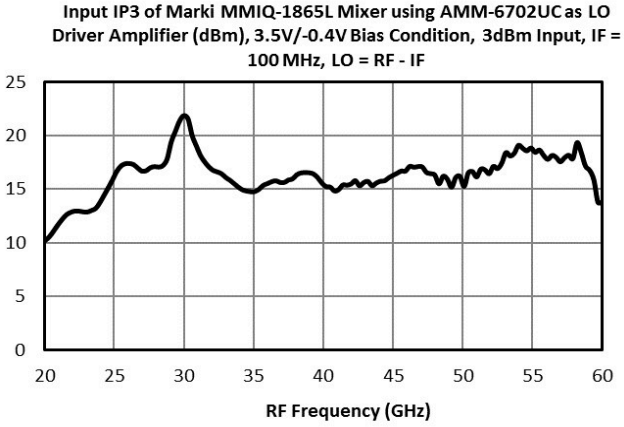


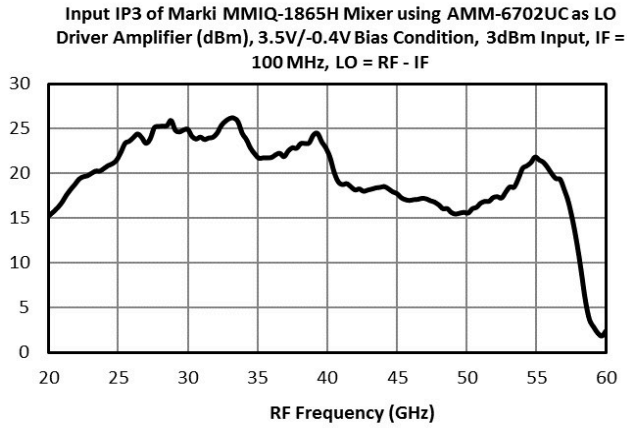
Conversion Loss of Marki MMIQ-1865H Mixer using AMM-6702UC as LO Driver Amplifier (dB), 3.5V/-0.4V Bias Condition, 3dBm Input, IF = 100 MHz, LO = RF-IF



Input-Referred IP3 of Marki Mixers Using AMM-6702UC as LO Driver



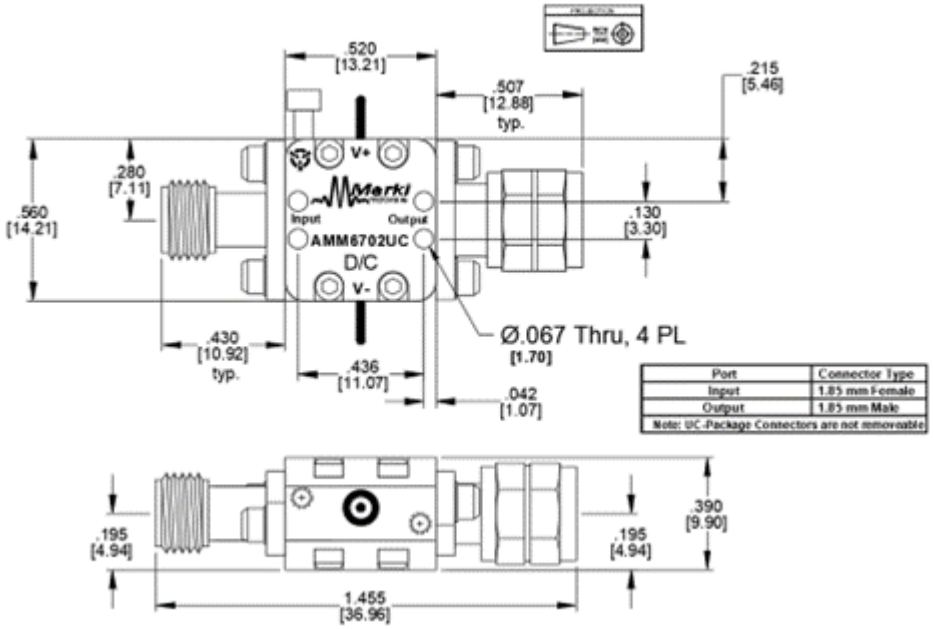




Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP



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