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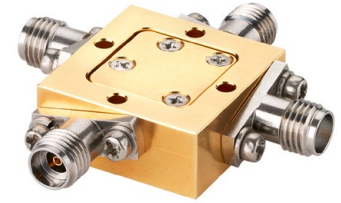
IQ Mixer

ZMIQ-143H-S+

50Ω Level 18 (LO Power +18 dBm) 5 to 14 GHz SMA Female

THE BIG DEAL

- Wideband RF & LO, 5 to 14 GHz
- Wideband IF, DC to 3 GHz, operational up to 7 GHz
- Excellent Image Rejection, Typ. 28 dB
- Excellent Side Band Suppression, Typ. 30 dB
- High Input IP3, Typ. +25 dBm
- Usable as Image Reject Mixer & SSB Converter
- Small Size with SMA connectors on all Ports

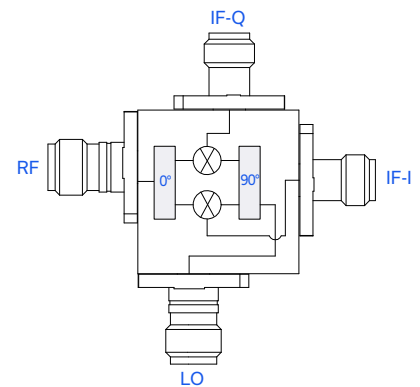


Generic photo used for illustration purposes only

APPLICATIONS

- Test and Measurement Equipment
- Back Haul Radio
- Satellite Communications
- Radar, EW, and ECM Defense Systems

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The ZMIQ-143H-S+ is a passive wideband in-phase/quadrature (I/Q) mixer utilizing Mini-Circuits' own GaAs HBT device, the [SMIQ-5143H+](#). This mixer can be used as a single-sideband upconverter for transmission or as an image rejection mixer for receiving applications. It is particularly well-suited for wideband uses that demand inherent image signal rejection and suppression of undesired sidebands. The mixer covers a broad band with an RF and LO frequency range of 5 to 14 GHz and an IF frequency range of DC to 3 GHz (operational up to 7 GHz). As a passive mixer, the ZMIQ-143H-S+ offers a lower noise figure than active mixers, enabling superior dynamic range for high performance applications. The mixer is housed in a compact, rugged package with SMA coaxial connections. This model also serves as an excellent evaluation module for the [SMIQ-5143H+](#).

KEY FEATURES

Feature	Advantages
High Image Rejection, 28 dB typ. High Side Band Suppression, 30 dB typ.	Provides inherent rejection of unwanted image signals and suppression of undesired side band without the need for external filtering.
High Isolation, • LO-RF, 40 dB typ. • LO-IF, 42 dB typ.	Enables excellent carrier rejection in single-sideband upconverter transmit applications. Minimizes filtering required to ensure signal integrity.
Wide Bandwidth, 5 to 14 GHz	Useful in wideband systems or in reconfigurable narrowband systems across multiple bands with minimal component changes.
Wide IF Bandwidth, DC to 3 GHz	Enables the use of high IF conversion to reduce filtering requirements. IF operation as low as DC enables use in phase detector applications.

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ELECTRICAL SPECIFICATIONS¹ AT +25°C, Z₀ = 50Ω, LO POWER = +18 dBm, UNLESS OTHERWISE NOTED.

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
RF Frequency Range		5		14	GHz
LO Frequency Range		5		14	GHz
IF Frequency Range		DC		3 ²	GHz
LO Power		+17	+18	+20	dBm
Conversion Loss ³	5 - 8		7.2	9.0	dB
	8 - 14		8.5	11.5	
Amplitude Unbalance	5 - 8		±0.1	±0.6	dB
	8 - 14		±0.2	±1.5	
Phase Unbalance (Relative to 90°)	5 - 8		1.5	7.5	Degree
	8 - 14		4.5	12.5	
Image Rejection ⁴ (Tested as a Downconverter)	5 - 8		22.0		dBc
	8 - 14		25.0		
Single Sideband Rejection ⁵ (Tested as an Upconverter)	5 - 8		30.0		dBc
	8 - 14		30.0		
LO-RF Isolation	5 - 8	33.0	40		dB
	8 - 14	32.5	40		
LO-I Isolation	5 - 8	30.0	40		dB
	8 - 14	30.0	45		
LO-Q Isolation	5 - 8	27.5	35		dB
	8 - 14	30.0	45		
RF-I Isolation	5 - 8	20.0	27		dB
	8 - 14	25.0	26		
RF-Q Isolation	5 - 8	20.0	25		dB
	8 - 14	15.0	25		
Input Power at 1dB Compression	5 - 14		+10		dBm
Input IP3 (I) ⁶ Lower Side Band	5 - 8		+24.5		dBm
	8 - 14		+26.5		
Input IP3 (Q) ⁶ Lower Side Band	5 - 8		+21.5		dBm
	8 - 14		+26.5		
Input IP3 (I) ⁶ Upper Side Band	5 - 8		+24.5		dBm
	8 - 14		+25.5		
Input IP3 (Q) ⁶ Upper Side Band	5 - 8		+21.5		dBm
	8 - 14		+26.0		

1. Unless otherwise specified, IF = 200 MHz

2. IF is operational up to 7 GHz.

3. Conversion loss (dB) = RF Power (dBm) minus worse of I/Q Port Power (dBm) minus 3 dB theoretical loss of an Ideal External Hybrid, measured as a Downconverter.

4. Level of undesired image signal below desired RF signal.

5. Level of undesired sideband below desired sideband.

6. IIP3 (dBm) = OIP3 (dBm) + Conversion loss (dB), where Conversion loss (dB) = RF Power (dBm) - worse of I/Q Port Power (dBm) measured as a Downconverter.

ABSOLUTE MAXIMUM RATINGS⁷

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power	+28 dBm
LO Power	+28 dBm
I/Q Power	+28 dBm
IF Current	49 mA

7. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous operation.





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TYPICAL PERFORMANCE GRAPHS

IMAGE REJECTION (DOWNCONVERTER)
@ IF = 200 MHz, IF=RF-LO

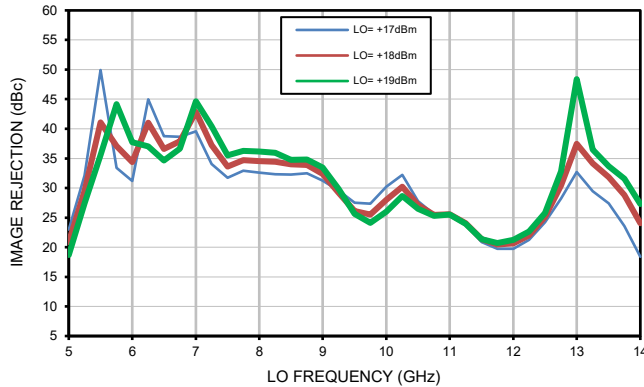


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 200 MHz, IF=LO-RF

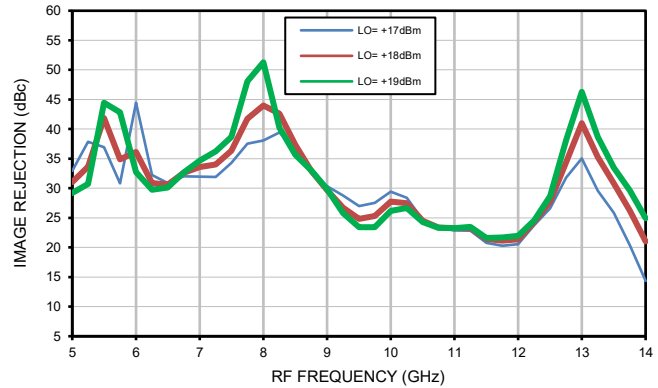


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 1000 MHz, IF=RF-LO

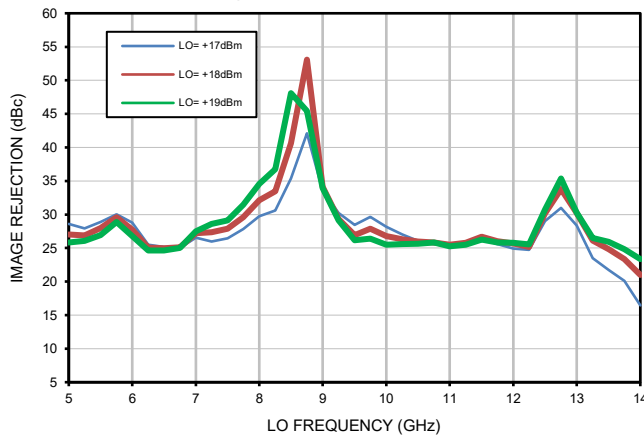


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 1000 MHz, IF=LO-RF

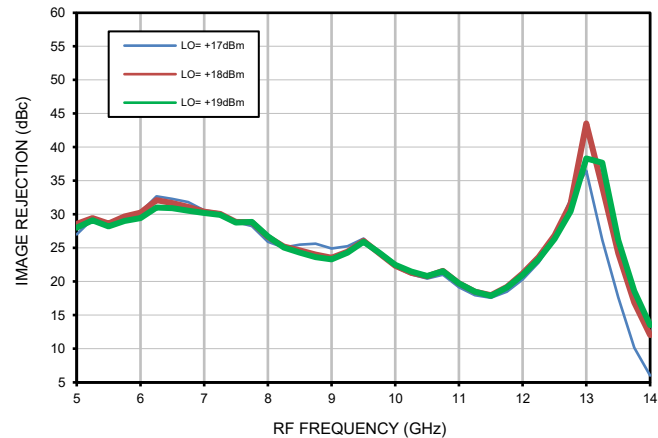


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 3000 MHz, IF=RF-LO

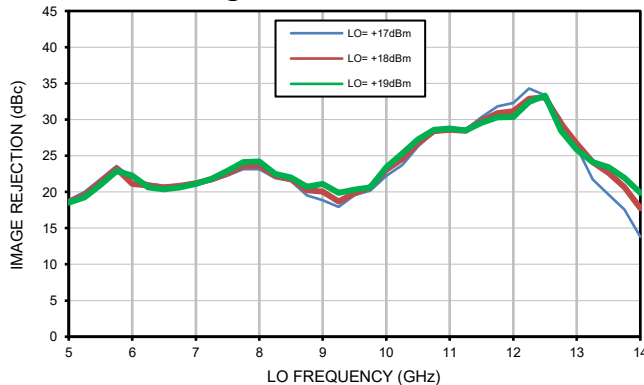
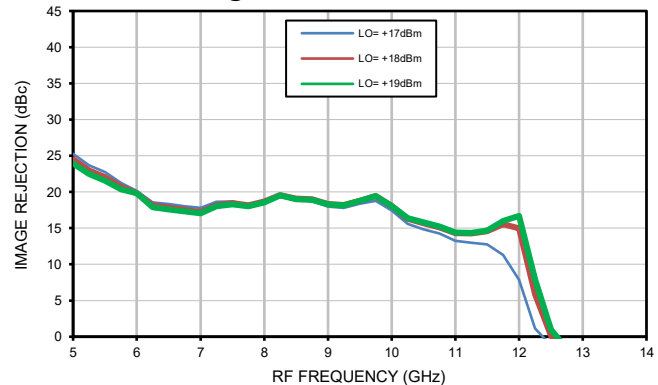


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 3000 MHz, IF=LO-RF





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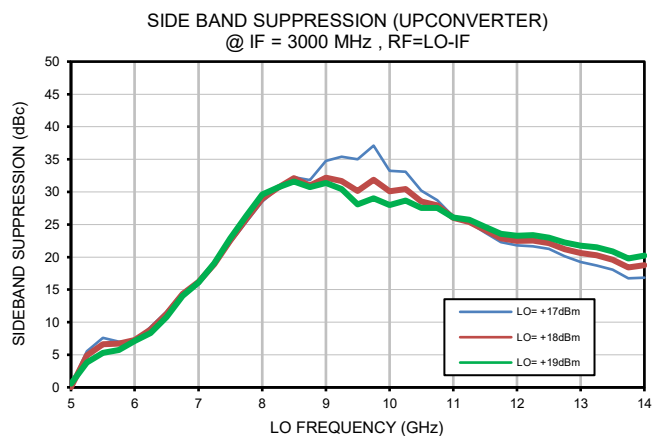
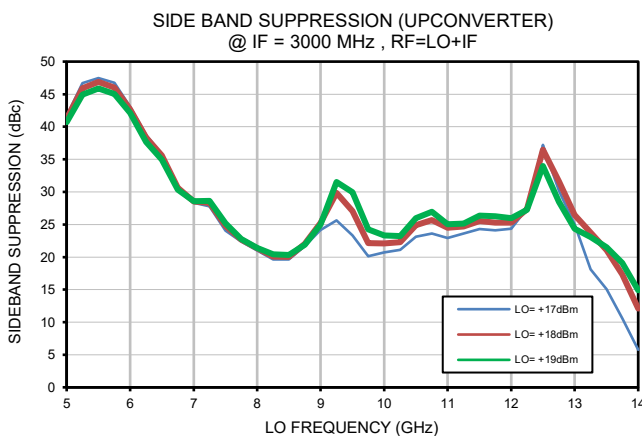
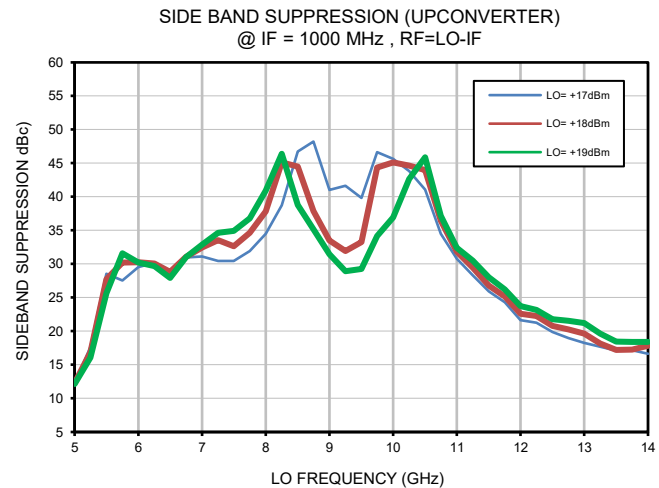
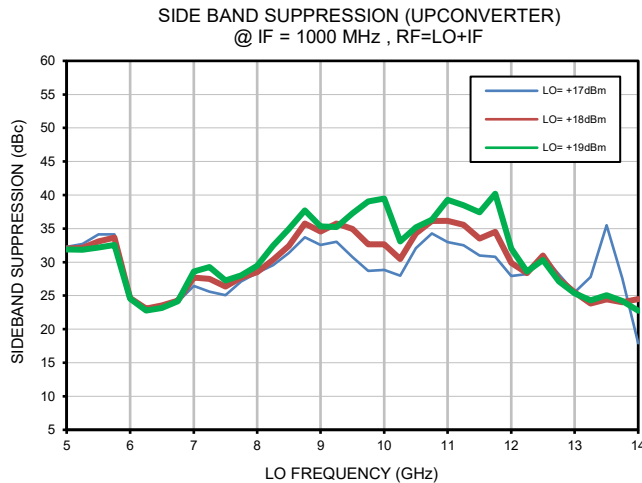
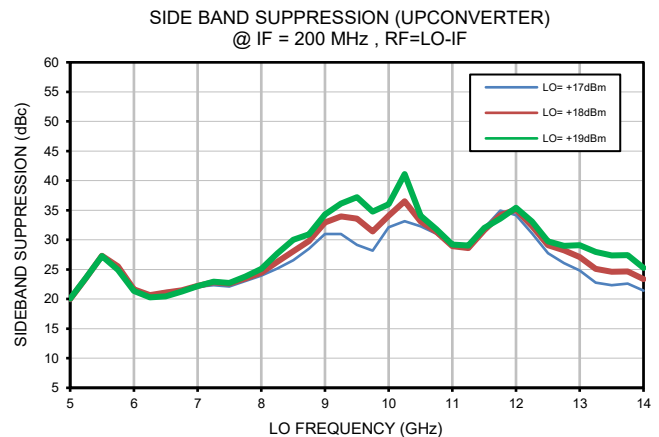
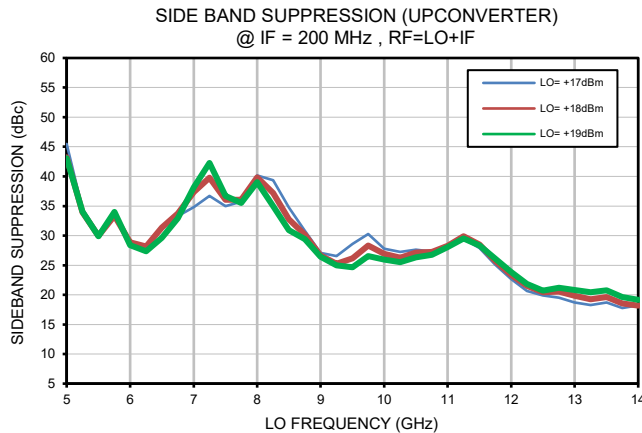
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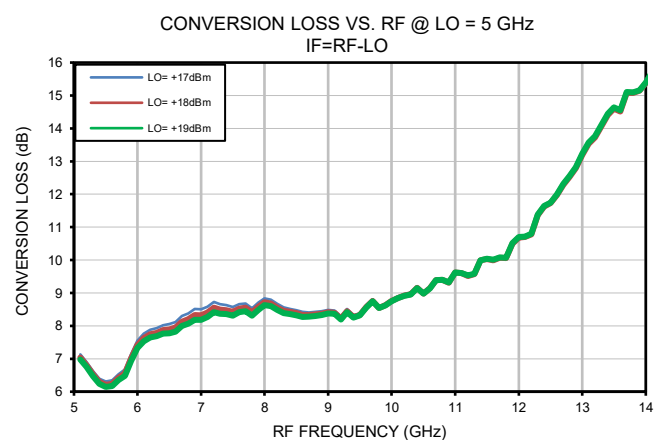
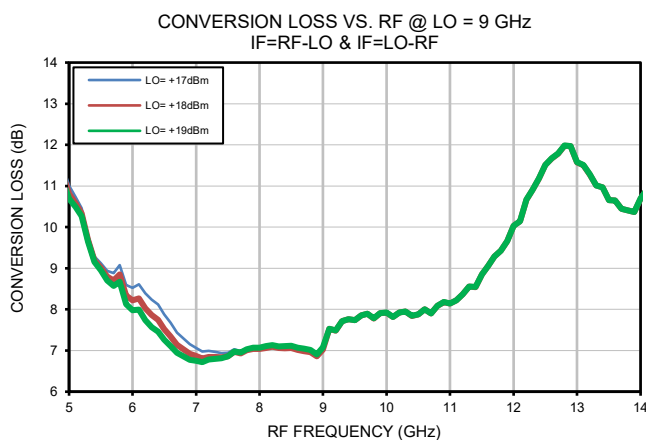
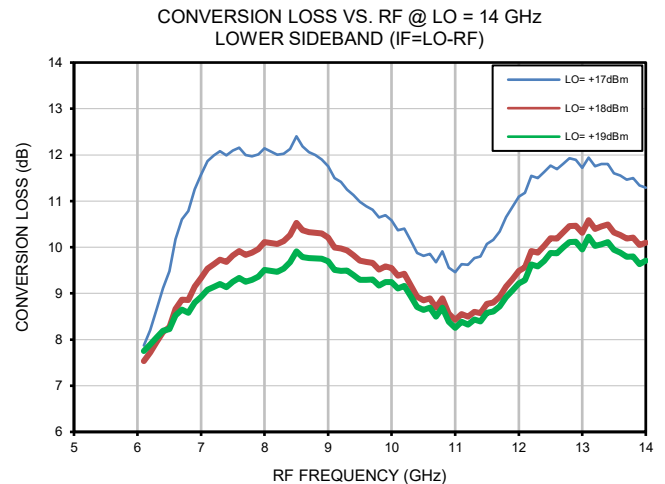
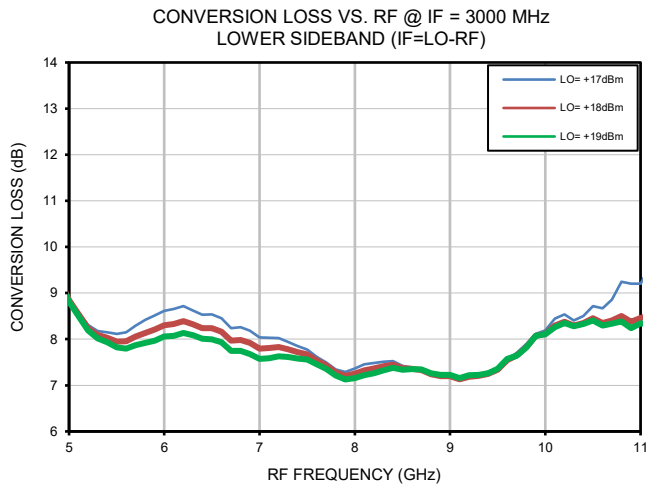
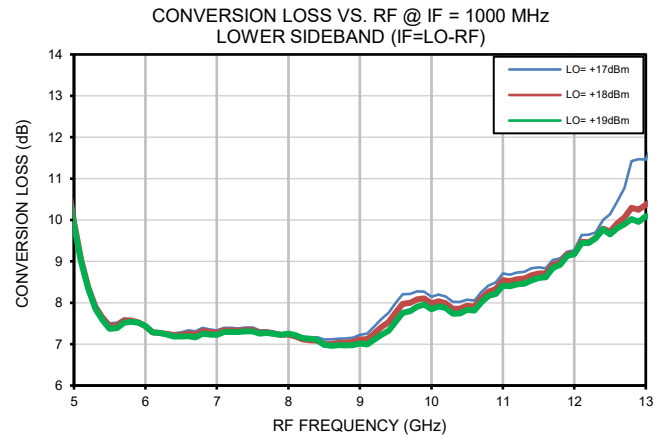
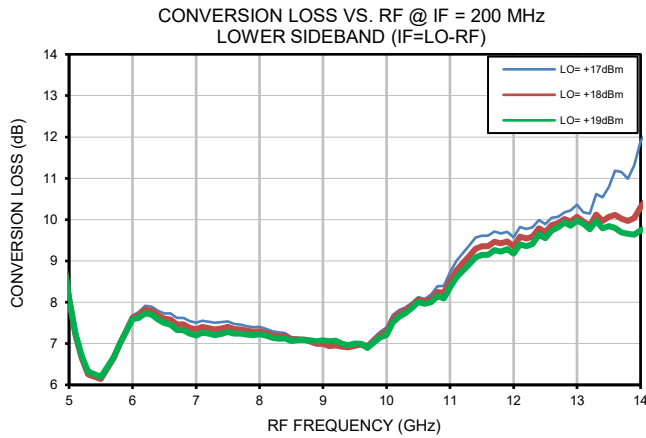
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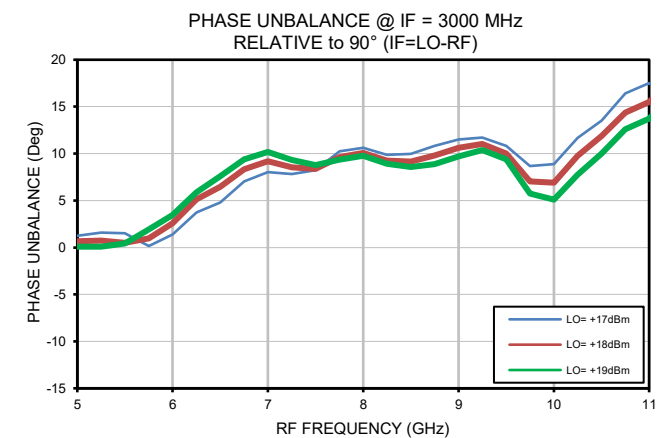
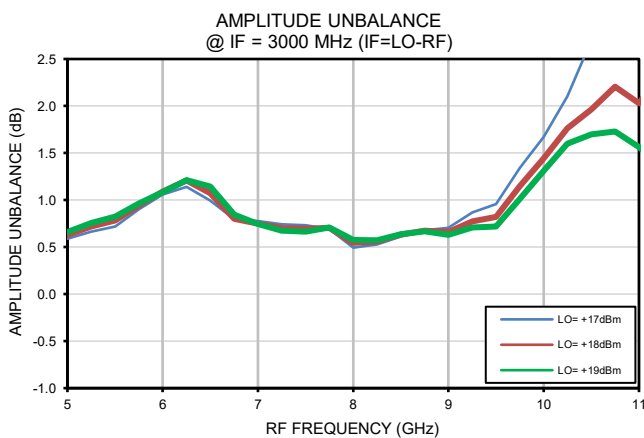
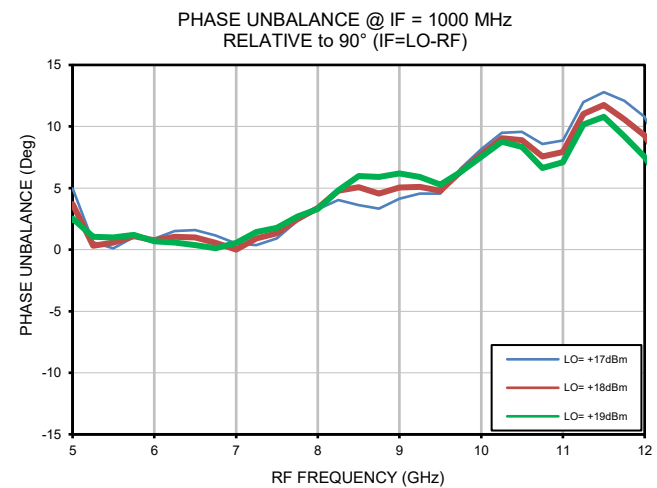
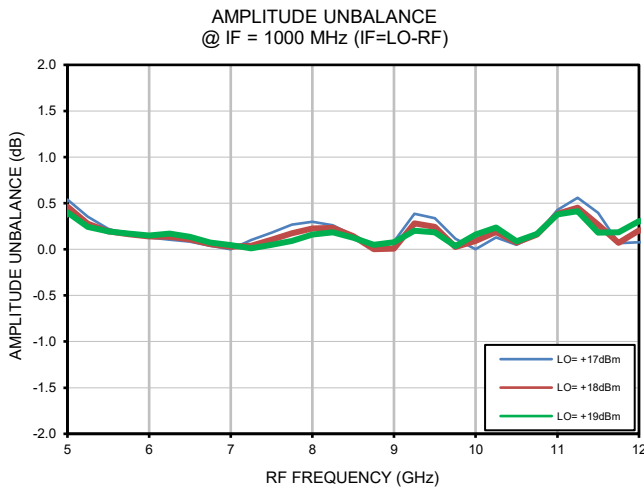
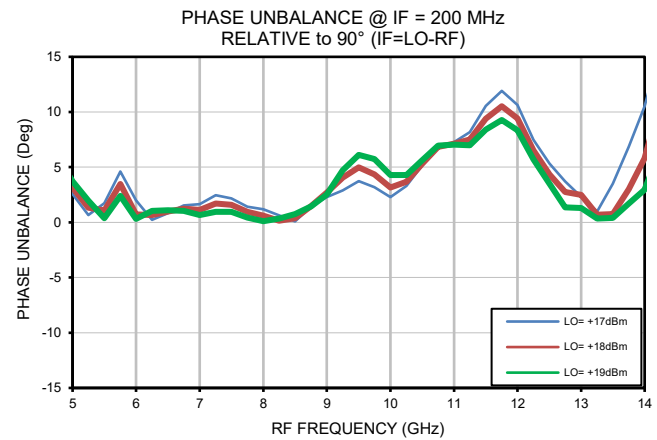
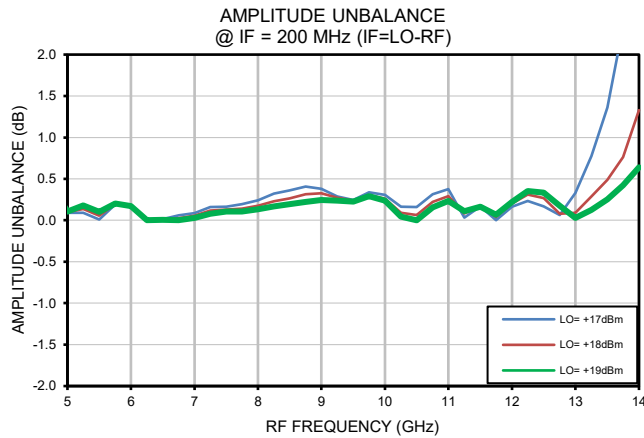
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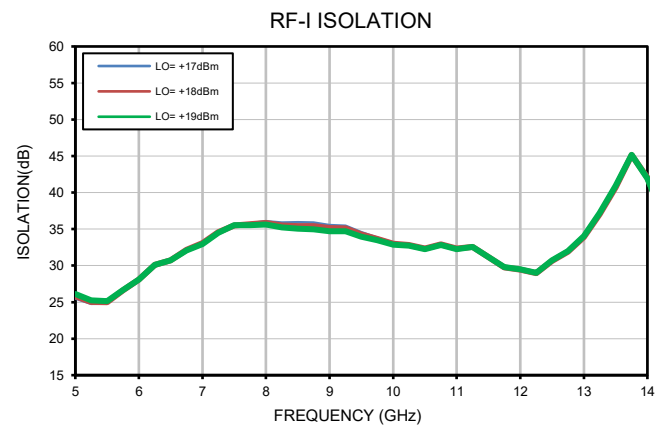
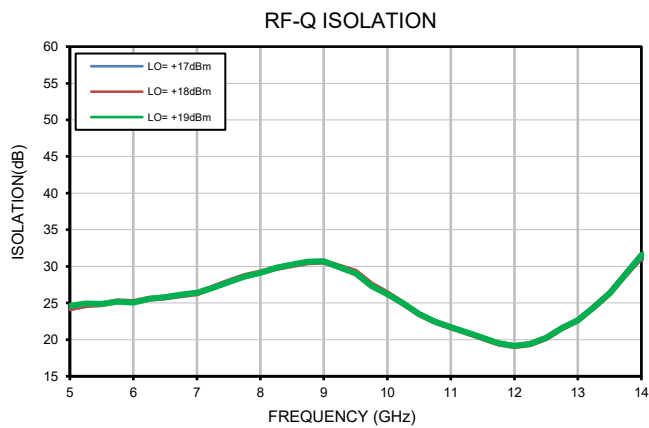
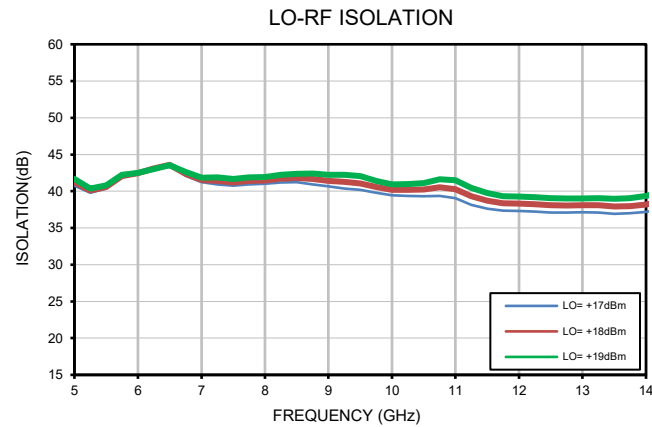
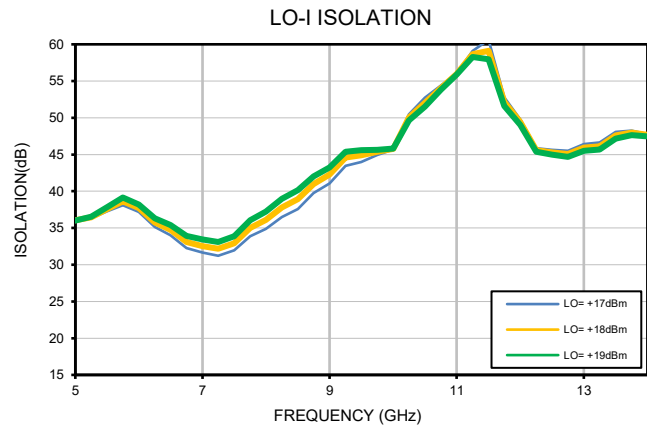
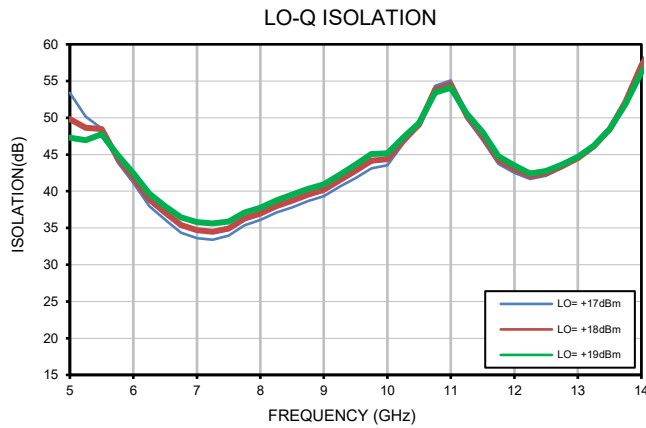
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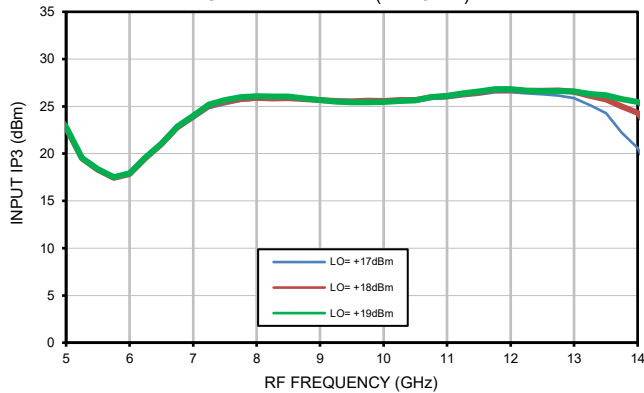
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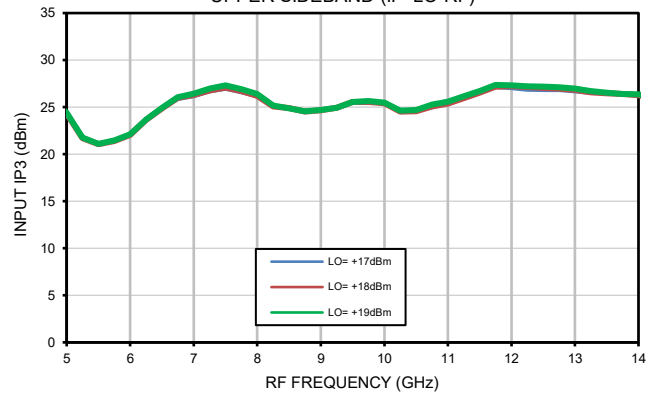
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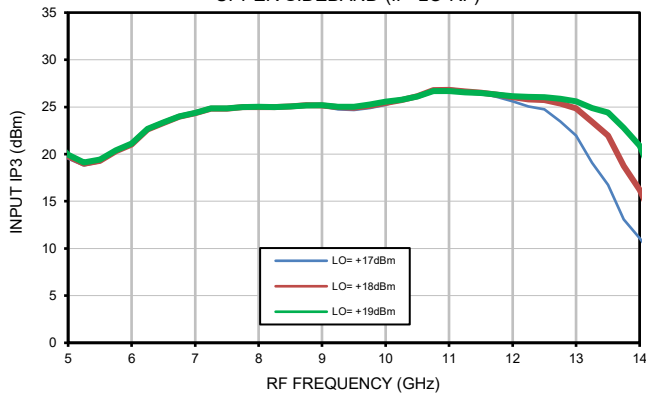
INPUT IP3(I) @ FIXED IF=200MHz
UPPER SIDEBAND (IF=LO-RF)



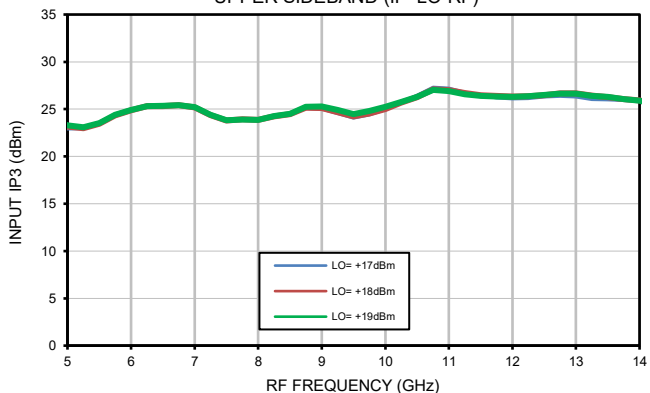
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UPPER SIDEBAND (IF=LO-RF)



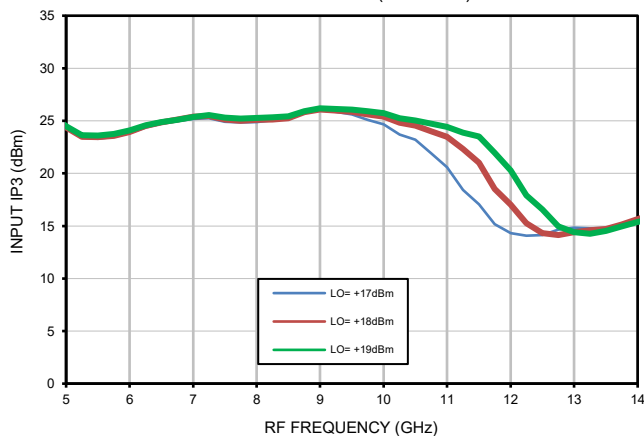
INPUT IP3(I) @ FIXED IF=1000MHz
UPPER SIDEBAND (IF=LO-RF)



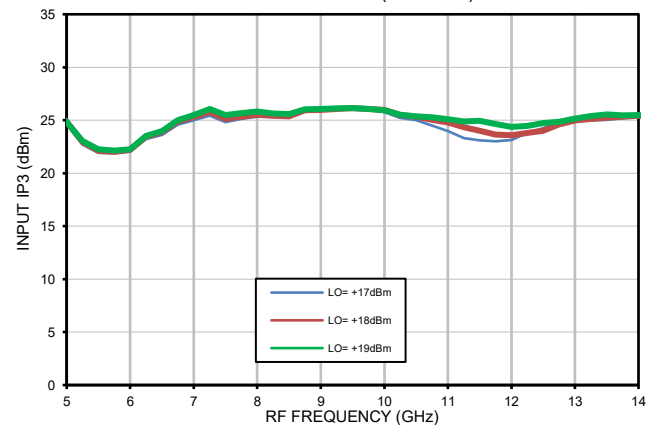
INPUT IP3(Q) @ FIXED IF=1000MHz
UPPER SIDEBAND (IF=LO-RF)



INPUT IP3(I) @ FIXED IF=3000MHz
UPPER SIDEBAND (IF=LO-RF)



INPUT IP3(Q) @ FIXED IF=3000MHz
UPPER SIDEBAND (IF=LO-RF)





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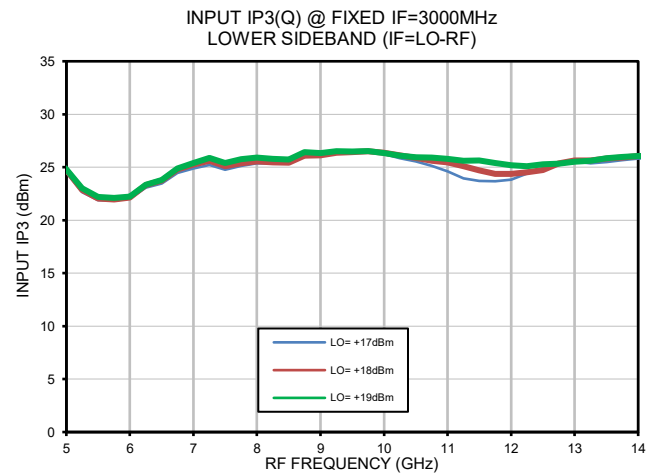
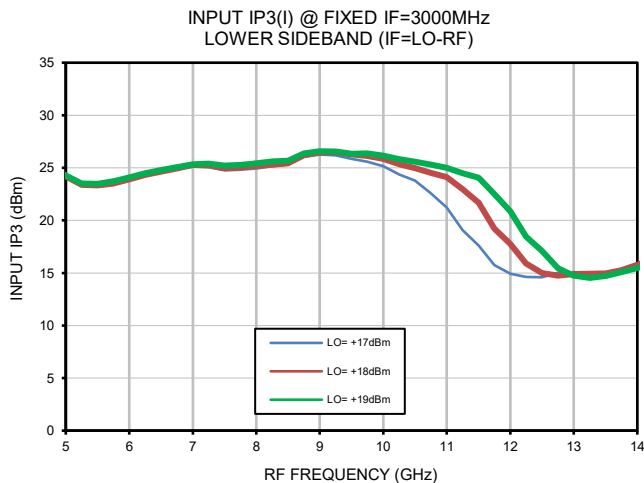
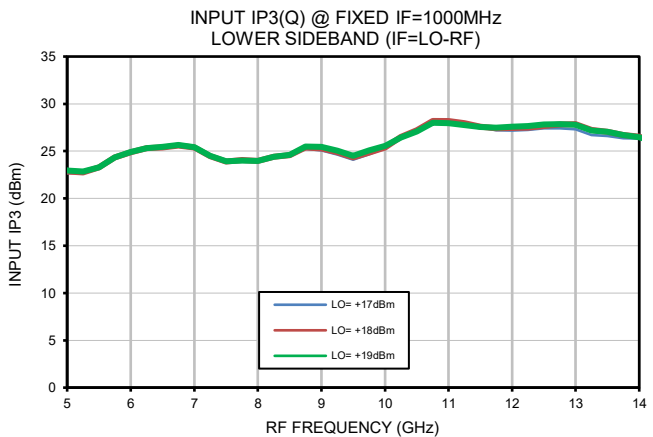
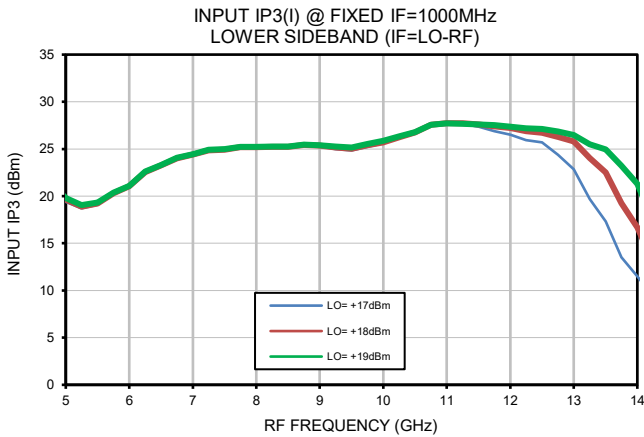
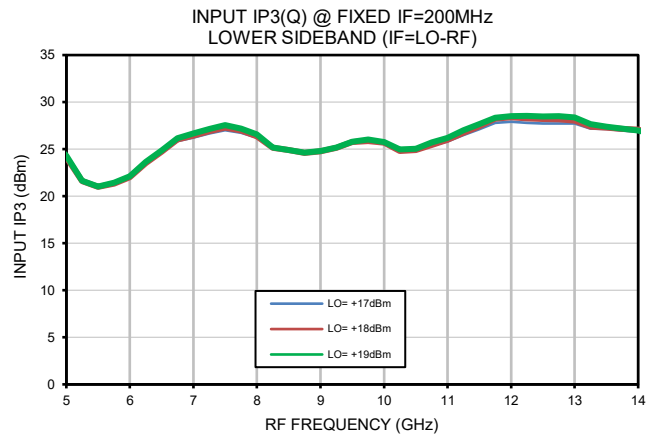
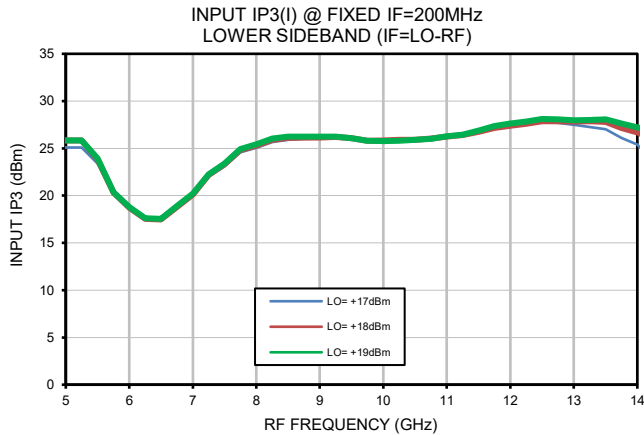
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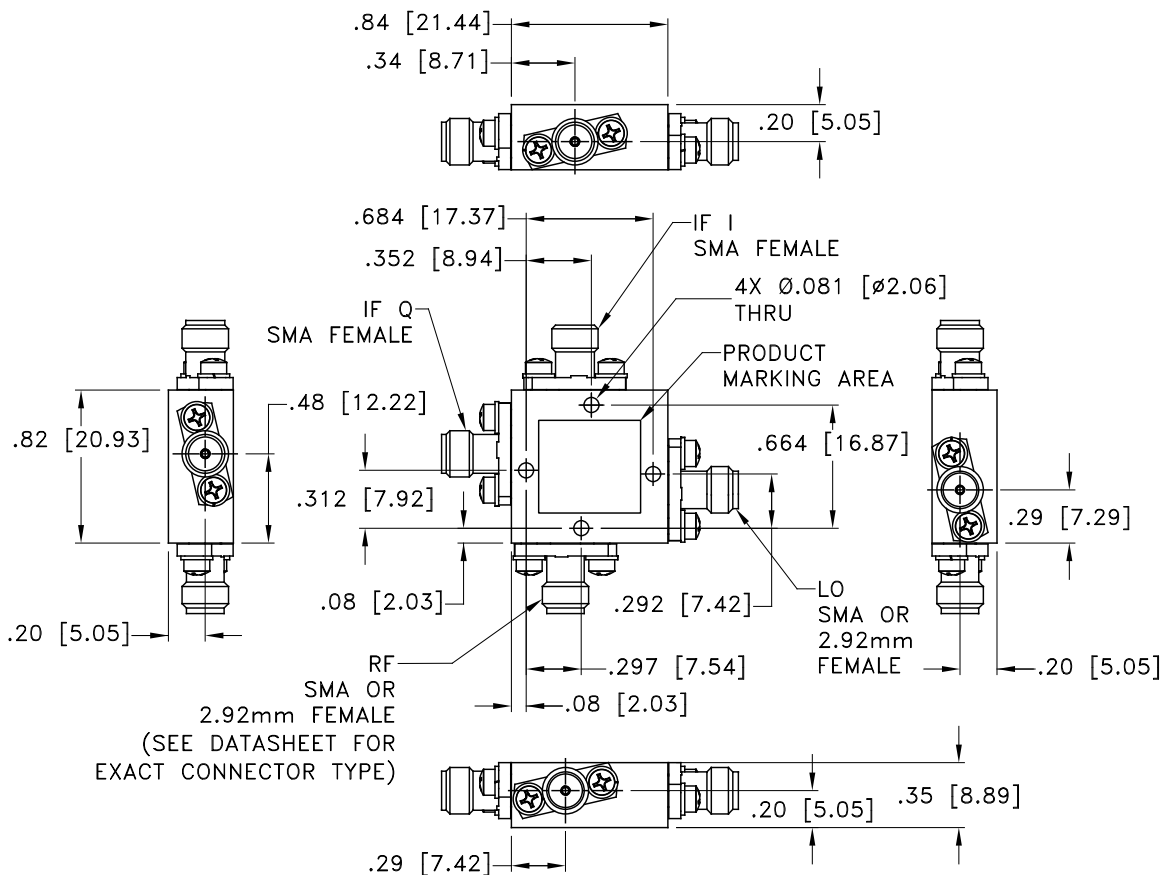
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COAXIAL CONNECTIONS

Function	Connector	Port Marking on Case Style Drawing	Description
RF Port	SMA-F	RF	RF Port. Connects to RF Output for Upconverters or RF Input for Downconverters.
LO Port	SMA-F	LO	LO Port. Connects to LO Input.
IF-I Port	SMA-F	IF I	IF I Port. Connects to the IF I Input for Upconverters or IF I Output for Downconverters.
IF-Q Port	SMA-F	IF Q	IF Q Port. Connects to the IF Q Input for Upconverters or IF Q Output for Downconverters.

CASE STYLE DRAWING



Weight: 32 grams

Dimensions are in inches [mm]. Tolerances: 2 PL±.03; 3 PL ±.015 inches





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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD [CLICK HERE](#)

Performance Data & Graphs	Data
	Graphs
Case Style	UK3584
Connectors	SMA Female
RoHS Status	Compliant
Environmental Ratings	ENV131

NOTES

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html

