



COAXIAL

# IQ Mixer

## ZMIQ-243H-K+

50Ω Level 18 (LO Power +18 dBm) 6 to 24 GHz 2.92 mm / SMA Female

### THE BIG DEAL

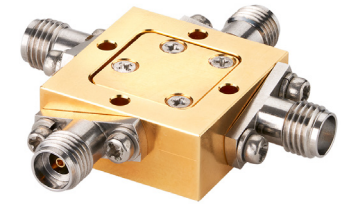
- Wideband RF & LO, 6 to 24 GHz
- Wideband IF, DC to 6 GHz
- Excellent Image Rejection, Typ. 30 dB
- High LO-RF Isolation, Typ. 38 dB
- High Input IP3, Typ. +25 dBm
- Usable as Image Reject Mixer & SSB Converter
- Small Size with 2.92 mm Connectors at RF- and LO-Ports, and SMA on IF-I and -Q Ports

### APPLICATIONS

- Test and Measurement Equipment
- 5G mmWave and Back Haul Radio
- Satellite Communications
- Radar, EW, and ECM Defense Systems

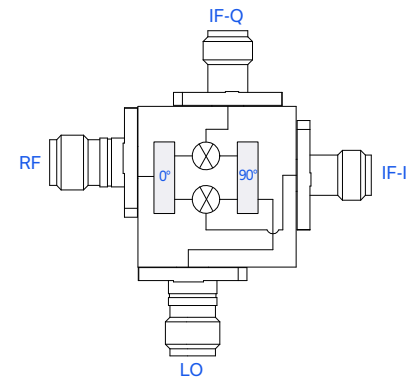
### PRODUCT OVERVIEW

The ZMIQ-243H-K+ is a passive wideband in-phase/quadrature (I/Q) mixer utilizing MCLs' own GaAs HBT device, [SMIQ-6243H+](#). The ZMIQ-243H-K+ is usable as a single-sideband upconverter for transmit applications or an image rejection mixer for receiver applications. The ZMIQ-243H-K+ is ideal for wideband frequency translation applications that require inherent rejection of image signals and spurious mixing products. The mixer covers a broad band with RF and LO frequency ranges of 6 to 24 GHz and an IF frequency range of DC to 6 GHz. As a passive mixer, the ZMIQ-243H-K+ offers lower noise figure than active mixers enabling superior dynamic range for high performance applications. The mixer is housed in a compact rugged package with 2.92 mm and SMA coaxial connections.



Generic photo used for illustration purposes only

### FUNCTIONAL DIAGRAM



### KEY FEATURES

Feature	Advantages
High Image Rejection, 30 dB typ.	Provides inherent rejection of unwanted image signals without the need to external filtering.
High Isolation, • LO-RF, 38 dB typ. • LO-IF, 38 dB typ.	Enables excellent carrier rejection in single-sideband upconverter transmit applications. Minimizes filtering requirements needed to ensure signal integrity.
Wide Bandwidth, 6 to 24 GHz	Useful in wideband systems or in reconfigurable narrowband systems across multiple bands with minimal component changes.
Wide IF Bandwidth, DC to 6 GHz	Enables 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 SPECIFICATIONS<sup>1</sup> AT +25°C, Z<sub>0</sub> = 50Ω, LO POWER = +18 dBm, UNLESS OTHERWISE NOTED.

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
RF Frequency Range		6		24	GHz
LO Frequency Range		6		24	GHz
IF Frequency Range		DC		6	GHz
LO Power		+17	+18	+20	dBm
Conversion Loss <sup>2</sup>	6 - 18		8.5	12.5	dB
	18 - 24		10.5	13.5	
Amplitude Unbalance	6 - 18		±0.40	±1.6	dB
	18 - 24		±0.15	±0.7	
Phase Unbalance (Relative to 90°)	7 - 16		4.0	13	Degree
	16 - 24		2.5	8	
Image Rejection <sup>3</sup> (Tested as a Downconverter)	6 - 24		30		dBc
Single Sideband Rejection <sup>4</sup> (Tested as an Upconverter)	6 - 24		25		dBc
LO-RF Isolation	6 - 18	34	40		dB
	18 - 24	30	35		
LO-I Isolation	6 - 18	30	45		dB
	18 - 24	20	30		
LO-Q Isolation	6 - 18	32	45		dB
	18 - 24	22	30		
RF-I Isolation	6 - 18	17	28		dB
	18 - 24	23	27		
RF-Q Isolation	6 - 18	18	30		dB
	18 - 24	24	30		
Input Power at 1dB Compression	6 - 24		+10		dBm
Input IP3 (I) <sup>5</sup> Lower Side Band	6 - 18		+20		dBm
	18 - 24		+25		
Input IP3 (Q) <sup>5</sup> Lower Side Band	6 - 18		+20		dBm
	18 - 24		+25		
Input IP3 (I) <sup>5</sup> Upper Side Band	6 - 8		+20		dBm
	8 - 24		+25		
Input IP3 (Q) <sup>5</sup> Upper Side Band	6 - 8		+20		dBm
	8 - 24		+25		

1. Unless otherwise specified, IF = 200 MHz

2. 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.

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

4. Level of undesired sideband below desired sideband.

5. 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 RATINGS<sup>5</sup>

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power	+25 dBm
LO Power	+24 dBm
I/Q Power	+23 dBm
IF Current	16 mA

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





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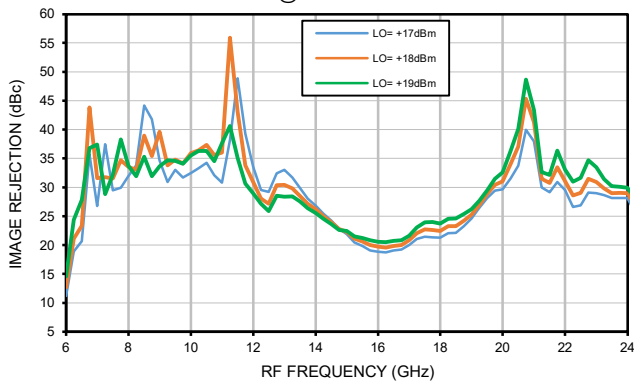
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### TYPICAL PERFORMANCE GRAPHS

IMAGE REJECTION (DOWNCONVERTER)  
@ IF = 200 MHz



SSB REJECTION (UPCONVERTER)  
@ IF = 200 MHz

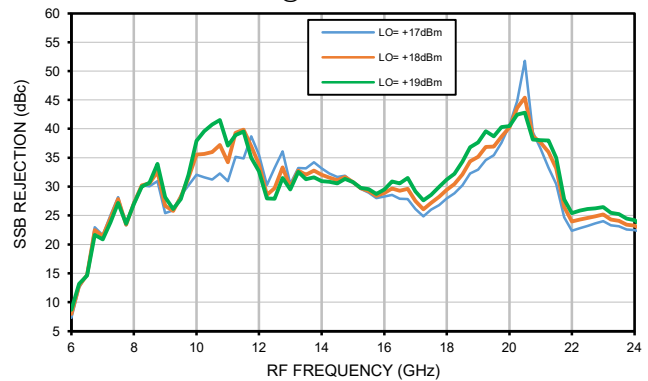
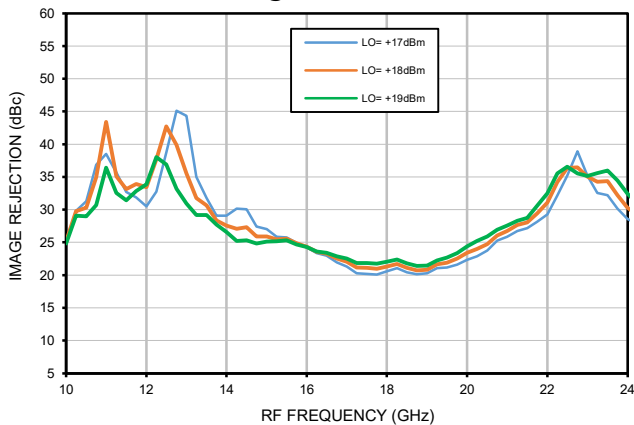


IMAGE REJECTION (DOWNCONVERTER)  
@ IF = 2000 MHz



SSB REJECTION (UPCONVERTER)  
@ IF = 2000 MHz

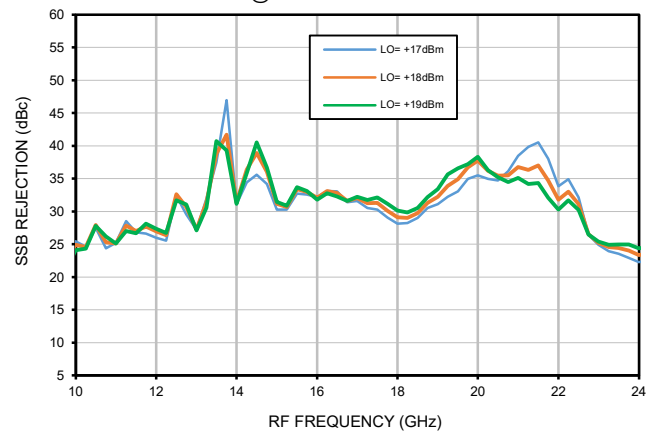
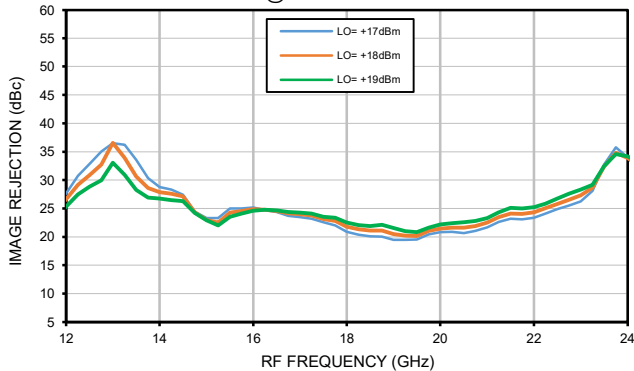
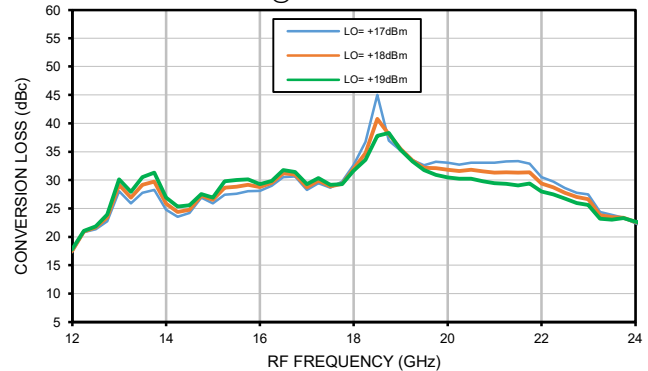


IMAGE REJECTION (DOWNCONVERTER)  
@ IF = 3000 MHz



SSB REJECTION (UPCONVERTER)  
@ IF = 3000 MHz





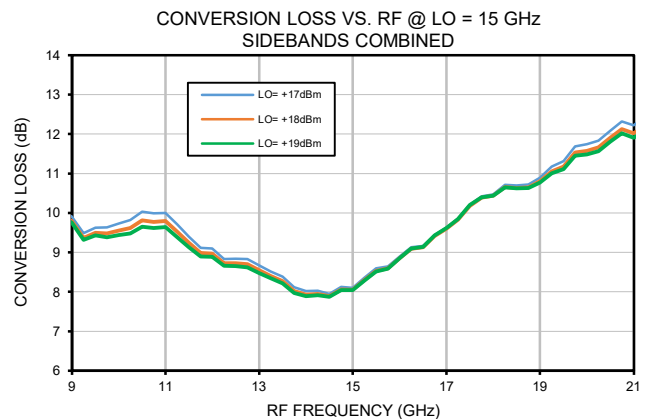
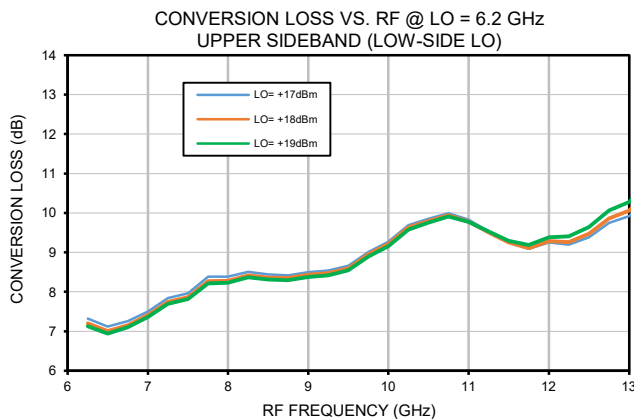
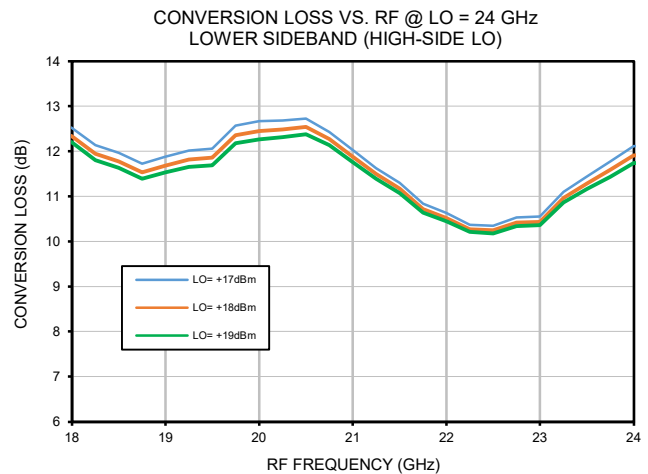
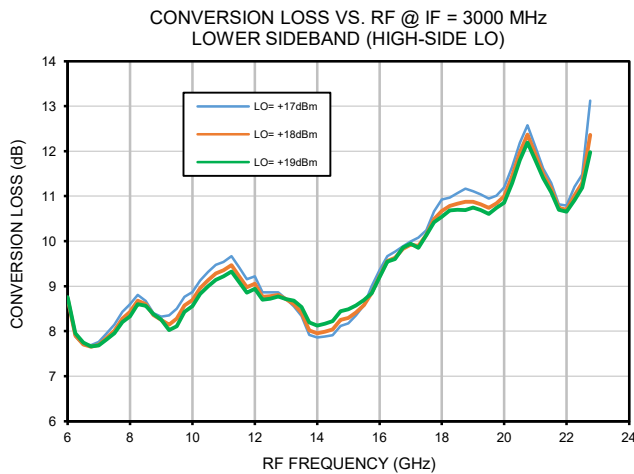
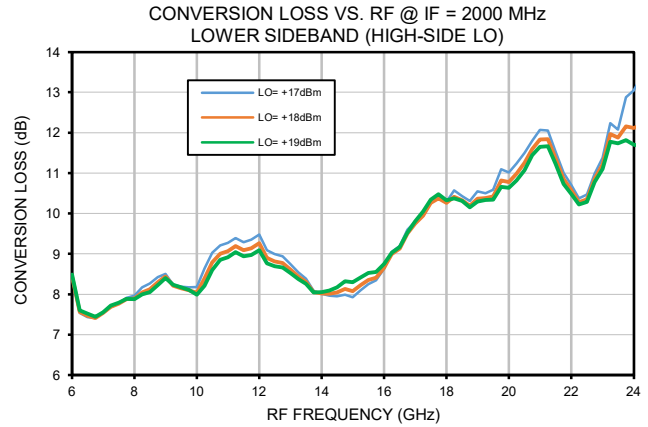
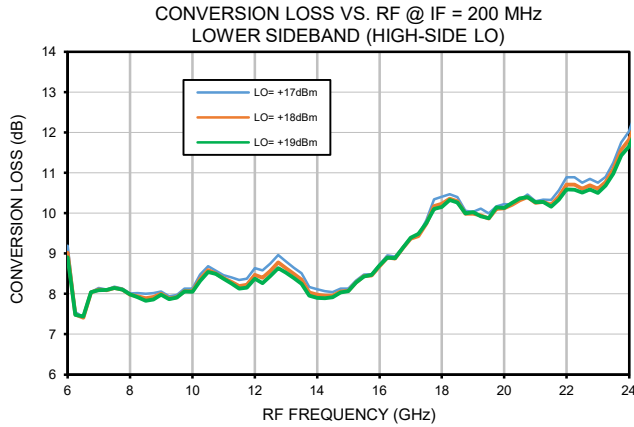
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### TYPICAL PERFORMANCE GRAPHS





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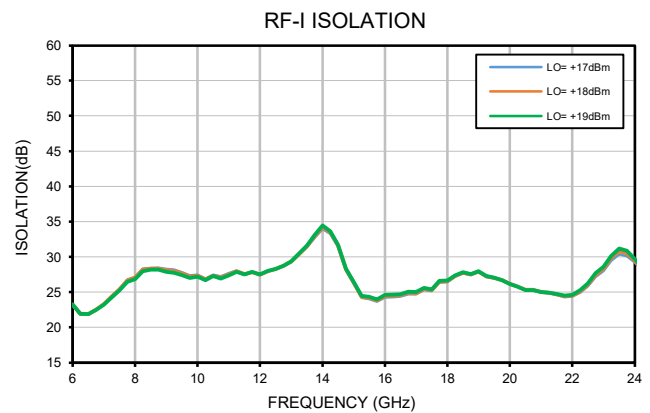
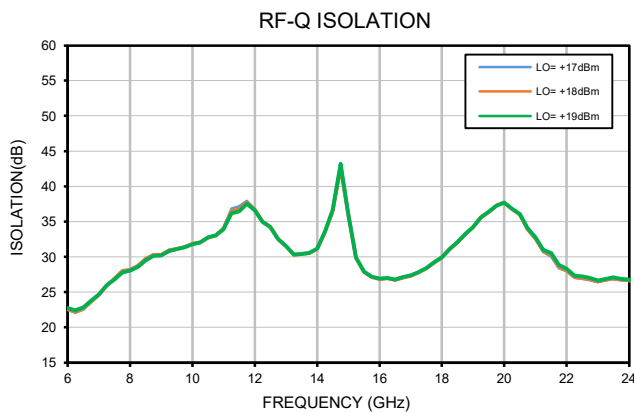
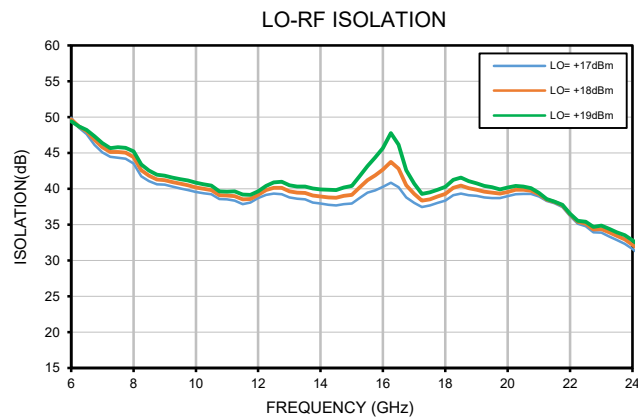
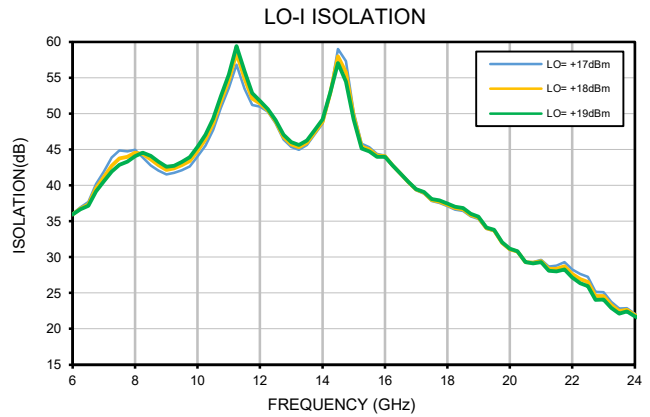
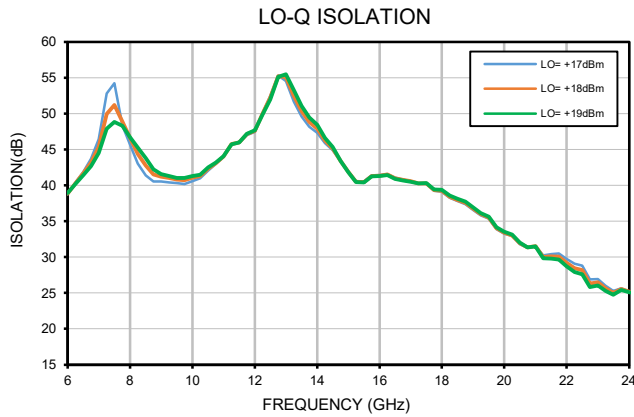
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## ZMIQ-243H-K+

Mini-Circuits

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### TYPICAL PERFORMANCE GRAPHS





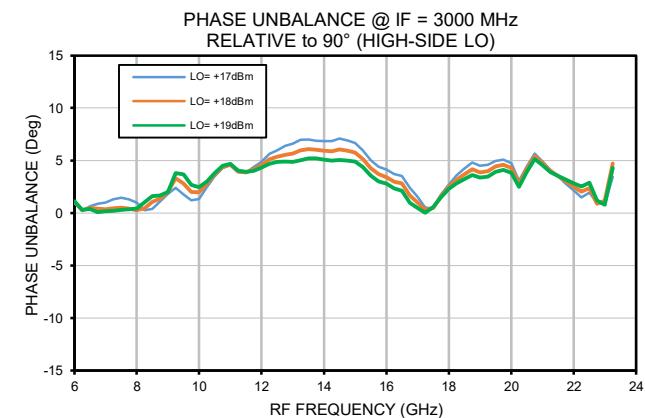
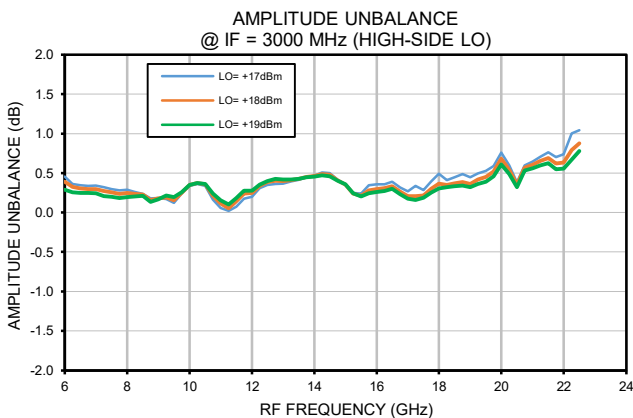
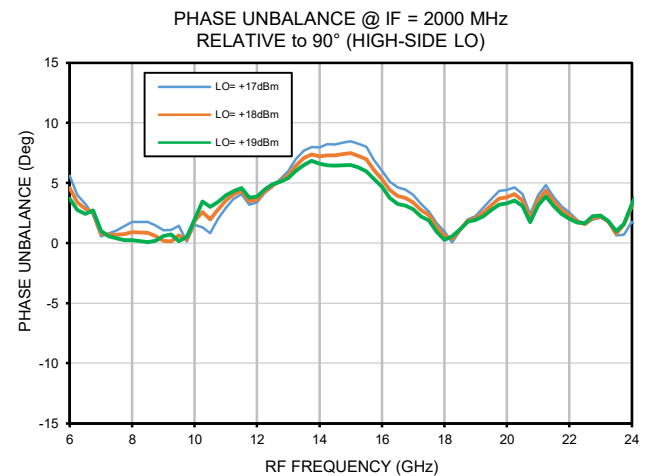
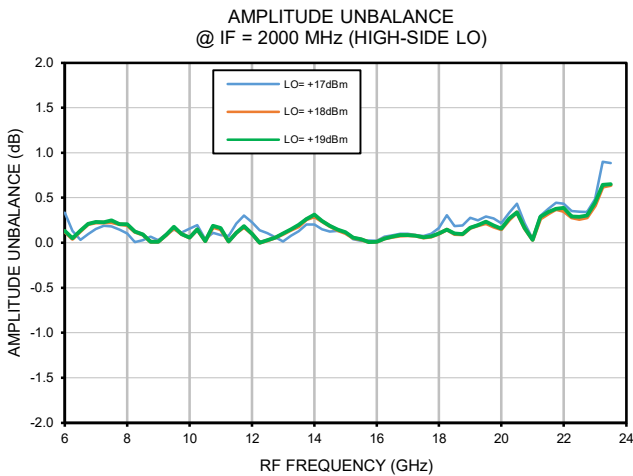
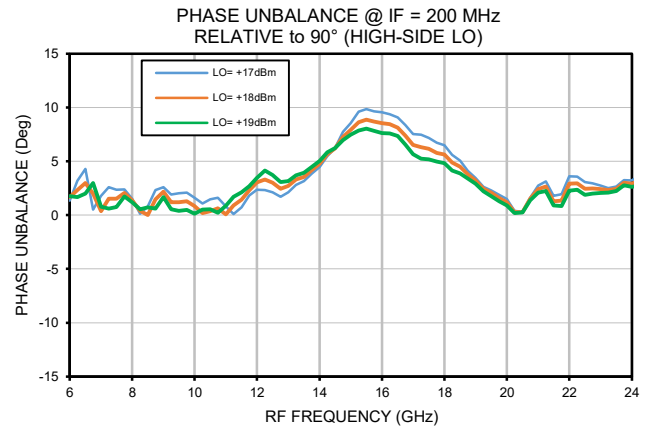
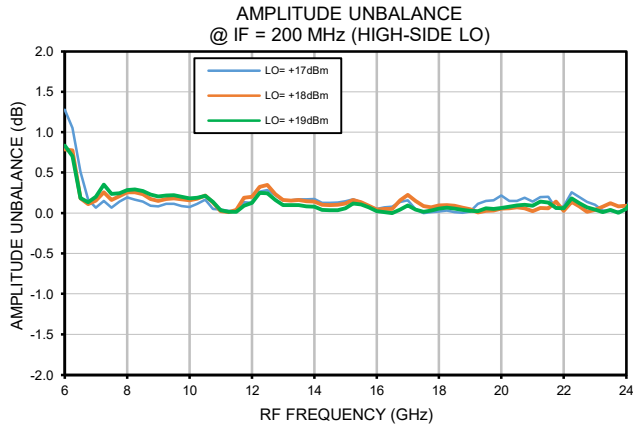
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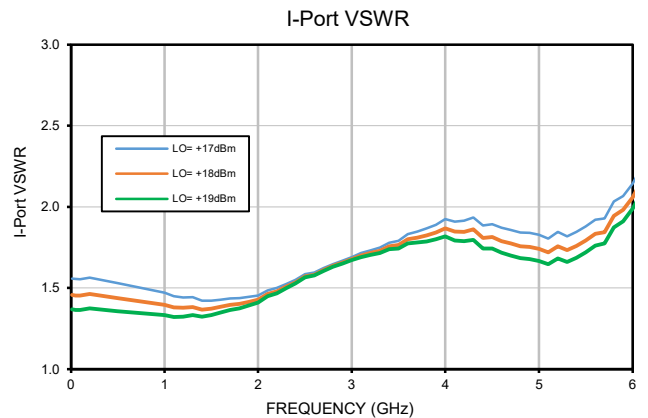
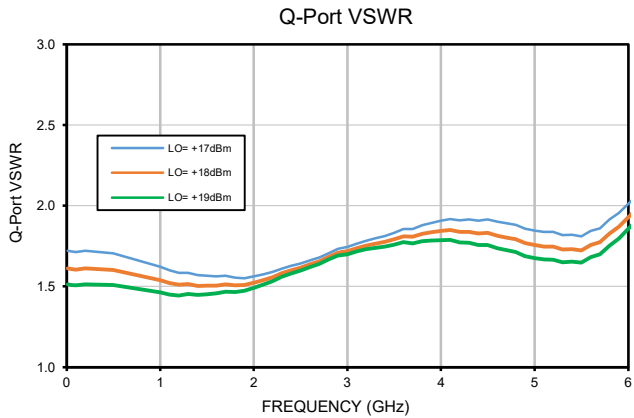
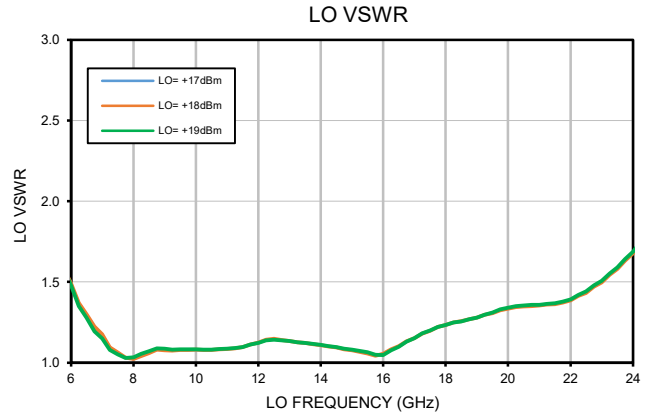
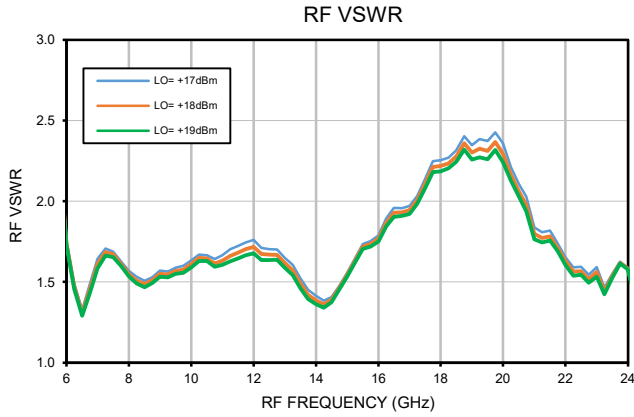
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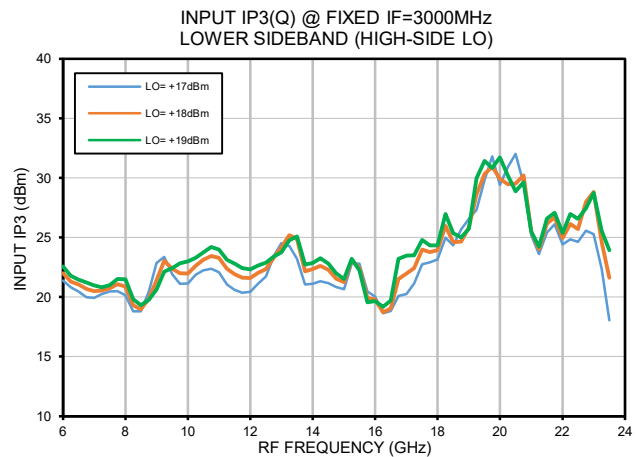
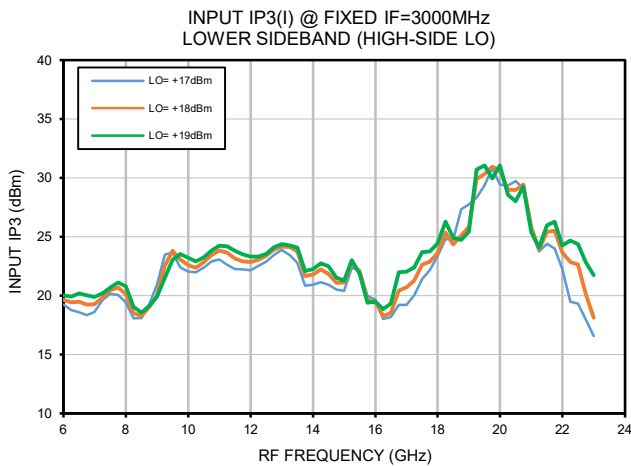
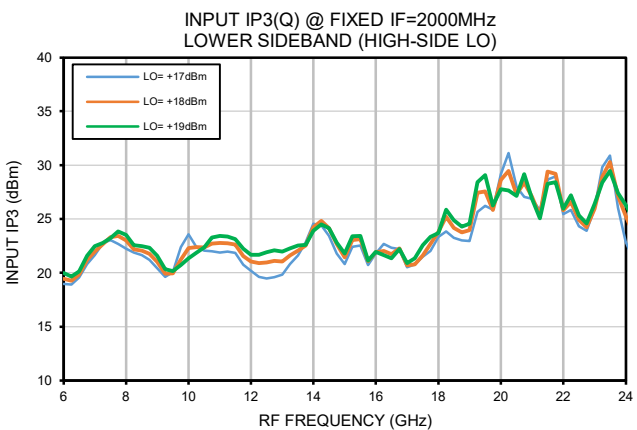
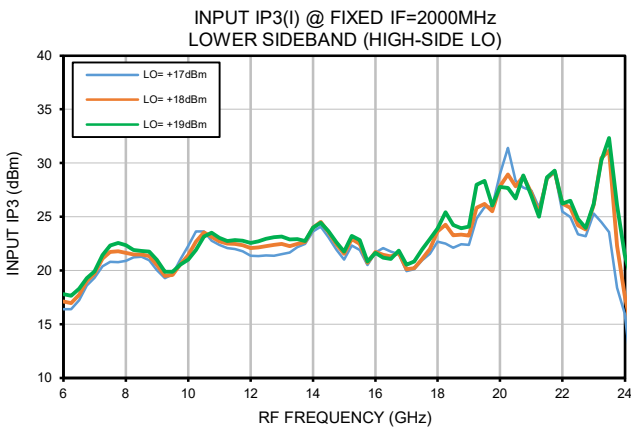
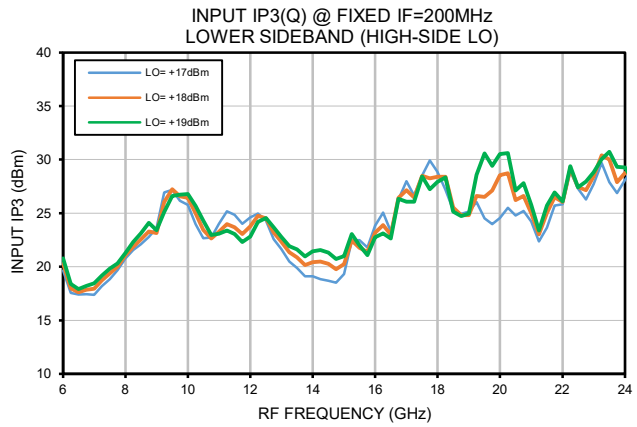
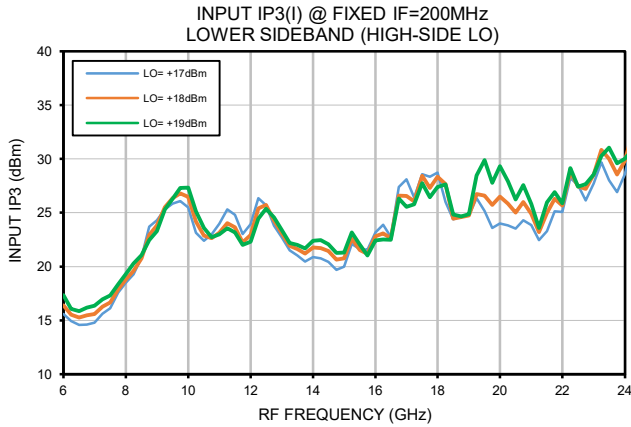
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### TYPICAL PERFORMANCE GRAPHS







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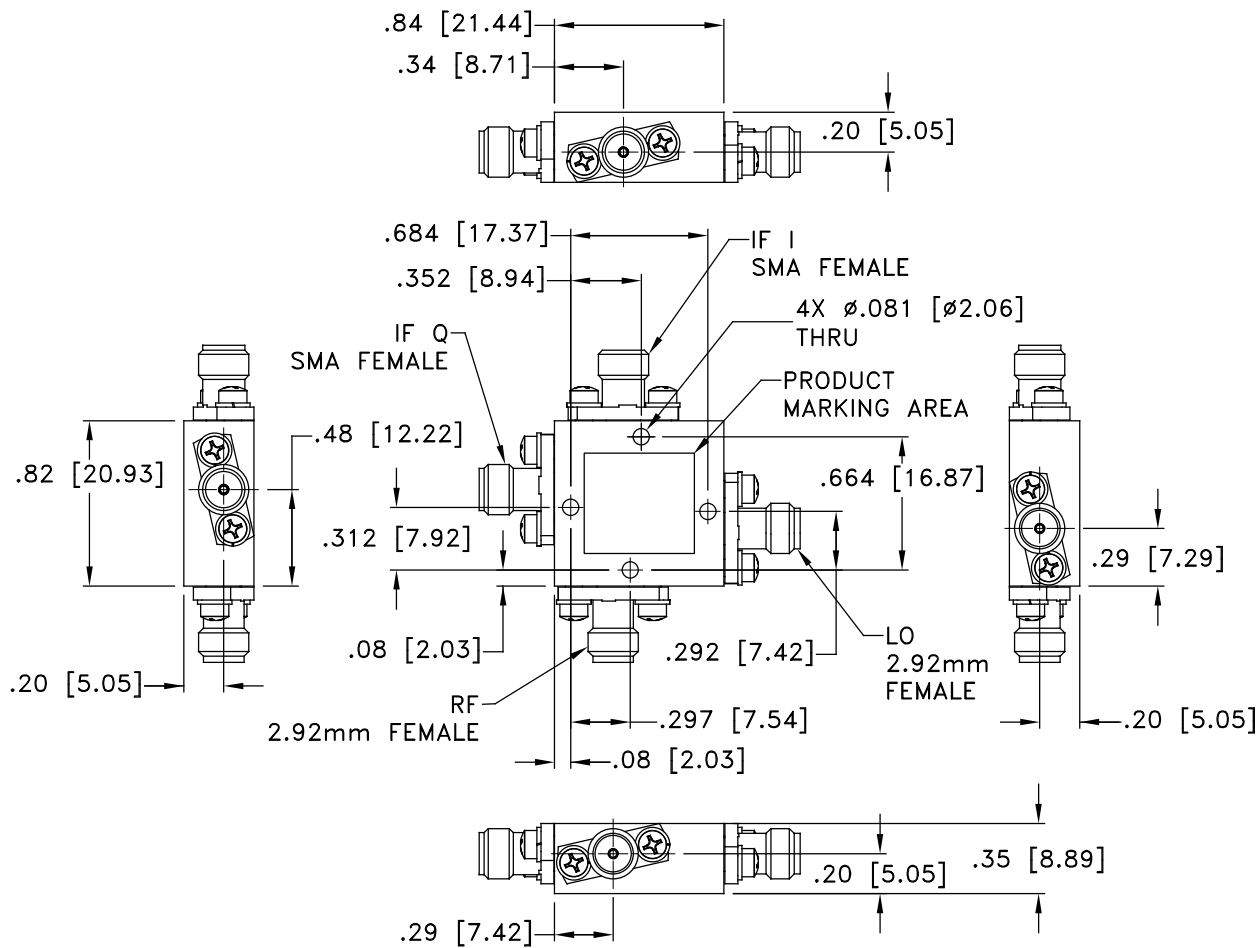
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### COAXIAL CONNECTIONS

Function	Connector	Port Marking on Case Style Drawing	Description
RF Port	2.92 mm-F	RF	RF Port. Connects to RF Output for Upconverters or RF Input for Downconverters.
LO Port	2.92 mm-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	2.92 mm / 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](http://www.minicircuits.com/terms/viewterm.html)



Typical Performance Data

RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	DOWNCONVERTER IMAGE REJECTION @ FIXED IF=200MHz			RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	DOWNCONVERTER IMAGE REJECTION @ FIXED IF=2000MHz			RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	DOWNCONVERTER IMAGE REJECTION @ FIXED IF=3000MHz		
		@ LO (dBm)					@ LO (dBm)					@ LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
6.0	5.8	11.3	12.7	14.6	8.0	6.0	20.2	20.3	20.8	9.0	6.0	27.4	26.3	25.6
6.5	6.3	20.7	23.4	27.8	8.5	6.5	26.2	25.2	24.1	9.5	6.5	30.0	25.8	23.5
7.0	6.8	26.8	31.6	37.4	9.0	7.0	31.2	27.7	25.6	10.0	7.0	26.4	23.9	22.3
7.5	7.3	29.5	31.5	32.2	9.5	7.5	24.1	23.8	23.2	10.5	7.5	27.4	25.1	23.4
8.0	7.8	32.0	33.5	33.7	10.0	8.0	25.0	25.1	24.8	11.0	8.0	24.7	23.7	22.6
8.5	8.3	44.2	39.0	35.3	10.5	8.5	31.3	30.3	29.0	11.5	8.5	23.9	23.3	22.5
9.0	8.8	34.6	39.6	33.6	11.0	9.0	38.5	43.4	36.4	12.0	9.0	27.6	26.6	25.3
9.5	9.3	33.0	34.8	34.6	11.5	9.5	32.7	33.1	31.4	12.5	9.5	32.8	30.9	28.8
10.0	9.8	32.5	35.9	35.5	12.0	10.0	30.5	33.4	33.9	13.0	10.0	36.5	36.6	33.0
10.5	10.3	34.3	37.4	36.3	12.5	10.5	38.7	42.7	36.9	13.5	10.5	33.6	30.6	28.3
11.0	10.8	30.8	36.0	37.6	13.0	11.0	44.3	35.5	30.9	14.0	11.0	28.8	27.9	26.7
11.5	11.3	48.9	43.0	35.1	13.5	11.5	31.8	30.7	29.2	14.5	11.5	27.4	27.1	26.3
12.0	11.8	33.5	30.9	28.9	14.0	12.0	29.1	27.5	26.6	15.0	12.0	23.3	23.0	22.9
12.5	12.3	29.2	27.1	25.9	14.5	12.5	30.0	27.3	25.3	15.5	12.5	25.0	24.3	23.5
13.0	12.8	33.0	30.4	28.4	15.0	13.0	27.0	25.9	25.1	16.0	13.0	25.2	24.9	24.6
13.5	13.3	29.9	28.5	27.5	15.5	13.5	25.7	25.5	25.3	16.5	13.5	24.4	24.6	24.7
14.0	13.8	26.8	26.2	25.6	16.0	14.0	24.2	24.4	24.3	17.0	14.0	23.5	24.0	24.2
14.5	14.3	24.3	24.0	23.7	16.5	14.5	23.0	23.3	23.4	17.5	14.5	22.6	23.1	23.5
15.0	14.8	21.9	22.3	22.4	17.0	15.0	21.3	22.0	22.5	18.0	15.0	20.9	21.8	22.5
15.5	15.3	19.8	20.6	21.3	17.5	15.5	20.2	21.1	21.8	18.5	15.5	20.1	21.1	21.9
16.0	15.8	18.8	19.7	20.5	18.0	16.0	20.6	21.3	22.0	19.0	16.0	19.5	20.5	21.5
16.5	16.3	19.1	19.9	20.7	18.5	16.5	20.4	21.1	21.8	19.5	16.5	19.5	20.2	20.8
17.0	16.8	20.0	20.8	21.6	19.0	17.0	20.3	20.8	21.4	20.0	17.0	20.8	21.5	22.2
17.5	17.3	21.5	22.7	23.9	19.5	17.5	21.1	21.9	22.7	20.5	17.5	20.7	21.6	22.6
18.0	17.8	21.3	22.5	23.7	20.0	18.0	22.3	23.4	24.4	21.0	18.0	21.7	22.5	23.3
18.5	18.3	22.1	23.3	24.6	20.5	18.5	23.8	24.7	25.9	21.5	18.5	23.2	24.1	25.1
19.0	18.8	24.6	25.3	26.2	21.0	19.0	25.9	26.7	27.6	22.0	19.0	23.4	24.3	25.2
19.5	19.3	28.2	28.9	29.5	21.5	19.5	27.2	28.0	28.7	22.5	19.5	24.9	25.8	26.8
20.0	19.8	29.6	31.0	32.6	22.0	20.0	29.3	31.1	32.5	23.0	20.0	26.2	27.3	28.3
20.5	20.3	33.8	37.1	40.1	22.5	20.5	35.2	36.4	36.6	23.5	20.5	32.7	32.4	32.4
21.0	20.8	37.9	41.3	43.4	23.0	21.0	35.2	35.0	35.1	24.0	21.0	34.0	33.9	34.2
21.5	21.3	29.1	30.8	32.1	23.5	21.5	32.2	34.4	36.0					
22.0	21.8	29.5	31.1	33.1	24.0	22.0	28.6	30.3	32.4					
22.5	22.3	26.9	29.0	31.6										
23.0	22.8	29.0	30.9	33.5										
23.5	23.3	28.1	29.0	30.2										
24.0	23.8	28.2	29.0	29.9										

Typical Performance Data

RF (OUT) FREQUENCY (GHz)	LO FREQUENCY (GHz)	UPCONVERTER SSB REJECTION @ FIXED IF=200MHz		
		@ LO (dBm)		
		+17	+18	+19
6.0	5.8	7.3	8.0	8.7
6.5	6.3	14.9	14.7	14.6
7.0	6.8	21.6	21.4	20.8
7.5	7.3	28.2	27.8	27.2
8.0	7.8	27.3	27.1	26.9
8.5	8.3	30.1	30.6	30.6
9.0	8.8	25.4	26.7	28.1
9.5	9.3	28.5	28.2	27.8
10.0	9.8	32.0	35.5	37.9
10.5	10.3	31.2	36.0	40.8
11.0	10.8	30.9	34.2	37.1
11.5	11.3	34.9	39.8	39.5
12.0	11.8	35.6	33.9	32.7
12.5	12.3	33.2	29.7	27.9
13.0	12.8	30.4	29.9	29.5
13.5	13.3	33.2	32.0	31.3
14.0	13.8	33.2	32.0	30.9
14.5	14.3	31.7	31.1	30.5
15.0	14.8	30.7	30.8	30.8
15.5	15.3	28.9	29.2	29.5
16.0	15.8	28.3	28.9	29.5
16.5	16.3	27.9	29.3	30.6
17.0	16.8	26.1	27.5	29.2
17.5	17.3	26.0	27.2	28.6
18.0	17.8	28.0	29.5	31.2
18.5	18.3	30.2	32.1	34.3
19.0	18.8	32.9	35.1	37.7
19.5	19.3	35.4	36.9	38.7
20.0	19.8	40.6	40.2	40.5
20.5	20.3	51.8	45.4	42.8
21.0	20.8	36.6	37.6	38.0
21.5	21.3	30.4	33.1	35.0
22.0	21.8	22.4	24.0	25.4
22.5	22.3	23.2	24.6	26.1
23.0	22.8	24.0	25.2	26.5
23.5	23.3	23.1	24.1	25.2
24.0	23.8	22.5	23.3	24.2

RF (OUT) FREQUENCY (GHz)	LO FREQUENCY (GHz)	UPCONVERTER SSB REJECTION @ FIXED IF=2000MHz		
		@ LO (dBm)		
		+17	+18	+19
9.0	7.0	13.6	12.5	11.4
9.5	7.5	18.7	17.7	16.7
10.0	8.0	25.7	25.4	24.8
10.5	8.5	26.1	26.5	26.6
11.0	9.0	25.0	24.9	24.9
11.5	9.5	28.1	28.4	28.0
12.0	10.0	25.6	26.9	27.7
12.5	10.5	26.4	26.8	26.9
13.0	11.0	29.8	30.3	30.3
13.5	11.5	40.1	38.8	37.7
14.0	12.0	33.8	35.8	35.6
14.5	12.5	31.2	32.1	32.5
15.0	13.0	33.6	35.0	35.8
15.5	13.5	32.0	32.5	32.7
16.0	14.0	33.1	33.3	33.2
16.5	14.5	33.0	33.0	32.8
17.0	15.0	31.1	31.6	31.8
17.5	15.5	29.5	30.6	31.5
18.0	16.0	28.2	29.1	30.1
18.5	16.5	29.1	29.8	30.5
19.0	17.0	31.8	33.2	34.5
19.5	17.5	33.0	35.0	36.8
20.0	18.0	35.5	37.0	36.8
20.5	18.5	35.2	35.4	35.1
21.0	19.0	37.4	35.4	33.7
21.5	19.5	38.3	34.9	32.3
22.0	20.0	36.9	34.0	32.0
22.5	20.5	31.0	30.4	29.8
23.0	21.0	24.1	24.5	24.8
23.5	21.5	23.1	24.1	24.9
24.0	22.0	22.9	24.0	25.1

RF (OUT) FREQUENCY (GHz)	LO FREQUENCY (GHz)	UP CONVERTER SSB REJECTION @ FIXED IF=3000MHz		
		@ LO (dBm)		
		+17	+18	+19
11.0	8.0	10.2	10.1	9.9
11.5	8.5	14.9	15.3	15.6
12.0	9.0	18.9	19.0	19.3
12.5	9.5	23.9	24.4	24.8
13.0	10.0	24.9	25.6	26.3
13.5	10.5	26.9	28.3	29.5
14.0	11.0	25.4	26.4	27.4
14.5	11.5	23.7	24.1	24.6
15.0	12.0	27.5	28.3	28.7
15.5	12.5	28.2	29.0	29.6
16.0	13.0	28.7	29.6	30.3
16.5	13.5	27.4	27.6	27.9
17.0	14.0	29.9	30.0	30.3
17.5	14.5	30.1	30.3	30.6
18.0	15.0	32.4	31.6	31.2
18.5	15.5	41.0	40.2	38.3
19.0	16.0	33.6	34.3	34.7
19.5	16.5	33.3	32.3	31.5
20.0	17.0	33.1	32.0	30.7
20.5	17.5	32.7	31.6	30.0
21.0	18.0	33.2	31.2	29.2
21.5	18.5	32.1	30.7	28.9
22.0	19.0	31.7	30.5	28.8
22.5	19.5	29.7	28.6	27.3
23.0	20.0	25.6	25.0	24.2
23.5	20.5	24.1	23.8	23.5
24.0	21.0	22.7	22.9	23.1

*Typical Performance Data*

RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED IF=200MHz			RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED IF=2000MHz			RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED IF=3000MHz		
		@ LO (dBm)					@ LO (dBm)					@ LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
6.0	6.2	9.2	9.0	8.9	6.0	8.0	8.4	8.4	8.5	6.0	9.0	8.7	8.7	8.8
6.5	6.7	7.4	7.4	7.4	6.5	8.5	7.4	7.5	7.5	6.5	9.5	7.7	7.7	7.7
7.0	7.2	8.1	8.1	8.1	7.0	9.0	7.5	7.5	7.6	7.0	10.0	7.8	7.7	7.7
7.5	7.7	8.2	8.1	8.1	7.5	9.5	7.8	7.8	7.8	7.5	10.5	8.1	8.0	7.9
8.0	8.2	8.0	8.0	8.0	8.0	10.0	8.0	7.9	7.9	8.0	11.0	8.6	8.4	8.3
8.5	8.7	8.0	7.9	7.8	8.5	10.5	8.3	8.1	8.1	8.5	11.5	8.7	8.6	8.6
9.0	9.2	8.1	8.0	8.0	9.0	11.0	8.5	8.4	8.4	9.0	12.0	8.3	8.2	8.3
9.5	9.7	8.0	7.9	7.9	9.5	11.5	8.2	8.2	8.2	9.5	12.5	8.5	8.3	8.1
10.0	10.2	8.1	8.1	8.0	10.0	12.0	8.2	8.0	8.0	10.0	13.0	8.9	8.7	8.6
10.5	10.7	8.7	8.6	8.5	10.5	12.5	9.0	8.8	8.6	10.5	13.5	9.3	9.1	9.0
11.0	11.2	8.5	8.4	8.4	11.0	13.0	9.3	9.1	8.9	11.0	14.0	9.5	9.4	9.2
11.5	11.7	8.3	8.2	8.1	11.5	13.5	9.3	9.1	8.9	11.5	14.5	9.4	9.2	9.1
12.0	12.2	8.6	8.5	8.4	12.0	14.0	9.5	9.3	9.1	12.0	15.0	9.2	9.1	8.9
12.5	12.7	8.7	8.6	8.4	12.5	14.5	9.0	8.8	8.7	12.5	15.5	8.9	8.8	8.7
13.0	13.2	8.8	8.6	8.5	13.0	15.0	8.7	8.6	8.5	13.0	16.0	8.7	8.7	8.7
13.5	13.7	8.5	8.3	8.2	13.5	15.5	8.4	8.3	8.3	13.5	16.5	8.3	8.4	8.5
14.0	14.2	8.1	8.0	7.9	14.0	16.0	8.0	8.0	8.1	14.0	17.0	7.9	8.0	8.1
14.5	14.7	8.0	8.0	7.9	14.5	16.5	7.9	8.0	8.2	14.5	17.5	7.9	8.0	8.2
15.0	15.2	8.1	8.1	8.1	15.0	17.0	7.9	8.1	8.3	15.0	18.0	8.2	8.3	8.5
15.5	15.7	8.5	8.4	8.4	15.5	17.5	8.2	8.4	8.5	15.5	18.5	8.6	8.6	8.7
16.0	16.2	8.7	8.7	8.7	16.0	18.0	8.6	8.7	8.8	16.0	19.0	9.4	9.2	9.2
16.5	16.7	8.9	8.9	8.9	16.5	18.5	9.2	9.1	9.2	16.5	19.5	9.8	9.6	9.6
17.0	17.2	9.4	9.4	9.4	17.0	19.0	9.8	9.7	9.8	17.0	20.0	10.0	9.9	9.9
17.5	17.7	9.8	9.7	9.8	17.5	19.5	10.3	10.3	10.3	17.5	20.5	10.2	10.1	10.1
18.0	18.2	10.4	10.2	10.2	18.0	20.0	10.3	10.3	10.3	18.0	21.0	10.9	10.7	10.5
18.5	18.7	10.4	10.3	10.3	18.5	20.5	10.4	10.3	10.3	18.5	21.5	11.1	10.8	10.7
19.0	19.2	10.0	10.0	10.0	19.0	21.0	10.5	10.4	10.3	19.0	22.0	11.1	10.9	10.7
19.5	19.7	10.0	9.9	9.9	19.5	21.5	10.6	10.4	10.3	19.5	22.5	10.9	10.7	10.6
20.0	20.2	10.2	10.1	10.1	20.0	22.0	11.0	10.8	10.6	20.0	23.0	11.2	11.0	10.9
20.5	20.7	10.3	10.3	10.4	20.5	22.5	11.5	11.3	11.1	20.5	23.5	12.2	12.0	11.8
21.0	21.2	10.3	10.3	10.3	21.0	23.0	12.1	11.8	11.6	21.0	24.0	12.1	11.9	11.8
21.5	21.7	10.3	10.2	10.2	21.5	23.5	11.5	11.4	11.2	21.5	24.5	11.3	11.2	11.1
22.0	22.2	10.9	10.7	10.6	22.0	24.0	10.7	10.6	10.5	22.0	25.0	10.8	10.7	10.7
22.5	22.7	10.8	10.6	10.5	22.5	24.5	10.5	10.4	10.3	22.5	25.5	11.5	11.3	11.2
23.0	23.2	10.8	10.6	10.5	23.0	25.0	11.4	11.2	11.1	23.0	26.0	13.3	12.3	11.8
23.5	23.7	11.2	11.1	11.0	23.5	25.5	12.1	11.9	11.7	23.5	26.5	16.4	15.1	13.2
24.0	24.2	12.0	11.8	11.6	24.0	26.0	13.0	12.1	11.7	24.0	27.0	16.5	15.7	14.7

*Typical Performance Data*

RF FREQUENCY (GHz)	IF FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED LO=6.2GHz		
		@ LO (dBm)		
		+17	+18	+19
6.2	0.01	7.4	7.3	7.2
6.5	0.30	7.1	7.0	6.9
6.8	0.55	7.3	7.2	7.1
7.0	0.80	7.5	7.4	7.4
7.3	1.05	7.8	7.7	7.7
7.5	1.30	8.0	7.9	7.8
7.8	1.55	8.4	8.3	8.2
8.0	1.80	8.4	8.3	8.2
8.3	2.05	8.5	8.4	8.4
8.5	2.30	8.4	8.4	8.3
8.8	2.55	8.4	8.3	8.3
9.0	2.80	8.5	8.4	8.4
9.3	3.05	8.5	8.5	8.4
9.5	3.30	8.7	8.6	8.5
9.8	3.55	9.0	9.0	8.9
10.0	3.80	9.3	9.2	9.2
10.3	4.05	9.7	9.6	9.6
10.5	4.30	9.9	9.8	9.8
10.8	4.55	10.0	9.9	9.9
11.0	4.80	9.8	9.8	9.8
11.3	5.05	9.5	9.5	9.5
11.5	5.30	9.3	9.3	9.3
11.8	5.55	9.1	9.1	9.2
12.0	5.80	9.3	9.3	9.4
12.3	6.05	9.2	9.3	9.4
12.5	6.30	9.4	9.5	9.6
12.8	6.55	9.7	9.9	10.1
13.0	6.80	9.9	10.1	10.3
13.3	7.05	10.4	10.5	10.8
13.5	7.30	10.8	11.0	11.3
13.8	7.55	11.3	11.5	11.8
14.0	7.80	12.0	12.3	12.6

RF FREQUENCY (GHz)	IF FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED LO=15GHz		
		@ LO (dBm)		
		+17	+18	+19
8.0	7.00	11.2	11.2	11.2
8.5	6.50	10.4	10.3	10.3
9.0	6.00	9.9	9.8	9.8
9.5	5.50	9.6	9.5	9.4
10.0	5.00	9.7	9.6	9.4
10.5	4.50	10.0	9.8	9.6
11.0	4.00	10.0	9.8	9.6
11.5	3.50	9.4	9.2	9.1
12.0	3.00	9.1	9.0	8.9
12.5	2.50	8.8	8.7	8.6
13.0	2.00	8.7	8.5	8.5
13.5	1.50	8.4	8.3	8.2
14.0	1.00	8.0	7.9	7.9
14.5	0.50	7.9	7.9	7.9
15.0	0.01	8.1	8.1	8.0
15.5	0.50	8.6	8.5	8.5
16.0	1.00	8.9	8.9	8.9
16.5	1.50	9.2	9.1	9.1
17.0	2.00	9.6	9.6	9.6
17.5	2.50	10.2	10.2	10.2
18.0	3.00	10.5	10.4	10.4
18.5	3.50	10.7	10.6	10.6
19.0	4.00	10.9	10.8	10.8
19.5	4.50	11.3	11.2	11.1
20.0	5.00	11.7	11.6	11.5
20.5	5.50	12.1	11.9	11.8
21.0	6.00	12.2	12.0	11.9
21.5	6.50	12.4	12.2	12.0
22.0	7.00	13.1	12.8	12.6

RF FREQUENCY (GHz)	IF FREQUENCY (GHz)	CONVERSION LOSS (dB) @ FIXED LO=24GHz		
		@ LO (dBm)		
		+17	+18	+19
15.0	9.00	16.0	16.0	16.1
15.3	8.75	16.4	16.4	16.4
15.5	8.50	16.5	16.5	16.5
15.8	8.25	16.2	16.2	16.2
16.0	8.00	15.8	15.8	15.8
16.3	7.75	15.3	15.3	15.3
16.5	7.50	14.7	14.6	14.6
16.8	7.25	14.2	14.1	14.0
17.0	7.00	13.8	13.7	13.6
17.3	6.75	13.1	13.0	12.9
17.5	6.50	13.1	12.9	12.8
17.8	6.25	12.7	12.5	12.4
18.0	6.00	12.5	12.3	12.2
18.3	5.75	12.1	11.9	11.8
18.5	5.50	12.0	11.8	11.6
18.8	5.25	11.7	11.5	11.4
19.0	5.00	11.9	11.7	11.5
19.3	4.75	12.0	11.8	11.7
19.5	4.50	12.1	11.9	11.7
19.8	4.25	12.6	12.4	12.2
20.0	4.00	12.7	12.5	12.3
20.3	3.75	12.7	12.5	12.3
20.5	3.50	12.7	12.5	12.4
20.8	3.25	12.4	12.3	12.1
21.0	3.00	12.0	11.9	11.8
21.3	2.75	11.6	11.5	11.4
21.5	2.50	11.3	11.2	11.1
21.8	2.25	10.8	10.7	10.6
22.0	2.00	10.6	10.5	10.4
22.3	1.75	10.4	10.3	10.2
22.5	1.50	10.4	10.2	10.2
22.8	1.25	10.5	10.4	10.3
23.0	1.00	10.6	10.4	10.4
23.3	0.75	11.1	11.0	10.9
23.5	0.50	11.4	11.3	11.2
23.8	0.25	11.8	11.6	11.4
24.0	0.01	12.1	11.9	11.7



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IF/RF MICROWAVE COMPONENTS

Typical Performance Data

LO FREQUENCY (GHz)	LO-RF Isolation (dB)			LO-IF (Q) Isolation (dB)			LO-IF (I) Isolation (dB)			RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	RF-IF (Q) Isolation (dB)			RF-IF (I) Isolation (dB)		
	@LO (dBm)			@LO (dBm)			@LO (dBm)					@LO (dBm)			@LO (dBm)		
	+17	+18	19	+17	+18	19	+17	+18	19			+17	+18	19	+17	+18	19
6.0	49.9	49.7	49.4	38.7	38.8	38.9	36.0	35.9	35.9	6.0	6.2	22.5	22.6	22.7	23.1	23.2	23.3
6.5	47.6	48.0	48.2	41.9	41.7	41.4	37.7	37.3	37.1	6.5	6.7	22.5	22.7	22.8	21.8	21.9	21.9
7.0	45.1	45.8	46.4	46.4	45.4	44.5	41.9	41.1	40.5	7.0	7.2	24.6	24.6	24.6	23.3	23.3	23.2
7.5	44.3	45.1	45.8	54.2	51.2	48.8	44.9	43.7	42.9	7.5	7.7	27.0	26.9	26.8	25.5	25.4	25.2
8.0	43.5	44.4	45.2	45.7	46.6	46.7	44.9	44.6	44.0	8.0	8.2	28.3	28.2	28.1	27.2	27.0	26.8
8.5	41.0	41.8	42.5	41.4	42.8	43.8	42.8	43.6	44.1	8.5	8.7	29.8	29.7	29.5	28.4	28.3	28.2
9.0	40.6	41.2	41.8	40.5	41.2	41.6	41.5	42.1	42.6	9.0	9.2	30.3	30.3	30.2	28.3	28.1	27.9
9.5	40.0	40.7	41.3	40.3	40.8	41.0	42.1	42.8	43.3	9.5	9.7	31.2	31.1	31.1	27.8	27.6	27.4
10.0	39.5	40.2	40.8	40.6	41.1	41.3	44.0	44.8	45.3	10.0	10.2	31.9	31.9	31.8	27.5	27.3	27.2
10.5	39.2	39.8	40.4	42.1	42.3	42.5	47.7	48.6	49.3	10.5	10.7	32.7	32.7	32.8	27.4	27.3	27.3
11.0	38.5	39.0	39.6	44.0	44.0	44.0	53.6	54.7	55.4	11.0	11.2	34.1	34.0	33.9	27.7	27.5	27.4
11.5	37.9	38.5	39.2	45.9	46.0	46.0	53.5	54.9	55.9	11.5	11.7	37.2	36.8	36.4	27.6	27.5	27.5
12.0	38.7	39.1	39.6	47.5	47.6	47.7	51.0	51.4	51.8	12.0	12.2	36.8	36.7	36.6	27.5	27.5	27.5
12.5	39.3	40.1	40.9	52.5	52.2	51.9	48.7	48.9	49.1	12.5	12.7	34.3	34.3	34.2	28.3	28.3	28.3
13.0	38.8	39.6	40.5	54.6	55.1	55.5	45.4	45.7	46.0	13.0	13.2	31.5	31.5	31.5	29.3	29.3	29.4
13.5	38.5	39.4	40.3	49.6	50.4	51.1	45.6	46.0	46.3	13.5	13.7	30.4	30.4	30.4	31.4	31.5	31.6
14.0	37.9	38.9	39.9	47.3	47.9	48.4	48.6	48.9	49.2	14.0	14.2	31.1	31.1	31.2	34.0	34.2	34.5
14.5	37.7	38.7	39.8	44.9	45.2	45.4	59.0	58.0	57.0	14.5	14.7	36.3	36.5	36.6	31.4	31.6	31.7
15.0	37.9	39.1	40.4	41.9	41.9	41.8	50.2	49.7	49.2	15.0	15.2	35.9	35.9	36.0	26.3	26.4	26.5
15.5	39.4	41.2	43.2	40.5	40.4	40.4	45.3	45.0	44.8	15.5	15.7	27.8	27.9	27.9	24.0	24.2	24.3
16.0	40.3	42.7	45.7	41.4	41.3	41.3	44.2	44.1	44.0	16.0	16.2	26.8	26.9	26.9	24.2	24.4	24.6
16.5	40.2	42.8	46.2	41.1	41.0	40.9	41.6	41.7	41.7	16.5	16.7	26.7	26.7	26.8	24.4	24.5	24.7
17.0	38.0	39.3	40.7	40.6	40.6	40.5	39.3	39.4	39.5	17.0	17.2	27.3	27.3	27.4	24.7	24.9	25.0
17.5	37.6	38.5	39.5	40.2	40.3	40.3	37.8	38.0	38.1	17.5	17.7	28.3	28.4	28.4	25.1	25.3	25.4
18.0	38.4	39.3	40.3	39.1	39.3	39.4	37.1	37.3	37.5	18.0	18.2	29.8	29.9	29.9	26.4	26.5	26.6
18.5	39.3	40.4	41.6	37.8	38.0	38.1	36.4	36.6	36.8	18.5	18.7	32.0	32.1	32.1	27.7	27.8	27.8
19.0	39.0	39.9	40.7	36.6	36.8	36.9	35.3	35.5	35.6	19.0	19.2	34.2	34.2	34.2	27.8	27.9	28.0
19.5	38.7	39.5	40.2	35.3	35.5	35.6	33.6	33.7	33.8	19.5	19.7	36.4	36.4	36.4	27.0	27.0	27.0
20.0	38.9	39.6	40.1	33.3	33.4	33.5	31.0	31.1	31.1	20.0	20.2	37.8	37.7	37.7	26.1	26.2	26.2
20.5	39.3	39.8	40.3	31.8	31.9	32.0	29.3	29.3	29.3	20.5	20.7	36.0	36.0	36.1	25.3	25.3	25.3
21.0	38.9	39.2	39.4	31.5	31.5	31.5	29.6	29.4	29.3	21.0	21.2	32.5	32.6	32.8	24.9	25.0	25.0
21.5	38.0	38.2	38.2	30.4	30.1	29.8	28.8	28.4	28.0	21.5	21.7	30.0	30.3	30.5	24.6	24.7	24.7
22.0	36.2	36.4	36.5	29.7	29.2	28.7	28.3	27.7	27.1	22.0	22.2	27.9	28.1	28.3	24.4	24.5	24.6
22.5	34.8	35.1	35.4	28.8	28.2	27.6	27.2	26.5	25.9	22.5	22.7	26.9	27.0	27.2	25.8	26.0	26.2
23.0	33.9	34.4	34.8	26.9	26.5	26.0	25.1	24.6	24.1	23.0	23.2	26.4	26.5	26.7	28.0	28.3	28.6
23.5	32.8	33.4	33.9	25.3	25.0	24.7	22.8	22.4	22.1	23.5	23.7	26.8	26.9	27.1	30.4	30.8	31.2
24.0	31.6	32.2	32.8	25.2	25.2	25.1	22.1	21.9	21.7	24.0	24.2	26.6	26.7	26.8	29.2	29.5	29.7

Typical Performance Data

RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	AMP UNBALANCE VS. RF @ FIXED IF=200MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	6.2	1.3	0.8	0.8
6.5	6.7	0.5	0.2	0.2
7.0	7.2	0.1	0.2	0.2
7.5	7.7	0.1	0.2	0.2
8.0	8.2	0.2	0.3	0.3
8.5	8.7	0.1	0.2	0.3
9.0	9.2	0.1	0.2	0.2
9.5	9.7	0.1	0.2	0.2
10.0	10.2	0.1	0.2	0.2
10.5	10.7	0.2	0.2	0.2
11.0	11.2	0.0	0.0	0.0
11.5	11.7	0.0	0.0	0.0
12.0	12.2	0.1	0.2	0.1
12.5	12.7	0.3	0.3	0.2
13.0	13.2	0.2	0.2	0.1
13.5	13.7	0.2	0.2	0.1
14.0	14.2	0.2	0.1	0.1
14.5	14.7	0.1	0.1	0.0
15.0	15.2	0.1	0.1	0.1
15.5	15.7	0.1	0.1	0.1
16.0	16.2	0.1	0.0	0.0
16.5	16.7	0.1	0.1	0.0
17.0	17.2	0.2	0.2	0.1
17.5	17.7	0.0	0.1	0.0
18.0	18.2	0.0	0.1	0.1
18.5	18.7	0.0	0.1	0.1
19.0	19.2	0.0	0.0	0.0
19.5	19.7	0.2	0.0	0.1
20.0	20.2	0.2	0.1	0.1
20.5	20.7	0.2	0.1	0.1
21.0	21.2	0.1	0.0	0.1
21.5	21.7	0.2	0.1	0.1
22.0	22.2	0.1	0.0	0.1
22.5	22.7	0.2	0.1	0.1
23.0	23.2	0.1	0.0	0.0
23.5	23.7	0.0	0.1	0.0
24.0	24.2	0.0	0.1	0.0
24.5	24.7	0.5	0.3	0.3
25.0	25.2	0.9	0.5	0.6
25.5	25.7	1.3	0.5	0.7
26.0	26.2	2.4	1.0	1.0
26.5	26.7	28.4	8.9	5.0
27.0	27.2	24.8	6.3	3.8
27.5	27.7	24.8	6.3	3.8
28.0	28.2	24.8	6.3	3.8

RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	AMP UNBALANCE VS. RF @ FIXED IF=2000MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	8.0	0.3	0.1	0.1
6.5	8.5	0.0	0.1	0.1
7.0	9.0	0.2	0.2	0.2
7.5	9.5	0.2	0.2	0.2
8.0	10.0	0.1	0.2	0.2
8.5	10.5	0.0	0.1	0.1
9.0	11.0	0.0	0.0	0.0
9.5	11.5	0.1	0.2	0.2
10.0	12.0	0.2	0.1	0.1
10.5	12.5	0.0	0.0	0.0
11.0	13.0	0.1	0.1	0.1
11.5	13.5	0.2	0.1	0.1
12.0	14.0	0.2	0.1	0.1
12.5	14.5	0.1	0.0	0.0
13.0	15.0	0.0	0.1	0.1
13.5	15.5	0.1	0.2	0.2
14.0	16.0	0.2	0.3	0.3
14.5	16.5	0.1	0.2	0.2
15.0	17.0	0.1	0.1	0.1
15.5	17.5	0.0	0.0	0.0
16.0	18.0	0.0	0.0	0.0
16.5	18.5	0.1	0.1	0.1
17.0	19.0	0.1	0.1	0.1
17.5	19.5	0.1	0.1	0.1
18.0	20.0	0.2	0.1	0.1
18.5	20.5	0.2	0.1	0.1
19.0	21.0	0.3	0.2	0.2
19.5	21.5	0.3	0.2	0.2
20.0	22.0	0.2	0.1	0.2
20.5	22.5	0.4	0.3	0.3
21.0	23.0	0.0	0.0	0.0
21.5	23.5	0.4	0.3	0.3
22.0	24.0	0.4	0.4	0.4
22.5	24.5	0.3	0.3	0.3
23.0	25.0	0.5	0.4	0.4
23.5	25.5	0.9	0.6	0.6
24.0	26.0	3.2	1.1	1.1
24.5	26.5	22.9	4.0	4.0
25.0	27.0	37.7	12.3	12.2
25.5	27.5	35.3	42.0	42.0
26.0	28.0	10.9	33.5	33.4

RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	AMP UNBALANCE VS. RF @ FIXED IF=3000MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	9.0	0.5	0.4	0.3
6.5	9.5	0.3	0.3	0.2
7.0	10.0	0.3	0.3	0.2
7.5	10.5	0.3	0.3	0.2
8.0	11.0	0.3	0.2	0.2
8.5	11.5	0.2	0.2	0.2
9.0	12.0	0.2	0.2	0.2
9.5	12.5	0.1	0.2	0.2
10.0	13.0	0.3	0.3	0.3
10.5	13.5	0.3	0.4	0.4
11.0	14.0	0.1	0.1	0.2
11.5	14.5	0.1	0.1	0.2
12.0	15.0	0.2	0.2	0.3
12.5	15.5	0.3	0.4	0.4
13.0	16.0	0.4	0.4	0.4
13.5	16.5	0.4	0.4	0.4
14.0	17.0	0.5	0.5	0.5
14.5	17.5	0.5	0.5	0.5
15.0	18.0	0.4	0.4	0.4
15.5	18.5	0.2	0.2	0.2
16.0	19.0	0.4	0.3	0.3
16.5	19.5	0.4	0.3	0.3
17.0	20.0	0.3	0.2	0.2
17.5	20.5	0.3	0.2	0.2
18.0	21.0	0.5	0.4	0.3
18.5	21.5	0.4	0.4	0.3
19.0	22.0	0.4	0.4	0.3
19.5	22.5	0.5	0.5	0.4
20.0	23.0	0.8	0.7	0.6
20.5	23.5	0.4	0.4	0.3
21.0	24.0	0.6	0.6	0.6
21.5	24.5	0.8	0.7	0.6
22.0	25.0	0.7	0.6	0.6
22.5	25.5	1.0	0.9	0.8
23.0	26.0	4.1	2.3	1.6
23.5	26.5	25.6	12.4	5.1
24.0	27.0	24.7	27.3	13.6
24.5	27.5	23.4	23.8	26.0
25.0	28.0	9.8	17.0	22.8



Typical Performance Data

RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	PHASE UNBALANCE VS. RF @ FIXED IF=200MHz			RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	PHASE UNBALANCE VS. RF @ FIXED IF=2000MHz			RF FREQUENCY (GHz)	LO FREQUENCY (GHz)	PHASE UNBALANCE VS. RF @ FIXED IF=3000MHz		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
6.0	6.2	1.3	1.7	1.8	6.0	8.0	5.6	4.6	3.7	6.0	9.0	1.0	1.1	1.1
6.5	6.7	4.3	3.0	2.0	6.5	8.5	3.2	2.8	2.4	6.5	9.5	0.6	0.5	0.4
7.0	7.2	1.8	0.4	0.8	7.0	9.0	0.6	0.8	1.0	7.0	10.0	1.0	0.3	0.2
7.5	7.7	2.4	1.5	0.7	7.5	9.5	1.0	0.7	0.4	7.5	10.5	1.5	0.5	0.3
8.0	8.2	1.5	1.4	1.2	8.0	10.0	1.7	0.9	0.2	8.0	11.0	1.0	0.3	0.4
8.5	8.7	0.8	0.0	0.7	8.5	10.5	1.8	0.8	0.1	8.5	11.5	0.4	1.0	1.6
9.0	9.2	2.6	2.2	1.7	9.0	11.0	1.1	0.2	0.6	9.0	12.0	1.8	2.0	2.0
9.5	9.7	2.0	1.2	0.4	9.5	11.5	1.4	0.6	0.2	9.5	12.5	1.7	2.8	3.7
10.0	10.2	1.6	0.8	0.2	10.0	12.0	1.5	1.8	1.9	10.0	13.0	1.3	2.0	2.5
10.5	10.7	1.5	0.3	0.5	10.5	12.5	0.8	2.0	3.0	10.5	13.5	3.5	3.7	3.8
11.0	11.2	0.8	0.1	0.9	11.0	13.0	2.9	3.5	4.0	11.0	14.0	4.6	4.6	4.7
11.5	11.7	0.7	1.4	2.1	11.5	13.5	4.1	4.4	4.6	11.5	14.5	3.8	3.9	3.9
12.0	12.2	2.4	3.0	3.5	12.0	14.0	3.4	3.6	3.9	12.0	15.0	4.9	4.5	4.3
12.5	12.7	2.1	3.0	3.7	12.5	14.5	4.7	4.8	4.9	12.5	15.5	6.0	5.4	4.9
13.0	13.2	2.1	2.7	3.2	13.0	15.0	6.0	5.6	5.4	13.0	16.0	6.6	5.6	4.9
13.5	13.7	3.2	3.5	3.9	13.5	15.5	7.7	7.1	6.5	13.5	16.5	7.0	6.1	5.2
14.0	14.2	4.5	4.8	5.0	14.0	16.0	8.0	7.2	6.6	14.0	17.0	6.9	5.9	5.1
14.5	14.7	6.2	6.2	6.2	14.5	16.5	8.2	7.3	6.4	14.5	17.5	7.1	6.0	5.0
15.0	15.2	8.5	7.9	7.5	15.0	17.0	8.5	7.5	6.5	15.0	18.0	6.7	5.7	4.9
15.5	15.7	9.9	8.9	8.0	15.5	17.5	8.0	7.0	6.0	15.5	18.5	5.0	4.3	3.5
16.0	16.2	9.5	8.5	7.6	16.0	18.0	6.0	5.3	4.7	16.0	19.0	4.1	3.4	2.8
16.5	16.7	9.1	8.1	7.3	16.5	18.5	4.6	3.9	3.2	16.5	19.5	3.5	2.8	2.1
17.0	17.2	7.5	6.5	5.7	17.0	19.0	4.0	3.4	2.8	17.0	20.0	1.6	1.0	0.5
17.5	17.7	7.2	6.2	5.2	17.5	19.5	2.6	2.3	1.9	17.5	20.5	0.4	0.5	0.6
18.0	18.2	6.5	5.6	4.8	18.0	20.0	1.0	0.6	0.3	18.0	21.0	2.7	2.5	2.3
18.5	18.7	5.1	4.5	3.9	18.5	20.5	1.0	1.1	1.1	18.5	21.5	4.2	3.7	3.2
19.0	19.2	3.5	3.2	2.9	19.0	21.0	2.2	2.1	1.9	19.0	22.0	4.5	3.9	3.4
19.5	19.7	2.3	2.1	1.8	19.5	21.5	3.7	3.1	2.7	19.5	22.5	5.0	4.4	3.9
20.0	20.2	1.5	1.2	0.9	20.0	22.0	4.4	3.8	3.3	20.0	23.0	4.7	4.3	3.8
20.5	20.7	0.3	0.3	0.2	20.5	22.5	4.1	3.5	3.1	20.5	23.5	4.4	4.2	3.9
21.0	21.2	2.7	2.4	2.1	21.0	23.0	4.0	3.6	3.1	21.0	24.0	4.9	4.8	4.5
21.5	21.7	1.8	1.3	0.9	21.5	23.5	3.8	3.5	3.1	21.5	24.5	3.5	3.5	3.5
22.0	22.2	3.6	2.9	2.2	22.0	24.0	2.5	2.3	2.0	22.0	25.0	2.1	2.5	2.8
22.5	22.7	3.1	2.5	1.9	22.5	24.5	1.6	1.6	1.7	22.5	25.5	1.9	2.4	2.9
23.0	23.2	2.7	2.4	2.1	23.0	25.0	2.1	2.2	2.3	23.0	26.0	0.9	1.2	0.8
23.5	23.7	2.7	2.4	2.2	23.5	25.5	0.6	0.8	1.0	23.5	26.5	49.5	3.5	5.3
24.0	24.2	3.2	2.9	2.6	24.0	26.0	1.8	3.0	3.2	24.0	27.0	33.8	63.9	7.4
24.5	24.7	3.6	3.2	2.8	24.5	26.5	23.6	5.0	1.9	24.5	27.5	21.7	18.0	37.0
25.0	25.2	1.8	1.6	1.6	25.0	27.0	49.6	29.1	6.1	25.0	28.0	47.6	72.7	26.8
25.5	25.7	1.7	0.6	0.4	25.5	27.5	12.7	0.8	60.8					
26.0	26.2	2.9	0.2	0.4	26.0	28.0	56.9	76.9	26.3					
26.5	26.7	14.5	8.4	3.8										
27.0	27.2	12.6	7.0	2.1										
27.5	27.7	12.6	7.0	2.1										
28.0	28.2	12.6	7.0	2.1										



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IF/RF MICROWAVE COMPONENTS

## Typical Performance Data

RF FREQUENCY (GHz)	RF VSWR (:1)			LO VSWR (:1)		
	@LO (dBm)			@LO (dBm)		
	+17	+18	19	+17	+18	19
6.0	1.75	1.74	1.73	1.49	1.49	1.48
6.5	1.33	1.30	1.29	1.30	1.30	1.28
7.0	1.64	1.61	1.58	1.17	1.17	1.15
7.5	1.69	1.67	1.65	1.06	1.06	1.05
8.0	1.57	1.55	1.53	1.02	1.02	1.03
8.5	1.51	1.49	1.47	1.06	1.06	1.07
9.0	1.57	1.55	1.53	1.08	1.08	1.08
9.5	1.59	1.57	1.55	1.08	1.08	1.08
10.0	1.63	1.61	1.59	1.08	1.08	1.08
10.5	1.66	1.65	1.63	1.08	1.08	1.08
11.0	1.66	1.63	1.61	1.08	1.08	1.08
11.5	1.72	1.68	1.64	1.10	1.10	1.10
12.0	1.76	1.72	1.68	1.12	1.12	1.12
12.5	1.70	1.67	1.64	1.15	1.15	1.14
13.0	1.65	1.62	1.59	1.13	1.13	1.13
13.5	1.52	1.49	1.46	1.12	1.12	1.12
14.0	1.41	1.39	1.36	1.11	1.11	1.11
14.5	1.40	1.39	1.37	1.09	1.09	1.10
15.0	1.56	1.54	1.53	1.08	1.08	1.08
15.5	1.73	1.72	1.70	1.06	1.06	1.06
16.0	1.79	1.77	1.75	1.05	1.05	1.05
16.5	1.96	1.93	1.90	1.10	1.10	1.10
17.0	1.97	1.94	1.92	1.15	1.15	1.15
17.5	2.14	2.11	2.08	1.20	1.20	1.20
18.0	2.25	2.22	2.18	1.23	1.23	1.23
18.5	2.32	2.28	2.25	1.26	1.26	1.26
19.0	2.35	2.30	2.26	1.28	1.28	1.28
19.5	2.37	2.31	2.26	1.31	1.31	1.31
20.0	2.36	2.29	2.24	1.33	1.33	1.34
20.5	2.11	2.06	2.03	1.35	1.35	1.35
21.0	1.84	1.80	1.76	1.35	1.35	1.36
21.5	1.82	1.78	1.76	1.36	1.36	1.37
22.0	1.65	1.63	1.60	1.39	1.38	1.39
22.5	1.59	1.57	1.54	1.43	1.43	1.44
23.0	1.59	1.56	1.53	1.50	1.50	1.51
23.5	1.55	1.53	1.52	1.58	1.58	1.59
24.0	1.59	1.58	1.58	1.68	1.68	1.69

IF FREQUENCY (GHz)	IF (Q) VSWR (:1)			IF (I) VSWR (:1)		
	@LO (dBm)			@LO (dBm)		
	+17	+18	19	+17	+18	19
0.01	1.72	1.61	1.51	1.56	1.46	1.37
0.05	1.72	1.61	1.51	1.55	1.45	1.36
0.10	1.71	1.60	1.51	1.55	1.45	1.36
0.20	1.72	1.61	1.51	1.56	1.46	1.37
0.50	1.70	1.60	1.51	1.53	1.44	1.36
1.00	1.62	1.54	1.46	1.47	1.40	1.33
1.20	1.58	1.51	1.44	1.44	1.38	1.32
1.40	1.57	1.50	1.45	1.42	1.37	1.32
1.60	1.56	1.50	1.46	1.43	1.38	1.35
1.80	1.55	1.51	1.46	1.44	1.40	1.37
2.00	1.56	1.52	1.49	1.45	1.43	1.41
2.20	1.59	1.56	1.53	1.50	1.48	1.47
2.40	1.63	1.60	1.58	1.55	1.53	1.53
2.60	1.66	1.64	1.62	1.59	1.58	1.58
2.80	1.70	1.68	1.67	1.65	1.64	1.63
3.00	1.74	1.72	1.70	1.69	1.68	1.67
3.20	1.78	1.75	1.73	1.73	1.71	1.70
3.40	1.81	1.78	1.75	1.78	1.76	1.74
3.60	1.85	1.81	1.77	1.83	1.80	1.77
3.80	1.88	1.83	1.78	1.87	1.82	1.79
4.00	1.91	1.84	1.79	1.92	1.87	1.82
4.20	1.91	1.84	1.77	1.91	1.85	1.79
4.40	1.91	1.83	1.76	1.89	1.81	1.74
4.60	1.90	1.81	1.74	1.87	1.79	1.72
4.80	1.88	1.79	1.71	1.84	1.76	1.68
5.00	1.85	1.76	1.67	1.83	1.74	1.67
5.20	1.84	1.75	1.67	1.84	1.76	1.68
5.30	1.82	1.73	1.65	1.82	1.73	1.66
5.40	1.82	1.73	1.65	1.84	1.76	1.69
5.50	1.81	1.72	1.65	1.88	1.79	1.72
5.60	1.84	1.76	1.68	1.92	1.83	1.76
5.70	1.86	1.77	1.70	1.93	1.84	1.77
5.80	1.91	1.83	1.75	2.03	1.94	1.87
5.90	1.95	1.87	1.80	2.07	1.98	1.91
6.00	2.01	1.93	1.85	2.14	2.06	1.99

Typical Performance Data

RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (I) LOWER SIDE @ FIXED IF=200MHz			RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (I) LOWER SIDE @ FIXED IF=2000MHz			RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (I) LOWER SIDE @ FIXED IF=300MHz		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
6.0	6.2	15.6	16.4	17.3	6.0	8.0	16.4	17.1	17.8	6.0	9.0	19.2	19.7	20.0
6.5	6.7	14.6	15.3	15.9	6.5	8.5	17.2	17.7	18.3	6.5	9.5	18.6	19.5	20.2
7.0	7.2	14.8	15.6	16.4	7.0	9.0	19.3	19.7	19.9	7.0	10.0	18.6	19.3	19.9
7.5	7.7	16.1	16.7	17.3	7.5	9.5	20.8	21.7	22.3	7.5	10.5	20.2	20.5	20.7
8.0	8.2	18.5	18.8	19.3	8.0	10.0	20.9	21.6	22.3	8.0	11.0	19.4	20.1	20.8
8.5	8.7	20.9	20.8	21.1	8.5	10.5	21.3	21.5	21.8	8.5	11.5	18.1	18.3	18.6
9.0	9.2	24.3	23.8	23.3	9.0	11.0	20.0	20.5	21.0	9.0	12.0	20.9	20.0	19.9
9.5	9.7	25.8	26.4	26.3	9.5	11.5	19.6	19.6	19.9	9.5	12.5	23.7	23.8	23.0
10.0	10.2	25.5	26.5	27.3	10.0	12.0	22.3	21.4	21.0	10.0	13.0	22.0	22.6	23.2
10.5	10.7	22.4	22.9	23.6	10.5	12.5	23.6	23.5	23.2	10.5	13.5	22.4	22.9	23.3
11.0	11.2	24.0	23.1	23.0	11.0	13.0	22.4	22.7	23.0	11.0	14.0	23.1	23.8	24.2
11.5	11.7	24.8	23.7	23.2	11.5	13.5	22.0	22.5	22.8	11.5	14.5	22.3	23.1	23.8
12.0	12.2	23.9	22.9	22.3	12.0	14.0	21.4	22.1	22.5	12.0	15.0	22.1	22.8	23.3
12.5	12.7	25.7	25.7	25.4	12.5	14.5	21.4	22.3	22.9	12.5	15.5	22.9	23.4	23.5
13.0	13.2	22.7	23.1	23.4	13.0	15.0	21.5	22.5	23.1	13.0	16.0	23.9	24.2	24.4
13.5	13.7	21.0	21.6	22.0	13.5	15.5	22.2	22.5	22.9	13.5	16.5	22.8	23.7	24.1
14.0	14.2	20.9	21.8	22.4	14.0	16.0	23.6	24.0	24.0	14.0	17.0	20.9	21.8	22.2
14.5	14.7	20.4	21.4	22.1	14.5	16.5	23.1	23.6	23.7	14.5	17.5	20.9	21.8	22.5
15.0	15.2	20.0	20.8	21.3	15.0	17.0	21.0	21.6	21.7	15.0	18.0	20.4	21.1	21.3
15.5	15.7	21.6	21.5	22.0	15.5	17.5	21.9	22.5	22.8	15.5	18.5	22.2	22.0	21.8
16.0	16.2	23.2	22.8	22.4	16.0	18.0	21.7	21.7	21.6	16.0	19.0	19.6	19.4	19.5
16.5	16.7	22.8	22.6	22.5	16.5	18.5	21.8	21.3	21.1	16.5	19.5	18.2	18.5	19.3
17.0	17.2	28.1	26.6	25.5	17.0	19.0	19.9	20.1	20.5	17.0	20.0	19.2	20.7	22.0
17.5	17.7	28.6	28.4	27.7	17.5	19.5	20.9	21.1	22.0	17.5	20.5	21.4	22.6	23.7
18.0	18.2	28.7	28.3	27.4	18.0	20.0	22.7	23.6	23.9	18.0	21.0	23.3	23.6	24.4
18.5	18.7	24.4	24.4	24.8	18.5	20.5	22.1	23.3	24.2	18.5	21.5	24.7	24.4	24.9
19.0	19.2	24.7	24.7	24.9	19.0	21.0	22.4	23.2	24.1	19.0	22.0	27.7	25.8	25.4
19.5	19.7	25.2	26.6	29.9	19.5	21.5	25.9	26.2	28.3	19.5	22.5	29.4	30.3	31.1
20.0	20.2	24.0	26.5	29.3	20.0	22.0	29.0	27.8	27.8	20.0	23.0	29.4	30.6	31.0
20.5	20.7	23.5	25.0	26.2	20.5	22.5	28.3	27.8	26.7	20.5	23.5	29.7	29.0	28.0
21.0	21.2	23.8	24.9	25.8	21.0	23.0	27.4	27.2	27.0	21.0	24.0	25.7	25.8	25.4
21.5	21.7	23.3	25.0	26.0	21.5	23.5	28.5	28.6	28.7					
22.0	22.2	25.1	25.7	25.9	22.0	24.0	25.5	26.2	26.2					
22.5	22.7	27.6	27.4	27.4										
23.0	23.2	27.7	28.6	28.6										
23.5	23.7	28.0	30.0	31.1										
24.0	24.2	28.5	29.8	30.0										

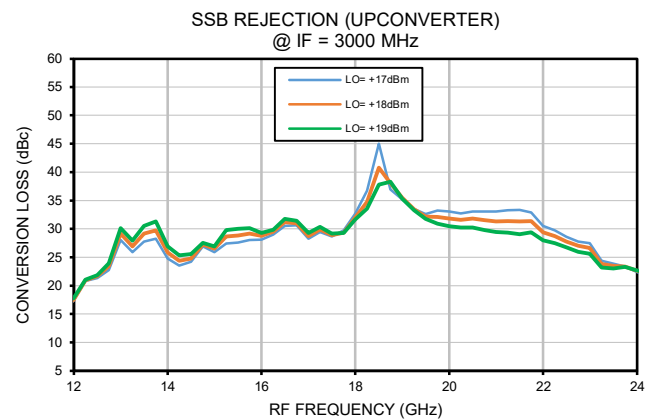
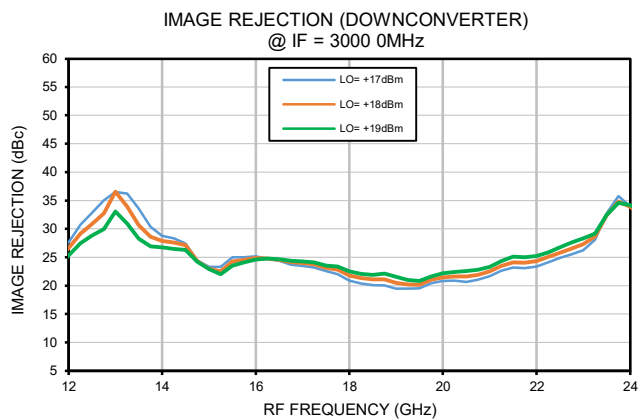
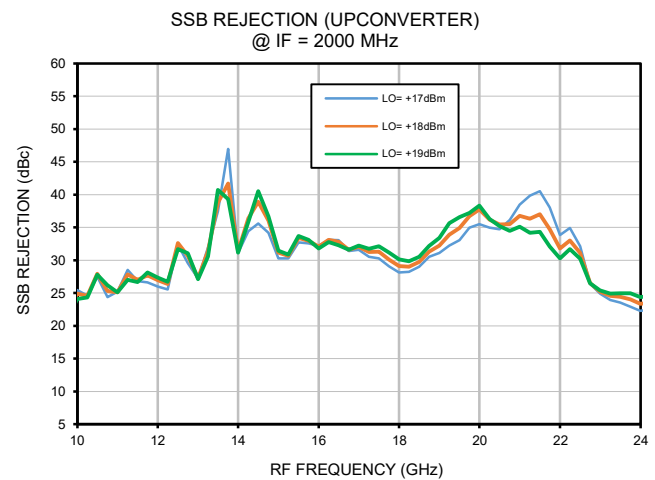
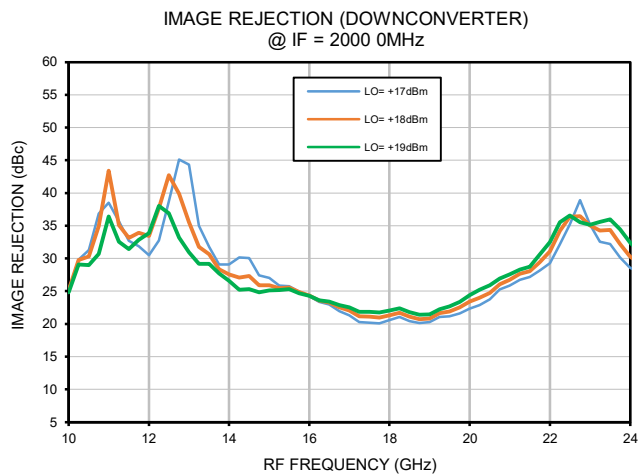
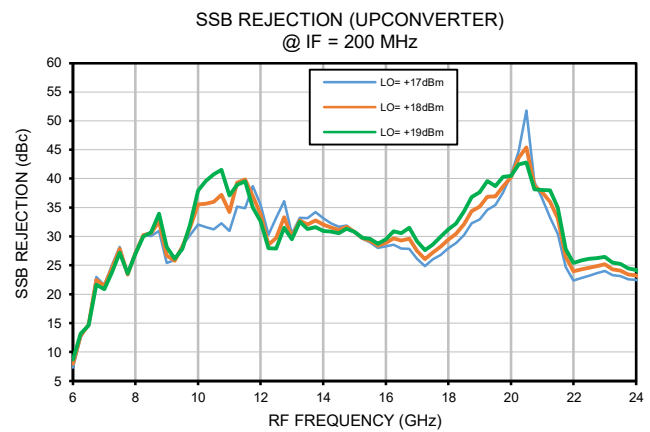
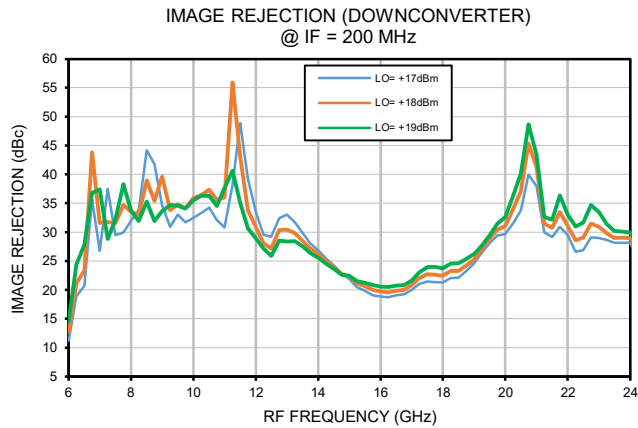
Typical Performance Data

RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (Q) LOWER SIDE @ FIXED IF=200MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	6.2	19.7	20.3	20.8
6.5	6.7	17.2	17.7	18.3
7.0	7.2	19.3	19.7	19.9
7.5	7.7	20.8	21.7	22.3
8.0	8.2	20.9	21.6	22.3
8.5	8.7	21.3	21.5	21.8
9.0	9.2	20.0	20.5	21.0
9.5	9.7	19.6	19.6	19.9
10.0	10.2	22.3	21.4	21.0
10.5	10.7	23.6	23.5	23.2
11.0	11.2	22.4	22.7	23.0
11.5	11.7	22.0	22.5	22.8
12.0	12.2	21.4	22.1	22.5
12.5	12.7	21.4	22.3	22.9
13.0	13.2	21.5	22.5	23.1
13.5	13.7	22.2	22.5	22.9
14.0	14.2	23.6	24.0	24.0
14.5	14.7	23.1	23.6	23.7
15.0	15.2	21.0	21.6	21.7
15.5	15.7	21.9	22.5	22.8
16.0	16.2	21.7	21.7	21.6
16.5	16.7	21.8	21.3	21.1
17.0	17.2	19.9	20.1	20.5
17.5	17.7	20.9	21.1	22.0
18.0	18.2	22.7	23.6	23.9
18.5	18.7	22.1	23.3	24.2
19.0	19.2	22.4	23.2	24.1
19.5	19.7	25.9	26.2	28.3
20.0	20.2	29.0	27.8	27.8
20.5	20.7	28.3	27.8	26.7
21.0	21.2	27.4	27.2	27.0
21.5	21.7	28.5	28.6	28.7
22.0	22.2	25.5	26.2	26.2
22.5	22.7	23.4	24.2	24.8
23.0	23.2	25.3	26.1	26.2
23.5	23.7	23.6	31.2	32.3
24.0	24.2	16.0	17.6	21.5

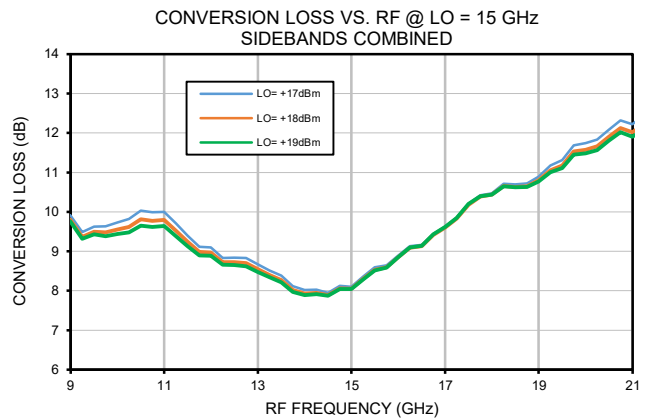
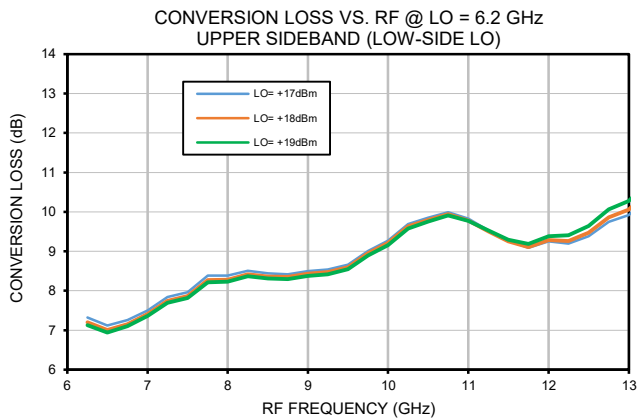
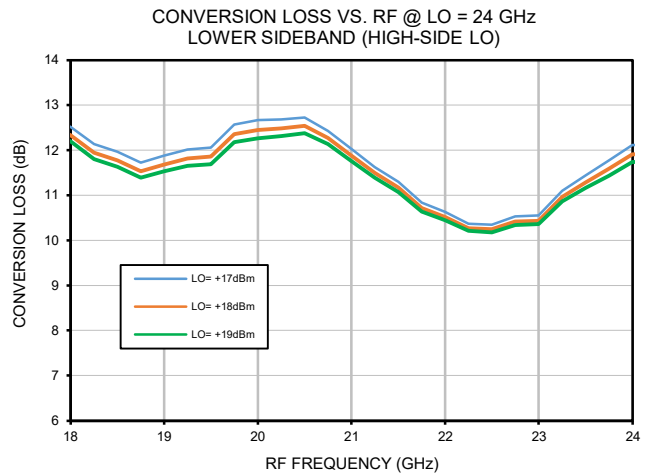
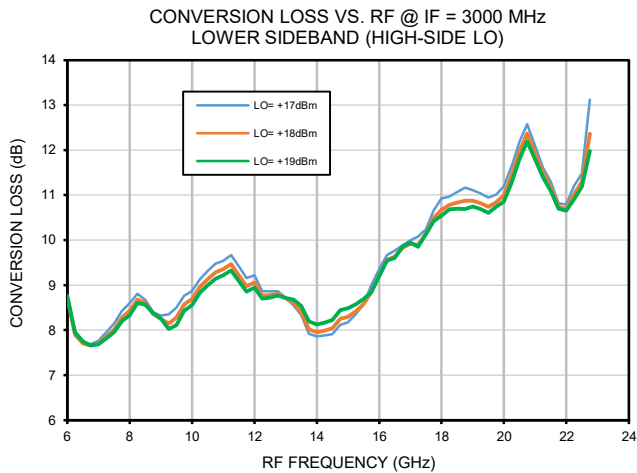
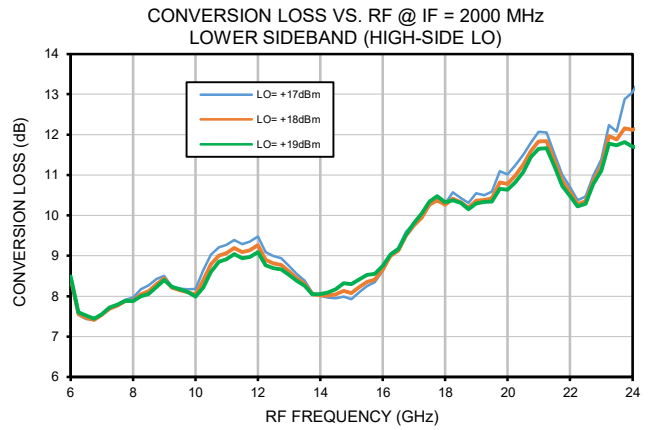
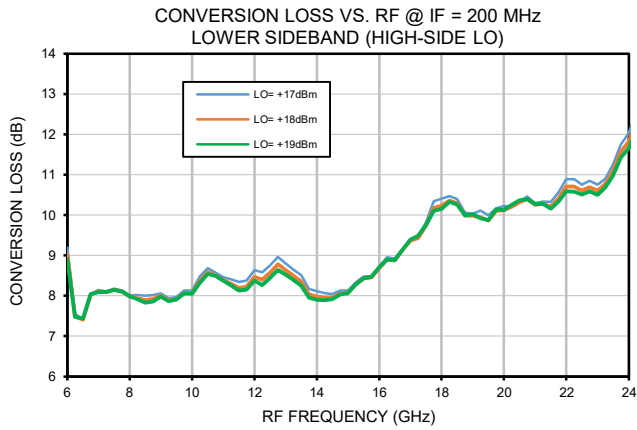
RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (Q) LOWER SIDE @ FIXED IF=2000MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	8.0	19.0	19.5	20.0
6.5	8.5	19.6	19.8	20.1
7.0	9.0	21.6	22.0	22.5
7.5	9.5	23.0	23.3	23.2
8.0	10.0	22.2	23.0	23.5
8.5	10.5	21.6	22.0	22.5
9.0	11.0	20.4	21.0	21.6
9.5	11.5	20.1	19.9	20.2
10.0	12.0	23.6	22.3	21.3
10.5	12.5	22.1	22.3	22.4
11.0	13.0	21.9	22.8	23.4
11.5	13.5	21.8	22.6	23.1
12.0	14.0	20.2	21.0	21.7
12.5	14.5	19.5	21.0	21.9
13.0	15.0	19.8	21.0	22.0
13.5	15.5	21.6	22.1	22.5
14.0	16.0	24.6	24.2	23.9
14.5	16.5	23.4	24.1	24.1
15.0	17.0	20.8	21.4	21.8
15.5	17.5	22.5	23.1	23.4
16.0	18.0	21.8	21.9	21.9
16.5	18.5	22.3	21.7	21.4
17.0	19.0	20.5	20.7	20.9
17.5	19.5	21.5	21.6	22.6
18.0	20.0	23.3	23.8	23.7
18.5	20.5	23.2	24.2	24.9
19.0	21.0	23.0	24.0	24.6
19.5	21.5	26.2	27.5	29.1
20.0	22.0	29.2	28.6	27.8
20.5	22.5	28.0	27.3	27.1
21.0	23.0	26.9	27.1	26.9
21.5	23.5	28.7	29.4	28.3
22.0	24.0	25.4	25.8	26.0

RF (IN) FREQUENCY (GHz)	LO FREQUENCY (GHz)	INPUT IP3 VS. RF (Q) LOWER SIDE @ FIXED IF=3000MHz		
		@LO (dBm)		
		+17	+18	+19
6.0	9.0	21.4	22.0	22.6
6.5	9.5	20.5	21.0	21.5
7.0	10.0	19.9	20.5	21.0
7.5	10.5	20.5	20.7	21.0
8.0	11.0	20.1	20.9	21.5
8.5	11.5	18.8	19.0	19.3
9.0	12.0	22.9	21.4	20.6
9.5	12.5	21.9	22.4	22.4
10.0	13.0	21.1	22.0	23.0
10.5	13.5	22.2	23.1	23.7
11.0	14.0	22.1	23.3	24.0
11.5	14.5	20.6	21.9	22.8
12.0	15.0	20.4	21.6	22.3
12.5	15.5	21.7	22.3	22.9
13.0	16.0	24.5	24.2	23.7
13.5	16.5	23.2	24.9	25.1
14.0	17.0	21.1	22.3	22.9
14.5	17.5	21.2	22.3	22.8
15.0	18.0	20.7	21.2	21.5
15.5	18.5	22.8	22.4	22.2
16.0	19.0	20.0	19.8	19.7
16.5	19.5	18.8	19.0	19.7
17.0	20.0	20.2	22.0	23.5
17.5	20.5	22.7	24.0	24.8
18.0	21.0	23.1	23.9	24.3
18.5	21.5	24.3	24.6	25.3
19.0	22.0	26.6	25.8	25.7
19.5	22.5	29.8	30.3	31.4
20.0	23.0	29.4	29.9	31.7
20.5	23.5	32.0	29.5	28.9
21.0	24.0	25.2	25.5	25.5

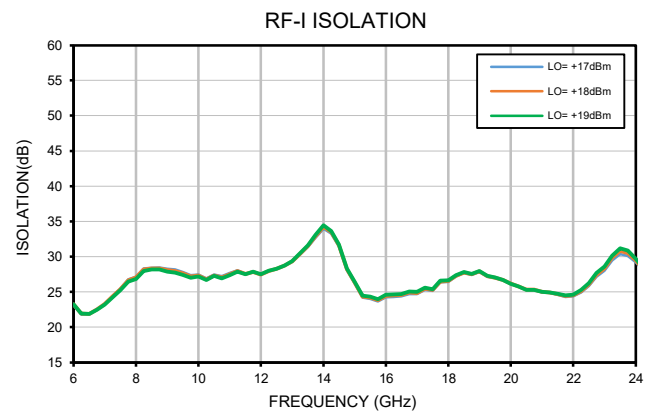
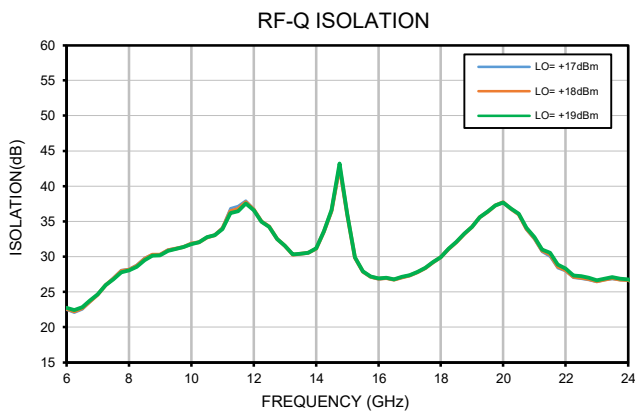
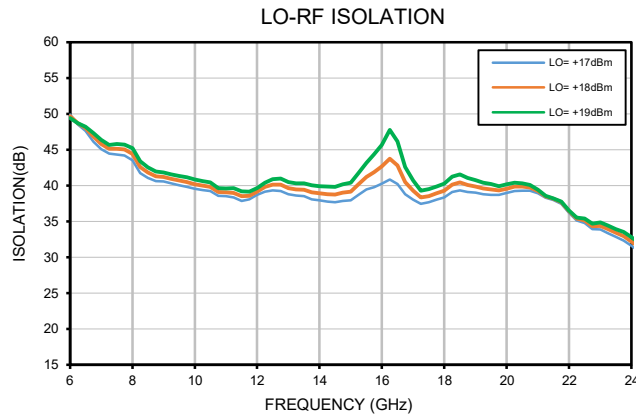
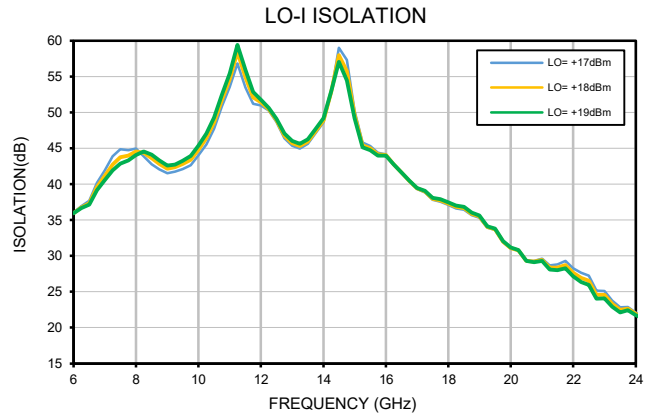
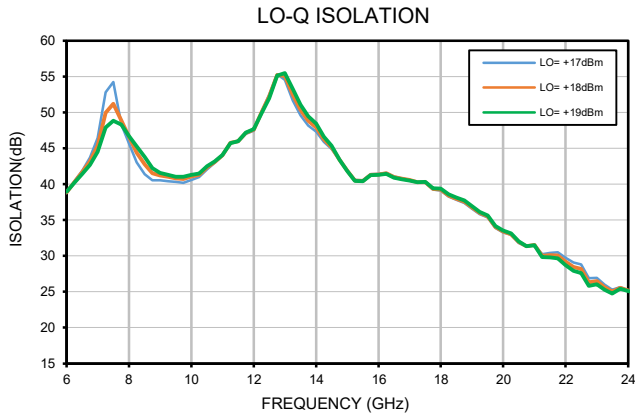
## Typical Performance Curves



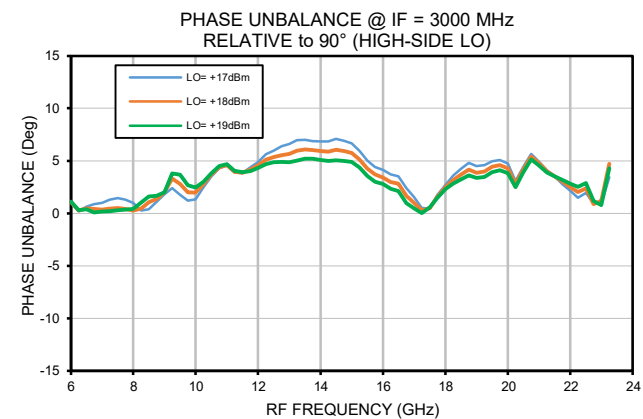
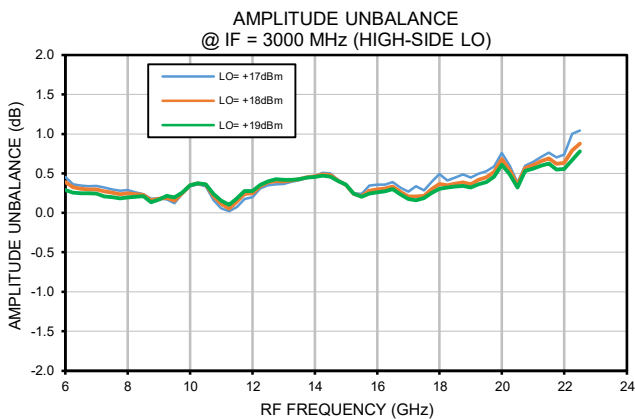
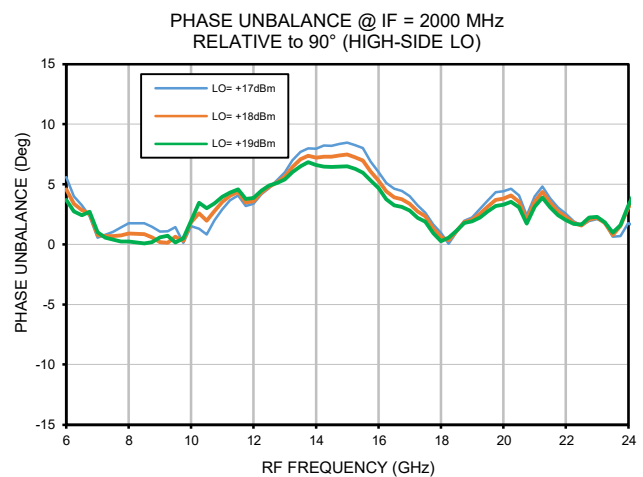
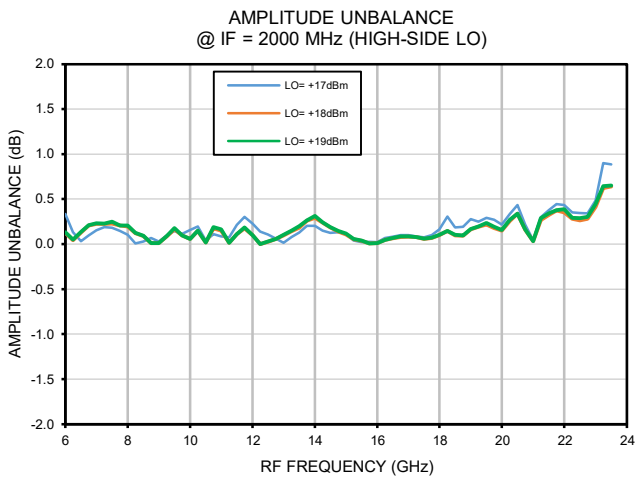
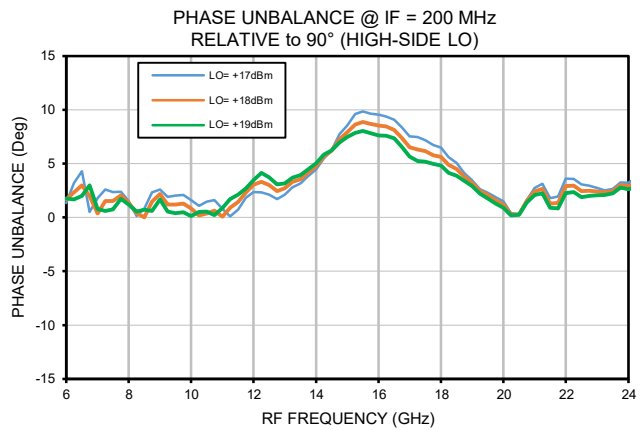
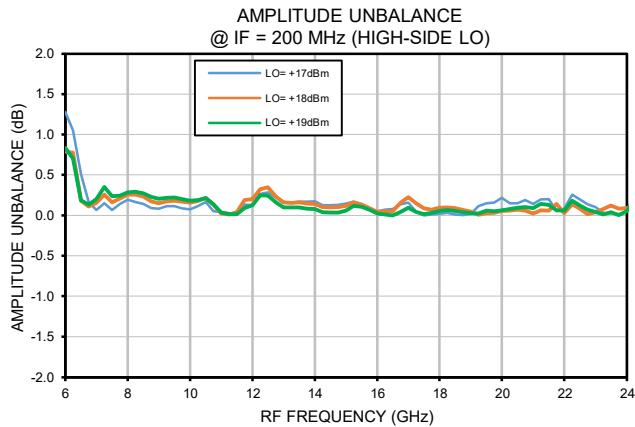
## Typical Performance Curves



## Typical Performance Curves

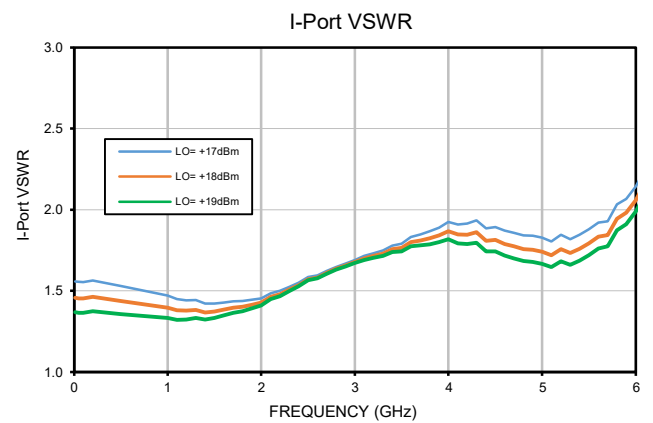
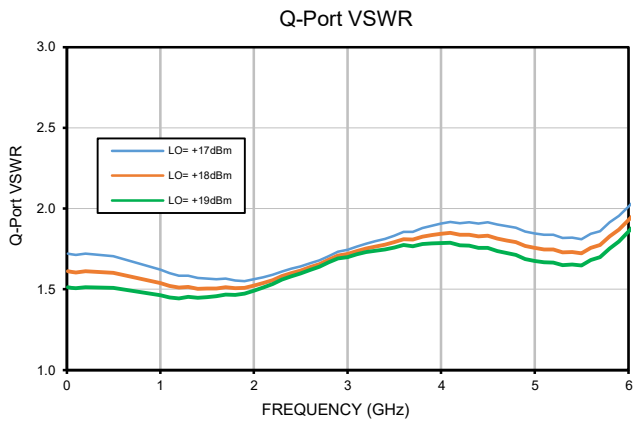
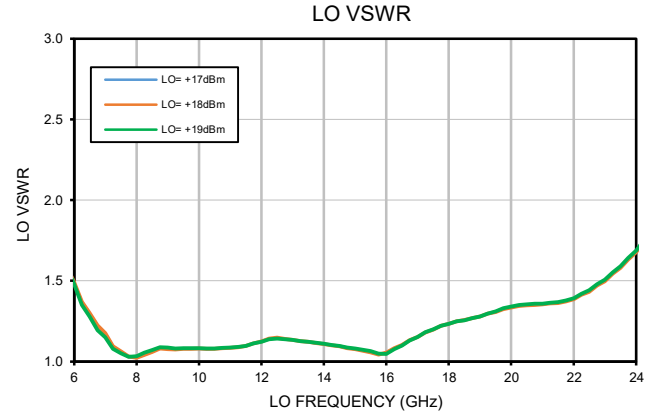
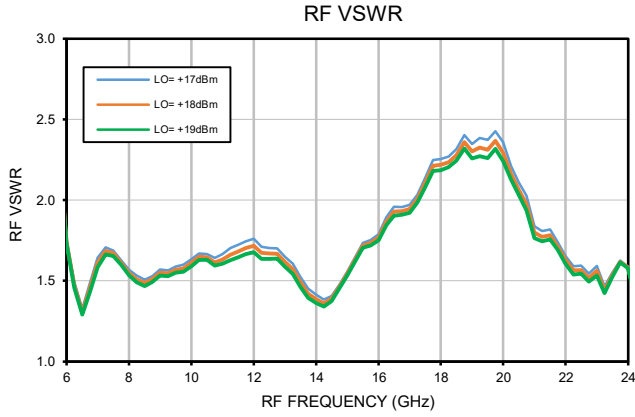


## Typical Performance Curves

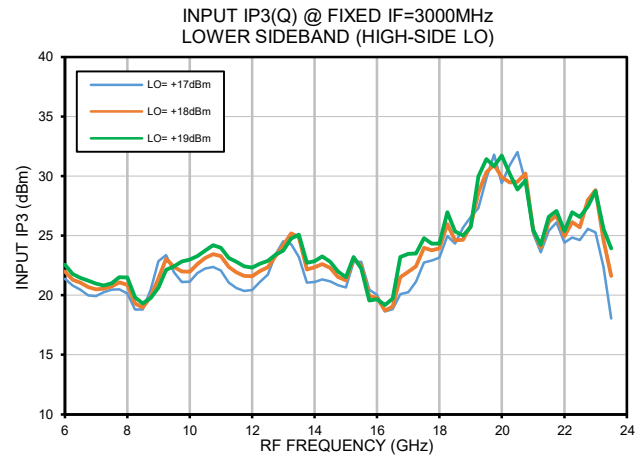
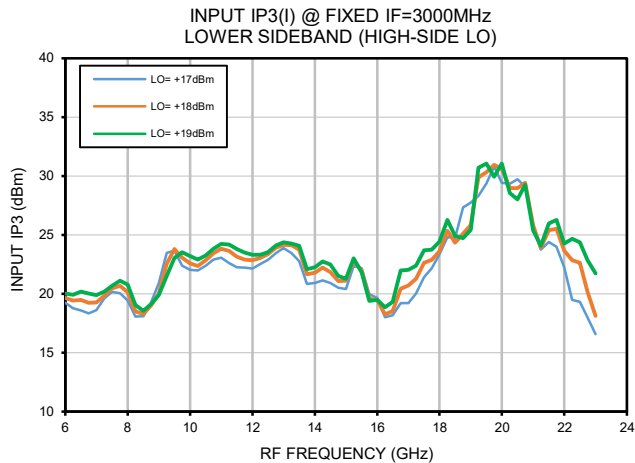
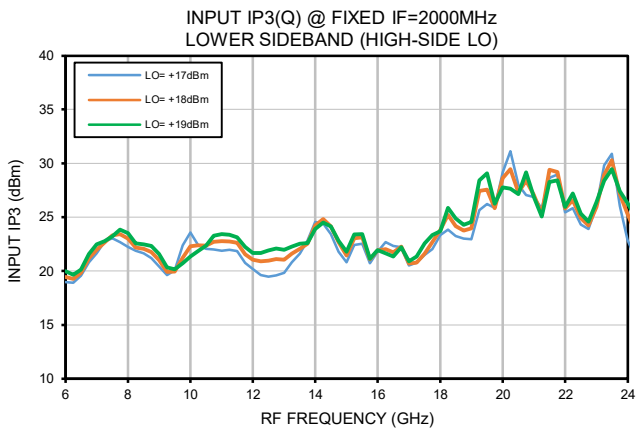
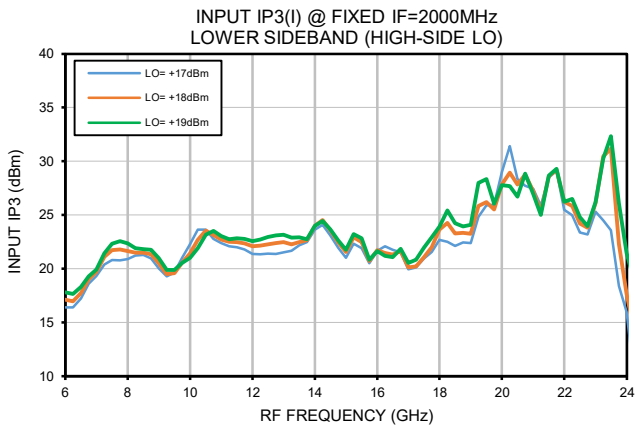
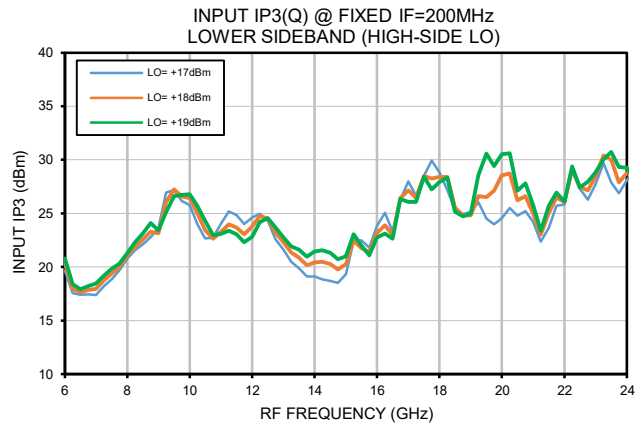
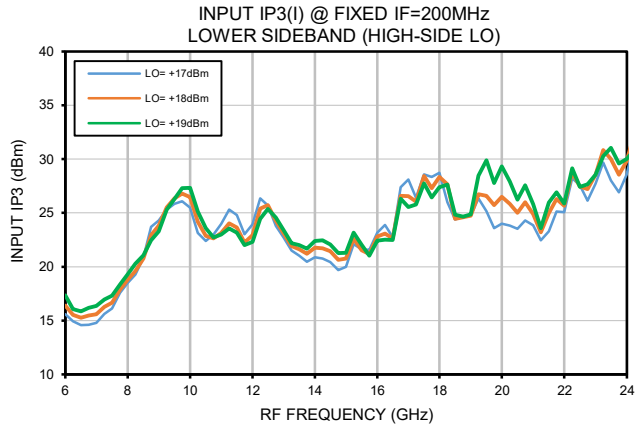


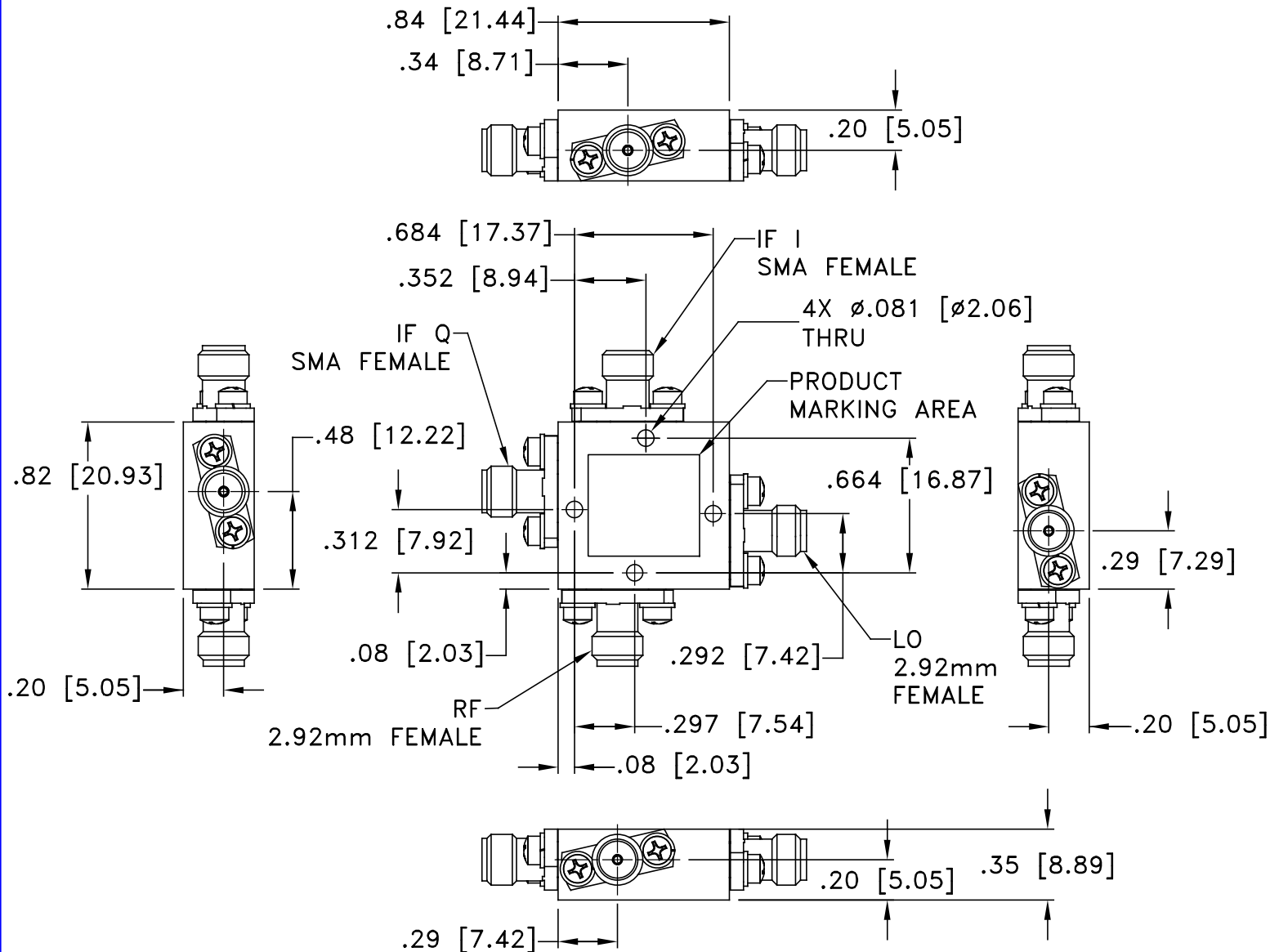


## Typical Performance Curves



## Typical Performance Curves





### Notes:

1. Case material: Aluminum
2. Case finish: Gold plating

Weight: 32 grams

Dimensions are in inches [mm]. Tolerances: 2 PL $\pm$ .03; 3 PL  $\pm$ .015 INCHES



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition B except over -55° to 100°C