



MMIC SURFACE MOUNT

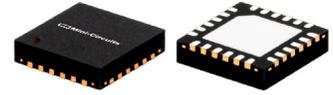
IQ Mixer

SMIQ-1844H+

50Ω Level 18 (LO Power +18 dBm) 18 to 40 GHz

THE BIG DEAL

- Wideband RF & LO, 18 to 40 GHz
- Wideband IF, DC to 7 GHz
- Excellent Image Rejection, Typ. 30 dB
- High LO-RF Isolation, Typ. 38 dB
- High Input IP3, Typ. +31 dBm
- Usable as Image Reject Mixer & SSB Converter
- 4x4 mm, 24-Lead QFN-Style Package

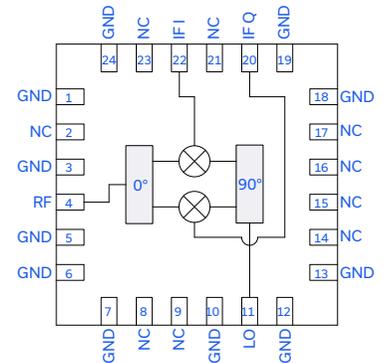


Generic photo used for illustration purposes only

APPLICATIONS

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

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The SMIQ-1844H+ is a passive wideband in-phase/quadrature (I/Q) mixer fabricated using GaAs HBT technology. The SMIQ-1844H+ is usable as a single-sideband upconverter for transmit applications or an image rejection mixer for receiver applications. The SMIQ-1844H+ 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 18 to 40 GHz and an IF frequency range of DC to 7 GHz. As a passive mixer, the SMIQ-1844H+ offers lower noise figure than active mixers enabling superior dynamic range for high performance applications. The mixer is housed in a compact 4x4 mm 24-Lead QFN-style package, and no DC bias is needed for operation.

KEY FEATURES

Feature	Advantages
High Image Rejection, 30 dB typ.	Provides inherent rejection of unwanted image signals without the need for external filtering.
High Isolation, <ul style="list-style-type: none"> • LO-RF, 38 dB typ. • LO-IF, 40 dB typ. 	Enables excellent carrier rejection in single-sideband upconverter transmit applications. Minimizes filtering requirements needed to ensure signal integrity.
Wide RF/LO Bandwidth, 18 to 40 GHz	Useful in wideband systems or in reconfigurable narrowband systems across multiple bands with minimal component changes.
Wide IF Bandwidth, DC to 7 GHz	Enables use of high IF conversion to reduce filtering requirements. IF operation as low as DC enables use in phase detector applications.
Small Size, 4x4 mm QFN-Style Package	Tiny footprint saves space in dense layouts while providing low inductance and repeatable transitions. Industry standard packaging allows for ease of assembly in high volume manufacturing processes.





MMIC SURFACE MOUNT

IQ Mixer

SMIQ-1844H+

50Ω Level 18 (LO Power +18 dBm) 18 to 40 GHz

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

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
RF Frequency Range		18		40	GHz
LO Frequency Range		18		40	GHz
IF Frequency Range		DC		7	GHz
LO Power		+17	+18	+19	dBm
Conversion Loss ²	18 - 26.5		8.9		dB
	26.5 - 40		9.4		
Amplitude Unbalance	18 - 26.5		±0.2	±0.9	dB
	26.5 - 40		±0.3	±1.4	
Phase Unbalance (Relative to 90°)	18 - 26.5		2	8	deg
	26.5 - 40		3	14	
Image Rejection ³ (Tested as a Downconverter)	18 - 26.5		30		dBc
	26.5 - 40		31		
Single Sideband Rejection ⁴ (Tested as an Upconverter)	18 - 26.5		26		dBc
	26.5 - 40		25		
LO-RF Isolation	18 - 26.5	25	38		dB
	26.5 - 40	24	37		
LO-I Isolation	18 - 26.5	27	42		dB
	26.5 - 40	24	38		
LO-Q Isolation	18 - 26.5	29	47		dB
	26.5 - 40	17	36		
RF-I Isolation	18 - 26.5	12	26		dB
	26.5 - 40	12	29		
RF-Q Isolation	18 - 26.5	19	30		dB
	26.5 - 40	30	40		
Input Power at 1dB Compression	18 - 40		+10		dBm
Input IP3 (I) Lower Side Band	18 - 26.5		+31		dBm
	26.5 - 40		+31		
Input IP3 (Q) Lower Side Band	18 - 26.5		+31		dBm
	26.5 - 40		+31		
Input IP3 (I) Upper Side Band	18 - 26.5		+30		dBm
	26.5 - 40		+29		
Input IP3 (Q) Upper Side Band	18 - 26.5		+29		dBm
	26.5 - 40		+29		

1. Measured on Mini-Circuits Characterization Test Board TB-SMIQ-1844HC+. See Figures 2, 3, & 4. Board loss de-embedded to the device. Unless otherwise specified, IF = 200MHz

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. See measurement block diagram Figure 2.

3. Level of undesired image signal below desired RF signal. See measurement block diagram Figure 3.

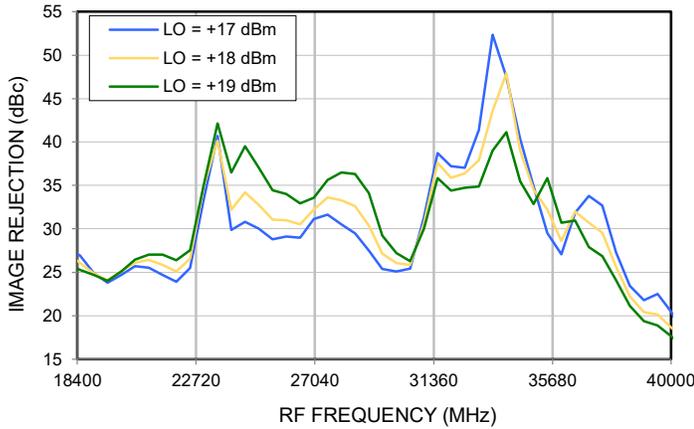
4. Level of undesired sideband below desired sideband. See measurement block diagram Figure 3.



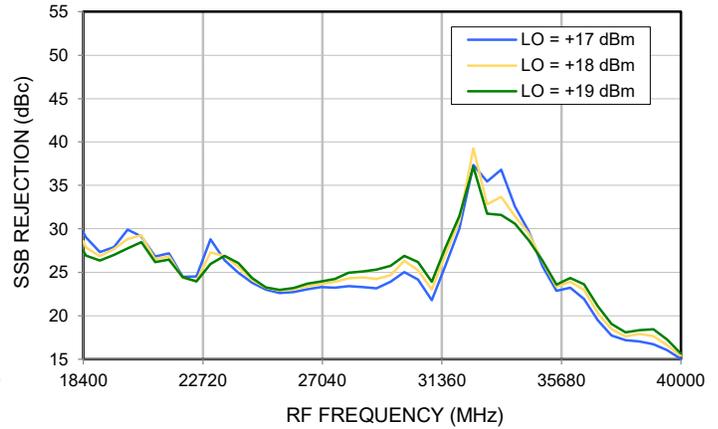


TYPICAL PERFORMANCE GRAPHS

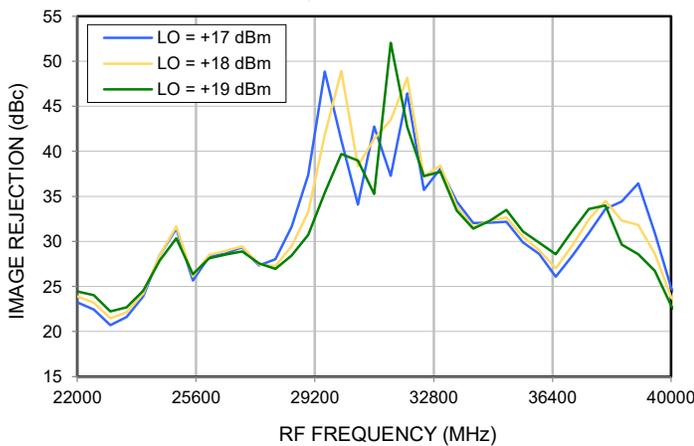
**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 200 MHz**



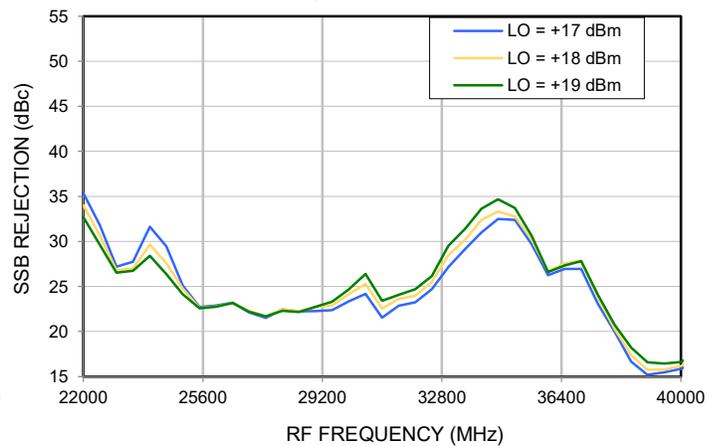
**SSB REJECTION (UPCONVERTER)
@ IF = 200 MHz**



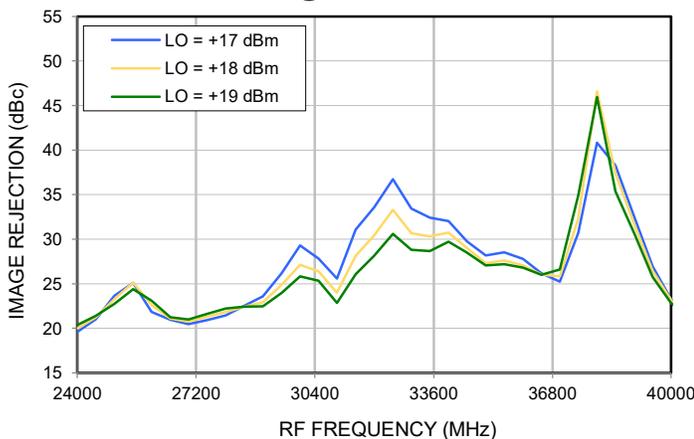
**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 2 GHz**



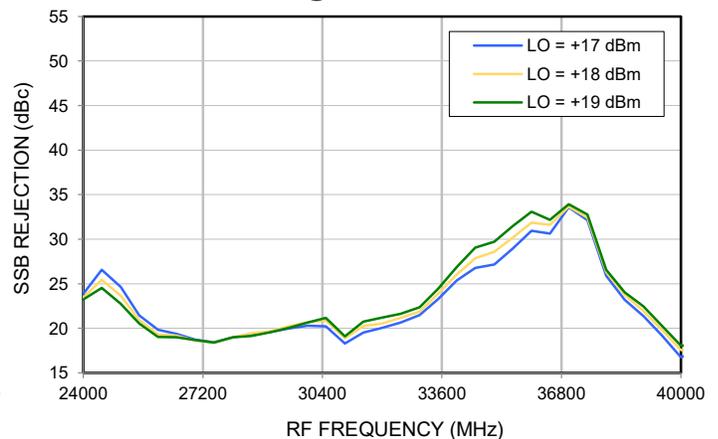
**SSB REJECTION (UPCONVERTER)
@ IF = 2 GHz**



**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 3 GHz**



**SSB REJECTION (UPCONVERTER)
@ IF = 3 GHz**

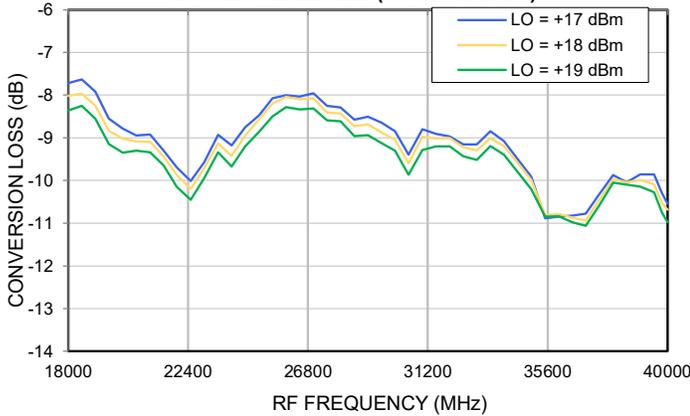




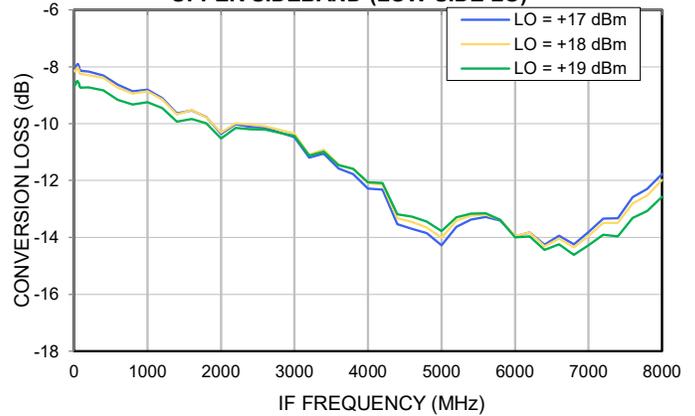
TYPICAL PERFORMANCE GRAPHS

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

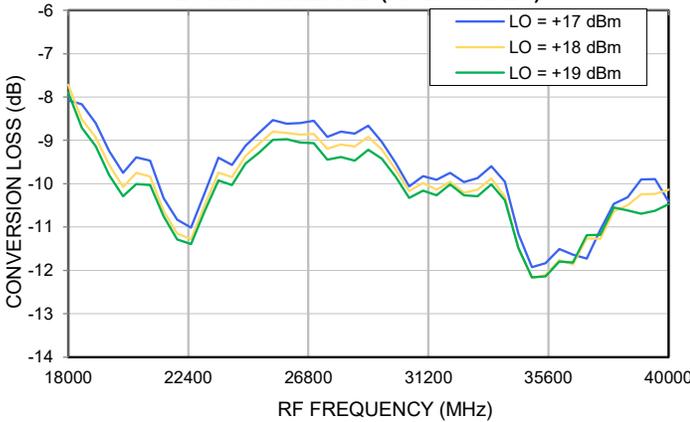
**CONVERSION LOSS VS. RF @ IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



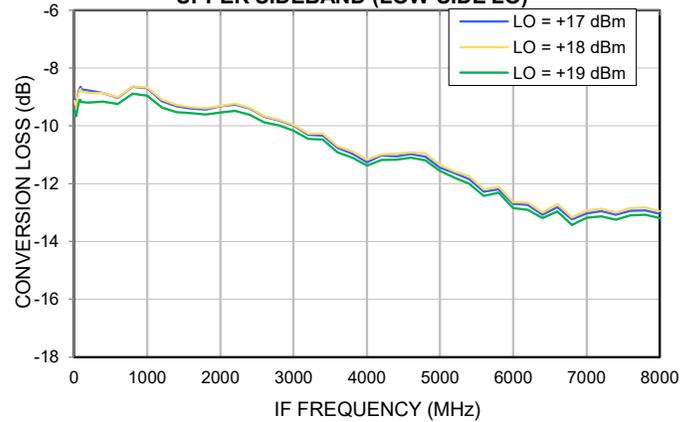
**CONVERSION LOSS VS. IF @ FIXED LO = 18 GHz
UPPER SIDEBAND (LOW-SIDE LO)**



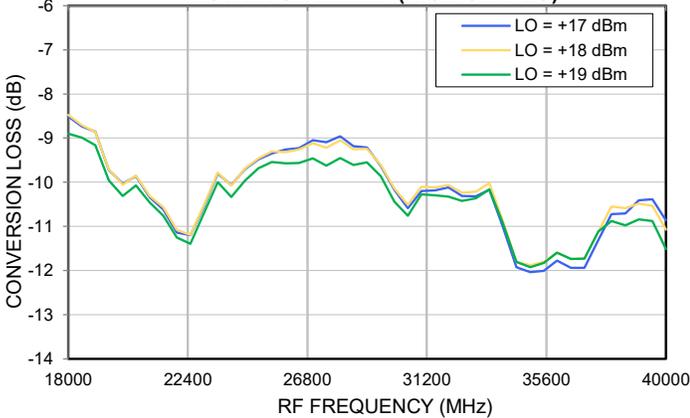
**CONVERSION LOSS VS. RF @ IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



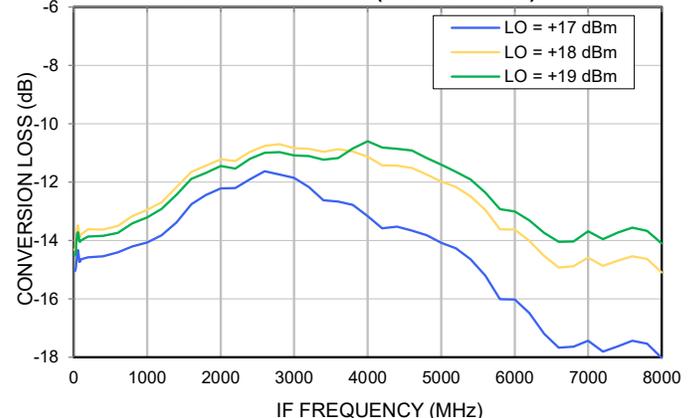
**CONVERSION LOSS VS. IF @ FIXED LO = 30.75 GHz
UPPER SIDEBAND (LOW-SIDE LO)**



**CONVERSION LOSS VS. RF @ IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**

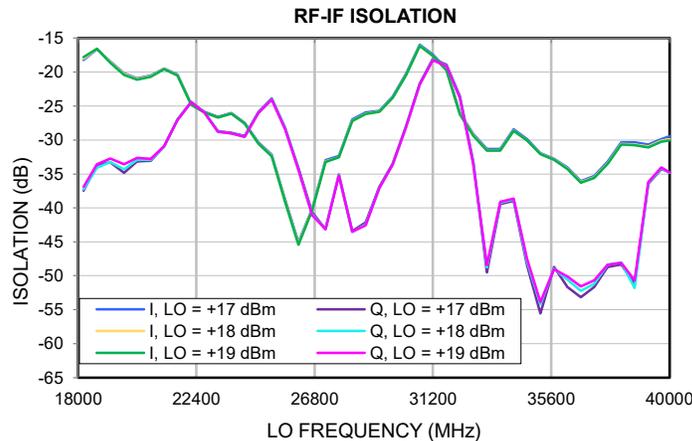
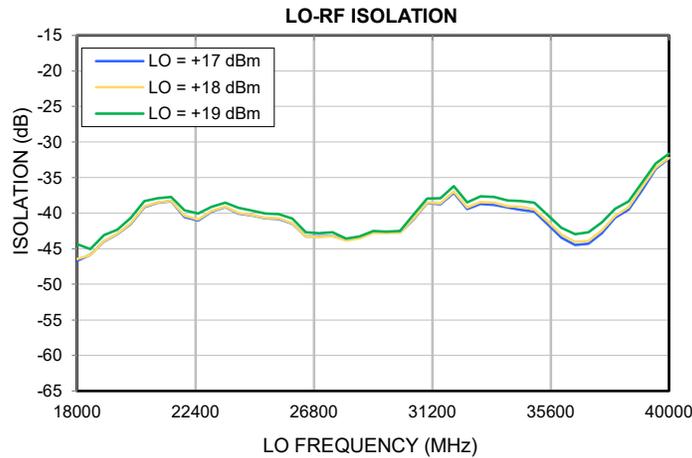
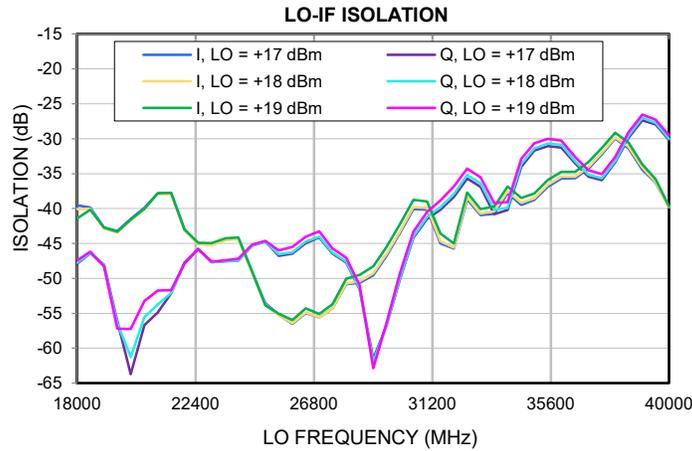


**CONVERSION LOSS VS. IF @ FIXED LO = 43.5 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**





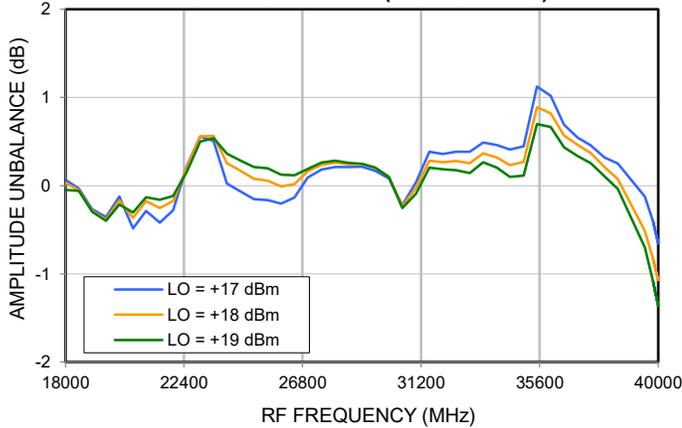
TYPICAL PERFORMANCE GRAPHS



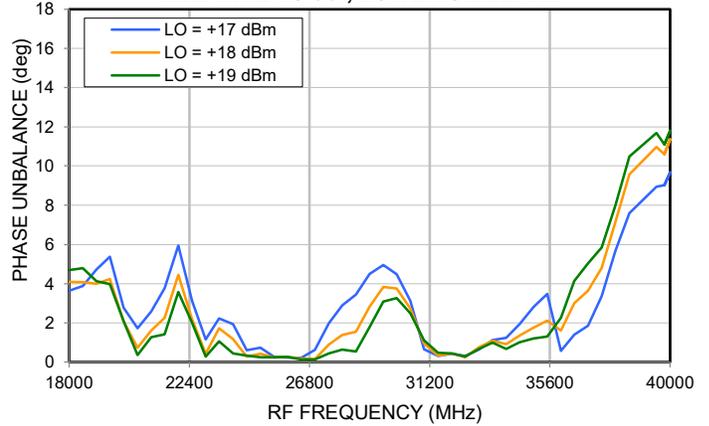


TYPICAL PERFORMANCE GRAPHS

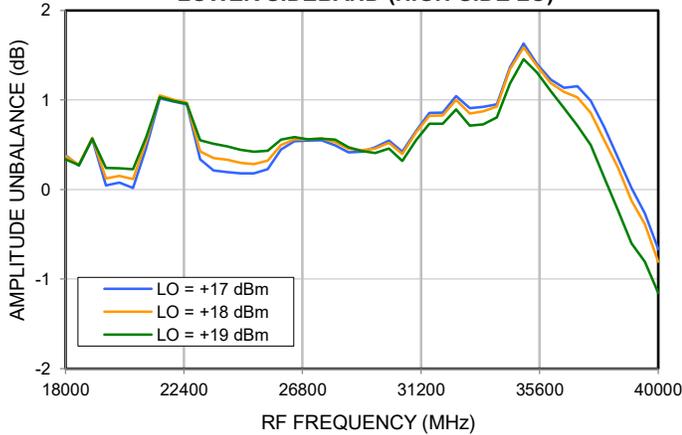
**AMPLITUDE UNBALANCE @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



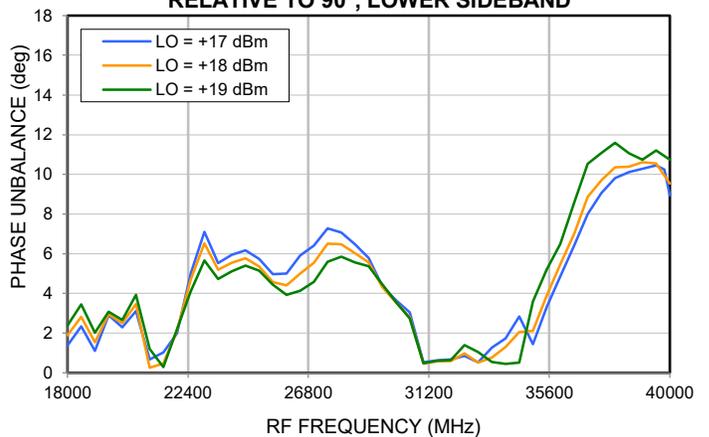
**PHASE UNBALANCE @ FIXED IF = 200 MHz
RELATIVE TO 90°, LOWER SIDEBAND**



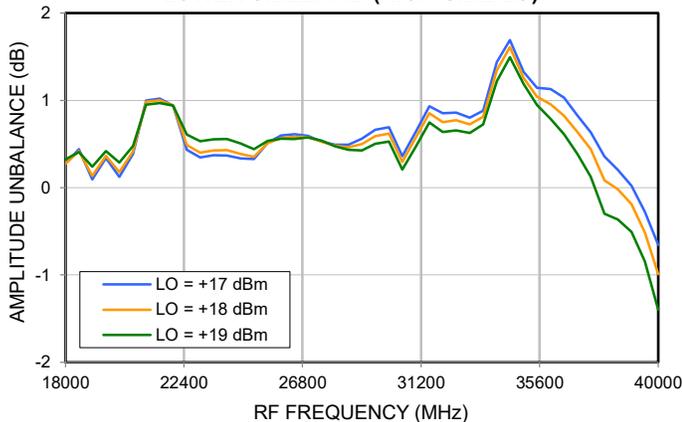
**AMPLITUDE UNBALANCE @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



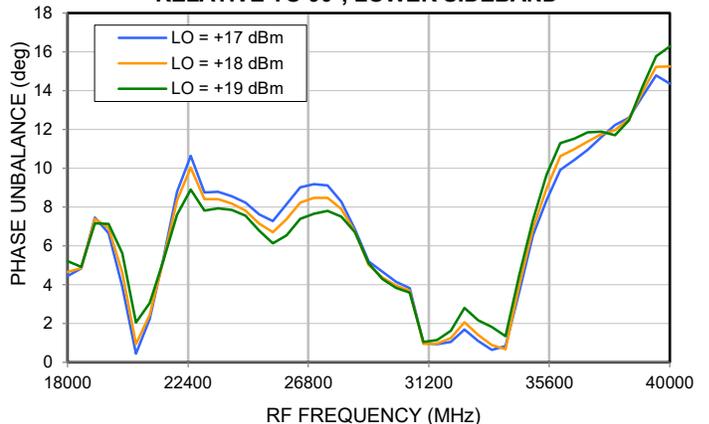
**PHASE UNBALANCE @ FIXED IF = 2 GHz
RELATIVE TO 90°, LOWER SIDEBAND**



**AMPLITUDE UNBALANCE @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



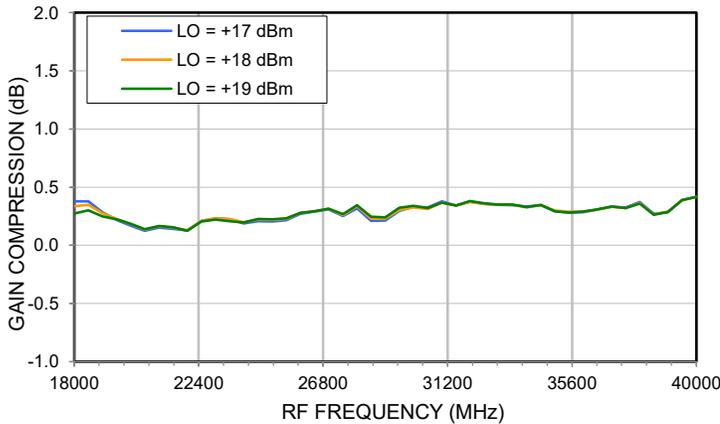
**PHASE UNBALANCE @ FIXED IF = 3 GHz
RELATIVE TO 90°, LOWER SIDEBAND**



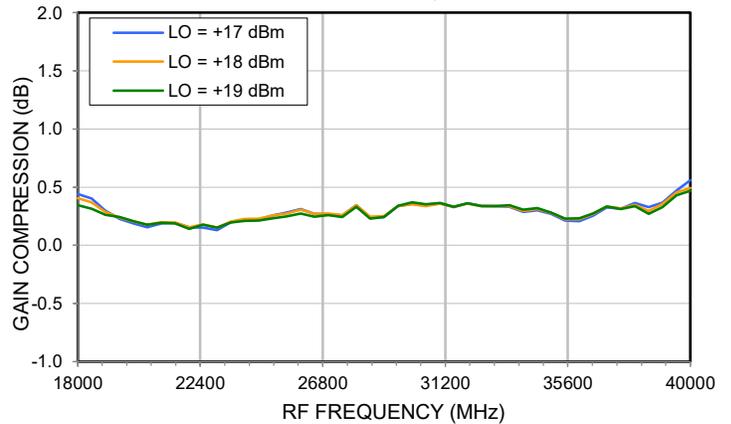


TYPICAL PERFORMANCE GRAPHS

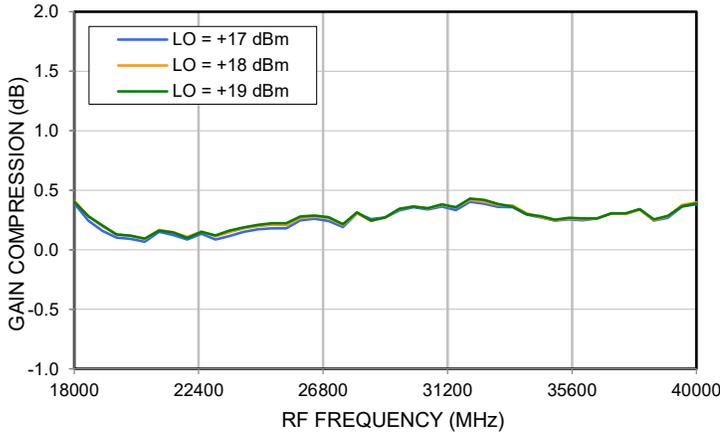
GAIN COMPRESSION (I) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



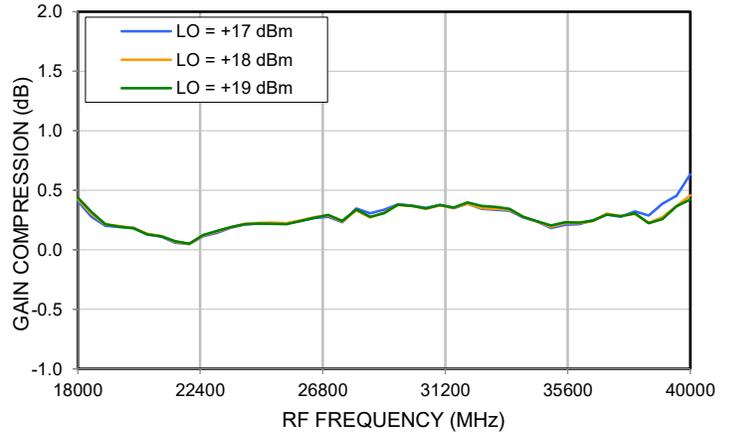
GAIN COMPRESSION (Q) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



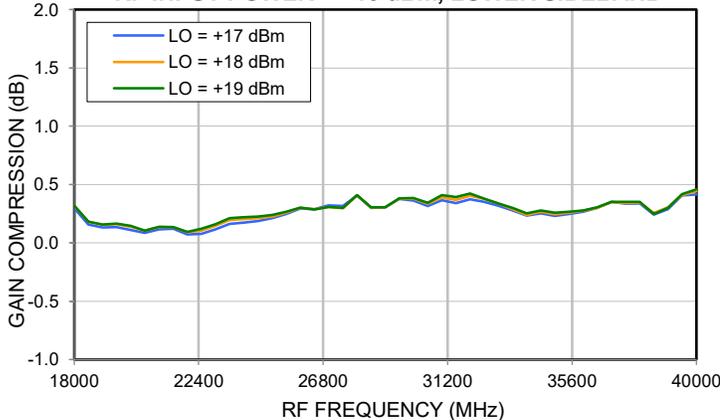
GAIN COMPRESSION (I) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



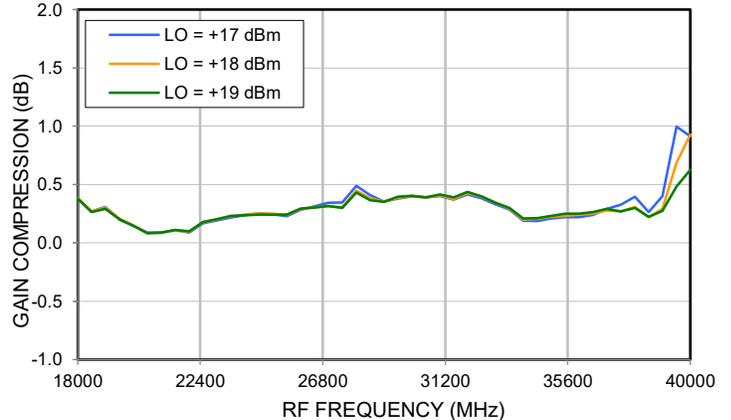
GAIN COMPRESSION (Q) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



GAIN COMPRESSION (I) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



GAIN COMPRESSION (Q) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND

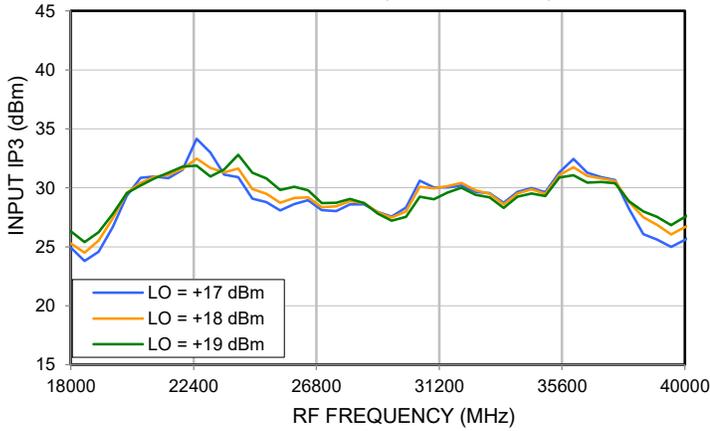




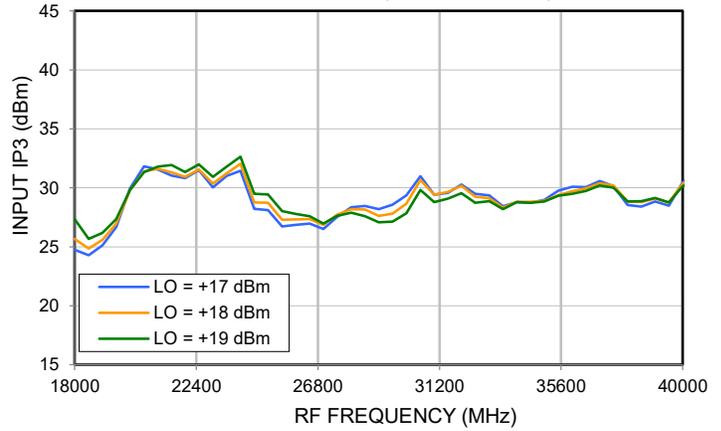
TYPICAL PERFORMANCE GRAPHS

$P_{IN} = 0$ dBm/Tone with 1 MHz spacing (RF2 = RF1 + 1 MHz)

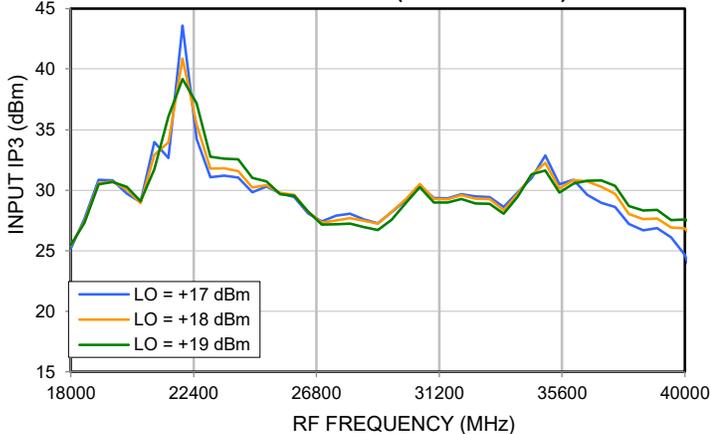
**INPUT IP3 (I) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



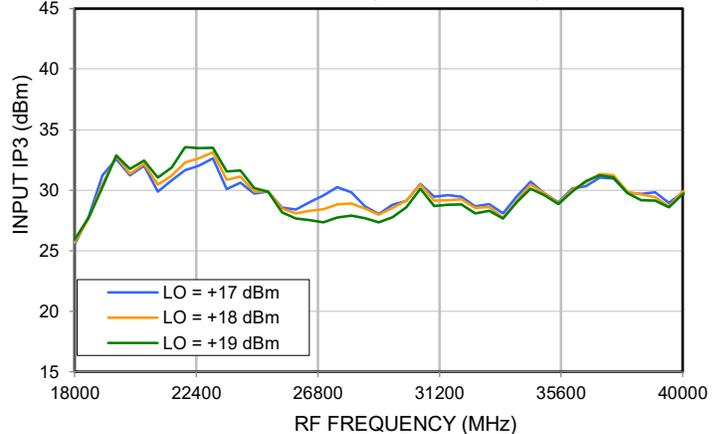
**INPUT IP3 (Q) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



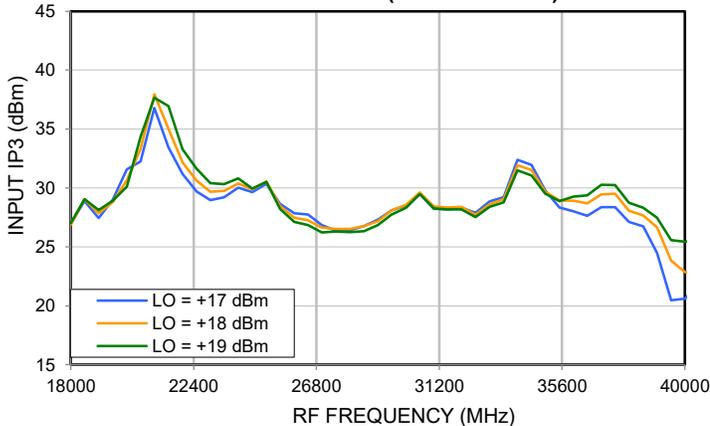
**INPUT IP3 (I) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



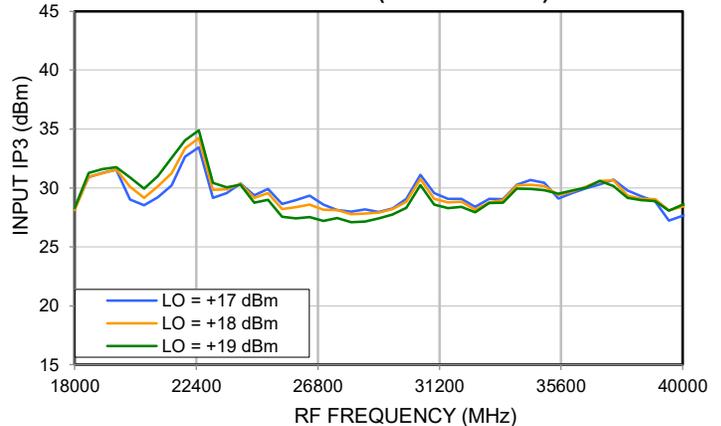
**INPUT IP3 (Q) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**INPUT IP3 (I) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**INPUT IP3 (Q) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**





ABSOLUTE MAXIMUM RATINGS⁵

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
Junction Temperature	+175°C
RF Power	+24 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

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	1A	250 to < 500 V	ANSI/ESDA/JEDEC JS-001-2017
CDM	C3	≥ 1000 V	JESD22-C101F



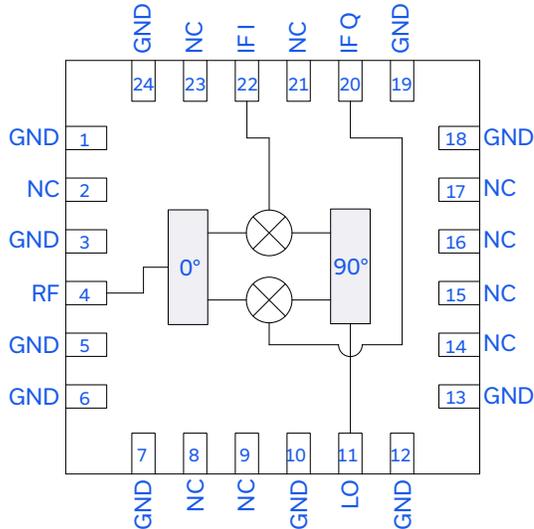
ESD HANDLING PRECAUTION: This device is designed to be Class 1A for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E /JEDEC J-STD-033C



FUNCTIONAL DIAGRAM

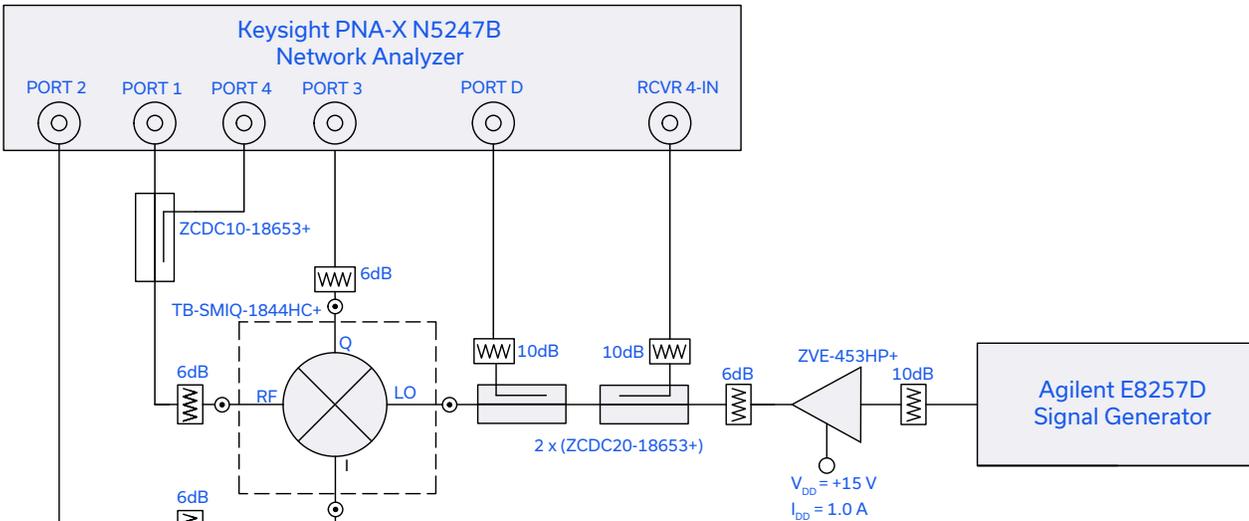


PAD CONNECTIONS

Function	Pad #	Description
RF	4	RF Port. Connects to RF Output for Upconverters or RF Input for Downconverters.
LO	11	LO Port. Connects to LO Input.
IF I	22	IF I Port. Connects to the IF I Input for Upconverters or IF I Output for Downconverters.
IF Q	20	IF Q Port. Connects to the IF Q Input for Upconverters or IF Q Output for Downconverters.
GND	1, 3, 5-7, 10, 12-13, 18-19, 24, Paddle	Connects to ground.
NC	2, 8-9, 14-17, 21, 23	No connection. Grounded on test board.

Figure 1. SMIQ-1844H+ Functional Diagram

CHARACTERIZATION TEST CIRCUITS



10 dB attenuators P/N BW-E10-1W653+
 6 dB attenuators P/N BW-E6-1W653+

Figure 2. Block diagram of test circuit used to characterize: Conversion Loss, Amplitude Unbalance, Phase Unbalance, Isolation, Return Loss, and Input IP3

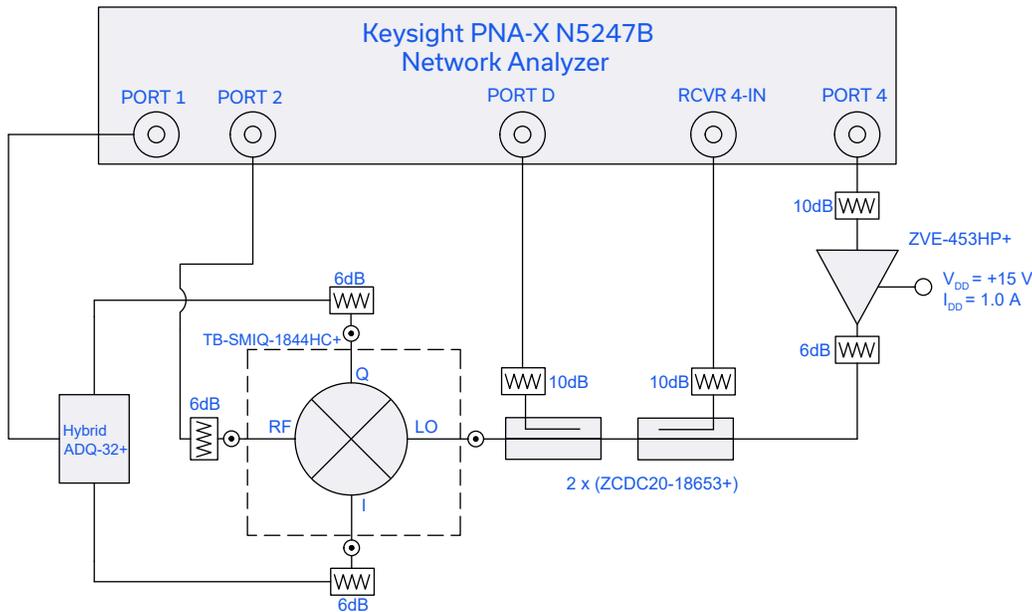
Test conditions:

For Conversion Loss, Return Loss, and Isolation:

RF Input Power = -10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, and 3 GHz

For Input IP3:

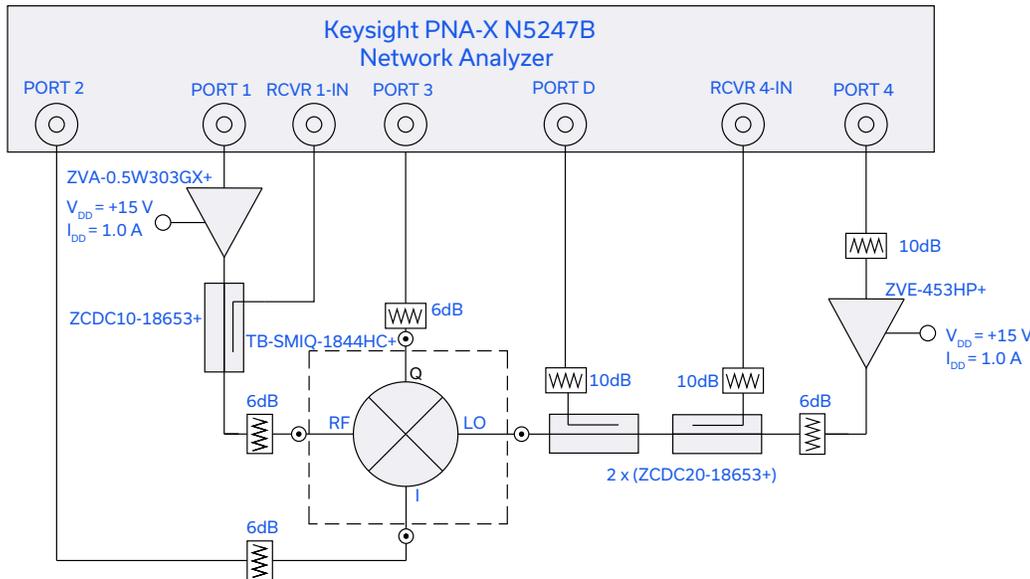
RF Input Power = 0 dBm/Tone, LO Input Power = +17 to +19 dBm. Two tones, spaced 1 MHz apart.



10 dB attenuators P/N BW-E10-1W653+
 6 dB attenuators P/N BW-E6-1W653+

Figure 3. Block diagram of Test Circuit used for characterization of Image Rejection and Single Side Band Rejection

Test conditions:
 RF Input Power = -10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, and 3 GHz



10 dB attenuators P/N BW-E10-1W653+
 6 dB attenuators P/N BW-E6-1W653+

Figure 4. Block diagram of test circuit used to characterize: Compression

Test conditions:
 RF Input Power = -10 dBm and +10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, and 3 GHz
 Compression = (Conversion Loss @ RF Power = +10 dBm) - (Conversion Loss @ RF Power = -10 dBm)



APPLICATION CONFIGURATION FOR IMAGE REJECT AND SINGLE SIDE BAND MIXER

In Image Reject or Single Sideband Upconverter applications an external 90° Hybrid is needed. Refer to Mini-Circuits extensive portfolio of 90° Hybrids.

IMAGE REJECT MIXER APPLICATION

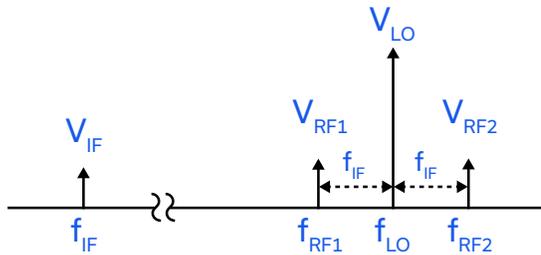


Figure 5. Spectral representation of Signals

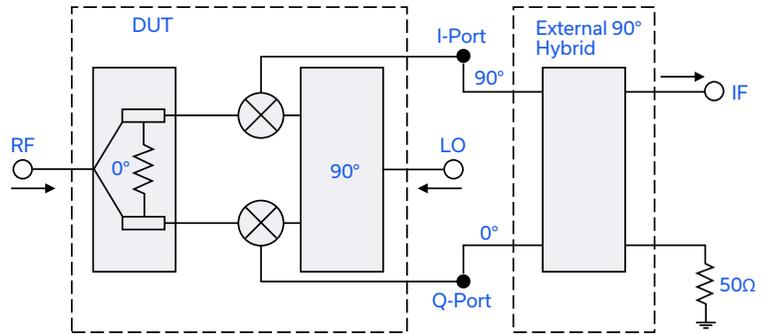


Figure 6. Block Diagram of Image Reject Mixer

If f_{RF1} is the desired signal and f_{RF2} is the image, connect the I port of DUT to the 90° port of the external hybrid and the Q port to the 0° port of the hybrid. This will send the $f_{RF2}-f_{LO}$ IF signal to the terminated output of the external 90° hybrid and desired IF signal $f_{LO}-f_{RF1}$ to IF port.

If f_{RF2} is the desired signal and f_{RF1} is the image signal, connect the I port of DUT to the 0 deg port of the external 90° hybrid and the Q port to the 90° port of the external hybrid. This will send $f_{LO}-f_{RF1}$ IF signal to the terminated output of the external 90° hybrid and desired IF signal $f_{RF2}-f_{LO}$ to IF port.

SINGLE SIDE BAND (SSB) UPCONVERTER APPLICATION

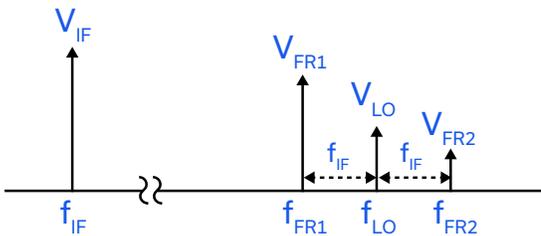


Figure 7. Spectral representation of Signals

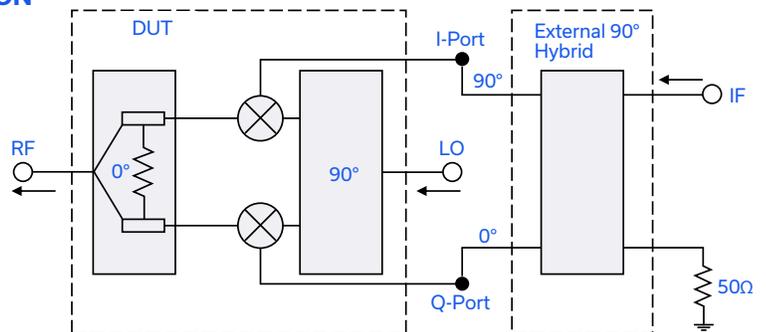


Figure 8. Block Diagram of Single Side Band Mixer

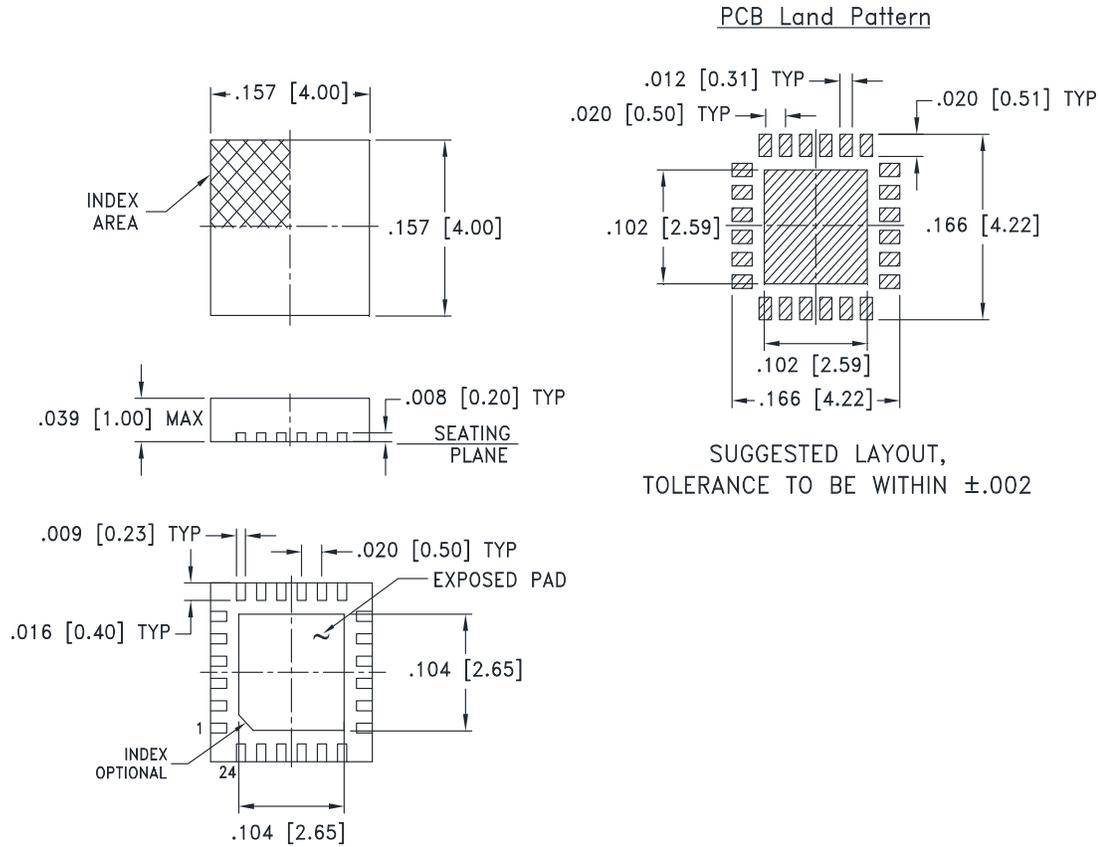
For upper sideband selection connect the I port to the 90° port of the external 90° hybrid and the Q port to the 0° port of the external hybrid. This will cause cancellation of the lower sideband signal in the 0° RF splitter of the DUT and the upper sideband signal will be present at the RF port.

For lower sideband selection connect the I port to the 0° port of the external 90° hybrid and the Q port to the 90° port of the hybrid. This will cause cancellation of the upper sideband signal in the 0° RF splitter of the DUT and the lower sideband signal will be present at the RF port.

Refer to Mini-Circuits blog, I&Q Mixers, Image Reject Down-Conversion & Single Sideband (SSB) Up-Conversion for a detailed explanation.



CASE STYLE DRAWING

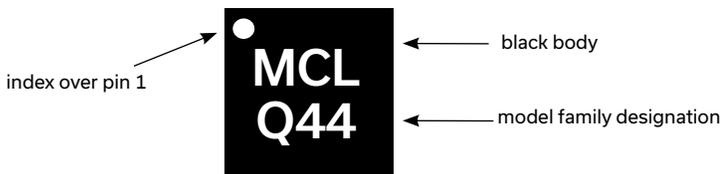


SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN ±.002

Weight: .04 Grams

Dimensions are in inches [mm]. Tolerances (values are in inches): 2 Pl. + .01; 3 Pl. + .005

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



MMIC SURFACE MOUNT

IQ Mixer

SMIQ-1844H+

50Ω Level 18 (LO Power +18 dBm) 18 to 40 GHz

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

Performance Data	Data Graphs Data Set (.zip file)
Case Style	DG1847 Plastic package, exposed paddle, lead finish: Matte-Tin
RoHS Status	Compliant
Tape & Reel Standard quantities available on reel	F68 7" reels with 20, 50, 100, 200, 500, or 1K devices
Suggested Layout for PCB Design	PL-763
Evaluation Board	TB-SMIQ-1844HC+
Environmental Ratings	ENV08T1

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 there in. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp
- D. Mini-Circuits does not warrant the accuracy or completeness of the information, text, graphics and other items contained within this document and same are provided as an accommodation and on an As is basis, with all faults.
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- F. Mini-Circuits and the Mini-Circuits logo are registered trademarks of Scientific Components Corporation d/b/a Mini-Circuits. All other third-party trademarks are the property of their respective owners. A reference to any third-party trademark does not constitute or imply any endorsement, affiliation, sponsorship, or recommendation by any such third-party of Mini-Circuits or its products.



Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=200MHz (dB)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=200MHz (dB)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=300MHz (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
18400	18200	29.65	28.59	27.50	22000	20000	35.39	34.03	32.68	24000	21000	23.86	23.47	23.23
18500	18300	29.04	27.89	26.94	22500	20500	31.79	30.66	29.63	24500	21500	26.58	25.45	24.55
19000	18800	27.33	26.87	26.38	23000	21000	27.19	26.79	26.53	25000	22000	24.65	23.69	22.76
19500	19300	27.92	27.69	27.03	23500	21500	27.74	27.01	26.73	25500	22500	21.44	20.91	20.54
20000	19800	29.92	28.85	27.76	24000	22000	31.64	29.66	28.39	26000	23000	19.84	19.34	19.05
20500	20300	29.13	29.28	28.49	24500	22500	29.42	27.56	26.37	26500	23500	19.41	19.15	19.00
21000	20800	26.84	26.50	26.17	25000	23000	25.10	24.79	24.16	27000	24000	18.73	18.62	18.68
21500	21300	27.20	26.89	26.47	25500	23500	22.70	22.62	22.59	27500	24500	18.47	18.39	18.44
22000	21800	24.49	24.35	24.45	26000	24000	22.90	22.81	22.73	28000	25000	18.96	18.95	18.98
22500	22300	24.54	24.02	23.96	26500	24500	23.22	23.19	23.18	28500	25500	19.38	19.46	19.12
23000	22800	28.81	27.28	25.97	27000	25000	22.16	22.31	22.20	29000	26000	19.60	19.66	19.57
23500	23300	26.39	26.88	26.93	27500	25500	21.53	21.67	21.68	29500	26500	19.99	20.26	20.05
24000	23800	24.93	25.64	26.10	28000	26000	22.48	22.48	22.31	30000	27000	20.31	20.67	20.66
24500	24300	23.82	24.15	24.36	28500	26500	22.23	22.28	22.19	30500	27500	20.23	20.87	21.17
25000	24800	23.03	23.21	23.31	29000	27000	22.27	22.68	22.74	31000	28000	18.30	18.91	19.11
25500	25300	22.65	22.90	22.97	29500	27500	22.38	22.92	23.30	31500	28500	19.54	20.27	20.74
26000	25800	22.73	23.07	23.20	30000	28000	23.34	24.14	24.66	32000	29000	20.05	20.55	21.22
26500	26300	23.06	23.43	23.69	30500	28500	24.17	25.29	26.39	32500	29500	20.65	21.18	21.64
27000	26800	23.32	23.67	23.93	31000	29000	21.55	22.53	23.41	33000	30000	21.48	21.90	22.36
27500	27300	23.22	23.91	24.24	31500	29500	22.87	23.64	24.08	33500	30500	23.26	23.87	24.43
28000	27800	23.42	24.34	24.97	32000	30000	23.24	23.98	24.71	34000	31000	25.40	26.07	26.89
28500	28300	23.33	24.42	25.11	32500	30500	24.70	25.50	26.18	34500	31500	26.75	27.86	29.06
29000	28800	23.16	24.25	25.34	33000	31000	27.16	28.46	29.53	35000	32000	27.17	28.62	29.74
29500	29300	23.93	24.68	25.73	33500	31500	29.16	30.21	31.44	35500	32500	28.96	30.21	31.47
30000	29800	25.04	26.33	26.92	34000	32000	30.99	32.39	33.66	36000	33000	30.93	31.87	33.10
30500	30300	24.18	25.27	26.18	34500	32500	32.51	33.34	34.68	36500	33500	30.65	31.61	32.18
31000	30800	21.79	23.03	23.93	35000	33000	32.39	32.79	33.74	37000	34000	33.59	33.64	33.93
31500	31300	25.83	27.07	27.87	35500	33500	29.72	30.22	30.66	37500	34500	32.15	32.42	32.78
32000	31800	29.99	30.88	31.48	36000	34000	26.26	26.66	26.61	38000	35000	25.88	26.31	26.57
32500	32300	37.35	39.27	37.13	36500	34500	26.93	27.57	27.34	38500	35500	23.20	23.78	24.03
33000	32800	35.45	32.85	31.73	37000	35000	26.92	27.86	27.85	39000	36000	21.37	21.94	22.45
33500	33300	36.81	33.72	31.61	37500	35500	23.11	23.81	24.11	39500	36500	19.17	19.80	20.26
34000	33800	32.56	31.48	30.60	38000	36000	19.98	20.27	20.76	40000	37000	16.76	17.55	18.04
34500	34300	29.72	29.49	28.69	38500	36500	16.65	17.39	18.23	40500	37500	17.51	17.75	18.08
35000	34800	25.72	26.30	26.37	39000	37000	15.19	15.76	16.58	41000	38000	20.10	20.28	20.41
35500	35300	22.88	23.38	23.59	39500	37500	15.50	15.80	16.46	41500	38500	22.51	22.45	22.66
36000	35800	23.27	23.92	24.36	40000	38000	15.86	16.18	16.61	42000	39000	23.48	23.16	23.23
36500	36300	21.96	22.98	23.64	40500	38500	16.69	17.21	17.60	42500	39500	23.36	22.33	22.39
37000	36800	19.49	20.32	21.13	41000	39000	18.13	18.75	19.11	43000	40000	24.28	23.83	22.82
37500	37300	17.75	18.46	19.07	41500	39500	18.87	19.22	19.19					
38000	37800	17.21	17.63	18.11	42000	40000	19.68	19.78	19.73					
38500	38300	17.04	17.93	18.36										
39000	38800	16.75	17.65	18.45										
39500	39300	16.04	16.65	17.30										
40000	39800	15.04	15.41	15.65										
40200	40000	14.89	15.35	15.45										

Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=200MHz (dB)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=2000MHz (dB)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=3000MHz (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
18400	18200	27.12	26.38	25.42	22000	20000	23.25	23.92	24.46	24000	21000	19.61	19.98	20.37
18500	18300	26.93	26.10	25.30	22500	20500	22.43	23.21	24.05	24500	21500	21.05	21.24	21.41
19000	18800	24.91	24.89	24.70	23000	21000	20.70	21.49	22.26	25000	22000	23.68	23.28	22.76
19500	19300	23.82	24.09	24.01	23500	21500	21.61	22.15	22.69	25500	22500	25.08	25.11	24.40
20000	19800	24.71	25.17	25.13	24000	22000	23.90	24.22	24.55	26000	23000	21.87	22.62	23.10
20500	20300	25.70	26.13	26.48	24500	22500	28.46	28.46	27.90	26500	23500	20.97	21.12	21.26
21000	20800	25.55	26.41	27.04	25000	23000	31.43	31.65	30.38	27000	24000	20.48	20.75	21.01
21500	21300	24.70	25.89	27.04	25500	23500	25.67	26.11	26.38	27500	24500	20.92	21.33	21.64
22000	21800	23.92	25.12	26.39	26000	24000	28.30	28.51	28.13	28000	25000	21.44	21.85	22.24
22500	22300	25.51	26.58	27.57	26500	24500	28.68	28.98	28.54	28500	25500	22.54	22.43	22.43
23000	22800	33.43	34.95	35.09	27000	25000	29.37	29.42	28.89	29000	26000	23.62	22.95	22.45
23500	23300	40.70	40.14	42.14	27500	25500	27.34	27.42	27.58	29500	26500	26.21	24.89	23.99
24000	23800	29.88	32.22	36.51	28000	26000	28.03	27.27	26.98	30000	27000	29.28	27.15	25.82
24500	24300	30.79	34.20	39.49	28500	26500	31.63	29.50	28.44	30500	27500	27.85	26.39	25.36
25000	24800	30.00	32.79	37.05	29000	27000	37.38	33.27	30.75	31000	28000	25.58	24.00	22.87
25500	25300	28.79	31.10	34.45	29500	27500	48.86	41.82	35.41	31500	28500	31.12	28.14	26.09
26000	25800	29.10	30.99	34.03	30000	28000	41.23	48.92	39.71	32000	29000	33.61	30.42	28.15
26500	26300	28.99	30.53	32.96	30500	28500	34.09	38.37	38.98	32500	29500	36.71	33.30	30.61
27000	26800	31.17	32.21	33.59	31000	29000	42.75	41.38	35.29	33000	30000	33.41	30.67	28.81
27500	27300	31.62	33.63	35.63	31500	29500	37.28	43.46	52.04	33500	30500	32.43	30.32	28.70
28000	27800	30.53	33.29	36.52	32000	30000	46.43	48.15	42.68	34000	31000	32.05	30.74	29.74
28500	28300	29.51	32.60	36.34	32500	30500	35.71	37.21	37.27	34500	31500	29.76	29.02	28.49
29000	28800	27.51	30.39	34.11	33000	31000	38.07	38.43	37.70	35000	32000	28.18	27.29	27.07
29500	29300	25.40	27.17	29.22	33500	31500	34.42	33.89	33.43	35500	32500	28.54	27.61	27.21
30000	29800	25.11	26.08	27.23	34000	32000	32.06	31.60	31.44	36000	33000	27.81	27.09	26.81
30500	30300	25.43	25.89	26.28	34500	32500	32.08	32.30	32.30	36500	33500	26.19	26.05	26.02
31000	30800	31.30	30.58	29.97	35000	33000	32.18	32.65	33.48	37000	34000	25.24	25.82	26.59
31500	31300	38.72	37.62	35.85	35500	33500	29.89	30.52	31.10	37500	34500	30.69	32.33	34.92
32000	31800	37.21	35.86	34.39	36000	34000	28.59	29.05	29.86	38000	35000	40.84	46.58	45.97
32500	32300	37.06	36.39	34.74	36500	34500	26.07	27.04	28.57	38500	35500	38.26	37.39	35.39
33000	32800	41.40	37.89	34.88	37000	35000	28.41	29.55	31.19	39000	36000	32.51	31.69	30.67
33500	33300	52.35	43.58	39.00	37500	35500	30.94	32.46	33.60	39500	36500	26.97	26.44	25.75
34000	33800	47.50	47.92	41.12	38000	36000	33.64	34.53	33.98	40000	37000	23.19	23.14	22.81
34500	34300	40.37	39.01	35.49	38500	36500	34.46	32.33	29.68	40500	37500	20.80	21.10	21.30
35000	34800	34.91	34.52	32.87	39000	37000	36.45	31.83	28.58	41000	38000	20.59	20.83	20.98
35500	35300	29.53	32.22	35.86	39500	37500	30.94	28.61	26.75	41500	38500	20.92	21.00	20.90
36000	35800	27.07	28.65	30.70	40000	38000	24.78	23.76	22.84	42000	39000	20.50	20.50	20.31
36500	36300	31.84	32.02	30.96	40500	38500	22.32	21.35	20.58	42500	39500	19.89	19.88	19.57
37000	36800	33.82	30.72	27.92	41000	39000	24.10	21.99	20.77	43000	40000	20.03	19.63	19.27
37500	37300	32.68	29.56	26.88	41500	39500	26.26	23.17	21.36					
38000	37800	27.30	25.65	24.13	42000	40000	22.51	21.01	19.86					
38500	38300	23.47	22.21	21.16										
39000	38800	21.80	20.42	19.38										
39500	39300	22.54	20.17	18.88										
40000	39800	20.45	18.64	17.63										
40200	40000	19.18	17.97	17.06										



Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 200 MHz			RF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 2000 MHz			RF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 3000 MHz		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
18000	18200	7.72	8.02	8.36	18000	20000	8.08	7.72	7.90	18000	21000	8.51	8.47	8.90
18500	18700	7.64	7.97	8.25	18500	20500	8.17	8.52	8.71	18500	21500	8.74	8.70	8.99
19000	19200	7.92	8.25	8.55	19000	21000	8.60	8.93	9.14	19000	22000	8.86	8.86	9.16
19500	19700	8.56	8.84	9.14	19500	21500	9.24	9.57	9.80	19500	22500	9.72	9.70	9.96
20000	20200	8.78	9.03	9.35	20000	22000	9.76	10.07	10.29	20000	23000	10.03	10.06	10.31
20500	20700	8.95	9.09	9.31	20500	22500	9.39	9.75	10.01	20500	23500	9.86	9.84	10.08
21000	21200	8.92	9.10	9.34	21000	23000	9.47	9.84	10.04	21000	24000	10.35	10.31	10.46
21500	21700	9.31	9.44	9.65	21500	23500	10.33	10.64	10.76	21500	24500	10.62	10.57	10.76
22000	22200	9.69	9.87	10.15	22000	24000	10.83	11.15	11.29	22000	25000	11.15	11.09	11.25
22500	22700	10.02	10.20	10.45	22500	24500	11.01	11.28	11.40	22500	25500	11.21	11.19	11.39
23000	23200	9.57	9.71	9.94	23000	25000	10.22	10.51	10.64	23000	26000	10.55	10.52	10.70
23500	23700	8.93	9.13	9.34	23500	25500	9.41	9.74	9.93	23500	26500	9.80	9.78	10.00
24000	24200	9.18	9.42	9.67	24000	26000	9.57	9.85	10.04	24000	27000	10.07	10.08	10.34
24500	24700	8.76	8.94	9.20	24500	26500	9.13	9.37	9.54	24500	27500	9.70	9.69	9.97
25000	25200	8.47	8.57	8.86	25000	27000	8.82	9.08	9.28	25000	28000	9.48	9.46	9.69
25500	25700	8.08	8.20	8.50	25500	27500	8.54	8.80	8.99	25500	28500	9.35	9.30	9.55
26000	26200	8.00	8.04	8.28	26000	28000	8.62	8.83	8.97	26000	29000	9.26	9.32	9.57
26500	26700	8.03	8.09	8.34	26500	28500	8.60	8.87	9.05	26500	29500	9.23	9.26	9.56
27000	27200	7.96	8.08	8.31	27000	29000	8.55	8.86	9.07	27000	30000	9.04	9.12	9.46
27500	27700	8.25	8.41	8.59	27500	29500	8.92	9.20	9.45	27500	30500	9.09	9.22	9.62
28000	28200	8.29	8.43	8.61	28000	30000	8.80	9.10	9.39	28000	31000	8.96	9.05	9.45
28500	28700	8.58	8.73	8.96	28500	30500	8.85	9.14	9.47	28500	31500	9.18	9.24	9.61
29000	29200	8.51	8.68	8.93	29000	31000	8.67	8.93	9.22	29000	32000	9.21	9.24	9.55
29500	29700	8.64	8.88	9.12	29500	31500	9.04	9.21	9.42	29500	32500	9.63	9.61	9.87
30000	30200	8.85	9.05	9.31	30000	32000	9.52	9.68	9.84	30000	33000	10.16	10.14	10.43
30500	30700	9.40	9.60	9.86	30500	32500	10.06	10.18	10.33	30500	33500	10.59	10.51	10.76
31000	31200	8.80	8.98	9.28	31000	33000	9.83	9.99	10.16	31000	34000	10.20	10.10	10.28
31500	31700	8.91	9.02	9.20	31500	33500	9.91	10.14	10.27	31500	34500	10.18	10.11	10.30
32000	32200	8.97	9.00	9.20	32000	34000	9.76	9.96	10.02	32000	35000	10.11	10.07	10.33
32500	32700	9.16	9.23	9.43	32500	34500	9.97	10.20	10.27	32500	35500	10.31	10.23	10.43
33000	33200	9.15	9.29	9.52	33000	35000	9.87	10.14	10.29	33000	36000	10.32	10.22	10.36
33500	33700	8.85	9.00	9.19	33500	35500	9.60	9.88	10.02	33500	36500	10.17	10.02	10.16
34000	34200	9.07	9.19	9.39	34000	36000	9.96	10.30	10.38	34000	37000	11.02	10.88	10.93
34500	34700	9.50	9.60	9.80	34500	36500	11.16	11.50	11.48	34500	37500	11.93	11.81	11.80
35000	35200	9.91	9.99	10.21	35000	37000	11.92	12.17	12.16	35000	38000	12.04	11.88	11.92
35500	35700	10.88	10.81	10.85	35500	37500	11.83	12.11	12.15	35500	38500	12.01	11.81	11.83
36000	36200	10.85	10.78	10.84	36000	38000	11.51	11.76	11.80	36000	39000	11.78	11.59	11.60
36500	36700	10.82	10.87	10.98	36500	38500	11.64	11.87	11.82	36500	39500	11.94	11.74	11.74
37000	37200	10.78	10.94	11.06	37000	39000	11.72	11.27	11.19	37000	40000	11.94	11.73	11.73
37500	37700	10.32	10.45	10.58	37500	39500	11.07	11.28	11.18	37500	40500	11.31	11.12	11.12
38000	38200	9.88	9.96	10.05	38000	40000	10.47	10.65	10.55	38000	41000	10.72	10.55	10.88
38500	38700	10.04	10.04	10.10	38500	40500	10.31	10.49	10.62	38500	41500	10.71	10.58	10.98
39000	39200	9.86	9.99	10.15	39000	41000	9.90	10.25	10.69	39000	42000	10.41	10.49	10.84
39500	39700	9.86	10.09	10.28	39500	41500	9.90	10.24	10.62	39500	42500	10.38	10.54	10.88
39800	40000	10.30	10.53	10.76	40000	42000	10.41	10.14	10.47	40000	43000	10.86	11.08	11.51
40000	40200	10.54	10.69	10.98										



Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 18000 MHz			IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 30750 MHz			IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 43500 GHz		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
10	18010	8.05	8.14	8.62	10	30760	9.09	9.13	9.47	10	43490	15.01	14.31	14.50
20	18020	8.07	8.17	8.65	20	30770	9.17	9.26	9.62	20	43480	15.05	14.32	14.52
30	18030	8.02	8.13	8.58	30	30780	9.24	9.31	9.66	30	43470	14.94	14.22	14.41
40	18040	7.96	8.07	8.52	40	30790	9.16	9.21	9.54	40	43460	14.77	13.89	14.09
50	18050	7.91	8.02	8.50	50	30800	8.96	9.04	9.38	50	43450	14.48	13.57	13.77
60	18060	7.92	8.07	8.54	60	30810	8.84	8.88	9.24	60	43440	14.33	13.48	13.72
70	18070	8.02	8.15	8.61	70	30820	8.74	8.83	9.15	70	43430	14.53	13.64	13.86
80	18080	8.15	8.23	8.69	80	30830	8.68	8.76	9.09	80	43420	14.74	13.81	14.04
90	18090	8.12	8.27	8.73	90	30840	8.65	8.73	9.11	90	43410	14.72	13.87	14.05
100	18100	8.15	8.25	8.74	100	30850	8.73	8.81	9.18	100	43400	14.65	13.79	14.00
200	18200	8.17	8.29	8.73	200	30950	8.77	8.87	9.20	200	43300	14.57	13.62	13.86
400	18400	8.31	8.39	8.83	400	31150	8.87	8.87	9.17	400	43100	14.55	13.63	13.84
600	18600	8.63	8.74	9.16	600	31350	9.03	9.01	9.24	600	42900	14.40	13.50	13.74
800	18800	8.87	8.95	9.32	800	31550	8.65	8.64	8.89	800	42700	14.20	13.16	13.41
1000	19000	8.81	8.87	9.25	1000	31750	8.70	8.67	8.96	1000	42500	14.07	12.95	13.22
1200	19200	9.11	9.15	9.45	1200	31950	9.14	9.09	9.37	1200	42300	13.81	12.69	12.92
1400	19400	9.64	9.67	9.94	1400	32150	9.32	9.28	9.52	1400	42100	13.37	12.17	12.43
1600	19600	9.54	9.53	9.84	1600	32350	9.40	9.36	9.56	1600	41900	12.76	11.65	11.89
1800	19800	9.77	9.77	9.99	1800	32550	9.43	9.39	9.61	1800	41700	12.44	11.44	11.68
2000	20000	10.36	10.31	10.52	2000	32750	9.32	9.31	9.54	2000	41500	12.22	11.22	11.45
2200	20200	10.03	9.99	10.15	2200	32950	9.27	9.22	9.49	2200	41300	12.21	11.28	11.54
2400	20400	10.12	10.04	10.19	2400	33150	9.40	9.38	9.62	2400	41100	11.90	10.96	11.20
2600	20600	10.15	10.09	10.22	2600	33350	9.69	9.66	9.89	2600	40900	11.63	10.75	11.00
2800	20800	10.32	10.23	10.33	2800	33550	9.81	9.79	9.99	2800	40700	11.74	10.70	10.98
3000	21000	10.48	10.35	10.43	3000	33750	9.99	9.95	10.16	3000	40500	11.85	10.83	11.08
3200	21200	11.19	11.09	11.12	3200	33950	10.32	10.26	10.45	3200	40300	12.16	10.86	11.11
3400	21400	11.06	10.92	10.98	3400	34150	10.34	10.27	10.48	3400	40100	12.63	10.96	11.24
3600	21600	11.58	11.44	11.46	3600	34350	10.76	10.71	10.92	3600	39900	12.66	10.87	11.17
3800	21800	11.78	11.59	11.59	3800	34550	10.97	10.88	11.11	3800	39700	12.78	10.95	10.85
4000	22000	12.28	12.09	12.06	4000	34750	11.26	11.17	11.38	4000	39500	13.16	11.13	10.60
4200	22200	12.33	12.15	12.10	4200	34950	11.02	10.98	11.17	4200	39300	13.58	11.42	10.81
4400	22400	13.53	13.32	13.19	4400	35150	11.06	10.96	11.17	4400	39100	13.53	11.43	10.86
4600	22600	13.69	13.46	13.27	4600	35350	10.98	10.92	11.10	4600	38900	13.66	11.52	10.92
4800	22800	13.85	13.64	13.44	4800	35550	11.07	10.96	11.19	4800	38700	13.82	11.74	11.17
5000	23000	14.27	14.01	13.78	5000	35750	11.45	11.35	11.56	5000	38500	14.08	11.97	11.40
5200	23200	13.62	13.41	13.30	5200	35950	11.65	11.57	11.80	5200	38300	14.27	12.17	11.65
5400	23400	13.38	13.23	13.17	5400	36150	11.85	11.75	12.00	5400	38100	14.65	12.48	11.92
5600	23600	13.29	13.19	13.15	5600	36350	12.27	12.20	12.42	5600	37900	15.20	12.96	12.36
5800	23800	13.41	13.38	13.39	5800	36550	12.19	12.10	12.31	5800	37700	16.01	13.62	12.93
6000	24000	13.97	13.95	14.00	6000	36750	12.70	12.65	12.85	6000	37500	16.02	13.63	13.00
6200	24200	13.83	13.82	13.97	6200	36950	12.73	12.66	12.91	6200	37300	16.49	14.01	13.30
6400	24400	14.25	14.31	14.44	6400	37150	13.07	13.00	13.19	6400	37100	17.20	14.53	13.74
6600	24600	13.94	14.04	14.24	6600	37350	12.81	12.70	12.96	6600	36900	17.67	14.92	14.04
6800	24800	14.24	14.35	14.62	6800	37550	13.23	13.17	13.42	6800	36700	17.63	14.89	14.04
7000	25000	13.81	13.95	14.28	7000	37750	13.02	12.92	13.19	7000	36500	17.43	14.59	13.68
7200	25200	13.33	13.49	13.91	7200	37950	12.96	12.87	13.13	7200	36300	17.81	14.87	13.95
7400	25400	13.32	13.49	13.97	7400	38150	13.08	13.00	13.25	7400	36100	17.62	14.69	13.73
7600	25600	12.58	12.81	13.31	7600	38350	12.94	12.85	13.10	7600	35900	17.43	14.54	13.56
7800	25800	12.30	12.53	13.08	7800	38550	12.93	12.82	13.08	7800	35700	17.54	14.63	13.67
8000	26000	11.77	11.98	12.58	8000	38750	13.03	12.95	13.19	8000	35500	18.02	15.10	14.09



Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

LO (IN) (MHz)	LO-RF ISOLATION (dB)			LO-IF (I) ISOLATION (dB)			LO-IF (Q) ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)			@LO (dBm)		
	+17	+18	+19	+17	+18	+19	+17	+18	+19
18000	46.73	46.45	44.31	39.54	40.10	41.43	47.91	47.81	47.44
18500	45.86	45.90	45.06	39.82	40.03	40.18	46.39	46.37	46.18
19000	44.02	43.95	43.10	42.71	42.89	42.70	48.05	48.10	48.28
19500	42.95	42.92	42.33	43.24	43.45	43.31	56.10	56.43	57.20
20000	41.56	41.41	40.67	41.47	41.68	41.57	63.72	61.27	57.23
20500	39.19	39.04	38.31	39.89	40.08	40.05	56.70	55.56	53.26
21000	38.52	38.45	37.93	37.82	37.94	37.79	54.87	53.71	51.76
21500	38.32	38.25	37.71	37.80	37.91	37.76	52.17	52.12	51.68
22000	40.54	40.38	39.60	43.05	43.16	43.00	47.77	47.92	47.90
22500	41.04	40.87	40.06	45.02	45.10	44.90	45.78	45.85	45.81
23000	39.82	39.73	39.10	45.19	45.24	44.95	47.65	47.69	47.57
23500	39.19	39.14	38.57	44.44	44.51	44.28	47.54	47.55	47.42
24000	40.06	39.96	39.28	44.29	44.36	44.13	47.45	47.43	47.21
24500	40.34	40.26	39.64	49.06	49.15	48.99	45.32	45.35	45.19
25000	40.73	40.66	40.06	53.57	53.79	53.88	44.74	44.78	44.63
25500	40.81	40.72	40.11	55.19	55.26	55.09	46.76	46.58	46.01
26000	41.48	41.42	40.77	56.51	56.44	55.99	46.45	46.27	45.53
26500	43.28	43.28	42.68	54.95	54.86	54.27	44.95	44.76	44.02
27000	43.30	43.37	42.82	55.63	55.63	55.14	44.17	44.02	43.27
27500	43.21	43.22	42.68	54.29	54.26	53.67	46.44	46.31	45.74
28000	43.73	43.84	43.56	50.83	50.73	50.02	47.69	47.57	47.03
28500	43.44	43.56	43.29	50.63	50.41	49.50	51.57	51.46	50.98
29000	42.70	42.81	42.51	49.52	49.27	48.27	61.54	61.92	62.87
29500	42.68	42.78	42.60	46.83	46.51	45.54	56.88	56.77	56.49
30000	42.65	42.75	42.52	43.49	43.27	42.20	50.07	49.92	49.26
30500	40.87	40.79	40.20	40.07	39.79	38.78	44.20	43.99	43.32
31000	38.60	38.51	37.95	40.18	39.90	38.98	41.49	41.21	40.45
31500	38.78	38.62	37.95	44.99	44.65	43.61	40.16	39.81	38.87
32000	37.12	36.97	36.23	45.70	45.60	45.01	38.34	37.92	36.86
32500	39.44	39.22	38.48	38.63	38.38	37.71	35.71	35.23	34.28
33000	38.70	38.42	37.62	40.95	40.71	40.08	36.92	36.41	35.53
33500	38.85	38.53	37.72	40.74	40.40	39.70	40.81	40.18	39.19
34000	39.22	39.01	38.23	37.80	37.56	36.83	40.22	39.87	39.09
34500	39.55	39.13	38.29	39.51	39.15	38.47	34.04	33.59	32.88
35000	39.81	39.47	38.53	38.78	38.53	37.83	31.71	31.35	30.62
35500	41.62	41.22	40.31	36.87	36.56	35.89	31.06	30.67	29.99
36000	43.47	43.02	42.06	35.74	35.41	34.77	31.29	30.91	30.28
36500	44.50	44.04	42.96	35.69	35.44	34.76	33.53	33.23	32.60
37000	44.27	43.93	42.70	34.27	34.09	33.37	35.41	35.18	34.53
37500	42.84	42.40	41.31	32.25	32.01	31.33	35.94	35.67	35.09
38000	40.65	40.38	39.37	29.98	29.82	29.14	33.39	33.17	32.59
38500	39.50	39.19	38.34	31.38	31.16	30.56	29.86	29.60	29.09
39000	36.71	36.30	35.70	34.47	34.13	33.66	27.38	26.99	26.57
39500	33.80	33.61	33.04	36.33	36.18	35.81	27.96	27.73	27.29
40000	32.34	32.21	31.66	39.75	39.79	39.65	30.19	29.99	29.51

Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF-IF (I) ISOLATION (dB)			RF-IF (Q) ISOLATION (dB)		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	18200	18.26	18.03	17.80	37.43	37.25	36.89
18500	18700	16.63	16.61	16.60	33.65	34.10	33.59
19000	19200	18.46	18.55	18.63	33.30	33.28	32.75
19500	19700	20.19	20.30	20.42	34.85	34.32	33.57
20000	20200	20.93	21.02	21.11	33.19	32.92	32.65
20500	20700	20.52	20.61	20.67	33.06	32.92	32.77
21000	21200	19.47	19.54	19.58	30.98	30.97	30.93
21500	21700	20.37	20.46	20.50	27.00	27.05	27.07
22000	22200	24.74	24.82	24.83	24.38	24.42	24.47
22500	22700	25.88	25.95	25.97	25.91	25.92	25.95
23000	23200	26.63	26.69	26.70	28.71	28.75	28.78
23500	23700	26.03	26.12	26.11	28.96	29.03	29.06
24000	24200	27.50	27.62	27.63	29.42	29.51	29.56
24500	24700	30.36	30.49	30.51	25.89	25.99	26.05
25000	25200	32.18	32.33	32.39	23.90	24.01	24.09
25500	25700	38.81	39.02	39.08	28.16	28.31	28.42
26000	26200	45.07	45.25	45.41	34.16	34.33	34.44
26500	26700	40.15	40.29	40.34	40.67	40.92	41.05
27000	27200	32.95	33.16	33.25	43.12	43.15	43.14
27500	27700	32.35	32.53	32.55	35.10	35.21	35.27
28000	28200	27.01	27.16	27.21	43.43	43.55	43.50
28500	28700	25.97	26.11	26.17	42.17	42.43	42.57
29000	29200	25.69	25.84	25.86	36.90	37.04	37.09
29500	29700	23.60	23.75	23.78	33.48	33.60	33.64
30000	30200	20.27	20.42	20.45	27.94	28.04	28.07
30500	30700	15.98	16.14	16.19	21.71	21.80	21.84
31000	31200	17.40	17.57	17.63	18.09	18.21	18.26
31500	31700	19.55	19.71	19.77	18.94	19.07	19.12
32000	32200	26.00	26.15	26.19	23.57	23.72	23.79
32500	32700	29.14	29.28	29.33	33.13	33.38	33.53
33000	33200	31.35	31.53	31.58	49.51	48.75	48.41
33500	33700	31.35	31.52	31.58	39.44	39.23	39.08
34000	34200	28.45	28.63	28.66	38.96	38.76	38.61
34500	34700	29.89	30.03	30.07	48.41	47.89	47.45
35000	35200	31.97	32.06	32.08	55.52	54.17	53.85
35500	35700	32.78	32.89	32.92	48.72	48.94	49.04
36000	36200	34.07	34.19	34.26	51.62	50.58	50.11
36500	36700	36.05	36.18	36.26	53.16	52.22	51.54
37000	37200	35.33	35.50	35.59	51.62	51.18	50.67
37500	37700	33.24	33.42	33.53	48.70	48.39	48.36
38000	38200	30.35	30.56	30.71	48.33	48.04	48.06
38500	38700	30.36	30.65	30.78	51.27	51.77	50.68
39000	39200	30.71	30.96	31.09	36.46	36.30	36.19
39500	39700	29.85	30.12	30.26	34.27	34.20	34.05
39800	40000	29.50	29.86	30.06	34.73	34.84	34.79

Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 200 MHz			PHASE UNBALANCE VS. RF FREQUENCY @IF = 200 MHz		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	18200	0.07	0.03	-0.05	3.64	4.09	4.69
18500	18700	-0.03	-0.05	-0.06	3.88	4.07	4.79
19000	19200	-0.27	-0.29	-0.29	4.73	4.00	4.12
19500	19700	-0.36	-0.38	-0.40	5.37	4.24	3.97
20000	20200	-0.12	-0.17	-0.22	2.78	2.08	2.10
20500	20700	-0.48	-0.37	-0.30	1.73	0.74	0.36
21000	21200	-0.29	-0.18	-0.13	2.58	1.62	1.28
21500	21700	-0.42	-0.25	-0.16	3.78	2.26	1.43
22000	22200	-0.28	-0.18	-0.12	5.94	4.46	3.59
22500	22700	0.22	0.20	0.16	3.14	2.19	2.02
23000	23200	0.56	0.55	0.50	1.15	0.43	0.28
23500	23700	0.50	0.57	0.54	2.22	1.73	1.06
24000	24200	0.02	0.25	0.36	1.93	1.18	0.44
24500	24700	-0.07	0.17	0.28	0.61	0.28	0.34
25000	25200	-0.15	0.07	0.21	0.73	0.42	0.24
25500	25700	-0.17	0.06	0.20	0.26	0.23	0.25
26000	26200	-0.20	-0.01	0.12	0.23	0.26	0.26
26500	26700	-0.14	0.01	0.11	0.22	0.18	0.15
27000	27200	0.09	0.16	0.19	0.62	0.16	0.14
27500	27700	0.18	0.24	0.26	1.98	0.90	0.45
28000	28200	0.21	0.26	0.28	2.90	1.39	0.64
28500	28700	0.21	0.24	0.26	3.45	1.54	0.54
29000	29200	0.21	0.25	0.25	4.50	2.83	1.78
29500	29700	0.17	0.20	0.20	4.95	3.83	3.09
30000	30200	0.08	0.10	0.10	4.48	3.75	3.26
30500	30700	-0.22	-0.23	-0.26	3.12	2.73	2.49
31000	31200	0.04	-0.03	-0.09	0.65	0.93	1.11
31500	31700	0.38	0.29	0.20	0.32	0.34	0.47
32000	32200	0.36	0.26	0.19	0.42	0.44	0.44
32500	32700	0.38	0.28	0.18	0.31	0.25	0.28
33000	33200	0.38	0.25	0.14	0.64	0.75	0.67
33500	33700	0.49	0.37	0.26	1.13	1.09	0.99
34000	34200	0.46	0.32	0.20	1.24	0.91	0.67
34500	34700	0.41	0.23	0.10	1.94	1.34	1.02
35000	35200	0.44	0.27	0.11	2.81	1.76	1.22
35500	35700	1.12	0.89	0.70	3.47	2.12	1.30
36000	36200	1.02	0.82	0.66	0.57	1.62	2.27
36500	36700	0.69	0.57	0.43	1.40	3.01	4.13
37000	37200	0.55	0.46	0.34	1.86	3.64	5.03
37500	37700	0.46	0.37	0.25	3.36	4.80	5.84
38000	38200	0.32	0.21	0.11	5.67	7.14	7.98
38500	38700	0.25	0.07	-0.04	7.59	9.57	10.48
39500	39700	-0.12	-0.51	-0.70	8.95	10.97	11.68
39800	40000	-0.41	-0.84	-1.09	9.02	10.60	11.10
40000	40200	-0.65	-1.07	-1.36	9.68	11.35	11.80
39800	40000	-0.41	-0.84	-1.09	9.02	10.60	11.10

Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 2000 MHz			PHASE UNBALANCE VS. RF FREQUENCY @IF = 2000 MHz		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	20000	0.39	0.37	0.34	1.38	1.88	2.38
18500	20500	0.26	0.28	0.28	2.33	2.82	3.44
19000	21000	0.57	0.58	0.57	1.09	1.53	2.02
19500	21500	0.05	0.12	0.24	2.89	2.95	3.08
20000	22000	0.08	0.15	0.24	2.29	2.49	2.66
20500	22500	0.02	0.12	0.23	3.10	3.46	3.93
21000	23000	0.46	0.53	0.58	0.67	0.24	1.19
21500	23500	1.02	1.05	1.03	1.01	0.45	0.29
22000	24000	0.98	1.01	0.99	1.99	2.12	2.20
22500	24500	0.95	0.97	0.96	4.99	4.68	4.10
23000	25000	0.34	0.42	0.55	7.10	6.52	5.66
23500	25500	0.21	0.35	0.51	5.52	5.19	4.74
24000	26000	0.20	0.33	0.48	5.94	5.54	5.10
24500	26500	0.18	0.30	0.44	6.16	5.76	5.40
25000	27000	0.18	0.29	0.42	5.73	5.36	5.14
25500	27500	0.23	0.32	0.43	4.97	4.56	4.43
26000	28000	0.45	0.50	0.55	5.01	4.40	3.93
26500	28500	0.54	0.56	0.59	5.91	5.00	4.13
27000	29000	0.55	0.56	0.56	6.39	5.54	4.58
27500	29500	0.55	0.57	0.57	7.27	6.50	5.60
28000	30000	0.49	0.53	0.55	7.06	6.48	5.85
28500	30500	0.42	0.45	0.47	6.48	6.03	5.55
29000	31000	0.42	0.44	0.43	5.78	5.55	5.38
29500	31500	0.47	0.46	0.41	4.36	4.32	4.45
30000	32000	0.55	0.52	0.46	3.64	3.54	3.56
30500	32500	0.42	0.40	0.32	3.05	2.81	2.73
31000	33000	0.65	0.64	0.55	0.53	0.45	0.49
31500	33500	0.86	0.82	0.73	0.62	0.57	0.60
32000	34000	0.86	0.83	0.73	0.66	0.59	0.63
32500	34500	1.04	1.00	0.90	0.83	0.97	1.38
33000	35000	0.91	0.85	0.71	0.52	0.51	1.03
33500	35500	0.92	0.87	0.73	1.26	0.77	0.54
34000	36000	0.95	0.92	0.81	1.72	1.29	0.43
34500	36500	1.37	1.34	1.18	2.84	2.05	0.50
35000	37000	1.63	1.59	1.45	1.43	2.10	3.58
35500	37500	1.40	1.38	1.31	3.30	3.88	5.19
36000	38000	1.23	1.19	1.10	4.86	5.47	6.50
36500	38500	1.14	1.09	0.91	6.41	7.01	8.60
37000	39000	1.15	1.03	0.71	8.00	8.86	10.53
37500	39500	0.99	0.85	0.50	9.05	9.69	11.06
38000	40000	0.69	0.54	0.12	9.81	10.36	11.59
38500	40500	0.36	0.25	-0.23	10.11	10.39	11.06
39000	41000	0.02	-0.13	-0.60	10.46	10.62	10.74
39500	41500	-0.27	-0.39	-0.81	10.24	10.55	11.20
40000	42000	-0.66	-0.81	-1.15	8.94	9.53	10.74

Frequency Mixer Die SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 3000 MHz			PHASE UNBALANCE VS. RF FREQUENCY @IF = 3000 MHz		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	21000	0.27	0.27	0.33	4.44	4.65	5.22
18500	21500	0.44	0.42	0.41	4.83	4.85	4.92
19000	22000	0.10	0.13	0.24	7.47	7.38	7.15
19500	22500	0.34	0.36	0.42	6.66	6.91	7.12
20000	23000	0.12	0.18	0.29	3.91	4.62	5.61
20500	23500	0.39	0.41	0.48	0.43	0.92	2.04
21000	24000	1.00	0.98	0.95	2.23	2.44	3.05
21500	24500	1.02	1.00	0.97	5.33	5.25	5.23
22000	25000	0.94	0.94	0.94	8.79	8.35	7.61
22500	25500	0.43	0.49	0.61	10.64	10.04	8.90
23000	26000	0.35	0.40	0.53	8.76	8.40	7.82
23500	26500	0.37	0.43	0.55	8.78	8.40	7.93
24000	27000	0.37	0.43	0.56	8.57	8.18	7.85
24500	27500	0.34	0.39	0.51	8.22	7.82	7.56
25000	28000	0.33	0.35	0.44	7.63	7.14	6.78
25500	28500	0.52	0.51	0.54	7.28	6.70	6.13
26000	29000	0.60	0.57	0.56	8.14	7.37	6.54
26500	29500	0.61	0.58	0.56	9.01	8.23	7.39
27000	30000	0.59	0.58	0.58	9.19	8.47	7.65
27500	30500	0.53	0.53	0.54	9.11	8.47	7.79
28000	31000	0.49	0.48	0.47	8.28	7.90	7.51
28500	31500	0.49	0.46	0.43	6.85	6.72	6.69
29000	32000	0.56	0.50	0.43	5.19	5.02	5.09
29500	32500	0.67	0.59	0.50	4.67	4.38	4.28
30000	33000	0.69	0.62	0.53	4.15	3.95	3.84
30500	33500	0.36	0.29	0.21	3.82	3.68	3.59
31000	34000	0.64	0.58	0.48	0.97	0.95	1.04
31500	34500	0.93	0.86	0.75	0.94	0.96	1.14
32000	35000	0.85	0.75	0.64	1.04	1.24	1.62
32500	35500	0.86	0.77	0.65	1.68	2.06	2.79
33000	36000	0.80	0.73	0.63	1.10	1.40	2.16
33500	36500	0.88	0.81	0.73	0.62	0.89	1.81
34000	37000	1.44	1.35	1.22	0.82	0.67	1.34
34500	37500	1.69	1.61	1.49	3.61	3.95	4.49
35000	38000	1.32	1.26	1.19	6.55	6.88	7.32
35500	38500	1.14	1.04	0.94	8.37	8.97	9.67
36000	39000	1.13	0.96	0.79	9.91	10.61	11.29
36500	39500	1.03	0.82	0.61	10.42	10.99	11.52
37000	40000	0.83	0.64	0.39	10.96	11.38	11.86
37500	40500	0.63	0.44	0.12	11.62	11.76	11.88
38000	41000	0.36	0.08	-0.30	12.23	11.97	11.71
38500	41500	0.20	-0.02	-0.37	12.61	12.56	12.48
39000	42000	0.02	-0.19	-0.51	13.72	13.95	14.20
39500	42500	-0.28	-0.51	-0.85	14.80	15.24	15.78
40000	43000	-0.66	-0.99	-1.40	14.37	15.25	16.28

Frequency Mixer Die

SMIQ-1844H+

Typical Performance Data

RF (IN) (MHz)	GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)			GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)			GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)		
	IF = LO-RF = 200MHz						IF = LO-RF = 2000MHz						IF = LO-RF = 3000MHz					
	@LO (dBm)			@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	+17	+18	+19
18000	0.38	0.34	0.27	0.44	0.41	0.34	0.39	0.41	0.40	0.41	0.42	0.44	0.30	0.32	0.32	0.38	0.38	0.38
18500	0.38	0.35	0.30	0.40	0.37	0.31	0.25	0.28	0.28	0.28	0.30	0.32	0.16	0.18	0.18	0.27	0.27	0.26
19000	0.29	0.28	0.25	0.30	0.29	0.26	0.16	0.20	0.20	0.20	0.21	0.21	0.13	0.16	0.16	0.31	0.30	0.29
19500	0.22	0.23	0.22	0.23	0.24	0.24	0.10	0.13	0.13	0.19	0.20	0.20	0.14	0.16	0.17	0.20	0.20	0.20
20000	0.17	0.18	0.18	0.19	0.20	0.21	0.09	0.12	0.12	0.19	0.18	0.18	0.11	0.14	0.14	0.14	0.15	0.15
20500	0.12	0.14	0.14	0.16	0.18	0.18	0.07	0.09	0.09	0.13	0.14	0.13	0.09	0.11	0.11	0.09	0.08	0.08
21000	0.15	0.16	0.17	0.19	0.20	0.19	0.15	0.17	0.16	0.11	0.12	0.12	0.12	0.13	0.14	0.09	0.09	0.09
21500	0.14	0.15	0.16	0.19	0.20	0.19	0.13	0.15	0.15	0.06	0.07	0.07	0.12	0.14	0.14	0.11	0.11	0.11
22000	0.13	0.13	0.12	0.15	0.16	0.14	0.09	0.11	0.10	0.05	0.05	0.05	0.07	0.09	0.09	0.09	0.10	0.10
22500	0.21	0.21	0.20	0.15	0.18	0.18	0.13	0.15	0.15	0.12	0.12	0.12	0.08	0.11	0.12	0.17	0.18	0.18
23000	0.23	0.23	0.22	0.13	0.15	0.15	0.09	0.11	0.12	0.14	0.15	0.16	0.12	0.15	0.16	0.19	0.20	0.20
23500	0.22	0.23	0.21	0.20	0.20	0.19	0.12	0.15	0.16	0.19	0.19	0.19	0.16	0.19	0.21	0.22	0.23	0.23
24000	0.19	0.20	0.20	0.22	0.23	0.21	0.15	0.18	0.19	0.21	0.22	0.22	0.17	0.20	0.22	0.24	0.24	0.24
24500	0.21	0.22	0.23	0.22	0.23	0.21	0.17	0.20	0.21	0.22	0.23	0.22	0.19	0.21	0.23	0.25	0.25	0.24
25000	0.20	0.22	0.22	0.25	0.26	0.23	0.18	0.21	0.22	0.22	0.23	0.22	0.21	0.23	0.24	0.25	0.25	0.24
25500	0.22	0.23	0.23	0.28	0.27	0.25	0.18	0.21	0.22	0.22	0.22	0.21	0.25	0.26	0.27	0.23	0.24	0.24
26000	0.27	0.28	0.28	0.31	0.31	0.27	0.25	0.27	0.28	0.24	0.25	0.24	0.30	0.30	0.30	0.28	0.29	0.29
26500	0.29	0.29	0.29	0.27	0.27	0.25	0.26	0.28	0.29	0.27	0.27	0.27	0.29	0.29	0.29	0.31	0.31	0.30
27000	0.31	0.31	0.31	0.27	0.27	0.26	0.24	0.27	0.28	0.28	0.29	0.29	0.32	0.31	0.31	0.34	0.31	0.32
27500	0.25	0.26	0.27	0.26	0.26	0.24	0.19	0.21	0.22	0.23	0.23	0.24	0.32	0.30	0.30	0.35	0.31	0.30
28000	0.32	0.34	0.35	0.35	0.34	0.33	0.31	0.31	0.32	0.35	0.33	0.34	0.40	0.40	0.41	0.49	0.45	0.43
28500	0.21	0.23	0.24	0.24	0.25	0.23	0.26	0.24	0.25	0.31	0.27	0.28	0.30	0.30	0.31	0.41	0.38	0.37
29000	0.21	0.23	0.24	0.24	0.25	0.24	0.27	0.27	0.27	0.34	0.31	0.31	0.30	0.30	0.30	0.36	0.36	0.35
29500	0.30	0.30	0.32	0.34	0.34	0.34	0.33	0.34	0.35	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.40
30000	0.33	0.32	0.34	0.36	0.35	0.37	0.36	0.36	0.36	0.37	0.37	0.37	0.36	0.38	0.38	0.40	0.40	0.40
30500	0.33	0.31	0.32	0.34	0.34	0.35	0.34	0.35	0.35	0.35	0.34	0.35	0.32	0.34	0.34	0.39	0.39	0.39
31000	0.38	0.37	0.37	0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.37	0.38	0.37	0.39	0.41	0.40	0.41	0.42
31500	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.35	0.36	0.35	0.35	0.35	0.34	0.37	0.39	0.37	0.38	0.39
32000	0.37	0.37	0.38	0.36	0.36	0.36	0.40	0.42	0.43	0.39	0.39	0.40	0.38	0.40	0.42	0.42	0.43	0.44
32500	0.36	0.36	0.36	0.34	0.34	0.34	0.39	0.40	0.42	0.34	0.35	0.37	0.35	0.38	0.38	0.38	0.40	0.40
33000	0.35	0.35	0.35	0.34	0.34	0.34	0.36	0.38	0.38	0.34	0.34	0.36	0.32	0.34	0.34	0.33	0.34	0.34
33500	0.35	0.35	0.35	0.33	0.34	0.34	0.36	0.37	0.36	0.33	0.34	0.34	0.28	0.29	0.30	0.29	0.29	0.30
34000	0.33	0.32	0.33	0.29	0.30	0.31	0.30	0.31	0.30	0.27	0.28	0.28	0.23	0.24	0.25	0.19	0.20	0.21
34500	0.35	0.35	0.35	0.30	0.31	0.32	0.27	0.28	0.28	0.24	0.23	0.24	0.25	0.27	0.28	0.19	0.20	0.21
35000	0.29	0.30	0.29	0.27	0.28	0.28	0.25	0.25	0.25	0.18	0.20	0.20	0.23	0.25	0.26	0.21	0.22	0.23
35500	0.28	0.29	0.28	0.21	0.23	0.23	0.26	0.26	0.27	0.21	0.22	0.23	0.25	0.26	0.27	0.22	0.23	0.25
36000	0.28	0.29	0.29	0.21	0.22	0.23	0.25	0.26	0.26	0.21	0.22	0.23	0.26	0.27	0.28	0.22	0.24	0.25
36500	0.31	0.31	0.31	0.25	0.27	0.27	0.26	0.26	0.26	0.25	0.24	0.24	0.30	0.30	0.31	0.24	0.25	0.26
37000	0.33	0.33	0.33	0.32	0.33	0.33	0.31	0.31	0.31	0.29	0.30	0.30	0.35	0.35	0.35	0.29	0.28	0.29
37500	0.32	0.32	0.32	0.31	0.32	0.31	0.30	0.30	0.31	0.28	0.28	0.28	0.33	0.34	0.35	0.33	0.27	0.27
38000	0.37	0.36	0.36	0.36	0.35	0.34	0.34	0.34	0.34	0.32	0.30	0.31	0.34	0.35	0.35	0.40	0.31	0.30
38500	0.27	0.26	0.26	0.33	0.29	0.27	0.24	0.25	0.26	0.29	0.23	0.22	0.24	0.26	0.25	0.26	0.22	0.22
39000	0.29	0.29	0.29	0.37	0.36	0.33	0.27	0.28	0.28	0.39	0.27	0.26	0.29	0.31	0.30	0.40	0.29	0.27
39500	0.39	0.39	0.39	0.47	0.45	0.43	0.36	0.38	0.36	0.46	0.37	0.36	0.41	0.41	0.42	1.00	0.69	0.48
40000	0.42	0.42	0.42	0.56	0.49	0.47	0.38	0.40	0.39	0.63	0.46	0.42	0.42	0.44	0.46	0.91	0.93	0.63

Frequency Mixer Die

SMIQ-1844H+

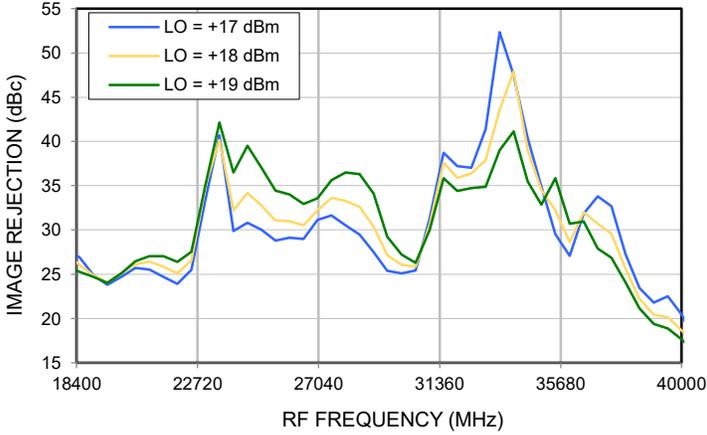
Typical Performance Data

RF (IN) (MHz)	Input IP3 (I)			Input IP3 (Q)			Input IP3 (I)			Input IP3 (Q)			Input IP3 (I)			Input IP3 (Q)		
	IF = LO-RF = 200MHz						IF = LO-RF = 2000MHz						IF = LO-RF = 3000MHz					
	@LO (dBm)			@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	+17	+18	+19
18000	24.91	25.29	26.31	24.74	25.67	27.35	25.17	25.40	25.48	25.53	25.69	25.91	26.97	26.88	27.03	28.23	28.12	28.27
18500	23.78	24.48	25.39	24.29	24.85	25.68	27.66	27.43	27.30	27.82	27.69	27.74	28.88	29.06	29.06	30.93	30.95	31.28
19000	24.59	25.53	26.25	25.13	25.59	26.17	30.86	30.60	30.48	31.23	30.47	30.25	27.45	27.87	28.13	31.27	31.25	31.62
19500	26.65	27.38	27.77	26.66	26.97	27.35	30.81	30.70	30.67	32.58	32.81	32.86	29.00	28.81	28.90	31.54	31.59	31.78
20000	29.31	29.57	29.57	29.95	29.79	29.82	29.73	30.07	30.26	31.24	31.36	31.75	31.57	30.66	30.11	29.03	30.11	30.89
20500	30.86	30.42	30.22	31.82	31.37	31.32	29.02	28.93	29.08	32.02	32.18	32.46	32.26	33.30	34.36	28.54	29.17	29.94
21000	30.97	30.94	30.81	31.56	31.61	31.79	33.97	32.90	31.73	29.86	30.44	31.03	36.78	37.95	37.66	29.22	30.14	31.01
21500	30.82	31.09	31.27	31.02	31.29	31.93	32.66	33.96	36.08	30.80	31.22	31.87	33.44	35.03	36.95	30.21	31.25	32.56
22000	31.54	31.60	31.79	30.83	30.93	31.34	43.60	40.86	39.18	31.64	32.27	33.55	31.20	32.16	33.29	32.67	33.37	34.05
22500	34.16	32.46	31.88	31.52	31.57	31.97	34.22	35.43	37.18	32.01	32.62	33.46	29.71	30.62	31.64	33.46	34.23	34.88
23000	32.99	31.68	30.96	30.03	30.35	30.94	31.07	31.78	32.75	32.63	33.13	33.50	28.96	29.68	30.41	29.16	29.83	30.45
23500	31.10	31.31	31.56	31.01	31.21	31.78	31.21	31.82	32.62	30.09	30.85	31.54	29.21	29.75	30.34	29.56	29.90	30.04
24000	30.89	31.63	32.80	31.46	32.04	32.64	31.04	31.56	32.55	30.64	31.10	31.63	30.03	30.40	30.82	30.40	30.36	30.26
24500	29.09	29.90	31.28	28.23	28.76	29.51	29.81	30.22	31.01	29.71	29.89	30.17	29.66	29.90	29.95	29.36	29.17	28.74
25000	28.77	29.48	30.80	28.10	28.71	29.42	30.30	30.39	30.73	29.89	29.92	29.88	30.38	30.54	30.52	29.91	29.56	29.02
25500	28.08	28.71	29.82	26.71	27.29	28.01	29.75	29.78	29.66	28.56	28.47	28.18	28.65	28.46	28.20	28.64	28.19	27.56
26000	28.62	29.15	30.08	26.85	27.31	27.78	29.43	29.61	29.54	28.39	28.09	27.66	27.86	27.47	27.12	28.95	28.39	27.43
26500	28.96	29.19	29.80	26.98	27.35	27.60	28.08	28.22	28.25	29.00	28.30	27.52	27.76	27.27	26.85	29.36	28.59	27.54
27000	28.10	28.36	28.68	26.50	26.83	26.97	27.45	27.30	27.15	29.56	28.42	27.36	26.84	26.64	26.23	28.60	28.14	27.20
27500	28.01	28.42	28.71	27.56	27.73	27.63	27.90	27.51	27.19	30.26	28.84	27.73	26.35	26.53	26.28	28.13	28.11	27.44
28000	28.59	28.86	29.07	28.36	28.19	27.88	28.06	27.68	27.24	29.81	28.92	27.89	26.44	26.53	26.25	27.99	27.77	27.11
28500	28.59	28.69	28.70	28.47	28.13	27.60	27.59	27.49	26.94	28.68	28.47	27.68	26.76	26.76	26.32	28.18	27.84	27.16
29000	27.93	27.92	27.80	28.18	27.62	27.09	27.26	27.22	26.70	28.05	27.95	27.35	27.32	27.20	26.83	27.96	27.91	27.42
29500	27.58	27.46	27.20	28.57	27.80	27.13	28.20	28.21	27.57	28.80	28.52	27.77	28.10	28.11	27.75	28.27	28.20	27.75
30000	28.34	27.99	27.51	29.34	28.65	27.83	29.16	29.30	28.94	29.11	29.13	28.58	28.51	28.57	28.30	29.09	28.82	28.32
30500	30.59	30.08	29.24	30.97	30.65	29.80	30.38	30.50	30.26	30.51	30.45	30.11	29.47	29.62	29.47	31.11	30.75	30.24
31000	30.03	29.94	29.04	29.39	29.39	28.77	29.36	29.29	28.98	29.47	29.12	28.69	28.23	28.43	28.25	29.55	29.08	28.59
31500	30.01	30.12	29.60	29.58	29.65	29.10	29.34	29.27	28.97	29.58	29.16	28.79	28.18	28.35	28.17	29.08	28.78	28.29
32000	30.20	30.41	29.98	30.27	30.19	29.56	29.67	29.58	29.27	29.46	29.23	28.84	28.35	28.42	28.18	29.08	28.81	28.40
32500	29.64	29.78	29.41	29.50	29.23	28.72	29.50	29.32	28.90	28.68	28.53	28.11	27.88	27.74	27.52	28.41	28.15	27.95
33000	29.55	29.47	29.20	29.36	29.10	28.87	29.43	29.28	28.88	28.86	28.63	28.30	28.86	28.62	28.40	29.08	28.79	28.73
33500	28.73	28.59	28.30	28.44	28.34	28.19	28.61	28.35	28.06	28.08	27.72	27.65	29.22	29.05	28.77	29.06	28.99	28.74
34000	29.65	29.53	29.24	28.78	28.79	28.76	29.80	29.66	29.44	29.50	29.12	29.01	32.41	31.93	31.48	30.25	30.21	29.95
34500	29.97	29.87	29.54	28.73	28.80	28.72	30.98	31.24	31.30	30.71	30.46	30.12	31.95	31.52	31.06	30.68	30.30	29.92
35000	29.64	29.51	29.30	28.97	28.89	28.84	32.86	32.26	31.61	29.74	29.74	29.58	29.78	29.70	29.50	30.45	30.16	29.83
35500	31.29	31.08	30.89	29.76	29.36	29.31	30.47	30.15	29.79	28.97	28.91	28.85	28.35	28.94	28.88	29.11	29.39	29.50
36000	32.43	31.75	31.06	30.07	29.71	29.49	30.86	30.83	30.55	30.14	30.05	29.88	28.02	28.90	29.26	29.57	29.71	29.80
36500	31.27	31.01	30.44	30.05	29.95	29.72	29.60	30.73	30.78	30.32	30.65	30.77	27.64	28.70	29.37	29.97	30.10	30.01
37000	30.90	30.77	30.50	30.58	30.38	30.20	28.95	30.27	30.79	31.03	31.33	31.24	28.37	29.45	30.27	30.30	30.60	30.61
37500	30.64	30.57	30.38	30.12	30.20	30.01	28.64	29.69	30.36	30.95	31.24	31.03	28.40	29.50	30.23	30.69	30.65	30.17
38000	28.26	28.79	28.86	28.55	28.82	28.86	27.20	28.04	28.71	29.76	29.84	29.74	27.13	28.07	28.76	29.79	29.34	29.15
38500	26.07	27.48	27.99	28.42	28.77	28.88	26.66	27.61	28.31	29.68	29.63	29.15	26.75	27.68	28.31	29.28	29.10	28.99
39000	25.63	26.84	27.55	28.86	29.08	29.14	26.87	27.66	28.36	29.83	29.43	29.13	24.49	26.66	27.48	28.85	29.06	28.87
39500	24.98	26.05	26.83	28.50	28.75	28.75	26.13	26.93	27.54	28.96	28.69	28.58	20.46	23.86	25.57	27.23	28.09	28.07
40000	25.59	26.66	27.53	30.46	30.36	30.12	24.64	26.86	27.60	29.79	29.92	29.65	20.62	22.85	25.43	27.63	28.43	28.60

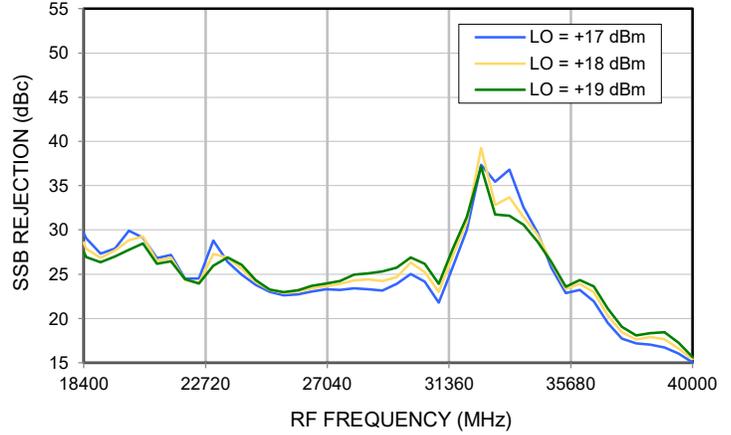


Typical Performance Curves

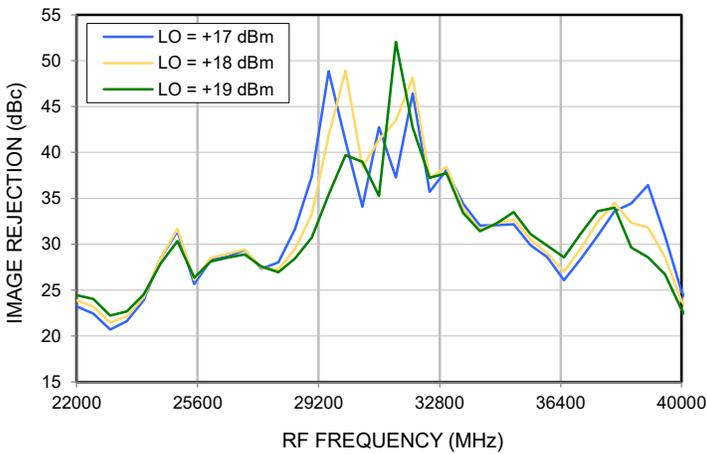
**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 200 MHz**



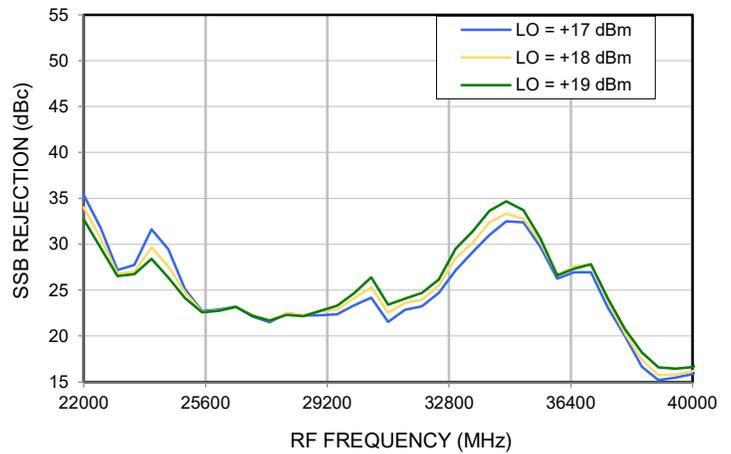
**SSB REJECTION (UPCONVERTER)
@ IF = 200 MHz**



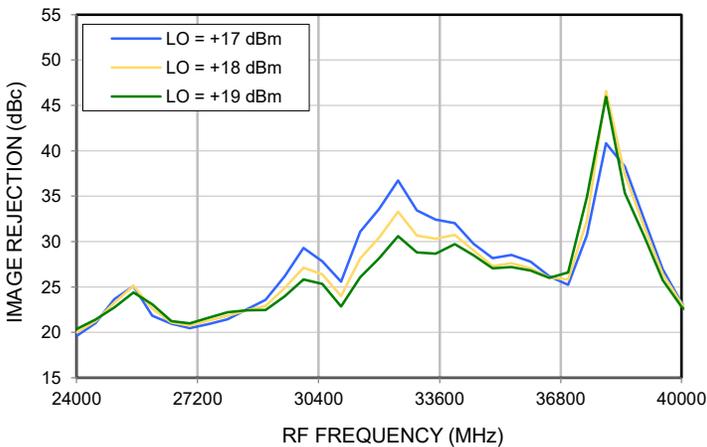
**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 2 GHz**



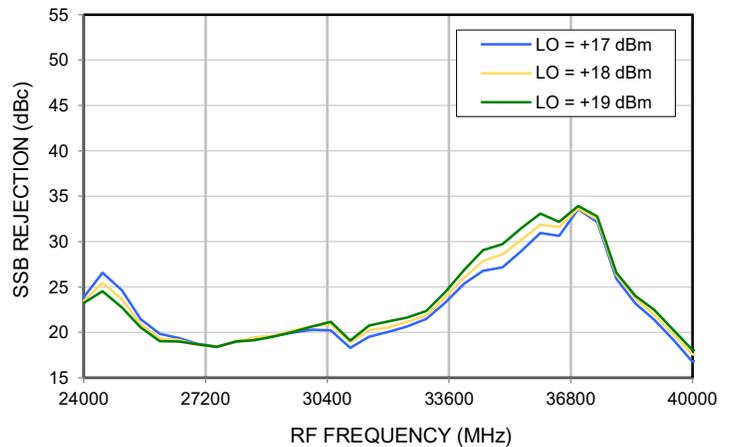
**SSB REJECTION (UPCONVERTER)
@ IF = 2 GHz**



**IMAGE REJECTION (DOWNCONVERTER)
@ IF = 3 GHz**

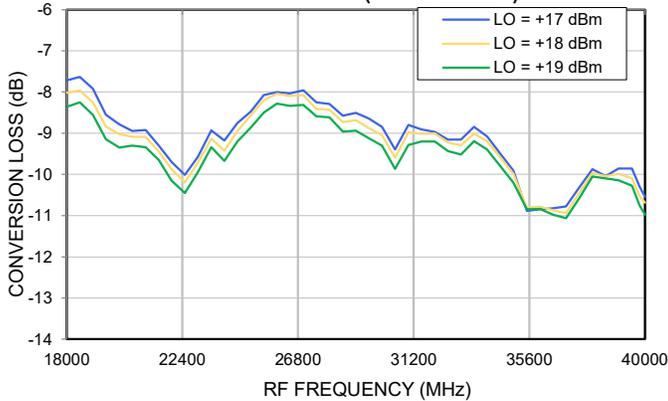


**SSB REJECTION (UPCONVERTER)
@ IF = 3 GHz**

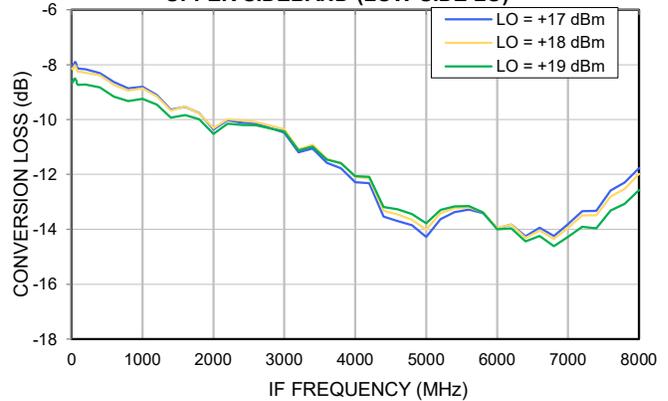


Typical Performance Curves

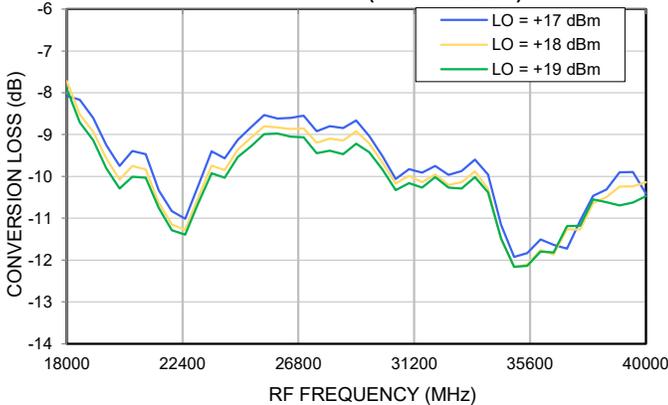
**CONVERSION LOSS VS. RF @ IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



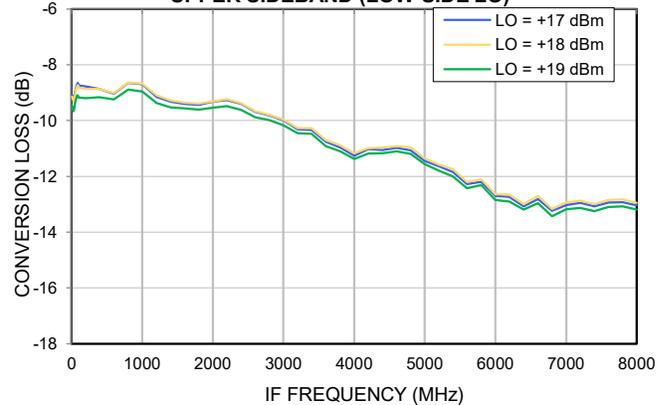
**CONVERSION LOSS VS. IF @ FIXED LO = 18 GHz
UPPER SIDEBAND (LOW-SIDE LO)**



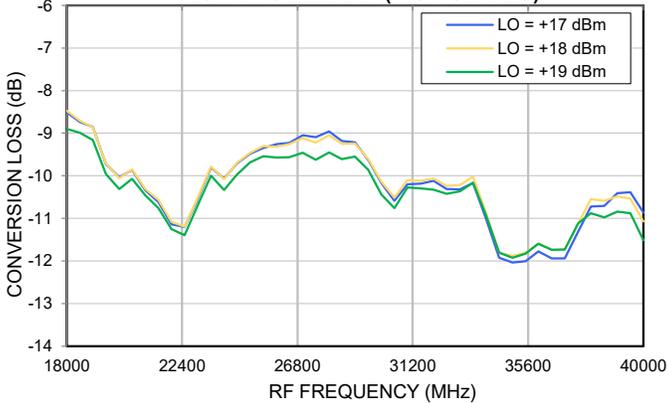
**CONVERSION LOSS VS. RF @ IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



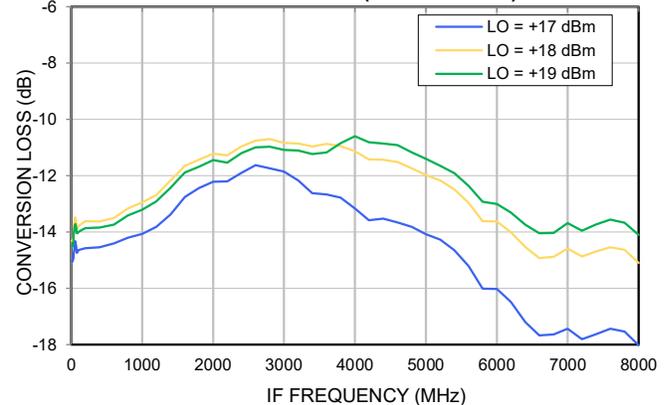
**CONVERSION LOSS VS. IF @ FIXED LO = 30.75 GHz
UPPER SIDEBAND (LOW-SIDE LO)**



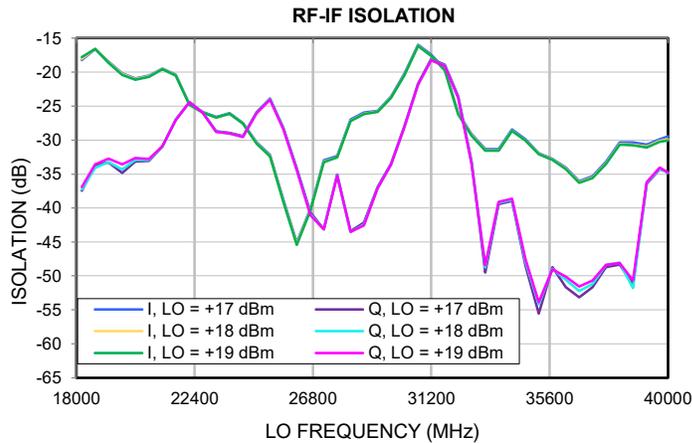
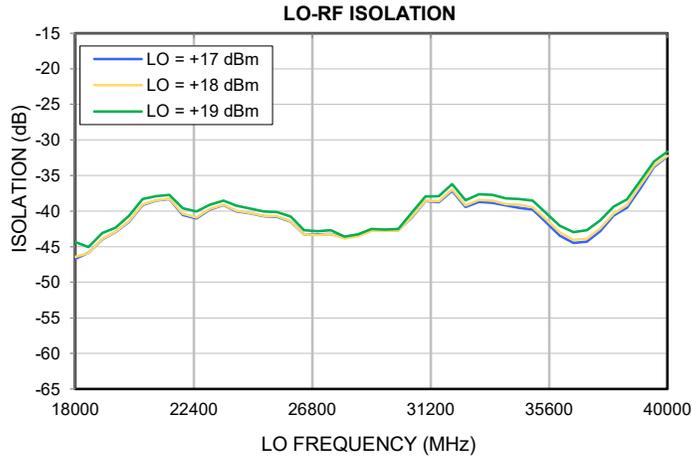
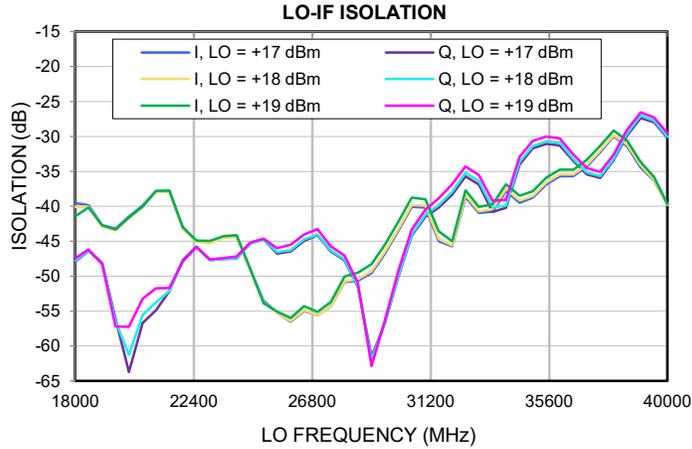
**CONVERSION LOSS VS. RF @ IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**CONVERSION LOSS VS. IF @ FIXED LO = 43.5 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**

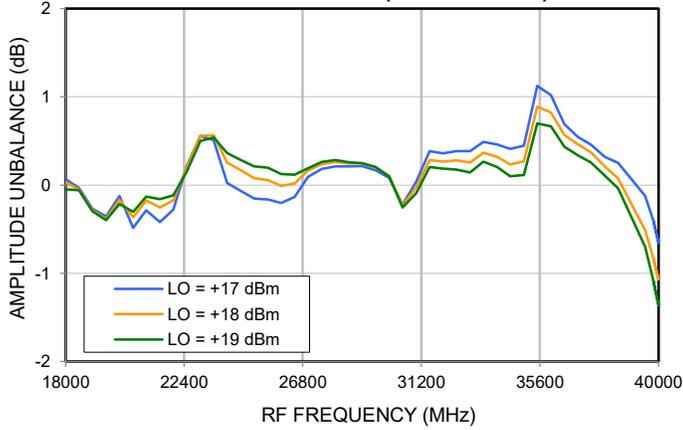


Typical Performance Curves

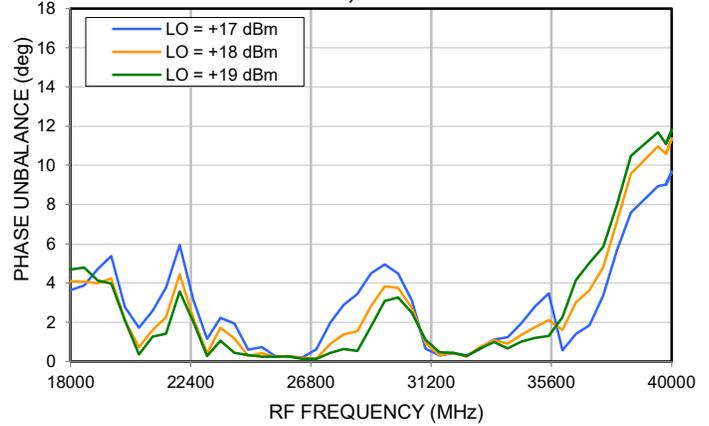


Typical Performance Curves

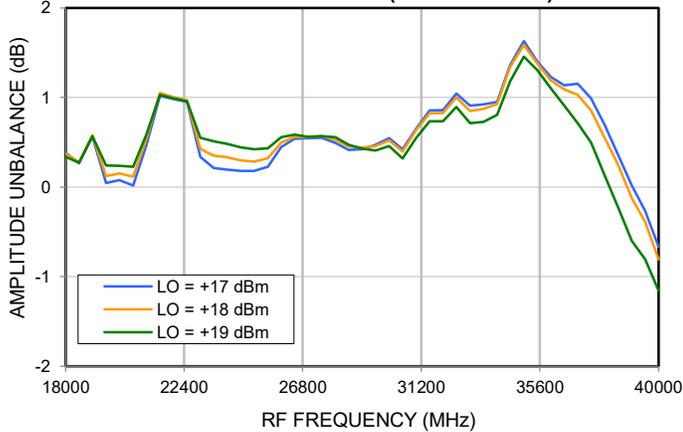
**AMPLITUDE UNBALANCE @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



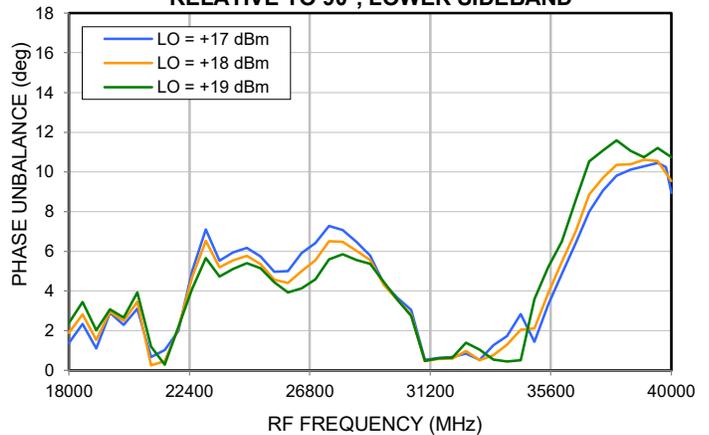
**PHASE UNBALANCE @ FIXED IF = 200 MHz
RELATIVE TO 90°, LOWER SIDEBAND**



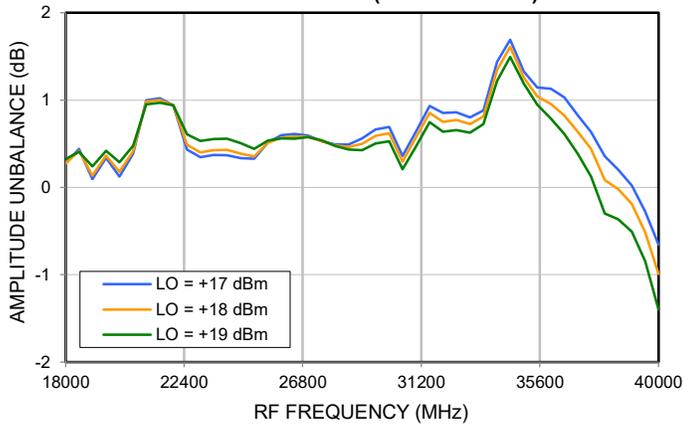
**AMPLITUDE UNBALANCE @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



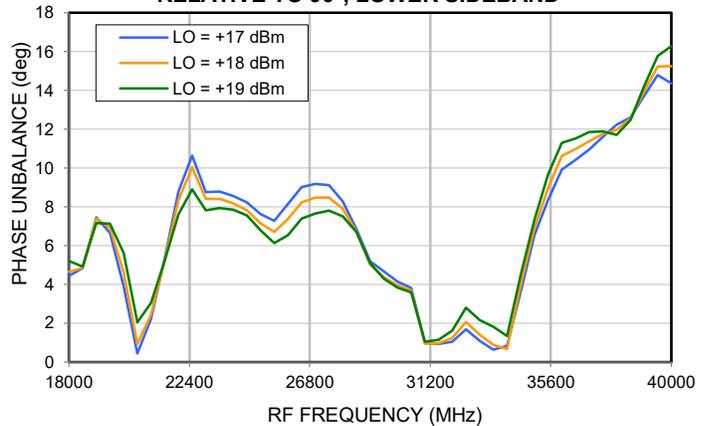
**PHASE UNBALANCE @ FIXED IF = 2 GHz
RELATIVE TO 90°, LOWER SIDEBAND**



**AMPLITUDE UNBALANCE @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**

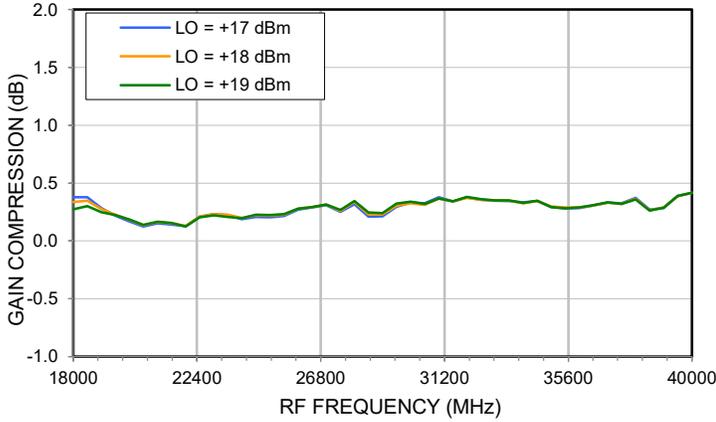


**PHASE UNBALANCE @ FIXED IF = 3 GHz
RELATIVE TO 90°, LOWER SIDEBAND**

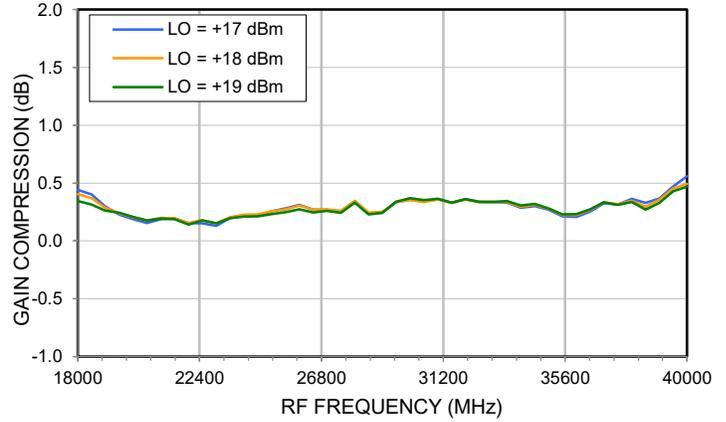


Typical Performance Curves

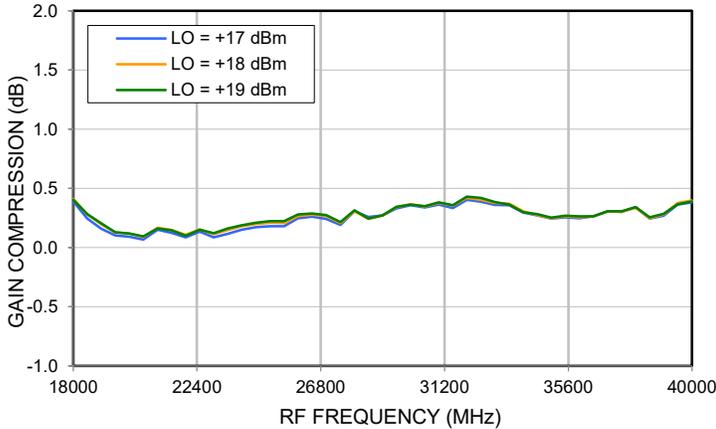
GAIN COMPRESSION (I) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



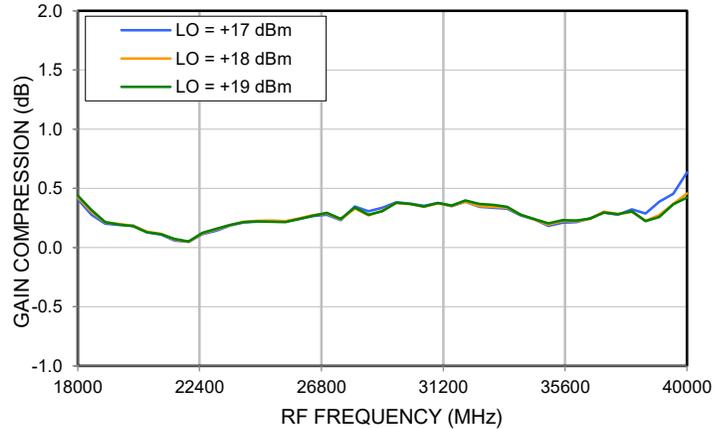
GAIN COMPRESSION (Q) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



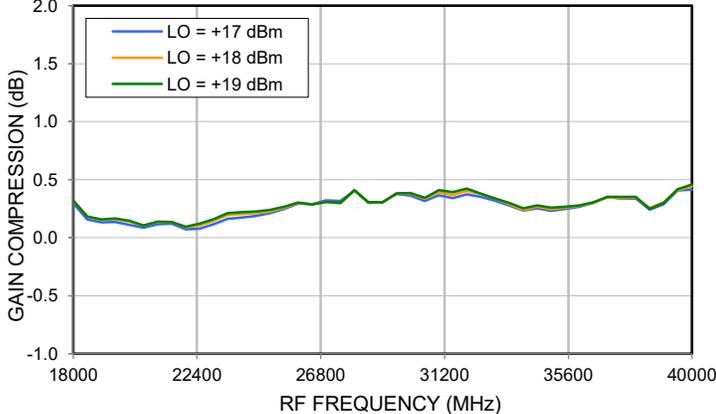
GAIN COMPRESSION (I) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



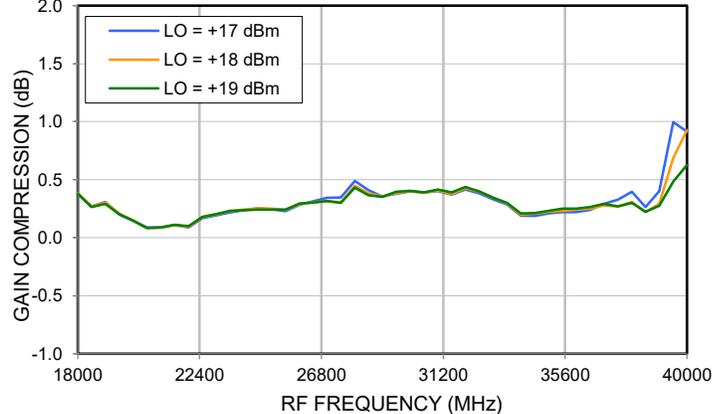
GAIN COMPRESSION (Q) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



GAIN COMPRESSION (I) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND

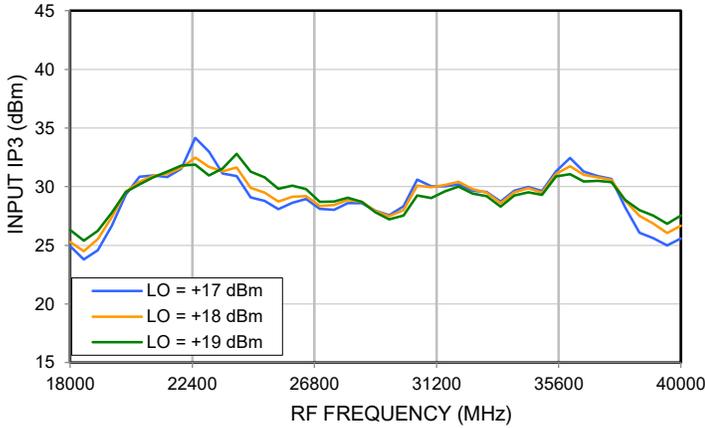


GAIN COMPRESSION (Q) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND

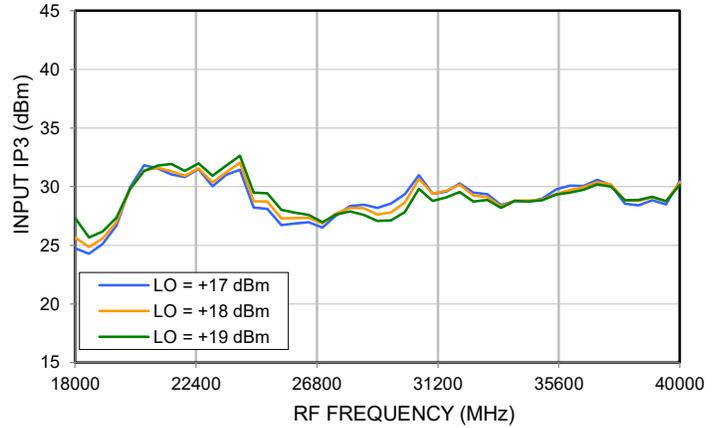


Typical Performance Curves

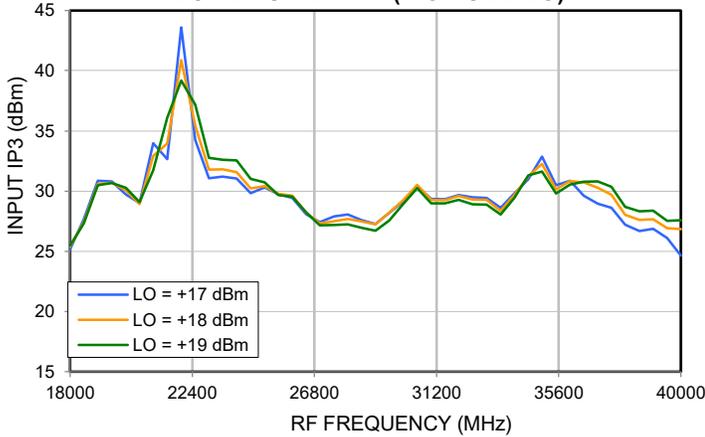
**INPUT IP3 (I) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



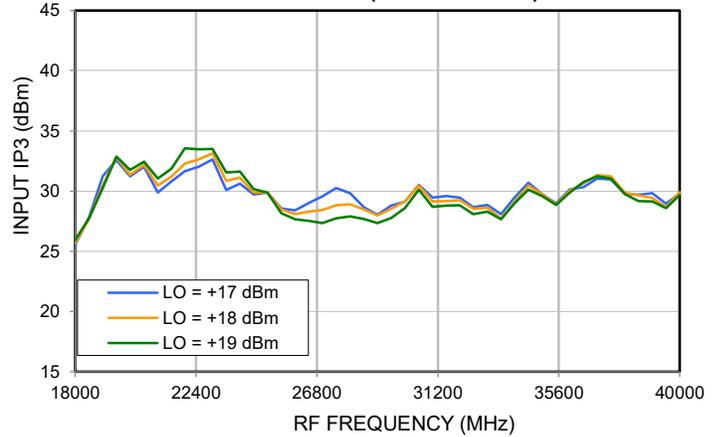
**INPUT IP3 (Q) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



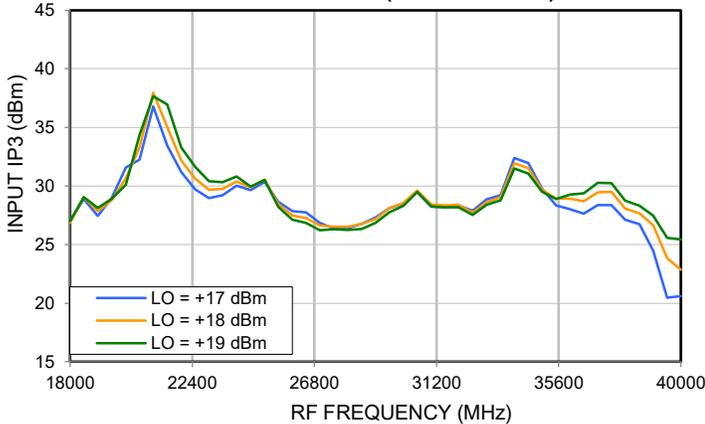
**INPUT IP3 (I) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



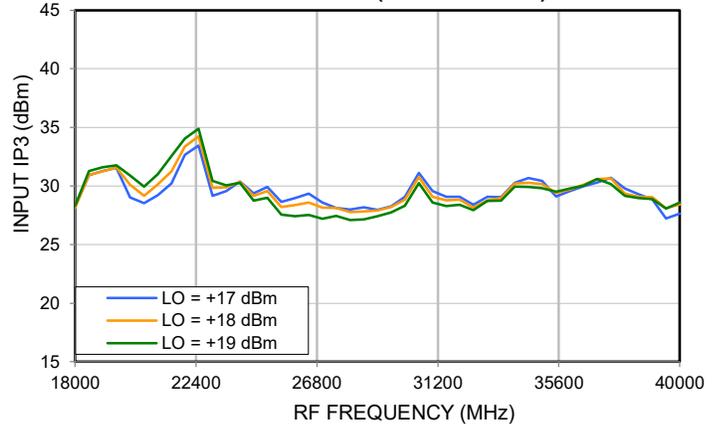
**INPUT IP3 (Q) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



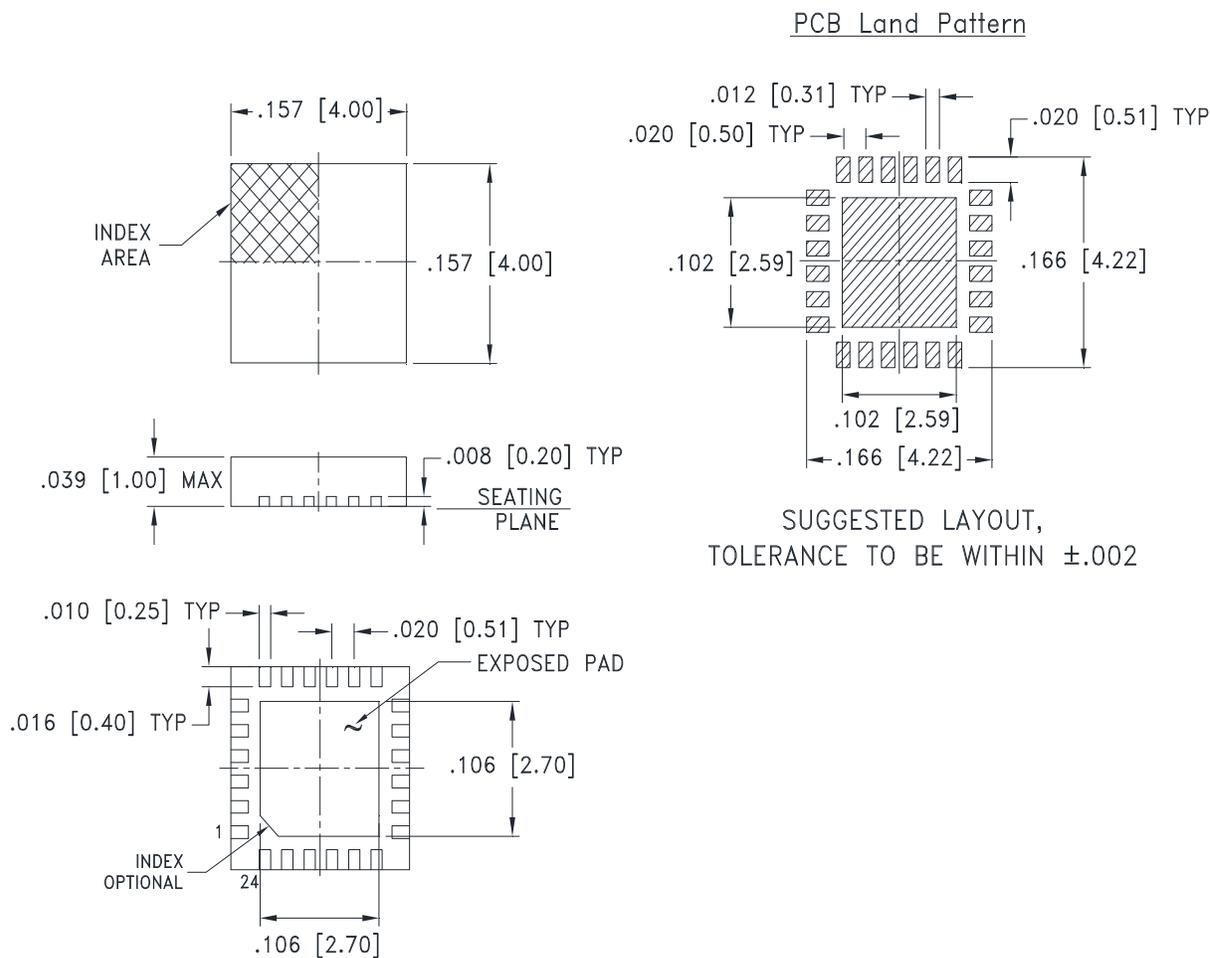
**INPUT IP3 (I) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**INPUT IP3 (Q) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



Outline Dimensions



SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN $\pm .002$

Weight: .04 Grams

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

1. Case material: Plastic.
2. Termination finish:
 - For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix. See model Data sheet.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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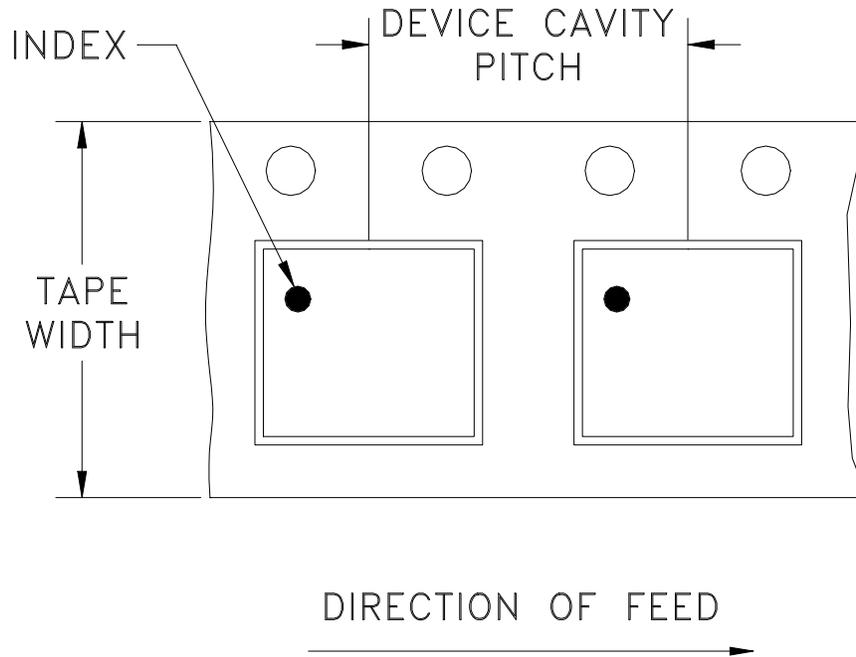


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F68

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
3000				
				4000

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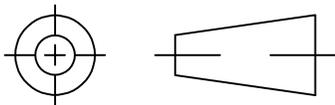
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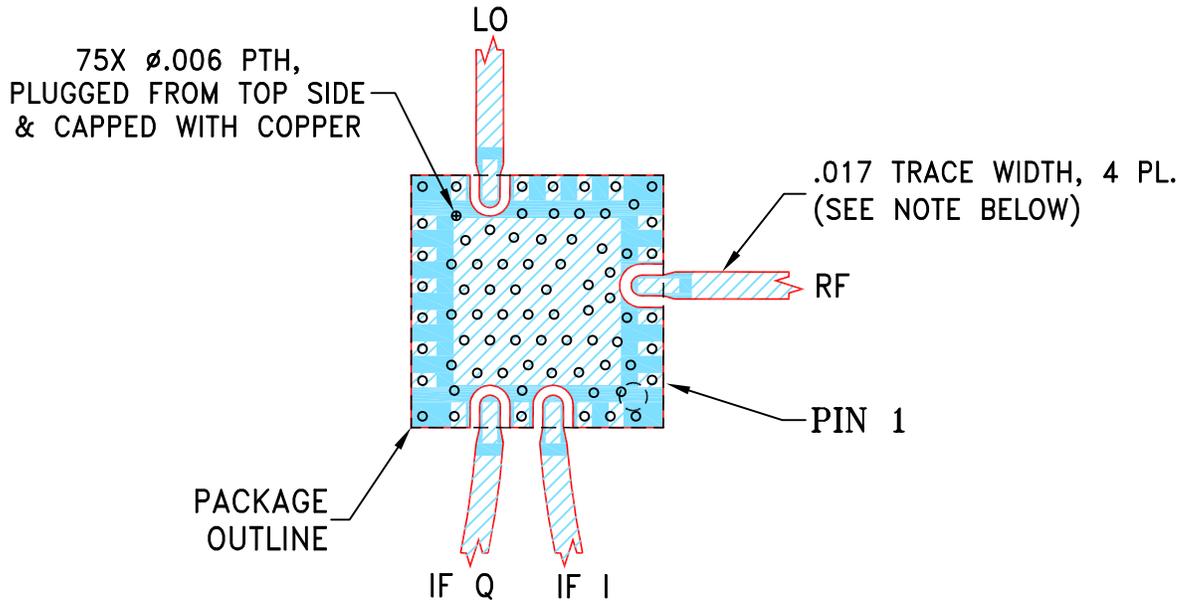
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-019414	NEW RELEASE	10/16/23	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR
DG1847 CASE STYLE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS R04003C DIELECTRIC THICKNESS .008"; COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. UNIT FOOT PRINT IS OPTIMIZED FOR PERFORMANCE AND IS DIFFERENT FROM CASE STYLE DG1847 RECOMMENDATIONS.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES	DRAWN	ITG	10/04/23
TOLERANCES ON:	CHECKED	GF	10/04/23
2 PL DECIMALS ±	APPROVED	IL	10/04/23
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

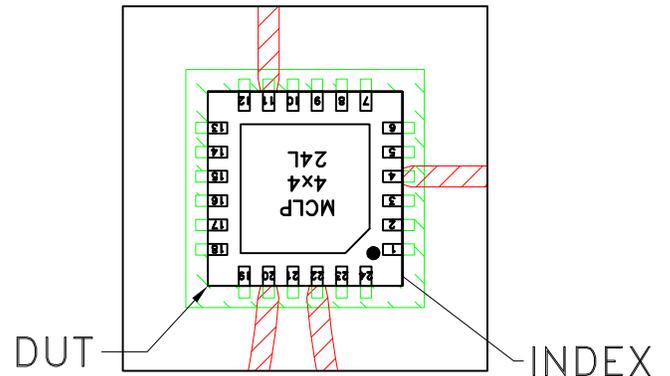
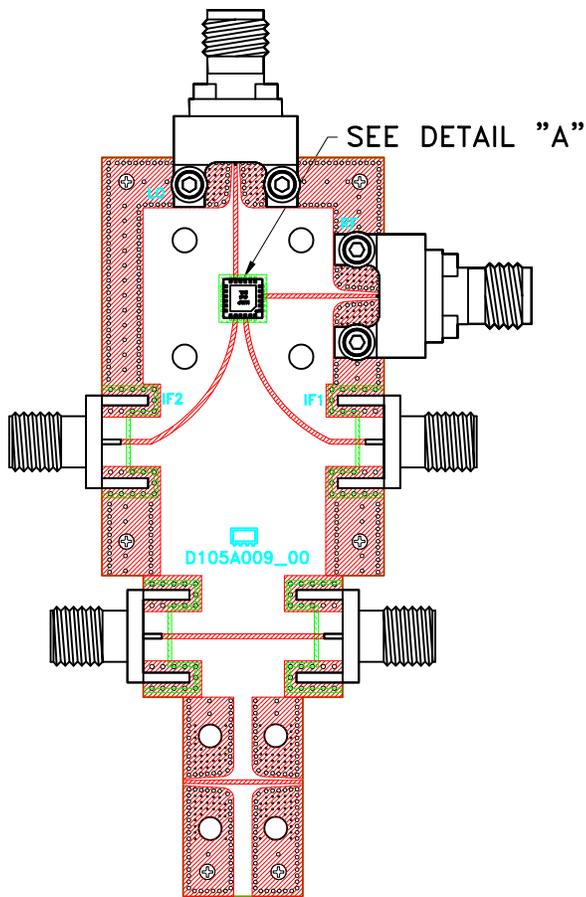
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PL, DG1847, TB-SMIQ-1844H(C)+

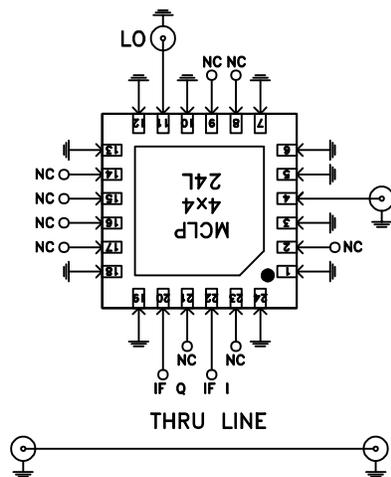
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-763	REV: OR
FILE: 98PL763	SCALE: 8:1	SHEET: 1 OF 1	

Evaluation Board and Circuit



DETAIL "A"
(SCALE 5:1)



SCHEMATIC DIAGRAM
(SCALE 5:1)

Function	Pad
RF	4
LO	11
IF I	22
IF Q	20
GND	1,3,5-7,10,12-13,18-19,24
NC, GND Externally	2,8-9,14-17,21,23

Notes:

1. 1.85mm Female Connectors.
2. PCB Material: Roger R04350B or equivalent,
Dielectric constant=3.5, Thickness=0.008 inch

 Mini-Circuits®

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.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020



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Specification	Test/Inspection Condition	Reference/Spec
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215