

Low Noise, High Gain

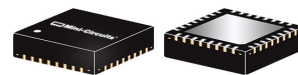
Monolithic Amplifier

YSIF-421+

50Ω 220 to 380 MHz

The Big Deal

- Low Noise figure, 1.6 dB typ.
- High Cascaded Gain, 37.2 dB typ.
- High IP3, 38.3 dBm typ.



CASE STYLE: DG1677-2

Product Overview

The YSIF-421+ is a multi-chip module that consists of a low pass reflectionless filter and two high dynamic range amplifiers. It operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (5x 5 x 0.89mm), accommodating dense circuit board layouts.

Key Features

Feature	Advantages
Low noise, 1.6 dB at 300 MHz	Enables lower system noise figure performance.
High Gain, 37.2 dB at 300 MHz	Enables signal amplification without the need for multiple gain stage. Thus minimize effect of subsequent stages on noise figure.
High IP3, 38.3 dB at 300 MHz	Combination of low noise and high IP3 makes this MMIC amplifier ideal for use in low noise receiver front end (RFE) as it gives the user advantages of sensitivity and two-tone IM performance at both ends of the dynamic range.
5x5 mm 32-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.



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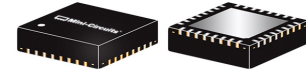
220-380 MHz

Product Features

- Low Noise figure, 1.6 dB typ.
- High IP3, 38.3 dBm typ.
- High Cascaded Gain, 37.2 dB typ.

Typical Applications

- VHF



Generic photo used for illustration purposes only

YSIF-421+

CASE STYLE: DG1667-2

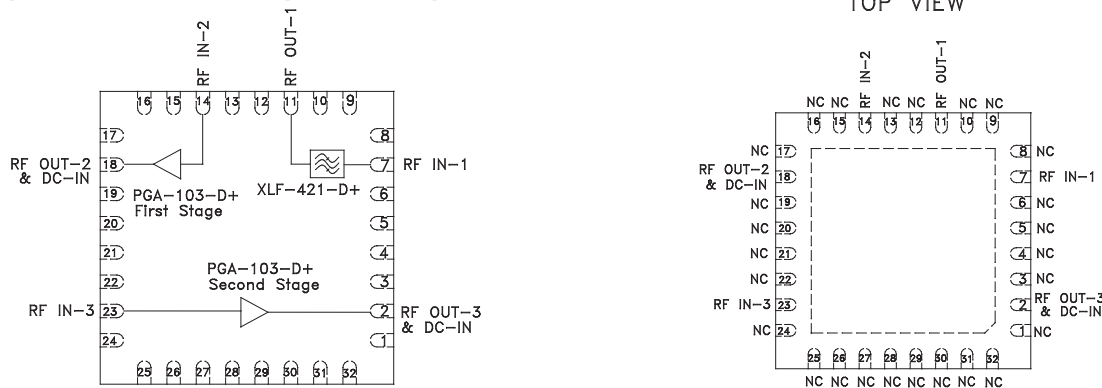
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

The YSIF-421+ is a multi-chip module that consists of a low pass reflectionless filter and two high dynamic range amplifiers. It operates on a single 5V supply, is well matched for 50Ω and comes in a tiny, low profile package (5x 5 x0.89mm), accommodating dense circuit board layouts.

Simplified schematic & pad description



Function	Pad Number	Description (See Figure 1)
RF IN-1	7	Input to the lowpass filter (XLF-421-D+)
RF OUT-1	11	Output of the lowpass filter (XLF-421-D+), Connects to RF IN-2 via C3
RF IN-2	14	Input to PGA-103-D+ first stage Connects to RF OUT-1 via C3
RF OUT-2 & DC-IN	18	RF Output and DC Input of PGA-103-D+ first stage. Connects to RF IN-3 via the Bias-Tee & Pi-Network Attenuator (optional)
RF IN-3	23	Input to PGA-103-D+ second stage, Connects to RF OUT-2 via Pi-Network Attenuator
RF OUT-3 & DC-IN	2	RF Output & DC Input of PGA-103-D+ second stage. Connects the output via Bias-Tee.
NC	1,3-6,8-10,12-13,15-17,19-22, 24-32	No connection. Connects to ground externally on TB.
GND	Paddle	Connects to ground.

Electrical Specifications¹ at 25°C and 5V, unless noted

Parameter	Condition (MHz)	V _{DD} =5.0V			Units
		Min.	Typ.	Max.	
Frequency Range		220		380	MHz
Gain	220	35.5	39.0	42.5	dB
	250	35.0	38.5	41.9	
	300	33.9	37.2	40.6	
	350	32.5	35.8	39.0	
	380	32.0	34.9	38.0	
Noise Figure	220		1.5		dB
	250		1.5		
	300		1.6		
	350		1.7		
	380		1.8		
Input Return Loss	220		10		dB
	250		10		
	300		11		
	350		11		
	380		12		
Output Return Loss	220	13.9	19		dB
	250	13.9	22		
	300	13.9	28		
	350	13.9	29		
	380	13.9	26		
Output Power @1dB Compression	220	19.0	22.0		dBm
	250	19.0	22.2		
	300	19.0	22.2		
	350	19.0	22.2		
	380	19.0	22.2		
Output IP3	220	35.0	37.8		dBm
	250	35.0	37.7		
	300	35.0	38.3		
	350	35.0	38.6		
	380	35.0	38.7		
Device Operating Voltage		4.75	5	5.25	V
Device Operating Current			189	220	mA
Device Current Variation vs. Temperature			-397.1		uA/degC
Device Current Variation vs. Voltage			0.0305		mA/mV
Thermal Resistance, Junction-to-ground lead			72		degC/W

1. Measured on Mini-Circuits Characterization test board TB-YSIF-421+. See Characterization Test Circuit (Fig. 1)

2. (Current at 85°C - Current at -45°C)/130

Absolute Maximum Ratings⁴

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 105°C
Storage Temperature	-65°C to 150°C
Total Power Dissipation	1W (PGA-103-D+)
Input Power (CW), V _d =5.6V ⁵	+33 dBm (XLF-421-D+ in pass band) +21 dBm (PGA-103-D+)
DC Voltage	6V

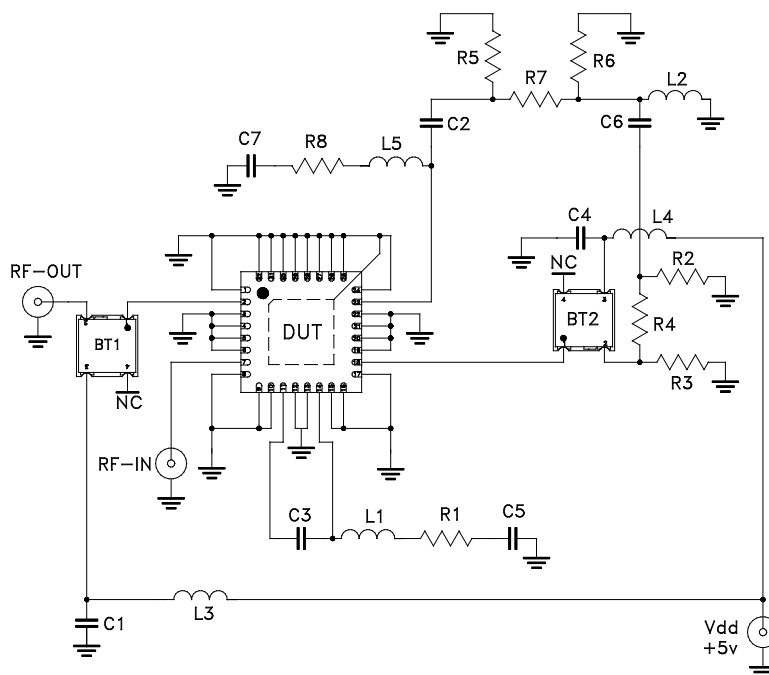
4. Permanent damage may occur if any of these limits are exceeded.

Electrical maximum ratings are not intended for continuous normal operation.

5. Measured on Mini-Circuits test board, TB-YSIF-421+



Recommended Application and Characterization Test Circuit



Component	Size	Value	P/N	Manufacturer
DUT	5x5mm	NA	YSIF-421+	MCL
BT1,BT2	3.81x3.81mm	NA	TCBT-14+	MCL
L1,L5	0.115x0.110	620nH	1008CS-621XGBC	Coilcraft
L2	0603	36nH	0603CS-36NXJLW	Coilcraft
L3,L4	0.115x0.110	10nH	1008CS-100XGLC	Coilcraft
C1,C4	0805	0.1uF	0805SC104KAT2A	AVX Corp
C2,C3	0402	0.001uF	GRM1555C1H102JA01D	Murata
C5,C7	0603	330pF	GRM1885C1H330JA01D	Murata
C6	0402	15pF	04025A150JAT2A	AVX Corp
R1,R8	0603	150 ohm	RK73H1JTTD1500F	KOA
R2,R3	0402	301 ohm	RK73H1ETTP3010F	KOA
R4	0402	17.8 ohm	RK73H1ETTP17R8F	KOA
R5,R6	0402	178 ohm	RK73H1ETTP1780F	KOA
R7	0402	30.1 ohm	RK73H1ETTP30R1F	KOA

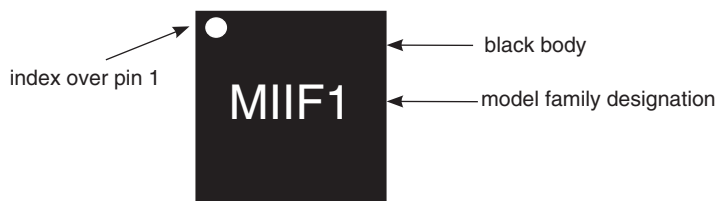
Fig 1. Application and Characterization Circuit

Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-YSIF-421+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return loss: Pin= -45dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, +5 dBm/tone at output.

Product Marking



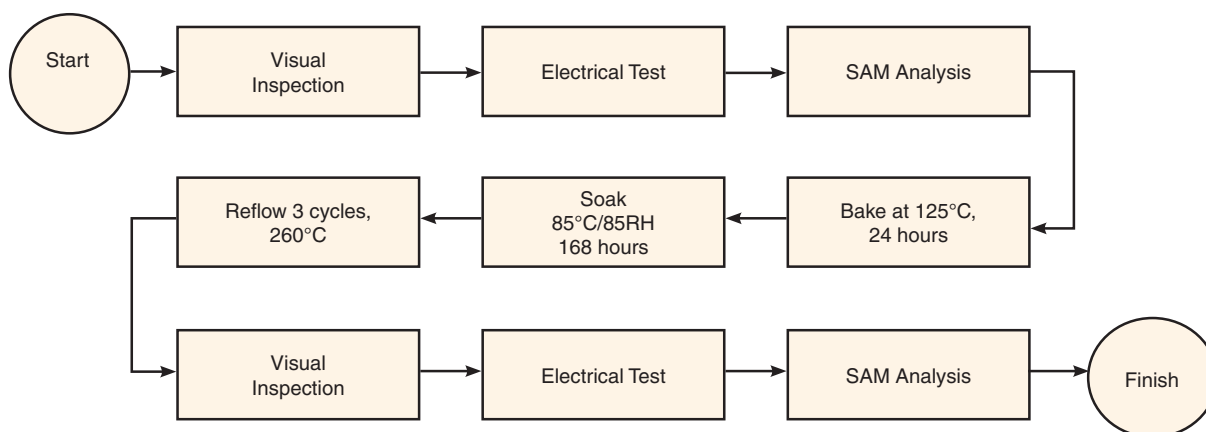
Marking may contain other features or characters for internal lot control

Additional Detailed Technical Information	
<i>additional information is available on our dash board. To access this information click here</i>	
Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DG1677-2 <i>Plastic package, exposed paddle, lead finish: Matte Tin</i>
Tape & Reel Standard quantities available on reel	F68 <i>7" reels with 20, 50, 100, 200, 500, 1K devices 13" reels with 2K, 3K & 4K devices</i>
Suggested Layout for PCB Design	PL-635
Evaluation Board	TB-YSIF-421+
Environmental Ratings	ENV08T1

ESD Rating

Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL Test Flow Chart



Additional 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-Circuit's 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/MCLStore/terms.jsp