FLAT GAIN, HIGH DYNAMIC RANGE

Monolithic Amplifier PGA-106-75+

75Ω 0.05 to 1.5 GHz

THE BIG DEAL

- High IP3, +37.3 dBm Typ. at 0.5 GHz
- Gain, 17.4 dB Typ. at 0.5 GHz
- High P1dB +19.8 dBm Typ. at 0.5 GHz
- Low Noise Figure, 3.1 dB at 0.5 GHz



Generic photo used for illustration purposes only

CASE STYLE: DF782

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- CATV
- GPON
- MOCA
- DBS

PRODUCT OVERVIEW

PGA-106-75+ (RoHS compliant) is an advanced wideband amplifier fabricated using E-pHEMT technology and offers extremely high dynamic range over a broad frequency range with low noise figure and flat gain. Lead finish is SnAgNi. It has repeatable performance from lot to lot and is enclosed in a SOT-89 package for very good thermal performance.

KEY FEATURES

Feature	Advantages
Broad Band: 0.05 to 1.5 GHz	Broadband covering primary CATV applications.
High IP3 Versus DC Power Consumption: +37 dBm Typical at 0.5 GHz	The PGA-106-75+ matches industry leading IP3 performance relative to device size and power consumption. The combination of the design and E-pHEMPT structure provides enhanced linearity over a broad frequency range as evidenced in the IP3 being typically 15-18 dB above the P1dB point. This feature makes this amplifier ideal for use in CATV applications.
High IP2 +50-+60 dBm	Suppresses second order product on wideband applications such as CATV
Low Noise Figure: 3.1 dB at 0.5 GHz	Low noise figure performance in combination with the high output IP3 results in high dynamic range.
Excellent CSO/CTB* CSO, -56 dBc CTB, -72 dBc	Competitive performance at lower current and supply voltage.

* 78 channels flat, 30 dBmv/channel at output, 6 MHz channel spacing.

REV. D
ECO-024506
PGA-106-75+
MCL NY
250212

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ELECTRICAL SPECIFICATIONS[1] AT +25°C, 75Ω AND +5.0 V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.05		1.5	GHz
Gain	0.05	15.5	17.8	19.5	dB
	0.5		17.4		
	1.0		16.9		
	1.2		16.7		
	1.5		16.1		
Input Return Loss	0.05		14.9		dB
	0.5		14.5		
	1.0		21.0		
	1.2		25.3		
	1.5		18.4		
Output Return Loss	0.05		21.2		dB
	0.5		16.0		
	1.0		15.5		
	1.2		14.6		
	1.5		12.5		
Reverse Isolation	1.0		24.4		dB
Output power @ 1 dB compression	0.05		+19.2		dBm
	0.5		+19.8		
	1.0		+20.1		
	1.2		+19.8		
	1.5		+19.3		
Output IP3[2]	0.05		+37.5		dBm
	0.5		+37.3		
	1.0		+36.2		
	1.2		+36.0		
	1.5		+35.0		
Output IP2[2]	0.05		+61.0		dBm
	0.5		+59.8		
	1.0		+58.4		
	1.2		+52.2		
	1.5		+59.8		
Noise Figure	0.05		3.3		dB
	0.5		3.1		
	1.0		3.3		
	1.2		3.3		
	1.5		3.7		
Device Operating Voltage (V_D)		+4.8	+5.0	+5.2	V
Device Operating Current			116	132	mA
Device Current Variation vs. Temperature[3]			97		µA/°C
Device Current Variation vs. Voltage			0.05		mA/mV
Thermal Resistance, Junction-to-Ground Lead			76		°C/W

1. Measured on Mini-Circuits Characterization Eval board TB-670+. See Characterization Test Circuit (Fig. 1).
2. Output IP2 measured at sum frequency of the two tones (f meas= f1 + f2).
3. (Current at +85°C - Current at -45°C)/130

Monolithic Amplifier PGA-106-75+

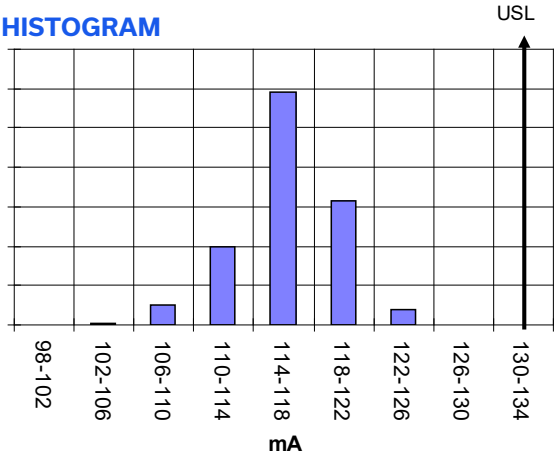
75Ω 0.05 to 1.5 GHz

ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature (Ground Lead)	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Operating Current at +5.0 V	170 mA
Power Dissipation	0.85 W
Input Power (CW)	+26 dBm (5 minutes) +14 dBm (continuous)
DC Voltage on Pin 3	+6 V

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

HISTOGRAM



CHARACTERIZATION TEST CIRCUIT

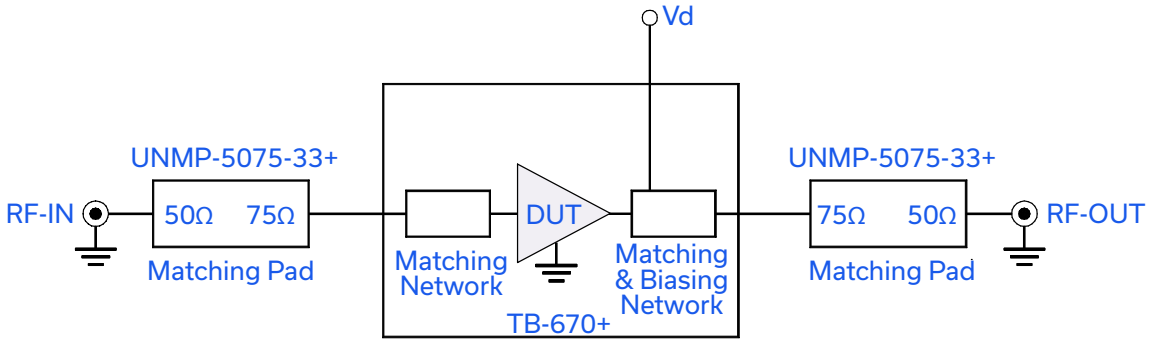


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT tested on Mini-Circuits Characterization Eval board TB-670+)
Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3), Output IP2 (OIP2) and Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain and Return loss: P_{IN}= -25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, +5 dBm/tone at output.
3. Output IP2 (OIP2): Two tones, spaced 11 MHz apart, +5 dBm/tone at output.

RECOMMENDED APPLICATION CIRCUIT (TB-670+)

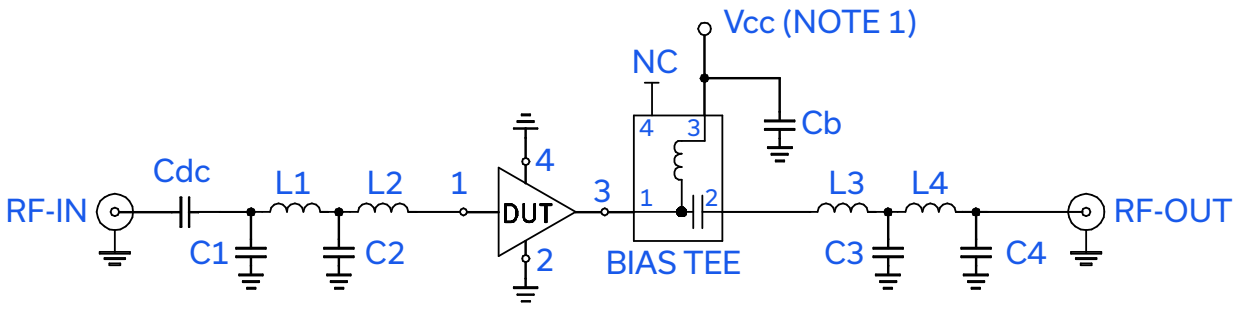
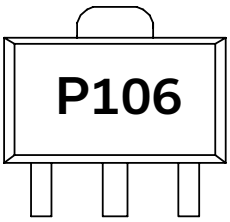


Fig 2. Evaluation board includes case, connectors, and components soldered to PCB

Component	Value
DUT	PGA-106-75+
Bias Tee	Mini-Circuits TCBT-14+
Cdc	2400 pF
Cb	0.1 µF
C1	0.5 pF
C2	1.3 pF
C3	1.2 pF
C4	0.7 pF
L1, L2, L4	7.5 nH
L3	4.7 nH

Note 1. V_{CC} voltage: +5±0.2 V

PRODUCT MARKING



Marking may contain other features or characters for internal lot control.

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DF782 (SOT 89) Plastic package, exposed paddle lead finish: tin-silver over nickel
Tape & Reel **Standard Quantities Available on Reel**	F55 7" Reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL-379
Evaluation Board	TB-670+
Environmental Ratings	ENV08T1

ESD RATING

Human Body Model (HBM): Class 1B (500<1000 V) in accordance with ANSI/ESD STM 5.1 - 2001
Machine Model (MM): Class class M1 (50 V) in accordance with ANSI/ESD STM5.2-1999

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020DD

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/terms/viewterm.html