ULTRA HIGH DYNAMIC RANGE

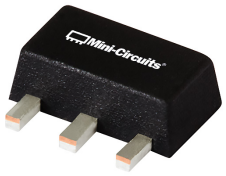
Monolithic Amplifier

PHA-23LN+

50Ω 30MHz to 2GHz

THE BIG DEAL

- Ultra-High IP3, +37.4 dBm typ.
- Low supply voltage, 3 to 5V
- Excellent Noise Figure, 1.2 dB typ.



Generic photo used for illustration purposes only

CASE STYLE: DF782

+RoHS Compliant

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

APPLICATIONS

- Base station infrastructure
- CATV
- Cellular

PRODUCT OVERVIEW

PHA-23LN+ (RoHS compliant) is an advanced wideband amplifier fabricated using E-PHEMT technology and offers extremely high dynamic range over a broad frequency range and with low noise figure. In addition, the PHA-23LN+ has good input and output return loss over a broad frequency range. PHA-23LN+ is enclosed in a SOT-89 package and has very good thermal performance.

KEY FEATURES

Feature	Advantages
Broad Band: 30MHz to 2GHz	Broadband covering primary wireless communications bands: VHF, UHF, Cellular
Extremely High IP3 40.9 dBm typical at 30MHz 37.4 dBm typical at1GHz	The PHA-23LN+ matches industry leading IP3 performance relative to device size and power consumption. The combination of the design and E-PHEMT Structure provides enhanced linearity over a broad frequency range as evidence in the IP3 being approximately 13-18 dB above the P1dB point. This feature makes this amplifier ideal for use in: • Driver amplifiers for complex waveform up converter paths • Drivers in linearized transmit systems • Secondary amplifiers in ultra-High Dynamic range receivers
Low Noise Figure 1.2 dB at 1 GHz	Enables lower system noise figure performance and along with High OIP3 provides high dynamic range
Low Supply Voltage	PHA-23LN+ supports low supply voltage operation which indicate low power consumption.

REV. B
ECO-010399
PHA-23LN+
MCL NY
211029

ELECTRICAL SPECIFICATIONS1 AT 25°C, 50Ω, UNLESS NOTED

Parameter	Condition (MHz)	Vd=5V[1] Min.	Vd=5V[1] Typ.	Vd=5V[1] Max.	Vd=3V[1] Typ.	Units
Frequency Range		30		2000	30-2000	MHz
Gain	30	—	23.0	—	22.3	dB
	500	—	21.9	—	21.0	
	1000	18.9	21.0	23.1	19.7	
	1500	18.1	20.1	22.1	18.5	
	2000	—	18.9	—	17.0	
Input Return Loss	30		12.0		12.4	dB
	500		11.6		10.5	
	1000		9.4		7.5	
	1500		9.6		7.7	
	2000		8.9		6.9	
Output Return Loss	30		14.9		16.6	dB
	500		16.5		21.0	
	1000		18.8		18.0	
	1500		12.2		10.8	
	2000		9.4		8.5	
Reverse isolation	1000		27.2		26.9	dB
Output Power @1 dB compression	30		22.8		17.4	dBm
	500		24.1		19.0	
	1000		23.9		18.8	
	1500		23.4		18.4	
	2000		23.3		18.0	
Output IP3 [2]	30		40.9		34.7	dBm
	500		39.3		33.3	
	1000		37.4		30.9	
	1500		36.3		30.5	
	2000		35.6		29.7	
Noise Figure	30		1.1		1.1	dB
	500		1.0		1.0	
	1000		1.2		1.2	
	1500		1.3		1.3	
	2000		1.6		1.6	
Device Operating Voltage			5.0		3.0	V
Device Operating Current			141.7	162	72.4	mA
Device Current Variation vs. Temperature[3]			14.2		33.1	µA/°C
Device Current Variation vs Voltage			0.0354		0.0354	mA/mV
Thermal Resistance, Junction-to-ground lead at 85°C stage temperature			23.3		23.3	°C/W

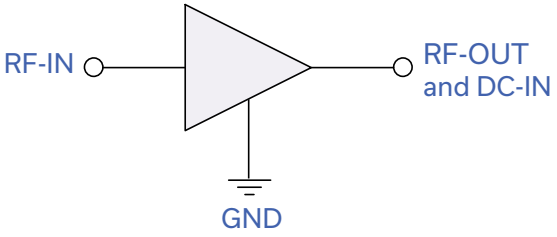
1. Measured on Mini-Circuits Characterization test board TB-951-23LN+. See Characterization Test Circuit (Fig. 1)
2. Tested at Pout= 0 dBm / tone.
3. (Current at 85°C — Current at -45°C)/130

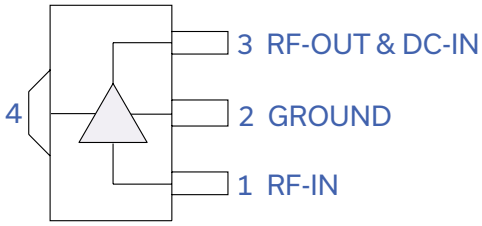
MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 105°C
Storage Temperature	-65°C to 150°C
Power Dissipation[5]	3.3W
Input Power (CW)	+22 dBm (5 minutes max)[6] +4 dBm (continuous) for 0.03-1GHz at 3V +8 dBm (continuous) for 0.03-1GHz at 5V +12 dBm (continuous) for 1-2GHz at 3V +15 dBm (continuous) for 1-2GHz at 5V
DC Voltage on Pin 3	10V

4. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.
5. Up to 85°C, derate linearly to 2.5W at 105°C.
6. Up to 85°C, derate linearly to +19dBm at 105°C.

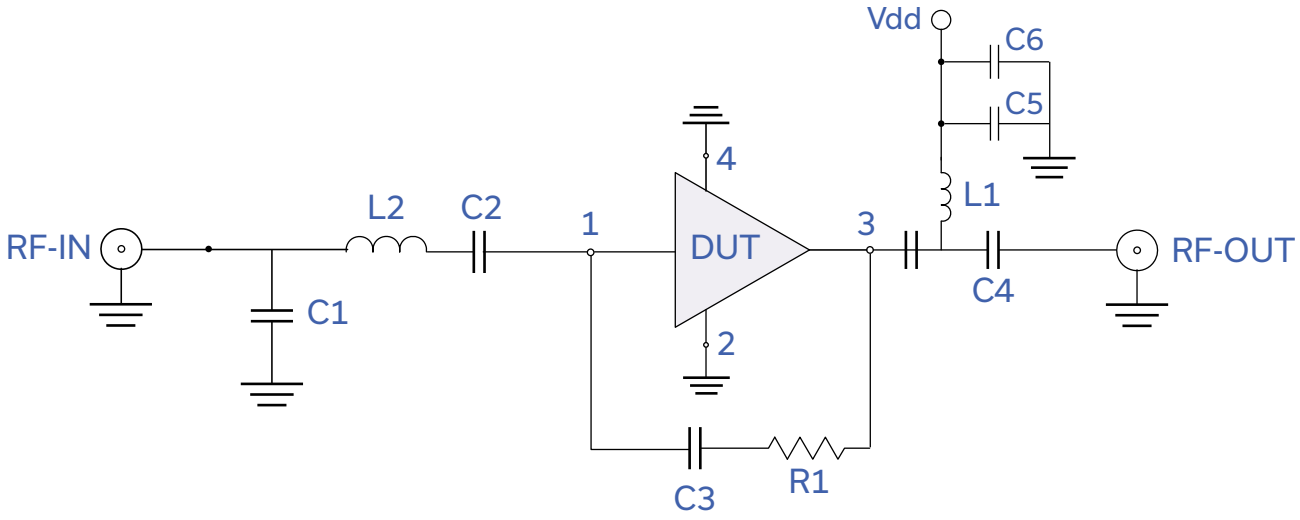
SIMPLIFIED SCHEMATIC AND PIN DESCRIPTION





Function	Pin Number	Description
RF IN	1	RF Input
RF-OUT and DC-IN	3	RF Output and DC Bias
GND	2,4	Connections to ground.

CHARACTERIZATION TEST / RECOMMENDED APPLICATION CIRCUIT

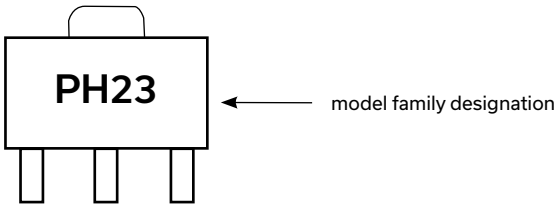


Component	Size	Value	Manufacturer	P/N
C1	0402	1.2pF	Murata	GRM1555C1H1R2WA01D
C2,C3,C6		0.1uF		GRM155R71C104KA88D
C4		0.001uF		GRM1555C1H102JA01D
C5		0.01uF		GRM155R71E103KA01D
R1		1.21KOhm	KOA	RK73H1ETTP1211F
L1	0805	0.68uH	Coilcraft	0805LS-681XJLB
L2	0402	1nH		0402CS-1N0XJLW

Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-951-23LN+)
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= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/ tone at output.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control