WIDEBAND, LOW NOISE, LOW CURRENT

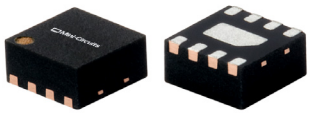
Monolithic Amplifier

PMA2-63LN+

50Ω 0.4 to 6 GHz

THE BIG DEAL

- Ultra wideband, 0.4 to 6 GHz
- Excellent noise figure, 0.5 dB at 2 GHz
- Low Current, 44mA at 5V
- High Gain, 19.5 dB at 2 GHz
- High IP3, +31.7 dBm at 2 GHz



Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

+RoHS Compliant

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

APPLICATIONS

- 5G
- Fixed-Satellite
- Cellular Infrastructure
- Defense

PRODUCT OVERVIEW

The PMA2-63LN+ is a PHEMT based wideband, low noise MMIC amplifier with an unique combination of high gain, high IP3 and low noise figure, making it ideal for sensitive, high-dynamic-range receiver applications. This design operates on a single 5V supply, is well matched for 50 ohm and comes in a tiny, low profile package (2 x 2 mm, 8 lead MCLP), accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
Excellent Noise Figure up to 6 GHz • 0.5 dB typ. at 2 GHz • 0.7 dB typ. at 4 GHz	Enables lower system noise figure performance.
High IP3 • +31.7 dBm at 2 GHz • +31.6 dBm at 4 GHz	Combination of low noise figure 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.
Low operating voltage & current 5V & 44mA	Low voltage & current consumption is ideal for use in amplifier chain.
2 x 2mm 8-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

REV. B
ECO-011027
PMA2-63LN+
GY/RS/CP
221014

Monolithic Amplifier PMA2-63LN+

ELECTRICAL SPECIFICATIONS[1] AT 25°C, ZO=50Ω UNLESS NOTED OTHERWISE

Parameter	Condition (MHz)	V_{DD}=5.0V & Vladj=Open			Units
		Min.	Typ.	Max.	
Frequency Range		0.4		6	GHz
Gain	400	21.1	24.1	25.8	dB
	1000	19.9	22.7	24.4	
	2000	17.2	19.5	21.0	
	4000	13.1	14.7	16.5	
	6000	—	11.5	—	
Input Return Loss	400		7.7		dB
	1000		9.5		
	2000		12.0		
	4000		14.2		
	6000		12.0		
Output Return Loss	400		9.4		dB
	1000		9.1		
	2000		7.7		
	4000		7.1		
	6000		6.4		
Output Power at 1dB Compression[2]	400		17.2		dBm
	1000		17.1		
	2000		17.7		
	4000		18.4		
	6000		17.9		
Output IP3	400		31.3		dBm
	1000		30.9		
	2000		31.7		
	4000		31.6		
	6000		32.8		
Noise Figure	400		0.5		dB
	1000		0.5		
	2000		0.5		
	4000		0.7		
	6000		1.0		
Device Operating Voltage (V_{DD})		4.75	5.0	5.25	V
Device Operating Current (I_{DD})		-	44	61	mA
Device Current Variation vs. Temperature[2]			-81		µA/°C
Device Current Variation vs. Voltage			0.014		mA/mV
Thermal Resistance, junction-to-ground lead			65		°C/W

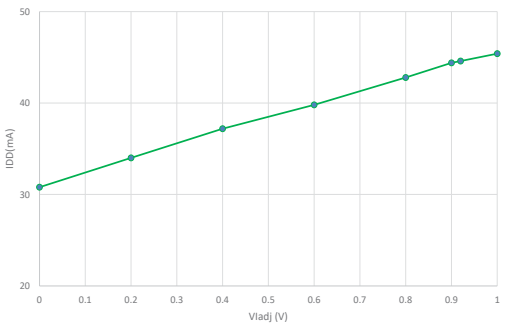
1. Measured on Mini-Circuits Characterization Test Board TB-PMA2-63LNE+. See Characterization Test & Application Circuit (Fig. 2)
2. Device Current Variation vs. Temperature= (Current in mA at 85°C - Current in mA at -45°C)/130°C
3. Device Current Variation vs. Voltage = (Current in mA at 5.25V – Current in mA at 4.75V) / ((5.25V-4.75V)*1000 mA/mV)

MAXIMUM RATINGS[5]

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	137°C
Total Power Dissipation	0.8W
Input Power (CW), Vd=5V	+22 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage at Pad 1	1.2V
DC Voltage at Pad 6	+7V

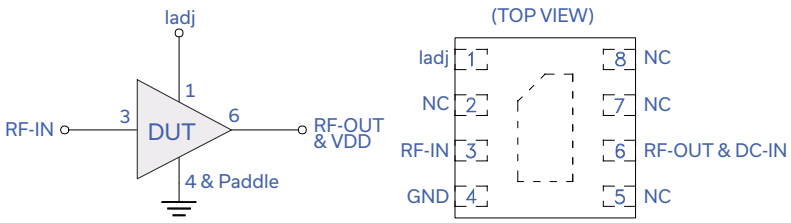
5.Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.

VOLTAGE LEVEL AT CURRENT ADUSTMENT PAD (VLADJ) VS. DEVICE CURRENT (IDD)[4]



4. When Iadj connection is Open, Vladj=0.92V given a device with IDD=44mA typ. For RF Performance at different Vladj, please see View Data and Graph.

SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



Function	Pad Number	Description (See Figure 2)
RF-IN	3	Connects to RF input via C1
RF-OUT & DC-IN	6	Connects to RF out via C2 and connects to V_{DD} via L1
ladj	1	Current Adjustment Pad. Can adjust device current by supplying different voltage levels
No Connection	2,5,7 & 8	Not used internally. Connected to ground on Test Board
Ground	4 & Paddle	Connects to ground on Test board.

CHARACTERIZATION TEST & APPLICATION CIRCUIT

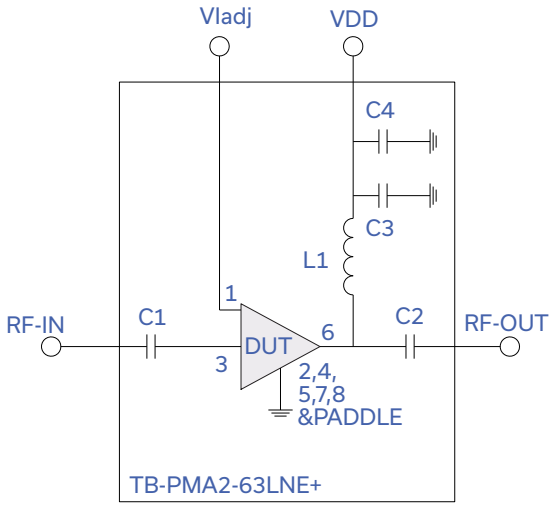
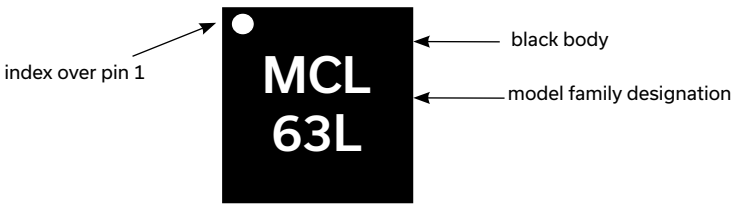


Fig 2. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA2-63LNE+) Gain, Return loss, Output power at 1dB compression (P1dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A 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.

Components	Size	Value	Manufacturer	P/N
C1	0402	150pF	Murata	GRM1555C1H151JA01
C2		150pF		GRM1555C1H151JA01
C3		100pF		GRM1555C1H101JA1D
C4		1uF		GRM155R61E105KA12
L1		56nH	Coilcraft	0402CS-56NXGL

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

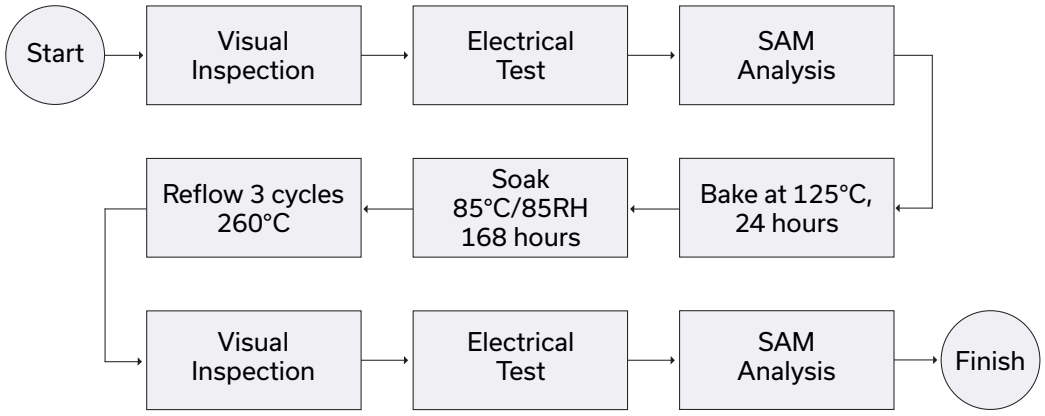
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style **Tape & Reel**	MC1631-1 Plastic package, exposed paddle, lead finish: tin silver over nickel F66
Standard quantities available on reel	7" reels with 20, 50, 100, 200, 500,1K or 2K devices
Suggested Layout for PCB Design	PL-683
Evaluation Board	TB-PMA2-63LNE+
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



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