



COAXIAL

Low Noise Amplifier

ZX60-10203LN+

50Ω 12.5 to 20 GHz SMA Female

KEY FEATURES

- Low Noise Figure, Typ. 1.9 dB from 12.5 GHz to 20 GHz
- High Output IP3, +24 dBm Typ.
- High Output P1dB, +17 dBm Typ.
- Voltage Regulated Internally and Reverse Voltage Protected
- Ideal Evaluation Module for [PMA3-10203+](#)

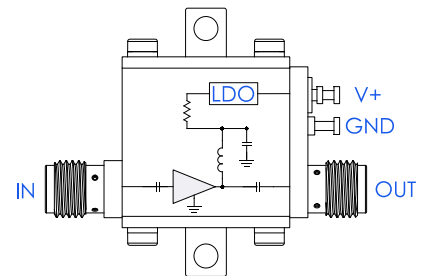


Generic photo used for illustration purposes only

APPLICATIONS

- Test & Measurement Equipment
- Back Haul Radio Systems
- Radar, EW, and ECM Defense Systems
- Satellite Systems

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' ZX60-10203LN+ is a low noise amplifier utilizing MCL's own pHEMT-based amplifier, [PMA3-10203+](#). Operating from 12.5 to 20 GHz, this amplifier features high dynamic range with typical 1.9 dB noise figure, 20 dB gain, +17 dBm P1dB, and +24 dBm OIP3. This combination of characteristics makes it ideal for sensitive, high dynamic range receiver applications. The ZX60-10203LN+ operates on a single +6 V supply at 58 mA and comes in a rugged, compact unibody case (0.74 × 0.75 × 0.46") with integrated SMA female connectors, making it an excellent candidate for demanding operating conditions and crowded system layouts.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND V_s = +6 V, UNLESS NOTED OTHERWISE

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range		12.5		20	GHz
Gain	12.5	16.8	20.3	-	dB
	14	16.5	20.0	-	
	16	18.3	21.4	-	
	18	17.0	20.1	-	
	20	14.7	18.1	-	
Input Return Loss	12.5	-	15.5	-	dB
	14	-	7.1	-	
	16	-	5.5	-	
	18	-	10.1	-	
	20	-	7.2	-	
Output Return Loss	12.5	-	23.2	-	dB
	14	-	10.0	-	
	16	-	15.7	-	
	18	-	13.3	-	
	20	-	11.9	-	
Directivity	12.5-20	-	28	-	dB





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ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND $V_S = +6$ V, UNLESS NOTED OTHERWISE

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Output Power at 1 dB Compression (P1dB)	12.5	-	+16.9	-	dBm
	14	-	+17.1	-	
	16	-	+17.0	-	
	18	-	+17.4	-	
	20	-	+16.3	-	
Output Third Order Intercept Point (Output Power = +5 dBm/Tone)	12.5	-	+24.1	-	dBm
	14	-	+25.0	-	
	16	-	+24.1	-	
	18	-	+22.8	-	
	20	-	+20.6	-	
Noise Figure	12.5	-	2.1	-	dB
	14	-	1.7	-	
	16	-	1.8	-	
	18	-	2.1	-	
	20	-	2.8	-	
DC Supply Voltage (V_S)	-	+5.6	+6	+10	V
DC Current ¹	-	-	58	95	mA

1. Typical current measured under small signal conditions. Max DC current measured at P_{SAT} . DC current increases as amplifier is driven into compression.



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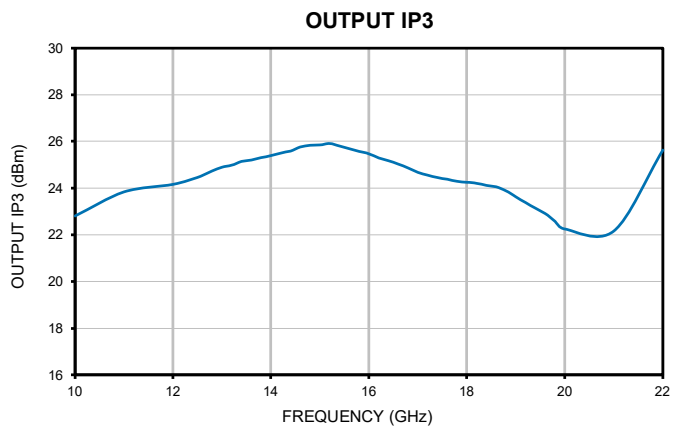
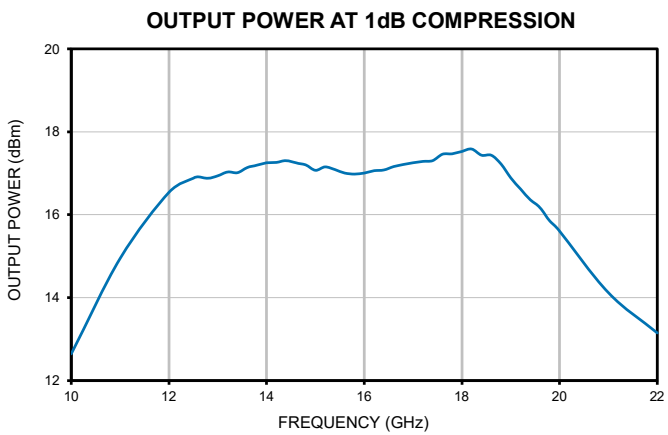
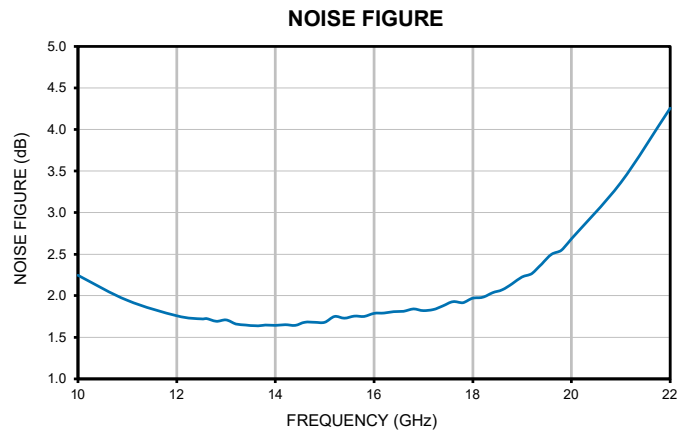
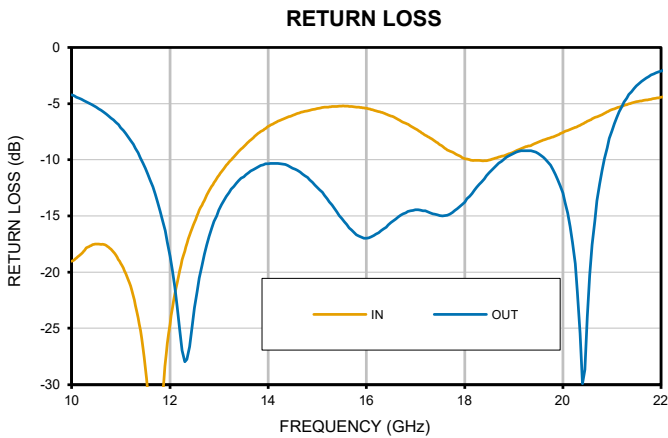
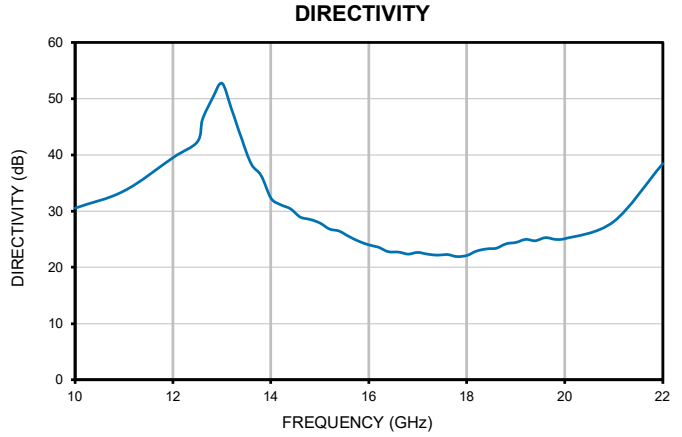
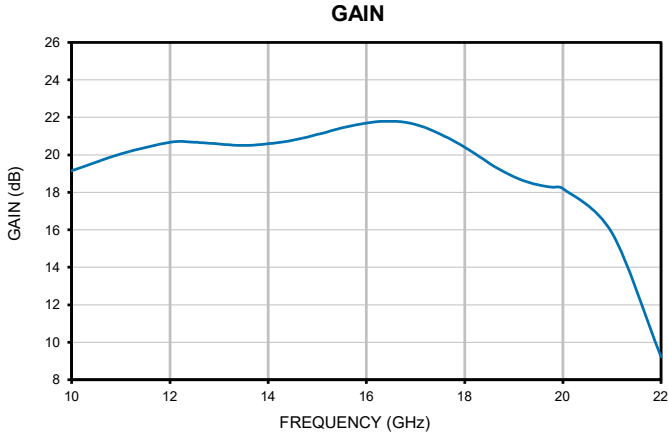
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TYPICAL PERFORMANCE GRAPHS





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ABSOLUTE MAXIMUM RATINGS^{2,3}

Parameter	Ratings
Operating Temperature (Case)	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation ⁴	1 W
RF Input Power (CW)	+13 dBm
DC Operating Voltage (V _s)	+10.5 V

2. Specified under matched load to 50Ω.

3. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.

4. Total power dissipation determined at V_s = +10.5 V with the amplifier operating in max DC Current conditions.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEATSINK

<i>MAXIMUM THERMAL RESISTANCE</i>	$= \frac{\text{MAXIMUM OPERATING CASE TEMP} - \text{MAXIMUM USER AMBIENT TEMP}}{\text{POWER DISSIPATION}}$
Example:	<p>MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)</p> <p>MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED)</p> <p>POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)</p> <p>THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W</p>



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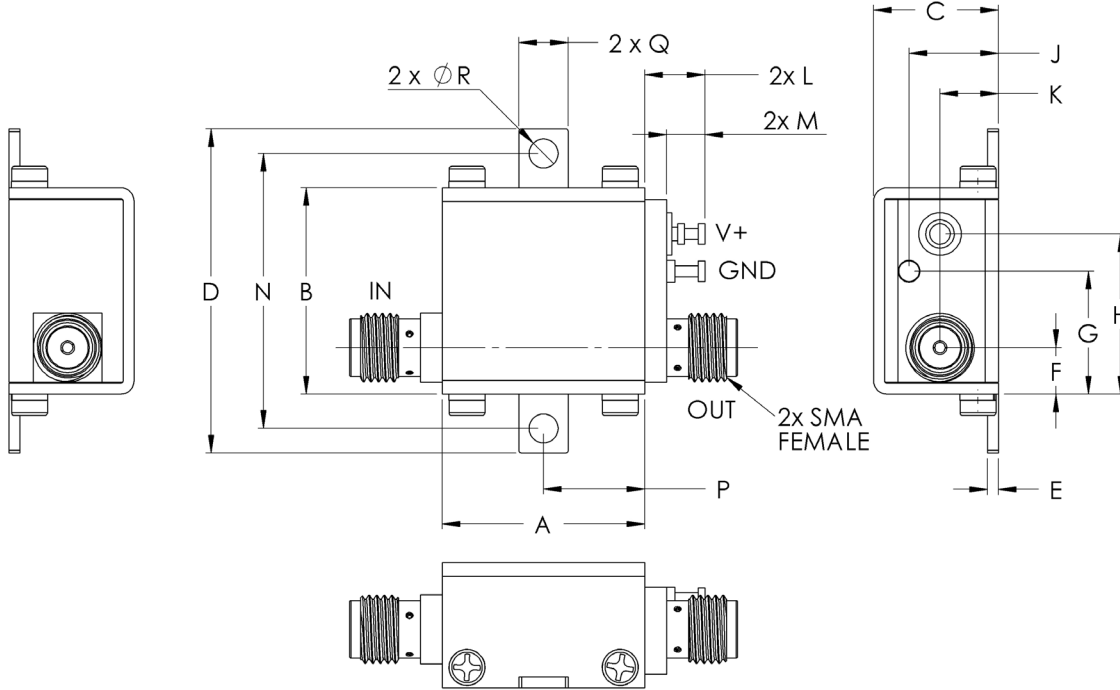
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CASE STYLE DRAWING



⚠ NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminal. See Application Note [AN-40-010](#).

OUTLINE DIMENSIONS (Inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.15	11.61	30.07	1.02	4.32	11.40	14.86	8.31	5.44	5.59	3.56	25.4	9.40	4.57	2.69	23.0





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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV23T10
Export Information	ECCN# EAR99

ORDERING INFORMATION

Model No. Link	ZX60-10203LN+
Case Style	GC957
Connector	IN: SMA Female OUT: SMA Female

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 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

