

# L-Band Low Noise Amplifiers

## LL-1500 Series

### Introduction

LL-1500 series L-Band Low Noise Amplifiers are specially designed for satellite earth station receiver front ends and other telecommunications applications. Utilizing state-of-the-art HEMT and MMIC technology, these amplifiers have been designed for both fixed and transportable applications. High performance models are available in several standard frequency ranges, with a variety of available options.

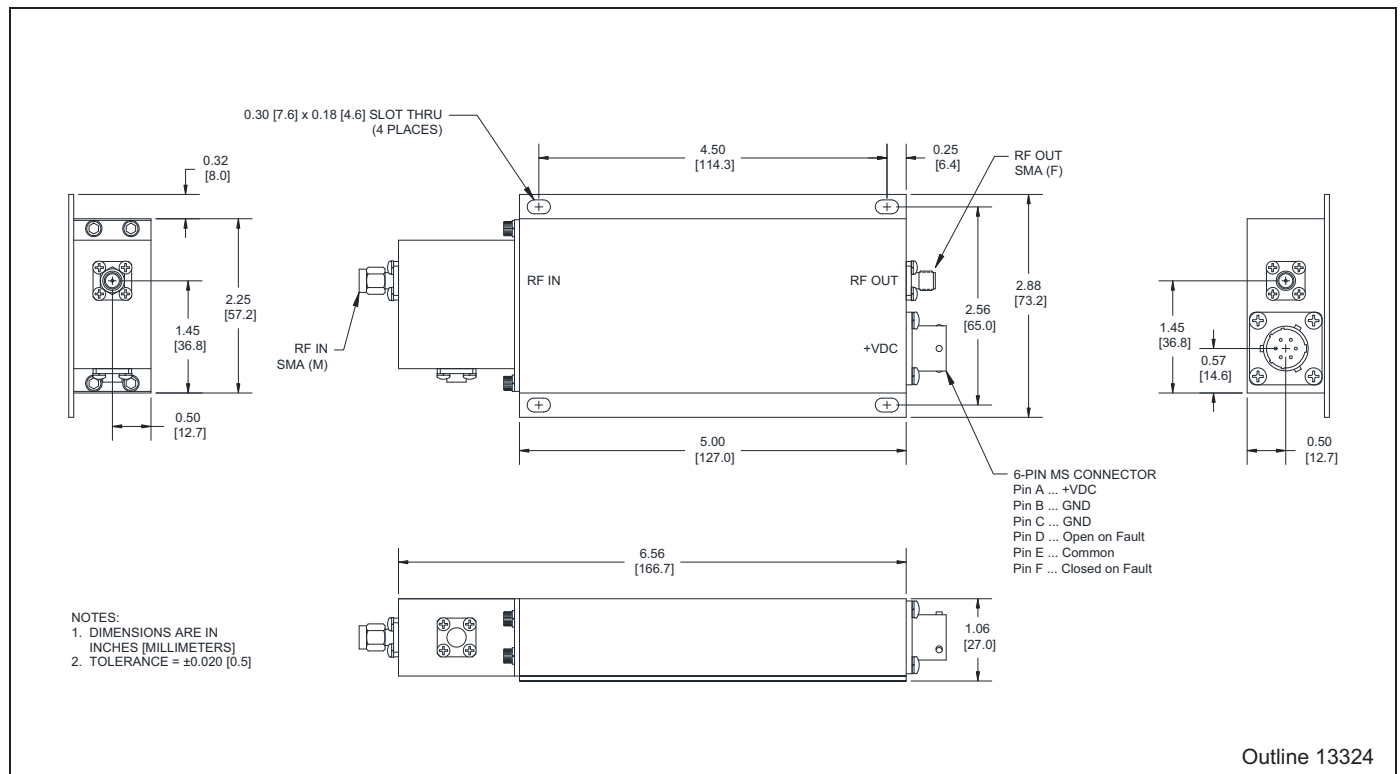
### Features

- State-of-the-art noise performance
- HEMT/MMIC design
- Internal regulator
- Reverse polarity protection
- High reliability
- Fault alarm

### Options

- Standard or extended L-Band
- 50 or 60 dB gain

### Outline Drawing



BUY NOW



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Parameter	Notes	Min.	Nom./Typ. <sup>†</sup>	Max.	Units
Frequency Range	Band "A"	1525		1561	MHz
	Band "B"	1510		1577	MHz
Gain	Standard	50	53		dB
	Option /1	60	63		dB
Gain Flatness	Full band Per 10 MHz			±0.5	dB
				±0.25	dB
VSWR	Input		1.20	1.25	:1
	Output		1.25	1.30	:1
Noise Temperature <sup>A</sup>	At +23 °C Versus temperature		See Table 2	See Table 1	
Power Output	At 1 dB compression	+10	+13		dBm
3rd Order Intercept	Output, OIP <sub>3</sub>	+20	+23		dBm
Group Delay per 36 MHz	Linear			0.05	ns/MHz
	Parabolic			0.005	ns/MHz <sup>2</sup>
	Ripple			1.0	ns p-p
AM/PM Conversion	-5 dBm output power			0.05	°/dB
Gain Stability (Constant Temp)	Short term (10 min)			±0.1	dB
	Medium term (24 hrs)			±0.2	dB
	Long term (1 week)			±0.5	dB
Gain Stability	Versus temperature		-0.04		dB per °C
Maximum Input Power	Damage threshold			+10	dBm
	Desens. threshold, <sup>B</sup> 1625-1661 MHz			-50	dBm
Connectors	Input Output Power		SMA Male SMA Female MS3112E10-6P (mate supplied)		
Power Requirements	Voltage	12	15	24	V
	Current		120	150	mA
Operating Temperature		-40		+60	°C

<sup>†</sup> When there is only one value on a line, the Nom./Typ. column is a nominal value; otherwise it is a typical value. Typical values are intended to illustrate typical performance, but are not guaranteed.

<sup>A</sup> Maximum noise temperature at +23 °C at any frequency in the specified band.

<sup>B</sup> Desens. threshold is -60 dBm with Option /1 (60 dB gain).

**Table 1 – Part Number/Ordering Information**

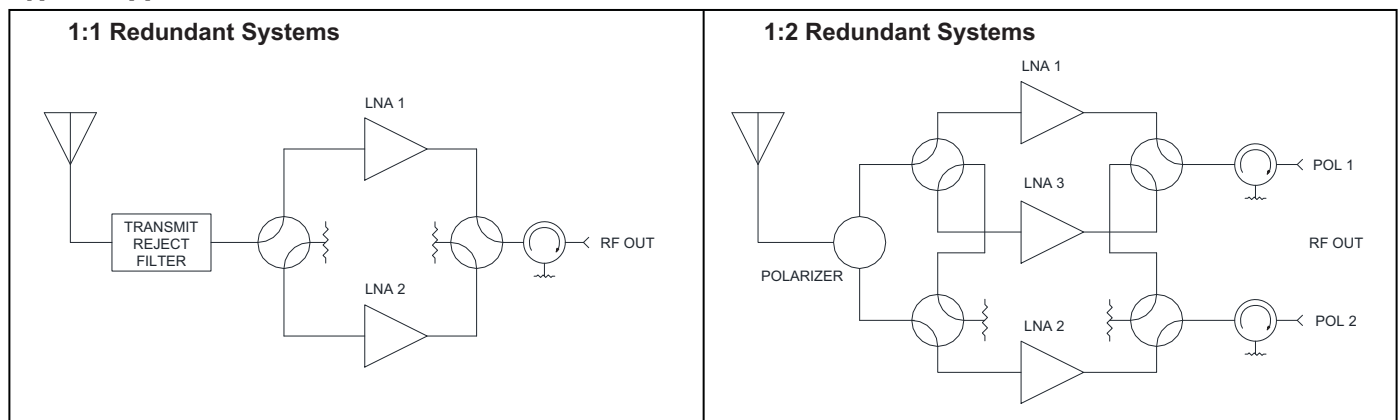
	<b>LL</b> <span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span> <b>-15</b> <span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span> <span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>
<b>Frequency Range</b>	
1525-1561 MHz .....	A
1510-1577 MHz .....	B
<b>Noise Temperature</b>	
60 K .....	60
50 K .....	50
45 K * .....	45
<b>Option</b>	
60 dB gain .....	/1

\* Consult factory for 45 K in Band "B".

**Table 2 – Noise Temperature vs. Ambient Temperature**

<p>Noise temperature vs. ambient temperature can be found from the equation,</p> $NT_2/NT_1 = (T_2/T_1)^{1.5}$ <p>where:</p> <ul style="list-style-type: none"> <li>NT<sub>2</sub> = Noise Temperature at T<sub>2</sub></li> <li>NT<sub>1</sub> = Noise Temperature at T<sub>1</sub></li> <li>T<sub>2</sub> = Temperature 2 in K</li> <li>T<sub>1</sub> = Temperature 1 in K (K = °C + 273)</li> </ul>	<p>For the case where T<sub>1</sub> = 296 K (+23 °C), the ratio NT<sub>2</sub> / NT<sub>1</sub> is shown in the table below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Ambient Temperature T<sub>2</sub> (°C)</th> <th>Ratio NT<sub>2</sub> / NT<sub>1</sub></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.89</td> </tr> <tr> <td>+23</td> <td>1.00</td> </tr> <tr> <td>+40</td> <td>1.09</td> </tr> <tr> <td>+50</td> <td>1.14</td> </tr> <tr> <td>+60</td> <td>1.19</td> </tr> </tbody> </table> <p>Example: For model LLA-1550, NT<sub>1</sub> = 50 K at +23 °C; what is NT<sub>2</sub> at +50 °C? From the table, NT<sub>2</sub> / NT<sub>1</sub> at 50 °C = 1.14: NT<sub>2</sub> = 1.14 x (50 K) = 57 K at 50 °C</p>	Ambient Temperature T <sub>2</sub> (°C)	Ratio NT <sub>2</sub> / NT <sub>1</sub>	0	0.89	+23	1.00	+40	1.09	+50	1.14	+60	1.19
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+60	1.19												

**Typical Applications**





## **Other Products**

- Low Noise Amplifiers and LNA Systems
- Solid-State Power Amplifiers and SSPA Systems
- General Purpose Converters
- Satellite Communications Equipment
- Custom Subsystems

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