

LL-1500 series L-Band Low Noise Amplifiers are specifically 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 with noise temperatures as low as 35 K. Noise temperature specifications are guaranteed over the full bandwidth of the LNA.



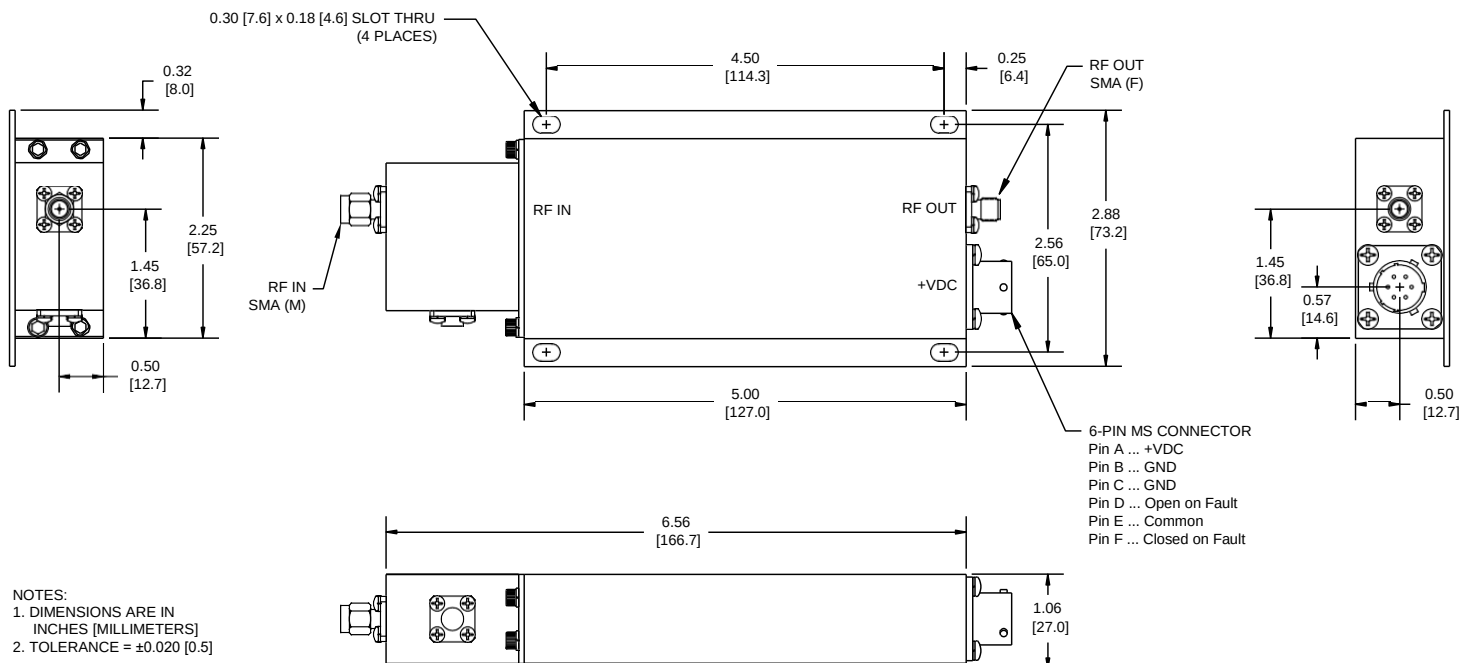
FEATURES:

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

OPTIONS:

- High Gain, 60 dB
- High Output Power, +20 dBm

Outline Drawing



L-Band Low Noise Amplifiers

Specifications

Parameter	Notes	Specification
Frequency Range	Band "B"	1510 to 1577 MHz
Gain	Standard Option 1	50 dB min., 53 dB typical, 55 dB max. 60 dB min., 63 dB typical, 65 dB max.
Gain Flatness		±0.5 dB over the full band ±0.25 dB per 10 MHz
VSWR	Input Output	1.20:1 typical, 1.25:1 max. 1.25:1 typical, 1.30:1 max.
Noise Temperature, System (1)	At +23°C Versus Temperature	See Table 1 See Table 2
Power Output at 1dB compression (P _{1dB})	Standard Option 2	+10 dBm min., +13 dBm typical +20 dBm min., +21 dBm typical
3 rd Order Output Intercept Point (OIP ₃)	Standard Option 2	+20 dBm min., +23 dBm typical +30 dBm min., +33 dBm typical
Group Delay per 36 MHz	Linear Parabolic Ripple	0.05 ns/MHz 0.005 ns/MHz ² 1.0 ns peak to peak
AM/PM Conversion		0.05°/dB max., at -5 dBm output power
Gain Stability (Constant Temp)	Short term (10 min.) Medium term (24 hrs) Long term (1 week)	±0.1 dB max ±0.2 dB max ±0.5 dB max
Gain Stability vs. Temperature		-0.04 dB per °C
Maximum Input Power	Damage Threshold Desens. Threshold, 1625-1661 MHz (2)	+10 dBm max. -50 dBm max.
Connectors	Input Output Power	SMA Male SMA Female PT02E10-6P-027 (mate supplied)
Power Requirements	Voltage Current, standard Current, with Option 1 or Option 2	11 V min., 12 V typical, 15 V max. 150 mA typical, 175 mA max. 200 mA typical, 220 mA max.
Operating Temperature		-40°C to +60°C
(1) Maximum Noise temperature at +23°C at any frequency in the specified band.		
(2) Desens Threshold is -60 dBm with Option 1 (60 dB gain).		

Table 1 - Part Number/Ordering Information

	LL	15S	-		
Frequency Band					
1510-1577 MHz	B				
Noise Temperature					
45 K.....		45			
40 K.....		40			
35 K.....		35			
Gain Option					
50 dB gain, standard			X		
60 dB gain, Option 1			1		
Output Power Option					
+10 dBm				X	
+20 dBm				2	

Table 2 - Noise Temperature vs. Ambient Temperature

Noise temperature vs. ambient temperature can be found from the equation,

$$NT_2/NT_1 = (T_2/T_1)^{1.5}$$

where:

- NT₂ = Noise Temperature at T₂
- NT₁ = Noise Temperature at T₁
- T₂ = Temperature 2 in K
- T₁ = Temperature 1 in K
- (K = °C + 273)

For the case where T₁ = 296 K (+23 °C), the ratio NT₂ / NT₁ is shown in the table below:

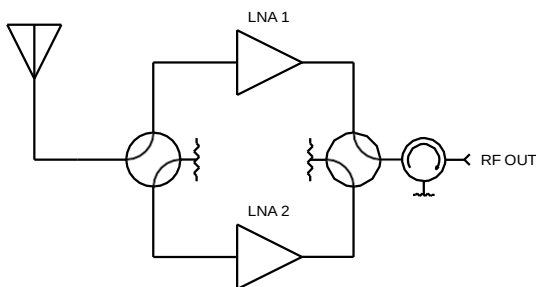
Ambient Temperature T ₂ (°C)	Ratio NT ₂ / NT ₁
0	0.88
+23	1.00
+40	1.09
+50	1.14
+60	1.19

Example: For model LLB15S45-X, NT₁ = 45 K at +23 °C; what is NT₂ at +50 °C?

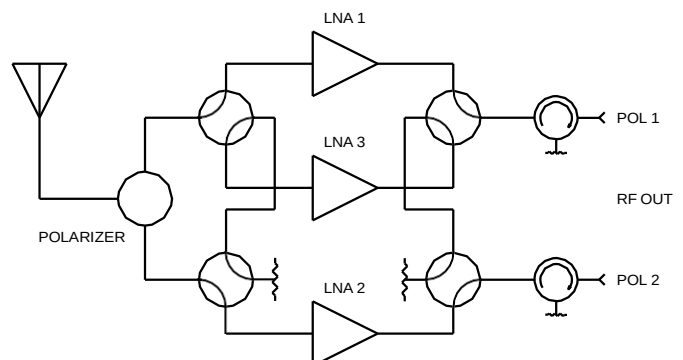
From the table, NT₂ / NT₁ at +50 °C = 1.14: NT₂ = 1.14 x (45 K) = 51.3 K at +50 °C

Typical Application

1:1 Redundant Systems



1:2 Redundant Systems



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