

LK-20S000 series Ka-Band Ultra Low Noise Amplifiers are specifically designed for satellite earth station and other telecommunications applications.

Utilizing state-of-the-art HEMT and GaAs FET technology, these amplifiers have been designed for both fixed and transportable applications. High performance models are available with noise temperatures of 120 K to 110 (Frequency Range Dependent). All noise temperature specifications are guaranteed over the full bandwidth of the LNA.



FEATURES:

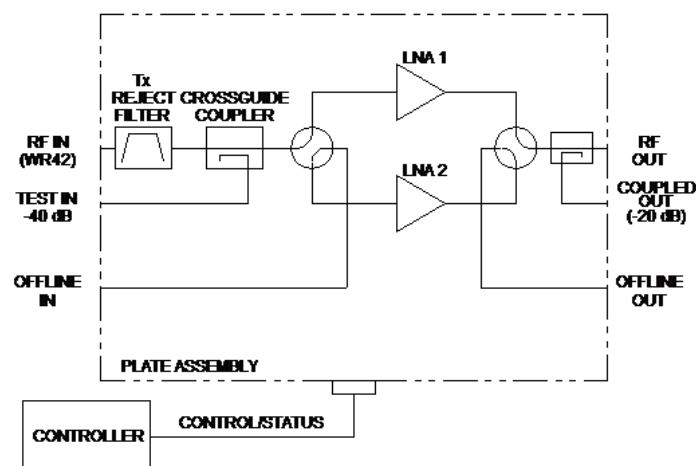
- Wideband coverage
- Noise temperatures to 110 K on select Models
- Temperature Compensated Gain
- High reliability HEMT design
- Input/output isolators
- Reverse polarity protection
- Wide operating temperature range, -40 °C to +70 °C
- Form 'A' alarm

OPTIONS:

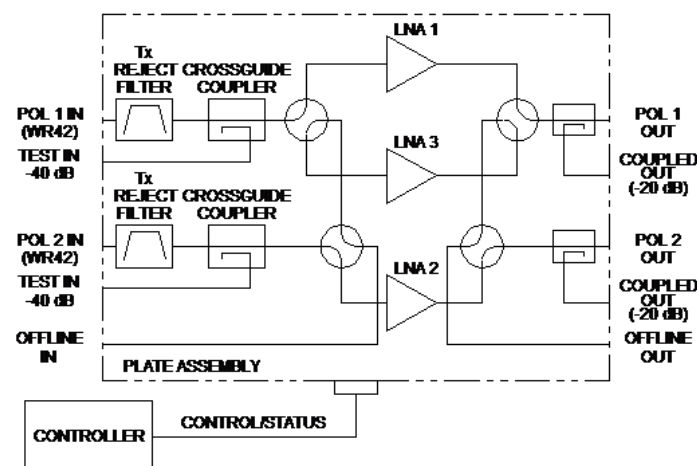
- Gain Levels of 50dB or 60 dB
- High Output power, P_{1 dB} = +20 dBm minimum

Typical Applications

1:1 System



1:2 System



Ka-Band Low Noise Amplifiers

Specifications

Parameter	Notes	Specification
Frequency Range	Band "A" Band "B" Band "C"	18.2 to 20.2 GHz 20.2 to 21.2 GHz 17.7 to 21.2 GHz
Gain	Standard LNA LNA with Option 1	59 dB min., 65 dB max. 49 dB min., 55 dB max.
Gain Flatness		±1.0 dB over the full band ±0.25 dB per 40 MHz
VSWR	Input Output	1.25:1 typical, 1:30:1 max. 1.40:1 typical, 1:50:1 max.
Noise Temperature, System (1)	At +23 °C Versus Temperature	See Table 1 See Table 2
Power Output at 1dB compression (P _{1dB})	Standard LNA LNA with Option 2	+12 dBm min., +14 dBm typical +20 dBm min., +22 dBm typical
3 rd Order Output Intercept Point (OIP ₃)	Standard LNA LNA with Option 2	+22 dBm min., +24 dBm typical +27 dBm min., +29 dBm typical
Group Delay per 40 MHz	Linear Parabolic Ripple	0.01 ns/MHz 0.001 ns/MHz ² 0.2 ns peak to peak
AM/PM Conversion		0.05°/dB max., at -5 dBm out
Gain Stability (Constant Temperature)	Short term (10 min.) Medium term (24 hrs.) Long term term (1 week)	±0.1 dB typical ±0.2 dB typical ±0.5 dB typical
Gain Stability (Versus Temperature)		5.0 dB typical peak to peak
Maximum Input Power	Damage threshold Desens. Threshold, 27.0-31.0 GHz	0 dBm max. -15 dBm
Connectors	Input Output Power	WR42 Cover Flange (#4-40 THD holes) SMA Female PT02E-8-4P-027 (mate supplied)
Power Requirements	Voltage Current Voltage (Option 4) (2)	11 VDC min., 28 VDC max. 600 mA 90 VAC min., 265 min. VAC
Operating Temperature	T _{AMB} (Standard) T _{AMB} (Option 4) (2)	-40 °C to +70 °C -40 °C to +60 °C
(1) Maximum noise temperature +23 °C at any frequency in the specified band. (2) Consult factory for AC power option.		

Table 1 - Part Number/Ordering Information

	LK		20S		-					
Frequency Range	18.2-20.2 GHz	A								
	20.2-21.2 GHz	B								
	17.7-21.2 GHz	C								
Noise Temperature	120 K	120								
	110 K (Frequency A & B only)	110								
Gain	60 dB typ.	X								
	50 dB typ.	1								
Output Power	+12 dBm min	X								
	+20 dBm min	2								
Compensation	Standard (5dB p-p)	X								
Power Configuration	+11 to +28 Vdc	X								
	90-265 Vac, 47-63 Hz (Consult factory)	4								
Finish Color	Commercial White	X								
	Green (Fed Std 595B; #34094 - Consult factory)	5								
	Tan (Fed Std 595B; #33303 - Consult factory)	6								

Table 2 - Noise Temperature vs Ambient Temperature

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

$$NT_2/NT_1 = (T_2/T_1)^{1.8}$$

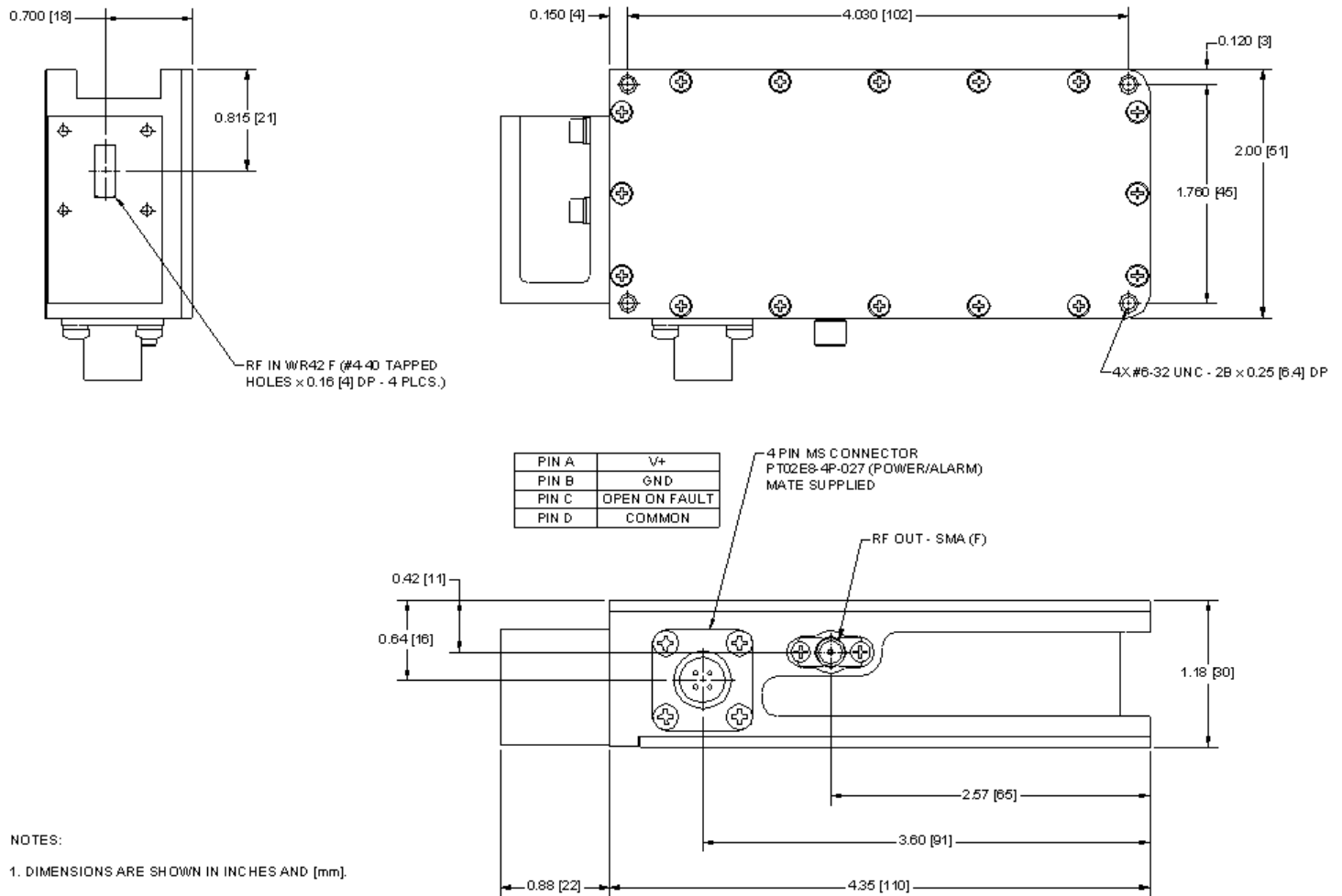
where:

NT_2	=	Noise Temperature at T_2
NT_1	=	Noise Temperature at T_1
T_2	=	Temperature 2 in K
T_1	=	Temperature 1 in K (K = °C + 273)

For the case where $T_1 = 296$ K (+23 °C), the ratio NT_2 / NT_1 is shown in the table below:

Ambient Temperature T_2 (°C)	Ratio NT_2 / NT_1
0	0.86
+23	1.00
+40	1.11
+50	1.17
+60	1.24

Example: For model LKB20S110-XXXXX, $NT_1 = 110$ K at +23 °C; what is NT_2 at +50 °C?
From the table, NT_2 / NT_1 at 50 °C = 1.17: $NT_2 = 1.17 \times (110 \text{ K}) = 128.7$ K at 50 °C



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