

Ka-Band Low Noise Amplifiers

LK-20S000 Series

Introduction

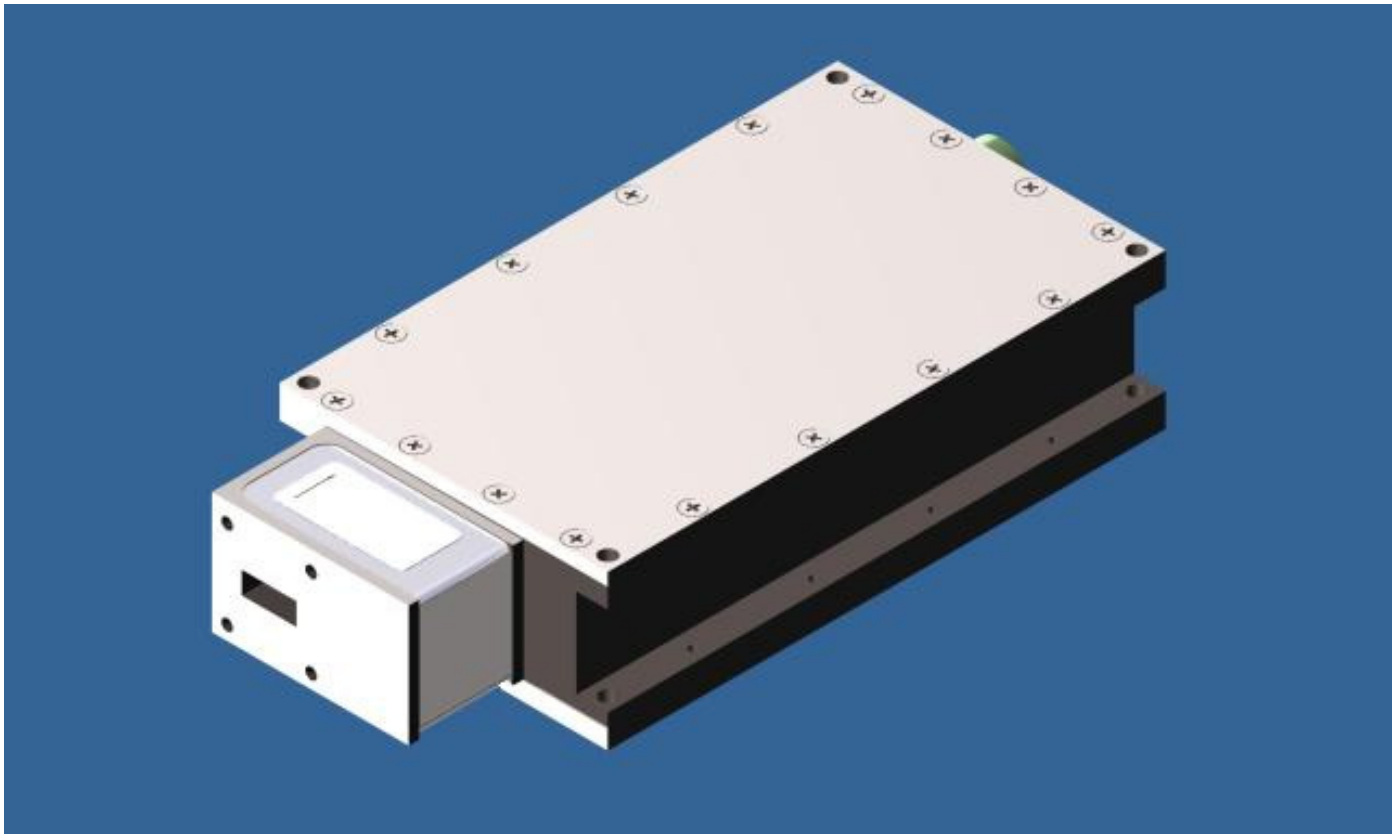
LK-20S000 series Ka-Band Ultra Low Noise Amplifiers are specially designed for satellite earth station and other telecommunications applications. Utilizing state-of-the-art HEMT and GaAs FET technology, these amplifiers have been designed for both fixed and transportable applications. High performance models are available with noise temperatures from 130 K to 110 K. All noise temperature specifications are guaranteed over the full bandwidth of the LNA.

Features

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

Options

- Low gain, 50 dB typical
- High Output power, $P_{1\text{ dB}} = +20\text{ dBm}$ minimum
- Excellent guaranteed gain stability due to built-in temperature compensation circuit (test data provided)
- Universal input AC power supply



Parameter	Notes	Min.	Nom./Typ. [†]	Max.	Units
Frequency	Band "A"	18.2		20.2	GHz
	Band "B"	20.2		21.2	GHz
Gain	Standard	57	60	63	dB
	Option 1	47	50	53	dB
Gain Flatness	Full band Per 40 MHz			±1.0	dB
				±0.2	dB
VSWR	Input		1.25	1.30	:1
	Output		1.40	1.50	:1
Noise Temperature ^A	At +23 °C Versus temperature		See Table 2	See Table 1	
Power Output at 1 dB compression (P _{1 dB})	Standard	+12	+14		dBm
	Option 2	+20	+22		dBm
3rd Order Output Intercept Point, OIP ₃	Standard	+22	+24		dBm
	Option 2	+28	+30		dBm
Group Delay per 40 MHz	Linear			0.01	ns/MHz
	Parabolic			0.001	ns/MHz ²
	Ripple			0.1	ns p-p
AM/PM Conversion	-5 dBm Output			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 (Standard) Improved stability (Option 3) over operational temp range		-0.06	2.0	dB per °C dB pk-pk
Maximum Input Power	Damage threshold			0	dBm
	Desens. threshold, 29.0–31.0 GHz			-25	dBm
Connectors	Input Output Power	WR42 Cover Flange (#4-40 THD holes) SMA Female PT02E-8-4P-027 (mate supplied)			
Power Requirements	Voltage (Standard)	11	15	24	Vdc
	Current, @ P _{1 dB} (Standard)			600	mA
	Current, @ P _{1 dB} (Option 1)			400	mA
	Current, @ P _{1 dB} (Option 2)			600	mA
	Voltage (Option 4) ^B	90		265	Vac
Operating Temperature	T _{AMB} (Standard)	-40		+70	°C
	T _{AMB} (Option 4) ^B	-40		+60	°C

[†] 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.

^A Maximum noise temperature at +23 °C at any frequency in the specified band.

^B 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		
Noise Temperature	130 K	.....	130		
	120 K	.....	120		
	110 K	.....	110		
Gain	60 dB typ.	.....	X		
	50 dB typ.	.....	1		
Output Power	+12 dBm min.	.....	X		
	+20 dBm min.	.....	2		
Compensation	Standard	.....	X		
	Temperature Compensation	.....	3		
Power Configuration	+11 to +24 Vdc	.....	X		
	90-265 Vac, 47-63 Hz (Consult factory)	.....	4		
Finish Color	Commercial White	.....	X		
	Green (Fed Std 595B; #34094)	.....	5		
	Tan (Fed Std 595B; #33303)	.....	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:

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

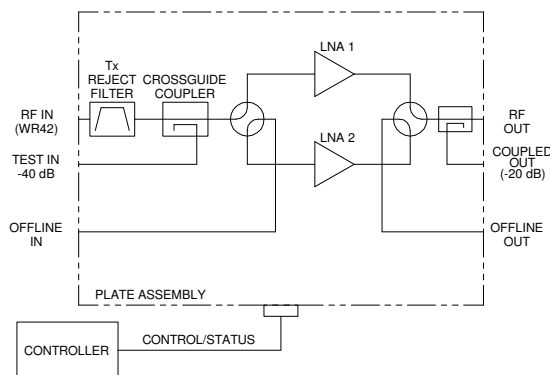
Example: For model LKB20S110-XXXXX, NT₁ = 110 K at +23 °C; what is NT₂ at +50 °C?
From the table, NT₂ /NT₁ at 50 °C = 1.17: NT₂ = 1.17 x (110 K) = 128.7 K at 50 °C

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

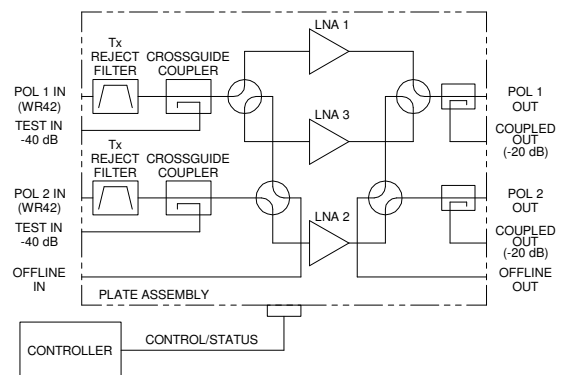
Ambient Temperature T ₂ (°C)	Ratio NT ₂ /NT ₁
0	0.86
+23	1.00
+40	1.11
+50	1.17
+60	1.24

Typical Applications

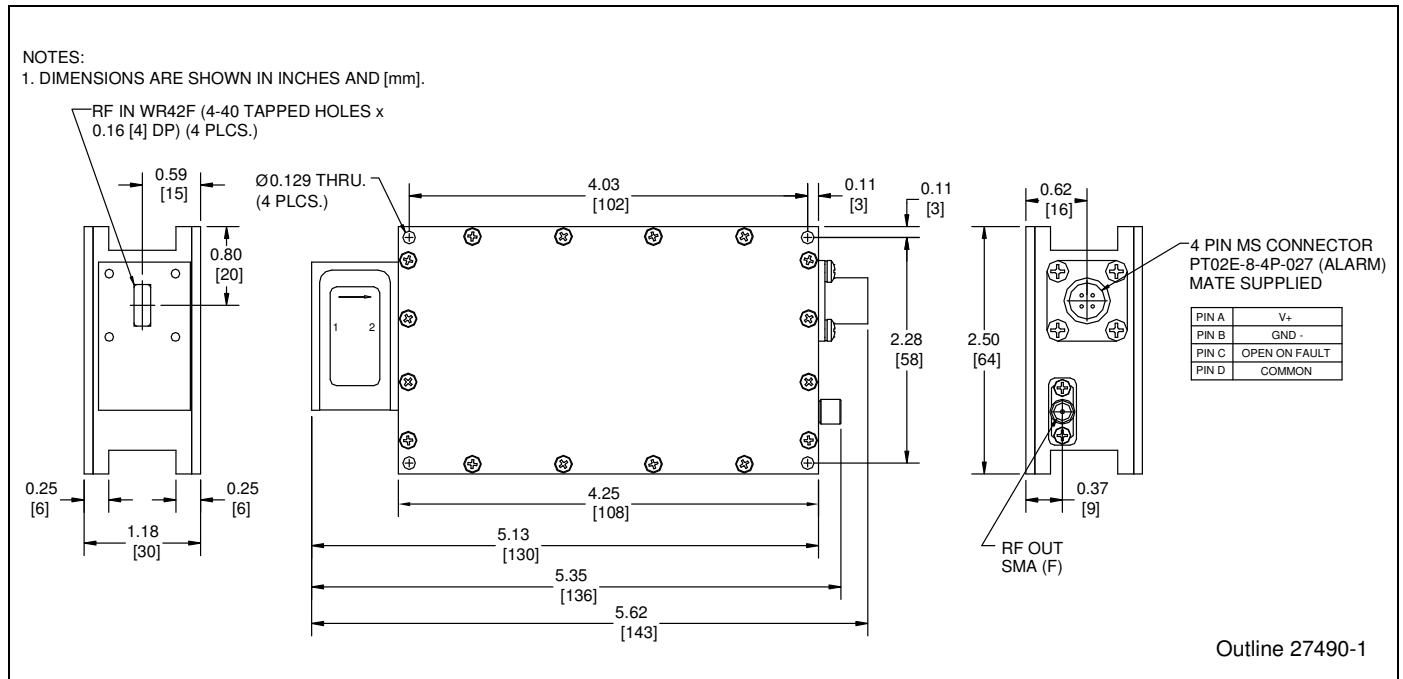
1:1 System



1:2 System



Outline Drawing



Other Products

- Solid-State Power Amplifiers and SSPA Systems
- Solid-State Power BUCs and SSPB Systems
- Low Noise Amplifiers and LNA Systems
- Low Noise Block Converters and LNB Systems
- Block Up and Block Down Converters
- Synthesized Converters
- Line Drive Amplifiers
- Power Supply Monitors
- Redundant Control Panels for SSPAs, SSPBs, and LNAs

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