Features

- Very low noise, of the order of 7K over an extremely wide bandwidth, 1 to 18 GHz. Usable from 0.5 to 22 GHz.
- Operates with wide range of DC supply voltages. Provides usable gain and noise at DC power as low as 3 mW..
- Input return loss is > 10 dB at >9 GHz and approaches an open circuit at low frequencies. Output return loss is >10 dB, 1 to 18 GHz.

Description

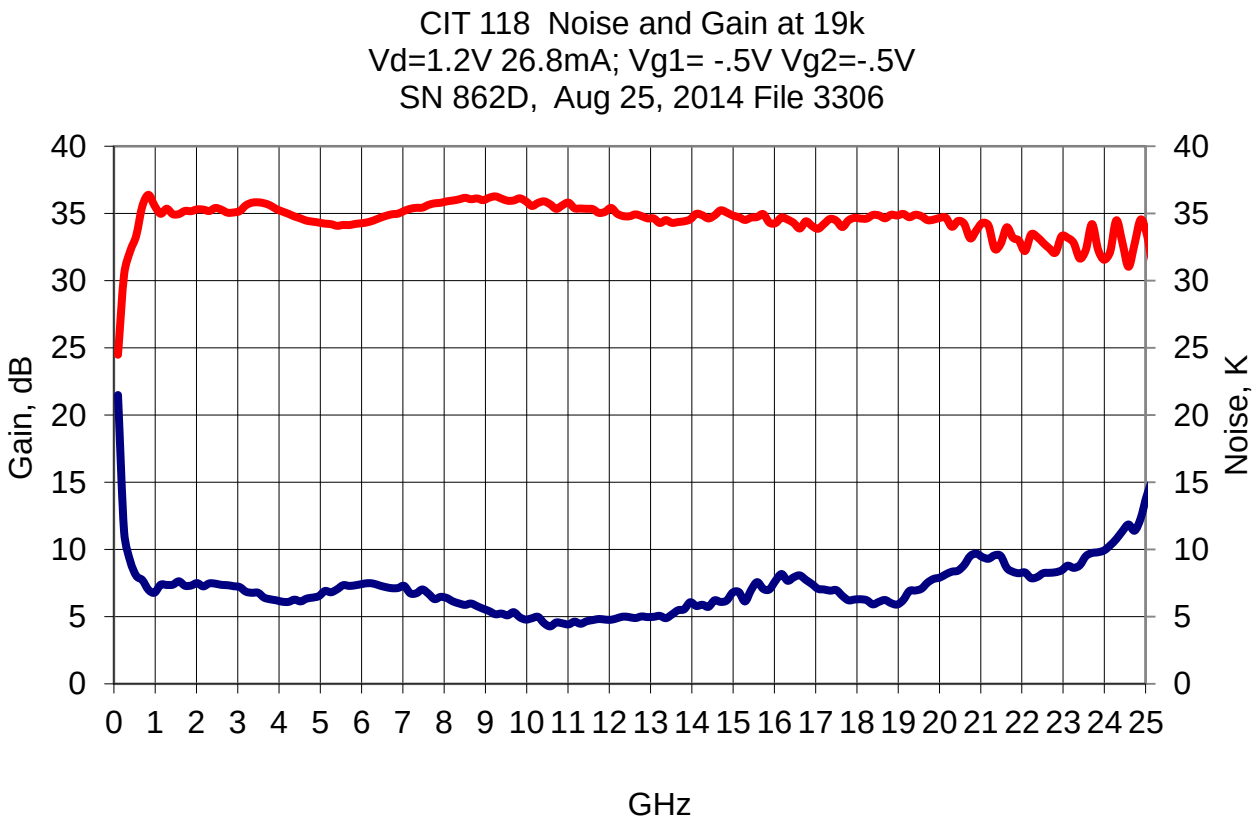
The CIT118 is a GaAs HEMT cryogenic, low noise, broadband amplifier. The amplifier requires one drain voltage in the 0.6V to 1.5V range and one gate voltage in the -3 V to +1 V range. through terminals Vg1 and Vg2, each with 11K DC input resistance. See the table on p. 4 for performance vs bias voltages. If desired the gate supply can be eliminated (open circuit pins Vg1 and Vg2) at slightly less than optimum performance.

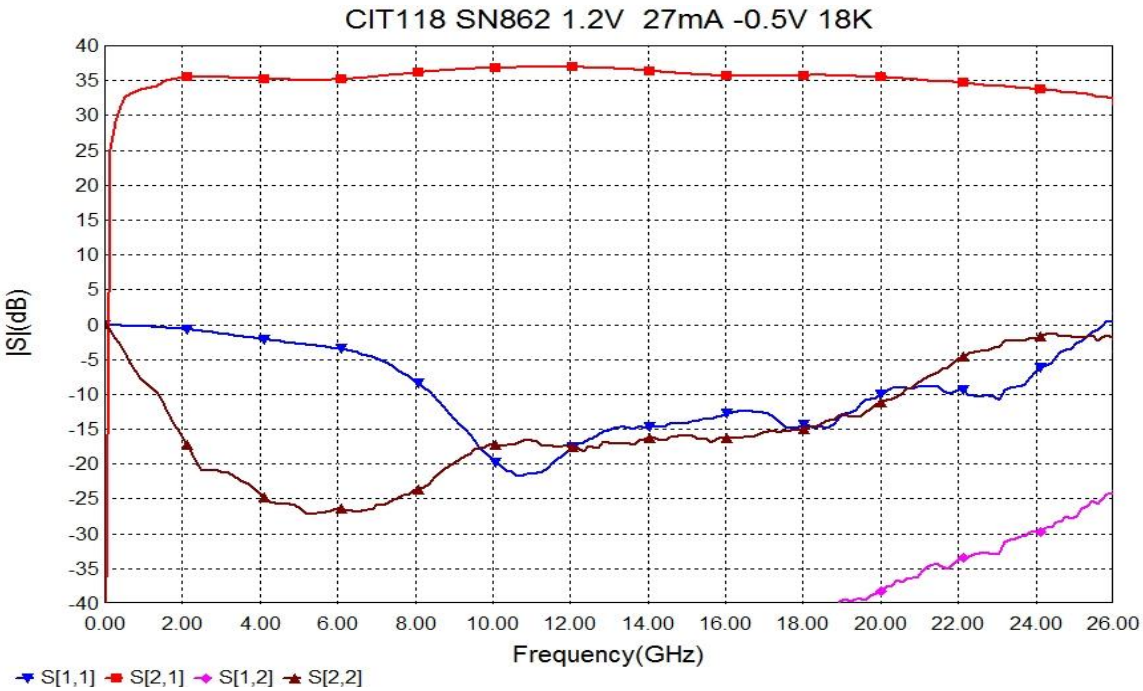
The amplifier may be operated at room temperature to give a noise figure < 1,70 dB and gain >33dB from 0.5 to 22 GHz. . Note that a more negative gate supply voltage, typically -1.5V is required at room temperature. However the amplifier is not damaged if the gate voltage for cryogenic operation, typically 0V, is applied at room temperature (though the gain will be low). Input and output return loss change very little from 300K to 4K.

Typical Performance at 18K and 1 to 18 GHz

Gain	35dB ± 2 dB
Noise temperature	<8K
Noise figure	**<** 0.13 dB
Input Return Loss	**>**0 dB (stable, all frequencies) >10 dB 9 to 22 GHz
Output Return Loss	>10dB, 1 to 18 GHz
Operating temperature:	4.2 K- 320 K
RF output power	<.005W, < +7dBm
Maximum input power	.01W, +10dBm
DC power @ 18 K:	Vd = 1.2V at 27 mA (32 mW) Vd as low as 0.6V at 8mA (4.8mW) with reduced performance

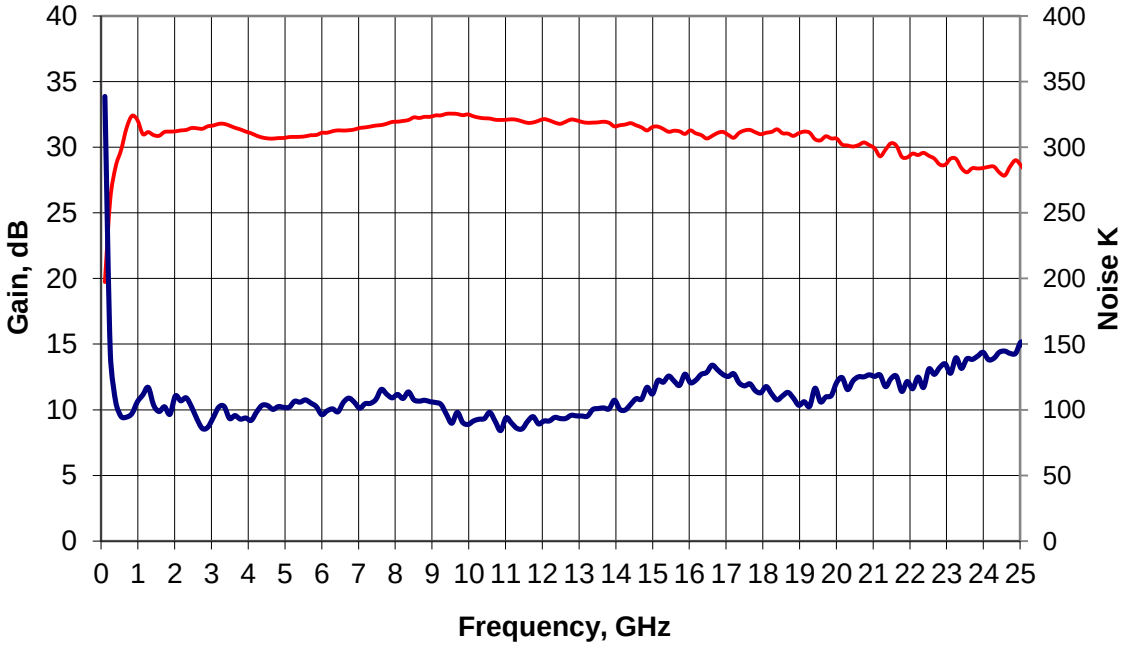
Performance at 19K

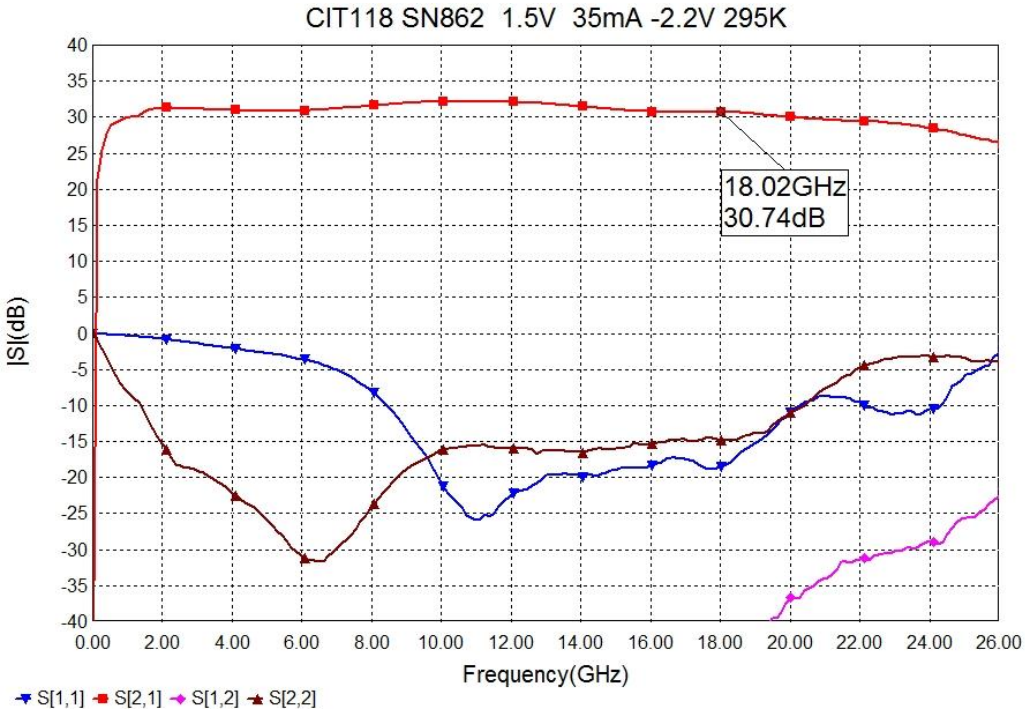




Performance at 300K

CIT 118 Noise and Gain at 300K
Vd=1.50V 34mA; Vg1= -2.2V Vg2= -2.2V
SN862D, Aug 25, 2014 File 3301





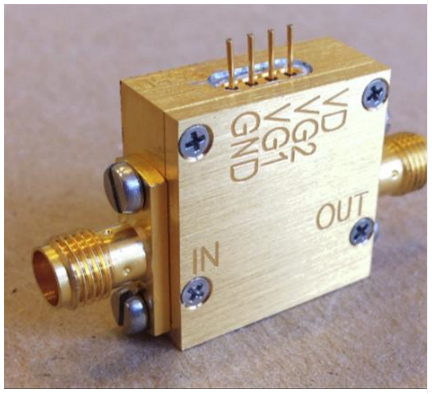
Noise, Gain, and P1dB vs Bias

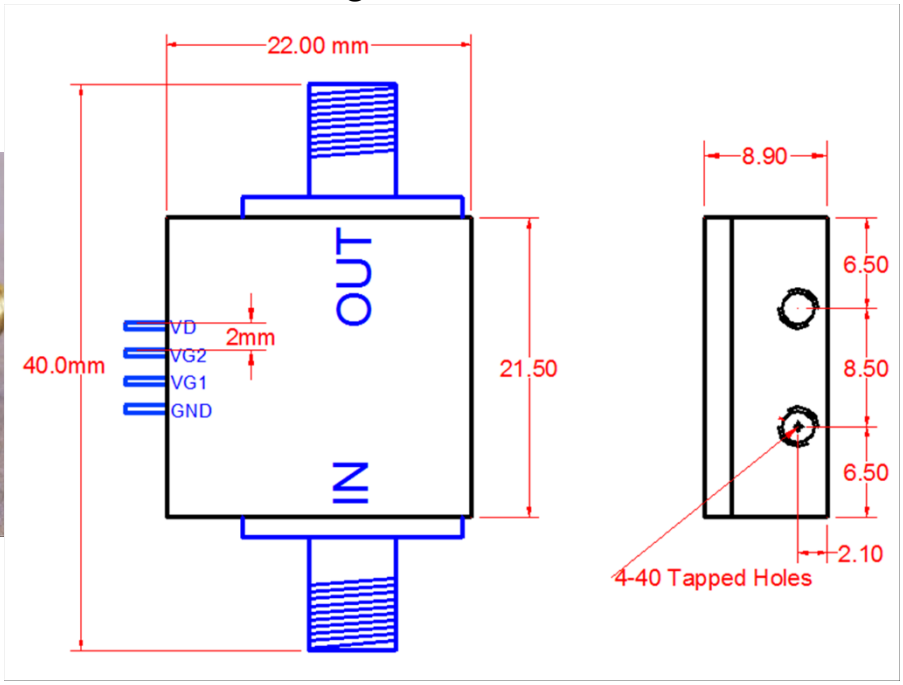
Noise and Gain at 18 GHz and at 19K vs DC Bias, Vg1=Vg2=Vg

Vd Volts	Id mA	Vg Volts	DC Power mW	Noise K	Gain dB	P1dB In dBm	P1dB Out dBm
0.6	4.9	-1.5	2.9	12.8	18.8		
0.6	8	-1.2	4.8	9.3	23.6	-33	-10
1	10.4	-1.5	10.4	7.7	28.6		
1	15.7	-1	15.7	6.5	31.9	-35	-3
1.2	17.7	-1.2	21.2	6.7	33.3		
1.2	27	-0.5	32.4	6.4	34.5	-36	-2
1.5	33	-0.5	49.5	6.5	36.8	-27*	+5*

*At Vd=1.5V and high signal levels gain expansion is observed.

Outline Drawing





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