

### Features

- Very low noise, of the order of 7K over an extremely wide bandwidth, 4 to 16 GHz. Usable from 3 to 18 GHz.
- Operates over a wide range of DC supply voltages. Provides usable gain and noise at DC power as low as 10 mW.
- Input and output return loss >10 dB over most of the 4 to 16 GHz range.



### Description

The CIT416 is a GaAs HEMT cryogenic, low noise, broadband amplifier. It utilizes SMA jacks for RF-input and output and a 4-pin 2 mm pitch header for DC bias. 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. (terminals Vg1 = Vg2) into 11K DC resistance. See the table on p. 4 for performance vs bias voltages. If desired the gate supply can be eliminated (open pins on Vg1 and Vg2) at slightly less than optimum performance.

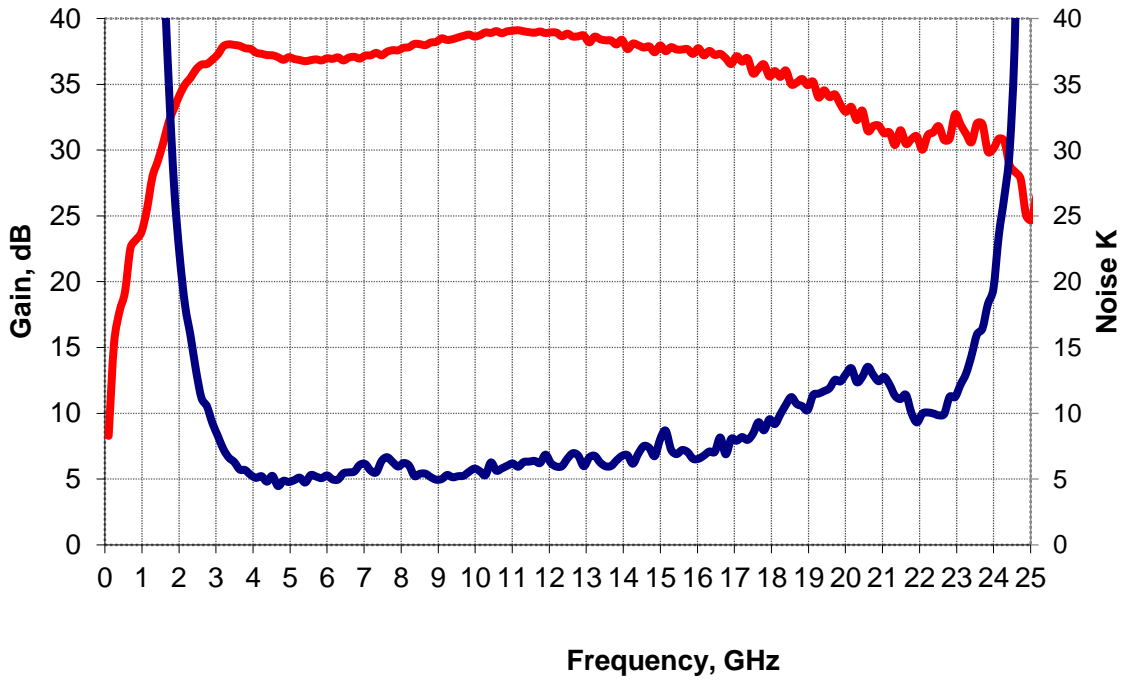
The amplifier may be operated at room temperature to give a noise figure < 1,7dB and gain ~30dB. Note that a more negative gate supply voltage, typically -1.5V is required at room temperature. However the amplifier is not damaged if the gate voltage for cryogenic operation, typically 0V, is applied at room temperature (though the gain is very low). Input and output return loss change very little from 300K to 4K.

### Typical Performance at 18K and 4 to 16 GHz

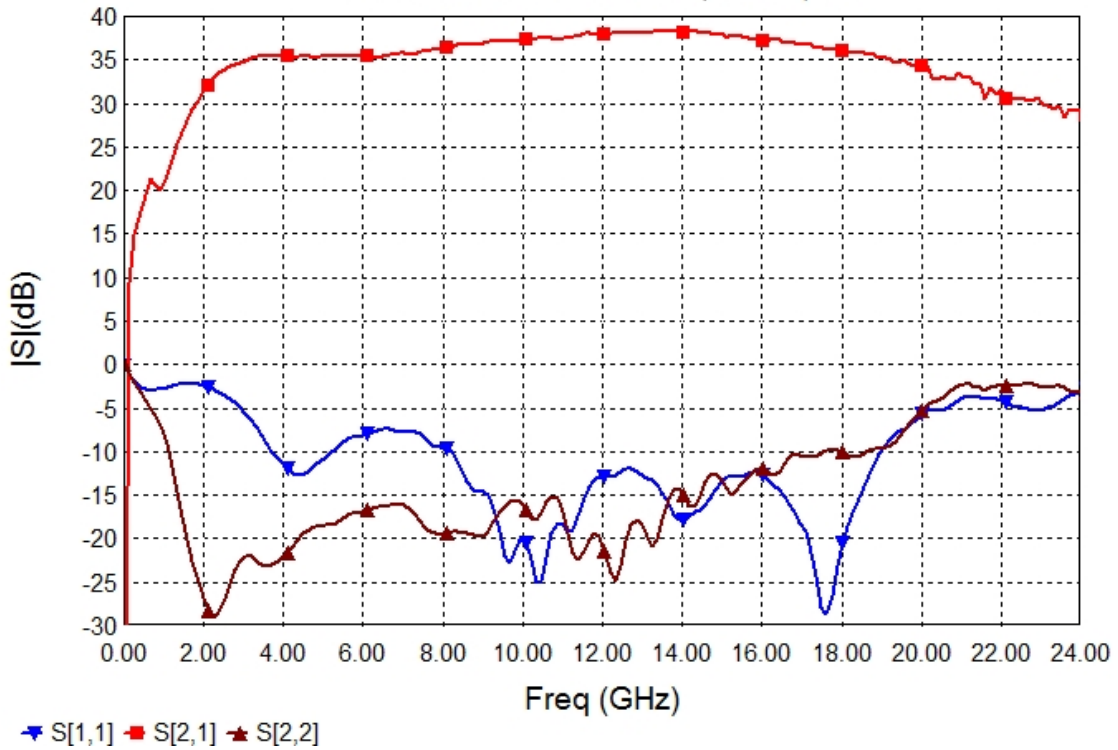
Gain	38dB ± 2 dB
Noise temperature	<9K
Noise figure	< 0.13 dB
Input Return Loss	>7 dB (stable, all frequencies) >10 dB 8 to 16 GHz
Output Return Loss	>10dB, 3 to 16 GHz
Operating temperature:	4.2 K- 320 K
RF output power	<.005W, < +7dBm
Maximum input power	.01W, +10dBm
DC power @ 18 K:	Vd = 1.2V at 23 mA (28mW)

# Performance at 19K

CIT416 Noise and Gain  
SN860D at 18K  
1.2V, 23mA, 0V Sep 2, 2014

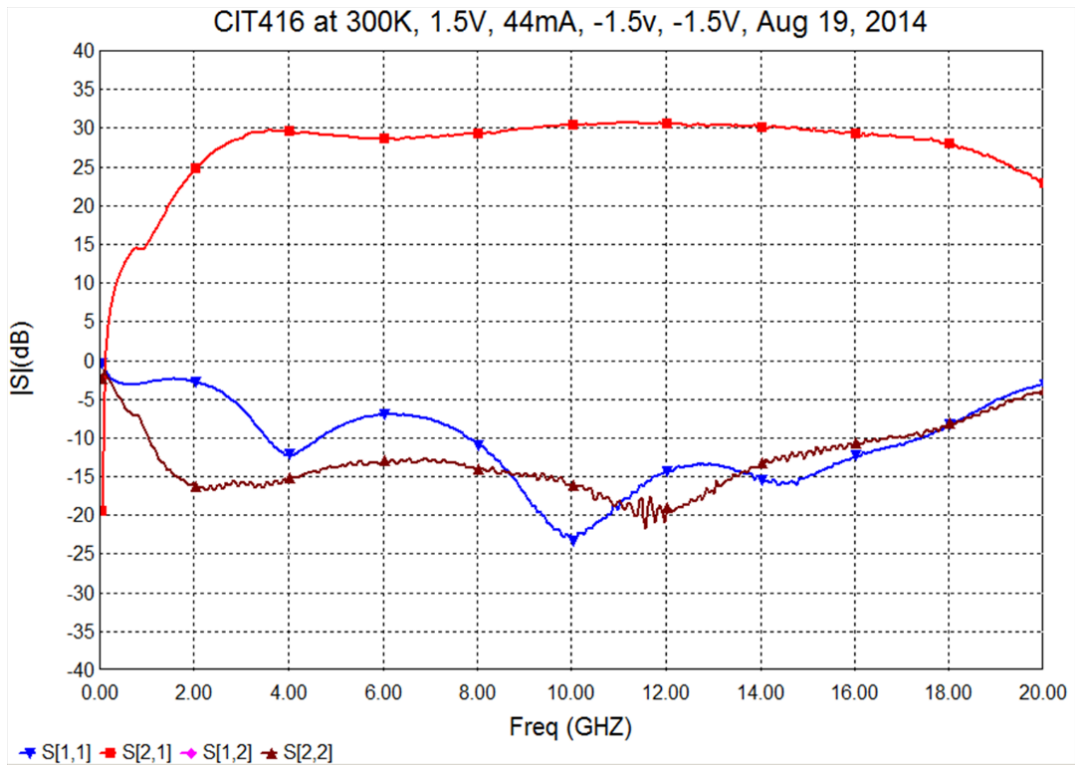
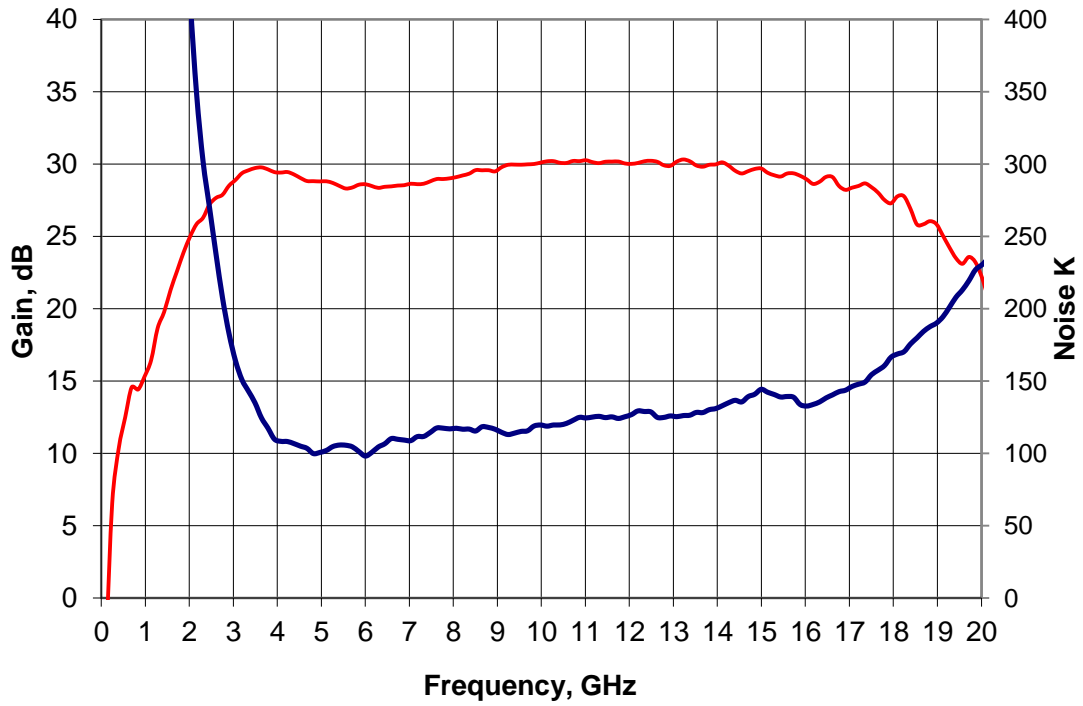


CIT416 SN855 19K 1.2V, 21mA, 0V



# Performance at 300K

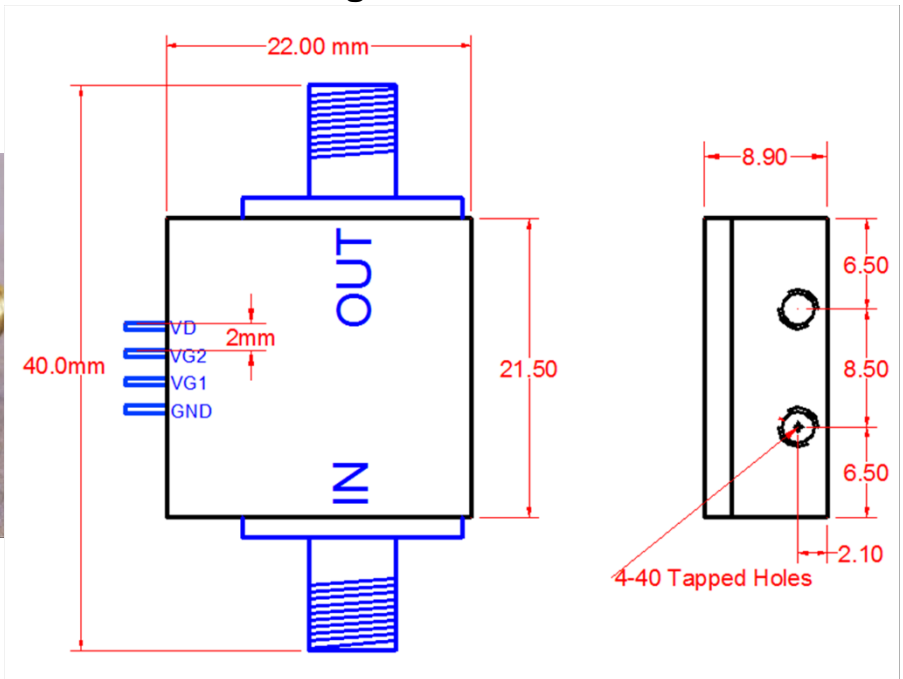
CIT416 Noise and Gain at 300K  
Vd=1.20V 37mA; Vg1= -0.8V Vg2= -1.6V  
Module 855D Jul 20, 2014 File 3170



## Noise, Gain, and P1dB vs Bias

Noise and Gain at 12 GHz and at 19K vs DC Bias, Vg1=Vg2=Vg							
Vd	Id	Vg	DC Power	Noise	Gain	P1dB In	P1dB Out
Volts	mA	Volts	mW	K	dB	dBm	dBm
0.7	23.8	0	16.7	7.9	22.5	-35	-13
1	33.4	0	33.4	7.3	30.5	-35	-5
1.2	35.1	0	42.1	7.1	33.6	-34	-1
1.2	29.5	-0.3	35.4	6.7	37.7	-36.5	0
1.5	42	0	63.0	6.5	38.4	-38	0

### Outline Drawing



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