



# Agilent 87405A

## Preamplifier 10 MHz to 3 GHz

Data Sheet

### Features

- 24 dB Gain
- 6.5 dB Noise Figure
- Probe-Power Bias Connection
- Compact Size

### Benchtop/general purpose use

Used alone on the bench, the Agilent Technologies 87405A can be added to any application in which additional gain and low noise are required. The compact and inexpensive 11899A probe power supply is a suitable source of DC bias in remote applications.

The Agilent 87405A preamplifier brings reliable gain and low noise figure to measurement systems to improve overall system performance and reduce systematic errors. With its compact size and convenient probe-power bias connection, the 87405A is ideal for use as the front end preamplifier for a variety of Agilent instruments such as the 8590E series of portable spectrum analyzers. The 87405A is the recommended preamplifier for use with the 8594E Noise Figure Measurement Solution. The rugged design along with its insertable configuration of connectors makes the 87405A ideal for test port applications.



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### Improve noise figure measurements

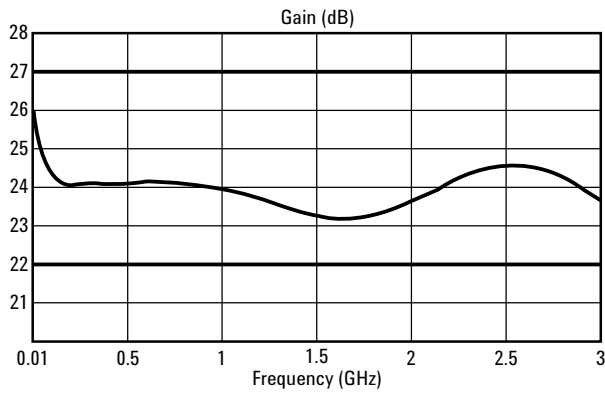
Add a preamplifier to noise figure measurement systems to significantly lower system noise figure. The noise figure of the system is dominated by the noise figure of the preamplifier.

$$F_{\text{new}} = F_{\text{pa}} + \frac{F_{\text{sys}} - 1}{G_{\text{pa}}}$$

Where F and G are noise figure and preamplifier gain, both in linear terms.

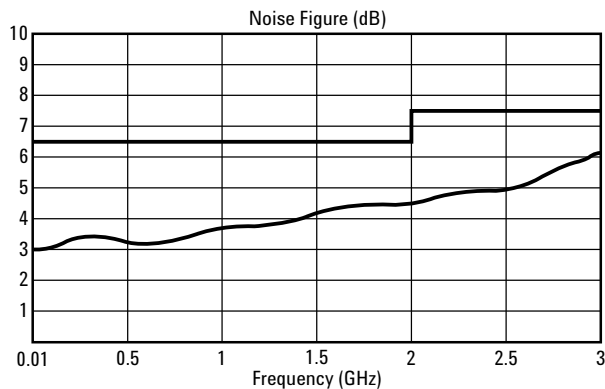
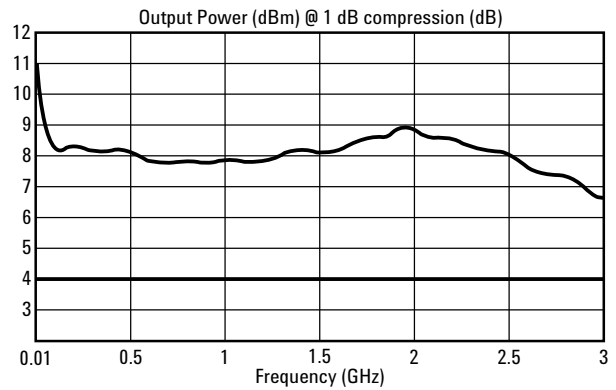
$$NF_{\text{sys}} = 10 \log (F_{\text{sys}}) \text{ in dB}$$

For systems having a single preamplifier, where the gain of the preamplifier is greater than or equal to the spectrum analyzer noise figure, the system noise figure approximately equals the noise figure of the preamplifier.



### Increase sensitivity and speed

Adding preamplifiers to measurement systems can improve sensitivity for measuring low-level signals. Boost the sensitivity of your Agilent spectrum analyzer 15 to 25 dB by using the 87405A preamplifier. Alternatively, better sensitivity can be traded for measurement speed. Spurious tests often require narrow resolution bandwidths to reduce the noise floor of the analyzer, allowing low-level signal detection. An analyzer with low noise figure allows you to use a wider resolution bandwidth, yet achieve the same sensitivity. Sweptimes can improve one hundred fold for each decade increase in bandwidth. The 87405A preamplifier has gain and noise figure characteristics that optimize dynamic range and sensitivity.



## 87405A product specifications

Frequency Range	10-3000 MHz
Small Signal Gain	22-27 dB min-max
Gain Flatness	±1.25 dB 50-3000 MHz ±2.0 dB 10-3000 MHz
Output Power (1 dBc)	4 dBm
Noise Figure	6.5 dB 10-2000 MHz 7.5 dB 2000-3000 MHz
Third Order Intercept (TOI)	15 dBm typical
Harmonics (@ +4 dBm output power)	20 dBc typical
Input VSWR	1.5:1 10-1000 MHz 1.7:1 1000-2000 MHz 2.0:1 2000-2900 MHz 2.2:1 2900-3000 MHz
Output VSWR	2.0:1
Impedance	50 ohms nominal
Reverse Isolation	60 dB typical
Survival Input Power (max)	+13 dBm typical
Power Dissipation	1.2 W nominal
Temperature (operating) (storage)	0 to +55°C -40 to +70°C

Specifications describe the instrument's warranted performance over the temperature range 0°C to +55°C (unless otherwise noted). All specifications apply after the instrument's temperature has been stabilized after one hour continuous operation. Typical characteristics are intended to provide information useful in applying the instrument by giving typical but nonwarranted performance parameters. These are denoted as "typical" or "nominal" and apply over the temperature range 0°C to +55°C.

Caution: Electrostatic Discharge (ESD) can damage or destroy electronic components. It is recommended that this preamplifier, like other electronic components, be installed and operated at a static-free workstation or in an environment where precautions against ESD have been implemented.

## General specifications

Bias Voltage and Current	15 ±6% Vdc @ 80 mA nominal
Connectors	RF DC Type N(f) in, N(m) out Probe Power Connector (f)
Weight	net 270 g, shipping 510 g

## Environmental information

EMC	IEC 801-2/1991 IEC 801-4/1988 IEC 801-3/1984 CISPR-11/1990
Moisture Resistance	65°C at 95% RH for 10 days per Mil-Std-883C method 1004.5
Random Vibration	5.2 G (rms) to 2000 Hz per Mil-Std- 883C method 2026-11A
Shock	1500 G (peak), 0.5 ms per Mil-Std- 883C method 2002.3-B
Altitude, non-operating	15,000 meters per Mil-Std-883C method 1001-C .



## Ordering information

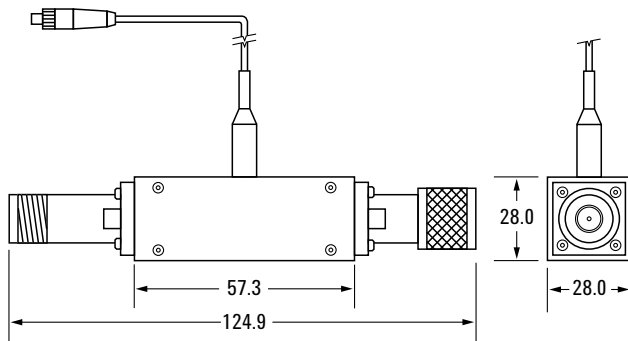
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1899A Probe Power Supply  
(must order one option)

Option 100	100 V operation
Option 120	120 V operation
Option 220	220 V operation
Option 240	240 V operation

## Related literature

	Pub. Number
<i>8590E Series Technical Data Sheet</i>	5091-3271E
<i>11899A Technical Data Sheet</i>	5091-0754E
<i>Noise Figure Measurement Accuracy</i> Application Note 57-2	5952-3706



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