OA 605

Low Noise Preamplifier Rev. 1.1

Shortform Datasheet

Features:

- **Low Noise Preamplifier**
- **For 200Ω…5kΩ Source Impedance Range**
- **Low 1/f Corner Frequency**
- **Low Quiescent Current**
- **High Speed**
- **No External Components Required**
- **Hermetically Sealed Metal Package (DIL-14)**

Applications:

Sonar, Instrumentation, Sensor Frontend

Production to MIL-Standards (MIL-PRF-38534 / MIL-STD 883C/D/E) available on request.

Circuit Description:

Low noise monolithic circuits generally have quite high current noise densities, rendering them unsuitable for source impedances (real value) of over 250Ω, not to mention impedances of 1kΩ or higher. Bias current of the input differential pair in a low noise amplifier has to be relatively high to reduce input noise voltage density. In the case of a bipolar input stage, this would cause the input bias current to rise beyond acceptable levels. Therefore designers often provided the input stage with current sources - which make the input current noise density even worse and may cause instabilities for higher source impedances.

This hybrid design shows none of the above mentioned drawbacks: Current noise density is low even with excellent voltage noise density, the amplifier has low input bias current and will not become unstable for high source impedances.

The circuit topology is internally differential, but with single ended input and output. There are generally no external components required to run the amplifier, supply bypass capacitors are integrated. However, if you intend to run the amplifier with high output load, additional bypass capacitors (tantalum) are recommended. The amplifier fits into DIL-14 sockets and features a hermetically closed (welded) metal package which provides RFI-protection and high reliability even under difficult environmental conditons.

The amplifier is recommended for ultrasonic signal conditioning, especially for transducer impedances in the 1kΩ range and frequencies up to 1.5MHz. By its outstanding DC input characteristics the amplifier also qualifies for low noise instrumentation or sensor applications.

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Absolute Maximum Ratings:

T_A=20°C unless otherwise noted, T_C=case temperature

Max. Supply Voltage	±18V
Max. Continuous Output Current	55mA
Max. Continuous Power Dissipation	800 mW
Max. Input Voltage Range	$V_{EE}+1V \leq V_{IN} \leq V_{CC}-1V$
Operating Temperature Range	-55°C…+125°C
Storage Temperature Range	-65°C…+150°C

Technical Data:

T_C=20°C, Operating Voltage V_B=±15V, Gain=100 if not stated otherwise. min/max with respect to absolute values. Negative signed current means current flowing from the hybrid.

Parameter	Test Conditions	min.	typ.	max.
Power Supply				
Supply Voltage		±5V	±15V	
Quiescent Current (user selectable)			10mA	15mA
Output				
Output Current		25mA	30mA	
Output Current (all load conditions)	continuous operation			20mA
Output Current	Short Circuit	40mA		
Output Swing	500Ω load	±13V		
Output Resistance	DC			1Ω
Output Resistance R Version	DC	49.5Ω	50Ω	50.5Ω
Input				
Input Current	V_{IN}=0V		±150nA	±250nA
Offset Voltage	V_{OUT}=0V		150µV	300µV
Input Noise Voltage Density	f=100kHz		1.2nV/√Hz	1.5nV/√Hz
Input Noise Current Density	1) f=100kHz		0.7pA/√Hz	0.9pA/√Hz
1/f Corner Frequency	1) Volt./Curr. N.			10Hz
AC Operation				
Gain Range		26dB		60dB
Gain Accuracy	f=100Hz			0.05dB
GBWP	R_L=100Ω		850MHz	1.2GHz
Slew Rate		80V/µs		

[1] Guaranteed by design, not measured in production test.

The gain has to be selected when placing the order with Quintenz Hybridtechnik. We can help you to optimize your system by choosing the proper bias current, trading noise power density versus speed or power consumption.
The amplifier is also available with 50Ω output resistance or decoupling capacitor at the input.

Please contact us for the latest preamplifier products or customer specific amplifiers!