Precision Instrumentation Amplifier In a Micro SOIC Package

Preliminary Technical Data — AD8221

FEATURES:

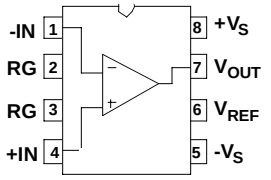
Excellent Noise Immunity:
EXCELLENT AC and DC PERFORMANCE
70dB Minimum CMRR DC to 10kHz (G=1 ARM)
80dB Minimum CMRR DC to 10kHz (G=1 BRM)

0.8 µV/°C Max Input Offset Drift (BRM)
10 ppm/°C Max Gain Drift (G=1 ARM)
7nV/√Hz RTI Input Noise

Supply Voltage Range:
Dual Supply ±2.3V to ±18V
Single Supply 4.6V to 36V

APPLICATIONS
Patient Monitor
Sensor Signal Conditioning
Bridge Transducer
Multiplexed Systems
4 to 20mA Converter

AD8221



CONNECTION DIAGRAM
8-Pin Plastic Micro SOIC: ARM, BRM Package

GENERAL DESCRIPTION

The AD8221 is a gain programmable, high performance instrumentation amplifier in a micro SOIC package. It provides the user with the highest CMRR over frequency available. This break through performance allows the user to reject common mode voltage noise out to 100 kHz. Moreover, the AD8221's small outline package saves valuable board space.

Errors in the user's system will be held to minimum with the high CMRR over frequency performance. Noise, as well as harmonics, encountered in aerospace applications, motors and repair equipment on factory floors, switching power supplies, and high frequency medical equipment will be rejected since the CMRR rejection is 100dB (G=10, BRM) minimum to 10kHz with great performance out to 100kHz.

The AD8221BRM also gives the user excellent DC performance by providing maximum offset and gain drift of 0.3µV/°C and 10 ppm/°C (G=1) respectively.

The AD8221 operates on both single and dual supplies. The device is specified for operation at a power supply voltage of ±15V and makes the AD8221 well suited for applications where input voltages of ±10Vare encountered.

The AD8221 is specified over the standard industrial temperature range, -40°C to +85°C.

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One Technology Way,P.O.Box 9106,Norwood,MA 02062-9106,U.S.A.
Tel:781/329-4700 www.analog.com
Fax:781/326-8703

AD8221–SPECIFICATIONS (T_A = 25C, V_S = ±15V and R_L = 10kΩ unless otherwise noted)

		AD8221 ARM			AD8221 BRM			
Parameter	Conditions	Min	Typ	Max	Min	Typ	Max	Units
GAIN	G = 1+ (49.9k/R_G)							
Gain Range		1		1000				V/V
Gain Error	V_O=±10V							
G = 1				0.10			0.10	%
G = 10				0.35			0.35	%
G = 100				0.35			0.35	%
G = 1000				0.35			0.35	%
Gain Nonlinearity	V_O=±10V							
G = 1 - 1000	R_L = 10kΩ		10	40		10	40	ppm
±Gain vs. Temperature								
G=1			3	10		3	10	ppm/°C
G>1				50			50	ppm/°C
VOLTAGE OFFSET	Total RTI Error = V_{OSI} + V_{OSO}/G							
Input Offset, V_{OSI}				500			150	µV
Average TC				2			0.8	µV/°C
Output Offset, V_{OSO}				1000			350	µV
Average TC				10			5	µV/°C
Offset Referred to the Input								
VS. Supply (PSR)								
G = 1		80	100		80	100		dB
G = 10		100	120		100	120		dB
G = 100		120	140		120	140		dB
G = 1000		120	140		120	140		dB
INPUT								
Input Operating Impedance								
Differential			100|| 2			100|| 2		GΩ|| pF
Common Mode			100|| 2			100|| 2		GΩ|| pF
Input Operating Voltage Range	V_S = ±3V to ±18V	-Vs +1.9		$+V_S$-1.4	$-V_s$+1.9		$+V_S$-1.4	V
Input Bias Current			0.5	2		0.5	2	nA
VS. Temperature			3			3		pA/°C
Input Offset Current			0.3	1		0.3	1	nA
VS. Temperature			1.5			1.5		pA/°C
Common Mode Rejection from								
60Hz								
with 1kΩ Source Imbalance	V_{CM} = 0V to ±10V							
G = 1		70			80			dB
G = 10		90			100			dB
G = 100		110			120			dB
G = 1000		120			130			dB
10kHz								
G = 1		70			80			dB
G = 10		90			100			dB
G = 100		110			120			dB
G = 1000		110			120			dB
OUTPUT								
Output Swing	R_L = 10kΩ	±13V						
	V_S = ±5V to ±18V	$-V_S$+1.2		V_S-1.4				V
DYNAMIC RESPONSE								
Small Signal -3dB Bandwidth								

G = 1			1000			1000		kHz
		AD8221 ARM			AD8221 BRM			
Parameter	Conditions	Min	Typ	Max	Min	Typ	Max	Units
G = 10			800			800		kHz
G = 100			120			120		kHz
G = 1000			12			12		kHz
Settling Time	10V Step							
G=1-100			15			15		µS
G=1000			150			150		µS
Slew Rate	G=1	1.7	2		1.7	2		V/µS
	G=5	2	2.5		2	2.5		
NOISE								
RTI, 0.01 Hz to 10 Hz								
G=1			2			2		µV p-p
G=10			0.4			0.4		µV p-p
G=100-1000			0.25			0.25		µV p-p
Voltage Noise, 1 kHz								
Input, Voltage Noise, e_{ni}			7	10		7	10	nV/√Hz
Output, Voltage Noise, e_{no}			50	75		50	75	nV/√Hz
POWER SUPPLY								
Operating Range		±2.3		±18	±2.3		±18	V
Quiescent Current	V_S = ±2.3V to ±18V		0.9	1		0.9	1	mA
TEMPERATURE RANGE								
For Specified Performance		-40		+85	-40		+85	°C