PRELIMINARY Data Sheet

CADEKA
Amplify the Human Experience

Comlinear® CLC1200
Instrumentation Amplifier

FEATURES
- ±2.3V to ±18V supply voltage range
- Gain range of 1 to 1,000
- Gain set with one external resistor
- ±125µV maximum input offset voltage
- 0.1µV/°C input offset drift
- 2.2mA maximum supply current
- 6.6nV/√Hz input voltage noise
- 70nV/√Hz output voltage noise
- 0.2µV$_{pp}$ noise (0.1Hz to 10Hz)
- Pb-free SOIC-8 or DIP-8

APPLICATIONS
- Bridge amplifier
- Scales
- Thermocouple amplifier
- ECG and medical instrumentation
- Transducer interface
- Data acquisition
- Strain gauge amplifier

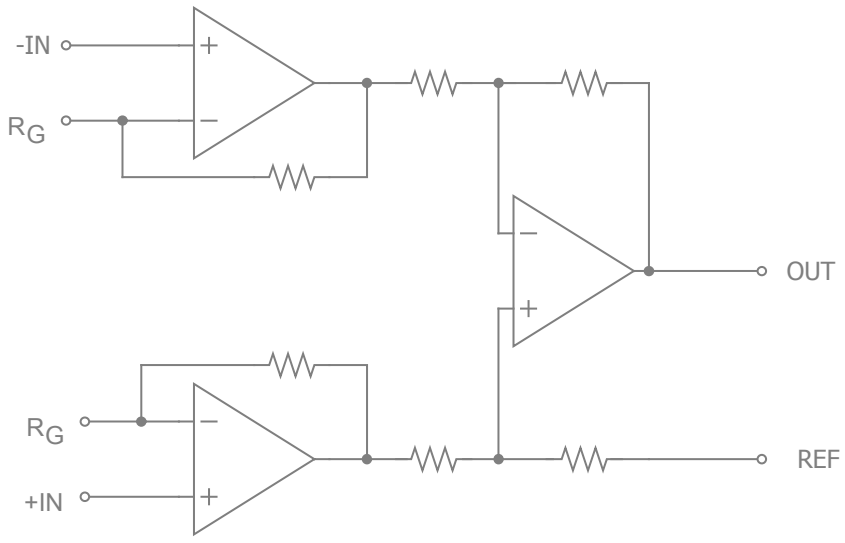
General Description

The CLC1200 is a low power, general purpose instrumentation amplifier with a gain range of 1 to 1,000. The CLC1200 is offered in 8-lead SOIC or DIP packages and requires only one external gain setting resistor making it smaller and easier to implement than discrete, 3-amp designs.

While consuming only 2.2mA of supply current, the CLC1200 offers a low 6.6nV/Hz input voltage noise and 0.2µV$_{pp}$ noise from 0.1Hz to 10Hz.

The CLC1200 offers a low input offset voltage of ±125µV that only varies 0.1µV/°C over it's operating temperature range of -40°C to +85°C. The CLC1200 also features 50ppm maximum nonlinearity. These features make it well suited for use in data aquisition systems.

Functional Block Diagram

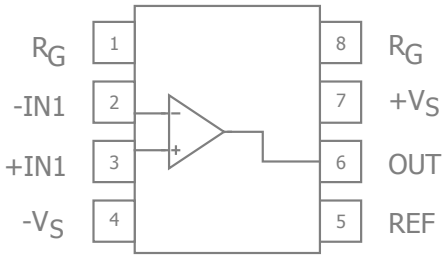


Ordering Information

Part Number	Package	Pb-Free	Operating Temperature Range	Packaging Method
CLC1200ISO8*	SOIC-8	Yes	-40°C to +85°C	Rail
CLC1200ISO8X*	SOIC-8	Yes	-40°C to +85°C	Reel
CLC1200IDP8*	DIP-8	Yes	-40°C to +85°C	Rail

*Preliminary information.
Moisture sensitivity level for all parts is MSL-1.

Pin Configuration



Pin Assignments

Pin No.	Pin Name	Description
1, 8	R_G	R_G sets gain
2	-IN	Negative input
3	+IN	Positive input
4	$-V_S$	Negative supply
5	REF	Output is referred to the REF pin potential
6	OUT	Output
7	$+V_S$	Positive supply

Absolute Maximum Ratings

The safety of the device is not guaranteed when it is operated above the "Absolute Maximum Ratings". The device should not be operated at these "absolute" limits. Adhere to the "Recommended Operating Conditions" for proper device function. The information contained in the Electrical Characteristics tables and Typical Performance plots reflect the operating conditions noted on the tables and plots.

Parameter	Min	Max	Unit
Supply Voltage	0	±18	V
Input Voltage Range	$-V_S$	$+V_S$	V
Differential Input Voltage, G = 1 to 10		25	V
Differential Input Voltage, G > 10		≤ 0.05 (R_G + 800) + 1	V
Load Resistance	0.001		kΩ
Output Short Circuit Current	TBD	TBD	mA

Reliability Information

Parameter	Min	Typ	Max	Unit
Junction Temperature			150	°C
Storage Temperature Range	-65		150	°C
Lead Temperature (Soldering, 10s)			260	°C
Package Thermal Resistance				
8-Lead SOIC		100		°C/W
8-Lead DIP		TBD		°C/W

Notes:
Package thermal resistance (θ_{JA}), JDEC standard, multi-layer test boards, still air.

ESD Protection

Product	SOIC-8	DIP-8
Human Body Model (HBM)	TBD	TBD
Charged Device Model (CDM)	TBD	TBD

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature Range	-40		+85	°C
Supply Voltage Range	±2.3		±18	V

Electrical Characteristics

T_A = 25°C, V_S = ±15V, R_L = TBDkΩ to GND; unless otherwise noted.

G = 1 + (49.9kΩ / R_G); Total RTI Error = V_{OSI} + (V_{OSO} / G)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Gain						
	Gain Range		1		1,000	
	Gain Error	G = 1, V_{OUT} = ±10V	-0.1		0.1	%
		G = 10, V_{OUT} = ±10V	-0.375		0.375	%
		G = 100, V_{OUT} = ±10V	-0.375		0.375	%
		G = 1,000, V_{OUT} = ±10V	-0.8		0.8	%
	Nonlinearity	G = 1 - 100, V_{OUT} = -10V to 10V, R_L = 10kΩ		10	50	ppm
		G = 1 - 100, V_{OUT} = -10V to 10V, R_L = 2kΩ		10	95	ppm
	Gain vs. Temperature	G = 1		TBD		ppm/°C
		G > 1		TBD		ppm/°C
	Reference Gain Error(2)	V_S = ±16.5	-0.03		0.03	%
Voltage Offset						
V_{OSI}	Input Offset Voltage	V_S = ±4.5 to ±16.5	-125		125	µV
		V_S = ±4.5 to ±16.5, -45°C to +85°C	-225		225	µV
	Average Temperature Coefficient	V_S = ±4.5 to ±16.5		0.1		µV/°C
V_{OSO}	Output Offset Voltage	V_S = ±4.5 to ±16.5, G = 1	-1500	200	1500	µV
		V_S = ±4.5 to ±16.5, -45°C to +85°C	-2000		2000	µV
	Average Temperature Coefficient	V_S = ±4.5 to ±16.5		2.5		µV/°C
PSR	Offset Referred to the Input vs. Supply	G = 1, V_S = ±2.3 to ±18V	80	100		dB
		G = 10, V_S = ±2.3 to ±18V	95	120		dB
		G = 100, V_S = ±2.3 to ±18V	110	140		dB
		G = 1,000, V_S = ±2.3 to ±18V	110	140		dB
Input Current						
I_B	Input Bias Current	V_S = ±16.5	-2	0.5	2	nA
		V_S = ±16.5, -45°C to +85°C	-5		5	nA
	Average Temperature Coefficient	V_S = ±16.5		3		pA/°C
I_{OS}	Input Offset Current	V_S = ±16.5	-1		1	nA
		V_S = ±16.5, -45°C to +85°C	-2		2	nA
Input						
	Input Impedabce	Differential		10, 2		GΩ, pF
		Common-Mode		10, 2		GΩ, pF
	Input Voltage Range(3)	V_S = ±4.5, G = 1	$-V_S$ +1.9		$+V_S$ -1.2	V
		V_S = ±16.5, G = 1	$-V_S$ +1.9		$+V_S$ -1.4	V
CMRR	Common Mode Rejection Ratio	G = 1, V_S = ±16.5V	70	90		dB
		G = 10, V_S = ±16.5V	90	110		dB
		G = 100, V_S = ±16.5V	108	130		dB
		G = 1,000, V_S = ±16.5V	108	130		dB
Output						
V_{OUT}	Output Swing	V_S = ±2.3V to ±4.5V	$-V_S$ +1.1		$+V_S$ -1.2	V
		V_S = ±4.5, -45°C to +85°C	$-V_S$ +1.6		$+V_S$ -1.3	V
		V_S = ±18, G = 1	$-V_S$ +1.4		$+V_S$ -1.2	V
		V_S = ±16.5, G = 1,-45°C to +85°C	$-V_S$ +1.5		$+V_S$ -2.3	V
I_{SC}	Short Circuit Current			±20		mA

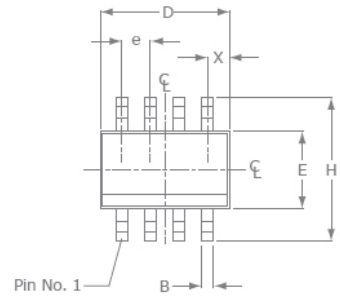
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Dynamic Performance						
BW_{-3dB}	Small Signal Bandwidth	G = 1		700		kHz
		G = 10		TBD		kHz
		G = 100		TBD		kHz
		G = 1,000		TBD		kHz
SR	Slew Rate	G = 10, V_S = ±15V	0.6	1.2		V/µs
t_S	Settling Time to 0.01%	G = 1 to 100, 10V step		TBD		µs
		G = 1,000, 10V step		TBD		µs
e_{ni}	Input Voltage Noise	1kHz, G = 1,000, V_S = ±15V		6.6	13	nV/√Hz
e_{no}	Output Voltage Noise	1kHz, G = 1, V_S = ±15V		70	100	nV/√Hz
RTI	RTI, 0.1Hz to 10Hz	G = 1		TBD		μV_{pp}
		G = 10, V_S = ±15V			0.8	μV_{pp}
		G = 100, V_S = ±15V		0.2	0.4	μV_{pp}
	Current Noise	f = 1kHz		TBD		fA/√Hz
		0.1Hz to 10Hz		TBD		pA_{pp}
Reference Input						
R_{IN}	Input Impedance			20		kΩ
I_{IN}	Input Current	V_S = ±16.5V		50	60	µA
	Voltage Range	V_S = ±15V	$-V_S$ +1.6		$+V_S$ -1.6	V
	Gain to Output		1 ± 0.0001			
Power Supply						
V_S	Operating Range		±2.3		±18	V
I_S	Supply Current	V_S = ±16.5V		1.3	2.2	mA
		V_S = ±15V, -40°C to +85°C			2.5	mA

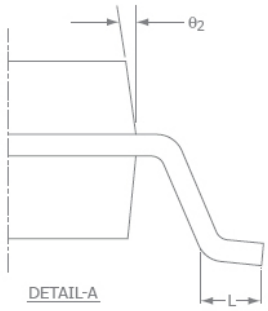
Notes:

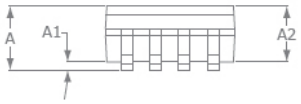
1. 100% tested at 25°C
2. Nominal reference voltage gain is 1.0
3. Input voltage range = CMV + (G V_{DIFF})/2

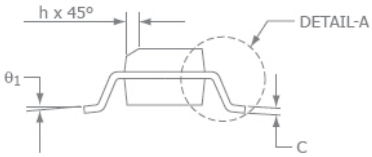
Mechanical Dimensions

SOIC-8 Package









SOIC-8		
SYMBOL	MIN	MAX
A1	0.10	0.25
B	0.36	0.48
C	0.19	0.25
D	4.80	4.98
E	3.81	3.99
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.5
L	0.41	1.27
A	1.37	1.73
θ_1	0°	8°
X	0.55 ref	
θ_2	7° BSC	

NOTE:

1. All dimensions are in millimeters.
2. Lead coplanarity should be 0 to 0.1mm (0.004") max.
3. Package surface finishing: VDI 24~27
4. All dimension excluding mold flashes.
5. The lead width, B to be determined at 0.1905mm from the lead tip.

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