Precision, Dual-Channel Difference Amplifier

Preliminary Technical Data

AD8270

FEATURES

With no external resistors:
- **Difference Amplifier: Gains: 0.5, 1, 2**
- **Inverting Amplifier: Gains: 0.5, 1, 2**
- **Noninverting Amplifier: Gains: 1.5, 2, 3**
- **Set reference voltage at 0, +Vs/2, or +Vs**

Excellent AC Specifications
- **10 MHz bandwidth**
- **30V/µs slew rate**

Low Distortion
- **-90 dBc @ 100 kHz, 20Vpp, 600 Ω load**

High Accuracy DC Performance
- **0.05% gain accuracy**
- **10 ppm gain drift**
- **400 uV offset voltage**
- **80 dB CMRR**

Two channels in small 4 mm × 4 mm LFCSP
Supply current: 2.5 mA per channel
Supply range: ±2.5 V to ±18 V

APPLICATIONS

Instrumentation Amplifier Building Block
Level Translator
Automatic Test Equipment
High Performance Audio
Sin/Cos Encoders

FUNCTIONAL BLOCK DIAGRAM

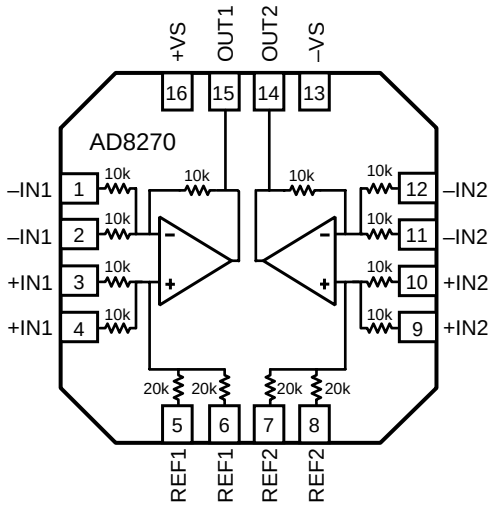

Figure 1. AD8270 Dual Difference Amplifier

Table 1. Difference Amplifiers by Category

Low Distortion	High Voltage	Single Supply Uni-directional	Single Supply Bi-directional
AD8270	AD628	AD8202	AD8205
AD8273	AD629	AD8203	AD8206
AMP03	AD8212		AD8210

GENERAL DESCRIPTION

The AD8270 is a low distortion, dual-channel amplifier with internal gain setting resistors. With no external components, it can be configured as a high performance difference amplifier (G=0.5, 1, or 2), inverting amplifier (G=0.5, 1, or 2) or non-inverting amplifier (G=1.5, 2, or 3).

The AD8270 is the first dual difference amplifier in the small 4 mm × 4mm LFCSP. It requires the same board area as a typical single difference amplifier. The smaller package allows a 2X increase in channel density and a lower cost per channel, all with no compromise in performance.

The AD8270 operates on both single and dual supplies and only requires 2.5 mA maximum supply current for both amplifiers. It is specified over the industrial temperature range of –40°C to +85°C and is fully RoHS compliant.

Rev. PrA

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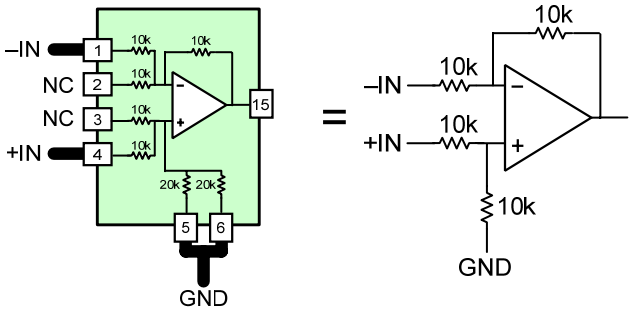
SPECIFICATIONS

V_S = ±15 V, V_{REF} = 0 V, T_A = 25°C, G = 1, R_L = 2 kΩ, unless otherwise noted.

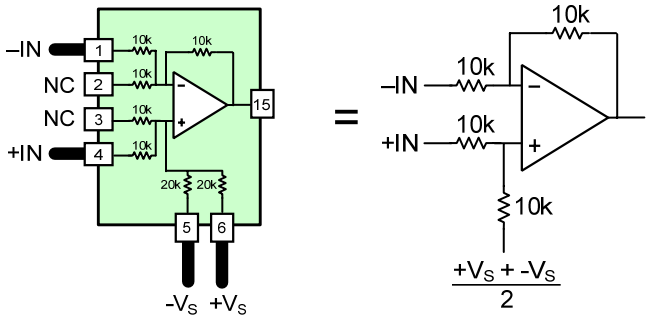
Table 2.

		G = 1/2			G = 1			G = 2			
Parameter	**Conditions**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
DYNAMIC PERFORMANCE											
Bandwidth			15			10			5		MHz
Slew Rate			30			30			30		V/µs
Settling Time to 0.01%	10V Step on output		700			800			850		ns
Settling Time to 0.001%	10V Step on output		800			900			950		ns
NOISE/DISTORTION											
Harmonic Distortion	f = 1 kHz, V_{OUT}= 20 Vpp		100			100			100		dBc
	f = 10 kHz, V_{OUT}= 20 Vpp		100			100			100		dBc
	f = 100 kHz, V_{OUT}= 20 Vpp		90			90			90		dBc
Output Voltage Noise (referred to input)	f = 0.1 Hz to 10 Hz										µV p-p
	f = 1 kHz		45			30			16		nV/√Hz
GAIN											
Gain Error				0.05			0.05			0.05	%
Gain Drift			1	10		1	10		1	10	ppm/°C
Gain Nonlinearity			10	40		10	40		10	40	ppm
INPUT CHARACTERISTICS											
Offset			100	400		100	400		100	400	µV
Overtemperature											µV
Drift			2	8		2	8		2	8	µV/°C
Common Mode Rejection Ratio	DC to 10 kHz	74	94		80	100		86	106		dB
Power Supply Rejection Ratio	DC to 10 kHz										dB
Input Voltage Range		-15.4		15.4	-15.4		15.4	-15.4		15.4	V
Impedance											
Differential			20			20			10		kΩ
Common Mode			7.5			10			7.5		kΩ
OUTPUT CHARACTERISTICS											
Output Swing		-13.5			-13.5			-13.5			V
	-40°C<T_A<85°C	-13			-13			-13			V
Short circuit current limit			60			60			60		mA
POWER SUPPLY											
Supply Current (per Amplifier)			2.5	3		2.5	3		2.5	3	mA
	-40°C<T_A<85°C		3	4		3	4		3	4	mA

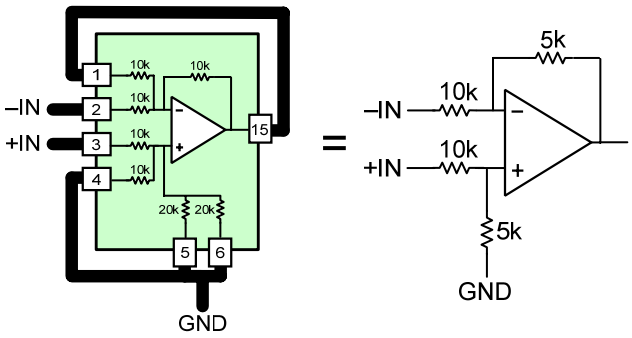
GAIN = 1
referenced to ground



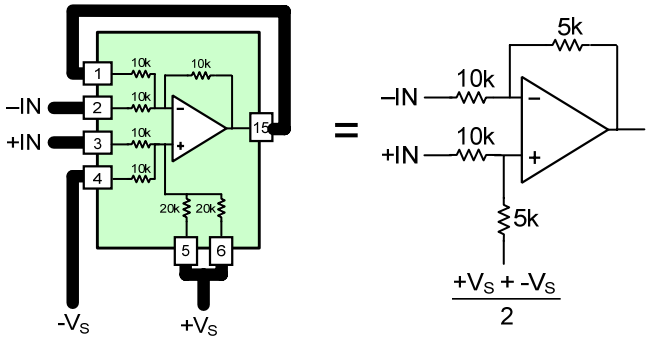
GAIN = 1
referenced to mid-supply



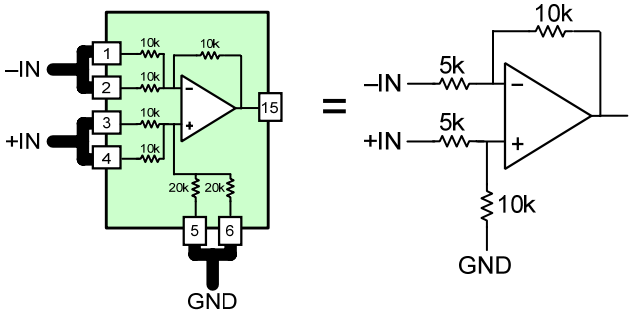
GAIN = 1/2
referenced to ground



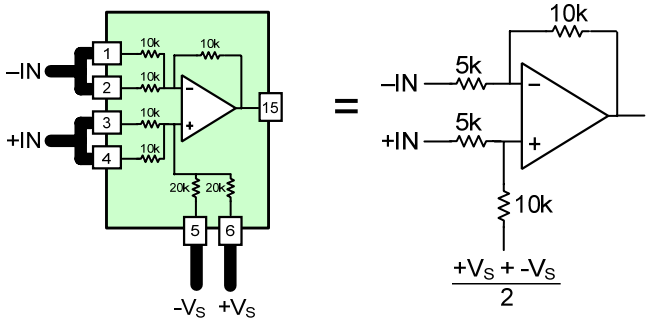
GAIN = 1/2
referenced to mid-supply



GAIN = 2
referenced to ground



GAIN = 2
referenced to mid-supply



OUTLINE DIMENSIONS

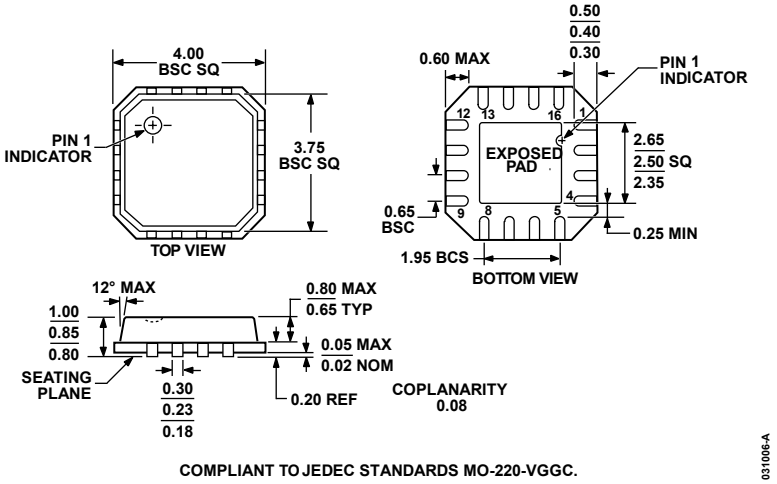


Figure 2. 16-Lead Lead Frame Chip Scale Package [LFCSP_VQ]
4 mm × 4 mm Body, Very Thin Quad
(CP-16-13)
Dimensions are shown in millimeters

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