

### FEATURES

#### Two gain settings:

Gain of 1/2 (–6 dB)

Gain of 2 (6 dB)

0.03% max gain accuracy

10 ppm max gain drift

#### Excellent AC Specifications

25V/μs slew rate

0.9 μs to 0.01% settling time

#### Low Distortion

0.003% at 1 kHz

#### High Accuracy DC Performance

90 dB typ CMRR

250 μV max offset voltage

#### 14 lead SOIC Package

Supply current: 2.5 mA per channel

Supply range: ±2.5 V to ±18 V

### APPLICATIONS

High Performance Audio

Instrumentation Amplifier Building Block

Level Translator

Automatic Test Equipment

Sin/Cos Encoders

### FUNCTIONAL BLOCK DIAGRAM

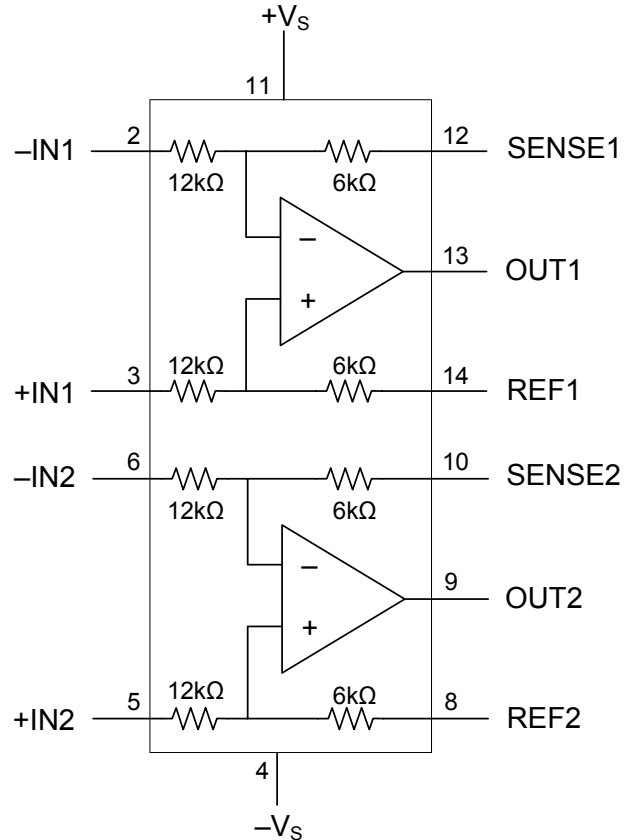


Figure 1. AD8273 Dual Difference Amplifier

### GENERAL DESCRIPTION

The AD8273 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 ( $G=0.5$  or  $2$ ), inverting amplifier ( $G=0.5$  or  $2$ ) or non-inverting amplifier ( $G=1.5$  or  $3$ ).

The AD8273 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  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  and is fully RoHS compliant.

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

#### Rev. PrA

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## SPECIFICATIONS

$V_S = \pm 18\text{ V}$ ,  $V_{REF} = 0\text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $G = 1/2$ ,  $R_L = 2\text{ k}\Omega$ , unless otherwise noted.

Table 2.

Parameter	Conditions	Min	Typ	Max	Unit
<b>DYNAMIC PERFORMANCE</b>					
Bandwidth			12		MHz
Slew Rate			25		V/ $\mu\text{s}$
Settling Time to 0.1%	10V Step on output, $C_L=100\text{ pF}$		0.7		$\mu\text{s}$
Settling Time to 0.01%	10V Step on output, $C_L=100\text{ pF}$		0.9		$\mu\text{s}$
Channel Separation	$f = 1\text{ kHz}$		130		dB
<b>NOISE/DISTORTION<sup>1</sup></b>					
THD + Noise	$f = 1\text{ kHz}$ , $V_{IN} = 10\text{ Vrms}$		0.003		%
Noise Floor, RTO	20 kHz BW		-120		dBu <sup>2</sup>
Output Voltage Noise (referred to input)	$f = 20\text{ Hz to } 20\text{ kHz}$		3		$\mu\text{Vrms}$
	$f = 1\text{ kHz}$		20		nV/ $\sqrt{\text{Hz}}$
<b>GAIN</b>					
Gain Error				0.03	%
Gain Drift			1	10	ppm/ $^\circ\text{C}$
Gain Nonlinearity			10		ppm
<b>INPUT CHARACTERISTICS</b>					
Offset <sup>3</sup>			200	400	$\mu\text{V}$
vs. Temperature			2		$\mu\text{V}/^\circ\text{C}$
vs. Power Supply			5	20	$\mu\text{V}/\text{V}$
Common Mode Rejection Ratio	$V_{CM} = \pm 18\text{ V}$ , $R_S = 0\Omega$ , referred to input	77	86		dB
Input Voltage Range		$-V_S - 0.5$		$+V_S + 0.5$	V
Impedance					
Differential			24		k $\Omega$
Common Mode <sup>4</sup>			9		k $\Omega$
<b>OUTPUT CHARACTERISTICS</b>					
Output Swing		$-V_S + 1.5$		$+V_S - 1.5$	V
Short circuit current limit			60		mA
Capacitive Load Drive			100		pF
<b>POWER SUPPLY</b>					
Supply Current (per Amplifier)				2.5	mA
<b>TEMPERATURE RANGE</b>					
Specified Performance		-40		85	

<sup>1</sup> Includes amplifier voltage noise, resistor network voltage noise, and amplifier current noise through resistor network

<sup>2</sup> dBu =  $20\log(V_{rms}/0.7746)$

<sup>3</sup> Includes effects of amplifier's input bias and offset currents

<sup>4</sup> Calculated looking into both inputs. Common mode impedance looking into only one input is 18 k $\Omega$

## ABSOLUTE MAXIMUM RATINGS

Table 3.

Parameter	Rating
Supply Voltage	TBD
Output Short-Circuit Current	Indefinite
Input Voltage (Common Mode)	TBD
Differential Input Voltage	TBD
Storage Temperature Range	−65°C to +130°C
Specified Temperature Range	−40°C to +85°C
Thermal Resistance $\theta_{JA}$	120 °C/W
Thermal Resistance $\theta_{JC}$	36 °C/W
Package Glass Transition Temperature ( $T_G$ )	130°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions may affect device reliability.

### Maximum Power Dissipation

The maximum safe power dissipation for the AD8273 is limited by the associated rise in junction temperature ( $T_j$ ) on the die. At approximately 130°C, which is the glass transition temperature, the plastic changes its properties. Even temporarily exceeding this temperature limit may change the stresses that the package exerts on the die, permanently shifting the parametric performance of the amplifiers. Exceeding a temperature of 130°C for an extended period can result in a loss of functionality.

### ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

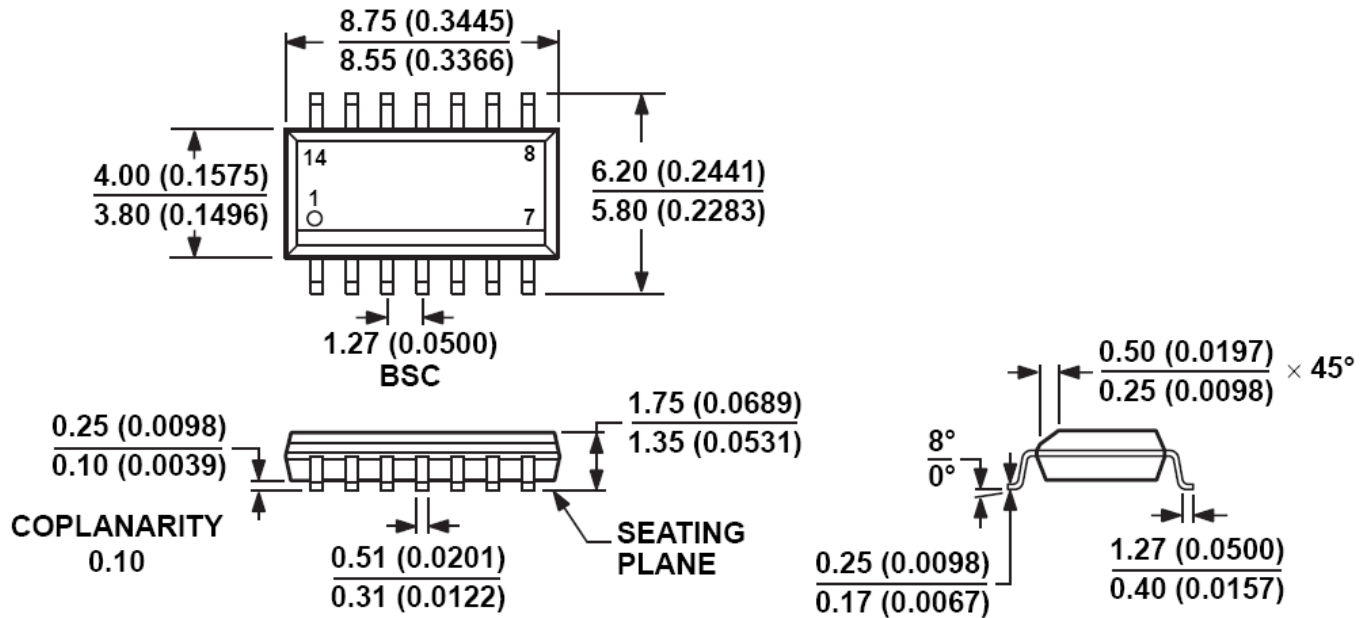


OUTLINE DIMENSIONS



14-Lead Standard Small Outline Package [SOIC\_N]  
Narrow Body  
(R-14)

Dimensions shown in millimeters and (inches)



COMPLIANT TO JEDEC STANDARDS MS-012-AB

Figure 2. 14 Lead Narrow Body SOIC package