



Single Supply 42V System Difference Amplifier

Preliminary Data Sheet

AD8205

FEATURES:

High Common Mode Input Voltage Range

- -2V to 65V operation
- -5V to 70V survival

Operating Temperature Range:

- Die: -40°C to 150°C
- 8 Pin SOIC: -40°C to 125°C

Adjustable Offset

Gain = 50

EXCELLENT AC and DC PERFORMANCE

- 20 $\mu\text{V}/^\circ\text{C}$ Offset Drift
- 20ppm/ $^\circ\text{C}$ Gain Drift
- 80dB CMRR Min DC to 10kHz

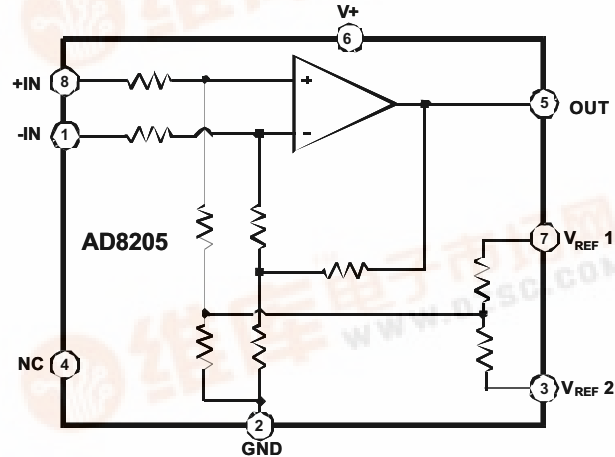
APPLICATIONS

- High Side Current Sensing
- Motor Control
- Transmission Control
- Diesel Injection Control
- Engine Management
- Suspension Control
- Vehicle Dynamic Control
- 42V DC/DC Converter Current Sensing

GENERAL DESCRIPTION

The AD8205 is a single supply difference amplifier for amplifying voltages in the presence of a large common mode voltage. The input CMV range extends from -2V to 65V at a typical supply voltage of 5V.

The AD8205 is offered in die and packaged form. The operating temperature range for the die is 25°C higher (up to 150°C) than that of the packaged part to enable the user to apply the AD8205 in high temperature applications.



CONNECTION DIAGRAM
Available in SOIC and Die form

Excellent DC performance over temperature keeps errors in the measurement loop to a minimum. Offset drift is less than 20 $\mu\text{V}/^\circ\text{C}$, and Gain Drift is below 30ppm/ $^\circ\text{C}$ up to 125°C.

The offset can be adjusted from 0.05V to 4.8V using the Vref 1 and Vref 2 pins. With Vref 1 attached to the V+ pin, and Vref 2 attached to the GND pin, the output will be at half scale. Attaching both pins to GND will cause the output to be unipolar, starting near ground. Attaching both pins to V+ will cause the output to be unipolar starting near V+. Other offsets can be obtained by applying an external voltage to the Vref 1 and Vref 2 pins.

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AD8205 - SPECIFICATIONS ($T_A = 25^\circ\text{C}$, $V_S = +5\text{V}$, $V_{CM} = 12\text{V}$ unless otherwise noted)

Parameter	Conditions	AD8205 SOIC			AD8205 DIE			Units
		Min	Typ	Max	Min	Typ	Max	
GAIN								
Initial Accuracy	$V_O \geq 0.1\text{V DC}$		50			50		%
Accuracy Over Temperature Gain vs. Temperature	Specified Temperature Range			± 1			± 1	%
			± 20	± 1.2		± 30	± 1.3	ppm/ $^\circ\text{C}$
VOLTAGE OFFSET								
Offset Voltage (RTI)	25°C			± 2			± 2.5	mV
Over Temperature (RTI) Offset Drift	Specified Temperature Range			± 4.5			± 6	mV
			$20\mu\text{V}/^\circ\text{C}$			$30\mu\text{V}/^\circ\text{C}$		
INPUT								
Input Impedance Differential			400			400		k Ω
Common Mode			200			200		k Ω
Input Voltage Range Common Mode	Common-Mode, Continuous	-2		65	-2		65	V
Input Voltage Range Differential ¹			100			100		mV
Common Mode Rejection Ratio	$f = 1\text{kHz}$	80			80			dB
Common Mode Rejection Ratio	$F = 10\text{kHz}^2$	80			80			dB
OUTPUT								
Output Voltage Range		0.05		4.8	0.05		4.8	V
Output Resistance			2			2		Ω
DYNAMIC RESPONSE								
Small Signal -3dB Bandwidth			50			50		kHz
Slew Rate			0.5			0.5		V/ μS
NOISE								
0.1Hz to 10Hz, RTI			20			20		μV , p-p
Spectral Density, 1kHz, , RTI			0.5			0.5		$\mu\text{V}/\sqrt{\text{Hz}}$
OFFSET ADJUSTMENT								
Ratiometric Accuracy ³	Divider to supplies	0.497		0.503	0.497		0.503	V/V
Accuracy, RTO	Voltage applied to Vref1 and Vref2 in parallel			± 1			± 1	mV
Offset Adjustment Range		0.05		4.8	0.05		4.8	V
V ref Divider resistor values		30		34	30		34	k Ω
POWER SUPPLY								
Operating Range		4.5		5.5	4.7		5.5	V
Quiescent Current Over Temp	$V_O = 0.1\text{V DC}$			1.5			1.5	mA
Power Supply Rejection Ratio		70			70			dB
TEMPERATURE RANGE								
For Specified Performance		-40		+125	-40		+150	$^\circ\text{C}$

¹Input voltage range = $\pm 50\text{mV}$ with half scale offset.

²Source Imbalance < 2Ω

³The offset adjustment is ratiometric to the power supply when Vref1, and Vref2 are used as a divider between the supplies.

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Absolute Maximum Ratings

Supply Voltage	12.5V
.....	
Continuous Input Voltage.....	65V
Transient Input Voltage	TBD
.....	
Reverse Supply Voltage	0.3V
.....	
Operating Temperature	-40°C to 125°C
Storage Temperature	-65°C to 150°C
Output Short Circuit Duration	Indefinite

OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

8-Lead SOIC Package (SO-8)

