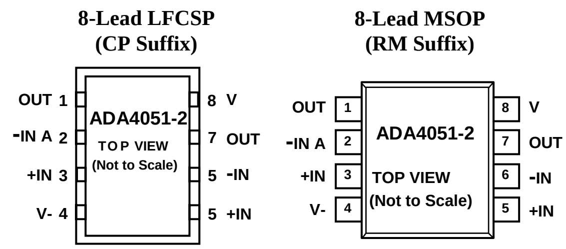
1.8V, µPower, Auto-Zero, Rail-toRail I/O Amplifier

Preliminary ADA4051-2

PIN CONFIGURATIONS



FEATURES

Very Low Supply Current: 15 µA/amp (Max)
10µV Offset Voltage (Max)
50nV/ºC Voltage Offset Drift (Max)
1.8V to 5.5V Single Supply Operation
Rail-to-Rail Input and Output
High PSRR and CMRR: 106 dB min

APPLICATIONS

Pressure and Position Sensors
Temperature Measurements
Electronic Scales
Medical Instrumentation
Battery Powered Equipment
Handheld Test Equipment

GENERAL DESCRIPTION

The ADA4051-2 is a dual CMOS high precision operational amplifier featuring rail-to-rail input and output swings, micro-power, and extremely low offset voltage while operating from a 1.8 V to 5.5 V single power supply.

Employing a new circuit technology, these low cost amplifiers offer high PSRR and CMRR, while operating with a supply current of 15 µA per amplifier maximum.

This combination of features makes the ADA4051 amplifier an ideal choice for battery powered applications where it is important to minimize power consumption and the need for high precision op amps.

The ADA4051-2 is specified for the extended industrial (-40° to +125°C) temperature range, but it is operational from -40° to +150°C. ADA4051-2 dual amplifier is available in the standard 8-pin MSOP and 8-pin LFCSP packages.

PrelimRev PrB

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ELECTRICAL CHARACTERISTICS

(@ V_S = +1.8V to +5V, V_{CM} = V_S/2, T_A =+25°C, R_L = 10kΩ to V_S/2, V_{OUT} = V_S/2, unless otherwise specified.**)**

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	0v < V_{CM} < 5V		2	10	μV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	-40°< T_A < +125°C		0.02	0.05	μV/°C
Input Bias Current	I_B			±70	±200	pA
		-40°< T_A < +125°C		±150		pA
Input Offset Current	I_{OS}			±140	±400	pA
Input Common Mode Voltage Range	V_{CM}		(V-) – 0.1		(V+) + 0.1	V
Common-Mode Rejection Ratio	CMRR	(V-) – 0.1V < V_{CM} < (V+) +0.1V	106	130		dB
		-40°< T_A < +125°C				
Channel Separation		DC		0.1		μV/V
Open Loop Voltage Gain	A_{OL}	(V-) – 0.1V < V_{CM} < (V+) +0.1V	106	130		dB
Input Capacitance		Differential		2		pF
		Common Mode		4		pF
OUTPUT CHARACTERISTICS						
Output Voltage Swing from Rail		R_L = 10 kΩ to V_S/2		30	50	mV
		-40°< T_A < +125°C			70	mV
Short Circuit Limit	I_{SC}			±25		mA
Open Loop Output Impedance		f = 350kHz, I_O = 0		2		kΩ
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 1.8V to 5.5V	106	120		dB
		-40°C to +125°C				
Supply Current/Amplifier	I_{SY}	V_O = V_S /2, I_O = 0		12	15	μA
		-40°< T_A < +125°C			20	μA
Supply Voltage	V_{SY}		1.8		5.5	V
Turn-On Time	t_{ON}	V_S = 5V		100		μs
DYNAMIC PERFORMANCE						
Slew Rate	SR+	G = +1		0.035		V/μs
	SR-			0.03		V/μs
Gain Bandwidth Product	GBP	C_L = 100pF		100		kHz
NOISE PERFORMANCE						
Input Voltage Noise	$e_{n\ p\text{-}p}$	f = 0.01Hz to 1Hz		TBD		μV p-p
		f = 0.1Hz to 10Hz		1.9		μV p-p
Voltage Noise Density	e_n	f=10Hz		95		nV/√Hz
Current Noise Density	i_n	f=10Hz		100		fA/√Hz
TEMPERATURE RANGE						
Specified Range	T_S		-40		+125	°C
Operating Range	T_A		-40		+150	°C

ABSOLUTE MAXIMUM RATINGS[1]

Supply voltage .... +6V
Input Voltage .... ±Vs
Differential Input Voltage[1] .... ±Vs
Output Short-Circuit Duration to Gnd .... Indefinite
Storage Temperature Range
KS, RJ, CP, RM Packages .... -65°C to +150°C
Operating Temperature Range
ADA405-1/2 .... -40°C to +125°C
Junction Temperature Range
KS, RJ, CP, RM Packages .... -65°C to +150°C
Lead Temperature Range (Soldering, 60 Sec) .... +260°C

Package Type	θ_{JA}[2]	θ_{JC}	Units
8-Pin MSOP (RM)	TBD	TBD	°C/W
8-bump LFCSP (CP)	TBD	TBD	°C/W

NOTES
[1] Differential input voltage is limited to 5V or the supply voltage whichever is less.
[2] θ_{JA} is specified for the worst case conditions, i.e., θ_{JA} is specified for device soldered in circuit board for surface mount packages.

ORDERING GUIDE

Model	Temperature Range	Package Description	Package Option
ADA4051-2ARMZ	-40°C to +125°C	8-Pin MSOP	RM-8
ADA4051-2ACPZ	-40°C to +125°C	8-Pin LFCSP	CP-8

ESD Caution

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulates 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.

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