

PRELIMINARY TECHNICAL DATA



Low-power High-Speed Rail-to-Rail Input/Output Op-Amp

Preliminary Technical Data

AD8029/AD8030/AD8040

CONNECTION DIAGRAMS
(TOP VIEW)

FEATURES

Low Power

1.3mA supply current

Rail-to-rail Input

Rail-to-rail Output

High Speed

125MHz, -3 dB Bandwidth (G = +1)

60V/μs Slew Rate

45ns Settling Time to 0.1%

Low Cost

Low Noise

11nV/rt Hz

1pA/rt Hz

Wide Supply Range

2.7V to +12V

Small Packaging

SOIC-8, SC70, SOT23-8, TSSOP14

APPLICATIONS

Battery Powered Instrumentation

Filters

A-to-D Driver

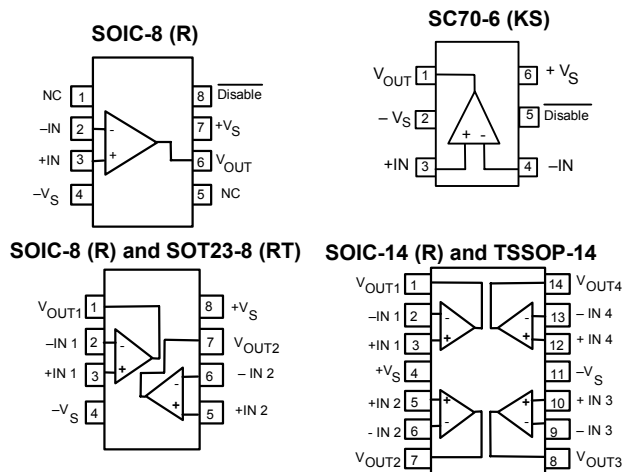
Level Shifting

Buffering

High-density PC Boards

PRODUCT DESCRIPTION

The AD8029/30/40 are low cost, high-speed amplifiers with quiescent current of 1.5mA max. With rail-to-rail input and output the AD8029/30/40 are ideal for low-power, low-voltage high-speed applications. ADI's proprietary XFCB process also allows for low noise operation (11nV/√Hz and 1pA/√Hz) with very low quiescent current. The AD8029 is a single, the AD8030 is a dual and the AD8040 is a quad amplifier.



Despite their low power consumption, the AD8029/30/40 amplifiers provide excellent overall performance. With wide supply voltage range (2.7V to 12V) and wide bandwidth (125MHz), the AD8029/30/40 amplifiers are designed to work in a variety of applications where power and space are at a premium. They offer high slew rate of 60V/μs and low input offset voltage of 6mV max.

The AD8029/30/40 amps have a wide input and output common mode range and will swing within 100mV of either rail.

The AD8029/30/40 amps are the only low-power high-speed amps available in tiny packages, SC70 for the single SOT23-8 for the dual and TSSOP14 for the quad. They are rated to work over the industrial temperature range, -40C to +85C.

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One Technology Way, P.O.Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 781/329-4700
Fax: 781/326-8703

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SPECIFICATIONS (@T_A = +25°C, V_S = +/-5V, R_L = 1kΩ, C_L = 5pF, Gain = +1, unless otherwise noted)

Parameter	Conditions	AD8029/30/40			Units
		Min	Typ	Max	
DYNAMIC PERFORMANCE					
-3 dB Bandwidth	V _O = 0.1Vp-p		125		MHz
	V _O = 2Vp-p		10		MHz
Bandwidth for 0.1 dB Flatness	V _O = 0.2Vp-p,		20		MHz
Slew Rate	G = +2, V _O = 2V Step, R _L = 1kΩ		60		V/μs
Settling Time to 0.1%	G = +2, V _O = 2V Step		45		ns
NOISE/HARMONIC PERFORMANCE					
SFDR	f _C = 100kHz, V _O = 2V p-p		-79		dBc
	f _C = 1 MHz, V _O = 2V p-p		-73		dBc
Crosstalk, Output to Output (Dual Only)	f = 5 MHz, G = +2		-60		dB
Input Voltage Noise	f = 100 kHz		11		nV/√Hz
Input Current Noise	f = 100 kHz		1		pA/√Hz
Differential Gain Error	NTSC, R _L = 1kΩ		0.1		%
Differential Phase Error	NTSC, R _L = 1kΩ		0.1		Degree
DC PERFORMANCE					
Input Offset Voltage			1.5	6	mV
	T _{min} - T _{max}				mV
Input Offset Voltage Drift			4		μV/°C
Input Bias Current			1		uA
	T _{min} - T _{max}		1.5		uA
Input Offset Current			0.1		uA
Open Loop Gain	V _O = ±4 V		76		dB
INPUT CHARACTERISTICS					
Input Resistance			23		MΩ
Input Capacitance			1		pF
Input Common-Mode Voltage Range			-5.1 to +5.1		V
Common-Mode Rejection Ratio	V _{CM} = -5V to +3.7V		85		dB
	V _{CM} = ±5V		80		dB
DISABLE/SELECT					
Disable Input Voltage			-4.1		V
Off isolation			-60		dB
Turn-on time			150		ns
Turn-off time			50		ns
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R _L = 10kΩ		-4.94 to +4.94		V
	R _L = 1kΩ		-4.85 to +4.85		V
Output Current	Sourcing		40		mA
	Sinking		40		mA
Capacitive Load Drive	30% overshoot		30		pF
POWER SUPPLY					
Operating Range		2.7		12	V
Quiescent Current per Amplifier			1.35		mA
	T _{min} - T _{max}			1.6	mA
	Disable=LOW		170		uA
Power Supply Rejection Ratio			-70		dB

SPECIFICATIONS (@T_A = +25°C, V_S = +3V, R_L = 1kΩ, C_L = 5pF, Gain = +1, unless otherwise noted)

Parameter	Conditions	AD8029/30/40			Units
		Min	Typ	Max	
DYNAMIC PERFORMANCE					
-3 dB Bandwidth	V _O = 0.1Vp-p		115		MHz
	V _O = 2Vp-p		10		MHz
Bandwidth for 0.1 dB Flatness	V _O = 0.2Vp-p,		20		MHz
Slew Rate	G = +2, V _O = 2V Step, R _L = 1kΩ		55		V/μs
Settling Time to 0.1%	G = +2, V _O = 2V Step		50		ns
NOISE/HARMONIC PERFORMANCE					
SFDR	f _C = 100kHz, V _O = 2V p-p		-78		dBc
	f _C = 1 MHz, V _O = 2V p-p		-78		dBc
Crosstalk, Output to Output (Dual only)	f = 5 MHz, G = +2		-60		dB
Input Voltage Noise	f = 100 kHz		11		nV/√Hz
Input Current Noise	f = 100 kHz		1		pA/√Hz
DC PERFORMANCE					
Input Offset Voltage			1.5	6	mV
	T _{min} - T _{max}				mV
Input Offset Voltage Drift			3		μV/°C
Input Bias Current			1		uA
	T _{min} - T _{max}		1.5		uA
Input Offset Current			0.1		uA
Open Loop Gain	V _O = +0.5 to +2.5V		73		dB
INPUT CHARACTERISTICS					
Input Resistance			17		MΩ
Input Capacitance			1		pF
Input Common-Mode Voltage Range			-0.1 to +3.1		V
Common-Mode Rejection Ratio	V _{CM} = 0V to +1.7V		80		dB
	V _{CM} = 0V to 3V		70		dB
DISABLE/SELECT					
Disable Input Voltage			+0.9		V
Off isolation	f = 5Mhz		-60		dB
Turn-on time			175		ns
Turn-off time			50		ns
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R _L = 10kΩ		+0.03 to +2.97		V
	R _L = 1kΩ		+0.07 to +2.93		V
Output Current	Sourcing		20		mA
	Sinking		30		mA
Capacitive Load Drive	30% overshoot		30		pF
POWER SUPPLY					
Operating Range		2.7		12	V
Quiescent Current per Amplifier			1.25		mA
	T _{min} - T _{max}			1.50	mA
	Disable=LOW		140		uA
Power Supply Rejection Ratio			-72		dB

SPECIFICATIONS (@T_A = +25°C, V_S = +5V, R_L = 1kΩ, C_L = 5pF, Gain = +1, unless otherwise noted)

Parameter	Conditions	AD8029/30/40			Units
		Min	Typ	Max	
DYNAMIC PERFORMANCE					
-3 dB Bandwidth	V _O = 0.2Vp-p		120		MHz
	V _O = 2Vp-p		10		MHz
Bandwidth for 0.1 dB Flatness	V _O = 0.2Vp-p,		20		MHz
Slew Rate	G = +2, V _O = 2V Step, R _L = 1kΩ		60		V/μs
Settling Time to 0.1%	G = +2, V _O = 2V Step		45		Ns
NOISE/HARMONIC PERFORMANCE					
SFDR	f _C = 100kHz, V _O = 2V p-p		-76		dBc
	f _C = 1 MHz, V _O = 2V p-p		-73		dBc
Crosstalk, Output to Output (Dual only)	f = 5 MHz, G = +2		-60		dB
Input Voltage Noise	f = 100 kHz		11		nV/√Hz
Input Current Noise	f = 100 kHz		1		pA/√Hz
Differential Gain Error	NTSC, R _L = 1kΩ		0.1		%
Differential Phase Error	NTSC, R _L = 1kΩ		0.1		Degree
DC PERFORMANCE					
Input Offset Voltage			1.5	6	mV
	T _{min} - T _{max}				mV
Input Offset Voltage Drift			3		μV/°C
Input Bias Current			1		uA
	T _{min} - T _{max}		1.5		uA
Input Offset Current			0.1		uA
Open Loop Gain	V _O = +1V to 4V		74		dB
INPUT CHARACTERISTICS					
Input Resistance			20		MΩ
Input Capacitance			1		pF
Input Common-Mode Voltage Range			-0.1 to +5.1		V
Common-Mode Rejection Ratio	V _{CM} = 0V to +3.7V		80		dB
	V _{CM} = 0 to +5V		74		dB
DISABLE/SELECT					
Disable Input Voltage			+0.9		V
Off isolation	f=5Mhz		-60		dB
Turn-on time			175		ns
Turn-off time			50		ns
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R _L = 10kΩ		+0.04 to +4.96		V
	R _L = 1kΩ		+0.10 to +4.90		V
Output Current	Sourcing		30		mA
	Sinking		40		mA
Capacitive Load Drive	30% overshoot		30		pF
POWER SUPPLY					
Operating Range		2.7		12	V
Quiescent Current per Amplifier			1.30	1.55	mA
	T _{min} - T _{max}				mA
	Disable=LOW		150		uA
Power Supply Rejection Ratio			-74		dB