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Very Low-Cost High-Speed *FAST FET*™ Op Amps

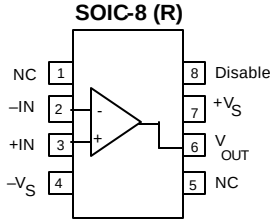
Preliminary Technical Data — AD8033/AD8034

FEATURES

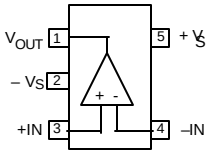
FET Input Amplifier
Single and Dual
Low Cost
High Speed
80MHz, –3 dB Bandwidth (G = +1)
80V/µs Slew Rate (G=-1)
Low Noise
10.6nV/rt Hz
5fA/rt Hz
Wide Supply Voltage Range
4V to 24V
Rail-to-Rail Output
Low Power
3.3mA/Amplifier Typ Supply Current
Small Packaging
SOIC-8; SOT23-8; SC70-5

CONNECTION DIAGRAMS
(TOP VIEW)

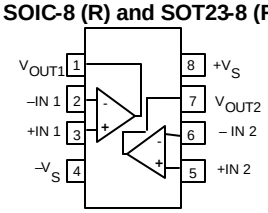
SOIC-8 (R)



SC70 (KS)



SOIC-8 (R) and SOT23-8 (RT)



APPLICATIONS

Instrumentation
Filters
Level Shifting
Buffering

PRODUCT DESCRIPTION

The ADAD8033/4 *FAST FET*™ amps are voltage feedback amplifiers with FET inputs offering ease of use and very low cost. Single (AD8033) an Dual (AD8034) versions will be available. The AD8033/4 *FAST FET*™ amps offer significant performance improvements over other low cost FET amps that are in the same price range.

With wide supply voltage range (4V to 24V) and bandwidth (85MHz), the AD8033/4 amps work in more applications than similarly priced FET amps. In addition they have rail-to-rail outputs for added versatility and a disable feature on the single amplifier (AD8033).

Despite very low cost, the amplifiers provide excellent overall performance. They offer high slew rate of 80V/µs, low input offset voltage of 6mV max, and low noise of 11nV/rt Hz.

The AD8033/4 amps also offer low power of 3.3mA/amplifier maximum, while capable of delivering up to 20mA of load current. These amplifiers are very stable and are optimized for driving capacitive loads up to 35pF.

The AD8033/4amps are the very low-cost FET amps available in small packages; SOT-23, and SC70. They are rated to work over the industrial temperature range, -40C to +85C without a premium over commercial grade products.

The AD8033 is scheduled to be released July 2002.
The AD8034 is scheduled to be released April 2002.

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AD8033/34

SPECIFICATIONS (@T_A = +25°C, V_S = +/-5V, R_L = 1kΩ, Gain =+2, unless otherwise noted)

Parameter	Conditions	AD8033/4 Min	Typ	Max	Units
DYNAMIC PERFORMANCE					
–3 dB Bandwidth	G =+1, V_o= 0.2Vp-p		80		MHz
	G =-1, V_o= 0.2Vp-p		29		MHz
	G =+2, V_o= 0.2Vp-p		30		MHz
	G =+2, V_o= 2Vp-p		21		MHz
Input Overdrive Recovery time	-6V to 6V input		135		ns
Output Overdrive Recovery time	-3V to 3V input, G=+2		140		ns
Slew Rate (25% to 75%)	G =+2, V_o= 4V Step , R_L = 1kΩ		80		V/µs
Settling Time to 0.1%	G = +2, V_o = 2V Step		100		ns
NOISE/HARMONIC PERFORMANCE					
Distortion	f_C = 1 MHz, V_o = 2V p-p,				
Second Harmonic	R_L=500Ω		-82		dBc
	R_L=1kΩ		-85		dBc
Third Harmonic	R_L=500Ω		-65		dBc
	R_L=1kΩ		-81		dBc
Crosstalk, Output to Output	f = 1 MHz, G = +2		-94		dB
Input Voltage Noise	f = 50 kHz		10.6		nV/√Hz
Input Current Noise	f = 100 kHz		5		fA/√Hz
DC PERFORMANCE					
Input Offset Voltage			1	3	mV
	T_{min}-T_{max}		TBD		mV
Input Offset Voltage Drift			6		µV/°C
Input Bias Current			1		pA
	T_{min}-T_{max}		64		pA
Input Bias Current drift			2X for each 10C change		
Open Loop Gain			90		dB
INPUT CHARACTERISTICS					
Input Resistance			1000		GΩ
Input Capacitance	+Input		2.5		pF
Input Common-Mode Voltage Range	R_L = 1kΩ		-5.2 to 4.5		V
Common-Mode Rejection Ratio			90		dB
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R_L = 1kΩ 1% DC non-linearity		-4.9 to +4.9		V
Output Short Circuit Current			35		mA
Capacitive Load Drive	30% over shoot		38		pF
POWER SUPPLY					
Operating Range		4		24	V
Quiescent Current per Amplifier			3.3		mA
Power Supply Rejection Ratio			-90		dB

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AD8033/34

SPECIFICATIONS (@T_A = +25°C, V_S = +5V, R_L = 1kΩ, Gain =+2, unless otherwise noted)

Parameter	Conditions	AD8033/4 Min	Typ	Max	Units
DYNAMIC PERFORMANCE					
–3 dB Bandwidth	G =+1, V_o= 0.2Vp-p		80		MHz
	G =-1, V_o= 0.2Vp-p		29		MHz
	G =+2, V_o= 0.2Vp-p		32		MHz
	G =+2, V_o= Vp-p		29		MHz
Input Overdrive Recovery time	-6V to 6V input		180		ns
Output Overdrive Recovery time	-6.5 to 3V input, G=+2		200		ns
Slew Rate (25% to 75%)	G =+2, V_o= 4V Step , R_L = 1kΩ		60		V/µs
Settling Time to 0.1%	G = +2, V_o = 2V Step		100		ns
NOISE/HARMONIC PERFORMANCE					
Distortion	f_C = 1 MHz, V_o = V p-p,				
Second Harmonic	R_L=500Ω		-80		dBc
	R_L=1kΩ		-83		dBc
Third Harmonic	R_L=500Ω		-65		dBc
	R_L=1kΩ		-82		dBc
Crosstalk, Output to Output	f = 1 MHz, G = +2		-94		dB
Input Voltage Noise	f = 50 kHz		10.6		nV/√Hz
Input Current Noise	f = 100 kHz		5		fA/√Hz
DC PERFORMANCE					
Input Offset Voltage			1	3	mV
	T_{min}-T_{max}		TBD		mV
Input Offset Voltage Drift			6		µV/°C
Input Bias Current			1		pA
	T_{min}-T_{max}		64		pA
Input Bias Current drift			2X for each 10C change		
Open Loop Gain			90		dB
INPUT CHARACTERISTICS					
Input Resistance			1000		GΩ
Input Capacitance	+Input		2.5		pF
Input Common-Mode Voltage Range	R_L = 1kΩ		-0.2 to 4.2		V
Common-Mode Rejection Ratio			90		dB
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R_L = 1kΩ 1% DC non-linearity		-0.1 to +4.9		V
Output Short Circuit Current			30		mA
Capacitive Load Drive	30% over shoot		25		pF
POWER SUPPLY					
Operating Range		4		24	V
Quiescent Current per Amplifier			3.3		mA
Power Supply Rejection Ratio			-90		dB

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AD8033/34

SPECIFICATIONS (@T_A = +25°C, V_S = +/-12V, R_L = 1kΩ, Gain =+2, unless otherwise noted)

Parameter	Conditions	AD8033/4 Min	Typ	Max	Units
DYNAMIC PERFORMANCE					
–3 dB Bandwidth	G =+1, V_o= 0.2Vp-p		80		MHz
	G =-1, V_o= 0.2Vp-p		29		Mhz
	G =+2, V_o= 0.2Vp-p		30		MHz
	G =+2, V_o= 2Vp-p		21		MHz
Input Overdrive Recovery time	-13V to 13V input		100		ns
Output Overdrive Recovery time	-6.5 to 6.5Vinput, G=+2		100		ns
Slew Rate (25% to 75%)	G =+2, V_o= 4V Step , R_L = 1kΩ		80		V/µs
Settling Time to 0.1%	G = +2, V_o = 2V Step		100		ns
NOISE/HARMONIC PERFORMANCE					
Distortion	f_C = 1 MHz, V_o = 2V p-p,				
Second Harmonic	R_L=500Ω		-82		dBc
	R_L=1kΩ		-96		dBc
Third Harmonic	R_L=500Ω		-66		dBc
	R_L=1kΩ		-82		dBc
Crosstalk, Output to Output	f = 1 MHz, G = +2		-94		dB
Input Voltage Noise	f = 50 kHz		10.6		nV/√Hz
Input Current Noise	f = 100 kHz		5		fA/√Hz
DC PERFORMANCE					
Input Offset Voltage			1	3	mV
	T_{min}-T_{max}		TBD		mV
Input Offset Voltage Drift			6		µV/°C
Input Bias Current			1		pA
	T_{min}-T_{max}		64		pA
Input Bias Current drift			2X for each 10C change		
Open Loop Gain			90		dB
INPUT CHARACTERISTICS					
Input Resistance			1000		GΩ
Input Capacitance	+Input		2.5		pF
Input Common-Mode Voltage Range	R_L = 1kΩ		-12.2 to 11.7		V
Common-Mode Rejection Ratio			90		dB
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R_L = 1kΩ 1% DC non-linearity		±11.9		V
Output Short Circuit Current			60		mA
Capacitive Load Drive	30% over shoot		38		pF
POWER SUPPLY					
Operating Range		4		24	V
Quiescent Current per Amplifier			3.3		mA
Power Supply Rejection Ratio			-90		dB

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