

FAN4230

Dual, High Speed, 2.5V to 12V, Rail-to-Rail Amplifier

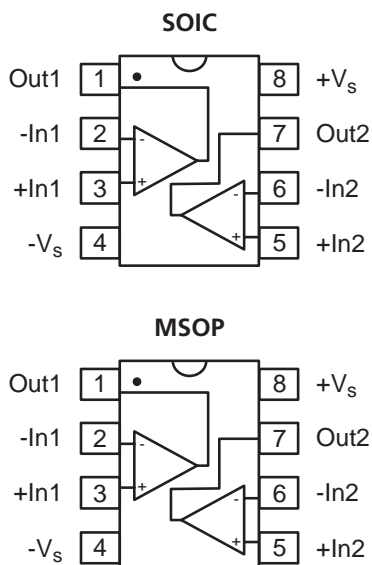
Features at ±5V

- 2.5mA supply current per amplifier
- 358MHz bandwidth
- Output voltage range at $R_L = 150\Omega$: -4.9V to 4.81V
- Input includes negative rail
- 217V/ μ s slew rate
- ± 130 mA output short circuit current
- 12nV/ $\sqrt{\text{Hz}}$ input voltage noise
- Competes with AD8052 and LMH6643
- Package options (MSOP-8 and SOIC-8)
- Fully specified at +3V, +5V, and ± 5 V supplies

Applications

- A/D driver
- Active filters
- CCD imaging systems
- CD/DVD ROM
- Coaxial cable drivers
- Portable/battery-powered applications
- Twisted pair driver
- Video driver

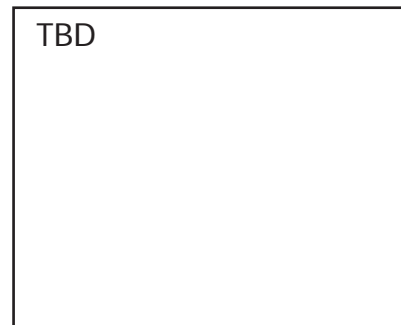
Pin Assignments



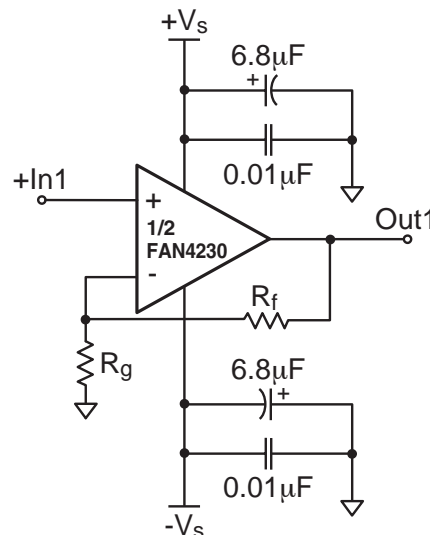
Description

The FAN4230 is a dual, low cost, high performance, voltage feedback amplifier that consumes only 2.5mA of supply current while providing ± 130 mA of output short circuit current. The FAN4230 is designed to operate from 2.5V to 12V (± 6 V) supplies. The common mode voltage range extends below the negative rail and the output provides rail-to-rail performance.

The FAN4230 is designed on a complimentary bipolar process and provides 358MHz of bandwidth and 217V/ μ s of slew rate at a supply voltage of ± 5 V. The combination of low power, rail-to-rail performance, low voltage operation, and tiny package options make the FAN4230 well suited for use in many general purpose high speed applications.



Typical Application



Electrical Characteristics ($V_s = +3V$, $G = 2$, $R_L = 2k\Omega$ to $V_s/2$; unless noted)

Parameters	Conditions	TYP	Min & Max	UNITS	NOTES
Case Temperature		+25°C	+25°C		
Frequency Domain Response					
-3dB bandwidth	$G = +1, V_O = 0.2V_{pp}$	295		MHz	
	$G = +2, V_O = 0.2V_{pp}$	119		MHz	
full power bandwidth	$G = +2, V_O = 2V_{pp}$	75		MHz	
gain bandwidth product		155		MHz	
Time Domain Response					
rise and fall time	0.2V step	2.74		ns	
settling time to 0.1%	2V step	TBD		ns	
overshoot	0.2V step,	8		%	
slew rate	3V step, $G = -1$	215		V/ μ s	
Distortion and Noise Response					
2nd harmonic distortion	$1V_{pp}, 5MHz$	-80		dBc	
3rd harmonic distortion	$1V_{pp}, 5MHz$	-80		dBc	
THD	$1V_{pp}, 5MHz$	75		dB	
input voltage noise	>1MHz	12.45		nV/ \sqrt{Hz}	
crosstalk	10MHz	TBD		dB	
DC Performance					
input offset voltage		1		mV	1
average drift		TBD		μ V/ $^{\circ}C$	
input bias current		-5		μ A	1
average drift		TBD		nA/ $^{\circ}C$	
input offset current		TBD		μ A	1
power supply rejection ratio	DC	73		dB	1
open loop gain		82		dB	1
quiescent current per amplifier		2.5		mA	1
Input Characteristics					
input resistance		TBD		M Ω	
input capacitance		TBD		pF	
input common mode voltage range		-0.3 to 1.8		V	
common mode rejection ratio	DC, $V_{cm} = 0V$ to $V_s - 1.5$	82		dB	1
Output Characteristics					
output voltage swing	$R_L = 2k\Omega$ to $V_s/2$ $R_L = 150\Omega$ to $V_s/2$	0.02 to 2.97 0.05 to 2.93		V V	1 1
linear output current		+99/-99		mA	
short circuit output current		± 130		mA	
power supply operating range		3	2.5 to 12	V	

Min/max ratings are based on product characterization and simulation. Individual parameters are tested as noted. Outgoing quality levels are determined from tested parameters.

NOTES:

1) 100% tested at +25°C.

Electrical Characteristics ($V_s = +5V$, $G = 2$, $R_L = 2k\Omega$ to $V_s/2$; unless noted)

Parameters	Conditions	TYP	Min & Max	UNITS	NOTES
Case Temperature		+25°C	+25°C		
Frequency Domain Response					
-3dB bandwidth	$G = +1$, $V_O = 0.2V_{pp}$	325		MHz	
full power bandwidth	$G = +2$, $V_O = 0.2V_{pp}$	122		MHz	
gain bandwidth product	$G = +2$, $V_O = 2V_{pp}$	75		MHz	
		155		MHz	
Time Domain Response					
rise and fall time	0.2V step	2.71		ns	
settling time to 0.1%	2V step	TBD		ns	
overshoot	0.2V step,	5.9		%	
slew rate	5V step, $G = -1$	217		V/ μ s	
Distortion and Noise Response					
2nd harmonic distortion	$2V_{pp}$, 5MHz	-76		dBc	
3rd harmonic distortion	$2V_{pp}$, 5MHz	-77		dBc	
THD	$2V_{pp}$, 5MHz	73		dB	
input voltage noise	>1MHz	12.36		nV/ \sqrt{Hz}	
crosstalk	10MHz	TBD		dB	
DC Performance					
input offset voltage		1		mV	1
average drift		TBD		μ V/ $^{\circ}$ C	
input bias current		-4.9		μ A	1
average drift		TBD		nA/ $^{\circ}$ C	
input offset current		TBD		μ A	1
power supply rejection ratio	DC	73		dB	1
open loop gain		85		dB	1
quiescent current per amplifier		2.5		mA	1
Input Characteristics					
input resistance		TBD		M Ω	
input capacitance		TBD		pF	
input common mode voltage range		-0.3 to 3.8		V	
common mode rejection ratio	DC, $V_{cm} = 0V$ to $V_s - 1.5$	85		dB	1
Output Characteristics					
output voltage swing	$R_L = 2k\Omega$ to $V_s/2$ $R_L = 150\Omega$ to $V_s/2$	0.02 to 4.96 0.07 to 4.89		V V	1 1
linear output current		+99/-99		mA	
short circuit output current		± 130		mA	
power supply operating range		5	2.5 to 12	V	

Min/max ratings are based on product characterization and simulation. Individual parameters are tested as noted. Outgoing quality levels are determined from tested parameters.

NOTES:

1) 100% tested at +25°C.

Electrical Characteristics ($V_s = \pm 5V$, $G = 2$, $R_L = 2k\Omega$ to $V_s/2$; unless noted)

PARAMETERS	CONDITIONS	TYP	MIN & MAX	UNITS	NOTES
Case Temperature		+25°C	+25°C		
Frequency Domain Response					
-3dB bandwidth	$G = +1, V_O = 0.2V_{pp}$	358		MHz	
full power bandwidth	$G = +2, V_O = 0.2V_{pp}$	123		MHz	
gain bandwidth product	$G = +2, V_O = 2V_{pp}$	77		MHz	
		155		MHz	
Time Domain Response					
rise and fall time	0.2V step	2.7		ns	
settling time to 0.1%	1V step	TBD		ns	
overshoot	0.2V step,	3.8		%	
slew rate	10V step, $G = -1$	217		V/ μ s	
Distortion and Noise Response					
2nd harmonic distortion	$2V_{pp}, 5MHz$	-73		dBc	
3rd harmonic distortion	$2V_{pp}, 5MHz$	-77		dBc	
THD	$2V_{pp}, 5MHz$	72		dB	
input voltage noise	>1MHz	12.29		nV/ \sqrt{Hz}	
crosstalk	10MHz	TBD		dB	
DC Performance					
input offset voltage		-1		mV	1
average drift		TBD		μ V/ $^{\circ}C$	
input bias current		-4.5		μ A	1
average drift		TBD		nA/ $^{\circ}C$	
input offset current		TBD		μ A	1
power supply rejection ratio	DC	73		dB	1
open loop gain		92		dB	1
quiescent current per amplifier		2.5		mA	1
Input Characteristics					
input resistance		TBD		M Ω	
input capacitance		TBD		pF	
input common mode voltage range		-5.3 to +3.8		V	
common mode rejection ratio	DC, $V_{cm} = 0V$ to $V_s - 1.5$	92		dB	1
Output Characteristics					
output voltage swing	$R_L = 2k\Omega$ to $V_s/2$	-4.94 to 4.93		V	1
	$R_L = 150\Omega$ to $V_s/2$	-4.9 to 4.81		V	1
linear output current		+99/-99		mA	
short circuit output current		± 130		mA	
power supply operating range		± 5	2.5 to 12	V	

Min/max ratings are based on product characterization and simulation. Individual parameters are tested as noted. Outgoing quality levels are determined from tested parameters.

NOTES:

1) 100% tested at +25°C.

Absolute Maximum Ratings

supply voltage	0 to +12V
maximum junction temperature	+175°C
storage temperature range	-65°C to +150°C
lead temperature (10 sec)	+300°C
operating temperature range (recommended)	-40°C to +85°C
input voltage range	+ V_s +0.5V; - V_s -0.5V
internal power dissipation	see power derating curves

Package Thermal Resistance

Package	θ_{JA}
8 lead SOIC	152°C/W
8 lead MSOP	206°C/W

Ordering Information

Model	Part Number	Package	Container	Pack Qty
FAN4230	FAN4230IMU8X	MSOP-8	Reel	3000
FAN4230	FAN4230IM8X	SOIC-8	Reel	2500

Temperature range for all parts: -40°C to +85°C.

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.