

FAN4230

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

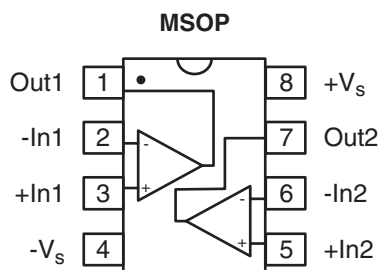
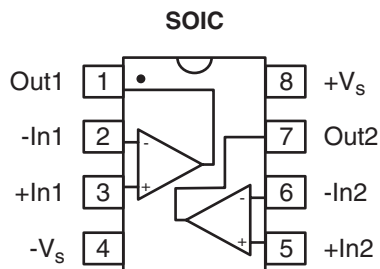
Features at ±5V

- 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
- ±130mA 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 ±5V 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

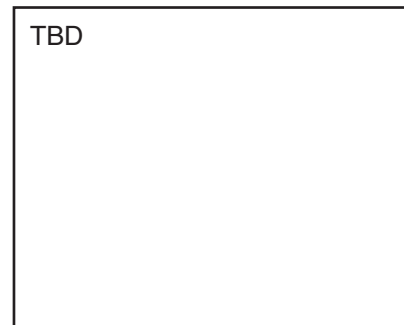
Pin Assignments



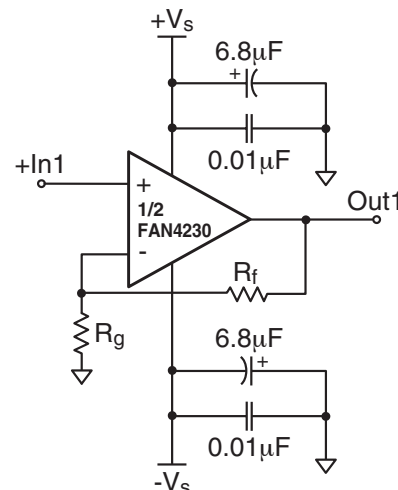
Description

The FAN4230 is a dual, low cost, high performance, voltage feedback amplifier that consumes only 2.5mA of supply current while providing ±130mA of output short circuit current. The FAN4230 is designed to operate from 2.5V to 12V (±6V) 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 ±5V. 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 Specifications at +3V

($V_S = +3V$, $G = 2$, $R_L = 2k\Omega$ to $V_S/2$; unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response						
UGBW	-3dB Bandwidth	$G = +1$, $V_{OUT} = 0.2V_{pp}$		295		MHz
BW_{SS}		$G = +2$, $V_{OUT} = 0.2V_{pp}$		119		MHz
BW_{LS}	Full Power Bandwidth	$G = +2$, $V_{OUT} = 1V_{pp}$		75		MHz
GBWP	Gain Bandwidth product			155		MHz
Time Domain Response						
t_R , t_F	Rise and Fall Time	0.2V step		2.74		ns
t_S	Settling Time to 0.1%	2V step		TBD		ns
OS	Overshoot	0.2V step		8		%
SR	Slew Rate	3V step, $G = -1$		215		V/ μ s
Distortion and Noise Response						
HD2	2nd Harmonic Distortion	$1V_{pp}$, 5MHz		-80		dBc
HD3	3rd Harmonic Distortion	$1V_{pp}$, 5MHz		-80		dBc
THD	Total Harmonic Distortion	$1V_{pp}$, 5MHz		75		dB
e_n	Input Voltage Noise	> 1MHz		12.45		nV/ \sqrt Hz
X_{TALK}	Crosstalk	10MHz		TBD		dB
DC Performance						
V_{IO}	Input Offset Voltage ¹			1		mV
dV_{IO}	Average Drift			TBD		μ V/ $^{\circ}$ C
I_{bn}	Input Bias Current ¹			-5		μ A
dI_{bn}	Average Drift			TBD		nA/ $^{\circ}$ C
I_{IO}	Input Offset Current ¹			TBD		μ A
PSRR	Power Supply Rejection Ratio ¹	DC		73		dB
A_{OL}	Open Loop Gain ¹	DC		82		dB
I_S	Quiescent Current Per Amplifier ¹			2.5		mA
Input Characteristics						
R_{IN}	Input Resistance			TBD		M Ω
C_{IN}	Input Capacitance			TBD		pF
CMIR	Input Common Mode Voltage Range		-0.3		1.8	V
CMRR	Common Mode Rejection Ratio ¹	DC, $V_{CM} = 0V$ to $V_S - 1.5$		82		dB
Output Characteristics						
V_O	Output Voltage Swing ¹	$R_L = 2k\Omega$ to $V_S/2$	0.02		2.97	V
		$R_L = 150\Omega$ to $V_S/2$	0.05		2.93	V
I_{OUT}	Linear Output Current			± 99		mA
I_{SC}	Short Circuit Output Current			± 130		mA
V_S	Power Supply Operating Range		2.5		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:

- 100% tested at 25 $^{\circ}$ C.

Electrical Specifications at +5V

($V_S = +5V$, $G = 2$, $R_L = 2k\Omega$ to $V_S/2$; unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response						
UGBW	-3dB Bandwidth	$G = +1$, $V_{OUT} = 0.2V_{pp}$		325		MHz
BW_{SS}		$G = +2$, $V_{OUT} = 0.2V_{pp}$		122		MHz
BW_{LS}	Full Power Bandwidth	$G = +2$, $V_{OUT} = 2V_{pp}$		75		MHz
GBWP	Gain Bandwidth product			155		MHz
Time Domain Response						
t_R , t_F	Rise and Fall Time	0.2V step		2.71		ns
t_S	Settling Time to 0.1%	2V step		TBD		ns
OS	Overshoot	0.2V step		5.9		%
SR	Slew Rate	3V step, $G = -1$		217		V/ μ s
Distortion and Noise Response						
HD2	2nd Harmonic Distortion	$2V_{pp}$, 5MHz		-77		dBc
HD3	3rd Harmonic Distortion	$2V_{pp}$, 5MHz		-73		dBc
THD	Total Harmonic Distortion	$2V_{pp}$, 5MHz		73		dB
e_n	Input Voltage Noise	> 1MHz		12.36		nV/ \sqrt Hz
X_{TALK}	Crosstalk	10MHz		TBD		dB
DC Performance						
V_{IO}	Input Offset Voltage			1		mV
dV_{IO}	Average Drift			TBD		μ V/ $^{\circ}$ C
I_{bn}	Input Bias Current			-4.9		μ A
dI_{bn}	Average Drift			TBD		nA/ $^{\circ}$ C
I_{IO}	Input Offset Current			TBD		μ A
PSRR	Power Supply Rejection Ratio	DC		73		dB
A_{OL}	Open Loop Gain	DC		85		dB
I_S	Quiescent Current Per Amplifier			2.5		mA
Input Characteristics						
R_{IN}	Input Resistance			TBD		M Ω
C_{IN}	Input Capacitance			TBD		pF
CMIR	Input Common Mode Voltage Range		-0.3		3.8	V
CMRR	Common Mode Rejection Ratio	DC, $V_{CM} = 0V$ to $V_S - 1.5$		85		dB
Output Characteristics						
V_O	Output Voltage Swing	$R_L = 2k\Omega$ to $V_S/2$	0.02		4.96	V
		$R_L = 150\Omega$ to $V_S/2$	0.07		4.89	V
I_{OUT}	Linear Output Current			± 99		mA
I_{SC}	Short Circuit Output Current			± 130		mA
V_S	Power Supply Operating Range		2.5		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.

Electrical Specifications at $\pm 5V$

($V_S = \pm 5V$, $G = 2$, $R_L = 2k\Omega$ to $V_S/2$; unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response						
UGBW	-3dB Bandwidth	$G = +1$, $V_{OUT} = 0.2V_{pp}$		358		MHz
BW_{SS}		$G = +2$, $V_{OUT} = 0.2V_{pp}$		123		MHz
BW_{LS}	Full Power Bandwidth	$G = +2$, $V_{OUT} = 2V_{pp}$		77		MHz
GBWP	Gain Bandwidth product			155		MHz
Time Domain Response						
t_R , t_F	Rise and Fall Time	0.2V step		2.7		ns
t_S	Settling Time to 0.1%	2V step		TBD		ns
OS	Overshoot	0.2V step		3.8		%
SR	Slew Rate	3V step, $G = -1$		217		V/ μ s
Distortion and Noise Response						
HD2	2nd Harmonic Distortion	$2V_{pp}$, 5MHz		-73		dBc
HD3	3rd Harmonic Distortion	$2V_{pp}$, 5MHz		-77		dBc
THD	Total Harmonic Distortion	$2V_{pp}$, 5MHz		72		dB
e_n	Input Voltage Noise	> 1MHz		12.29		nV/ \sqrt Hz
X_{TALK}	Crosstalk	10MHz		TBD		dB
DC Performance						
V_{IO}	Input Offset Voltage			-1		mV
dV_{IO}	Average Drift			TBD		μ V/ $^{\circ}$ C
I_{bn}	Input Bias Current			-4.5		μ A
dI_{bn}	Average Drift			TBD		nA/ $^{\circ}$ C
I_{IO}	Input Offset Current			TBD		μ A
PSRR	Power Supply Rejection Ratio	DC		73		dB
A_{OL}	Open Loop Gain	DC		92		dB
I_S	Quiescent Current Per Amplifier			2.5		mA
Input Characteristics						
R_{IN}	Input Resistance			TBD		M Ω
C_{IN}	Input Capacitance			TBD		pF
CMIR	Input Common Mode Voltage Range		-5.3		3.8	V
CMRR	Common Mode Rejection Ratio	DC, $V_{CM} = 0V$ to $V_S - 1.5$		92		dB
Output Characteristics						
V_O	Output Voltage Swing	$R_L = 2k\Omega$ to $V_S/2$	-4.94		4.93	V
		$R_L = 150\Omega$ to $V_S/2$	-4.9		4.81	V
I_{OUT}	Linear Output Current			± 99		mA
I_{SC}	Short Circuit Output Current			± 130		mA
V_S	Power Supply Operating Range		2.5		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.

Absolute Maximum Ratings (beyond which the device may be damaged)

Parameter	Min	Max	Units
Supply Voltage	0	12.6	V
Maximum Junction Temperature		175	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10s)		+300	°C
Operating Temperature Range (Recommended)	-40	+85	°C
Input Voltage Range	+V _S +0.5V	-V _S -0.5V	°C

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	8-pin MSOP	Reel	3000
FAN4230	FAN4230IM8X	8-pin SOIC	Reel	2500

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

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