Wideband, High Output Current, Fast Settling Op Amp

AD842

FEATURES

AC PERFORMANCE

Gain Bandwidth Product: 80 MHz (Gain = 2)
Fast Settling: 100 ns to 0.01% for a 10 V Step
Slew Rate: 375 V/μs
Stable at Gains of 2 or Greater
Full Power Bandwidth: 6.0 MHz for 20 V p–p

DC PERFORMANCE

Input Offset Voltage: 1 mV max
Input Offset Drift: 14 μV/°C
Input Voltage Noise: 9 nV/$\sqrt{Hz}$ typ
Open-Loop Gain: 90 V/mV into a 500 Ω Load
Output Current: 100 mA min
Quiescent Supply Current: 14 mA max

APPLICATIONS

Line Drivers
DAC and ADC Buffers
Video and Pulse Amplifiers
Available in Plastic DIP, Hermetic Metal Can, Hermetic Cerdip, SOIC and LCC Packages and in Chip Form
MIL-STD-883B Parts Available
Available in Tape and Reel in Accordance with EIA-481A Standard

PRODUCT DESCRIPTION

The AD842 is a member of the Analog Devices family of wide bandwidth operational amplifiers. This family includes, among others, the AD840 which is stable at a gain of 10 or greater and the AD841 which is unity-gain stable. These devices are fabricated using Analog Devices' junction isolated complementary bipolar (CB) process. This process permits a combination of dc precision and wideband ac performance previously unobtainable in a monolithic op amp. In addition to its 80 MHz gain bandwidth, the AD842 offers extremely fast settling characteristics, typically settling to within 0.01% of final value in less than 100 ns for a 10 volt step.

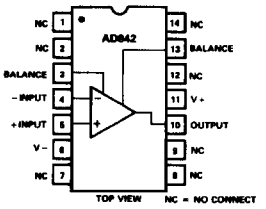
The AD842 also offers a low quiescent current of 13 mA, a high output current drive capability (100 mA minimum), a low input voltage noise of 9 nV$\sqrt{Hz}$ and a low input offset voltage (1 mV maximum).

The 375 V/μs slew rate of the AD842, along with its 80 MHz gain bandwidth, ensures excellent performance in video and pulse amplifier applications. This amplifier is ideally suited for use in high frequency signal conditioning circuits and wide bandwidth active filters. The extremely rapid settling time of the AD842 makes this amplifier the preferred choice for data acquisition applications which require 12-bit accuracy. The AD842 is also appropriate for other applications such as high speed DAC and ADC buffer amplifiers and other wide bandwidth circuitry.

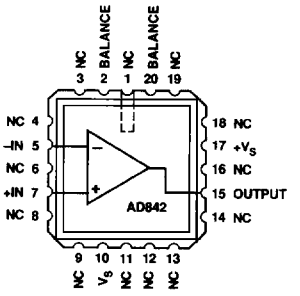
This is an abridged data sheet. To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212.

CONNECTION DIAGRAMS

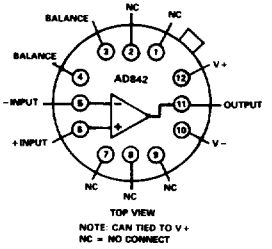
Plastic DIP (N) Package and Cerdip (Q) Package



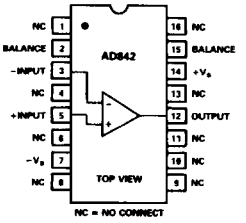
LCC (E) Package



TO-8 (H) Package



SOIC (R-16) Package



APPLICATION HIGHLIGHTS

1. The high slew rate and fast settling time of the AD842 make it ideal for DAC and ADC buffers amplifiers, lines drivers and all types of video instrumentation circuitry.
2. The AD842 is a precision amplifier. It offers accuracy to 0.01% or better and wide bandwidth; performance previously available only in hybrids.
3. Laser-wafer trimming reduces the input offset voltage of 1 mV max, thus eliminating the need for external offset nulling in many applications.
4. Full differential inputs provide outstanding performance in all standard high frequency op amp applications where the circuit gain will be 2 or greater.
5. The AD842 is an enhanced replacement for the HA2542.

AD842—SPECIFICATIONS (@ +25°C and ±15 V dc, unless otherwise noted)

Model	Conditions	AD842J/JR[1] Min	AD842J/JR[1] Typ	AD842J/JR[1] Max	AD842K Min	AD842K Typ	AD842K Max	AD842S[2] Min	AD842S[2] Typ	AD842S[2] Max	Units
INPUT OFFSET VOLTAGE[3]			0.5	1.5		0.3	1.0		0.5	1.5	mV
	T_{min}–T_{max}			2.5/3			1.5			3.5	mV
Offset Drift			14			14			14		µV/°C
INPUT BIAS CURRENT			4.2	8		3.5	5		4.2	8	µA
	T_{min}–T_{max}			10			6			12	µA
Input Offset Current			0.1	0.4		0.05	0.2		0.1	0.4	µA
	T_{min}–T_{max}			0.5			0.3			0.6	µA
INPUT CHARACTERISTICS											
Input Resistance	Differential Mode		100			100			100		kΩ
Input Capacitance			2.0			2.0			2.0		pF
INPUT VOLTAGE RANGE											
Common Mode		±10			±10			±10			V
Common-Mode Rejection	V_{CM} = ±10 V	86	115		90	115		86	115		dB
	T_{min}–T_{max}	80			86			80			dB
INPUT VOLTAGE NOISE	f = 1 kHz		9			9			9		nV/√Hz
Wideband Noise	10 Hz to 10 MHz		28			28			28		µV rms
OPEN-LOOP GAIN	V_O = ±10 V										
	R_{LOAD}≥500 Ω	40/30	90		50	90		40	90		V/mV
	T_{min}–T_{max}	20/15			25			20			V/mV
OUTPUT CHARACTERISTICS											
Voltage	R_{LOAD}≥500 Ω	±10			±10			±10			V
Current	V_{OUT} = ±10 V	100			100			100			mA
	Open Loop		5			5			5		Ω
FREQUENCY RESPONSE											
Gain Bandwidth Product	V_{OUT} = 90 mV		80			80			80		MHz
Full Power Bandwidth[4]	V_O = 20 V p–p										
	R_{LOAD}≥500 Ω	4.7	6		4.7	6		4.7	6		MHz
Rise Time[5]	A_{VCL} = −2		10			10			10		ns
Overshoot[5]	A_{VCL} = −2		20			20			20		%
Slew Rate[5]	A_{VCL} = −2	300	375		300	375		300	375		V/µs
Settling Time[5]	10 V Step										
	to 0.1%		80			80			80		ns
	to 0.01%		100			100			100		ns
Differential Gain	f = 4.4 MHz		0.015			0.015			0.015		%
Differential Phase	f = 4.4 MHz		0.035			0.035			0.035		Degree
POWER SUPPLY											
Rated Performance			±15			±15			±15		V
Operating Range		±5		±18	±5		±18	±5		±18	V
Quiescent Current			13/14	14/16		13	14		13	14	mA
	T_{min}–T_{max}			16/19.5			16			19	mA
Power Supply Rejection Ratio	V_S = ±5 V to ±18 V	86	100		90	105		86	100		dB
	T_{min}–T_{max}	80			86			80			dB
TEMPERATURE RANGE											
Rated Performance[6]		0		+75	0		+75	−55		+125	°C
PACKAGE OPTIONS[7]											
Plastic (N-14)			AD842JN			AD842KN					
Cerdip (Q-14)			AD842JQ			AD842KQ			AD842SQ, AD842SQ/883B		
SOIC (R-16)			AD842JR-16								
Tape and Reel			AD842JR-16-REEL								
TO-8 (H-12A)			AD842JH			AD842KH			AD842SH		
LCC (E-20A)									AD842SE/883B		
Chips			AD842JCHIPS						AD842SCHIPS		

NOTES

[1]AD842JR specifications differ from those of the AD842JN, JQ and JH due to the thermal characteristics of the SOIC package.

[2]Standard Military Drawing available 5962-8964201xx
2A – (SE/883B); XA – (SH/883B); CA – (SQ/883B).

[3]Input offset voltage specifications are guaranteed after 5 minutes at T_A = +25°C.

[4]FPBW Slew Rate/2π V_{PEAK}.

[5]Refer to Figures 22 and 23.

[6]"S" grade T_{min} and T_{max} specifications are tested with automatic test equipment at T_A = −55°C and T_A = +125°C.

[7]For outline information see Package Information section.

All min and max specifications are guaranteed. Specifications in **boldface** are tested on all production units at final electrical test. Results from those tests are used to calculate outgoing quality levels.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS[1]

Supply Voltage . . . . . ±18 V
Internal Power Dissipation[2]
Plastic (N) . . . . . 1.3 W
Cerdip (Q) . . . . . 1.1 W
TO-8 (H) . . . . . 1.3 W
SOIC (R) . . . . . 1.3 W
LCC (E) . . . . . 1.0 W
Input Voltage . . . . . $\pm V_S$
Differential Input Voltage . . . . . ±6 V
Storage Temperature Range
(Q, H, E) . . . . . −65°C to +150°C
(N, R) . . . . . −65°C to +125°C
Junction Temperature . . . . . +175°C
Lead Temperature Range (Soldering 60 sec) . . . . . +300°C

NOTES

[1]Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

[2]Maximum internal power dissipation is specified so that T_J does not exceed +150°C at an ambient temperature of +25°C.

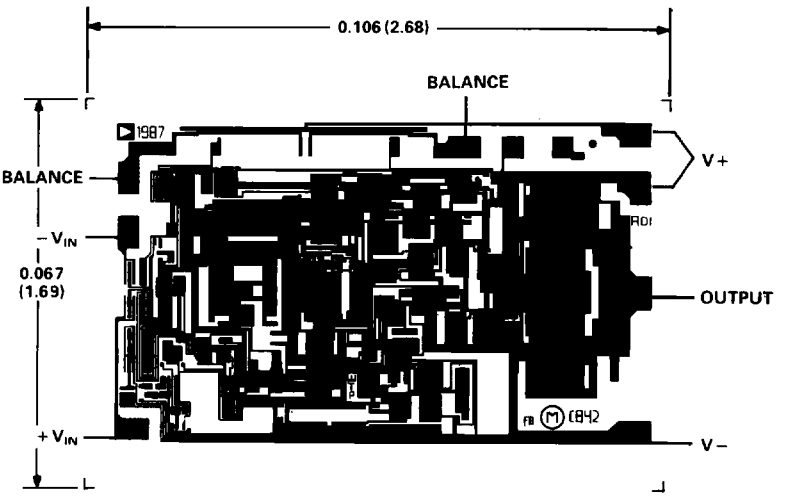
Thermal Characteristics:

	θ_{JC}	θ_{JA}	θ_{SA}
Plastic Package	30°C/W	100°C/W	
Cerdip Package	30°C/W	110°C/W	38°C/W
TO-8 Package	30°C/W	100°C/W	27°C/W
16-Pin SOIC Package	30°C/W	100°C/W	
20-Pin LCC Package	35°C/W	150°C/W	

Recommended heat sink: Aavid Engineering© #602B

METALIZATION PHOTOGRAPH

Contact factory for latest dimensions.
Dimensions shown in inches and (mm).



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