

FEATURES

AC PERFORMANCE

500 ns Settling to 0.01% for 10 V Step
75 V/ μ s Slew Rate
0.0001% Total Harmonic Distortion (THD)
13 MHz Gain Bandwidth
Internal Compensation for Gains of +2 or Greater

DC PERFORMANCE

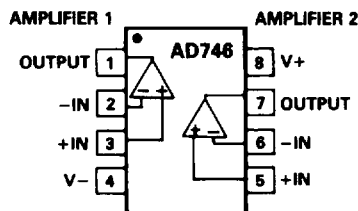
0.5 mV max Offset Voltage (AD746B)
10 μ V/ $^{\circ}$ C max Drift (AD746B)
175 V/mV min Open Loop Gain (AD746B)
2 μ V p-p Noise, 0.1 Hz to 10 Hz
Available in Plastic Mini-DIP, Cerdip and Surface Mount Packages
Available in Tape and Reel in Accordance with EIA-481A Standard
MIL-STD-883B Processing also Available
Single Version: AD744

APPLICATIONS

Dual Output Buffers for 12- and 14-Bit DACs
Input Buffers for Precision ADCs, Wideband Preamplifiers and Low Distortion Audio Circuitry

CONNECTION DIAGRAM

Plastic Mini-DIP (N)
Cerdip (Q) and
Plastic SOIC (R) Packages



PRODUCT DESCRIPTION

The AD746 is a dual operational amplifier, consisting of two AD744 BiFET op amps on a single chip. These precision monolithic op amps offer excellent dc characteristics plus rapid settling times, high slew rates and ample bandwidths. In addition, the AD746 provides the close matching ac and dc characteristics inherent to amplifiers sharing the same monolithic die.

The single pole response of the AD746 provides fast settling: 500 ns to 0.01%. This feature, combined with its high dc precision, makes it suitable for use as a buffer amplifier for 12- or 14-bit DACs and ADCs. Furthermore, the AD746's low total harmonic distortion (THD) level of 0.0001% and very close matching ac characteristics make it an ideal amplifier for many demanding audio applications.

The AD746 is internally compensated for stable operation as a unity gain inverter or as a noninverting amplifier with a gain of 2 or greater. It is available in four performance grades. The AD746J is rated over the commercial temperature range of 0 $^{\circ}$ C to +70 $^{\circ}$ C. The AD746A and AD746B are rated over the industrial temperature range of -40 $^{\circ}$ C to +85 $^{\circ}$ C. The AD746S is rated over the military temperature range of -55 $^{\circ}$ C to +125 $^{\circ}$ C and is available processed to MIL-STD-883B, Rev. C.

The AD746 is available in three 8-pin packages: plastic mini-DIP, hermetic cerdip and surface mount (SOIC).

PRODUCT HIGHLIGHTS

1. The AD746 offers exceptional dynamic response for high speed data acquisition systems. It settles to 0.01% in 500 ns and has a 100% tested minimum slew rate of 50 V/ μ s (AD746B).
2. Outstanding dc precision is provided by a combination of Analog Devices' advanced processing technology, laser wafer drift trimming and well-matched ion-implanted JFETs. Input offset voltage, input bias current and input offset current are specified in the warmed-up condition and are 100% tested.
3. Differential and multichannel systems will benefit from the AD746's very close matching of ac characteristics. Input offset voltage specs are fully tested and guaranteed to a maximum of 0.5 mV (AD746B).
4. The AD746 has very close, guaranteed matching of input bias current between its two amplifiers.
5. Unity gain stable version AD712 also available.

To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212 or visit our World Wide Web site at <http://www.analog.com>.

AD746—SPECIFICATIONS (@ +25°C and ±15 V dc, unless otherwise noted)

Model	Conditions	AD746J/A			AD746B			AD746S			Units
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
INPUT OFFSET VOLTAGE											
Initial Offset	T_{MIN} to T_{MAX}		0.3	1.5		0.25	0.5		0.3	1.0	mV
Offset vs. Temperature				2.0			0.7			1.5	mV/°C
vs. Supply (PSRR)			80	12	20	84	5	10	80	12	20
vs. Supply (PSRR)	T_{MIN} to T_{MAX}	80	95		84	100		80	95		dB
Long Term Stability			15			15			15		μV/month
INPUT BIAS CURRENT											
Either Input	$V_{CM} = 0$ V		110	250		110	150		110	250	pA
Either Input @ T_{MAX}	$V_{CM} = 0$ V		2.5/7	5.7/16		7	9.6		113	256	nA
Either Input	$V_{CM} = +10$ V		145	350		145	200		145	350	pA
Offset Current	$V_{CM} = 0$ V		45	125		45	75		45	125	pA
Offset Current @ T_{MAX}	$V_{CM} = 0$ V		1.0/3	2.8/8		3	4.8		45	128	nA
MATCHING CHARACTERISTICS											
Input Offset Voltage	T_{MIN} to T_{MAX}		0.6	1.5		0.3	0.5		0.6	1.0	mV
Input Offset Voltage				2.0			0.7			1.5	mV
Input Offset Voltage Drift					20			20			20
Input Bias Current				125			75			125	pA
Crosstalk	@ 1 kHz		120			120			120		dB
	@ 100 kHz		90			90			90		dB
FREQUENCY RESPONSE											
Gain BW, Small Signal	$G = 1$	8	13		9	13		8	13		MHz
Slew Rate, Unity Gain	$G = -1$	45	75		50	75		45	75		V/μs
Full Power Response	$V_O = 20$ V p-p		600			600			600		kHz
Settling Time to 0.01%	$G = 1$		0.5	0.75		0.5	0.75		0.5	0.75	μs
Total Harmonic Distortion	$R_I \geq 2$ kΩ $V_{IS} = 3$ V rms		0.0001			0.0001			0.0001		%
INPUT IMPEDANCE											
Differential			$2.5 \times 10^{11} 5.5$			$2.5 \times 10^{11} 5.5$			$2.5 \times 10^{11} 5.5$		Ω pF
Common Mode			$2.5 \times 10^{11} 5.5$			$2.5 \times 10^{11} 5.5$			$2.5 \times 10^{11} 5.5$		Ω pF
INPUT VOLTAGE RANGE											
Differential			±20			±20			±20		V
Common-Mode Voltage			+14.5, -11.5			+14.5, -11.5			+14.5, -11.5		V
Over Max Operating Range				+13			+13			+13	V
Common-Mode Rejection Ratio	$V_{CM} = \pm 10$ V	-11	78	88	-11	82	88	-11	78	88	dB
	T_{MIN} to T_{MAX}		76	84		80	84		76	84	dB
	$V_{CM} = \pm 11$ V		72	84		78	84		72	84	dB
	T_{MIN} to T_{MAX}		70	80		74	80		70	80	dB
INPUT VOLTAGE NOISE											
	0.1 Hz to 10 Hz		2			2			2		μV p-p
	$f = 10$ Hz		45			45			45		nV/√Hz
	$f = 100$ Hz		22			22			22		nV/√Hz
	$f = 1$ kHz		18			18			18		nV/√Hz
	$f = 10$ kHz		16			16			16		nV/√Hz
INPUT CURRENT NOISE											
	$f = 1$ kHz		0.01			0.01			0.01		pA/√Hz
OPEN LOOP GAIN											
	$V_O = \pm 10$ V $R_{LOAD} \geq 2$ kΩ		150	300		175	300		150	300	V/mV
	T_{MIN} to T_{MAX}		75	200		75	200		65	175	V/mV
OUTPUT CHARACTERISTICS											
Voltage	$R_{LOAD} \geq 2$ kΩ	+13, -12.5	+13.9, 13.3		+13, -12.5	+13.9, 13.3		+13, -12.5	+13.9, 13.3		V
	T_{MIN} to T_{MAX}	±12	+13.8, 13.1		±12	+13.8, 13.1		±12	+13.8, 13.1		V
Current	Short Circuit		25			25			25		mA
Max Capacitive Load	Gain = -1		50			50			50		pF
Driving Capability	Gain = 10		500			500			500		pF
POWER SUPPLY											
Rated Performance			±15			±15			±15		V
Operating Range		±4.5		±18	±4.5		±18	±4.5		±18	V
Quiescent Current			7	10		7	8.0		7	10	mA
TEMPERATURE RANGE											
Rated Performance			0 to +70/ 40 to +85			40 to +85			-55 to +125		°C
PACKAGE OPTIONS¹											
8-Pin Plastic Mini-DIP (N-8)			AD746JN			AD746BQ			AD746SQ		
8-Pin Cerdip (Q-8)			AD746AQ								
8-Pin Surface Mount (R-8)			AD746JR								
Tape and Reel Chips			AD746JR-REEL						AD746SCHIPS		
TRANSISTOR COUNT											
			54			54			54		

NOTE

¹For outline information see Package Information section. Specifications subject to change without notice.