Parameter		Conditions	AS324N			Units
			Min	Typ	Max	
Short Circuit to Ground		V^+=15 V_{DC}, T_A=25^{0}C		40	60	mA_{DC}
Input Offset Voltage					±9	mV_{DC}
Input Offset Voltage Drift		R_S=0 Om		±7		µV/^{0}C
Input Bias Current		$I_{IN(+)}$ - $I_{IN(-)}$, V_{CM}=0 V			±150	nA_{DC}
Input Offset Current Drift		R_S=0 Om		±10		pA_{DC}/^{0}C
Input Bias Current		$I_{IN(+)}$ or $I_{IN(-)}$		40	500	nA_{DC}
Input Common-Mode Voltage Range		V^+=+30 V_{DC}	0		V^+ -2	V_{DC}
Large Signal Voltage Gain		V^+=+15 V_{DC} (V_0Swing=1 V_{DC} to 11 V_{DC}) R_L>=2 kOm	15			V/mV
Otput Voltage Swing	V_{OH}	V^+=+30 V_{DC}, R_L=2 kOm	26			V_{DC}
		R_L>=10 kOm	27	28		
	V_{OL}	V^+=5 V_{DC}, R_L>=10 kOm		5	20	mV_{DC}
Output Current	Source	V_0=2 V_{DC} V_{IN}^+=+1 V_{DC}, V_{IN}^-=0 V_{DC}, V^+=15 V_{DC}	10	20		mA_{DC}
	Sink	V_{IN}^+=+1 V_{DC}, V_{IN}^-=0 V_{DC}, V^+=15 V_{DC}	5	8		

• *AS324N are manufactured in packages 14 DIP plastic with 2,5 mm-pin spacing (2,54 mm by equivalent).*

Low Power Quad Operational Amplifier

General Description

The AS324N series consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.
Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power suplly systems. For example, the AS324N series can be directly operated off of the standard +5 V_{DC} power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional ±15 V_{DC} power supply.

Unique Characteristics

• In the linear mode the input common-mode voltage range includes ground and the output voltage can also swing to ground, even though operated from only a single power supply voltage.
• The unity gain cross frequency is temperature compensated.
• The input bias current is also temperature compensated.

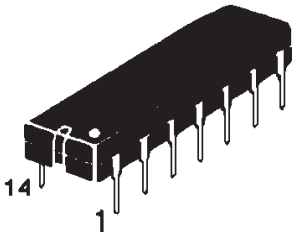
Advantages

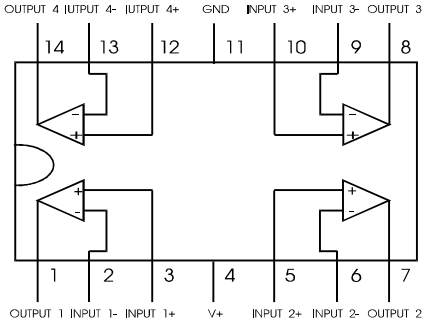
• Eliminated need for dual supplies.
• Four internally compensated op amps in a single package.
• Allows directly sensing near GND and V_{OUT} also goes to GND.
• Compatible with all forms of logic.
• Power drain suitable for battery operation.

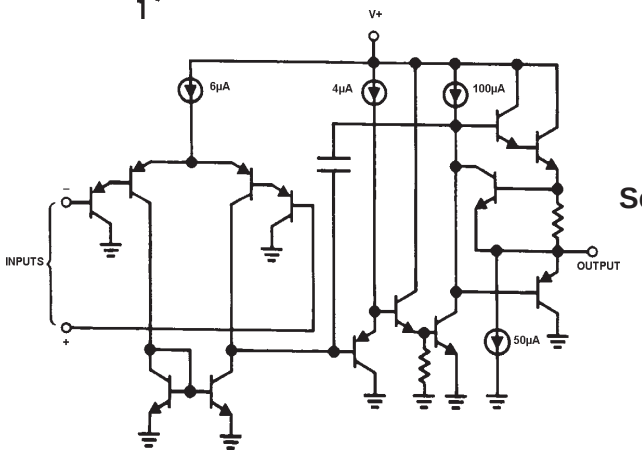
Features

• Internally frequency compensated for unity gain.
• Large DC voltage gain 100 dB
• Wide bandwidth (unity gain) 1 MHz
(temperature compensated)
• Wide power supply range:
Single supply 3 V_{DC} to 32 V_{DC}
or dual supplies ±1,5 V_{DC} to ±16 V_{DC}
• Very low supply current drain (700 µA) - essentially independent of supply voltage.
• Low input biasing current 45 nA_{DC}
(temperature compensated)
• Low input offset voltage 2 mV_{DC}
and offset current 5 nA_{DC}
• Input common-mode voltage range includes ground.
• Differential input voltage equal to the power supply voltage.
• Large output voltage swing 0 V_{DC} to V^+ - 1,5 V_{DC}

Connection Diagram
Dual-in-Line Packege







Schematic Diagram
(Each Amplifier)

Absolute Maximum Ratings

Supply Voltage, V^+	32 V_{DC} or ±16 V_{DC}
Differential Input Voltage	32 V_{DC}
Input Voltage	-0,3 V_{DC} to +32 V_{DC}
Input Current (V_{IN} <-0,3 V_{DC})	50 mA
Power Dissipation	1130 mW
Output Short-Circuit to GND (One Amplifier)	
V^+ <= 15 V_{DC} and T_A =25°C	Continuous
Operating Temperature Range	0°C to 70°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	260°C

Electrical Characteristics V^+ = +5,0 V_{DC}, unless otherwise stated

Parameter		Conditions	AS324N Min	Typ	Max	Units
Input Offset Voltage		T_A=25°C		±2	±7	mV_{DC}
Input Bias Current		$I_{IN(+)}$ or $I_{IN(-)}$, V_{CM}=0 V, T_A=25°C		45	250	nA_{DC}
Input Offset Current		$I_{IN(+)}$ - $I_{IN(-)}$, V_{CM}=0 V, T_A=25°C		±5	±50	nA_{DC}
Input Common-Mode Voltage Range		V^+=30 V_{DC}, T_A=25°C	0		V^+-1.5	V_{DC}
Supply Current		Over Full Temperature Range R_L= On All Op Amps V^+=30 V V^+=5 V		1.5 0.7	3 1.2	mA_{DC}
Large Signal Voltage Gain		V^+=15 V_{DC}, R_L>=2 kOm (V_0=1 V_{DC} to 11 V_{DC}), T_A=25°C	25	100		V/mV
Common-Mode Rejection Ratio		DC, V_{CM}=0 V to V^+ -1.5 V_{DC} T_A=25°C	65	85		dB
Power Supply Rejection Ratio		DC, V^+=5 V_{DC} to 30 V_{DC} T_A=25°C	65	100		dB
Amplifier-to-Amplifier Coupling		f=1kHz to 20 kHz, T_A=25°C (Input Referred)		-120		
Output Current	Source	V_{IN}^+=1 V_{DC}, V_{IN}^-=0 V_{DC}, V^+=15 V_{DC}, V_0=2 V_{DC}, T_A=25°C	20	40		mA_{DC}
	Sink	V_{IN}^-=1 V_{DC}, V_{IN}^+=0 V_{DC}, V^+=15 V_{DC}, V_0=2 V_{DC}, T_A=25°C	10	20		
		V_{IN}^+=1 V_{DC}, V_{IN}^-=0 V_{DC}, T_A=25°C, V^+=15 V_{DC}, V_0=200 mV_{DC}	12	50		μA_{DC}