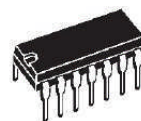


Description

The LM324 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 the magnitude of the power supply voltage. Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits.

Features

- Wide range of supply voltages
 - Low supply current drain independent of supply voltage
 - Low input biasing current
- Low input offset voltage and offset current
- Input common-mode voltage range includes ground
 - Differential input voltage range equal to the power supply voltage
- DC voltage gain 100 V/ mV Typ



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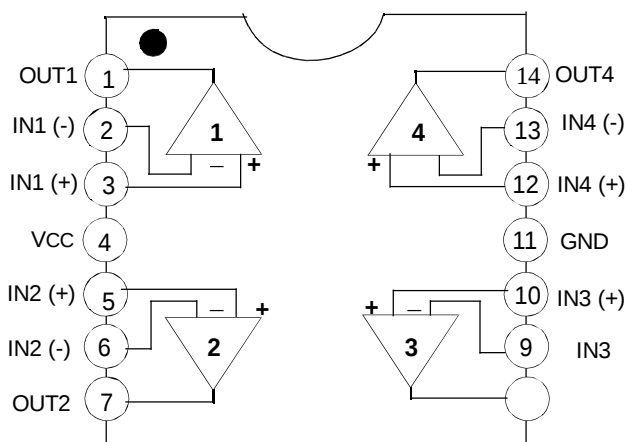


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Package

Internal Block Diagram

PIN CONNECTIONS (top view)



Electrical Characteristics

(V_{CC}= 5.0V V_{EE}=GND TA= 25⁰C unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Input Offset	V _{IO}	V _{CC} =5V to MAX, V _{ic} =VICR min, V _o =1.4V	25 ⁰ C		3	7	mV
			Full range			9	
Input Offset Current	I _{IO}	V _o =1.4V	25 ⁰ C		2	50	nA
Input Bias Current	I _{BIAS}	V _o =1.4V	25 ⁰ C		-20	-250	nA
Common-mode input voltage range	V _{I(R)}	V _{CC} =5V to MAX	25 ⁰ C	0		V _{CC} -1.5	V
High-level output voltage	V _{O(H)} V _{O(L)}	V _{CC} =MAX, R _L =2K Ω		26			V
		V _{CC} =MAX, R _L =10K Ω	Full range	27	28		
Low-level output voltage	A _{VO}	R _L =10K Ω V _{CC} =15V,	Full range		5	20	mV
Large-signal differential voltage amplification		V _o =1V to 11V	25 ⁰ C	25	100		V/mV
		R _L =2K Ω	Full range	15			
Common-Mode rejection ratio	CMRR	V _{CC} =15V to MAX V _{ic} =VICR min	25 ⁰ C	65	80		dB
Supply voltage rejection ratio	PSRR	V _{CC} =5V to MAX f=1kHz to 20kHz	25 ⁰ C	65	100		dB
Crosstalk attenuation	I _o	V _{CC} =15V, V _{ID} = 1V, V _o =0	25 ⁰ C	-20	-30		mA
			Full range	-10			
		V _{CC} =15V, V _{ID} =-1V, V _o =0	25 ⁰ C	10	20		
			Full range	5			
		V _{ID} =-1V, V _o =200mA	25 ⁰ C	12	30		mA
Short-circuit out put current	I _{os}	V _{CC} at 5V, GND at -5V, V _o =0	25 ⁰ C		+40	+60	mA
Supply current (four amplifiers)	I _{CC}	V _o =2.5V, No load	Full range		0.7	1.2	mA
		V _{CC} =MAX, V _o = 0.5V _{CC} , No load			1.1	3	

*All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified. !MAX"V_{CC} for testing purposes is 30 V. full range is 0⁰C to 70⁰C

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Power Supply Voltage	Vcc	- 16 or 32	V
Differential Input Voltage	VI(DIFF)	32	V
Input Voltage	VI	- to 32	V
Output Short Circuit to ND Vcc15V,(one Amp)		Continuous	
Operating Temperature Range	TOPR	0 to 70	°C
Shorage Temperature Range		- to +	°C

Typical Applications Circuit

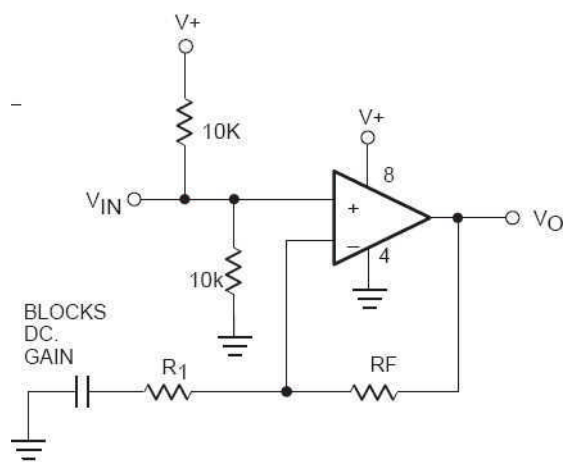


Figure 1. Non-Inverting

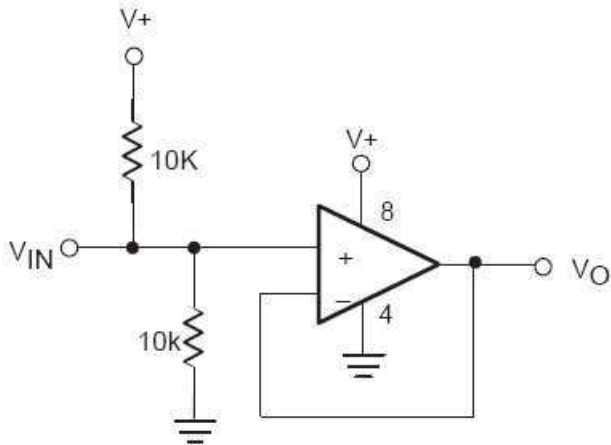


Figure 2. Input Biasing Voltage-

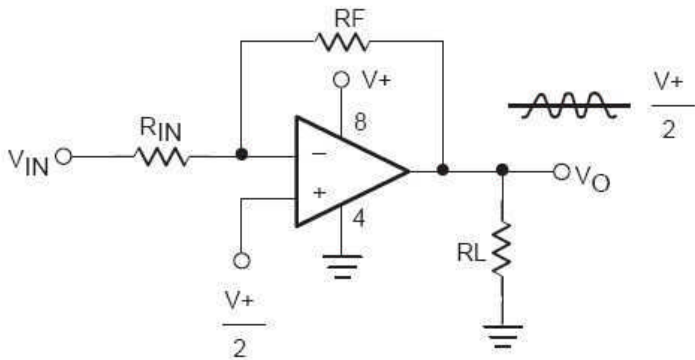


Figure 3. Single Supply Inverting

Ordering Information

ORDERING NUMBE	PACKAGE	MARKING
LM324	SOP-14 / DIP-14	LM324