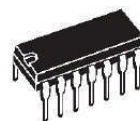


Description

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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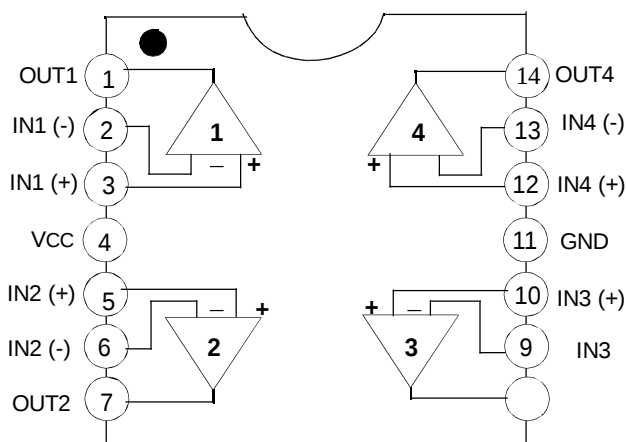


SOP - 14

Package

Internal Block Diagram

PIN CONNECTIONS (top view)



Electrical Characteristics

($V_{CC} = 5.0V$ $V_{EE} = GND$ $T_A = 25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Offset	V_{IO}	$V_{CC}=5V$ to MAX, $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	$25^{\circ}C$	3	7	mV
			Full range		9	
Input Offset Current	I_{IO}	$V_O=1.4V$	$25^{\circ}C$	2	50	nA
Input Bias Current	I_{BIAS}	$V_O=1.4V$	$25^{\circ}C$	-20	-250	nA
Common-mode input voltage range	$V_{I(R)}$	$V_{CC}=5V$ to MAX	$25^{\circ}C$	0	$V_{CC}-1.5$	V
High-level output voltage	$V_{O(H)}$ $V_{O(L)}$	$V_{CC}=MAX, R_L=2K\Omega$		26		V
		$V_{CC}=MAX, R_L=10K\Omega$	Full range	27	28	
Low-level output voltage	A_{VD}	$R_L=10K\Omega$ $V_{CC}=15V$,	Full range	5	20	mV
Large-signal differential voltage amplification		$V_O=1V$ to $11V$	$25^{\circ}C$	25	100	V/mV
		$R_L=2K\Omega$	Full range	15		
Common-Mode rejection ratio	CMRR	$V_{CC}=15V$ to MAX $V_{IC}=V_{ICR}$ min	$25^{\circ}C$	65	80	dB
K_{SVR} Supply voltage rejection ratio	PSRR	$V_{CC}=5V$ to MAX $f=1kHz$ to $20kHz$	$25^{\circ}C$	65	100	dB
Crosstalk attenuation	V_{O1}/V_{O2}	$V_{CC}=15V$, $V_{ID}=1V$, $V_O=0$	$25^{\circ}C$	-20	-30	mA
			Full range	-10		
		$V_{CC}=15V$, $V_{ID}=-1V$, $V_O=0$	$25^{\circ}C$	10	20	
			Full range	5		
		$V_{ID}=-1V$, $V_O=200mA$	$25^{\circ}C$	12	30	mA
Short-circuit out put current	I_{OS}	V_{CC} at $5V$, GND at $-5V$, $V_O=0$	$25^{\circ}C$	+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 $0^{\circ}C$ to $70^{\circ}C$

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Power Supply Voltage	V _{cc}	- 16 or 32	V
Differential Input Voltage	V _{I(DIFF)}	32	V
Input Voltage	V _I	- to 32	V
Output Short Circuit to V _{cc} 15V,(one Amp)	ND	Continuous	
Operating Temperature Range	T _{OPR}	0 to 70	°C
Shorage Temperature Range		- to +	°C

Typical Applications Circuit

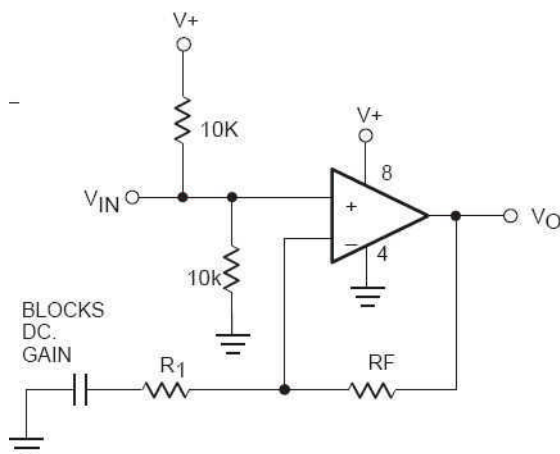


Figure 1. Non-Inverting

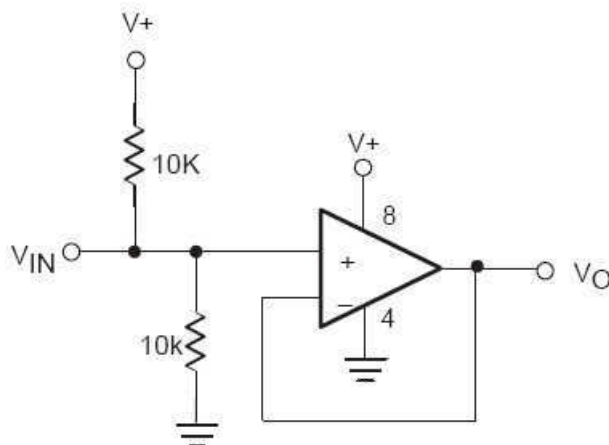


Figure 2. Input Biasing Voltage-

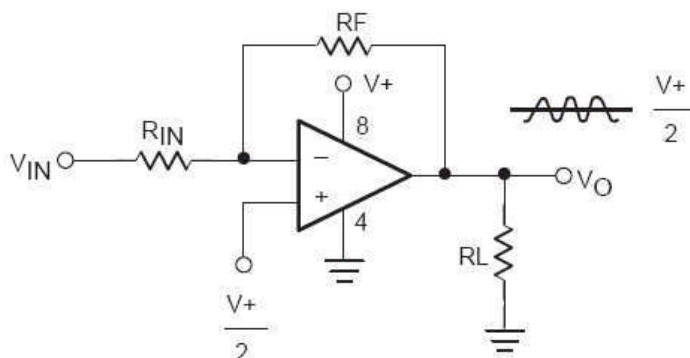


Figure 3. Single Supply Inverting

Ordering Information

ORDERING NUMBE	PACKAGE	M A R K I N G
LM324	SOP-14 / DIP-14	LM324

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