

Quadruple Operational Amplifiers

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 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.

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
- Internally frequency compensation



PACKAGE INFORMATION



ELECTRICAL CHARACTERISTICS

at specified free-air temperature, $V_{CC} = 5V$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		LM324			
			MIN	TYP	MAX	UNIT
V _{IO}	Vcc =5V to MAX,	25 °C		3	7	mV
Input offset voltage	$V_{IC} = V_{ICR} min,$ $V_{O}=1.4V$	Full temperature range			9	=
αV _{Io} Average temperature coefficient of input offset voltage		Full temperature range		7		µV/°C
l _{io}	Vo=1.4V	25 ° C		2	50	nA
Input offset current		Full temperature range			150	
αl _{to} Average temperature coefficient of input offset current		Full temperature range		10		pA/°C
I _{IB}	Vo=1.4V	25 °C		-20	-250	nA
Input bias current		Full temperature range			-500	
VICR	Vcc = 5V to MAX	25 °C	0 to Vcc-1.5			V
Common-mode input voltage range		Full temperature range	0 to Vcc - 2			
Vон	$RL = 2 k\Omega$	25 °C	Vcc-1.5			V
High-level output voltage	$Vcc = MAX, R_L = 2k\Omega$	Full temperature range	26			
	Vcc = MAX, RL = 10 k Ω	Full temperature range	27	28		
V _{oL} Low-level output voltage	RL = 10 kΩ	Full temperature range		5	20	mV
A _{VD}	Vcc = 15 V,	25 °C	25	100		V/mV
Large-signal differential voltage amplification	Vo=1V to 11 V, R _L \geq 2 k Ω	Full temperature range	15			
CMRR Common-mode rejection ratio	Vcc = 5V to MAX, $V_{IC} = V_{ICR}$ min	25 °C	65	80		dB
k_{SVR} Supply voltage rejection ratio ($\Delta Vcc/\Delta V_{IO}$)	Vcc = 5V to MAX	25 °C	65	100		dB
Vo1/Vo2 Crosstalk attenuation	f=1kHz to 20 kHz	25 °C		120		dB
lo	Vcc = 15 V,	25 °C	-20	-30		mA
Output current	V _{ID} =1V,Vo= 0	Full temperature range	-10			
	Vcc = 15 V, V _{ID} = -1V, Vo=15V	25 °C	10	20		
		Full temperature range	5			
	V_{ID} = -1V, Vo = 200 mV	25 °C	12	30		μA
los Short-circuit output current	Vcc at 5 V, GND at -5V,Vo=0	25 °C		±40	±60	mA
lcc	Vo = 2.5 V, No load	Full temperature range		1.5	2.4	mA
Supply current (four amplifiers)	Vcc = MAX, Vo = 0.5Vcc, No load	Full temperature range		1.1	3	

* All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified.

"MAX" Vcc for testing purposes is 30 V. Operating temperature $-40 \div 85^{\circ}$ C, MAX Junction temperature $+ 125^{\circ}$ C.

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PACKAGE





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