

Quadruple Operational Amplifiers

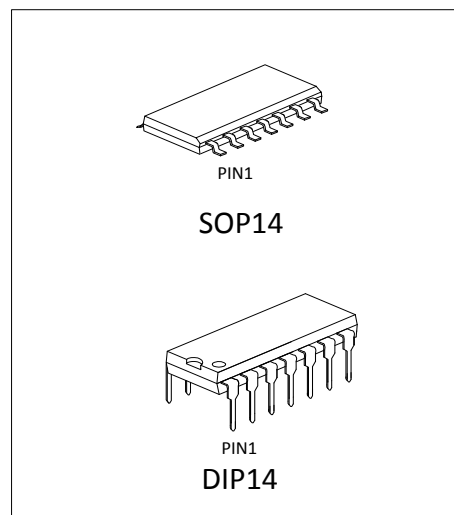
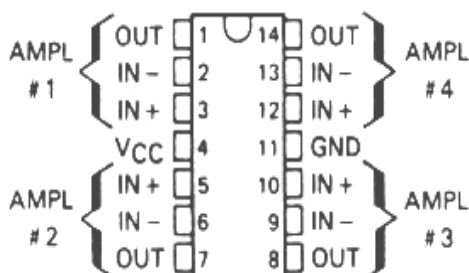
DESCRIPTION

The LM324A 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



Quadruple Operational Amplifiers

ELECTRICAL CHARACTERISTICS

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

PARAMETER	TEST CONDITIONS*		LM324			UNIT
			MIN	TYP	MAX	
V _{IO} Input offset voltage	V _{CC} =5V to MAX, V _{IC} = V _{ICR} min, V _O =1.4V	25 °C Full temperature range		3	7 9	mV
αV _{IO} Average temperature coefficient of input offset voltage		Full temperature range		7		μV/°C
I _{IO} Input offset current	V _O =1.4V	25 ° C Full temperature range		2	50 150	nA
αI _{IO} Average temperature coefficient of input offset current		Full temperature range		10		pA/°C
I _{IB} Input bias current	V _O =1.4V	25 °C Full temperature range		-20	-250 -500	nA
V _{ICR} Common-mode input voltage range	V _{CC} = 5V to MAX	25 °C Full temperature range	0 to V _{CC} -1.5 0 to V _{CC} - 2			V
V _{OH} High-level output voltage	R _L = 2 kΩ V _{CC} = MAX, R _L =2kΩ V _{CC} = MAX, R _L = 10 kΩ	25 °C Full temperature range Full temperature range	V _{CC} -1.5 26 27			V
V _{OL} Low-level output voltage	R _L = 10 kΩ	Full temperature range		5	20	mV
A _{VD} Large-signal differential voltage amplification	V _{CC} = 15 V, V _O =1V to 11 V, R _L ≥ 2 kΩ	25 °C Full temperature range	25 15	100		V/mV
CMRR Common-mode rejection ratio	V _{CC} = 5V to MAX, V _{IC} = V _{ICR} min	25 °C	65	80		dB
k _{SVR} Supply voltage rejection ratio (ΔV _{CC} /ΔV _{IO})	V _{CC} = 5V to MAX	25 °C	65	100		dB
Vo1/Vo2 Crosstalk attenuation	f=1kHz to 20 kHz	25 °C		120		dB
I _O Output current	V _{CC} = 15 V, V _{ID} =1V,V _O = 0 V _{CC} = 15 V, V _{ID} = -1V, V _O =15V V _{ID} = -1V, V _O = 200 mV	25 °C Full temperature range 25 °C Full temperature range 25 °C	-20 -10 10 5 12	-30		mA
I _{OS} Short-circuit output current	V _{CC} at 5 V, GND at -5V,V _O =0	25 °C		±40	±60	mA
I _{CC} Supply current (four amplifiers)	V _O = 2.5 V, No load V _{CC} = MAX, V _O = 0.5V _{CC} , No load	Full temperature range Full temperature range		1.5 1.1	2.4 3	mA

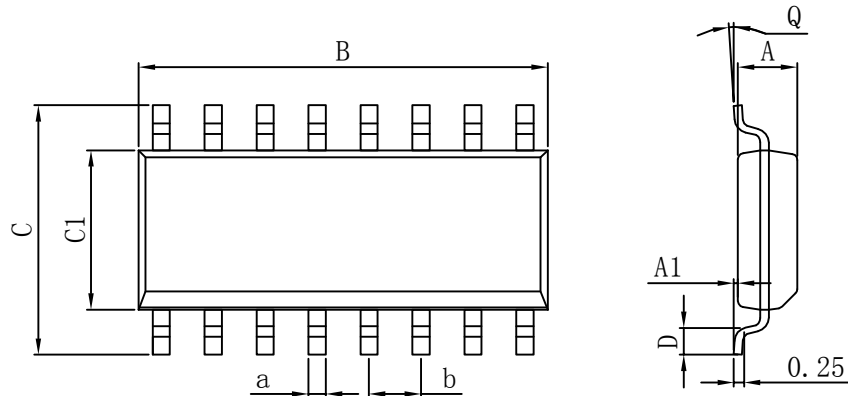
* All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified.

"MAX" Vcc for testing purposes is 30 V. Operating temperature -40 - 85° C.

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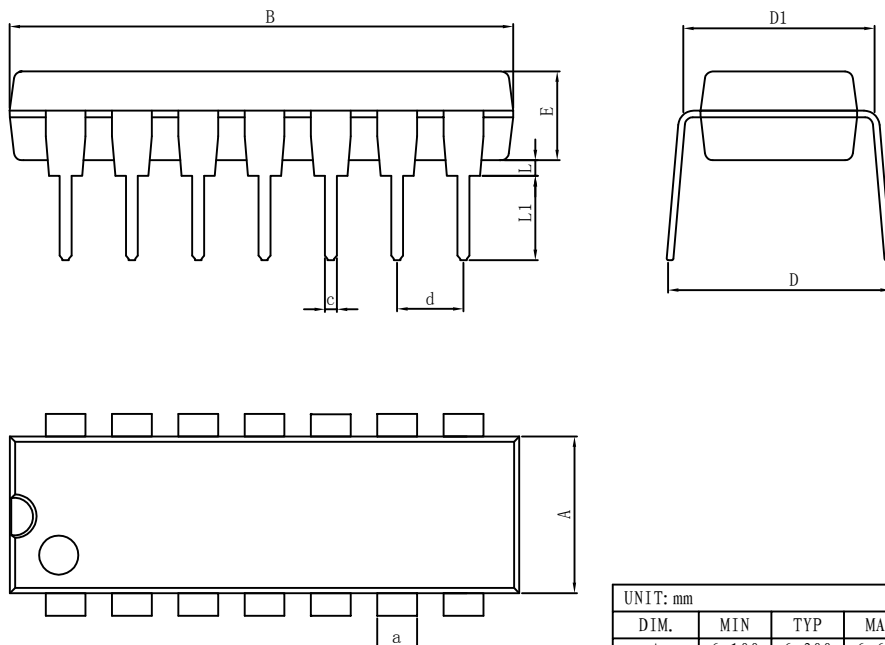
PACKAGE

SOP14



UNIT: mm							
DIM.	MIN	TYP	MAX	DIM.	MIN	TYP	MAX
A	4.520	4.570	4.620	a	0.400	0.420	0.440
A1	0.100	—	0.250	b	1.260	1.270	1.280
B	8.500	8.750	9.000	Q	0°	—	8°
C	5.800	6.100	6.250				
C1	3.800	3.900	4.000				
D	0.400	—	0.950				

DIP14



UNIT: mm							
DIM.	MIN	TYP	MAX	DIM.	MIN	TYP	MAX
A	6.100	6.300	6.680	a	1.504	1.524	1.544
B	18.940	19.200	19.560	c	0.437	0.457	0.477
D	8.200	8.700	9.200	d	2.530	2.540	2.550
D1	7.42	7.62	7.82	L	0.500	—	0.800
E	3.100	3.300	3.550	L1	3.000	3.200	3.600