CO324

Quad Ground Sense Operational Amplifier

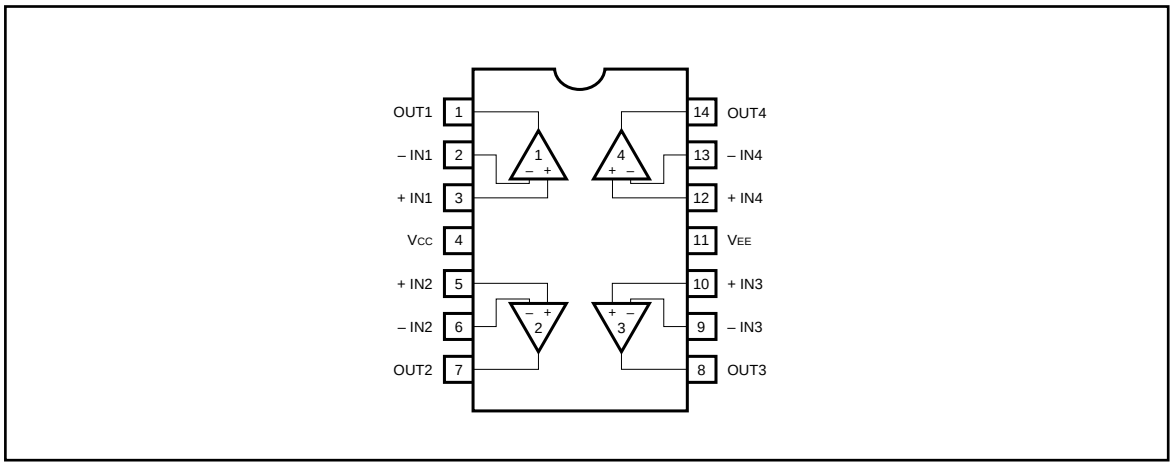
The CO324 is monolithic IC with four built-in operational amplifiers featuring internal phase compensation.

Either a dual or single power supply can be driven, and these products can be driven by a digital system 5V single power supply. These products can be used in a wide range of administrative and industrial applications, including transducer amplifiers and DC amplifiers.

●Applications
Ground sensing type pre-amplifiers
Active filters
DC amplifiers
Pulse generators.

●Features
1) Wide range of operating power supply voltages and single power supply drive enabled.
(single power supply: 3 to 30V, dual power supply: ± 1.5 to ± 15V)
2) Common-mode input voltage can be operated from the ground level.
3) Differential input voltage can be operated up to the power supply voltage level.
4) Low current dissipation. (I_Q = 0.6mA)
5) Low offset voltage and offset current. (V_{IO} = 2mV, I_{IO} = 5nA typ.)
6) Four operational amplifiers with phase compensation are built into the DIP / SOP Pin 14.
7) Compatible with model 324 operational amplifiers of other manufacturers.

●Block diagram



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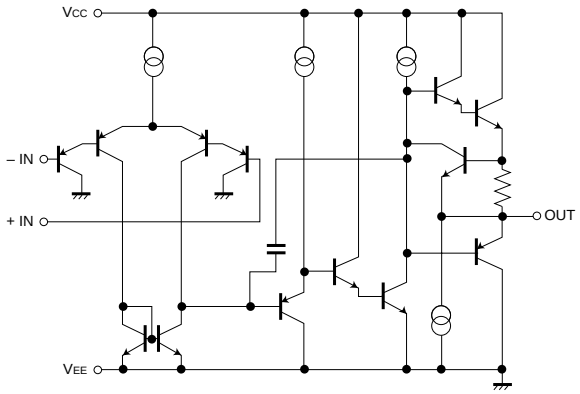
●Internal circuit configuration



●Absolute maximum rating (Ta = 25°C)

Parameter	Symbol	Limits		Unit
		CO324 (DIP-14)	CO324 (SOP-14)	
Power supply voltage	Vcc	36(±16)	36(±16)	V
Power dissipation	Pd	720*	450*	mW
Differential input voltage	VID	±VCC	±VCC	V
Common-mode input voltage	VI	-0.3~Vcc	-0.3~Vcc	V
Operating temperature	Topr	-40~+85	-40~+85	℃
Storage temperature	Tstg	-55~+125	-55~+125	℃

* Refer to the Pd characteristics diagram.

● ORDERING INFORMATION

CO324 X

BLANK: SO-14

N:DIP14

A:SO-14 & TAPING

* All specs and applications shown above subject to change without prior notice.

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●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 5V)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage		V_{IO}	—	2	7	mV	R_S = 50Ω
Input offset current		I_{IO}	—	5	50	nA	
Input bias current		Ib	—	45	250	nA	∗1
Common-mode input voltage		V_{ICM}	0	—	V_{CC} – 1.5	V	
Common-mode rejection ratio		CMRR	65	75	—	dB	
High-amplitude voltage gain		A_{VOI}	87	100	—	dB	R_L ≧ 2kΩ, V_{CC} = 15V
Power supply voltage rejection ratio		PSRR	65	100	—	dB	R_S = 50Ω
Quiescent current		I_Q	—	0.6	2.0	mA	R_L = ∞, on All Op - Amps
Maximum output voltage		V_{OH}	V_{CC} – 1.5	—	—	V	R_L = 2kΩ
		V_{OL}	—	—	0.25	V	R_L = ∞
Maximum output current	Source	I_{OH}	20	35	—	mA	V_O = 0
	Sink	I_{OL}	10	20	—	mA	V_O = V_{CC}
Channel separation		CS	—	120	—	dB	f = 1kHz input conversion

∗1 Because the first stage is configured with a PNP transistor, input bias current is from the IC.

●Electrical characteristic curves

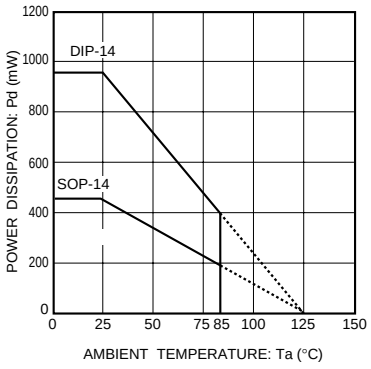

Fig.1 Power dissipation vs. ambient temperature

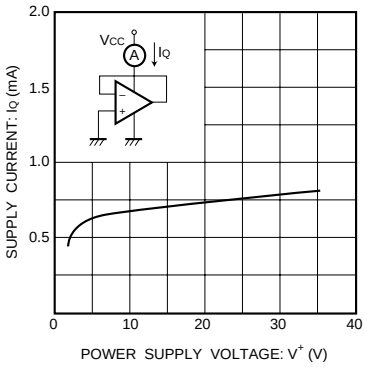

Fig.2 Quiescent current vs. power supply voltage

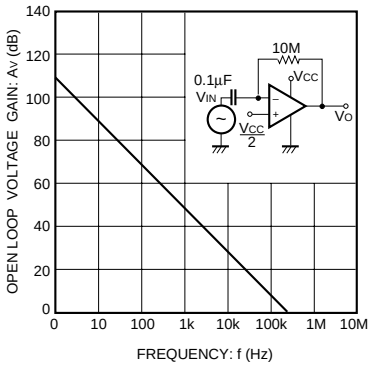

Fig.3 Open loop voltage gain vs. frequency

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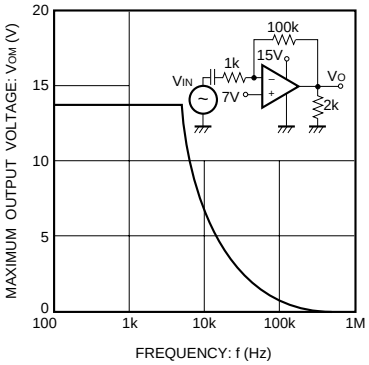

Fig.4 Maximum output voltage vs. frequency

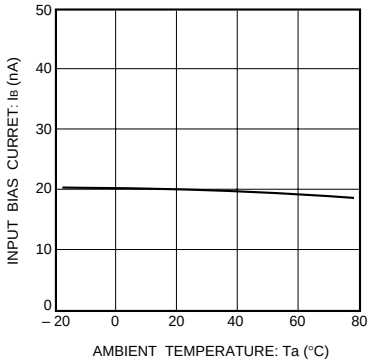

Fig.5 Input bias current vs. ambient temperature

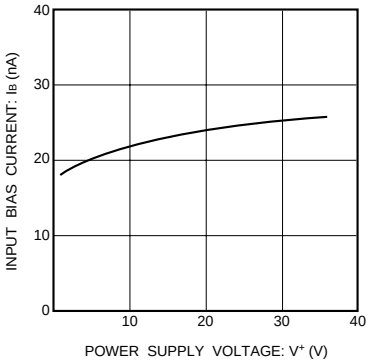

Fig.6 Input bias current vs. power supply voltage

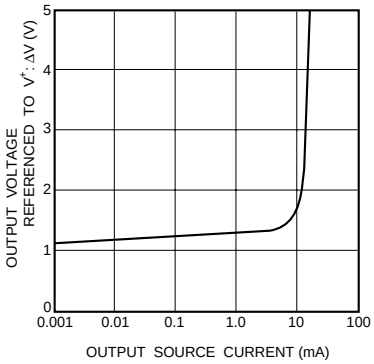

Fig.7 Potential difference during power supply output vs. output source current

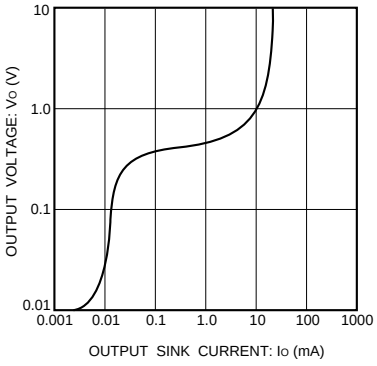

Fig.8 Output voltage vs. output sink current

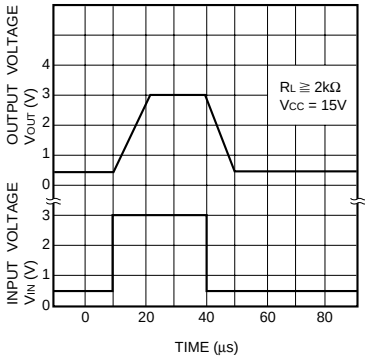

Fig.9 Output response characteristics

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●Operation notes

(1) Unused circuit connections

If there are any circuits which are not being used, we recommend making connections as shown in Figure 10, with the non-inverted input pin connected to the potential within the in-phase input voltage range (V_{ICM}).

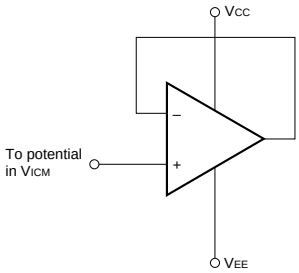
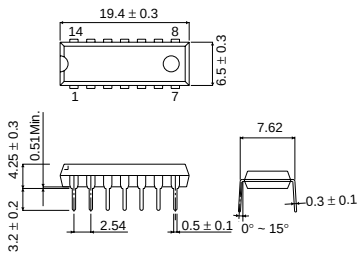
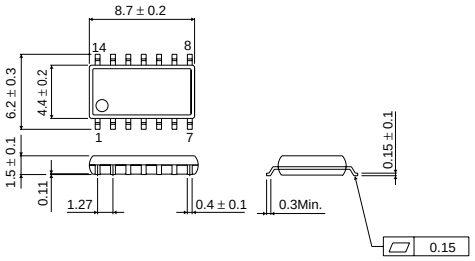


Fig.10 Unused circuit connections

●External dimensions (Units: mm)



DIP14



SOP14

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