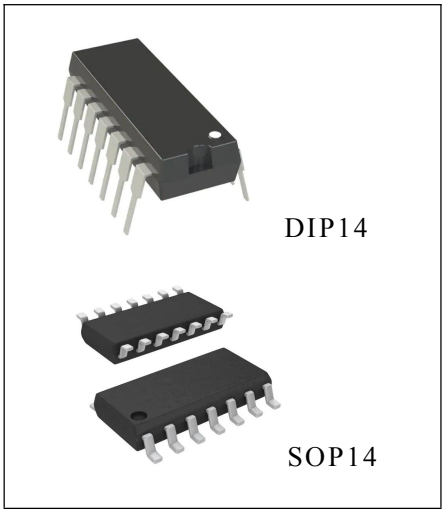
D324
Quad Operational Amplifier

General Description



The D324 consist of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide voltage range. 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 amplifier, DC gain blocks and all the conventional OP amp circuits which now can be easily implemented in single power supply systems.

D324 is available in DIP14、SOP14 packages.

Features

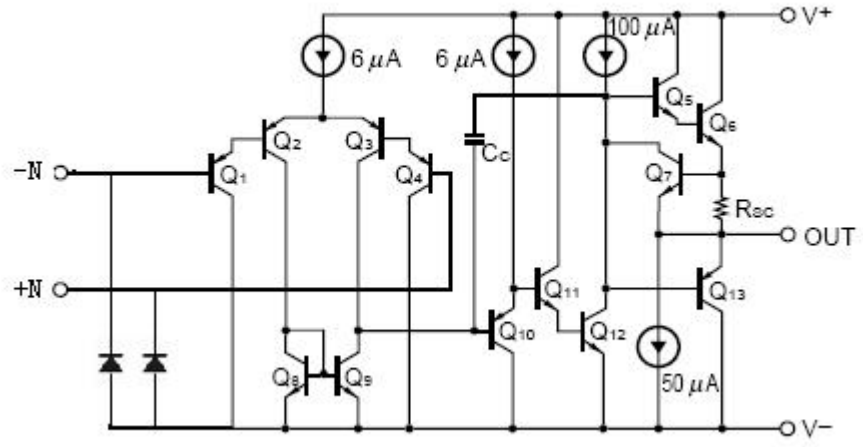
- Large DC voltage gain: 100dB
- Wide power supply range:
  Vcc=3V~32V(or Vcc=±1.5V~±16V)
- Input common-mode voltage range includes ground.
- Large output voltage swing :0V~Vcc-1.5V
- Power drain suitable for battery operation
- Internally frequency compensated for unity gain
- Wide bandwidth(unity gain) 1MHz
- Very low supply current drain(700μA)—essentially independent of supply voltage
- Low input biasing current 45nA
- Low input offset voltage 2mV and offset current 5nA
- Differential input voltage range equal to the power supply voltage
- Compatible with all forms of logic

Package Information

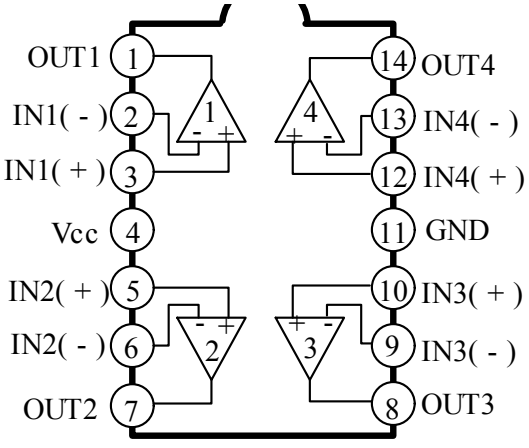
PART NO.	PACKAG DESCRIPTION	PACKAGE MARKING	PACKAGE OPTION
D324	DIP14	CHMC SXXXX D324	25/Tube
D324(F)	SOP14	CHMC SXXXX D324	50/Tube 4000/Reel

CHMC:Trademark D324:Part NO. SXXXX:Lot NO.

Schematic Diagram



Internal Block Diagram and Pin Configuration



D324(SOP14/DIP14)

Absolute Maximum Ratings(Ta=25°C)

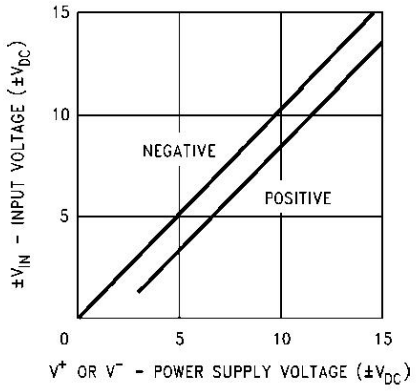
Characteristic		Symbol	Value	Unit
Power Supply Voltage		Vcc	±16 or 32	V
Differential Input Voltage		V_{ID}	32	V
Input Voltage		V_{IN}	-0.3~32	V
Output Short Circuit to GND			Continuous	
Power Dissipation	DIP14	P_D	1130	mW
	SOP14		800	
Operating Temperature Range		Topr	0~70	°C
Storage Temperature		Tstg	-65~150	°C

Electrical Characteristics (unless otherwise specified: Ta=25°C, Vcc=5V)

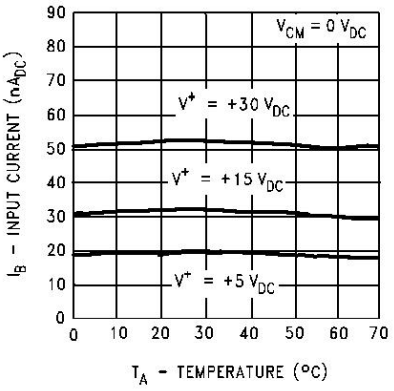
Characteristics		Test Conditions	Min.	Typ.	Max.	Unit
Input offset voltage		Ta=25°C		1	3	mV
		Ta=0°C			5	
		Ta=70°C			5	
Input bias current		$I_{IN(+)}$ or I_{IN-},V_{CM}=0V, Ta=25°C		20	250	nA
		$I_{IN(+)}$ or I_{IN-},V_{CM}=0V, Ta=0～70°C			500	
Input offset current		$I_{IN(+)}$ or I_{IN-},V_{CM}=0V, Ta=25°C		5	50	nA
		$I_{IN(+)}$ or I_{IN-},V_{CM}=0V, Ta=0～70°C			150	
Input common-mose voltage range		Vcc=30V, Ta=25°C	0		Vcc-1.5	V
		Vcc=30V, Ta=0～70°C			Vcc-1.8	
Supply current		Over full temperature range RL=∞ on all OP amps Vcc=30V Vcc=5V		1.5 0.7	3 1.2	mA
Large signal voltage gain		Vcc=15V,R_L≥2kΩ, Ta=25°C	25	100		V/mV
		Vcc=15V,R_L≥2kΩ, Ta=0～70°C	15			
Common-mode rejection ratio		DC,V_{CM}=0V to Vcc-1.5V	65	85		dB
Power supply rejection ratio		Vcc=5V to 30V	65	100		dB
Output current	Source	V_{IN}^+=1V, V_{IN}^-=0V Vcc=15V,Vo=2V	20	40		mA
	Sink	V_{IN}^+=0V, V_{IN}^-=1V Vcc=15V,Vo=2V	8	20		mA
		V_{IN}^+=0V, V_{IN}^-=1V Vcc=15V,Vo=200mV	12	50		μA
Short circuit to ground		Vcc=15V		40	60	mA
Output voltage swing	V_{OH}	Vcc=30V, R_L=2kΩ	26			V
		Vcc=30V, R_L=10kΩ	27	28		V
	V_{OL}	Vcc=5V, R_L=10kΩ		5	20	mV

Characteristics Curves

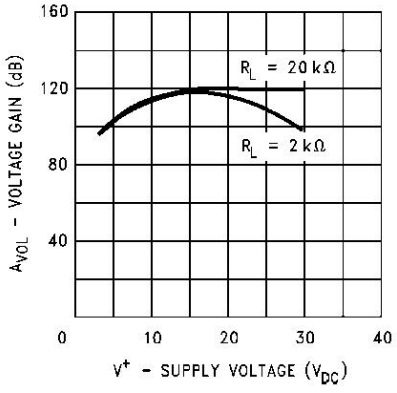
Input Voltage Range



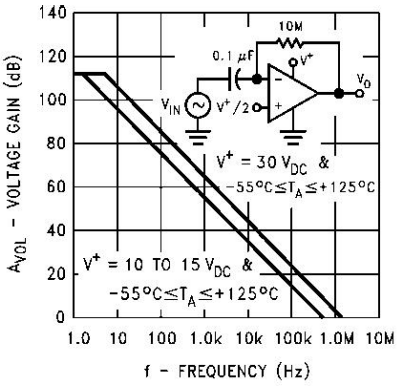
Input Current



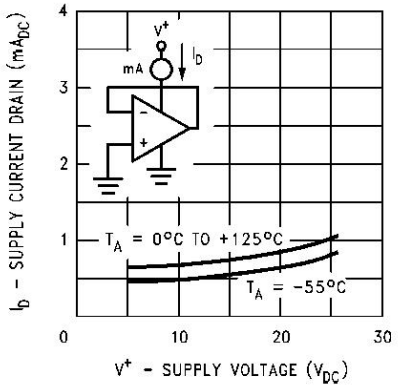
Voltage Gain



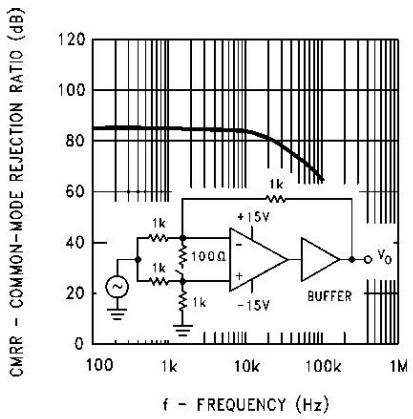
Open Loop Frequency Response



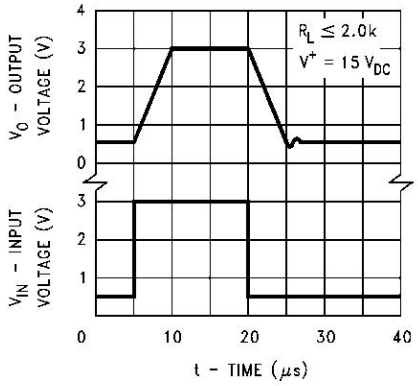
Supply Current



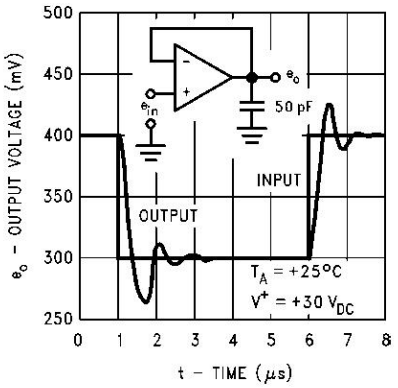
Common Mode Rejection Ratio



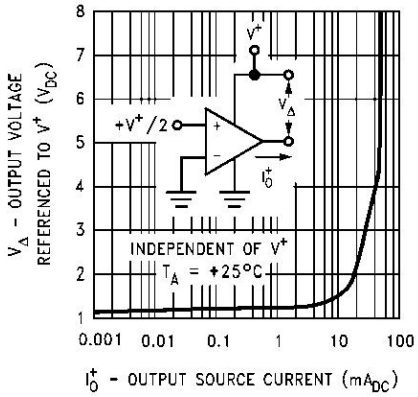
Voltage Follower Pulse Response



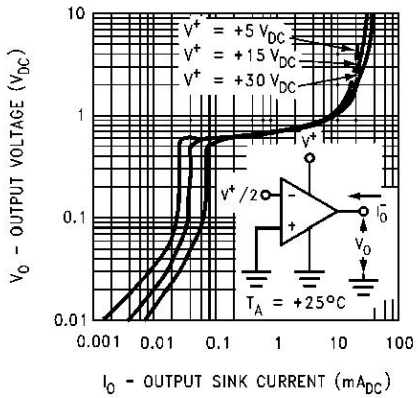
Voltage Follower Pulse Response (Small Signal)



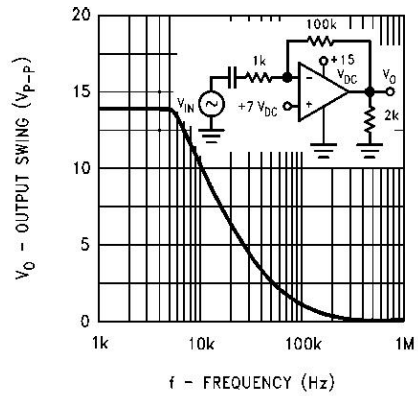
Output Characteristics Current Sourcing



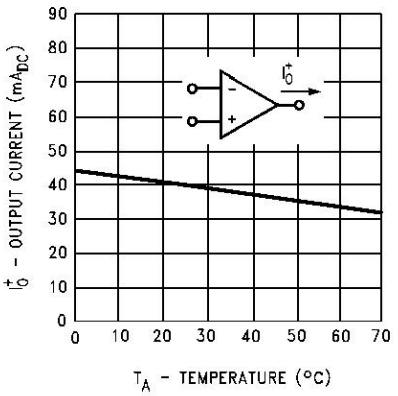
Output Characteristics Current Sinking



Large Signal Frequency Response

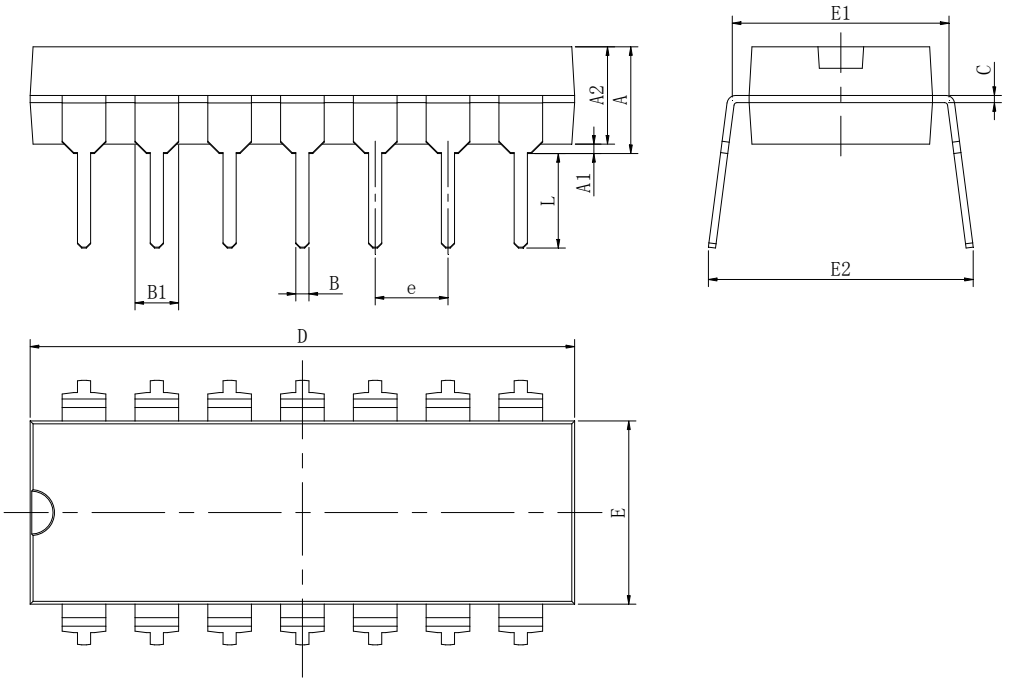


Current Limiting



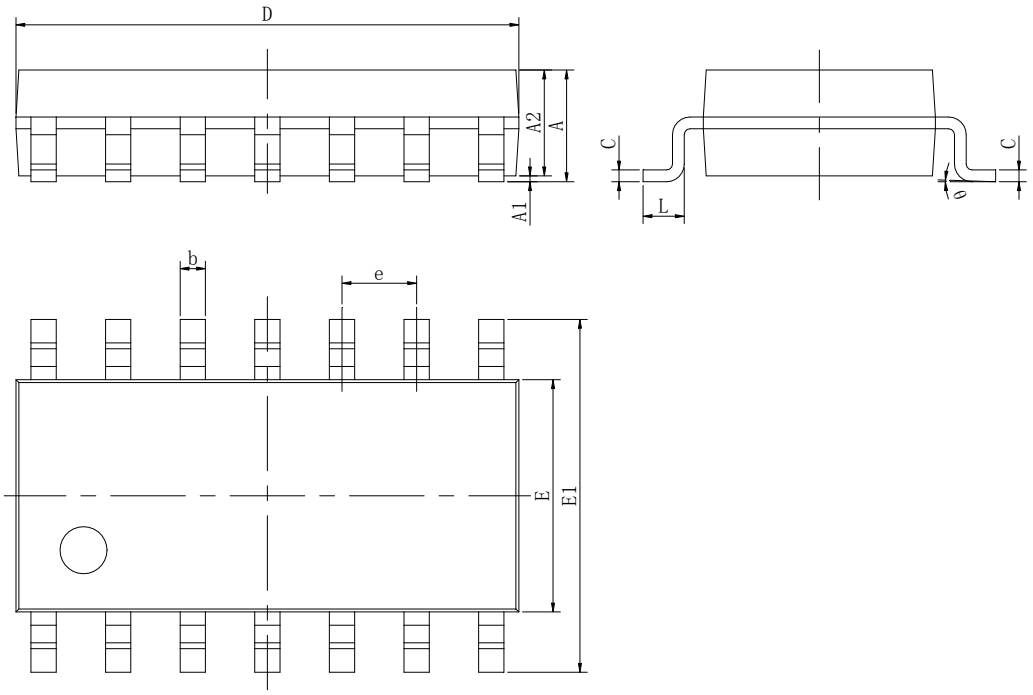
Outline Dimensions

DIP14 Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.204	0.360	0.008	0.014
D	18.800	19.200	0.740	0.756
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540(BSC)		0.100(BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

SOP14 Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	8.360	8.760	0.329	0.345
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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