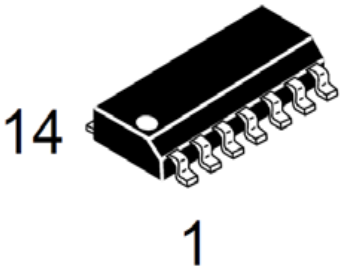
DESCRIPTION

The LM324ADR-CN series are low - cost, quad operational amplifiers with true differential inputs. They have several distinct advantages over standard operational amplifier types in single supply applications. The quad amplifier can operate at supply voltages as low as 3.0 V or as high as 32 V with quiescent currents about one-fifth of those associated with the MC1741 (on a per amplifier basis). The common mode input range includes the negative supply, thereby eliminating the necessity for external biasing components in many applications. The output voltage range also includes the negative power supply voltage.

LM324ADR-CN

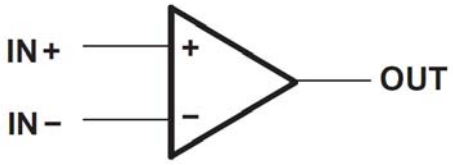


SOP14

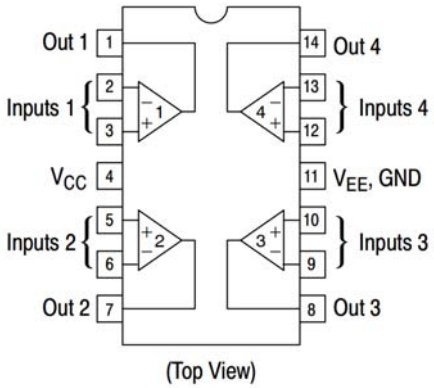
Features

- Short Circuited Protected Outputs
- True Differential Input Stage
- Single Supply Operation: 3.0 V to 32 V
- Four Amplifiers Per Package
- Common Mode Range Extends to Negative Supply
- Industry Standard Pinouts
- Internally Compensated

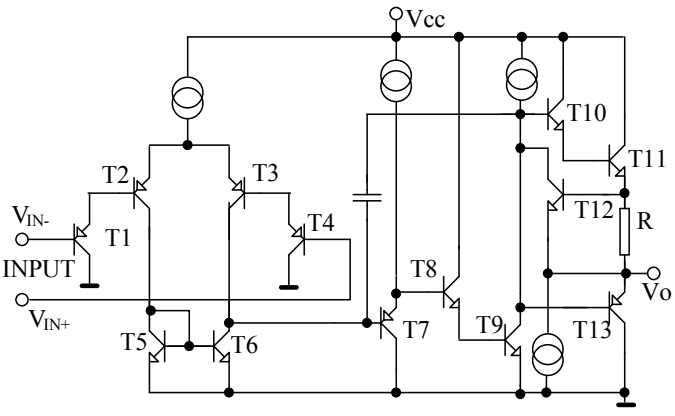
Symbols(EACH AMPLIFIER)



PIN CONNECTIONS



Schematic (each amplifier)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
Vcc	Supply Voltage	32	V
Vi	Input Voltage	-0.3~32	V
Vid	Differential Input Voltage	32	V
Ptot	Power Dissipation SOP	400	mW
Toper	Operating Free Air Temperature Range	-20~85	℃
Tstg	Storage Temperature Range	-55-125	℃

ELECTRICAL CHARACTERISTICS

VCC = 15V, Tamb = 25℃(unless otherwise specified)

Symbol	Parameter	LM324ADR-CN			Unit
		Min.	Typ.	Max.	
Vio	Input Offset Voltage(Rs=50Ω)		±2	±5	mV
Iio	Input Offset Current		±5	±50	nA
Iib	Input Bias Current		45	250	nA
Avd	Large Signal Voltage Gain (Vcc=15V,RL≥2 kΩ)	25	100		V/mV
SVR	Supply Voltage Rejection Ratio	65	100		dB
Icc	Supply Current, per Amp, no Load Vcc=5V Vcc=30V		 0.6 1.5	 2 3	 mA mA
Vicm	Input Common Mode Voltage Range	0	Vcc-1.5		V
CMR	Common Mode Rejection Ratio(Rs=50Ω)	65	80		dB
Vo	Output Voltage Range	0		Vcc-1.5	V
Io	Output Current： Isource,vo=2V Isink,vo=2V	 20 10	 35 13		 mA mA
SR	Slew Rate(Vin=10V，RL=2KΩ，CL=100pF)		0.5		V/us
GBP	Gain Bandwidth Product (f=100kHz ，Vin=10mV ，RL=2KΩ， CL=100pF)		1.2		MHz

Typical Application

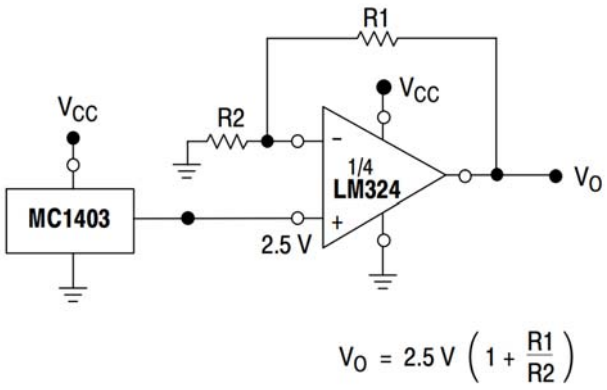


Figure 1. Voltage Reference

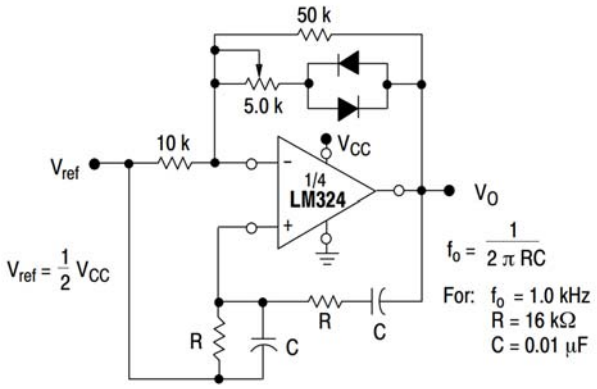


Figure 2. Wien Bridge Oscillator

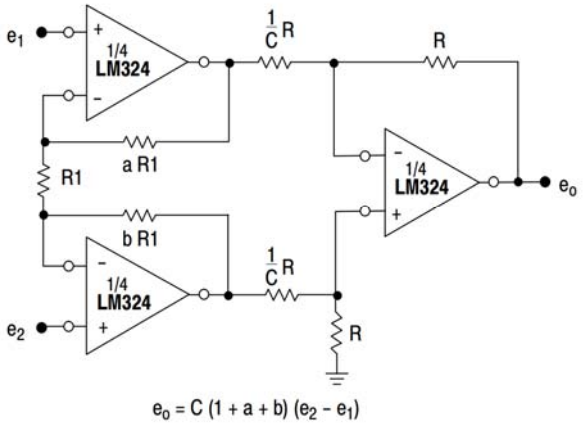


Figure 3. eo = C (1 + a + b) (e2 - e1)

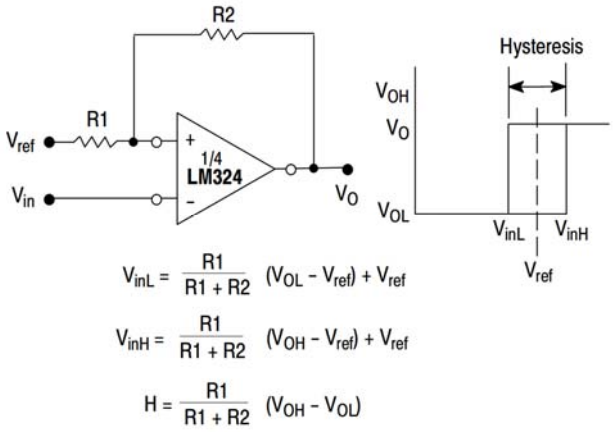


Figure 4. Comparator with Hysteresis

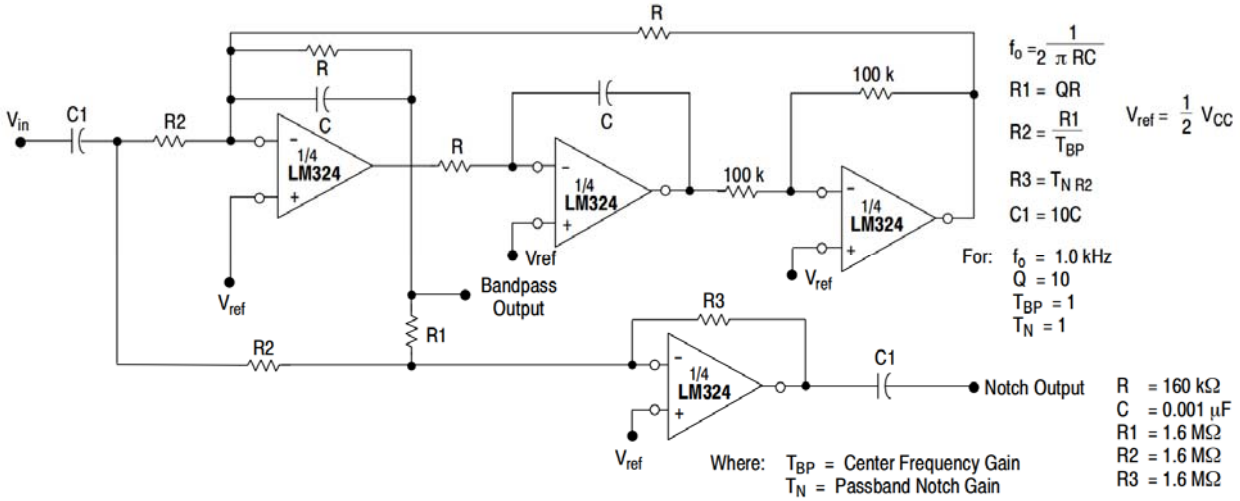


Figure 5. Bi−Quad Filter

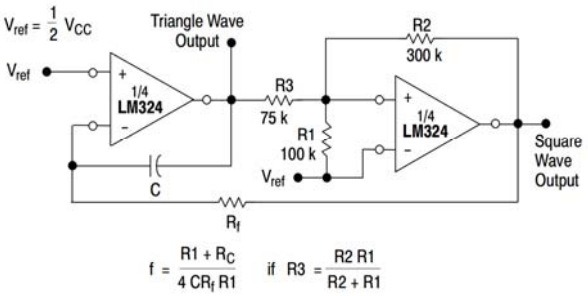


Figure 6. Function Generator

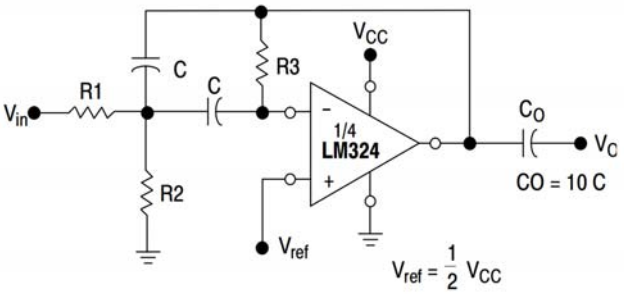


Figure 7. Multiple Feedback Bandpass Filter

Typical Performance Characteristics

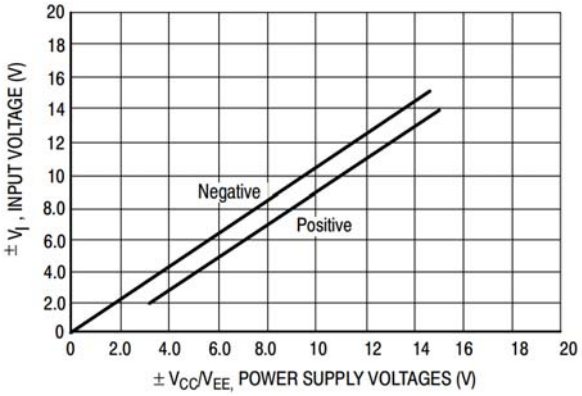


Figure 8. Input Voltage Range

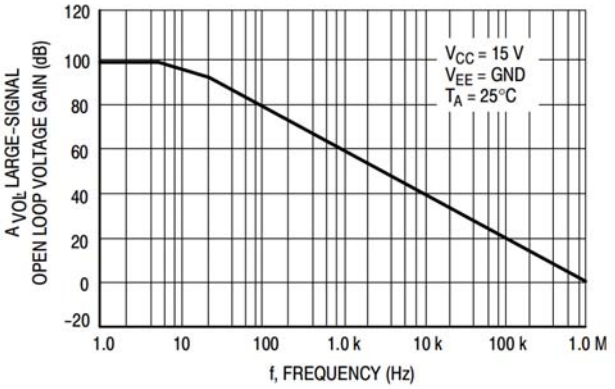


Figure 9. Open Loop Frequency

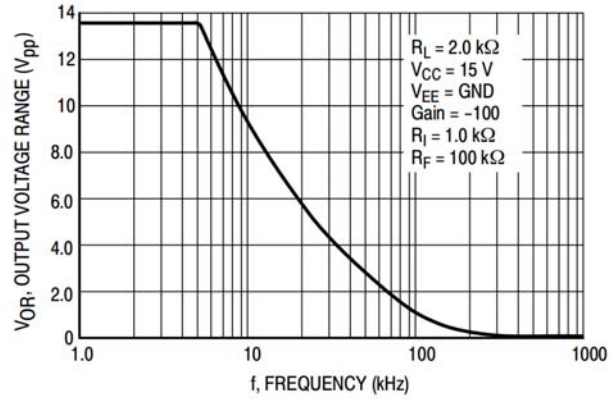


Figure 10. Large−Signal Frequency Response

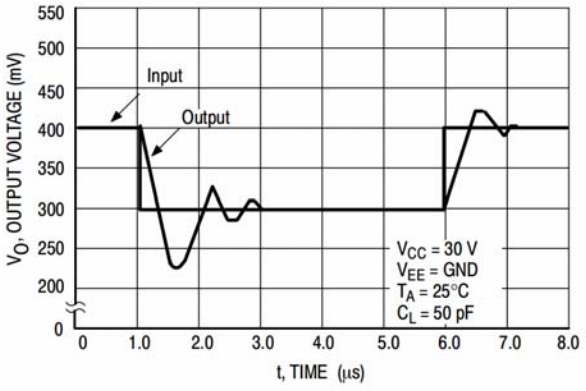


Figure 11. Small−Signal Voltage Follower Pulse Response (Noninverting)

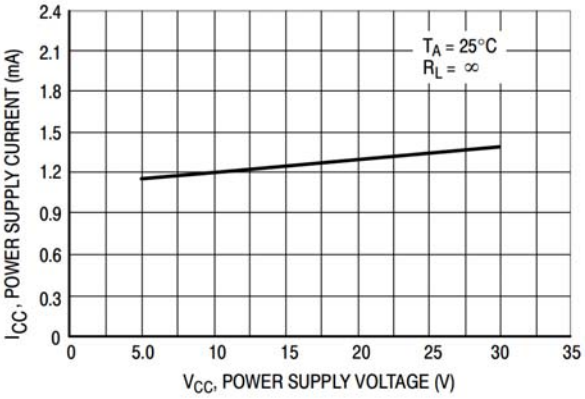


Figure 12. Power Supply Current versus Power Supply Voltage

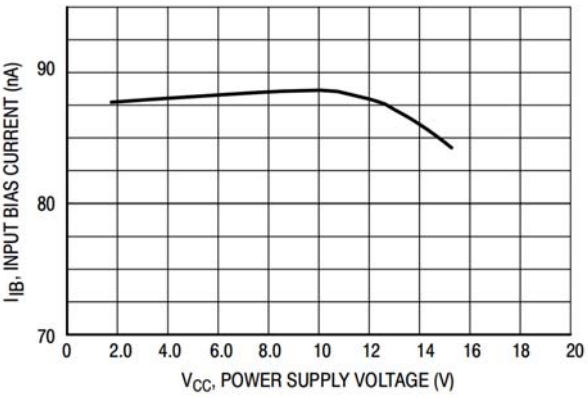
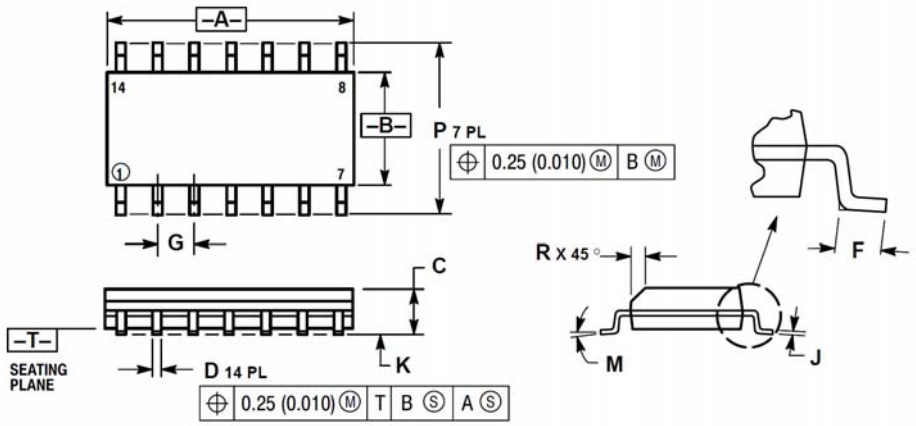


Figure 13. Input Bias Current versus Power Supply Voltage

PACKAGE MECHANICAL DATA



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

SOP14

NOTICE

The information presented in this document is for reference only. Involving product optimization and productivity improvement, ChipNobo reserves the right to adjust product indicators and upgrade some technical parameters. ChipNobo is entitled to be exempted from liability for any delay or non-delivery of the information disclosure process that occurs.
本文件中提供的信息仅供参考。涉及产品优化和生产效率改善，ChipNobo 有权调整产品指标和部分技术参数的升级，所出现信息披露过程存在延后或者不能送达的情形，ChipNobo 有获免责权。

The product listed herein is designed to be used with residential and commercial equipment, and do not support sensitive items and specialized equipment in areas where sanctions do exist. ChipNobo Co., Ltd or anyone on its behalf, assumes no responsibility or liability for any damages resulting from improper use.
此处列出的产品旨在民用和商业设备上使用，不支持确有制裁地区的敏感项目和特殊设备，ChipNobo 有限公司或其代表，对因不当使用而造成的任何损害不承担任何责任。

For additional information, please visit our website http://www.chipnobo.com, or consult your nearest Chipnobo sales office for further assistance.
欲了解更多信息，请访问我们的网站 http://www.chipnobo.com，或咨询离您最近的 Chipnobo 销售办事处以获得进一步帮助。