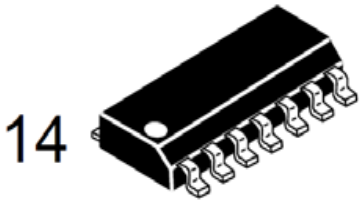
DESCRIPTION

The LM224DR-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.

LM224DR-CN



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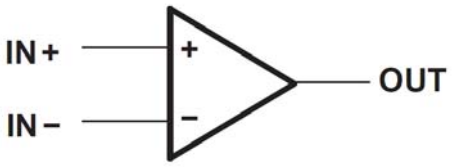
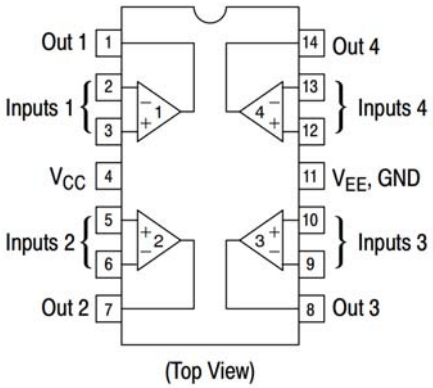
Features

- 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

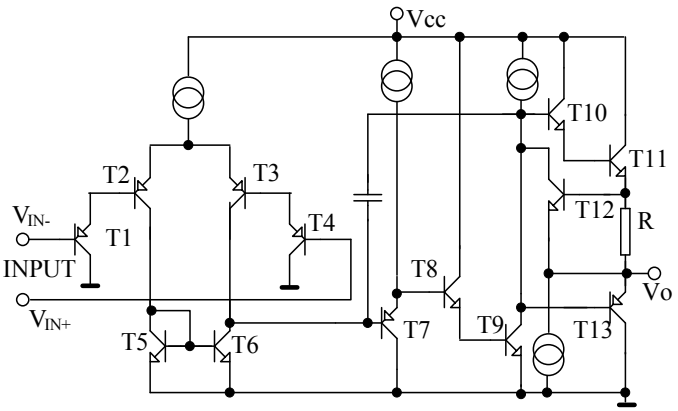
Symbols(EACH AMPLIFIER)



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	LM224DR-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

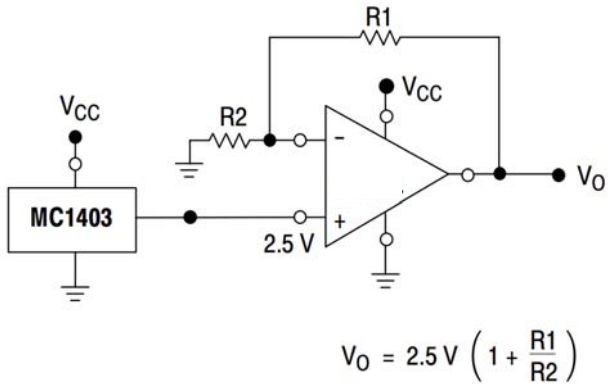


Figure 1. Voltage Reference

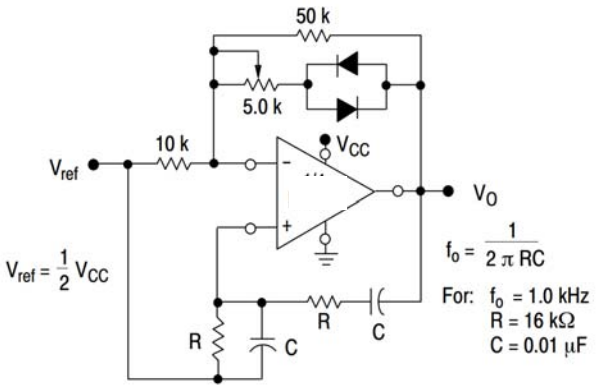


Figure 2. Wien Bridge Oscillator

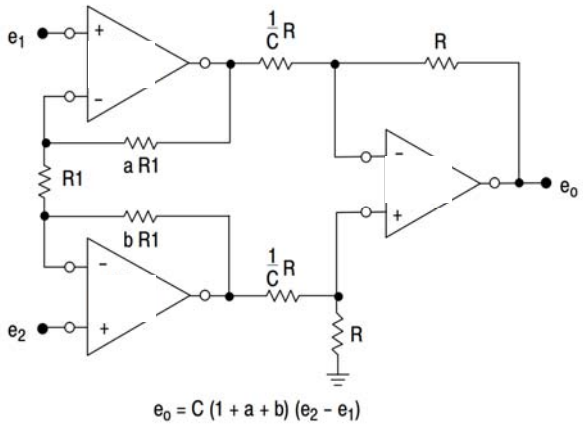


Figure 3. eo = C (1 + a + b) (e2 - e1)

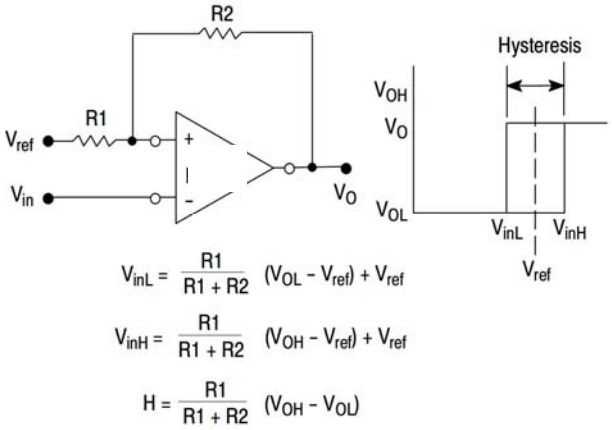


Figure 4. Comparator with Hysteresis

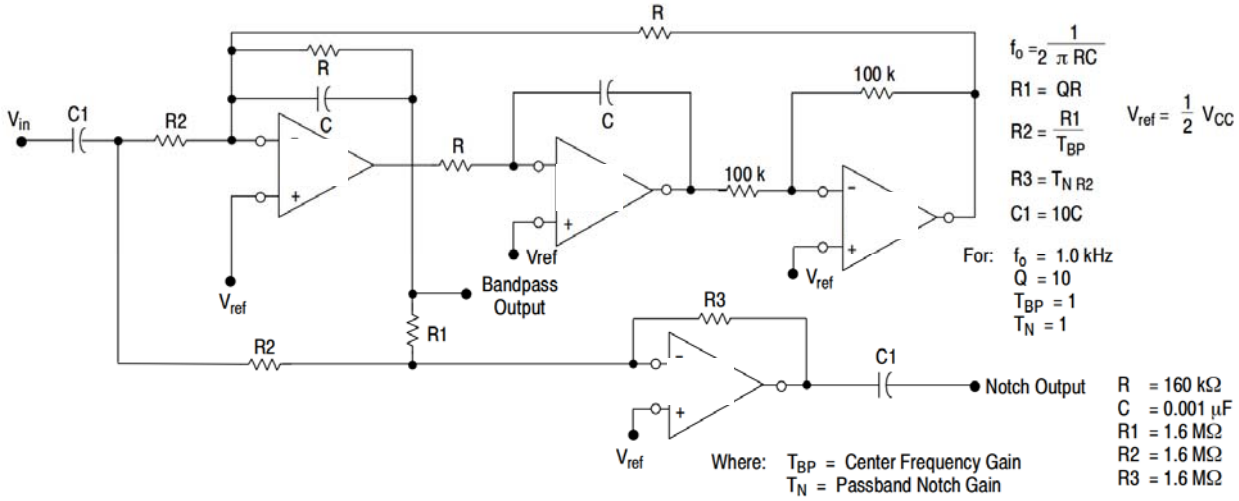


Figure 5. Bi−Quad Filter

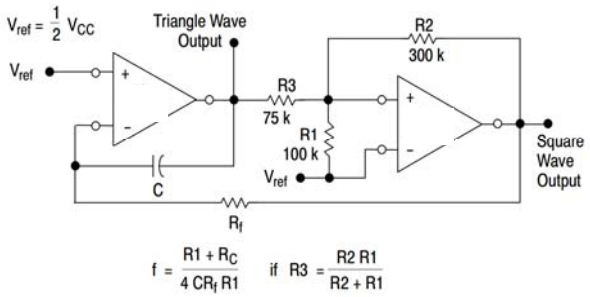


Figure 6. Function Generator

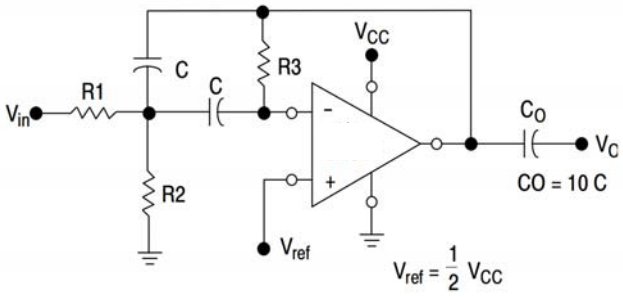


Figure 7. Multiple Feedback Bandpass Filter

Typical Performance Characteristics

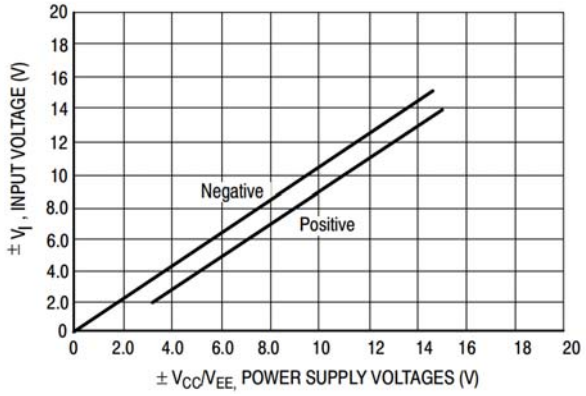


Figure 8. Input Voltage Range

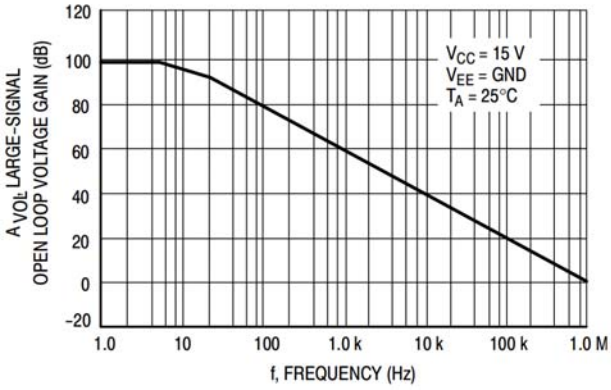


Figure 9. Open Loop Frequency

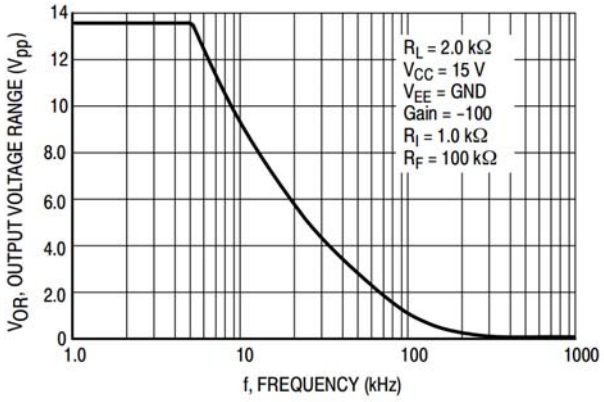


Figure 10. Large−Signal Frequency Response

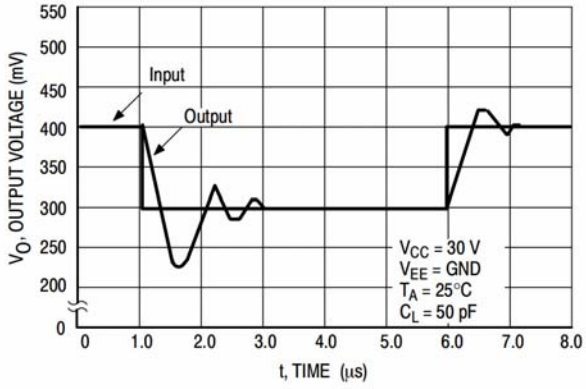


Figure 11. Small−Signal Voltage Follower Pulse Response (Noninverting)

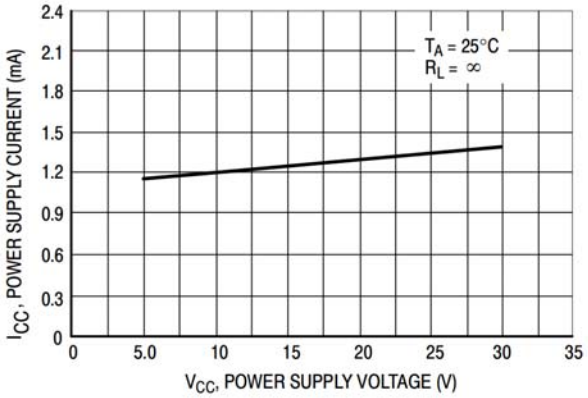


Figure 12. Power Supply Current versus Power Supply Voltage

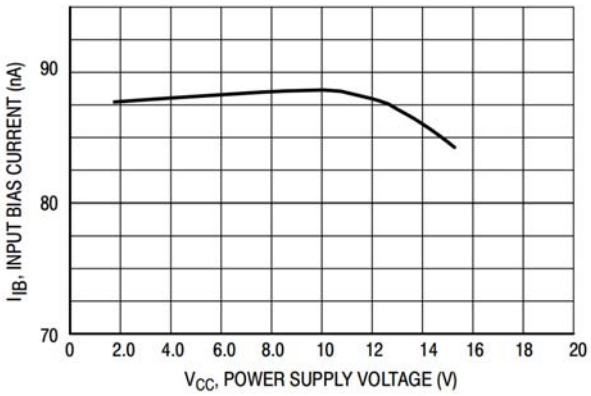
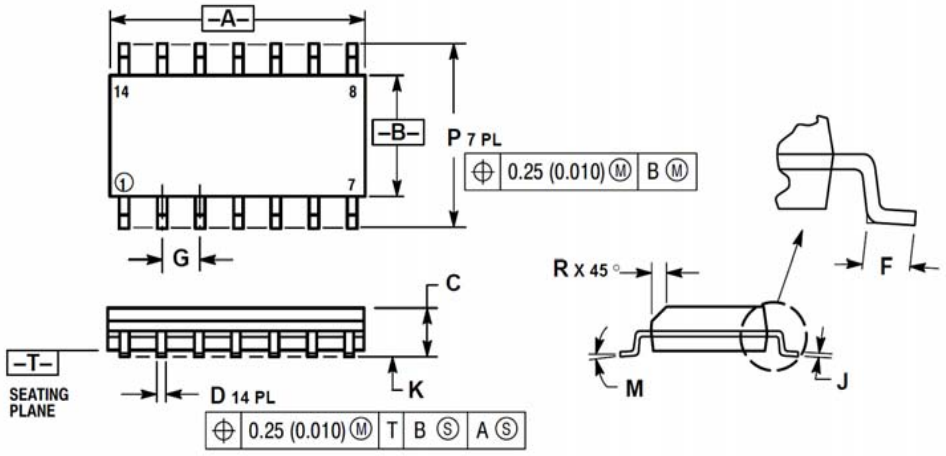


Figure 13. Input Bias Current versus Power Supply Voltage

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

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