

QUAD OPERATIONAL AMPLIFIERS

DESCRIPTION

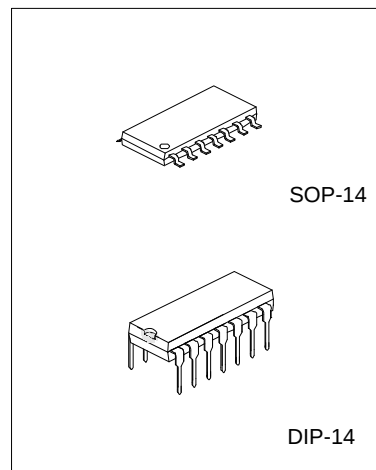
The HK324 consists of four independent, high gain internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide voltage range.

Operation from split power supplies is also possible so long as the difference between the two supplies 3 Volts to 32 volts.

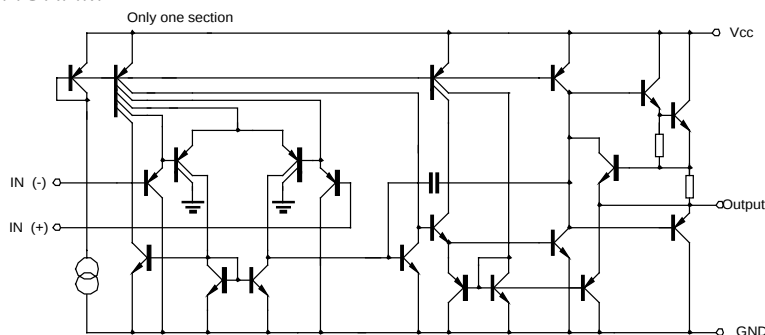
Application areas include transducer amplifier, DC gain blocks and all the conventional OP amp circuits which now can be easily implemented in single power supply system.

FEATURES

- *Internally frequency compensated for unity gain
- *Large DC voltage gain :100dB
- *Wide operating supply range($V_{CC}=3V\sim 32V$)
- *Input common-mode voltage includes ground
- *Large output voltage swing: From 0V to $V_{CC}-1.5V$
- *Power drain suitable for battery operation



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}C$)

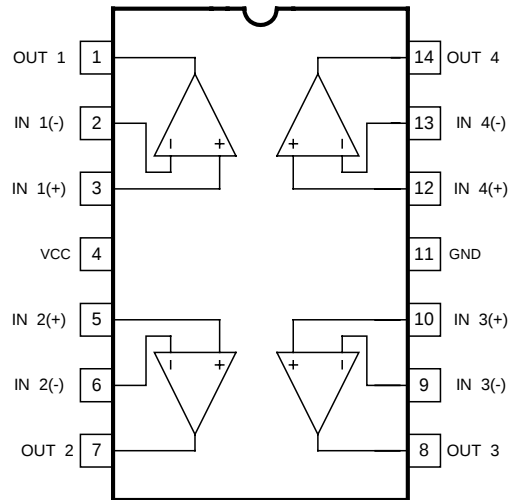
Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	± 16	V
Differential input voltage	$V_{I(diff)}$	32	V
Input Voltage	V_I	-0.3~32V	V
Power Dissipation	P_d	570	mW
Operating Temperature	T_{opr}	0 to +70	$^{\circ}C$
Storage Temperature	T_{stg}	-65 to 150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS(Ta=25°C)

(Vcc=5.0V, All voltage referenced to GND unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Input offset voltage	V_{IO}	$V_{CM}=0$ to $V_{CC}-1.5$ $V_{O(p)}=1.4V, R_S=0$		1.5	7.0	mV
Input offset current	I_{IO}			3.0	50	nA
Input Bias current	I_B			40	250	nA
Input Common-mode voltage range	$V_{I(R)}$	$V_{CC}=30V$	0	$V_{CC}-1.5$		V
Supply Current	I_{CC}	$R_L=\infty, V_{CC}=30V$		1.0	3	mA
		$V_{CC}=5V$		0.7	1.2	mA
Large signal Voltage Gain	G_V	$V_{CC}=15V, R_L>2k\Omega$ $V_{O(p)}=1V$ to $11V$	25	100		V/mV
Output voltage Swing	$V_{(OH)}$	$V_{CC}=30V, R_L=2k\Omega$	26			V
		$V_{CC}=30V, R_L=10k\Omega$	27	28		V
	$V_{(OL)}$	$V_{CC}=5, R_L>10k\Omega$		5	20	mV
Common-mode rejection Ratio	CMRR		65	75		dB
Power supply rejection Ratio	PSRR		65	100		dB
Channel Separation	CS	$f=1kHz$ to $20kHz$		5	20	mV
Short circuit to GND	I_{SC}			40	60	mA
Output current	I_{source}	$V_I(+)=1V, V_I(-)=0$ $V_{CC}=15V, V_{O(p)}=2V$	20	40		mA
	I_{sink}	$V_I(+)=0V, V_I(-)=1V$ $V_{CC}=15V, V_{O(p)}=2V$	10	13		mA
		$V_I(+)=1V, V_I(-)=0$ $V_{CC}=15V, V_{O(p)}=200V$	12	45		μA
Differential input voltage	$V_I(diff)$				V_{CC}	V

PIN CONFIGURATION



TYPICAL CHARACTERISTICS PERFORMANCE

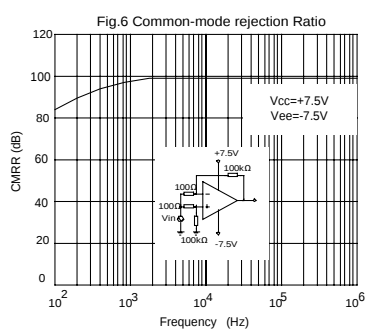
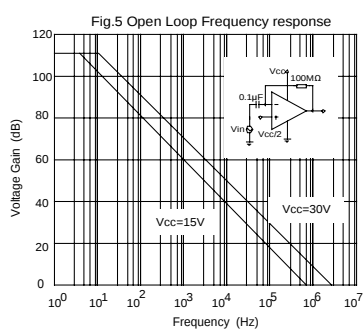
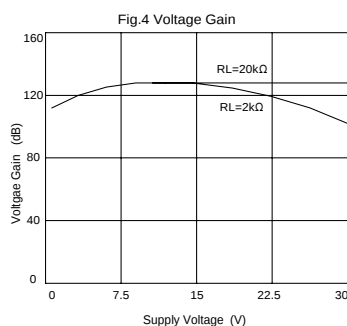
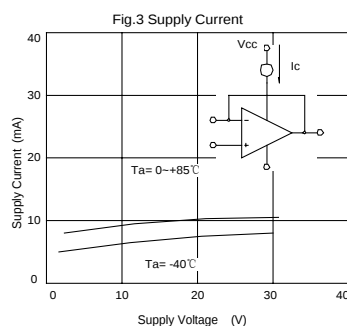
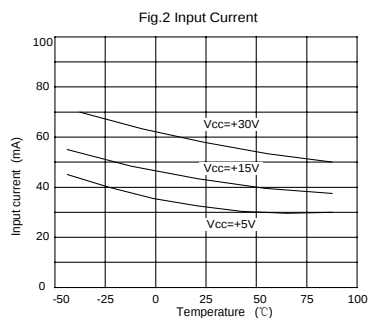
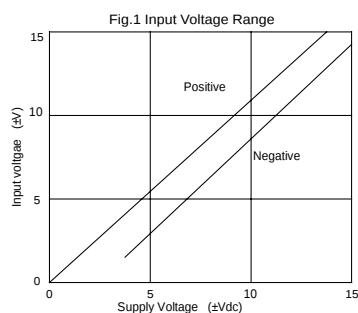


Fig.7

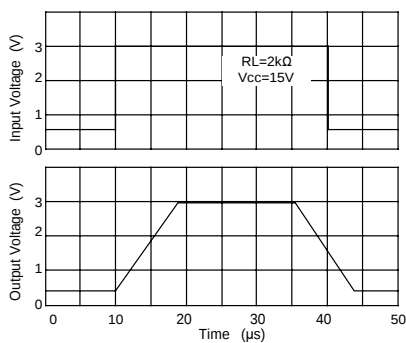


Fig.8 voltage Follower pulse response (small signal)

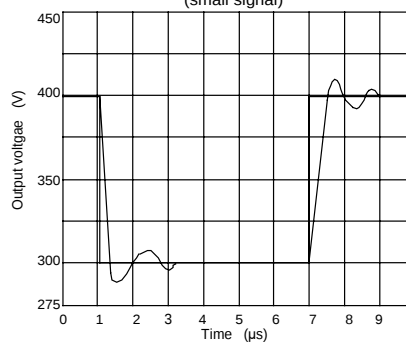


Fig.9 Large signal Frequency Response

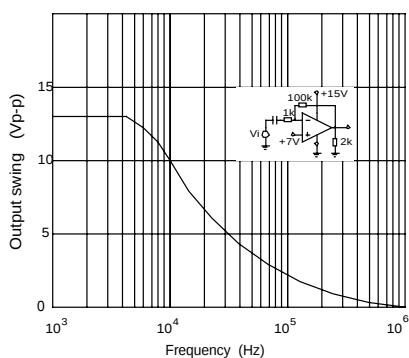


Fig.10 Output Characteristics current sourcing

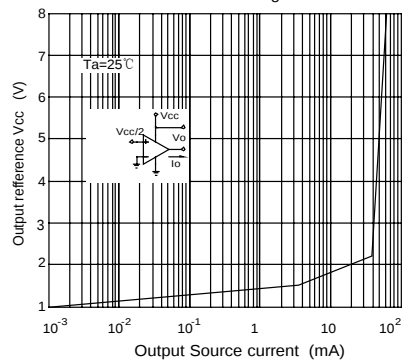


Fig.11 Output Characteristics Current sinking

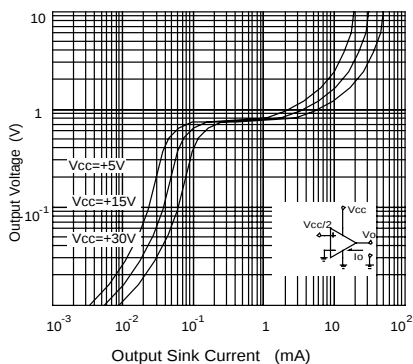


Fig.12 Current Limiting

