Ordering number : ENN2704C

LA6324N

ON Semiconductor®

http://onsemi.com

Monolithic Linear IC

High-Performance Quad Operational Amplifier

Overview

The LA6324 consists of four independent, high-performance, internally phase compensated operational amplifiers that are designed to operate from a single power supply over a wide range of voltages. These four operational amplifiers are packaged in a single package. As in case of conventional general-purpose operational amplifiers, operation from dual power supplies is also possible and the power dissipation is low. It can be applied to various uses in commercial and industrial equipment including all types of transducer amplifiers and DC amplifiers.

Features

- No phase compensation required
- Wide operating voltage range:
  - 3.0 V to 30.0 V (single supply)
  - ±1.5 V to ±15.0 V (dual supplies)
- Highly resistant to dielectric breakdown
- Input voltag range includes the neighborhood of GND level and output voltage range V_{OUT} is from 0 to V_{CC} −1.5 V.
- Small current dissipation:
  I_{CC} = 0.6 mA typ/V_{CC} = + 5 V, R_L = ∞

Specitications

Absolute Maximum Ratings at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply voltage	V_{CC} max		32	V
Differential input voltage	V_{ID}		32	V
Maximum input voltage	V_{IN} max		-0.3 to +32	V
Allowable power dissipation	Pd max	LA6324N	720	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +125	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

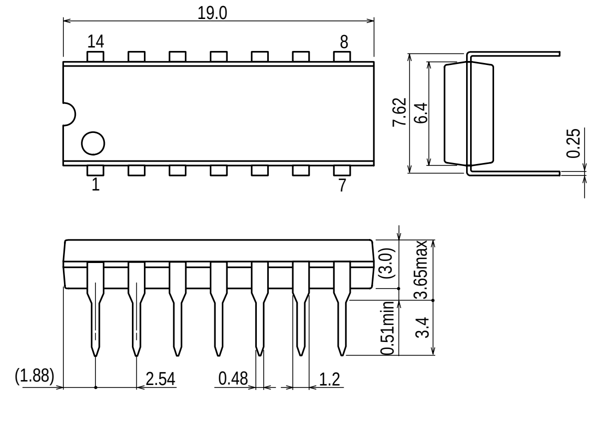
Operating Characteristics at Ta = 25 °C, V_{CC} = +5 V

Parameter	Symbol	Conditions	Test circuit	Ratings			Unit
				min	typ	max	
Input offset voltage	V_{IO}		1		±2	±7	mV
Input offset current	I_{IO}	$I_{IN}(+)$ / $I_{IN}(-)$	2		±5	±50	nA
Input bias current	I_B	$I_{IN}(+)$ / $I_{IN}(-)$	3		45	250	nA
Common-mode input voltage range	V_{ICM}		4	0		V_{CC} –1.5	V
Common-mode rejection ratio	CMR		4	65	80		dB
Voltage gain	VG	V_{CC} = 15 V, $R_L \geq 2$ kΩ	5	25	100		V/mV
Output voltage range	V_{OUT}			0		V_{CC} –1.5	V
Supply voltage rejection ratio	SVR		6	65	100		dB
Channel separation	CS	f = 1 k to 20 kHz	7		120		dB
Current drain	I_{CC}		8		0.6	2	mA
	I_{CC}	V_{CC} = 30 V	8		1.5	3	mA
Output current (Source)	I_O source	V_{IN}^+ = 1 V, V_{IN}^- = 0 V	9	20	40		mA
Output current (Sink)	I_O sink	V_{IN}^+ = 0 V, V_{IN}^- = 1 V	10	10	20		mA

Package Dimensions

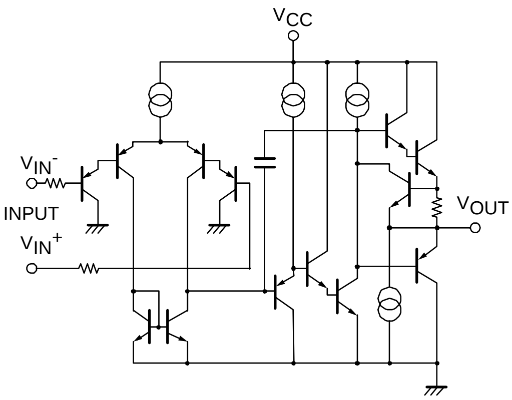
unit : mm

3003B [LA6324N]



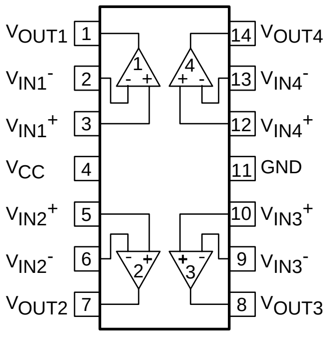
Equivalent Circuit

(1 unit)



Pin Assignment

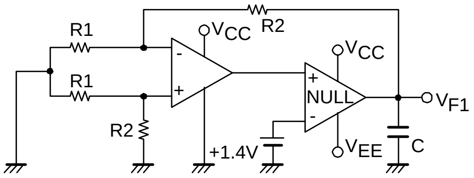
(LA6324N)



Top view

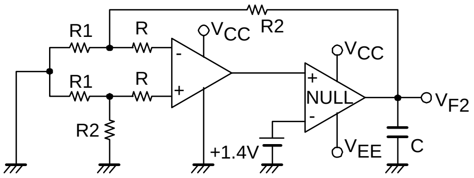
Test Circuit

1. Input offset voltage V_{IO}



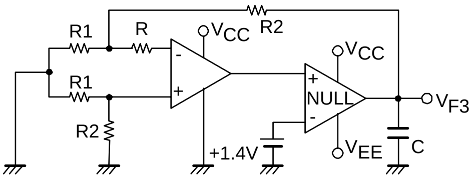
$$V_{IO} = \frac{V_{F1}}{1+R2/R1}$$

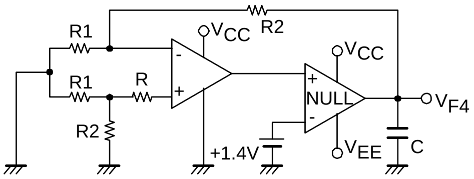
2. Input offset current I_{IO}



$$I_{IO} = \frac{V_{F2} - V_{F1}}{R(1+R2/R1)}$$

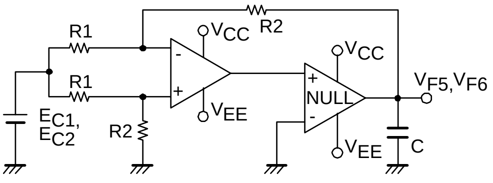
3. Input bias current I_B





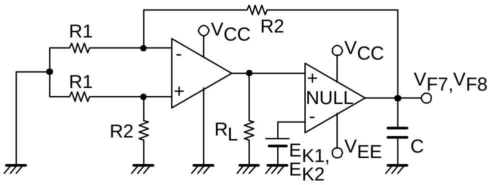
$$I_B = \frac{V_{F4} - V_{F3}}{2R(1+R2/R1)}$$

4. Common-mode rejection ratio CMR
   Common-mode input voltage range V_{ICM}



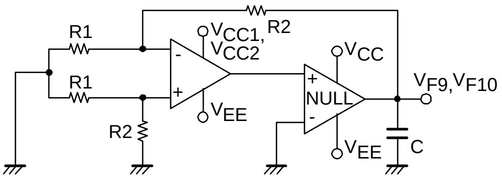
$$CMR = 20 \log \left| \frac{(E_{C1} - E_{C2})\,(1+R2/R1)}{V_{F5} - V_{F6}} \right|$$

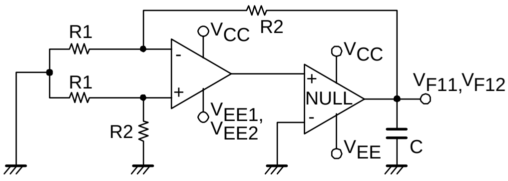
5. Voltage gain VG



$$VG = \frac{(E_{K1} - E_{K2})\,(1+R2/R1)}{V_{F8} - V_{F7}}$$

6. Supply voltage rejection ratio SVR

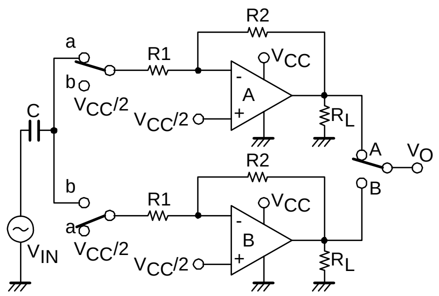




$$SVR\,(+) = 20 \log \left| \frac{(1+R2/R1)\,(V_{CC1} - V_{CC2})}{V_{F9} - V_{F10}} \right|$$

$$SVR\,(-) = 20 \log \left| \frac{(1+R2/R1)\,(V_{EE1} - V_{EE2})}{V_{F11} - V_{F12}} \right|$$

7. Channel separation CS

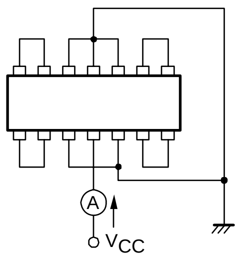


SW: a
$$CS\,(A \rightarrow B) = 20 \log \frac{R2\,V_{OA}}{R1\,V_{OB}}$$

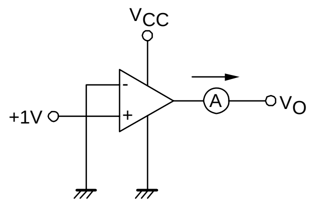
SW: b
$$CS\,(B \rightarrow A) = 20 \log \frac{R2\,V_{OB}}{R1\,V_{OA}}$$

These apply also to other channels.

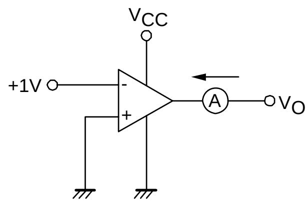
8. Current drain I_{CC}



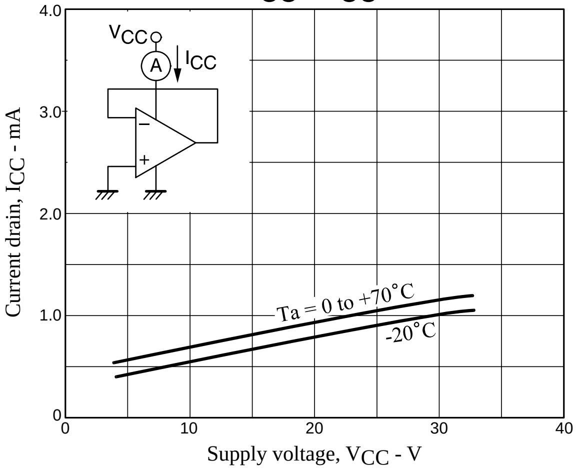
9. Output current I_O source



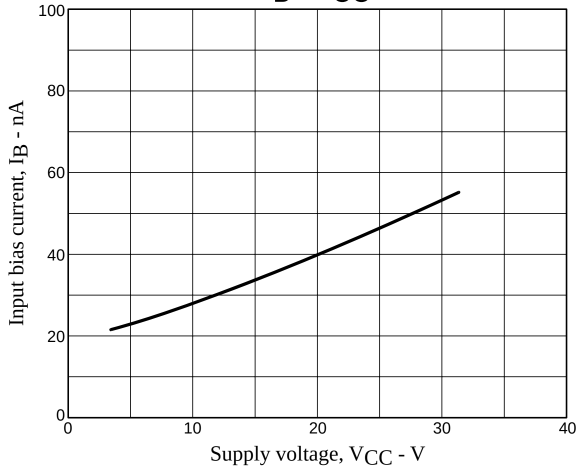
10. Output current I_O sink



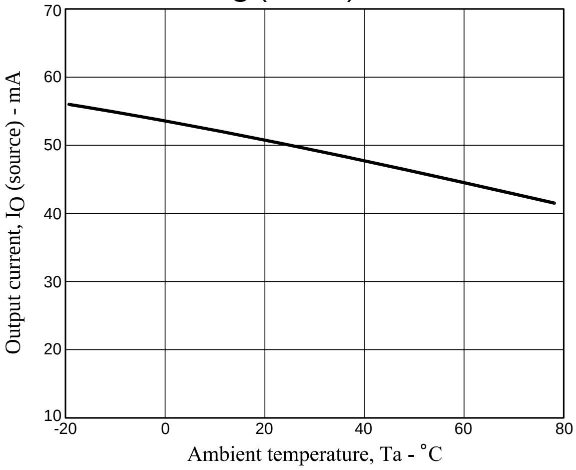
I_{CC} - V_{CC}



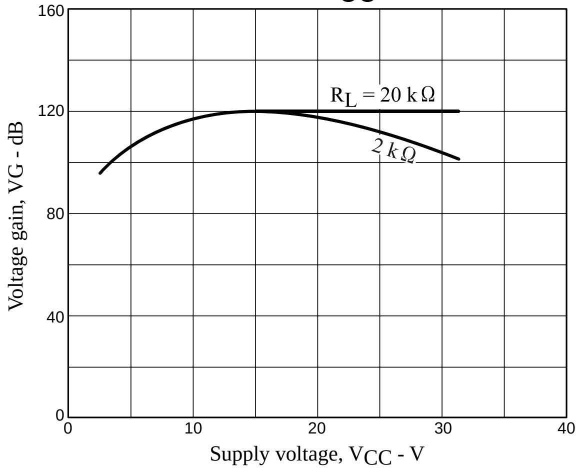
I_B - V_{CC}



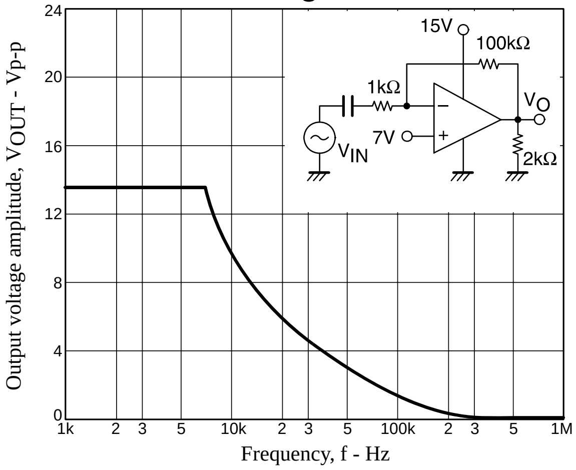
I_O (source) - Ta



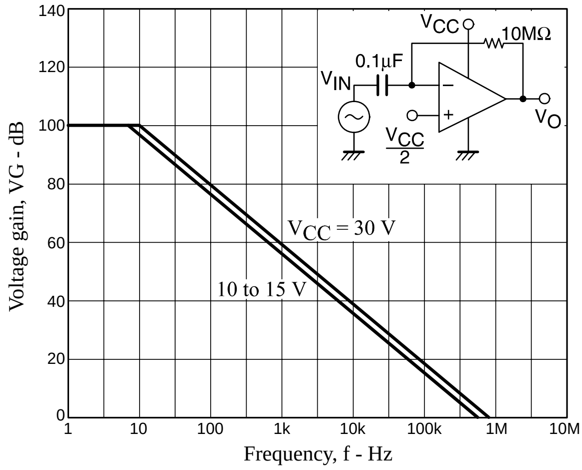
VG - V_{CC}

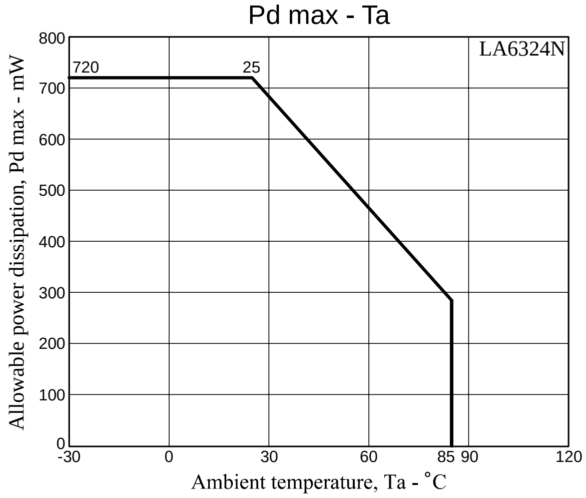


V_O - f



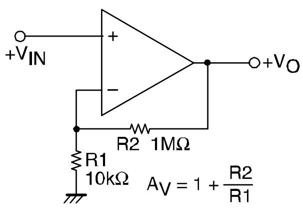
VG - f



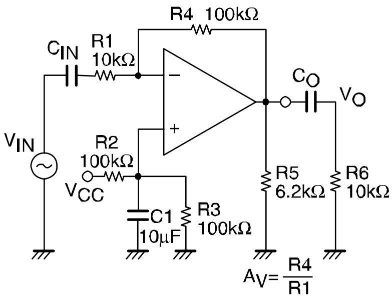


Sample Application Circuits

Noninverting DC amplifier



Rectangular wave oscillator



Inverting AC amplifier