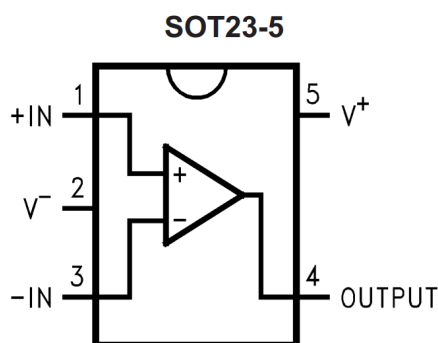


Overview

The LM321A brings both performance and cost-effectiveness to low-power systems. With a high gain-bandwidth product and a guaranteed slew rate of $0.4 \text{ V}/\mu\text{s}$, the quiescent current is only $430 \mu\text{A}$ per amplifier (at 5V). The input common-mode range includes ground, allowing the device to operate in both single-supply and dual-supply applications. It is also capable of comfortably driving high-capacitance loads.

The LM321A uses a SOT23-5 package. Overall, the LM321A is a low-power, wide-supply-range performance operational amplifier that can be designed into various applications at an economical price, without sacrificing valuable PCB space.

Pin Diagram



Main Features

- High gain-bandwidth product
- Low quiescent current
- Low input bias current
- Wide supply voltage range
- Stable with high capacitive loads

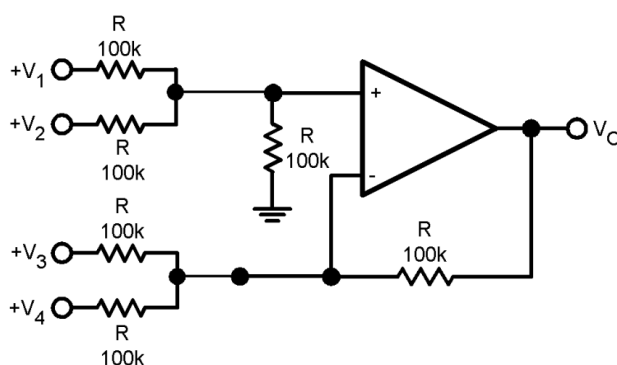
Application

- Charger
- Power supply
- Industry: control, instrumentation
- Desktop computer
- Communication
- infrastructure

Application Circuit

DC Summing Amplifier

($V_{IN'S} \geq 0V_{DC}, V_O \geq 0V_{DC}$)



Note: $V_O = V_1 + V_2 - V_3 - V_4$, ($V_1 + V_2 \geq (V_3 + V_4)$) to maintain $V_O \geq 0V_{DC}$

Limiting values (absolute maximum ratings, unless otherwise specified, $T_{amb} = 25^{\circ}\text{C}$)

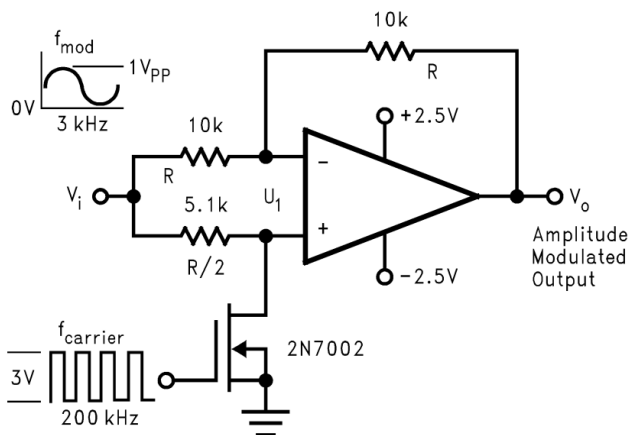
Parameter Name		Numerical Value	Unit
Power Supply Voltage		24 or ± 12	V
Differential input voltage		24	V
Input Voltage		-0.3 ~ V_{CC}	V
Power Consumption (Note 1)	DIP Package	830	mW
	SOP Package	530	
Output-to-ground short-circuit current (per amplifier)($V \leq 15\text{V}$, $T_a = 25^{\circ}\text{C}$)		Continuous	
Input current ($V_{IN} < -0.3\text{V}$)		50	mA
Maximum Operating Junction Temperature		150	$^{\circ}\text{C}$
Working environment temperature		0 ~ 70	$^{\circ}\text{C}$
Storage Temperature		-65 ~ 150	$^{\circ}\text{C}$

Note 1: The maximum junction temperature must not be exceeded.

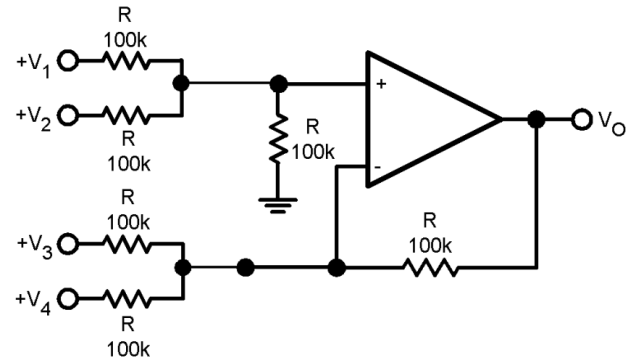
Electrical characteristics (unless otherwise specified, $V_{CC} = 5.0\text{V}$)

Parameters		Test Conditions		Standard Value			Unit
				Min	Typ	Max	
Input offset voltage		Ta=25℃			±2	±5	mV
Input bias current		Ta=25℃, IIN(+) or IIN(-), VCM=0V			±45	±250	nA
Input unbalanced current		Ta=25℃, IIN(+) - IIN(-), VCM=0V			±3	±50	nA
Input Common-Mode Voltage Range		Ta=25℃, V*=24V		0		Vcc -1.5	V
Power Supply Current		RL = ∞ on all operational amplifiers	Vcc =24V		0.7	2	mA
			Vcc =5V		0.5	1.2	mA
Large-signal voltage gain		Vcc =15V, Ta=25℃, RL≥2kΩ (Regarding Vo=1~11V)		25	100		V/mV
Common-Mode Rejection Ratio		DC, Ta=25℃, VCM=0~Vcc-1.5V		65	90		dB
Power Supply Rejection Ratio		DC, Ta=25℃, Vcc =5~24V		65	100		dB
Output Source Current		VIN(+)=1V,VIN(-)=0V,Vcc=15V,Vo=2V,Ta=25℃		20	40		mA
Output leakage current		VIN(-)=1V,VIN(+)=0V,Vcc=15V,Vo=2V,Ta=25℃		10	15		mA
		VIN(-)=1V,VIN(+)=0V,Vcc=15V,Vo=200mV, Ta=25℃		12	50		μA
Ground Short-Circuit Current		Vcc=15V, Ta=25℃			40	60	mA
Output voltage swing	VOH	Vcc=24V	RL=2kΩ	22			V
		Vcc=24V	RL=10kΩ	22			V
	VOL	Vcc=5V, RL=10kΩ			5	20	mV

Typical Applications



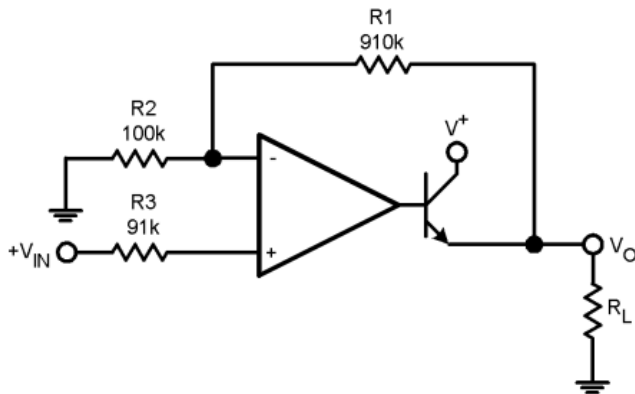
Amplitude Modulator Circuit



Note: $V_o = V_1 + V_2 - V_3 - V_4, (V_1 + V_2) \geq (V_3 + V_4)$ to maintain $V_o \geq 0V_{DC}$

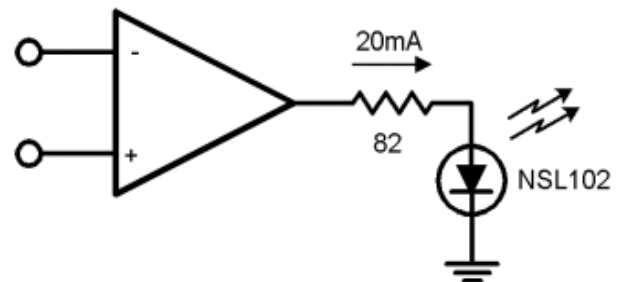
DC Summing Amplifier

($V_{IN}'S \geq 0V_{DC}, V_o \geq V_{DC}$)

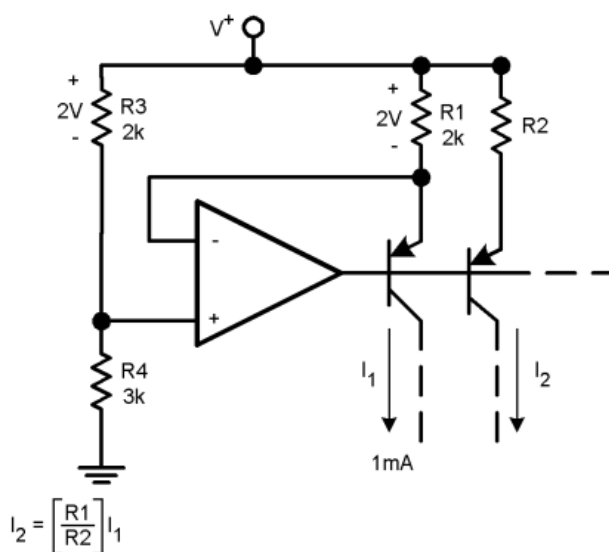


$V_o = 0V_{DC}$ for $V_{IN} = 0V_{DC}$, $A_v = 10$

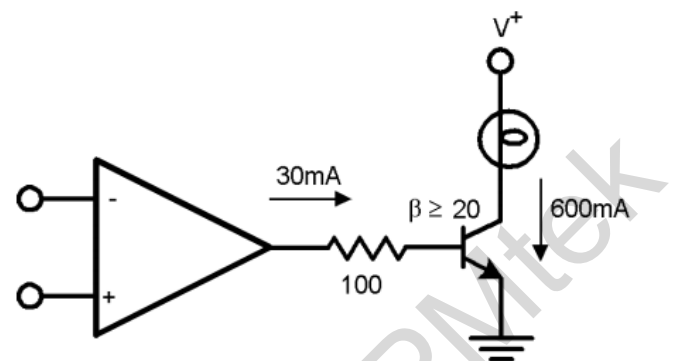
Power Amplifier



LED Driver

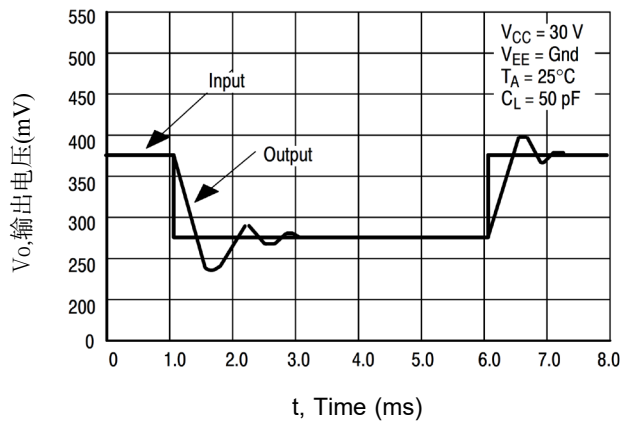
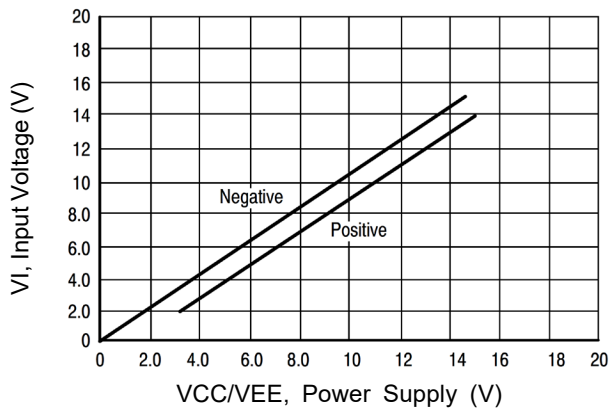


Constant Current Source

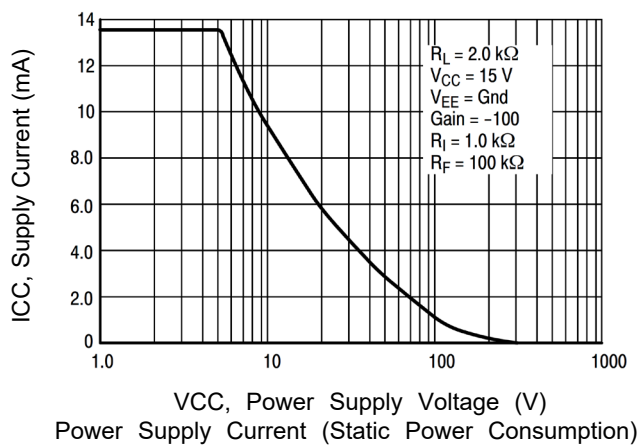


Lamp Driver

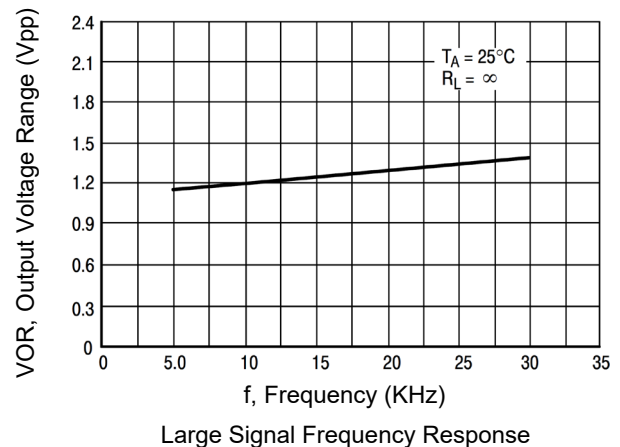
Typical Characteristic Curve



Input Voltage Range



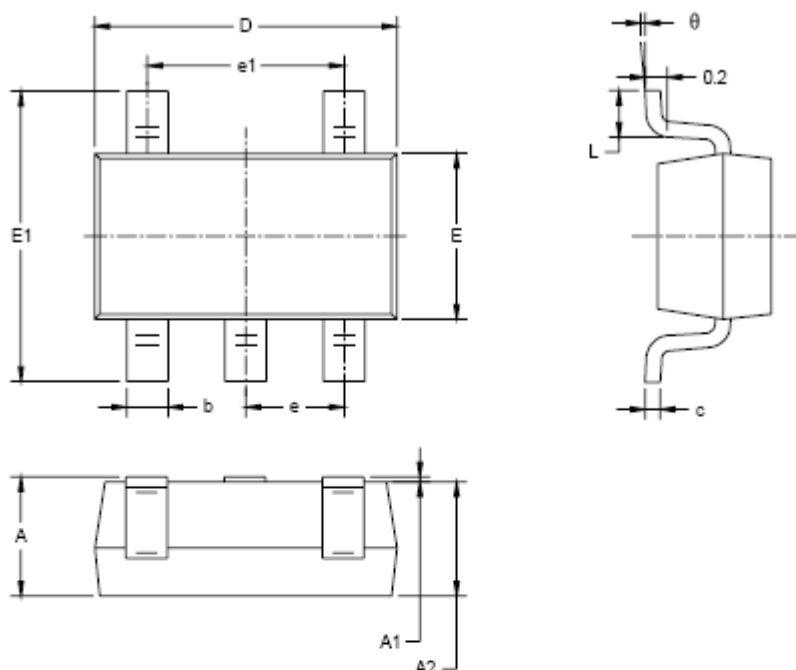
Small-Signal Voltage Follower Pulse Response (In-Phase)



Large Signal Frequency Response

Encapsulated Information

SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.800	0.012	0.024
θ	0°	8°	0°	8°

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