

Low Power Single Operational Amplifier

Description

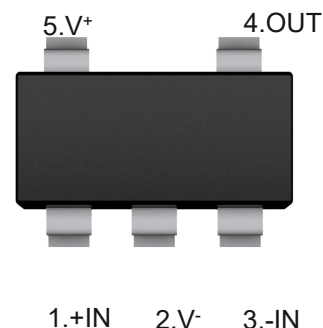
LM321 is a low power, wide power range performance operational amplifier; The static current is only 430 μA per amplifier (5V) with high unit gain frequency and A voltage swing rate of 0.4V/ μs . Input common model circuit includes ground, so the device can operate in single - and dual-power applications. It can also comfortably drive large capacity loads.

Features

- Low quiescent current
- Low input bias current
- Wide range of supply voltage
- High capacity load stability

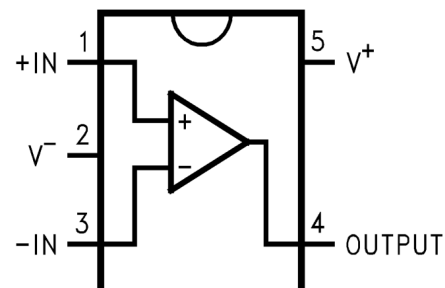
Application

- Communication infrastructure
- Battery charger
- Power supply



SOT-23-5

Pin arrangement diagram



Absolute Maximum Ratings (T_A=25°C)

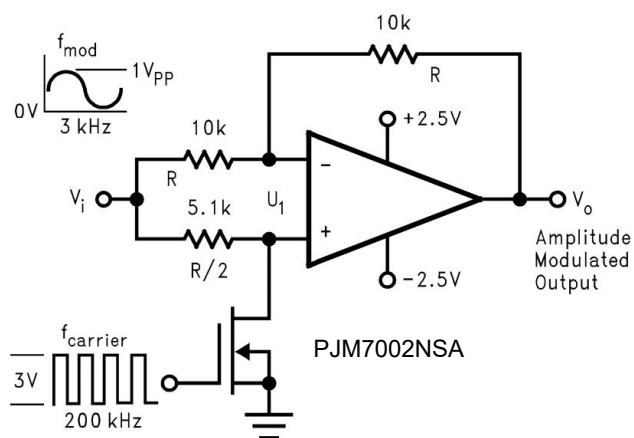
Parameter	Symbol	Value	Units
Supply Voltage	V _{CC}	24 or ±12	V
Differential Input Voltage	V _{ID}	24	V
Input Voltage	V _{IN}	-0.3~V _{CC}	V
Power Dissipation	P _D	530	mW
Output Short Circuit to GND V≤15V, T _a =25°C	I _O	Continuous	
Input Current V _{IN} <-0.3V	I _{IN}	50	mA
Junction Temperature	T _J	150	°C
Operating Temperature Range	T _{OPR}	0 to 70	°C
Storage Temperature Range	T _{STG}	-65 to 150	°C

Electrical Characteristics

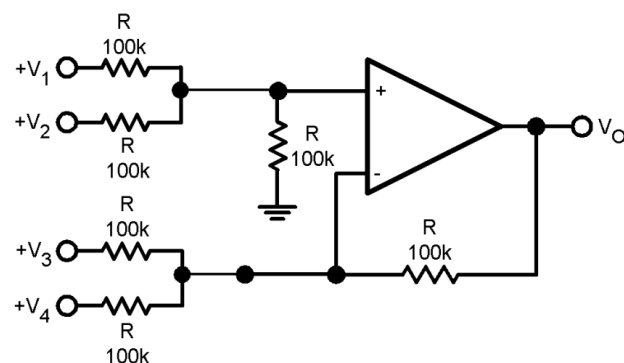
At V_{CC}=5V, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage	V _{OS}	T _a =25°C	--	±2	±5	mV
Input offset current	I _{OS}	T _a =25°C, I _{IN} (+) - I _{IN} (-) , V _{CM} =0V	--	±3	±50	nA
Input bias current	I _B	T _a =25°C, I _{IN} (+) or I _{IN} (-) , V _{CM} =0V	--	±45	±250	nA
Common-mode input voltage range	V _{CM}	T _a =25°C, V ⁺ =24V	0	--	V _{CC} -1.5	V
Supply current	I _S	V _{CC} =24V, R _L = ∞	--	0.7	2	mA
		V _{CC} =5V, R _L = ∞	--	0.5	1.2	
Common Mode Rejection	CMRR	V _{CM} = 0~V _{CC} -1.5V, T _a =25°C, DC	65	90	--	dB
Power Supply Rejection	PSRR	V _{CC} = 5V~24V, T _a =25°C, DC	65	100	--	dB
Large signal voltage gain	A _V	V _{CC} = 15V, T _a =25°C, R _L ≥ 2kΩ (for V _O =1~11V)	25	100	--	V/mV
Output voltage swing	V _O	V _{OH} V _{CC} = 24V, R _L = 2 kΩ	22	--	--	V
		V _{OH} V _{CC} = 24V, R _L = 10 kΩ	22	--	--	V
		V _{OL} V _{CC} = 5V, R _L = 10 kΩ	--	5	20	mV
Output Current Sourcing	I _{SOURCE}	V _{IN} (+) = 1V, V _{IN} (-) = 0V, V _{CC} =15V, V _O =2V, T _a =25°C	20	40	--	mA
Output Current Sinking	I _{SINK}	V _{IN} (+) = 0V, V _{IN} (-) = 1V, V _{CC} =15V, V _O =2V, T _a =25°C	10	15	--	mA
		V _{IN} (+) = 0V, V _{IN} (-) = 1V, V _{CC} =15V, V _O =200mV, T _a =25°C	12	50	--	μA
Output Short Circuit to Ground	I _O	V _{CC} =15V, T _a =25°C	--	40	60	mA

Typical Applications



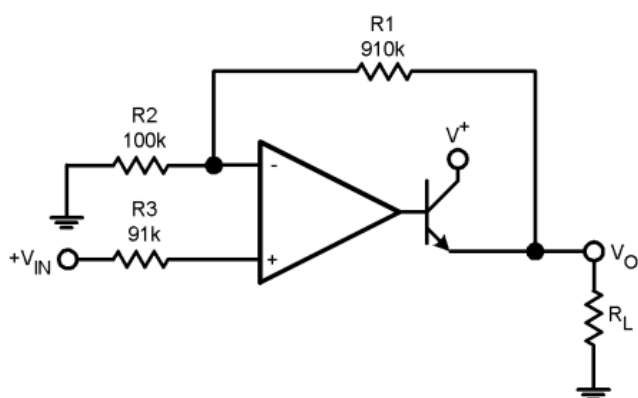
Amplitude modulator circuit



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

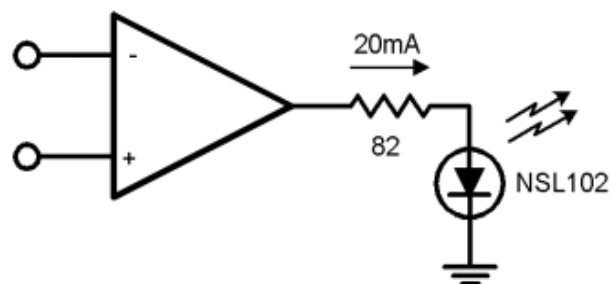
DC adder amplifier

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

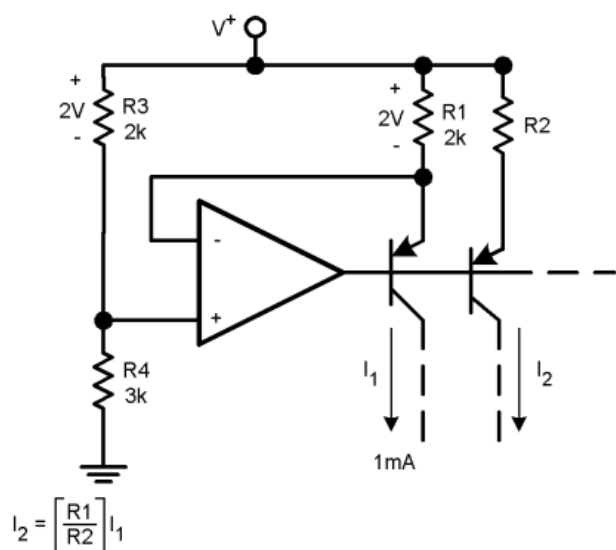


$V_o = 0V_{DC}$ for $V_{IN} = 0V_{DC}$, $A_v = 10$

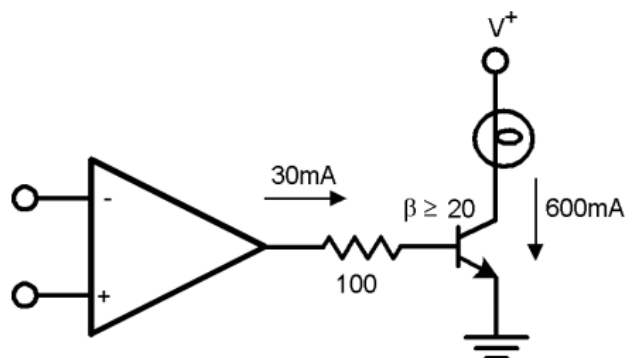
Power Amplifier



LED Driver

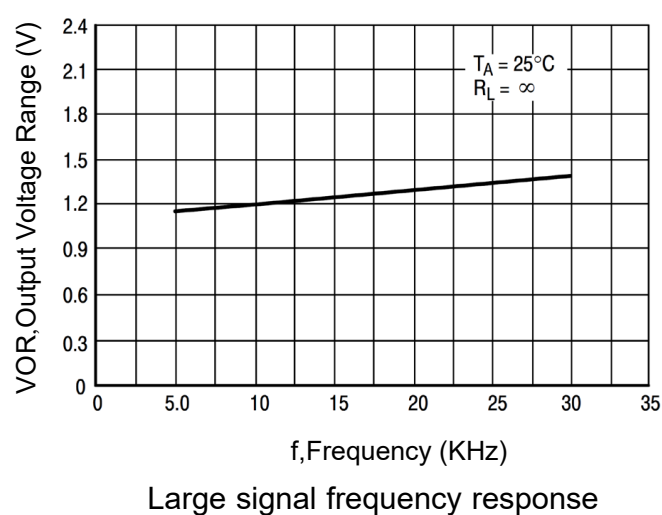
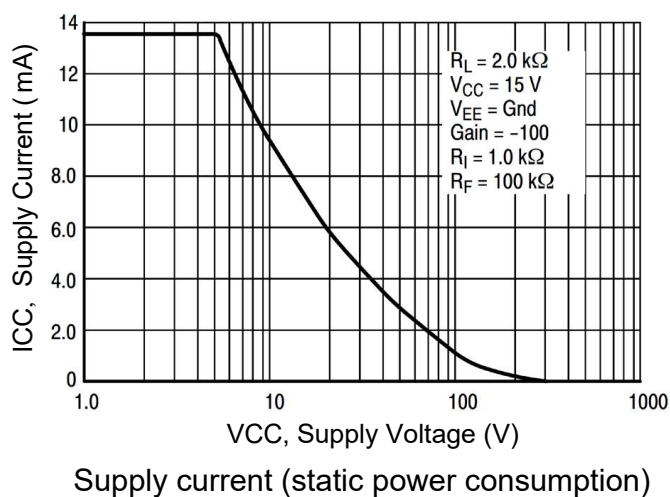
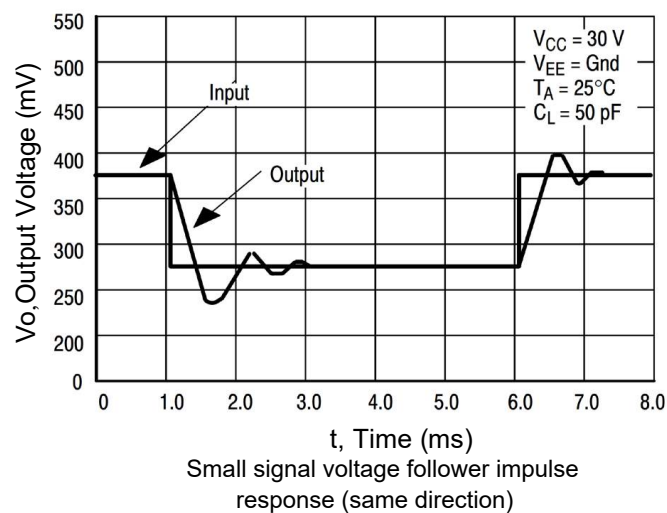
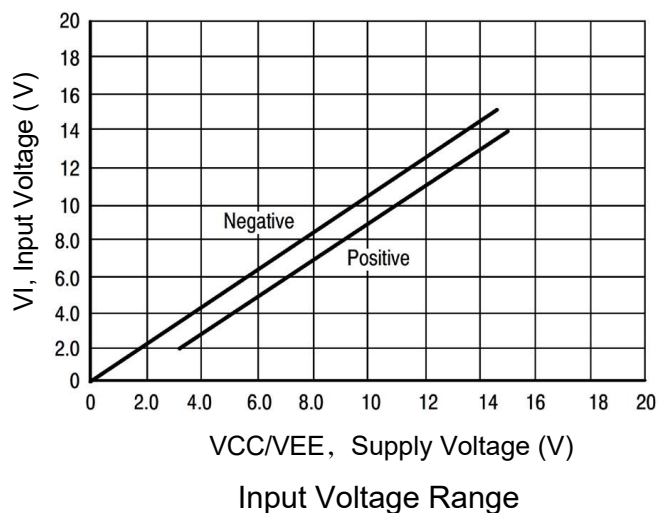


Fixed current source



Lamp Driver

Typical characteristic curve



Package Outline

SOT-23-5

Dimensions in mm

