

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.

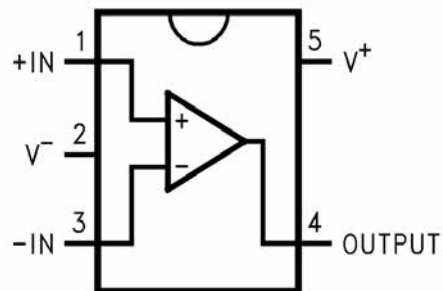
Features

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

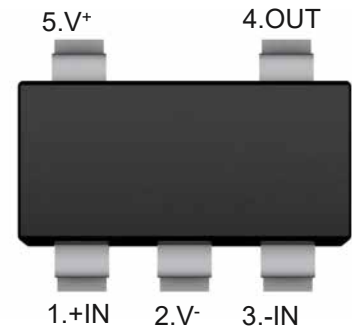
Applications

- Battery-Powered Equipment
- Smoke Detector and Sensor
- Micro Controller Applications

Pin arrangement diagram



SOT-23-5



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 |

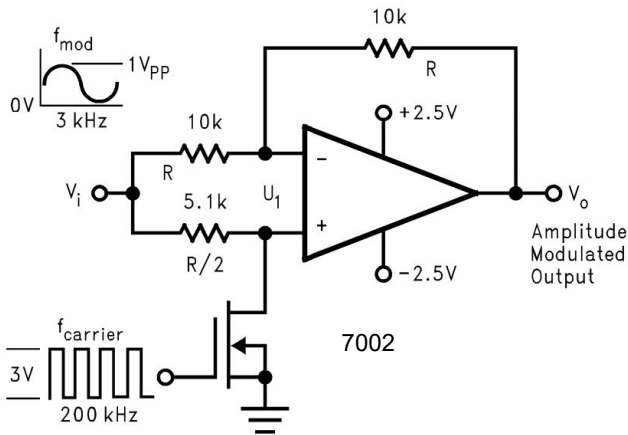
Electrical Characteristics

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

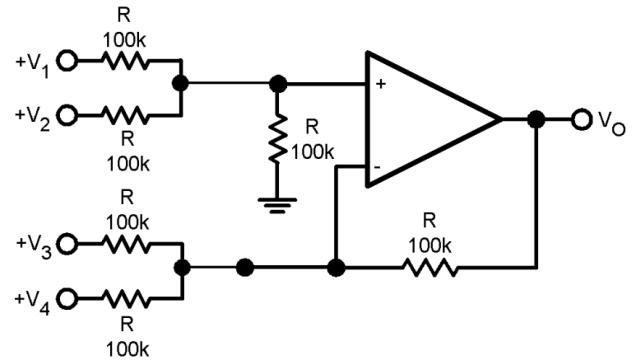
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units | |
|---------------------------------|---------------------|---|--|------|----------------------|-------|----|
| Input Offset Voltage | V _{OS} | T _a =25°C | -- | ±2 | ±5 | mV | |
| Input offset current | I _{OS} | T _a =25°C, I _{IN} (+) - 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 _{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

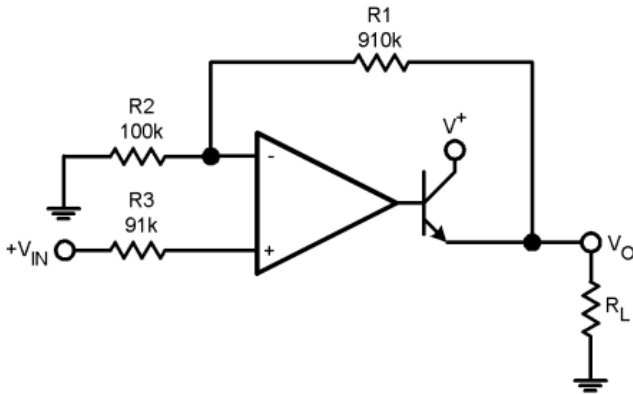


Amplitude modulator circuit



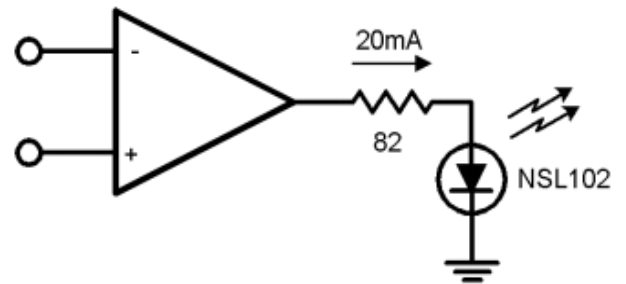
Note: $V_o = V_1 + V_2 - V_3 - V_4, (V_1 + V_2) \geq (V_3 + V_4)$ for $V_o \geq 0V_{DC}$

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

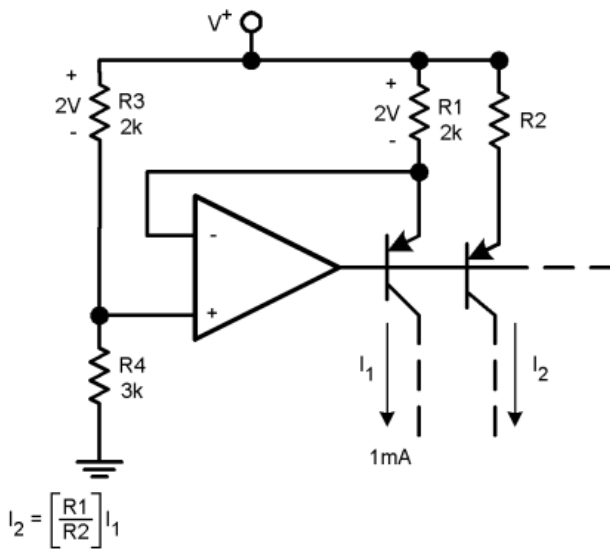


$V_o = 0V_{DC}$ for $V_{IN} = 0V_{DC}$, $A_v = 10$

Power Amplifier

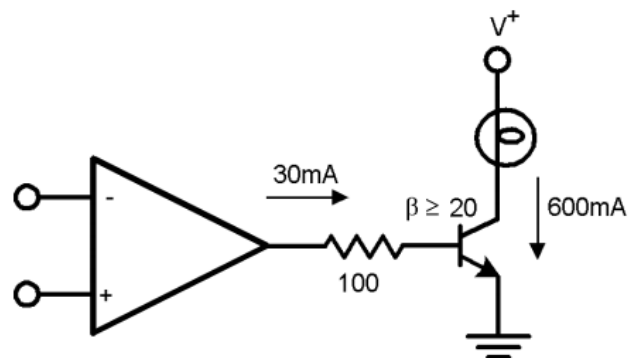


LED Driver



$$I_2 = \left[\frac{R_1}{R_2} \right] I_1$$

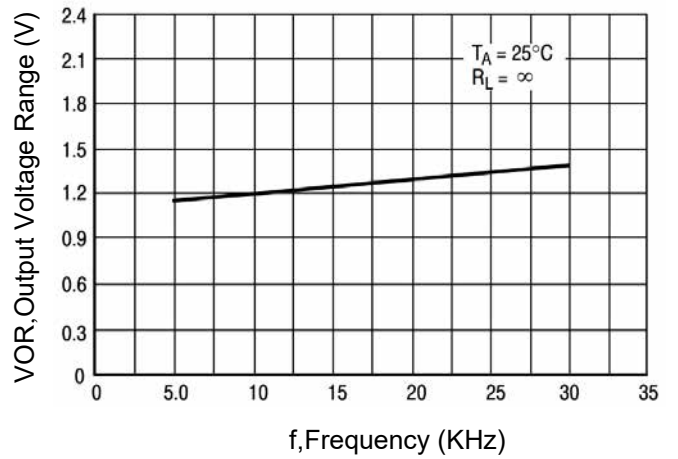
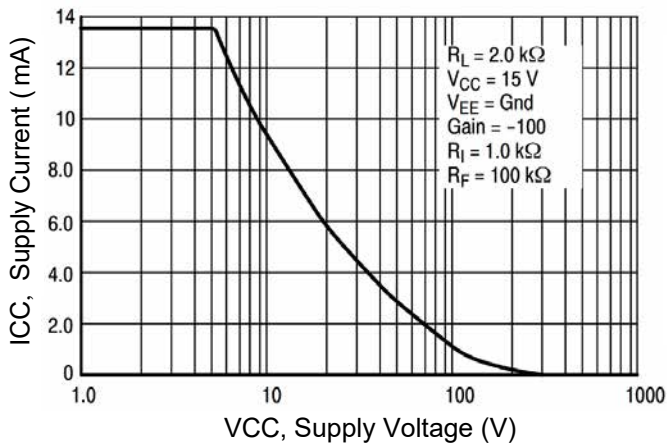
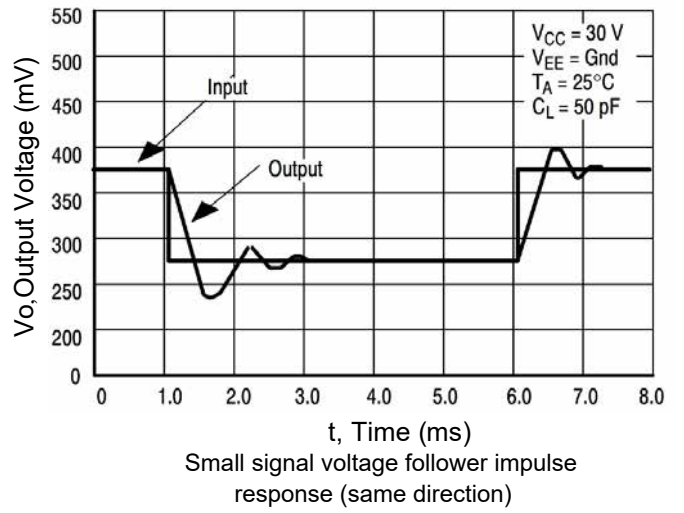
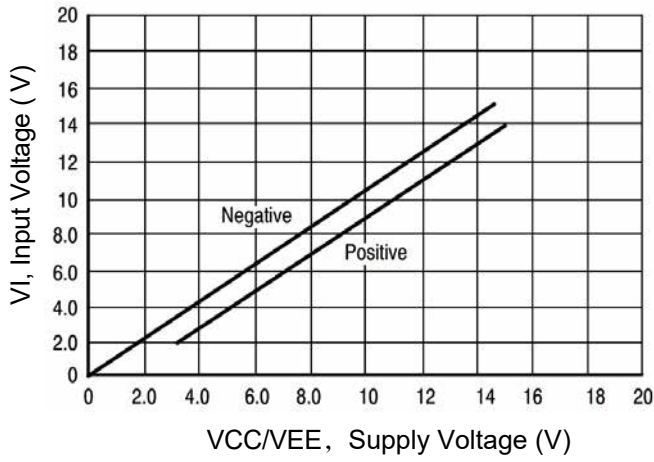
Fixed current source



Lamp Driver



Typical characteristic curve

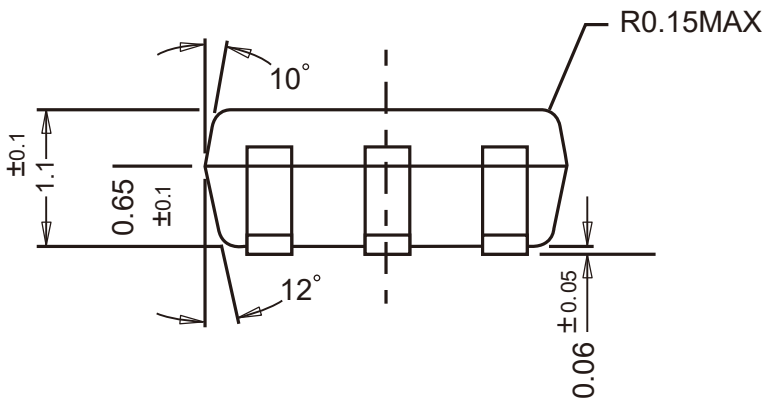
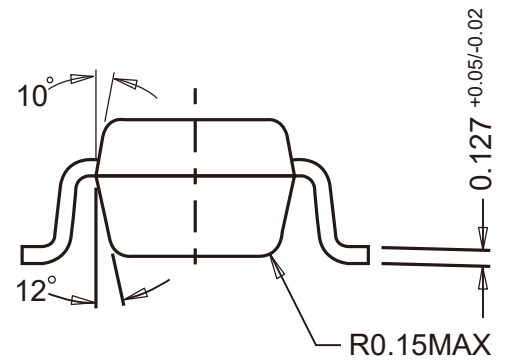
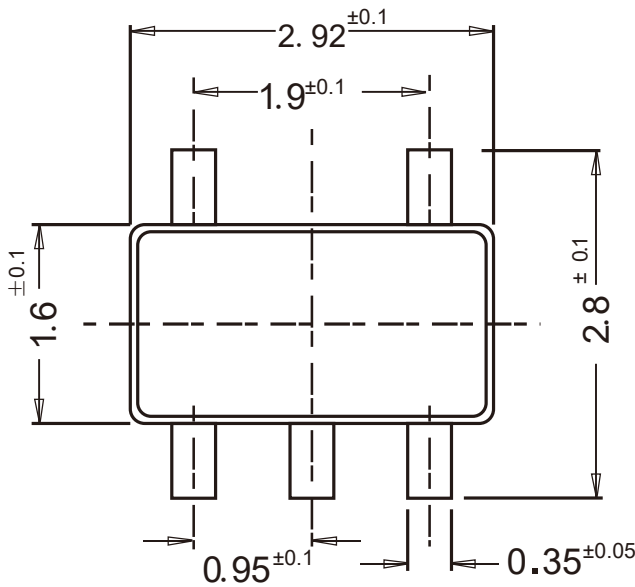




Package Outline

SOT-23-5

Dimensions in mm



Ordering Information

| Device | Package | Shipping |
|--------|----------|-----------------------|
| LM321 | SOT-23-5 | 3,000PCS/Reel&7inches |