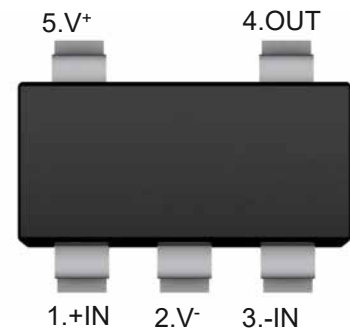


Low Power Single Operational Amplifier

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 $0.4\text{V}/\mu\text{s}$. 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.

SOT-23-5



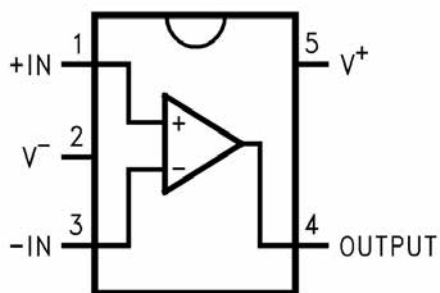
Features

- 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



Absolute Maximum Ratings (T_A=25°C)

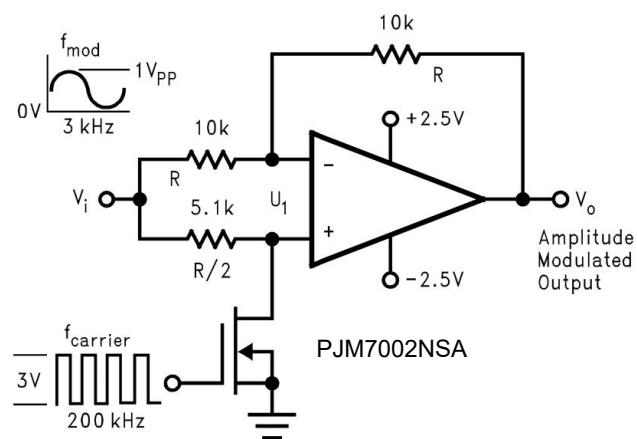
Parameter	Symbol	Value	Units
Supply Voltage	V _{CC}	24 or ±12	V
Differential Input Voltage	V _{ID}	24	V
Input Voltage	V _{IN}	-0.3~V _{CC}	V
Power Dissipation	P _D	530	mW
Output Short Circuit to GND V≤15V,Ta=25°C	I _O	Continuous	
Input Current V _{IN} <-0.3V	I _{IN}	50	mA
Junction Temperature	T _J	150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

Electrical Characteristics

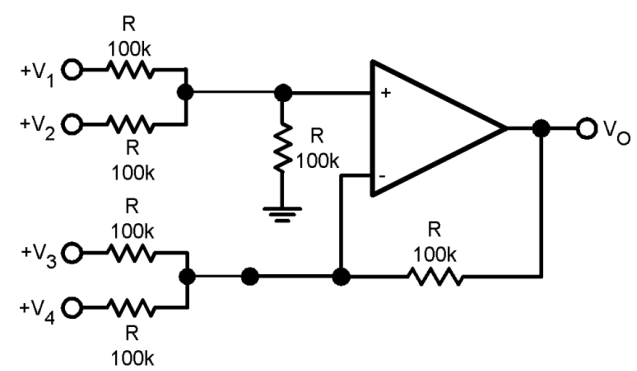
At V_{CC}=5V, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage	V _{OS}	Ta=25°C	--	±2	±5	mV
Input offset current	I _{OS}	Ta=25°C,I _{IN} (+) - I _{IN} (-) , V _{CM} =0V	--	±3	±50	nA
Input bias current	I _B	Ta=25°C,I _{IN} (+) or I _{IN} (-) , V _{CM} =0V	--	±45	±250	nA
Common-mode input voltage range	V _{CM}	Ta=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, Ta=25°C, DC	65	90	--	dB
Power Supply Rejection	PSRR	V _{CC} = 5V~24V, Ta=25°C, DC	65	100	--	dB
Large signal voltage gain	A _V	V _{CC} = 15V,Ta=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,Ta=25°C	20	40	--	mA
Output Current Sinking	I _{SINK}	V _{IN} (+) =0V,V _{IN} (-) =1V,V _{CC} =15V, V _O =2V,Ta=25°C	10	15	--	mA
		V _{IN} (+) =0V,V _{IN} (-) =1V,V _{CC} =15V, V _O =200mV,Ta=25°C	12	50	--	μA
Output Short Circuit to Ground	I _O	V _{CC} =15V,Ta=25°C	--	40	60	mA

Typical Applications



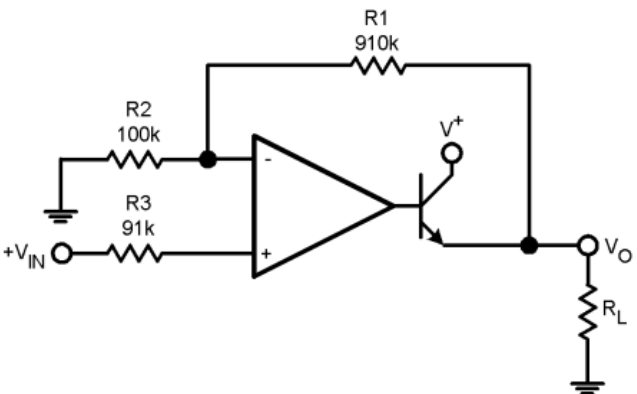
Amplitude modulator circuit



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

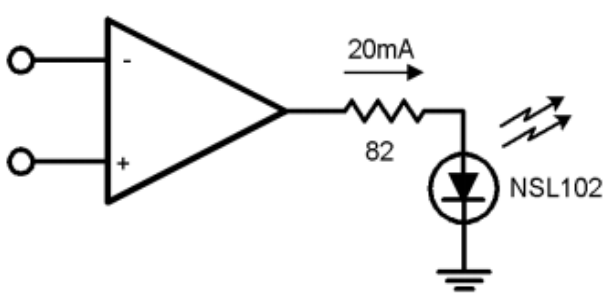
DC adder amplifier

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

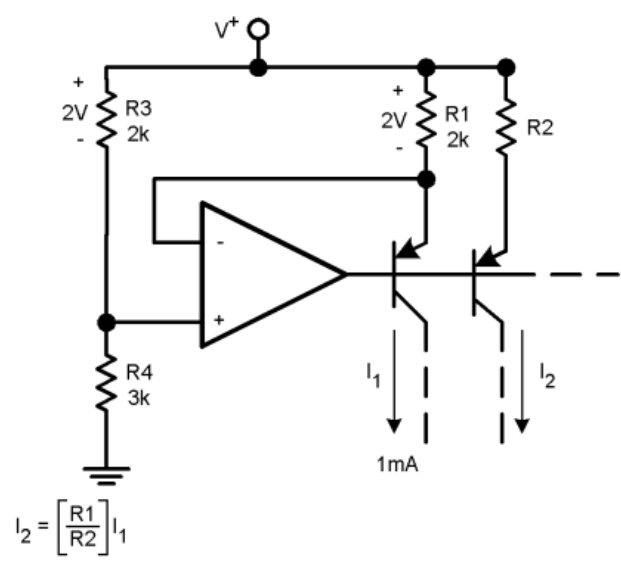


$V_o = 0V_{DC}$ for $V_{IN} = 0V_{DC}$, $A_v = 10$

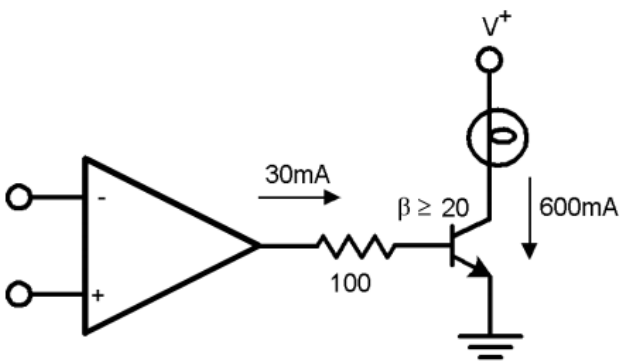
Power Amplifier



LED Driver

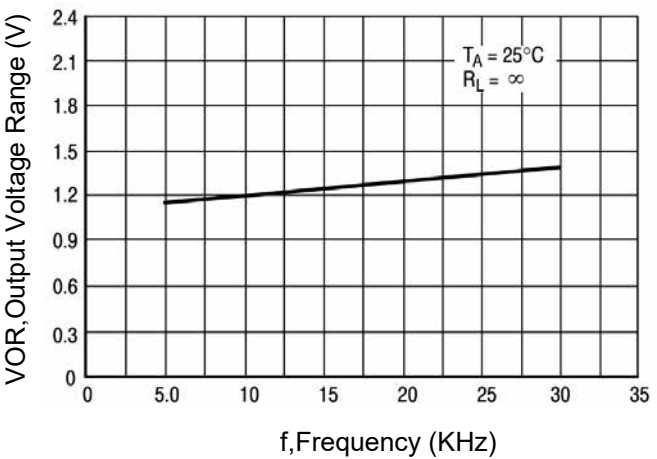
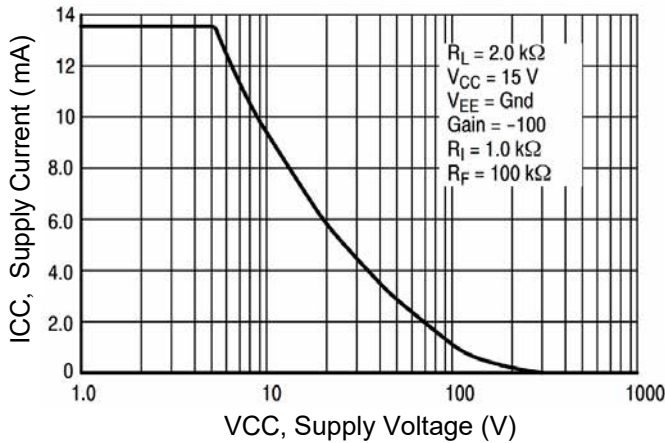
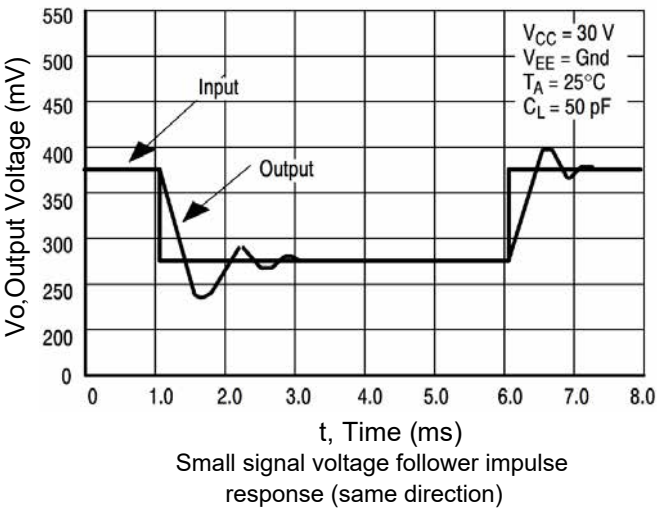
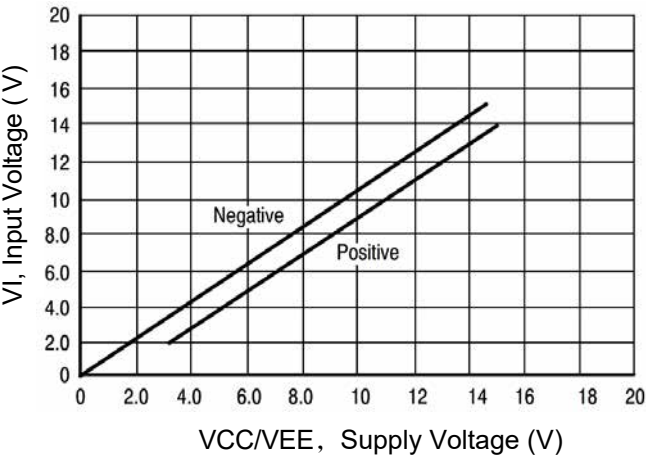


Fixed current source



Lamp Driver

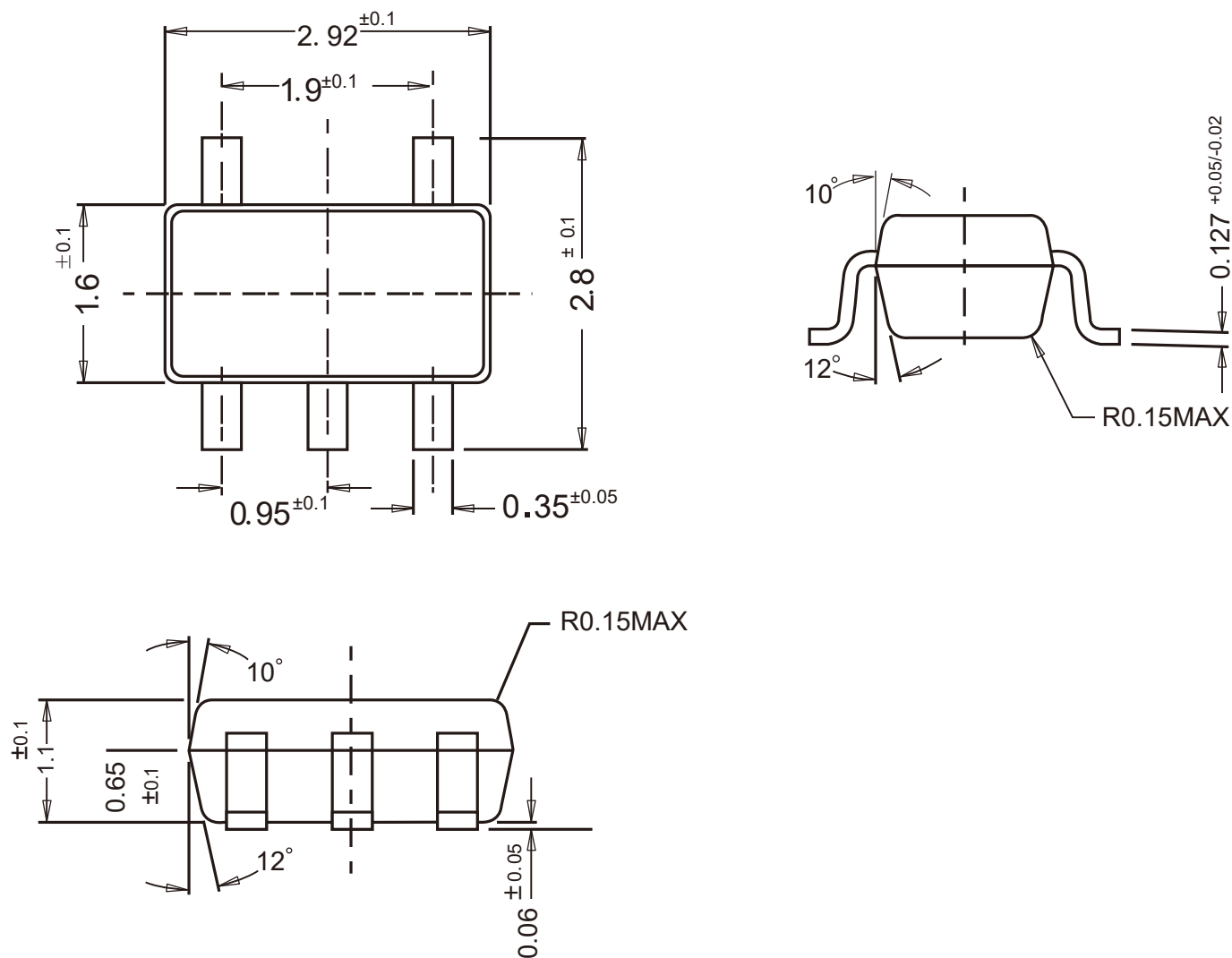
Typical characteristic curve



Package Outline

SOT-23-5

Dimensions in mm



Ordering Information

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

Contact Information

TANI website: <http://www.tanisemi.com> Email: tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations.

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