LMV321

DATASHEET

Specification Revision History：

Version	Date	Description
V1.0	2020/01	New
V1.1	2021/11	Modify Ordering Information
V1.2	2023/02	Modify Ordering Information
V1.3	2025/05	Add application precautions and overall typesetting.

General Description

The LMV321 is rail-to-rail output voltage feedback amplifier offering low cost .It has a wide input common-mode voltage range and output voltage swing , and take the minimum operating supply voltage down to 2.5V and the maximum recommended supply voltage is 5.5 V .

All are specified over the extended −45℃ to +85℃ temperature range .

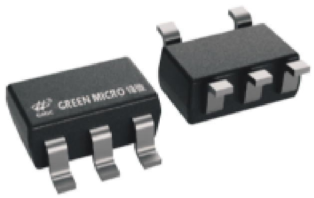
The LMV321 provide 1MHz bandwidth at a low current consumption. Very low input bias currents of 10pA , enable LMV321 to be used for integrator s , photodiode amplifiers, and piezoelectric sensors.Rail-to-rail inputs and outputs are useful to designers buffering ASIC in single-supply systems.

Applications for the series amplifiers include safety monitor, portable equipment , battery and power supply control, and signal conditioning and interfacing for transducers in very low power systems

Features

- Low Cost
- Rail-to-Rail Output: 0.8mV Typical Vos
- Unity Gain Stable
- Gain Bandwidth Product: 1MHz
- Very Low Input Bias Currents : 10pA
- Operates on 2.5 V to 5.5 V Supplies
- Input Voltage Range: -0.1V to +5.6V with Vs= 5.5V

The appearance of the product

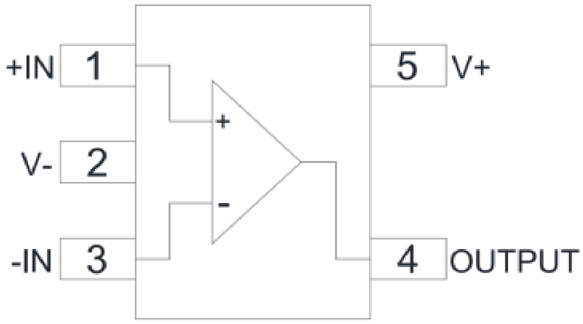


SOT-23-5

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
LMV321ICR	SOT-23-5	321 GMIC	REEL	3000PCS/REEL
LMV321IDBVR341	SOT-23-5	321 GMIC	REEL	3000PCS/REEL

Internal Block Diagram and Pin Connection



LMV321(SOT23-5)

Absolute Maximum Ratings (Ta=25°C)

Characteristic	Min.	Max.	Unit
Power Supply Voltage	0	+6.5	V
Maximum Junction Temperature		+160	℃
Input Voltage Range	-Vs-0.5	+Vs+0.5	V
Operating Temperature Range	-45	+85	℃
Storage Temperature Range	-65	+150	℃
Lead Temperature, 10 seconds		+260	℃

Recommended Operating Conditions

Characteristic	Min.	Max.	Unit
Operating Temperature Rangge	-40	+85	℃
Power Supply Operating Range	2.5	5.5	V

Electrical Characteristics

(Vs=+5 V, R_L= 10kΩ to Vs/2 , V_{out} =Vs/2; unless otherwise noted)

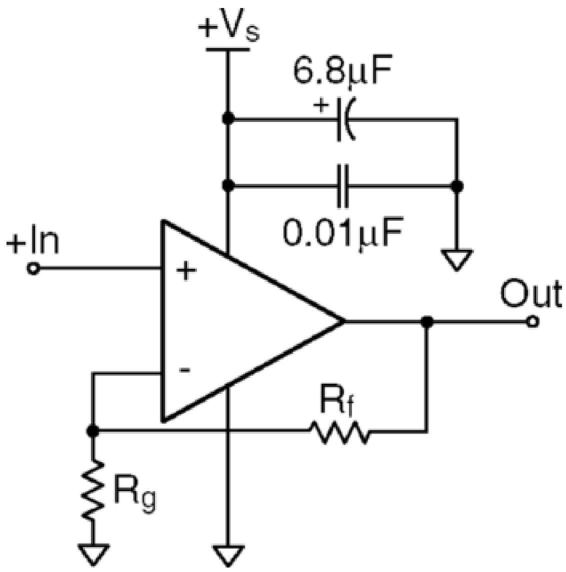
Characteristics	Test Conditions	Min.	Typ.	Max.	Unit
AC Performance					
Gain bandwidth product	CL =100pF		1.0		MHz
Phase margin			52		Deg
Gain margin			17		dB
Slew rate	Vo=1Vpp		0.52		V/µs
Input voltage noise	>50kHz		36		nV/Hz
DC Performance					
Input offset voltage			±0.8	±5	mV
Input bias current			10		pA
Input offset current			10		pA
Power supply rejection ratio	Vs=+2.5V～+5.5V	60	82		dB
Supply current			80	240	µA
Input characteristics					
Input common mode voltage range	Vs=5.5V	-0.1		5.6	V
Common mode rejection ratio	Vs=5.5V Vo= 0.1 ～4.9V	56	68		dB
Output characteristics					
Output voltage Swing from Rail	R_L =100k Ω		0.008		V
Output current	R_L =100k Ω	20	23		mA

Application Summary

Data Sheet

The LMV321 is single supply, general purpose, voltage-feedback amplifiers that is pin-for-pin compatible and drop in replacements with other industry standard LMV321 amplifier. The LMV321 is fabricated on a CMOS process, features a rail-to-rail output, and is unity gain stable.

The typical non-inverting circuit schematic is shown in Figure below:



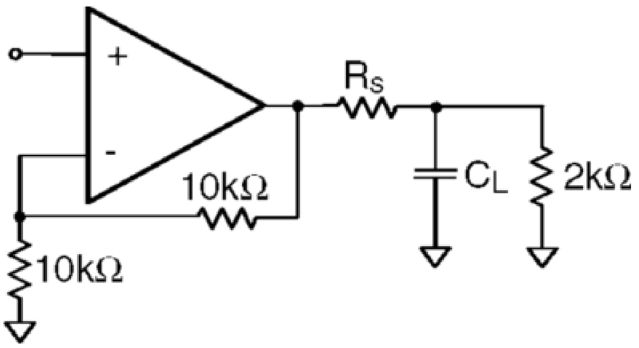
Typical Non-inverting configuration

Power Dissipation

The maximum internal power dissipation allowed is directly related to the maximum junction temperature. If the maximum junction temperature exceeds 150°C, some performance degradation will occur. If the maximum junction temperature exceeds 175°C for an extended time, device failure may occur.

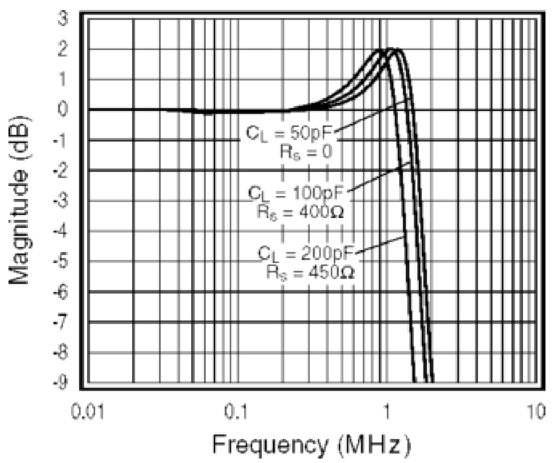
Driving Capacitive Loads

The Frequency Response vs CL plot illustrates the response ofthe LMV321.A small series resistance (Rs) at the output of the amplifier ,illustrated in Figure below,will improve stability and settling performance. Rs values in the Frequency Response vs CL plot were chosen to achieve maximum bandwidth with less than 1dB of peaking. For maximum flatness , use a larger Rs. As the plot indicates, the LMV321 family can easily drive a 200pF capacitive load without a series resistance.



Driving a capacitive load introduces phase-lag into the output signal, which reduces phase margin in the amplifier. The unity gain follower is the most sensitive configuration.

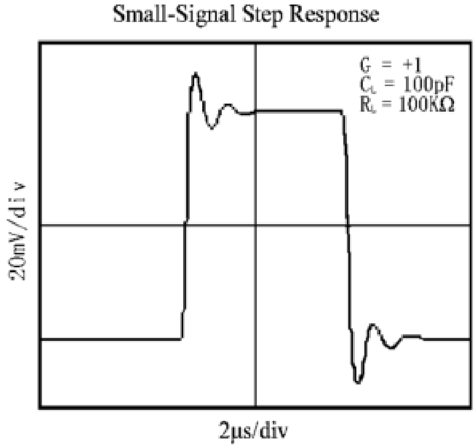
The response is illustrated in Figure below:

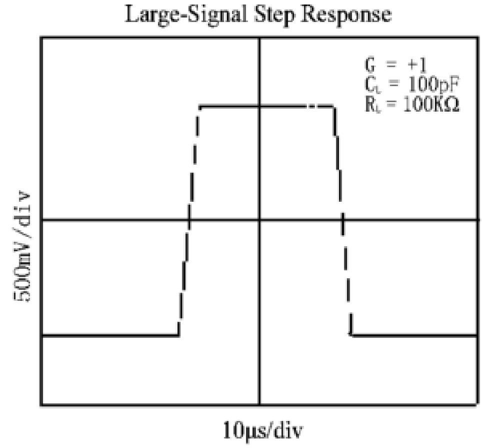


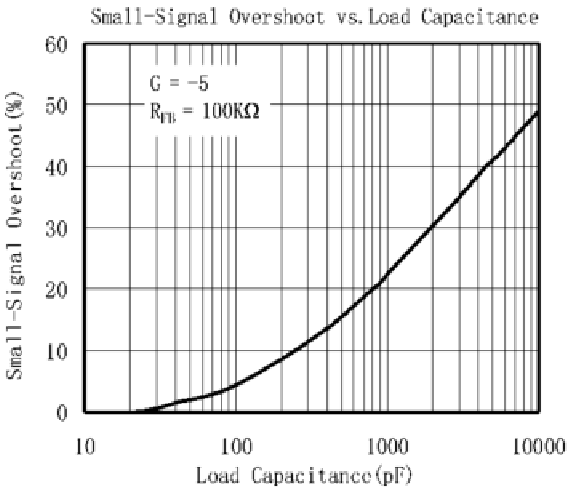
Frequency Response vs C_L for unity gain configuration

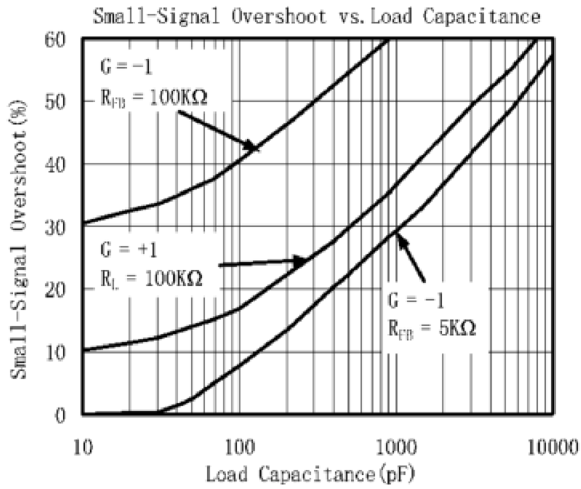
Characteristic Curves

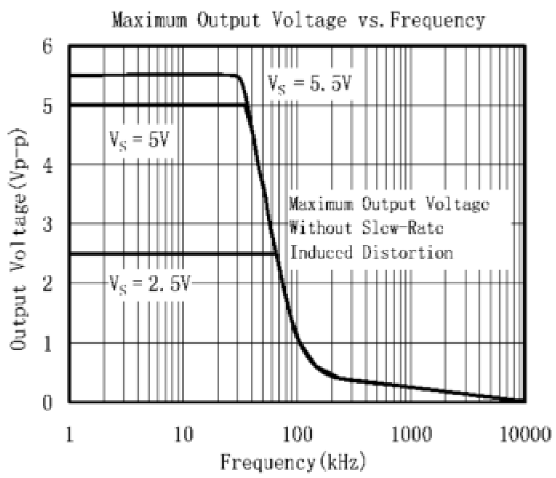
(Ta=+25°C ,Vs=+5V, RL= 100k Ω connected to Vs/2)

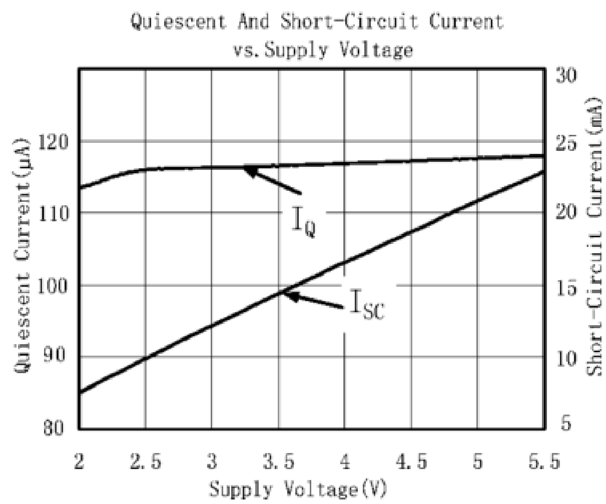




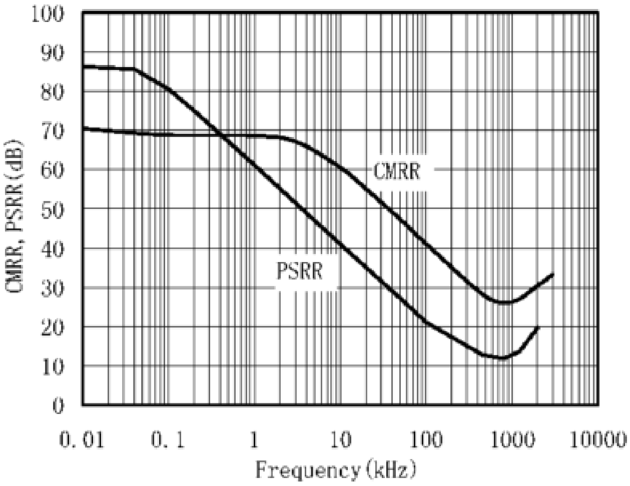




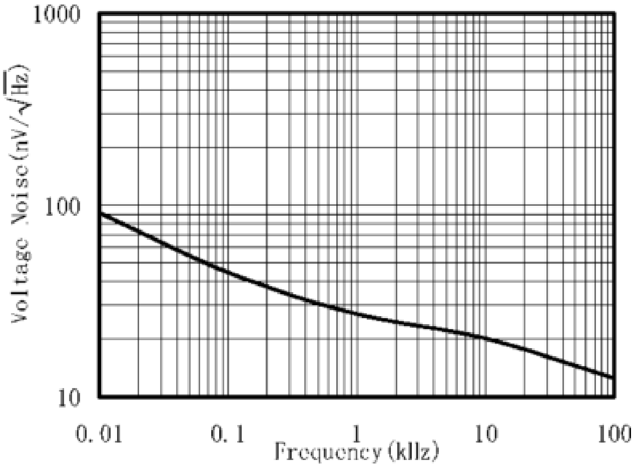




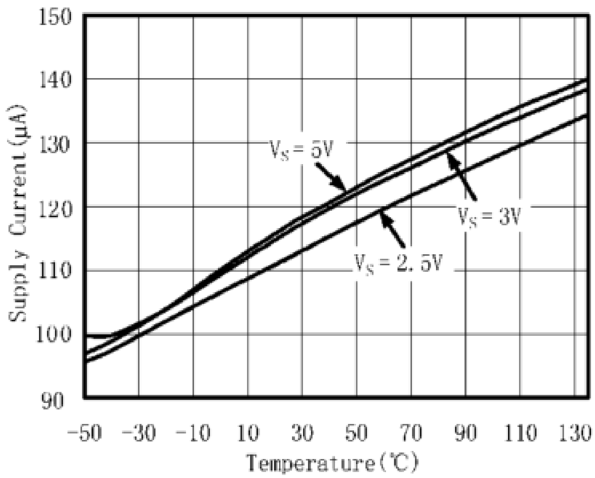
CMRR And PSRR vs. Frequency



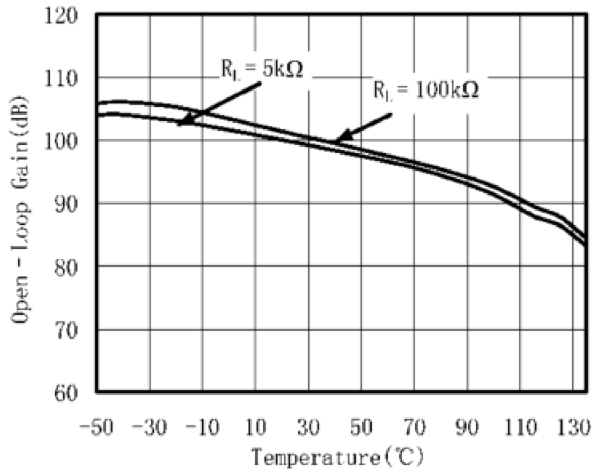
Input Voltage Noise Spectral Density vs. Frequency



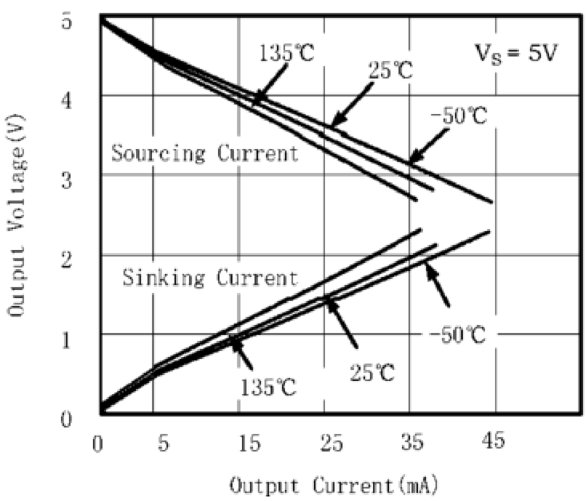
Supply Current vs. Temperature



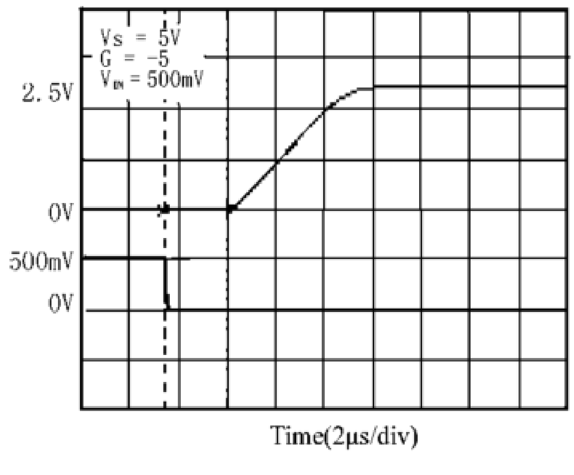
Open-Loop Gain vs. Temperature

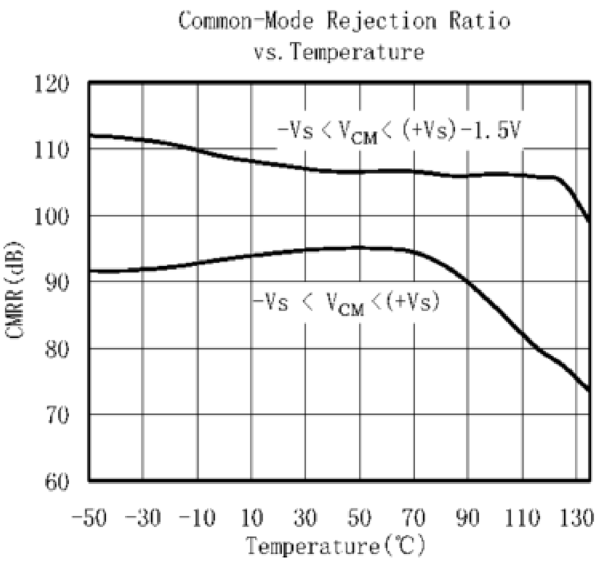


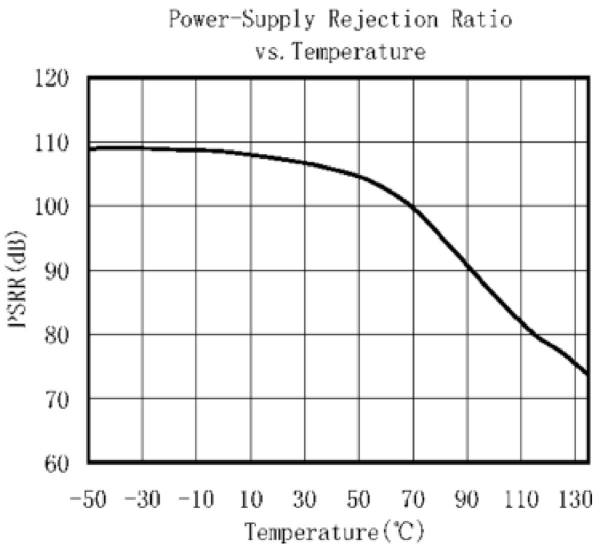
Output Voltage Swing vs. Output Current



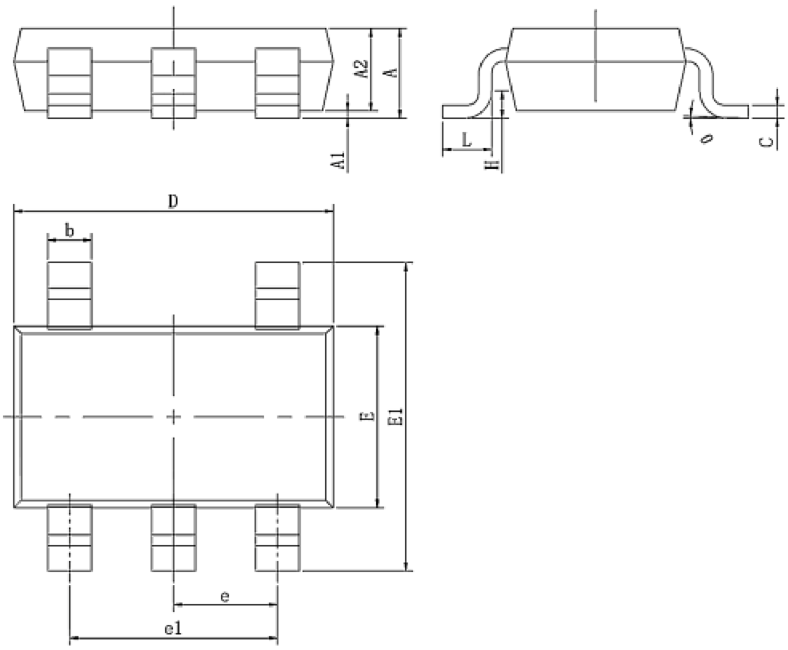
Overload Recovery Time




Common-Mode Rejection Ratio
vs. Temperature
-Vs < V_{CM} < (+Vs)-1.5V
-Vs < V_{CM} < (+Vs)
CMRR (dB)
120
110
100
90
80
70
60
-50 -30 -10 10 30 50 70 90 110 130
Temperature(℃)


Power-Supply Rejection Ratio
vs. Temperature
PSRR (dB)
120
110
100
90
80
70
60
-50 -30 -10 10 30 50 70 90 110 130
Temperature(℃)

SOT-23-5 Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.130	0.000	0.005
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	0.95（BSC)		0.037(BSC)	
e1	1.90（BSC)		0.075(BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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