LMV321

PRODUCT DESCRIPTION

The LMV321(single)are rail-to-rail input and output voltage feedback amplifier offering low cost. They have a wide input common-mode voltage range and output voltage swing,and take the minimum operating supply voltage down to 2.1V and the maximum recommended supply voltage is 5.5V. temperature range.

The LMV321 provide 1MHz bandwidth at a low current consumption of 60µA per amplifier. Very low input bias currents of 10pA enable LMV321 to be used for integrators, 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 monitoring, portable equipment, battery and power supply control, and signal conditioning and interfacing for transducers in very low power systems.

FEATURES

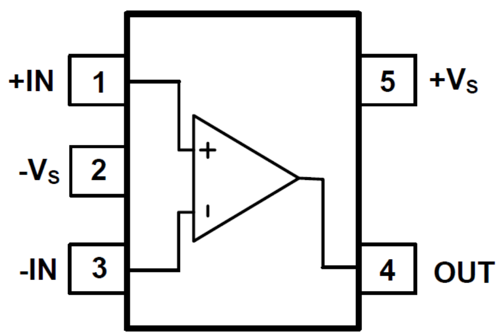
- Low Cost
- Rail-to-Rail Input and Output
- 0.8mV Typical VOS
- Unity Gain Stable
- Gain Bandwidth Product: 1MHz
- Very Low Input Bias Currents:
- Operates on 2.1V to 5.5V Supplies
- Input Voltage Range:-0.1V to +5.6V with VS = 5.5V
- Low Supply Current: <60µA
- Small Packaging：LMV321 Available in SOT-23-5L。

APPLICATIONS

- ASIC Input or Output Amplifier
- Sensor Interface
- Piezo Electric Transducer Amplifier
- Medical Instrumentation
- Mobile Communication
- Audio Output
- Portable Systems
- Smoke Detectors
- Notebook PC
- PCMCIA Cards
- Battery –Powered Equipment
- DSP Interface

PIN CONFIGURATIONS

LMV321
(Top View)



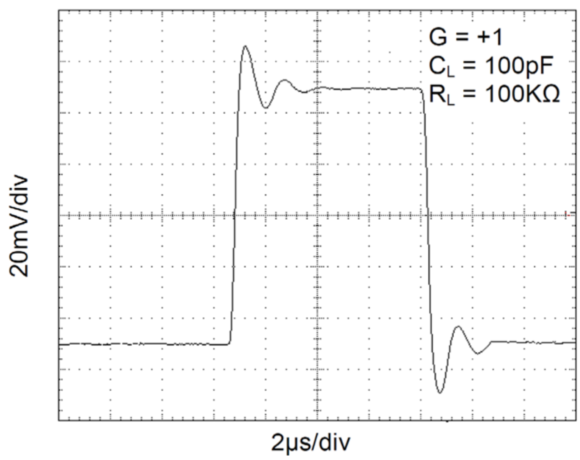
LMV321 ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS	LMV321				
		TYP	MIN/MAX OVER TEMPERATURE			
		+25℃	+25℃	0℃ to 75℃	UNITS	MIN/MAX
DYNAMIC PERFORMANCE						
Gain-Bandwidth Product (GBP)	CL= 100pF	1			MHz	TYP
Slew Rate (SR)	G = +1, 2V Output Step	0.52			V/µs	TYP
Settling Time to 0.1% (tS)	G = +1, 2V Output Step	5.3			µs	TYP
Overload Recovery Time	VIN ·Gain = VS	2.6			µs	TYP
NOISE PERFORMANCE						
Voltage Noise Density (en)	f = 1kHz	27			$nV/\sqrt{Hz}$	TYP
	f = 10kHz	20			$nV/\sqrt{Hz}$	TYP

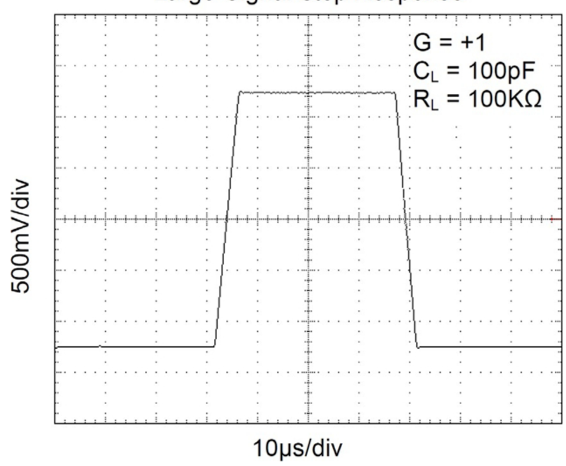
TYPICAL PERFORMANCE CHARACTERISTICS

At TA = +25˚C, VS = +5V, and RL = 100KΩ connected to Vs/2, unless otherwise noted.

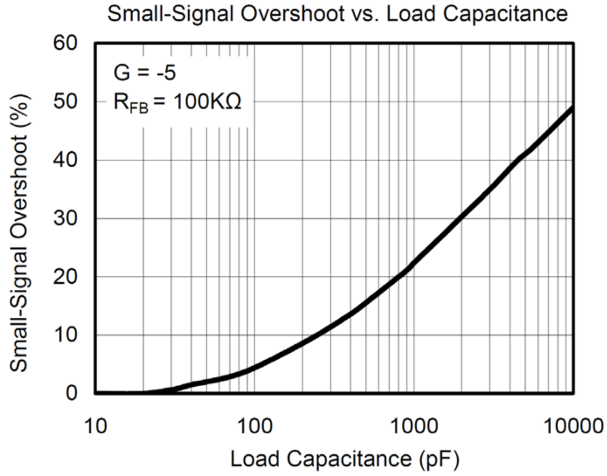
Small-Signal Step Response



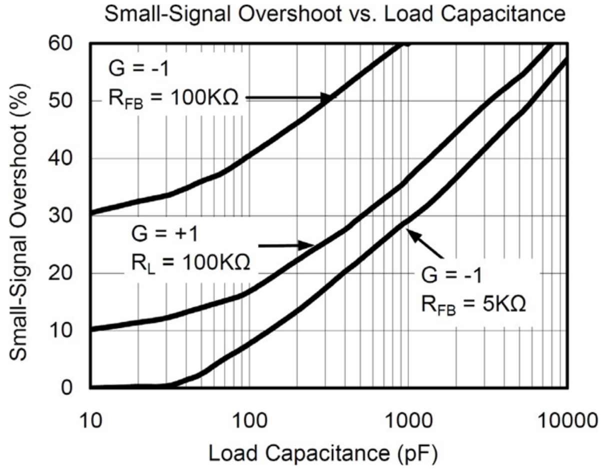
Large-Signal Step Response



Small-Signal Overshoot vs. Load Capacitance



Small-Signal Overshoot vs. Load Capacitance



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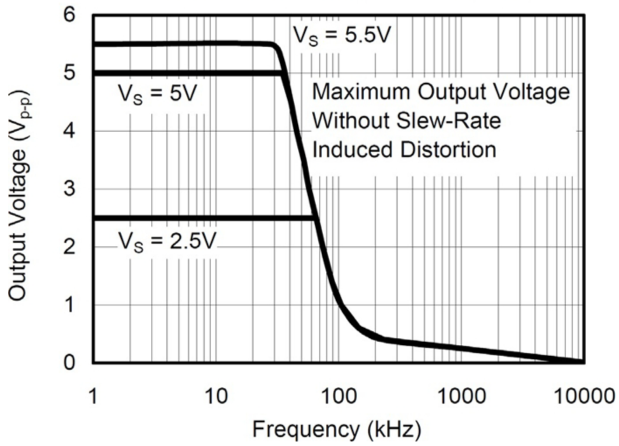
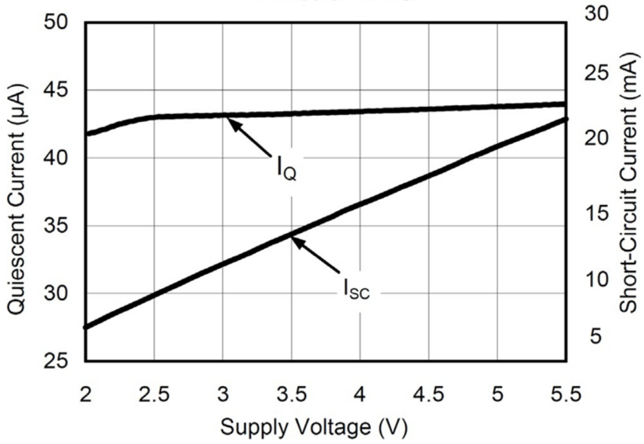
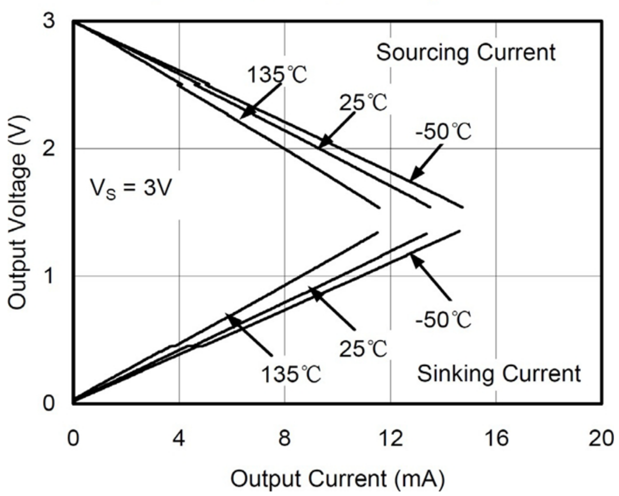
Maximum Output Voltage vs. Frequency



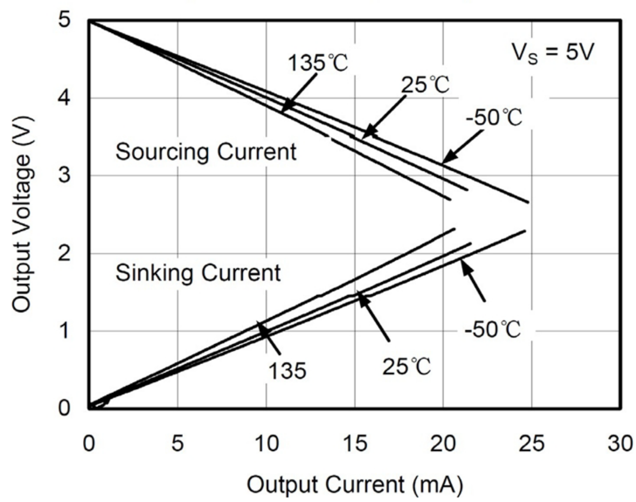
Quiescent and Short-Circuit Current vs. Supply Voltage



Output Voltage Swing vs. Output Current



Output Voltage Swing vs. Output Current



TYPICAL PERFORMANCE CHARACTERISTICS

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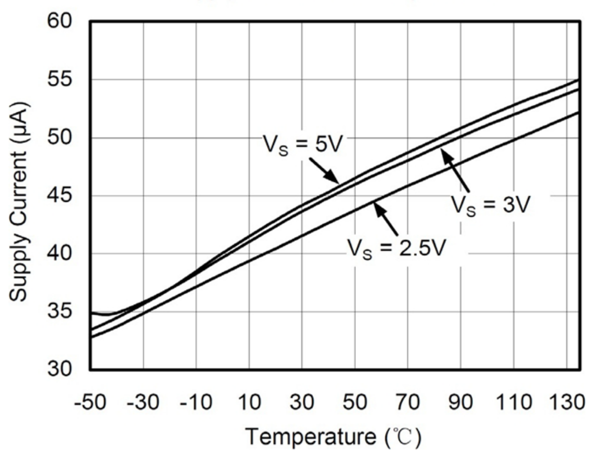
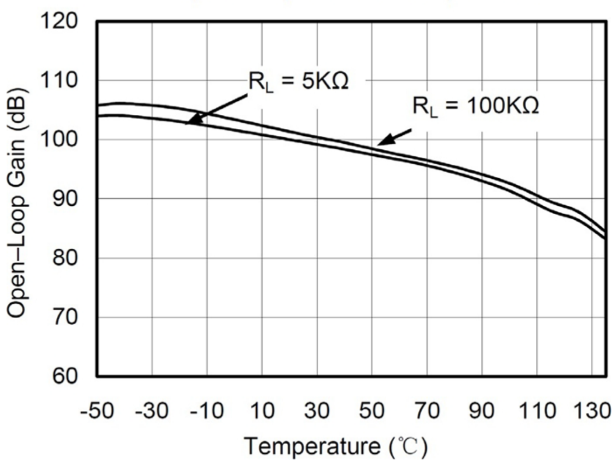
Supply Current vs. Temperature



Open-Loop Gain vs. Temperature



For no-buffer configuration, there are two others ways to increase the phase margin: (a) by increasing the amplifier's gain or (b) by placing a capacitor in parallel with the feedback resistor to counteract the parasitic capacitance associated with inverting node.

Power-Supply Bypassing and Layout

The LMV321 family operates from either a single +2.5V to +5.5V supply or dual ±1.25V to ±2.75V supplies. For single-supply operation, bypass the power supply VDD with a 0.1μF ceramic capacitor which should be placed close to the VDD pin. For dual-supply operation, both the VDD and the VSS supplies should be bypassed to ground with separate 0.1μF ceramic capacitors. 2.2μF tantalum capacitor can be added for better performance.

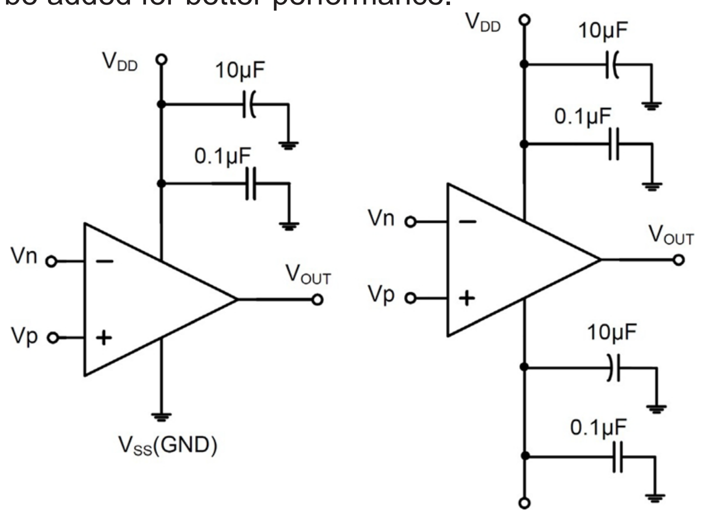


Figure 3. Amplifier with Bypass Capacitors

TYPICAL APPLICATION CIRCUITS

Differential Amplifier

The circuit shown in Figure 4 performs the difference function. If the resistors ratios are equal (R4 / R3 = R2 / R1), then VOUT = (Vp – Vn) × R2 / R1 + VREF.

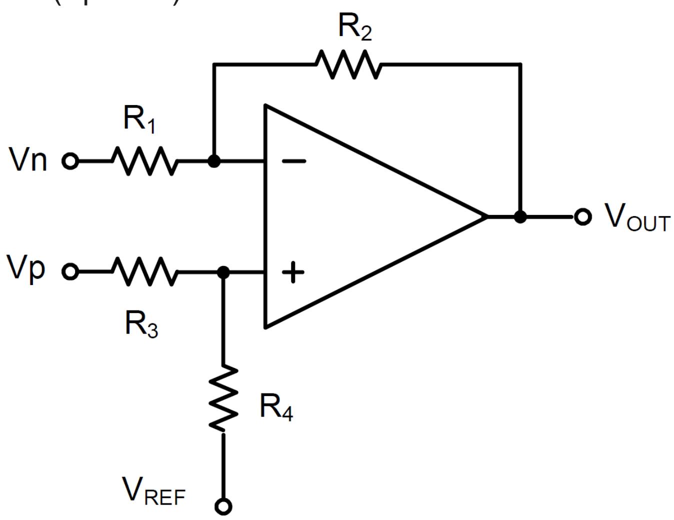


Figure 4. Differential Amplifier

Instrumentation Amplifier

The circuit in Figure 5 performs the same function as that in Figure 4 but with the high input impedance.

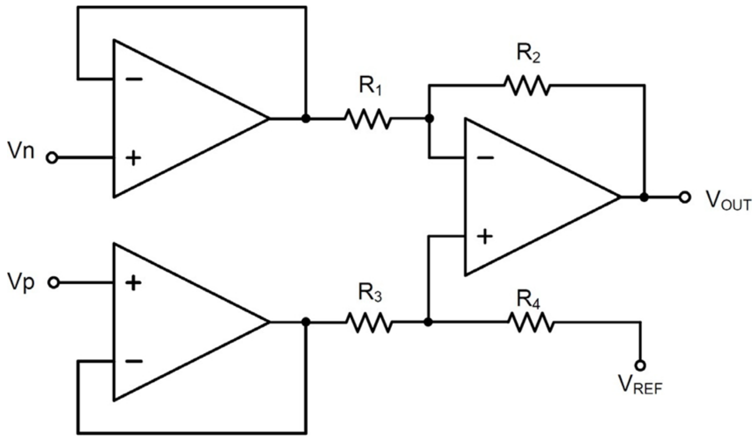


Figure 5. Instrumentation Amplifier

Low Pass Active Filter

The low pass filter shown in Figure 6 has a DC gain of (-R2 / R1) and the –3dB corner frequency is 1/2πR2C. Make sure the filter is within the bandwidth of the amplifier. The Large values of feedback resistors can couple with parasitic capacitance and cause undesired effects such as ringing or oscillation in high-speed amplifiers. Keep resistors value as low as possible and consistent with output loading consideration.

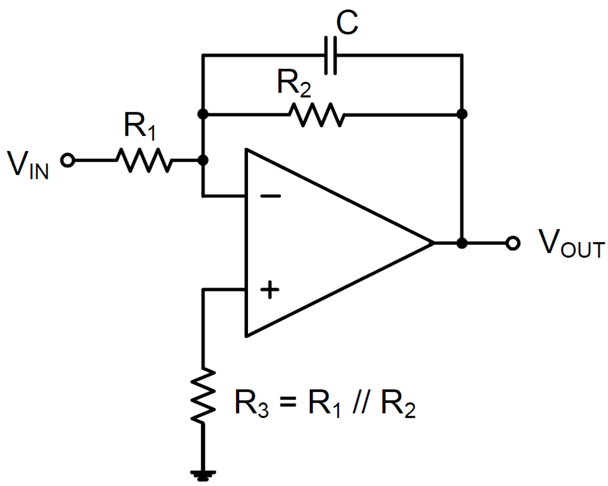


Figure 6. Low Pass Active Filter