ROHM SEMICONDUCTOR
TLR2374FV-LB Non-inverting Amplifier

ROHM TLR2374FV-LB Non-inverting Amplifier User Guide

Contents

ROHM SEMICONDUCTOR

ROHM TLR2374FV-LB Non-inverting Amplifier

Specifications

- **Product Name:** ROHM Solution Simulator
- **Type:** Low Noise High Output Drive Rail-to-Rail input/output CMOS Operational Amplifier
- **Function:** Simulates transient response to sine wave input with non-inverting amplifier configured Op-Amps

Product Usage Instructions

Simulation Schematic

- Refer to Figure 1 for the simulation schematic.

How to Simulate

- Simulation settings can be configured from the ‘Simulation Settings’ as shown in Figure 2. Table 1 displays the default setup.

Simulation Conditions

- Table 2 lists the simulation condition parameters including instance name, type, and parameters.

SOURCE Parameter Setup

- Refer to Figure 3 to understand how the VSOURCE parameters correspond to the VIN stimulus waveform.

Op-Amp Model

- Table 3 shows the model pin functions used for simulation. The op-Amp model is a behavioral model for input/output characteristics.

FAQ

- **Q:** Can I customize the parameters of the components in the simulation?
- **A**: Yes, you can customize parameters such as VSOURCE and peripheral components for simulation.
- **Q:** What is the default simulation type?
- **A**: The default simulation type is Time-Domain.
- **Q:** What are the default values for the VSOURCE parameters?
- **A**: The default values are Peak_voltage: 0.5, Initial_phase: 0, DC_offset: 2.5, Frequency: 0.0, AC_magnitude: 0.0, AC_phase: 0.0.

Low Noise High Output Drive Rail-to-Rail input/output CMOS Operational Amplifier TLR2374FV-LB – Non-inverting Amplifier (Sine Wave Input) – Transient Response simulation
This circuit simulates the transient response to sine wave input with a non-inverting amplifier configured Op-Amps. You can observe the output voltage and how faithfully the sine wave input voltage is reproduced. You can customize the parameters of the components shown in blue, such as VSOURCE, or peripheral components, and simulate the non-inverting amplifier with the desired operating condition.
You can simulate the circuit in the published application note: Operational amplifier, Comparator (Tutorial). **[JP] [EN] [CN] [KR]**

General Cautions

- Caution 1: The values from the simulation results are not guaranteed. Please use these results as a guide for your design.
- Caution 2: These model characteristics are specifically at Ta=25°C. Thus, the simulation result with temperature variance may significantly differ from the result with the one done at actual application board (actual measurement).
- Caution 3: Please refer to the Application note of Op-Amps for details of the technical information.
- Caution 4: The characteristics may change depending on the actual board design and ROHM strongly recommends to double check those characteristics with actual board where the chips will be mounted on.

Simulation Schematic

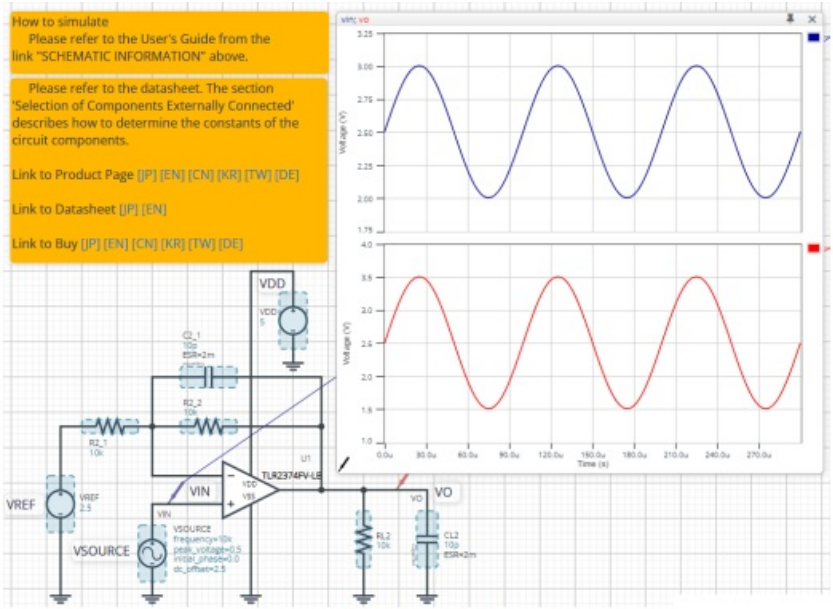


Figure 1. Simulation Schematic

How to simulate

The simulation settings, such as parameter sweep or convergence options, are configurable from the ‘Simulation Settings’ shown in Figure 2, and Table 1 shows the default setup of the simulation. In case of simulation convergence issue, you can change advanced options to solve. The temperature is set to 27 °C in the default statement in ‘Manual Options’. You can modify it.

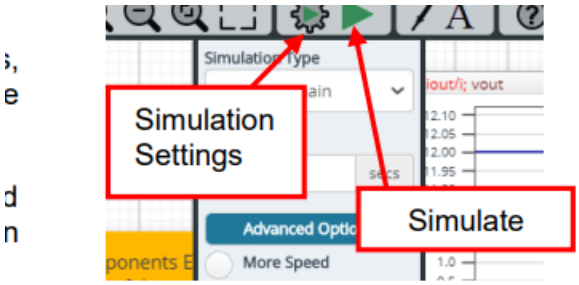


Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default	Note
Simulation Type	Time-Domain	Do not change the Simulation Type
End Time	300 µs	–
Advanced options	1e-7	Simulation Resolution (eps)
	Convergence Assist	–
Manual Options	.temp 27	–

Simulation Conditions

Table 2. List of the simulation condition parameters

Instance Name	Type	Parameters	Default Value	Variable Range		Units
				Min	Max	
VSOURCE	Voltage Source	Frequency	10k	10	10M	Hz
		Peak_voltage	0.5	0	16	V
		Initial_phase	0	free		°
		DC_offset	2.5	0	16	V
		DF	0.0	fixed		1/s
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
VDD	Voltage Source For Op-Amp	Voltage_level	5	4*(Note1)*	16*(Note1)*	V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
VREF	Voltage Source	Voltage_level	2.5	VSS	VDD	V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°

(Note 1) Set it to the guaranteed operating range of the Op-Amps.

SOURCE parameter setup

Figure 3 shows how the VSOURCE parameters correspond to the VIN stimulus waveform.

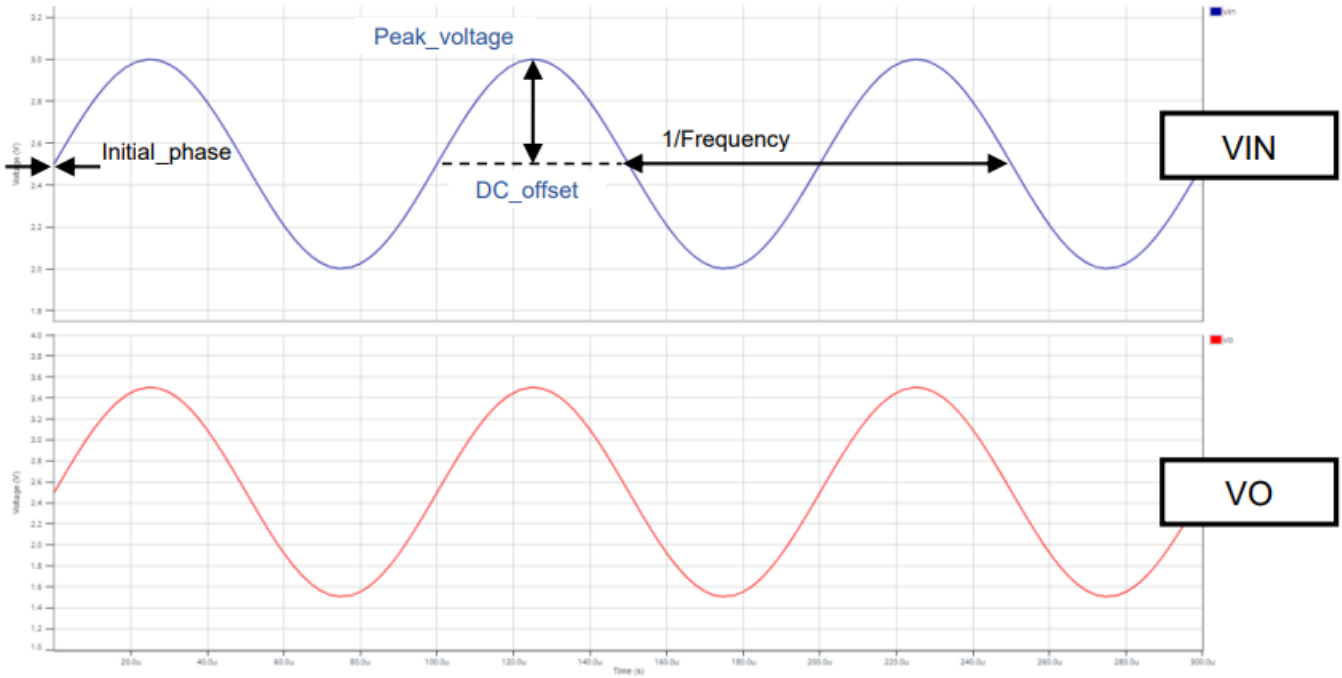


Figure 3. VSOURCE parameters and its waveform

Op-Amp model
Table 3 shows the model pin function implemented. Note that the Op-Amp model is the behavioral model for its input/output characteristics, and neither protection circuits nor functions unrelated to the purpose are implemented.

Table 3. Op-Amp model pins used for the simulation

Pin Name	Description
+IN	Non-inverting input
-IN	Inverting input
VDD	Positive power supply
VSS	Negative power supply / Ground
OUT	Output

Peripheral Components

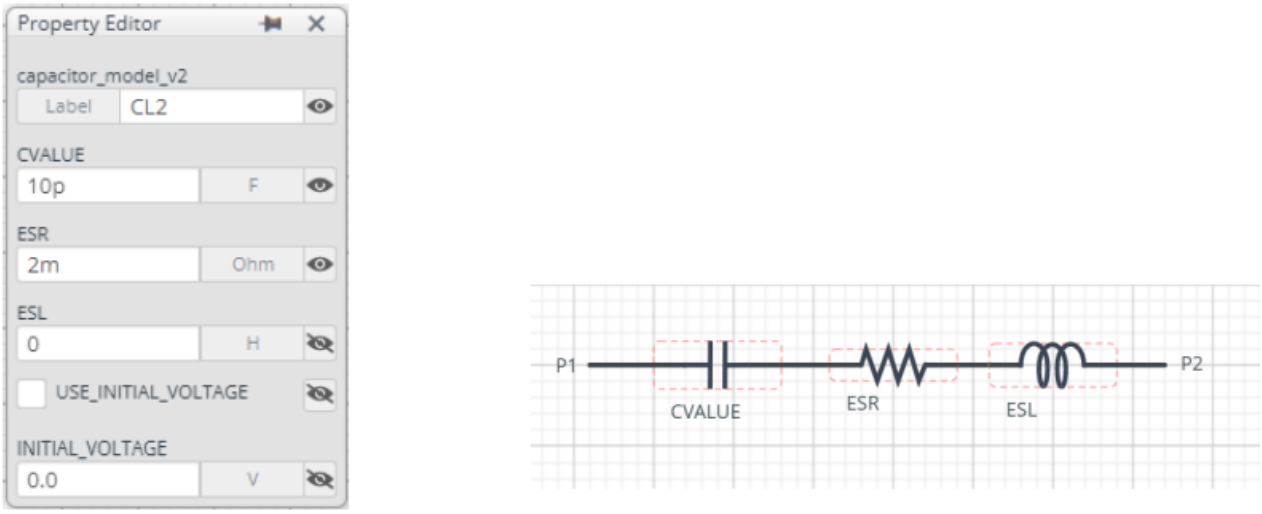
Bill of Material

Table 4 shows the list of components used in the simulation schematic. Each of the capacitors has the parameters of the equivalent circuit shown below. The default values of equivalent components are set to zero except for the ESR of C. You can modify the values of each component.

Table 4. List of capacitors used in the simulation circuit

Type	Instance Name	Default Value	Variable Range		Units
			Min	Max	
Resistor	R2_1	10k	1k	1M	Ω
	R2_2	10k	1k	1M	Ω
	RL2	10k	1k	1M, NC	Ω
Capacitor	C2_1	10	0.1	100	pF
	CL2	10	free, NC		pF

Capacitor Equivalent Circuits



(a) Property editor (b) Equivalent circuit

Figure 4. Capacitor property editor and equivalent circuit

Recommended Products

Op-Amp

TLR2374FV-LB: Low Noise High Output Drive Rail-to-Rail In/Out CMOS Op-Amp. [JP] [EN] [CN] [KR] [TW] [DE]
Technical Articles and Tools can be found in the Design Resources on the product web page.

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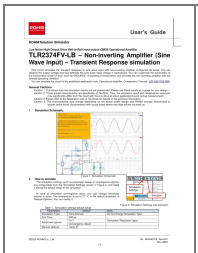	ROHM TLR2374FV-LB Non-inverting Amplifier [pdf] User Guide TLR2374FV-LB Non-inverting Amplifier, TLR2374FV-LB, Non-inverting Amplifier, Amplifier

References

- User Manual