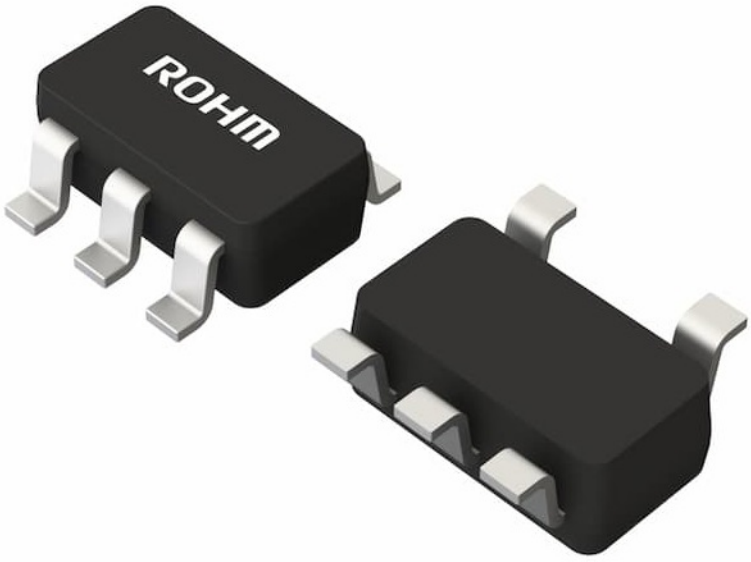
Contents [hide]

ROHM TLR728G-LB Noise Rail to Rail Input and Output High Speed CMOS Amplifier



Product Specifications

- **Product Name:** ROHM Solution Simulator
- **Features:** Low Offset & Low Noise Rail-to-Rail Input/Output High Speed CMOS Operational Amplifiers

Product Usage Instructions

Simulation Schematic

Figure 1 shows the simulation schematic for the frequency response with an Op-Amp as a non-inverting amplifier.

How to Simulate

The simulation settings can be configured in the ‘Simulation Settings’ menu as shown in Figure 2. Table 1 displays the default setup of the simulation.
Simulation Settings

- **Simulation Type:** Frequency-Domain
- **Start Frequency – End Frequency:** 0 Hz – 100 MHz
- **Advanced Options:** Simulation Resolution, Convergence Assist
- **Manual Options:** .temp 27

Simulation Conditions

Table 2 lists the simulation condition parameters, including instance name, type, and parameters for voltage sources and the Op-Amp.

Op-Amp Model

Table 3 displays the model pin functions for the Op-Amp simulation, specifying the input/output characteristics.

Peripheral Components

Bill of Materials

Table 4 lists the components used in the simulation schematic, including resistors and capacitors with their default values and variable ranges.

Capacitor Equivalent Circuits

Figure 3 illustrates the capacitor property editor and equivalent circuit, noting that the default value of ESR is 2m.

INTRODUCTION

- This circuit simulates the frequency response with an Op-Amp as a non-inverting amplifier. You can observe the AC gain and phase of the ratio of output to input voltage when the input source voltage AC frequency is changed. 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.
- In the published application note, you can simulate the circuit: 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 variances may significantly differ from the result with the one done at the 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 double-checking those characteristics with the

actual board where the chips will be mounted.

Simulation Schematic

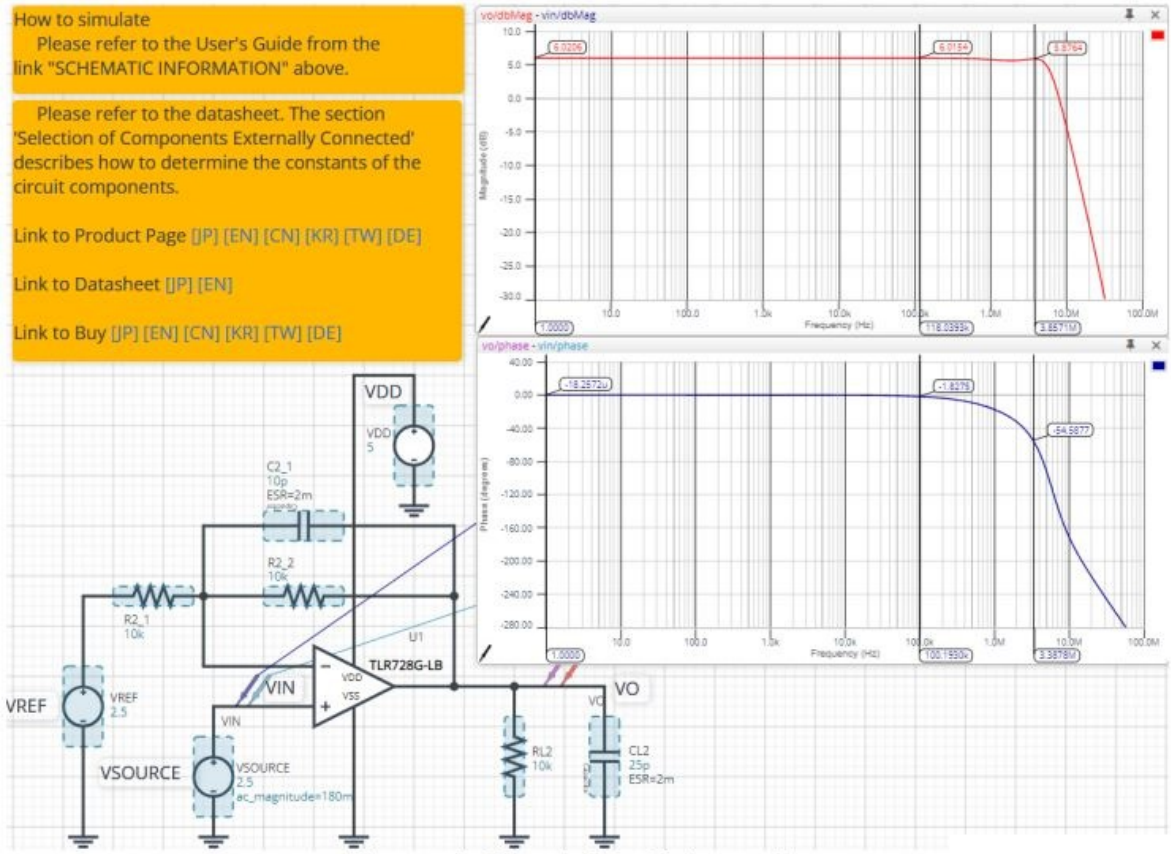


Figure 1. Simulation Schematic

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 a simulation convergence issue, you can change the advanced options to solve it. The temperature is set to 27 °C in the default statement in ‘Manual Options’. You can modify it.

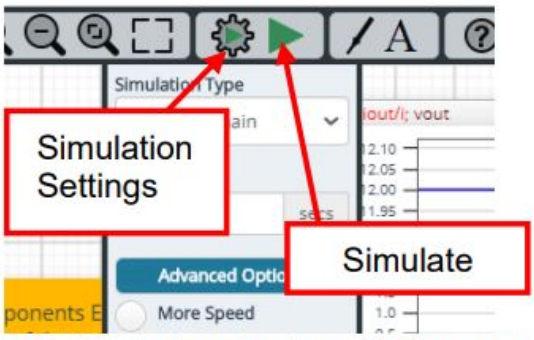


Figure 2. Simulation Settings and execution

Parameters	Default	Note
Simulation Type	Frequency-Domain	Do not change Simulation Type
Start Frequency	0 Hz	Simulate the frequency response for the frequency range from 0 Hz to 100 MHz.
End Frequency	100Meg Hz	
Advanced options	Simulation Resolution	1e-7
	Convergence Assist	–
Manual Options	.temp 27	–

Simulation Conditions

Instance Name	Type	Parameters	Default Value	Variable Range		Units
				Min	Max	
VSOURCE	Voltage Source	Voltage_level	2.5	0	5.5	V
		AC_magnitude	180m	free		V
		AC_phase	0.0	fixed		°
VDD	Voltage Source for Op-Amp	Voltage_level	5	2.5*(Note1)*	5.5*(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.

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.

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

Peripheral Components

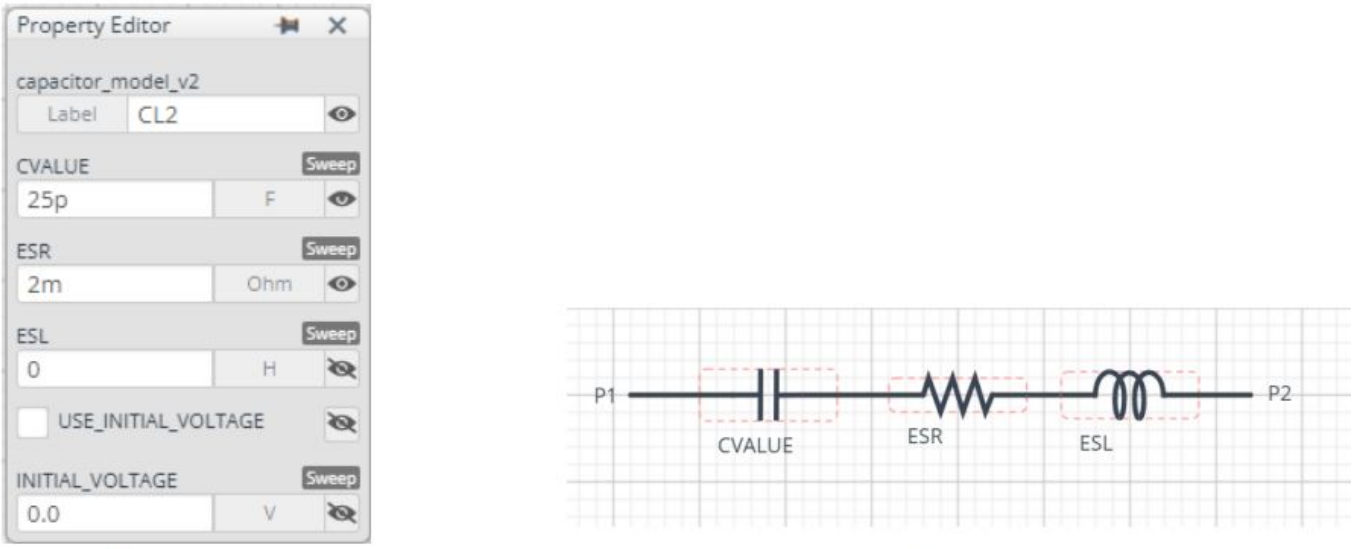
Bill of Materials

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.

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	25	free, NC		pF

Capacitor Equivalent Circuits



(a) Property editor (b) Equivalent circuit

Figure 3. Capacitor property editor and equivalent circuit

The default value of ESR is 2 mΩ.

(Note 2) These parameters can take any positive value or zero in simulation, but it does not guarantee the operation of the IC in any condition. Refer to the datasheet to determine the adequate value of parameters.

Recommended Products

Op-Amp

- TLR728G-LB: Low Offset & Low Noise Rail-to-Rail Input/Output High Speed CMOS Op-Amps. [JP] [EN] [CN] [KR] [TW] [DE]
- Technical Articles and Tools can be found in the Design Resources on the product web page.

Notice

1. The information contained in this document is intended to introduce ROHM Group (hereafter referred to as ROHM) products. When using ROHM products, please verify the latest specifications or datasheets before use.
2. ROHM products are designed and manufactured for use in general electronic equipment and applications (such as Audio Visual equipment, Office Automation equipment, telecommunication equipment, home appliances, amusement devices, etc.) or specified in the datasheets. Therefore, please contact the ROHM sales representative before using ROHM products in equipment or devices requiring extremely high reliability and whose failure or malfunction may cause danger or injury to human life or body or other serious damage (such as medical equipment, transportation, traffic, aircraft, spacecraft, nuclear power controllers, fuel control, automotive equipment including car accessories, etc. hereafter referred to as Specific Applications). Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses, or losses incurred by you or third parties arising from the use of ROHM Products for Specific Applications.
3. Electronic components, including semiconductors, can fail or malfunction at a certain rate. Please be sure to implement, at your responsibility, adequate safety measures, including but not limited to fail-safe design against physical injury, and damage to any property, which a failure or malfunction of products may cause.
4. The information contained in this document, including application circuit examples and their constants, is intended to explain the standard operation and usage of ROHM products. It is not intended to guarantee, either explicitly or implicitly, the operation of the product in the actual equipment it will be used in. As a result, you are solely responsible for it, and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses, or losses incurred by you or third parties arising from the use of such information.
5. When exporting ROHM products or technologies described in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, such as the Foreign Exchange and Foreign Trade Act and the US Export Administration Regulations, and follow the necessary procedures under these provisions.
6. The technical information and data described in this document, including typical

application circuits, are examples only and are not intended to guarantee that to are free from infringement of third parties' intellectual property or other rights. ROHM does not grant any license, express or implied, to implement, use, or exploit any intellectual property or other rights owned or controlled by ROHM or any third parties concerning the information contained herein.

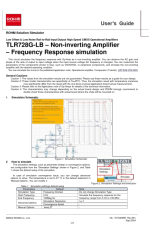
7. No part of this document may be reprinted or reproduced in any form by any means without the prior written consent of ROHM.
8. All information contained in this document is current as of the date of publication and subject to change without notice. Before purchasing or using ROHM products, please confirm the latest information with the ROHM sales representative.
9. ROHM does not warrant that the information contained herein is error-free. ROHM shall not be in any way responsible or liable for any damages, expenses, or losses incurred by you or third parties resulting from errors contained in this document.

https://www.rohm.com/contactus

Frequently Asked Questions (FAQ)

- **Can I modify the parameters of the components in the simulation?**
  Yes, you can customize the parameters of components shown in blue, such as VSRCE or peripheral components, to simulate the non-inverting amplifier with desired operating conditions.
- **What is the default simulation type?**
  The default simulation type is Frequency-Domain to analyze the frequency response from 0 Hz to 100 MHz.

Documents / Resources

	ROHM TLR728G-LB Noise Rail to Rail Input and Output High Speed CMOS Amplifier [pdf] User Guide TLR728G-LB, TLR728G-LB Noise Rail to Rail Input and Output High Speed CMOS Amplifier, Noise Rail to Rail Input and Output High Speed CMOS Amplifier, Input and Output High Speed CMOS Amplifier, High Speed CMOS Amplifier, CMOS Amplifier

References

- User Manual

ROHM

CMOS Amplifier, High Speed CMOS Amplifier, Input and Output High Speed CMOS Amplifier, Noise Rail to Rail Input and Output High Speed CMOS Amplifier, ROHM, TLR728G-LB, TLR728G-LB Noise Rail to Rail Input and Output High Speed CMOS Amplifier

Leave a comment

Your email address will not be published. Required fields are marked *

Comment *

Name

Email

Website

Save my name, email, and website in this browser for the next time I comment.

Post Comment

Search:

e.g. whirlpool wrf535swhz

Search