



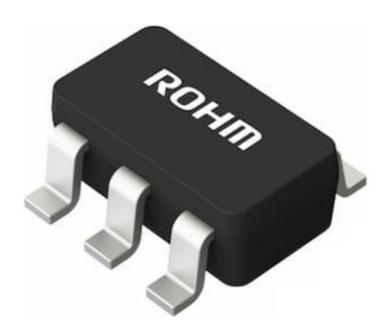
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# **ROHM**

**ROHM TLR728G-LB Input and Output High Speed CMOS Amplifiers** 



## **Specifications**

- Product Name: ROHM Solution Simulator
- Type: Low Offset & Low Noise Rail-to-Rail Input/Output High Speed CMOS Operational Amplifiers
- Function: Simulates transient response to sine wave input with voltage follower configured Op-Amps

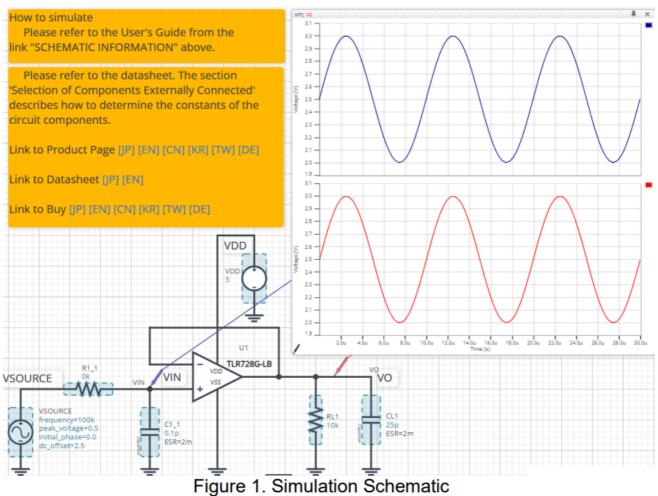
This circuit simulates the transient response to a sine wave input with voltage follower configured Op-Amps. You can observe the output voltage and how faithfully the sine wave input voltage is reproduced. You can customize the parameters of the components shown in blue, such as VSOURCE or peripheral components, and simulate the voltage follower with the desired operating condition. You can simulate the circuit in the published application note: Operational amplifier, Comparator (Tutorial).

#### **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 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 recommend to double check those characteristics with actual board where the chips will be mounted on.

### **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. The temperature is set to 27 °C in the default statement in 'Manual Options'. You can modify it.

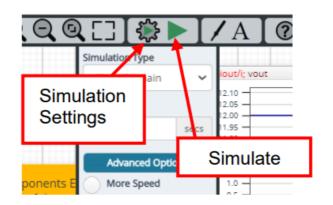


Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default	Note
Simulation Type	Time-Domain	Do not change Simulation Type
End Time	30 μs	_
Advanced option	Simulation Resolution	1e-7
s	Convergence Assist	_
Manual Options	.temp 27	_

## **Simulation Conditions**

**Table 2. List of the simulation condition parameters** 

Instance	Туре	Parameters	Defaul t Valu e	Variable Range		Unit
Name				Min	Max	s
		Frequency	100k	10	10M	Hz
		Peak_voltage	0.5	0	5.5	V
		Initial_phase	0	free	1	0

VSOURC E	Voltage Sour ce	DC_offset	2.5	0	5.5	V
		DF	0.0	fixed		1/s
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		o
	Voltage Sour	Voltage_level	5	2.5(No te1)	5.5(N ote1)	V
VDD	ce For Op-A	AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		o

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

### **VSOURCE** parameter setup

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

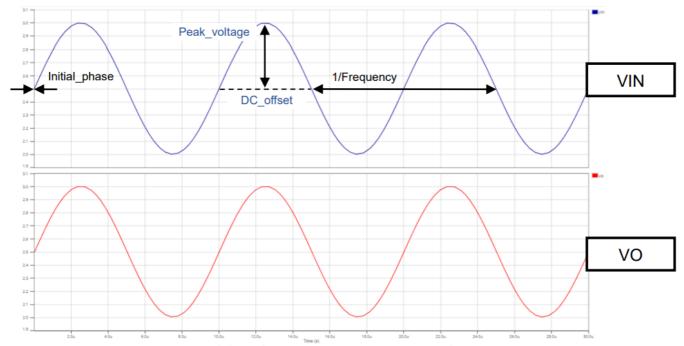


Figure 3. VSOURCE parameters and its waveform

## **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 Materials**

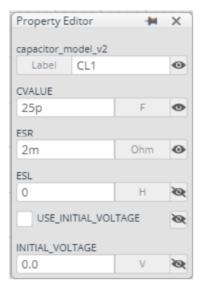
Table 4 shows the list of components used in the simulation schematic. Each of the capacitors has the parameters of equivalent circuit shown below. The default values of equivalent components are set to zero except for the ESR of C. You can modify the values of each component.

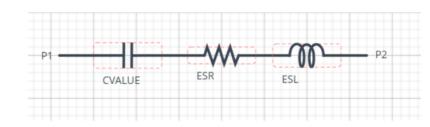
Table 4. List of capacitors used in the simulation circuit

Туре	Instance Name	Default Value	Variable Range ue Units	Lipito	
	Instance Name Default Value	Min	Max	Units	
	R1_1	0	0	10	kΩ
Resistor	RL1	10k	1k	1M, N C	Ω
	C1_1	0.1	0.1	22	pF
Capacitor			•		

CL1	25	free, NC	pF

#### **Capacitor Equivalent Circuits**





(a) Property editor (b) Equivalent circuit Figure 4. Capacitor property editor and equivalent circuit

The default value of ESR is  $2m\Omega$ . (Note 2) These parameters can take any positive value or zero in simulation but it does not guarantee the operation bof the IC in any condition. Refer to the datasheet to determine 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.

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#### **FAQs**

#### Q: Can I modify the values of components in the simulation?

A: Yes, you can modify the values of each component within the specified variable range.

## Q: What is the default value of ESR for capacitors?

A: The default value of ESR is 2m. Positive values or zeros can be used in simulation, but it does not guarantee operation.

## **Documents / Resources**



ROHM TLR728G-LB Input and Output High Speed CMOS Amplifiers [pdf] User Guide

TLR728G-LB, TLR728G-LB Input and Output High Speed CMOS Amplifiers, Input and Output High Speed CMOS Amplifiers, High Speed CMOS Amplifiers, CMOS Amplifiers, Amplifiers



### ROHM TLR728G-LB Input and Output High Speed CMOS Amplifiers [pdf]

User Guide

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User Guide

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#### References

- User Manual
- ROHM
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