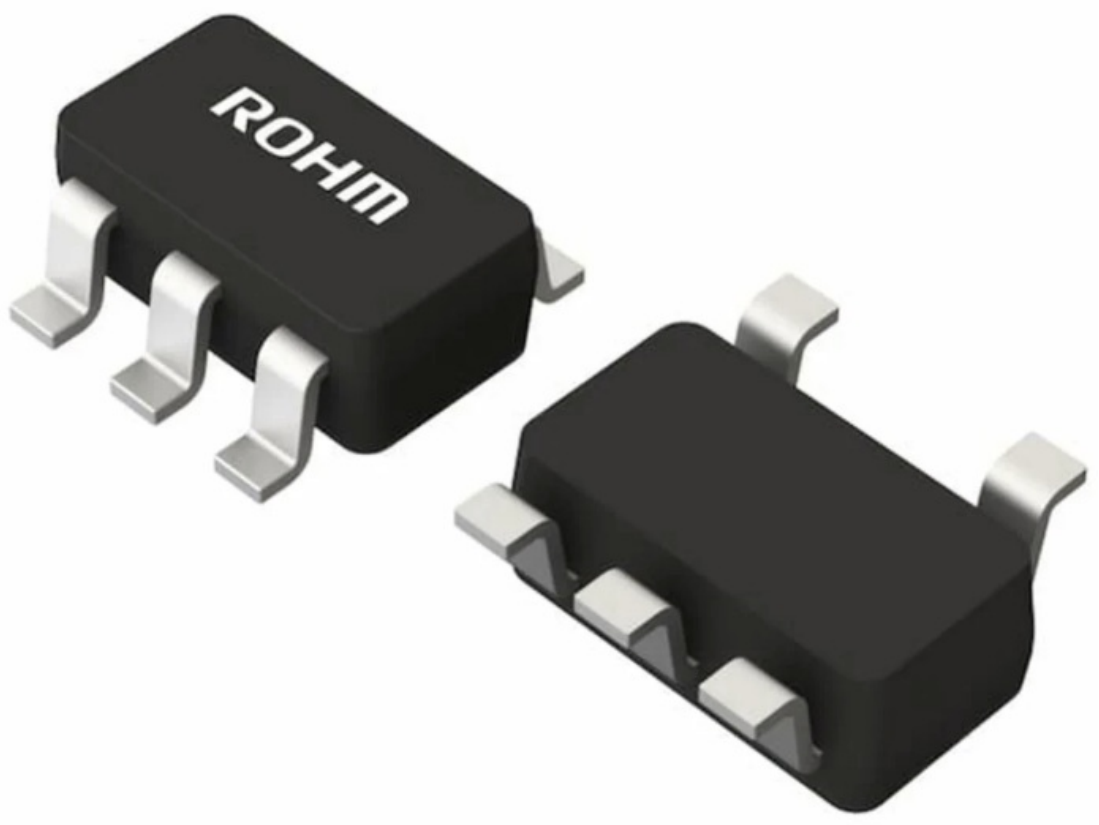
Contents [hide]

ROHM BD87521G-LB Non Inverting Amplifier



Specifications

- **Product Name:** ROHM Solution Simulator
- **Features:** Excellent EMI Immunity, High Output Drive, Rail-to-Rail Input/Output, CMOS Operational Amplifier
- **Simulation Type:** Frequency-Domain
- **Default Start Frequency:** 0 Hz
- **Default End Frequency:** 100 MHz

This circuit simulates the transient response to a pulse input with voltage follower configured Op-Amps. You can observe the fluctuation of the output voltage when the input voltage is abruptly changed. 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). [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 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

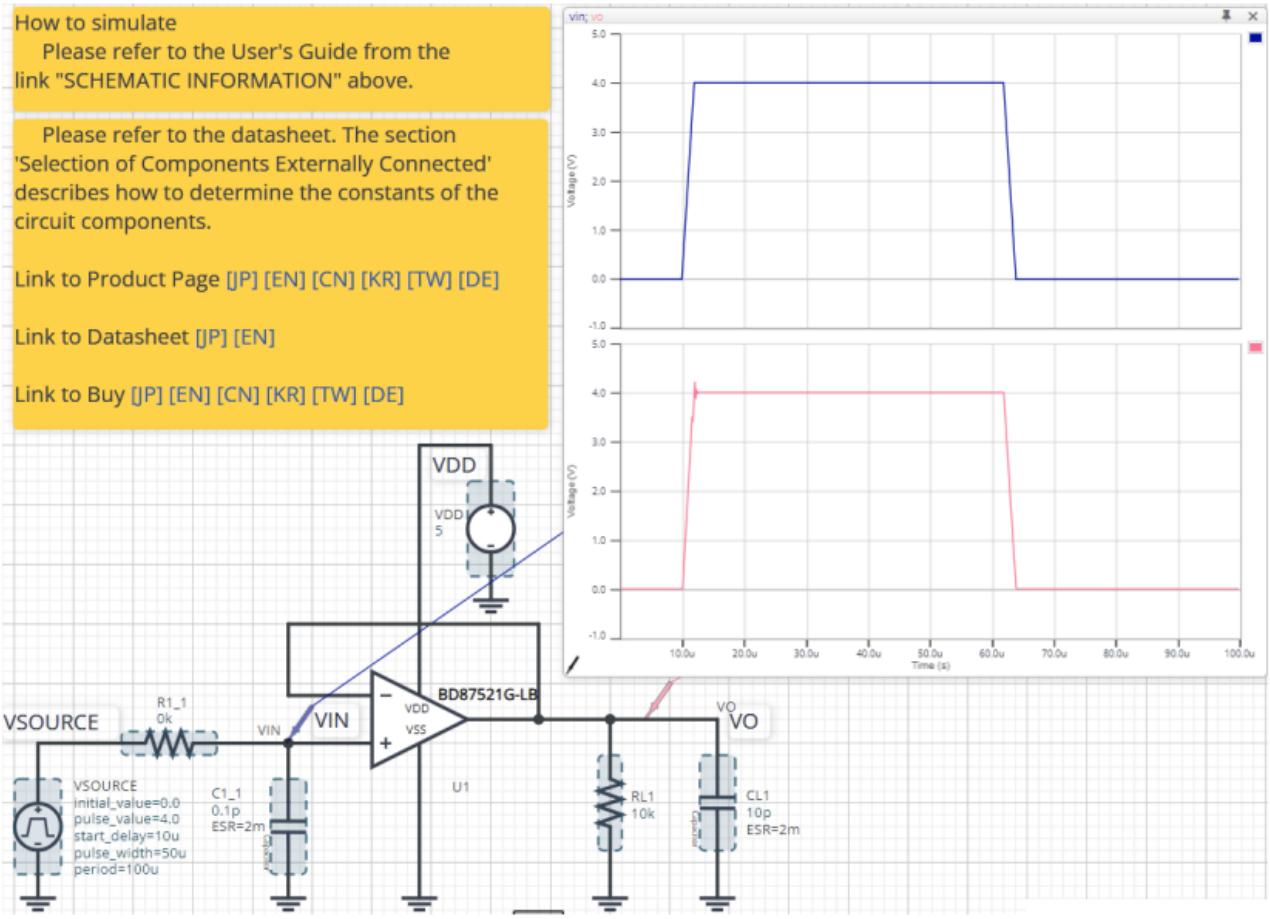


Figure 1. Simulation Schematic

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.

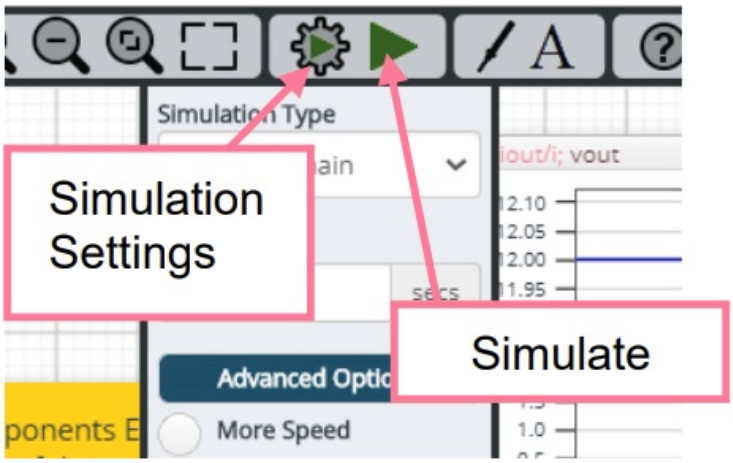


Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default	Note
Simulation Type	Time-Domain	Do not change Simulation Type
End Time	100 µs	–
Advanced options	Balanced	–
	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	
		Initial_value	0	VSS	VDD	V

VSOURCE	Voltage Source	Pulse_value	4	VSS	VDD	V
		ramptime_initial_to_pulse	2	free		µs
		ramptime_pulse_to_initial	2	free		µs
		Start_delay	10	free		µs
		Pulse_width	50	free		µs
		Period	100	free		µs
VDD	Voltage Source For Op-Amp	Voltage_level	5	4*(Note 1)*	15*(Note1)*	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.

VSOURCE parameter setup

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

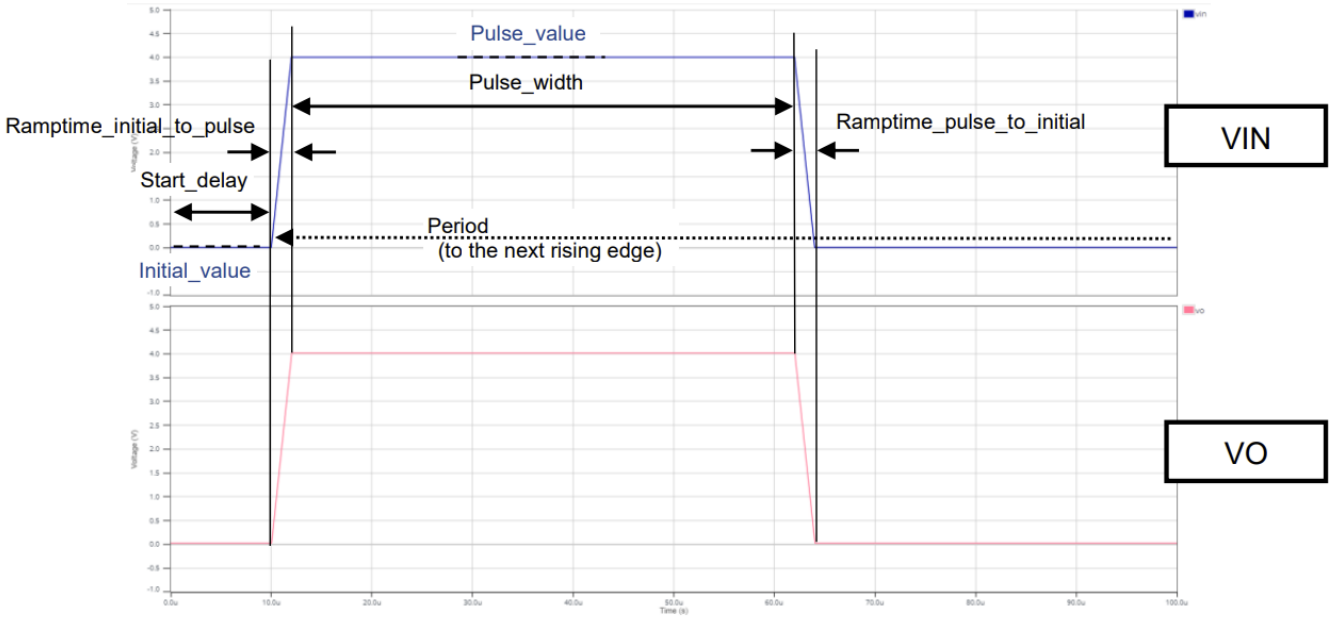


Figure 3. VSOURCE parameters and its waveform

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.

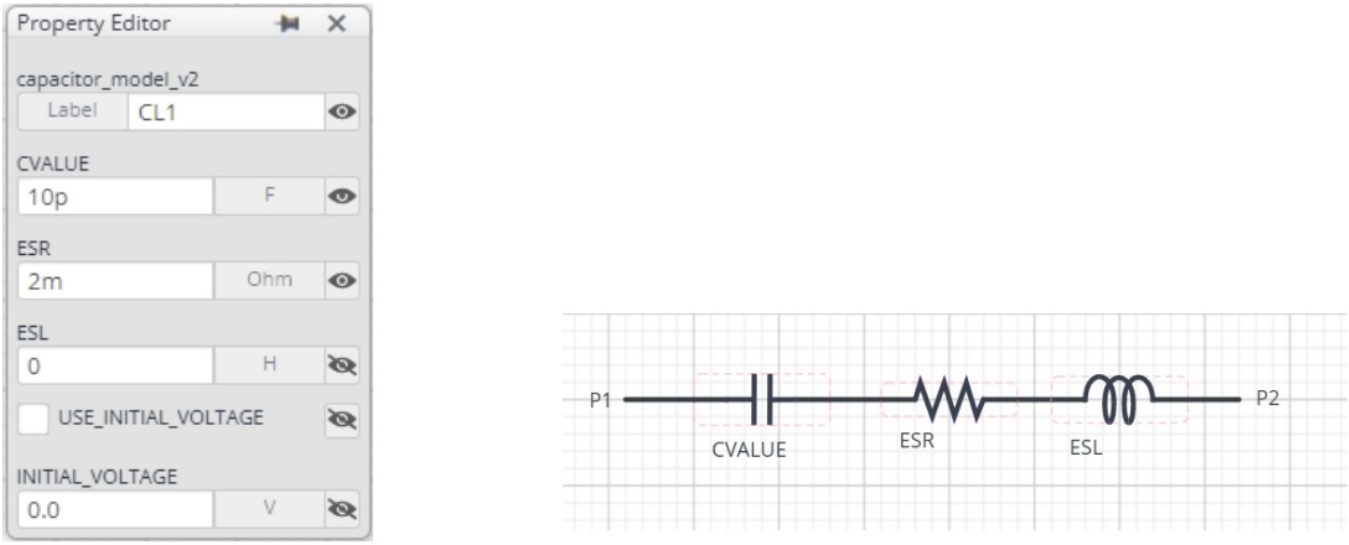
Table 4. List of capacitors used in the simulation circuit

Type	Instance Name	Default Value	Range (Min)	Range (Max)	Units
Resistor	R1_1	0	0	10	kΩ
Resistor	RL1	10k	1k	1M, NC	Ω
Capacitor	C1_1	0.1	0.1	22	pF
Capacitor	CL1	10	free, NC	—	pF

Notes:

- “NC” stands for “Not Connected” or “No Connection”.
- For CL1, “free, NC” suggests it may either be freely chosen or left unconnected.

Capacitor Equivalent Circuits



(a) Property editor (b) Equivalent circuit

Figure 4. 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 adequate value of parameters.

Recommended Products

Op-Amp

1. **BD87521G-LB: 1**ch Excellent EMI Immunity High Output Drive Rail-to-Rail I/O CMOS Op-Amp. [JP] [EN] [CN] [KR] [TW] [DE]
2. **BD87522FJ-LB:** 2ch Excellent EMI Immunity High Output Drive Rail-to-Rail I/O CMOS Op-Amp. [JP] [EN] [CN] [KR] [TW] [DE]
3. **BD87524FV-LB:** 4ch Excellent EMI Immunity High Output Drive Rail-to-Rail I/O 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.

General Precaution

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Notice – WE

FAQ

Q: Can I change the simulation type?

A: The default simulation type is Frequency-Domain, and it is recommended not to change this setting.

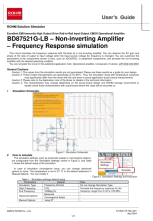
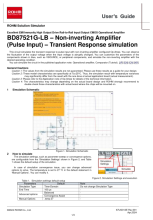
Q: What is the default start and end frequency for simulation?

A: The default start frequency is 0 Hz, and the end frequency is 100 MHz for simulating the frequency response.

Q: How can I modify the values of components in the simulation?

A: You can customize parameters of components shown in blue, such as VSOURCE, or peripheral components, to simulate the desired operating conditions.

Documents / Resources

	ROHM BD87521G-LB Non Inverting Amplifier [pdf] User Guide BD87521G-LB, BD87521G-LB Non Inverting Amplifier, BD87521G-LB, N on Inverting Amplifier, Inverting Amplifier, Amplifier
	ROHM BD87521G-LB Non Inverting Amplifier [pdf] User Guide BD87521G-LB, BD87521G-LB Non Inverting Amplifier, Non Inverting Am plifier, Inverting Amplifier, Amplifier

References

- User Manual

ROHM

Amplifier, BD87521G-LB, BD87521G-LB Non Inverting Amplifier, inverting Amplifier, Non-inverting Amplifier, ROHM

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