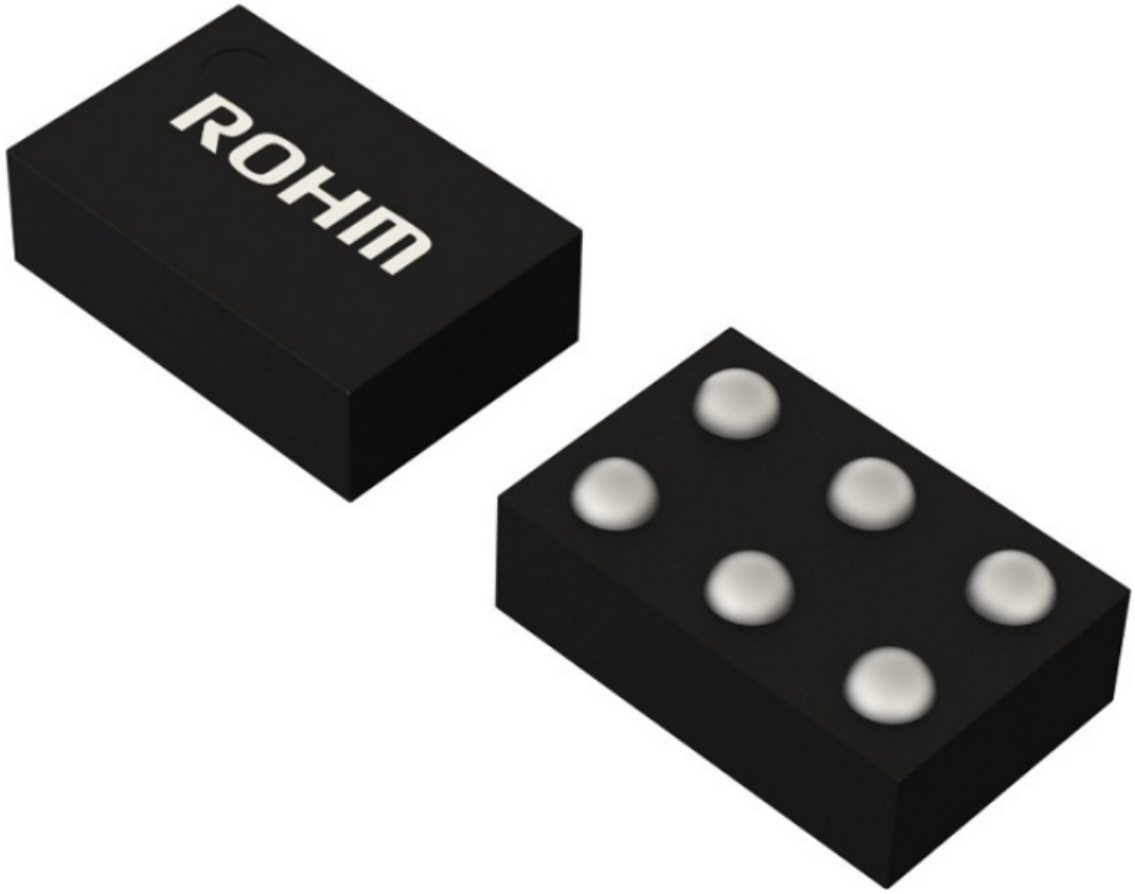
Contents [hide]

ROHM TLR377GYZ Voltage Follower Pulse Input Transient CMOS Amplifier



This circuit simulates the transient response to 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

1. Caution 1: The values from the simulation results are not guaranteed. Please use these results as a guide for your design.
2. 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).
3. Caution 3: Please refer to the Application note of Op-Amps for details of the technical information.
4. 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

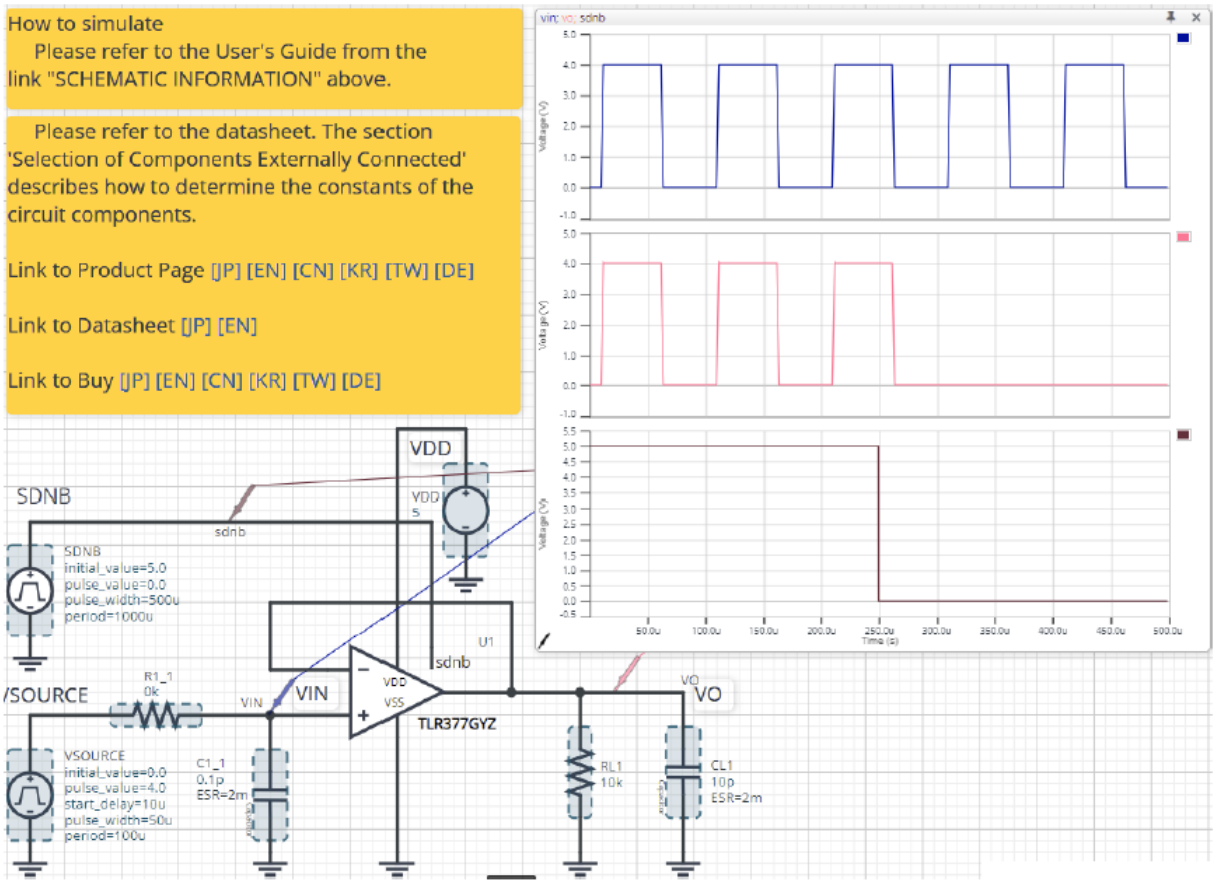


Figure 1. Simulation Schematic

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.

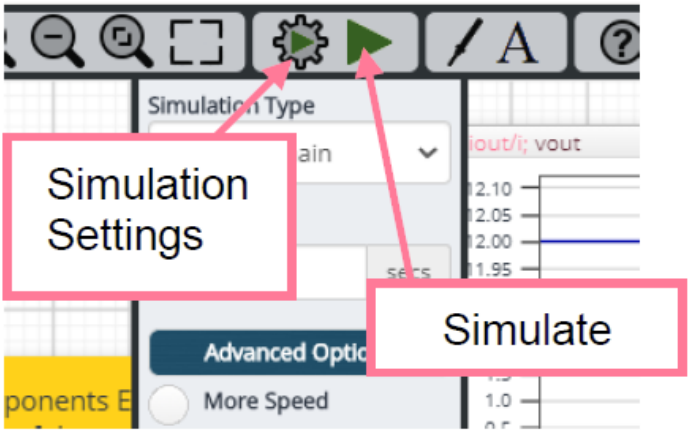


Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default	Note
Simulation Type	Time-Domain	Do not change Simulation Type
End Time	500 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	0	5.5	V
		Pulse_value	4	0	5.5	V

VSOURCE	Voltage Source	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	1.8*(Note1)*	5.5*(Note1)*	V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
SDNB	Voltage Source For Shutdown Setting	Initial_value	5	VSS	VDD	V
		Pulse_value	0	VSS	VDD	V
		ramptime_initial_to_pulse	100	free		ns
		ramptime_pulse_to_initial	100	free		ns
		Start_delay	250	free		µs
		Pulse_width	500	free		µs
		Period	1	1	–	ms

(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.

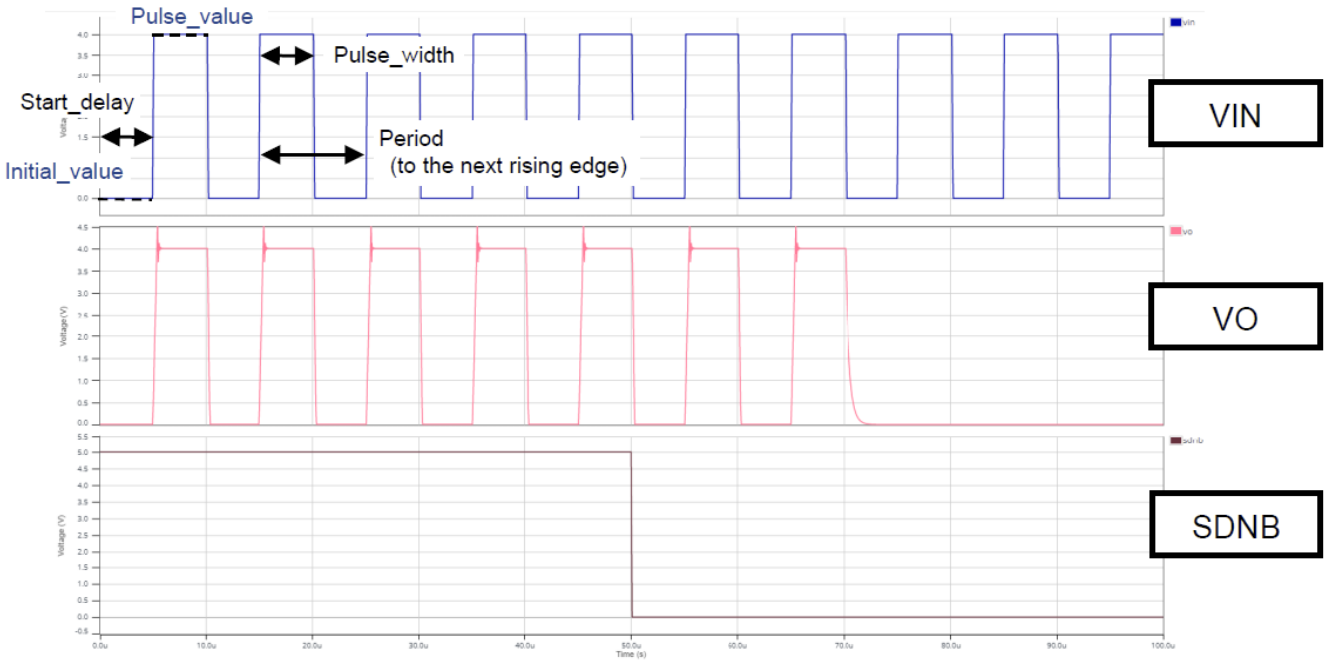


Figure 3. VSOURCE parameters and its waveform

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
SDNB	Shutdown setting

Peripheral Components

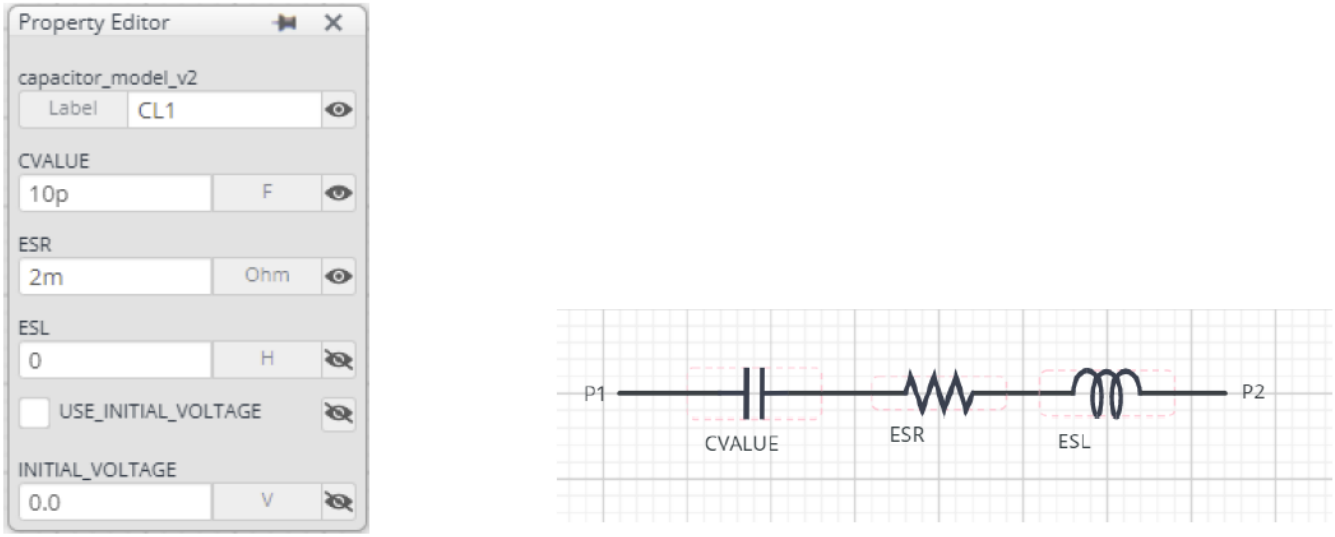
Bill of Material

Table 4 shows the list of components used in the simulation schematic. Each of the capacitors has the parameters of 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	R1_1	0	0	10	kΩ
	RL1	10k	1k	1M, NC	Ω
Capacitor	C1_1	0.1	0.1	22	pF
	CL1	10	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 Ω.

(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

TLR377GYZ: Ultra Small Package & High Precision Rail-to-Rail Input/Output CMOS Operational Amplifier. [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 asROHM) 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 own 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, and is not intended to guarantee, either explicitly or implicitly, the operation of the product in the actual equipment it will be used. 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 in accordance with 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 to be 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 with respect to 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.

Thank you for your accessing to ROHM product information. More detail product information and catalogs are available, please contact us.

ROHM Customer Support System: https://www.rohm.com/contactus

www.rohm.com

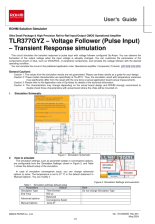
© 2023 ROHM Co., Ltd. All rights reserved.

FAQ

Q: Can I modify the values of the components in the simulation circuit?
A: Yes, you can customize the parameters of components shown in blue or modify the values of each component in the simulation.

Q: What is the purpose of the Op-Amp model in the simulation?
A: The Op-Amp model is a behavioral model for its input/output characteristics, ensuring accurate simulation results.

Documents / Resources

	ROHM TLR377GYZ Voltage Follower Pulse Input Transient CMOS Amplifier [pdf] User Guide TLR377GYZ, TLR377GYZ Voltage Follower Pulse Input Transient CMOS Amplifier, Voltage Follower Pulse Input Transient CMOS Amplifier, Pulse Input Transient CMOS Amplifier, Transient CMOS Amplifier, CMOS Amplifier

References

- User Manual

ROHM

CMOS Amplifier, Pulse Input Transient CMOS Amplifier, ROHM, TLR377GYZ, TLR377GYZ Voltage Follower Pulse Input Transient CMOS Amplifier, Transient CMOS Amplifier, Voltage Follower Pulse Input Transient 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

This website is an independent publication and is neither affiliated with nor endorsed by any of the trademark owners. The "Bluetooth®" word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. The "Wi-Fi®" word mark and logos are registered trademarks owned by the Wi-Fi Alliance. Any use of these marks on this website does not imply any affiliation with or endorsement.