ROHM Solution Simulator

905nm Pulsed Laser Diode

RLD90QZWx series/ Resonant wave B-01

This circuit simulate the resonant wave B-01 Time-Domain response of RLD90QZWx series. You can observe the resonant wave of not only the current but also the optical output waveform. You can customize the parameters of the components shown in blue, such as VIN, or peripheral components, and simulate the resonant wave B-01 Time-Domain with desired operating condition.

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: Please refer to the Application note of Laser Diode for details of the technical information.
Caution 3: 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.

1 Simulation Schematic

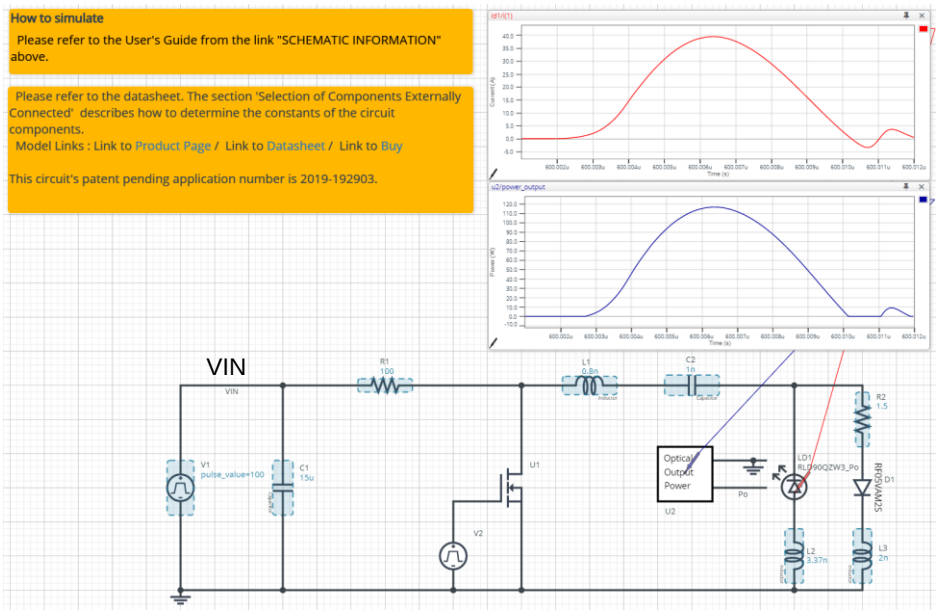


Figure 1. Simulation Schematic

2 How to simulate

The simulation settings, such as simulation time 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. Default statement in 'Manual Options' sets the time to start saving the result to 0.600001ms. You can modify or delete it.

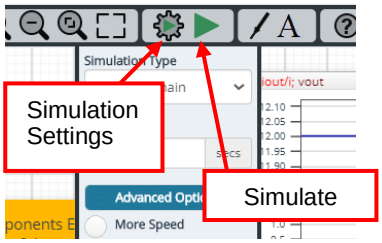


Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default	Note
Simulation Type	Time-Domain	Do not change Simulation Type
End Time	0.600012ms	-
Advanced options	Balanced	-
	Time Resolution Enhancement Convergence Assist	-
Manual Options	".tran 0 0.600012m 0.600001m"	-

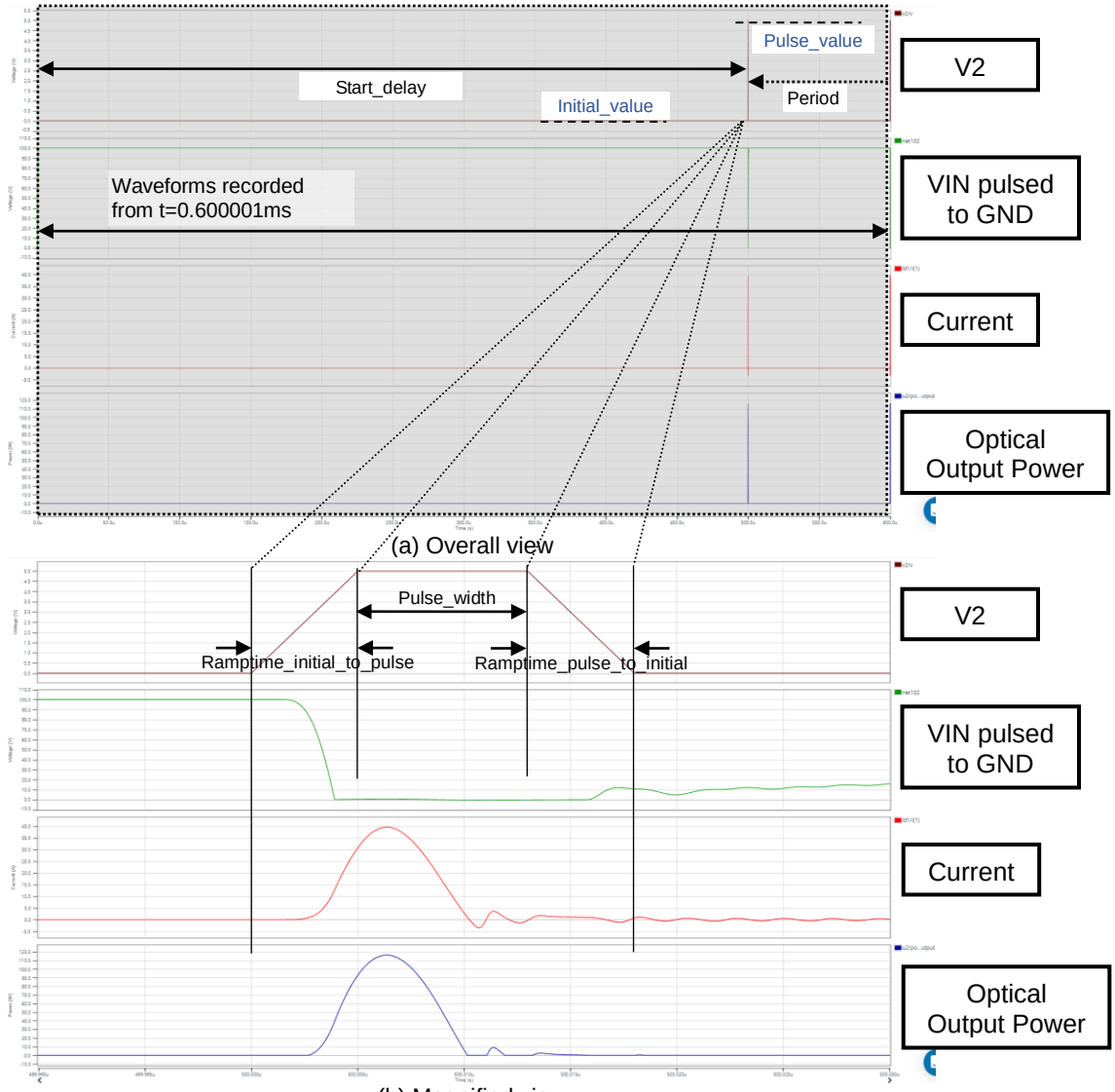
3 Simulation Conditions

Table 2. List of the simulation condition parameters

Instance Name	Type	Parameters	Default Value	Variable Range		Units
				Min	Max	
V1	Voltage Source	Initial_value	0	-		V
		Pulse_value	100	10	180	V
		ramptime_initial_to_pulse	10	-		ns
		ramptime_pulse_to_initial	10	-		ns
		Start_delay	0	-		s
		Pulse_width	1	-		s
		Period	2	-		s
V2	Voltage Source	Initial_value	0	-		V
		Pulse_value	5	-		V
		ramptime_initial_to_pulse	5	-		ns
		ramptime_pulse_to_initial	5	-		ns
		Start_delay	0.5	-		ms
		Pulse_width	8	-		ns
		Period	100	-		µs

3.1 V2 parameter setup

Figure 3 shows how the V2 parameters correspond to the VIN stimulus waveform.



(a) Overall view

(b) Magnified view

Figure 3. V2 parameters and its waveform

4 RLD90QZWx series_Po model

Table 3 shows the model terminal function implemented. Note that RLD90QZWx series_Po is the behavior model for its resonant wave optical output power response operation, and no protection circuits or the functions not related to the purpose are not implemented.

Table 3. RLD90QZWx series_Po model terminals used for the simulation

Terminals	Description
1	A / Anode
2	C / Cathode
OPT	Optical output power in V [volts]
GND	Ground

(Note 1) Use the simulation results only as a design guide and the data reported herein is not a guaranteed value.

4.1 Optical Output Power

RLD90QZWx series_Po model outputs optical output power in V [volts] unit. Optical Output Power insert model multiplies the output result by 1A and convert it to W [watts]. To monitor the optical output power in W [watts], select probe item 'power_output' from property of Optical Output Power insert model.

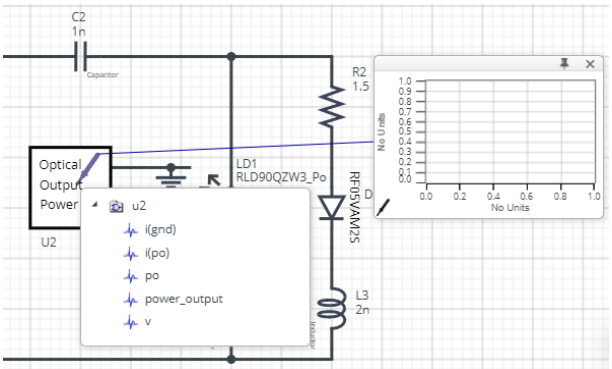


Figure 4. Probe Items of Optical Output Power insert model

5 Peripheral Components

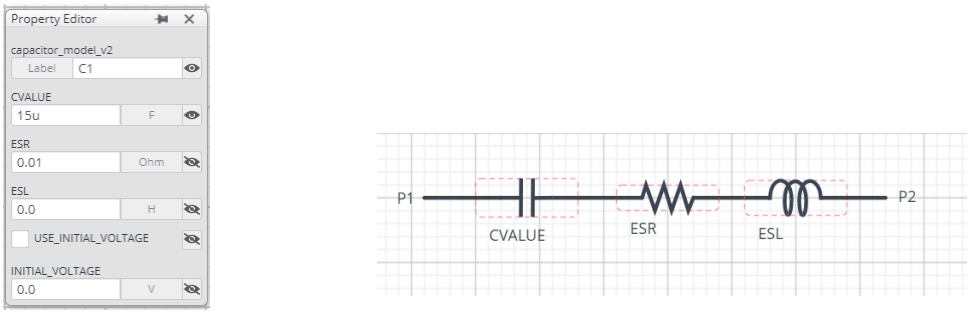
5.1 Bill of Material

Table 4 shows the list of components used in the simulation schematic. Each of the capacitor and inductor has the parameters of equivalent circuit shown below. The default value of equivalent components are set to zero except for the ESR of C, and parallel resistance of L. 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	
Capacitor	C1	15	-	-	µF
	C2	1	0.1	100	nF
Inductor	L1	0.8	0.1	5	nH
	L2	3.37	0.1	5	nH
	L3	2	0.1	5	nH
Resistor	R1	100	1	200	Ω
	R2	1.5	0.1	20	Ω

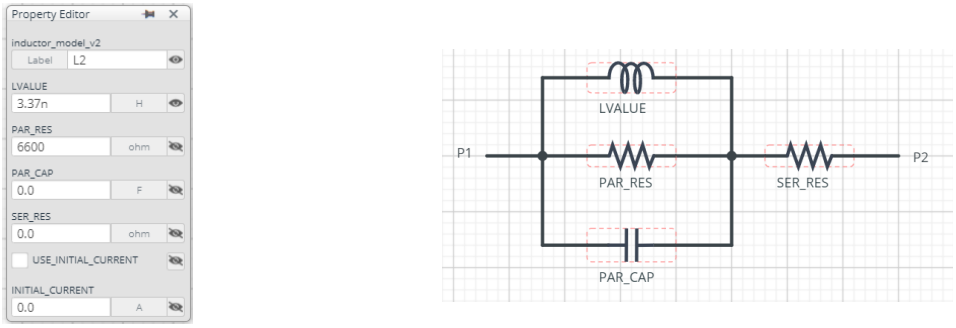
5.2 Capacitor Equivalent Circuits



(a) Property editor (b) Equivalent circuit

Figure 5. Capacitor property editor and equivalent circuit

5.3 Inductor Equivalent Circuits



(a) Property editor (b) Equivalent circuit

Figure 6. Inductor property editor and equivalent circuit

The default value of PAR_RES is 6.6kohm.

(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.

6 Link to the product information and tools

6.1 Product webpage link:

https://www.rohm.com/products/laser-diodes/high-power-lasers/rld90qzw3-product
https://www.rohm.com/products/laser-diodes/high-power-lasers/rld90qzw5-product
https://www.rohm.com/products/laser-diodes/high-power-lasers/rld90qzw6-product
https://www.rohm.com/products/laser-diodes/high-power-lasers/rld90qzw8-product

6.2 Related documents

The application notes are available from 'Documents in Design Resources' tab of the product page.

RLD90QZW3 RLD90QZW5 RLD90QZW6 RLD90QZW8

6.3 Design assist tools are available from 'Tools in Design Resources' tab of the product page.

RLD90QZW3 RLD90QZW5 RLD90QZW6 RLD90QZW8

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