



ROHM Solution Simulator Hands-on User's Manual Rev.2

February, 2020

Choose Simulation Circuit

Execute Simulation

Customize Simulation

Export Schematics

Order Samples

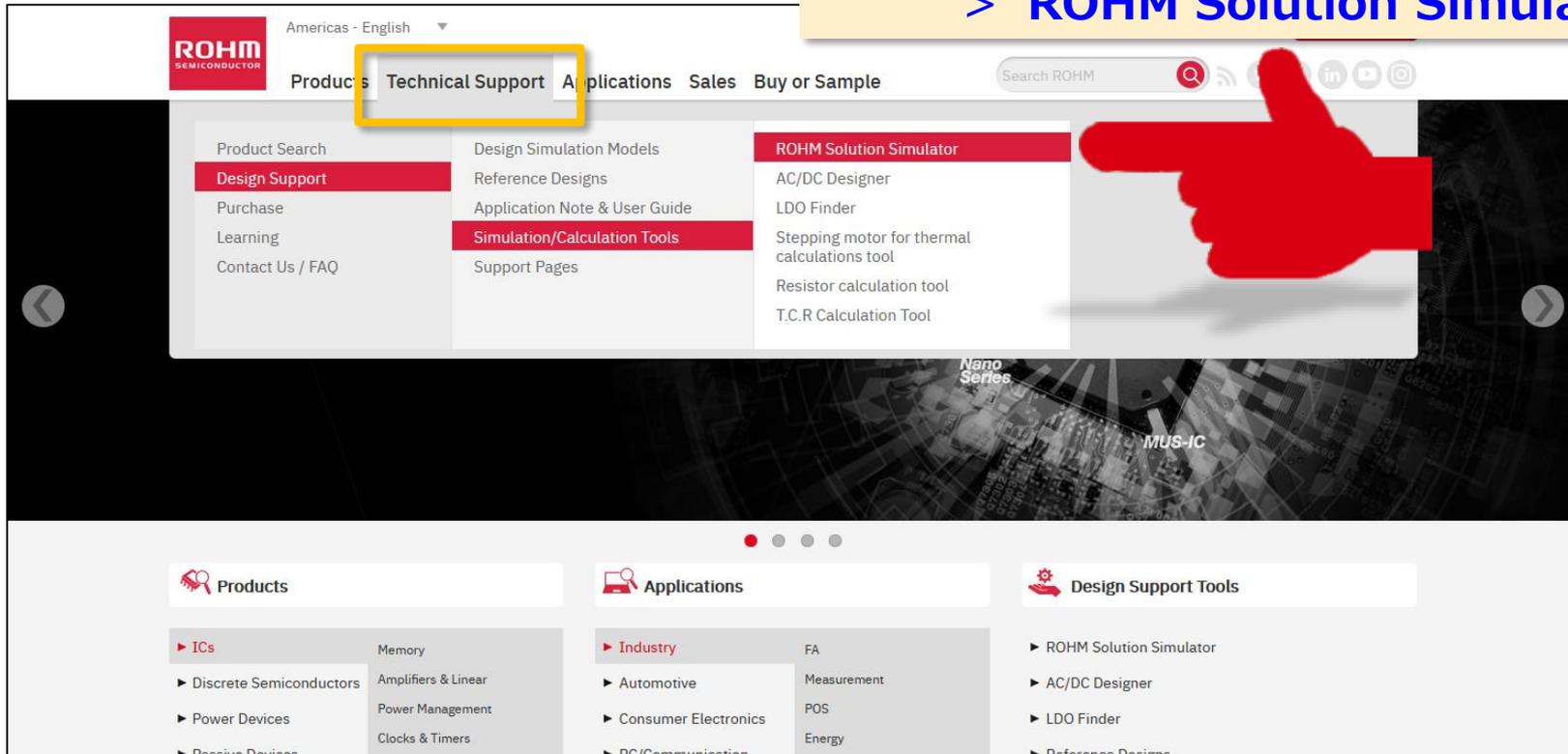
1.Link from ROHM Web Top Page

The screenshot shows the ROHM website's top navigation bar with the logo, language selector (Americas - English), and links for Company, CSR, R&D, Careers, Contact Us, and MyROHM Login. Below the navigation is a search bar and social media icons. The main banner features the 'Analog Power' logo and tagline: 'Combining analog expertise cultivated over many years with pioneering power technology'. The 'Design Support Tools' section is highlighted with a yellow box, and a red hand icon points to the 'ROHM Solution Simulator' link.

Products	Applications	Design Support Tools
<ul style="list-style-type: none">TCsDiscrete SemiconductorsPower DevicesPassive DevicesModules (Sub Systems)Opto DevicesCommercial Products	<ul style="list-style-type: none">IndustryAutomotiveConsumer ElectronicsPC/Communication	<ul style="list-style-type: none">ROHM Solution SimulatorDC/DC DesignerIDD FinderReference DesignsAC/DC Design LibraryMOSFET Selection for synchronous rectification DC/DCThermal calculations tool (Motor driver)MOSFET Selection of Load SwitchDigital transistor Selection ToolResistor calculation toolTCR (Temperature Coefficient of Resistance)

2. From 'Technical Support' pull-down

- 'Technical Support'
 - > 'Design Support'
 - > 'Simulation/Calculation Tools'
 - > **'ROHM Solution Simulator'**



3. From Product Pages

Global - English

Company CSR R&D Careers Contact Us MyROHM Login

Products Technical Support Applications Sales Buy or Sample

Search ROHM

Home » SiC Power Devices » SiC MOSFETs » SCT3080KL

N-channel Silicon Carbide Power MOSFET - SCT3080KL

SCT3080KL is an SiC (Silicon Carbide) trench MOSFET. Features include high voltage resistance, low ON resistance, and fast switching speed.

Package

BUY * SAMPLE * FAQ CONTACT US DATA SHEET

PRODUCT DETAIL DOCUMENTATION **TOOLS** PACKAGING & QUALITY

SIMULATIONS

Web Simulation (Login Required)		DC-DC Converter Buck Converter Vo=250V Io=20A
Web Simulation (Login Required)		DC-DC Converter Buck Converter 2-Phase Vo=250V Io=40A

MODELS

SPICE Simulation Evaluation Circuit		Circuit data for device evaluation
-------------------------------------	--	------------------------------------

Link to the corresponding simulation schematics under TOOLS Tab



Simulation schematics are categorized and you can choose one from the menu of a variety of circuit topology

The screenshot shows the ROHM Solution Simulator web interface. On the left, a sidebar titled "Simulation Circuits" lists categories: "Power Device Solution Circuit" (containing AC-DC PFC, DC-AC Inverter, and DC-DC Converter) and "ICs Solution Circuit" (containing Switching Regulators). The "DC-DC Converter" option is circled in red. A red arrow points from this circle to a larger red-bordered box that highlights a table of simulation circuit options. The table is organized into sections: "DC-DC Converter", "Bi-Direction", "Boost", and "Buck". Each section contains a list of circuit types with columns for "Circuit", "Documentation", and "Simulation (Login Required)". The "Simulation" column contains a "Simulation" button. A yellow callout box labeled "Simulation schematic information" points to the "Circuit" column. Another yellow callout box labeled "Initiate simulator" points to the "Simulation" buttons. A red hand icon with a pointing finger is located at the bottom right of the screenshot.

Section	Circuit	Documentation	Simulation (Login Required)
DC-DC Converter	Bi-Direction		
	Bi-Directional Converter $V_{\mu}=350V$ $V_L=50V$ $I_L=200A$		
Boost	Boost Converter $V_o=800V$ $I_o=20A$		Simulation
	Boost Converter 2-Phase $V_o=800V$ $I_o=40A$		Simulation
	Boost Synchro Converter $V_o=800V$ $I_o=20A$		Simulation
	Boost Synchro Converter 2-Phase $V_o=500V$ $I_o=10A$		Simulation
Buck	Buck Converter $V_o=250V$ $I_o=20A$		Simulation

As an example, "Buck Converter $V_o=250V$ $I_o=20A$ " from DC-DC Converter is chosen

Login to My ROHM Account to initiate ROHM Solution Simulator



Americas - English ▾

Company CSR R&D Careers Contact Us **MyROHM Login**

Products Technical Support Applications Sales Buy or Sample

Search ROHM



MyROHM Login

E-mail

Password

Sign in

Remember me

[Forgot Password?](#)

or

New user? Register for free

Registration is easy and allows you to:

- Use ROHM's eLAB - Design Simulation Software
- Tag 'Favorite' Products or Product Categories and receive email update alerts
- Receive ROHM Newsletter, highlighting the latest product information
- Save customized Parametric Searches for future reference
- Report and manage technical support inquiries
- Direct contact with Sales/Customer Support for all inquiries.

Register

Choose Simulation Circuit

Execute Simulation

Customize Simulation

Export Schematics

Order Samples

- Learn ROHM Solution Simulator through the cases
- **Open Schematics on the simulator**
- **User interface and basic operations**
- **Simulation setup and simulate**
- **Simulation result and waveforms**
 - How to use the Wavebox
 - How to use the Waveform Viewer

Open Schematics on the simulator 1/2

The schematic image shows up when login to My ROHM Account

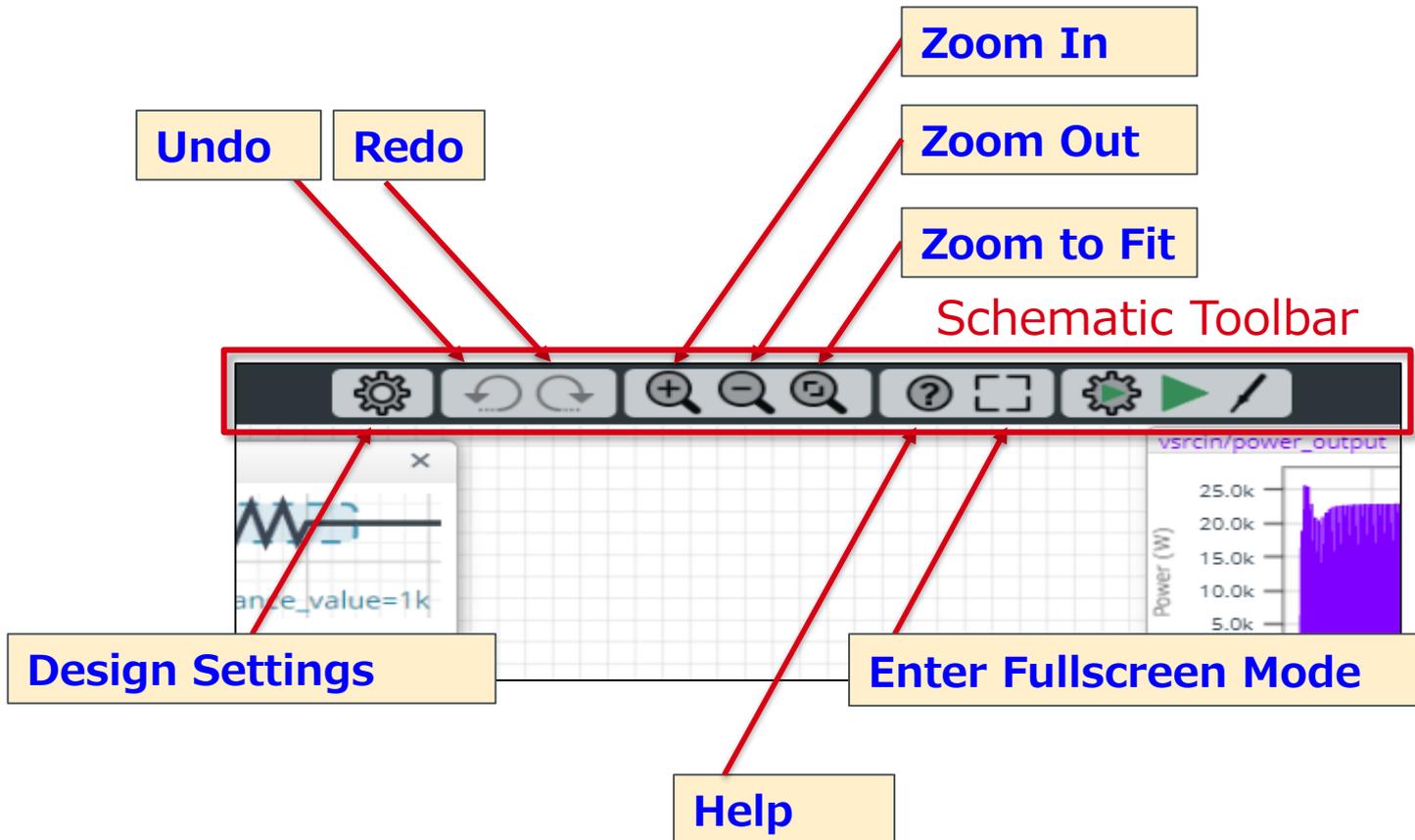
The image shows a screenshot of the ROHM website interface. At the top, there is a navigation bar with 'My ROHM - Hello' and 'Logout'. Below this, there are links for 'Products', 'Technical Support', 'Applications', 'Sales', and 'Buy or Sample'. A search bar is also present. The main content area displays a schematic diagram of a DC-DC converter. A yellow callout box with blue text says 'Click the icon in yellow to initiate the simulator'. A red hand icon points to a yellow square icon on the schematic. Below the schematic, there are several simulation plots: 'vsrcli/(neg)', 'vsrcli/(neg)', 'ro/power_dissipated', 'vsrclin/power_output', and 'net68'. A yellow arrow points from the schematic area to a 'Starting Simulator' window. The 'Starting Simulator' window shows the 'systemvision' logo and the text 'Initializing Designer...'. A red box highlights a 'resistance_value=1k' parameter in the schematic. The bottom right corner of the simulation window has a button that says 'Edit in systemvision.com'.

ROHM Solution Simulator User Interface

Refer to the link for the description of schematic and simulation setup

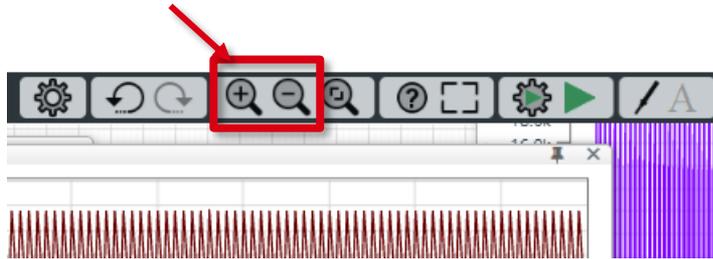
The screenshot displays the ROHM Solution Simulator interface for a DC-DC Converter / Buck circuit. The top navigation bar includes 'ROHM SEMICONDUCTOR', 'Products', and 'Technical Support'. The main title is 'DC-DC Converter / Buck' with a subtitle 'Buck Converter $V_o=250V$ $I_o=20A$ '. A 'DOCUMENTATION' button is highlighted with a red box. Below the title is a 'Schematic Toolbar' containing icons for settings, undo, redo, zoom in, zoom out, pan, help, simulation, and text editing. The central 'Schematic Field' shows a circuit diagram with a component 'r1' having a parameter 'resistance_value=1k'. To the right, two waveforms are shown: 'vsrcli/(neg)' and 'vsrclh/(neg)'. Below the schematic, three more waveforms are displayed: 'ro/power_dissipated', 'vsrclin/power_output', and 'net68'. A 'Wavebox' label points to the 'net68' waveform. At the bottom left, a 'Waveform Viewer Icon' is highlighted with a red box. A yellow button at the bottom right says 'Edit in systemvision.com'.

Schematic Toolbar icon and functions



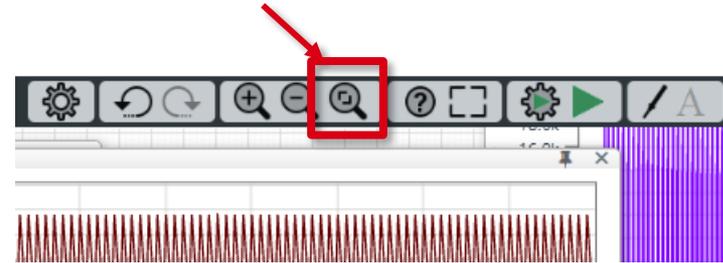
Zoom in/out

- Click Zoom in or out.



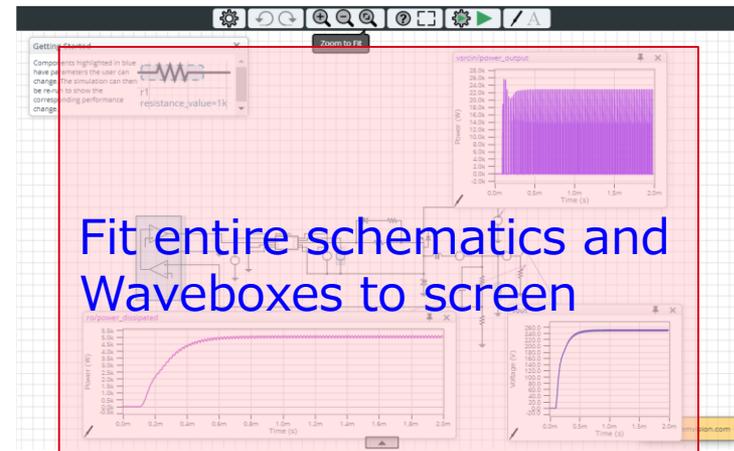
Zoom to Fit

- Click Zoom to Fit.



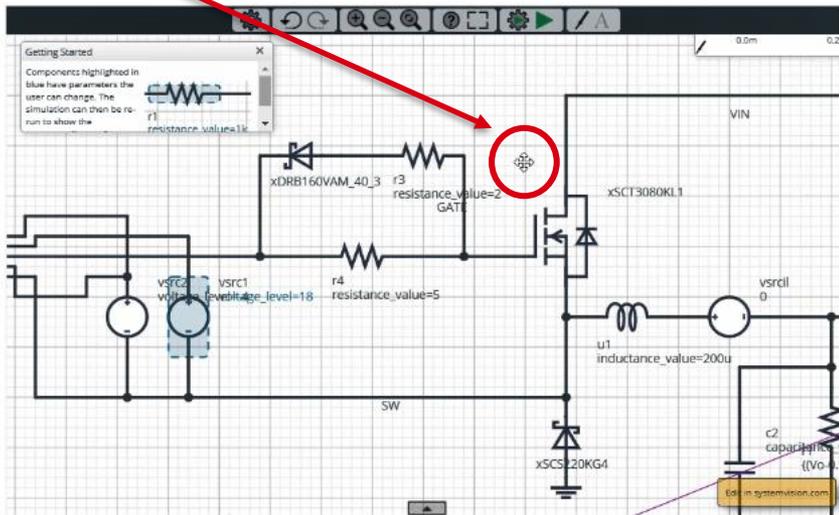
- Mouse wheel or touch pad work

	Zoom In	Zoom Out
Mouse wheel	Up	Down
2finger swipe on touch pad	Down	Up



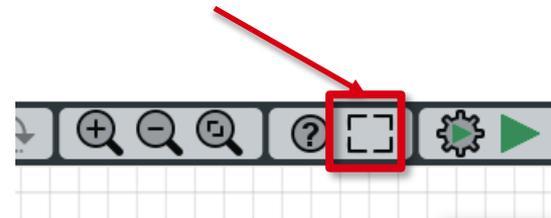
Drag schematics

Click on the schematic field
Drag the cursor to move the schematic drawings. The mouse cursor will change while dragging the schematic.

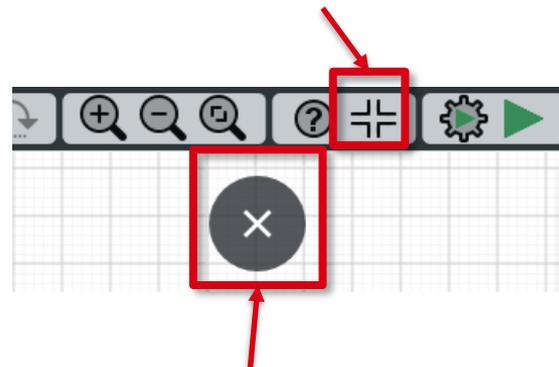


Full screen mode

- Go full screen



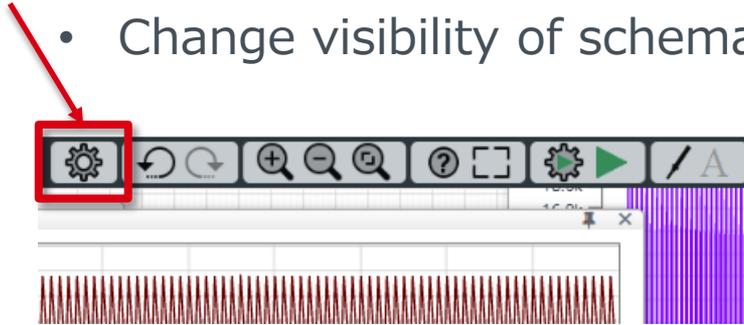
- Leave full screen



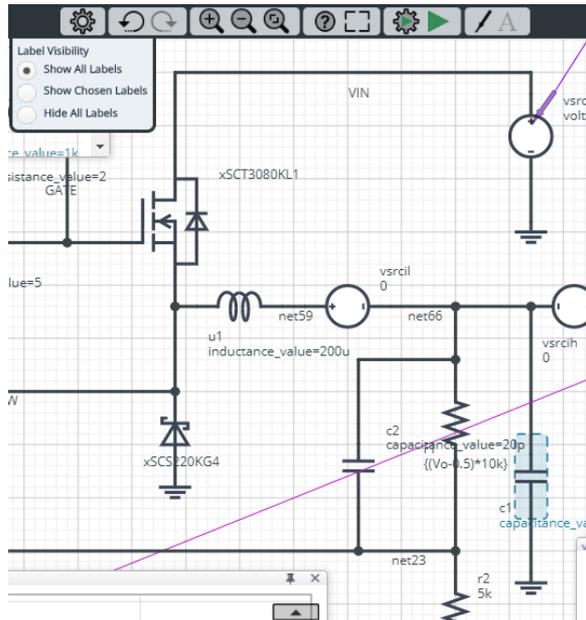
- Move mouse to top, and this icon shows up. Click it to leave full screen.
- ESC Key does the same

Design Settings

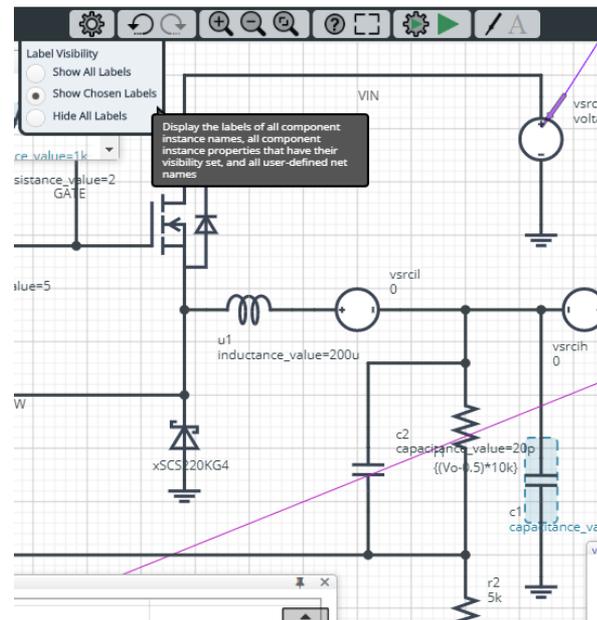
- Change visibility of schematic label



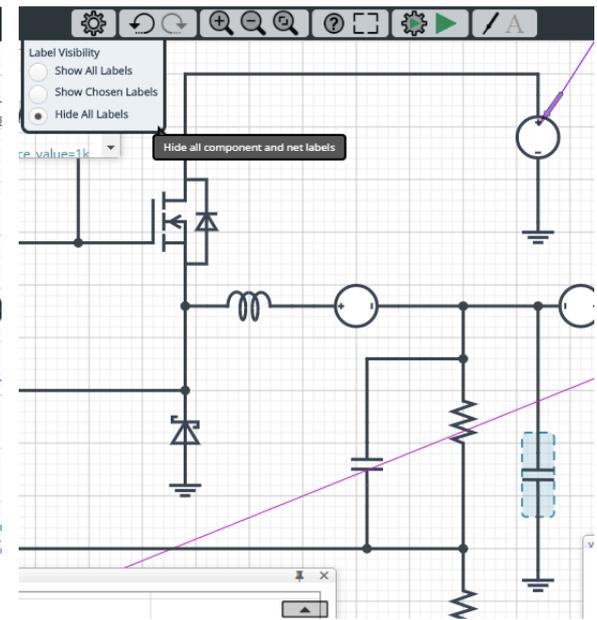
Show All Labels



Show Chosen Labels



Hide all labels



Simulation setup and execution (1/3)

Click Run to simulate

My ROHM · Hello 村田 | Logout

Products Technical Support Applications Sales Buy or Sample

Search ROHM

DC-DC Converter / Buck

Buck Converter $V_o=250V$ $I_o=20A$

DOCUMENTATION

Getting Started

Components highlighted in blue have parameters the user can change. The simulation can then be re-run to show the corresponding performance change.

$r1$ resistance_value=1k

vsrcli/(neg)

Current (A)

Time (s)

vsrclh/(neg)

Current (A)

Time (s)

ro/power_dissipated

Power (W)

Time (s)

vsrcln/power_output

Power (W)

Time (s)

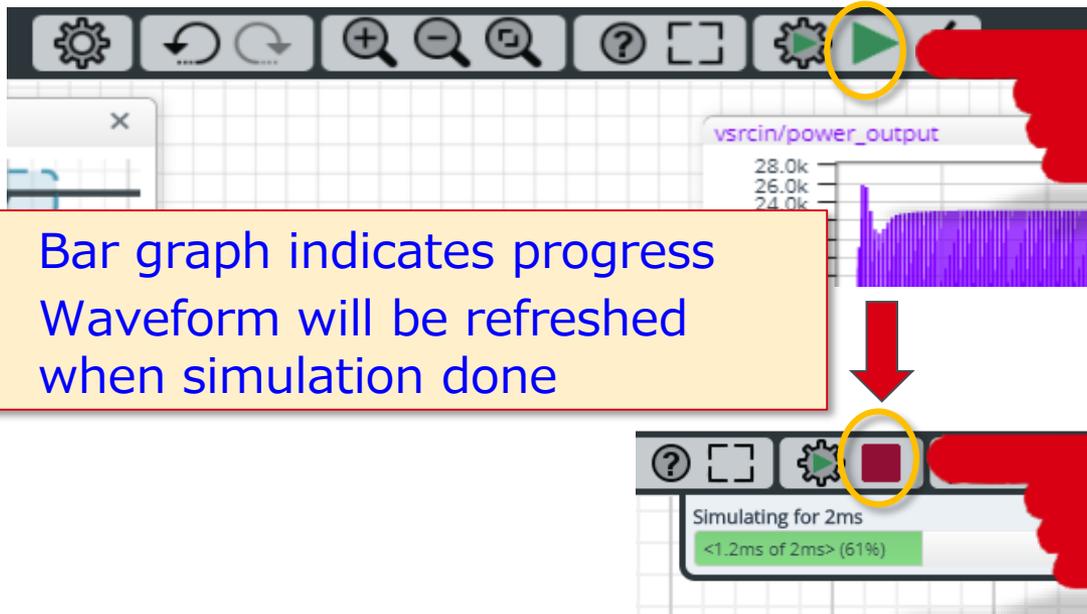
net68

Voltage (V)

Time (s)

Edit in systemvision.com

Run / Terminate simulation



- Bar graph indicates progress
- Waveform will be refreshed when simulation done

- Interrupt simulation
- Cannot resume

Restrictions

- Fixed schematics, no connection change or adding component
- Able to change designated component constant, or to swap power device
- Maximum simulation time 60 minutes

Simulation setup

Note:

Simulation setup is predefined in the schematics.

Simulation Type
Time-Domain

End Time
2m secs

Advanced Options

- More Speed
- Balanced
- More Accuracy

Time Resolution Enhancement

Convergence Assist

Manual Options

```
.TEMP 100  
.param Vo=250 Io=20  
PI=3.14159265359
```

Simulation Status

Simulation Type (do not change)

- Time-Domain (transient analysis)
- Frequency-Domain (frequency analysis)

End Time : Simulation time

Advanced Options :
Accuracy and speed trade-off option

Manual Options :
Condition descriptions

Simulation Status :
Simulation logs

You can display waveforms of designated connection nodes or components using viewer tools.

- Display waveforms
- Waveform analysis
- Export waveforms (csv files)

How to use Wavebox

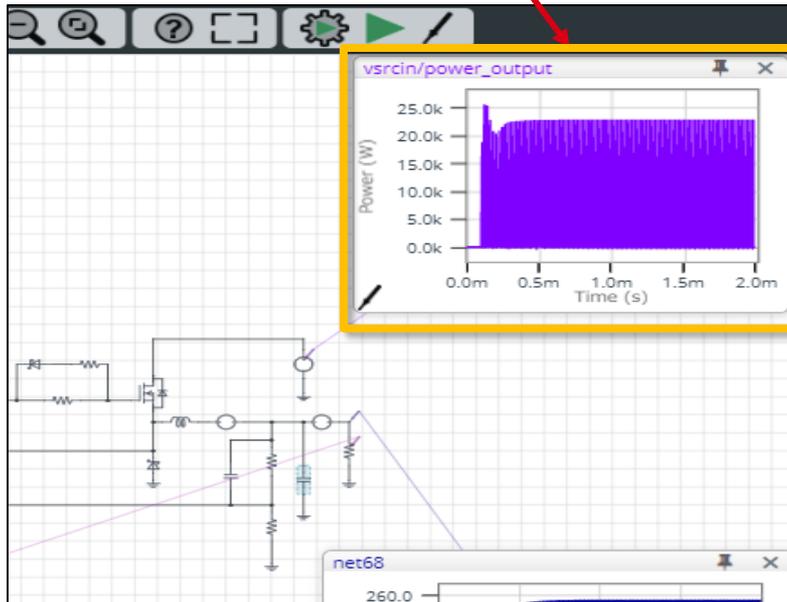
How to use Waveform Viewer

How to display waveforms

- Probe signals of the nodes or components on the schematics
- Use Wavebox and Waveform Viewer to display waveforms

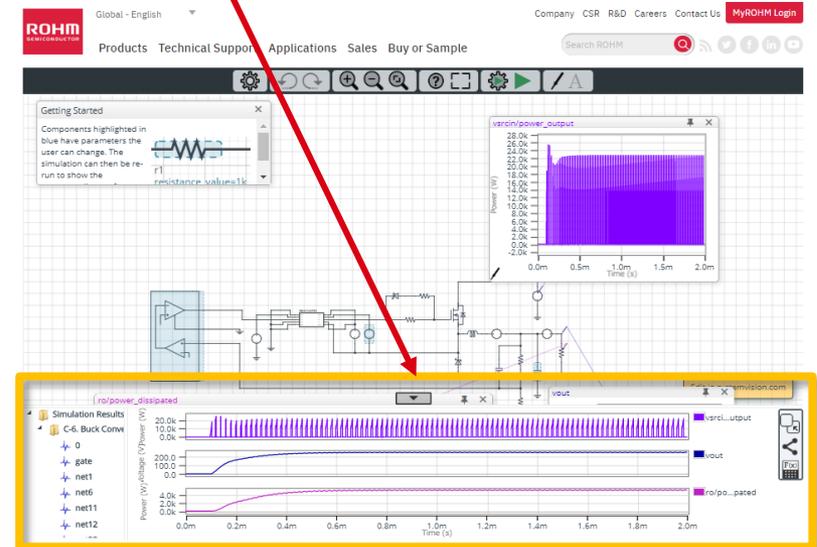
Wavebox

- Shows waveform where the probe icon is placed



Waveform Viewer

- Multiple waveforms in a window
- Waveform analyzers
- Compare waveforms
- Generate a link to Waveform Viewer



You can display waveforms of designated connection nodes or components using viewer tools.

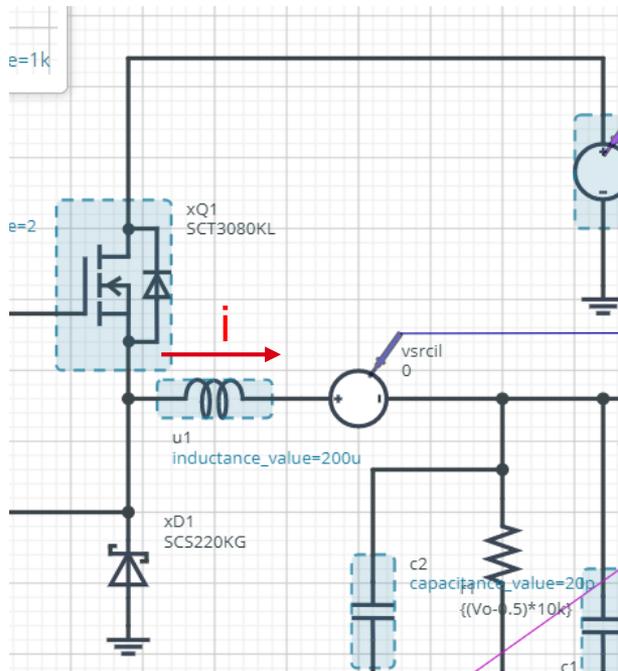
- Display waveforms
- Waveform analysis
- Export waveforms (csv files)

How to use Wavebox

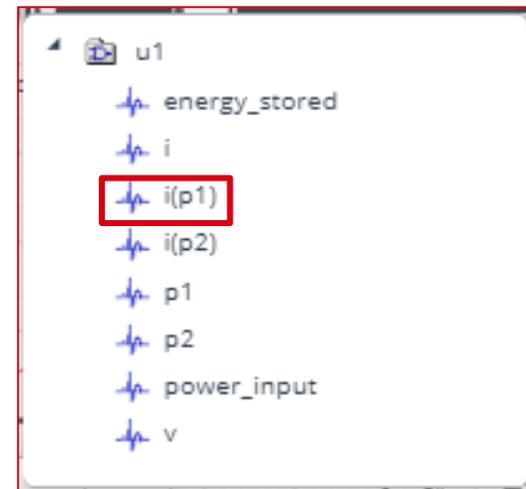
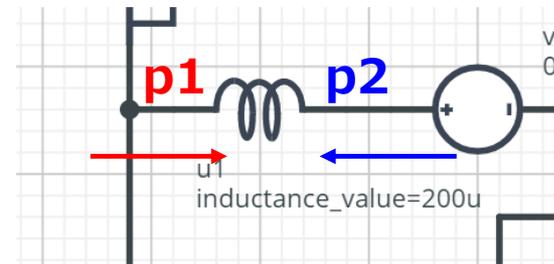
How to use Waveform Viewer

(Case #1) Indicate the waveform of Inductor u1 current i(p1)

- Place Wavebox at u1
- Indicate current i(p1)

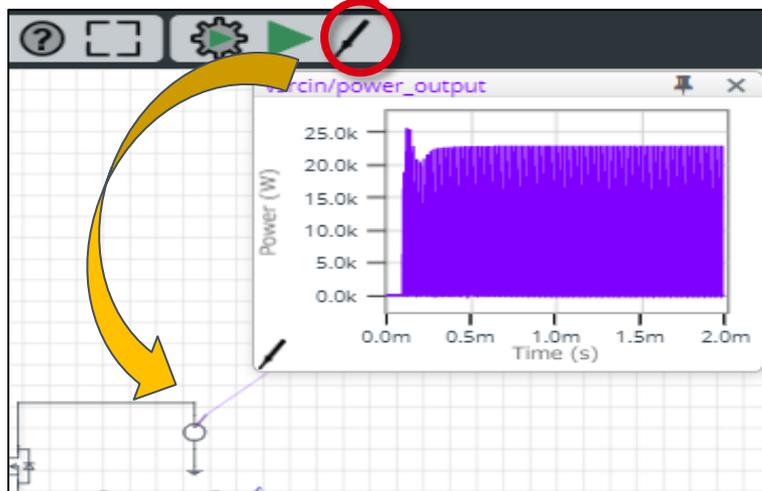


- i(terminal) represent the current through the terminal



How to place / delete Wavebox?

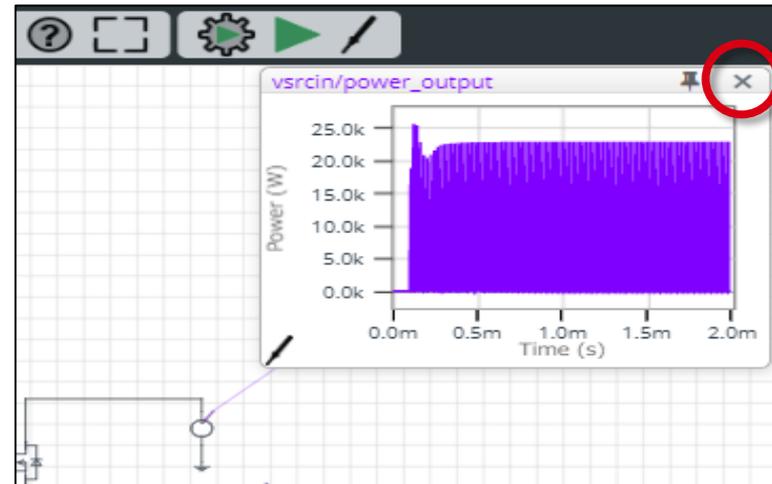
Click waveform probe icon, drag cursor to a wire or over a component, and click



<Tips>

- Replace probe then Wavebox renews waveforms at the location
- Free to move Wavebox in the schematic field

Click x mark to delete Wavebox

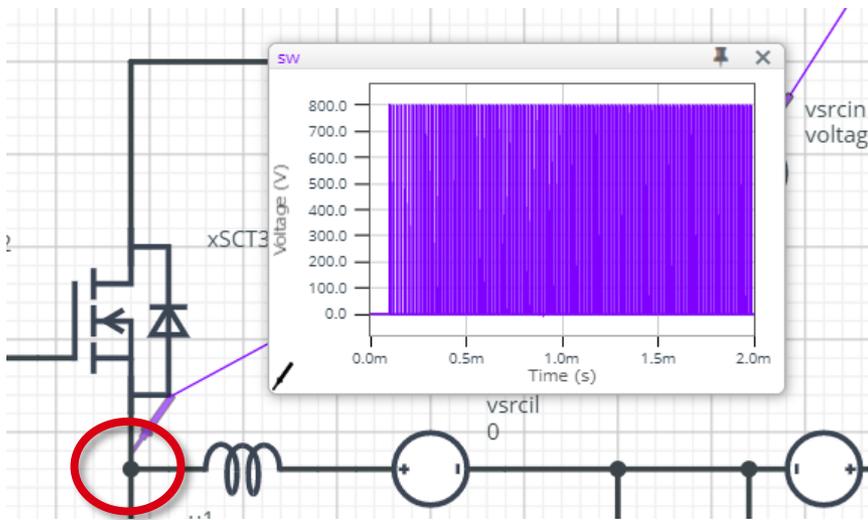


<Tips>

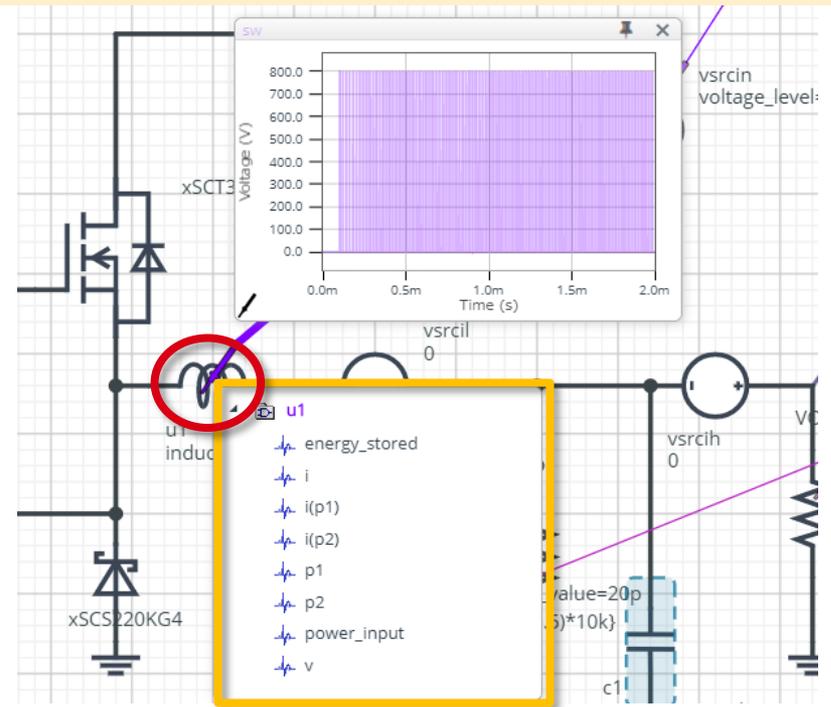
- Grab the corner of Wavebox to change its size

How to show a waveform in Wavebox

Probe on a wire > voltage



Probe on a component
> chose a signal from the pull-down

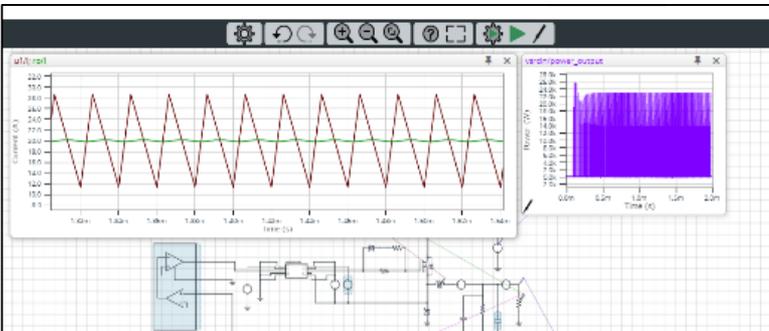
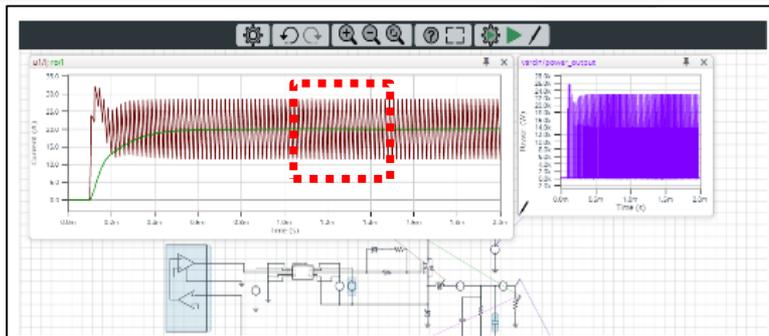


How to use Wavebox (4/10)

Zoom in / Zoom out waveforms

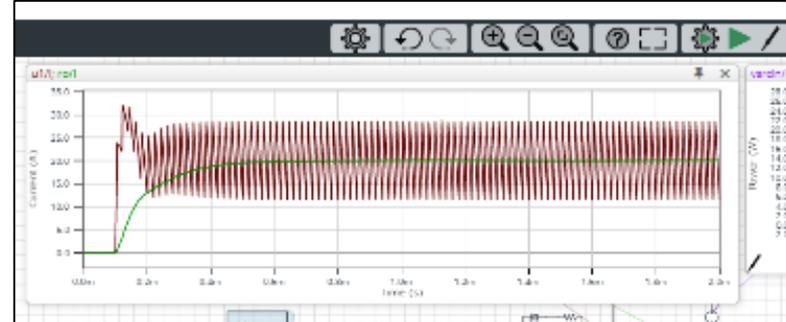
Zoom In :

Drag mouse in desired area



Zoom Out :

Right click > 'View All'

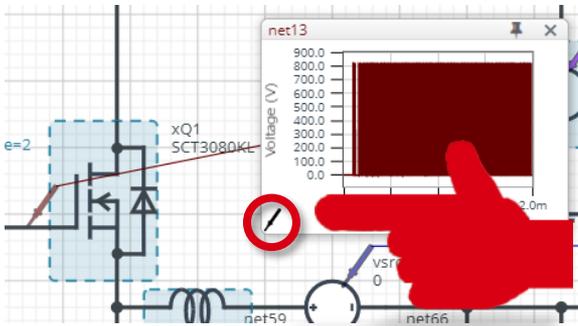


How to use Wavebox (6/10)

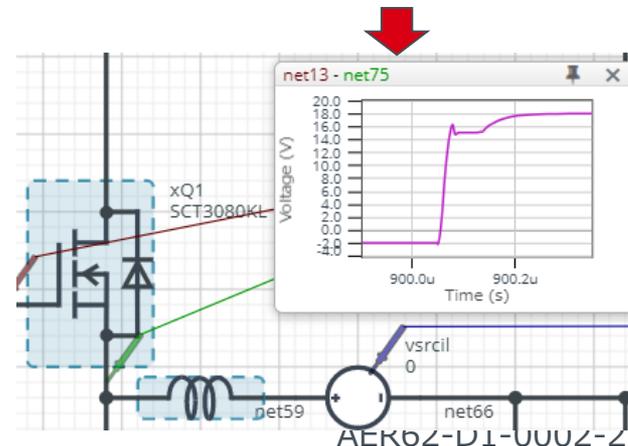
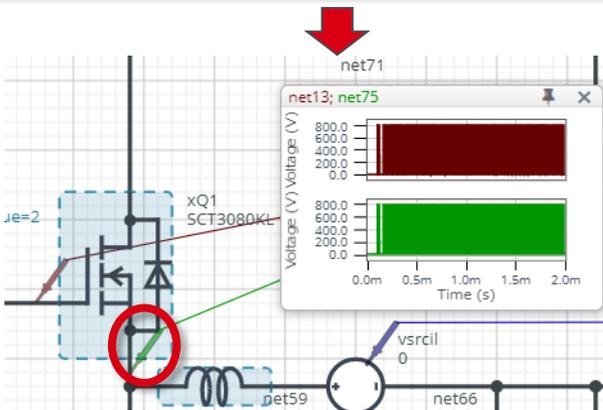
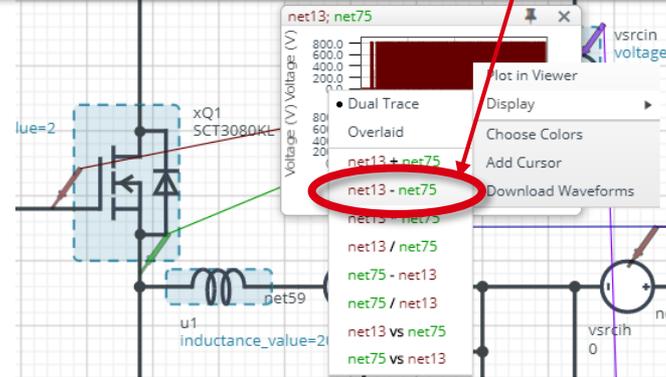
Differential probe with Wavebox

Probe xQ1 gate to open Wavebox

Right click on the graph area
> 'Display' > 'net13-net75'

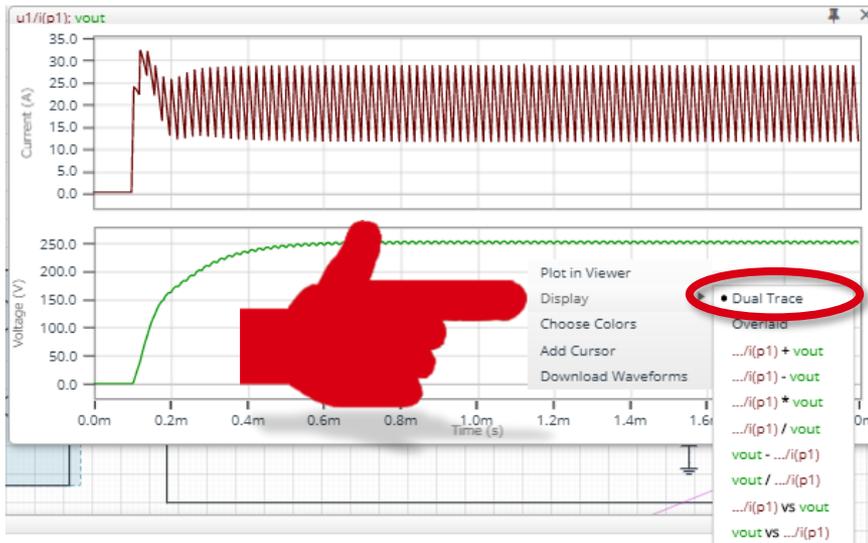


Drag & drop the probe icon at left bottom of window to the xQ1 source

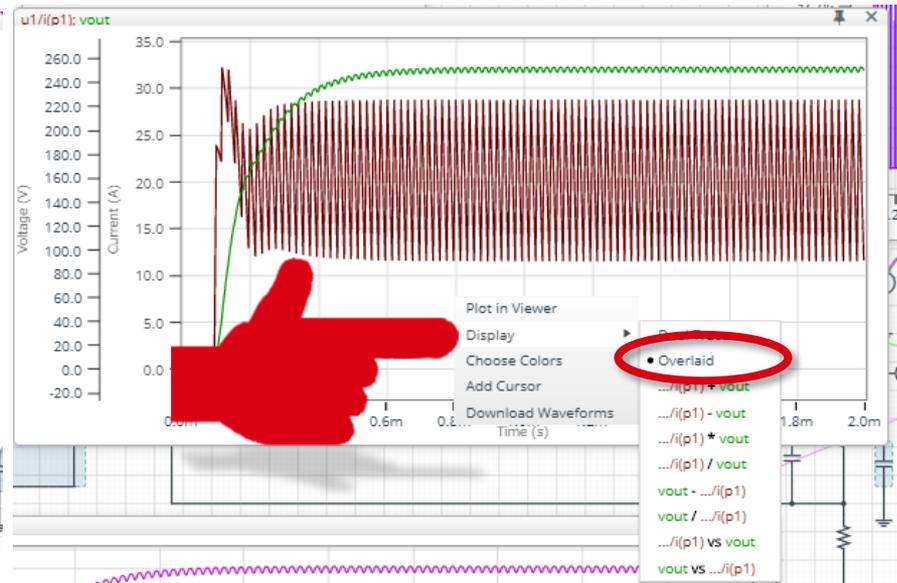


Display two waveforms in a Wavebox

Display > Dual Trace



Display > Overlaid



How to use Wavebox (8/10)

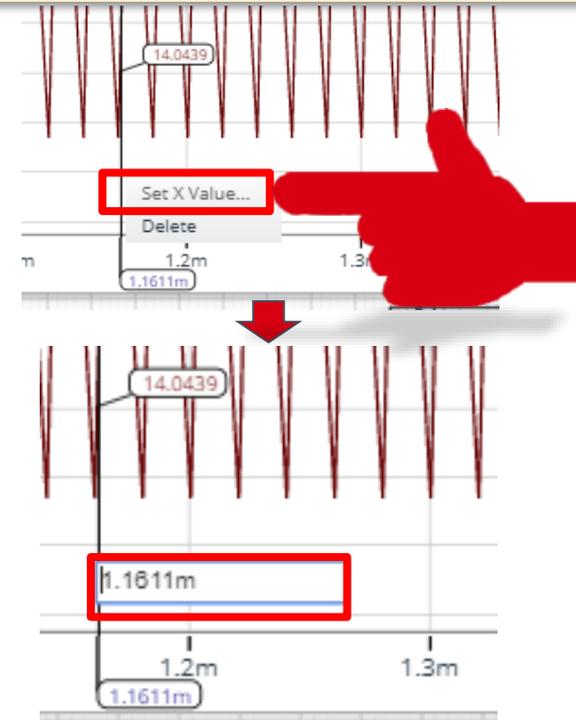
Add Cursor : Right click on Waveform > Add Cursor



Move Cursor: Put mouse over the cursor, drag it to move

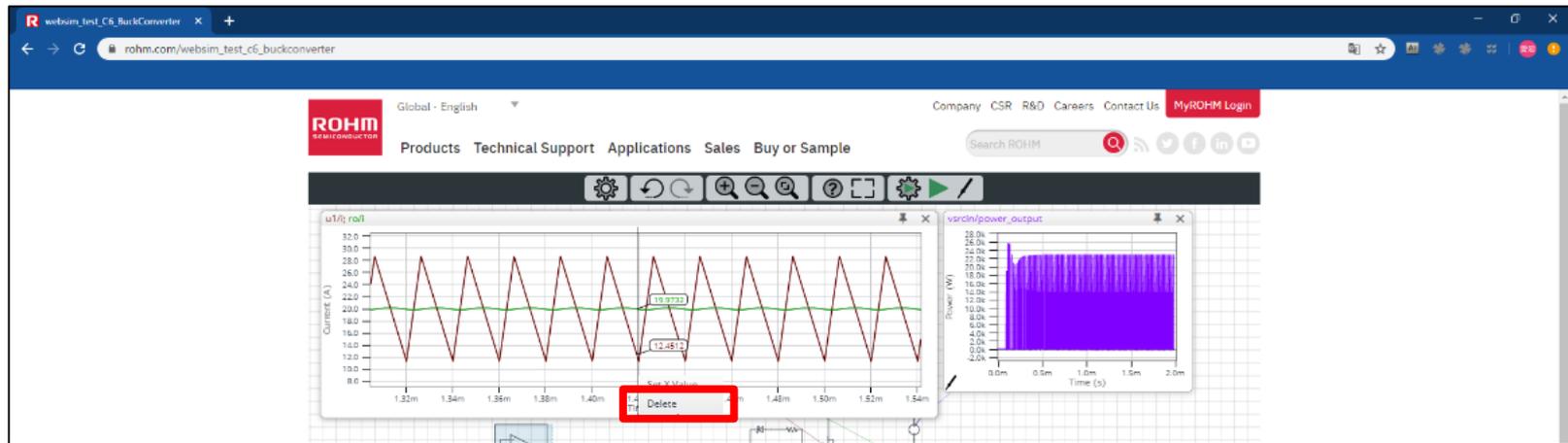
Or

Right click on the cursor > Set X Value > input value



How to use Wavebox (9/10)

Delete Cursor: Right Click on Cursor > Delete



You can display waveforms of designated connection nodes or components using viewer tools.

- Display waveforms
- Waveform analysis
- Export waveforms (csv files)

How to use Wavebox

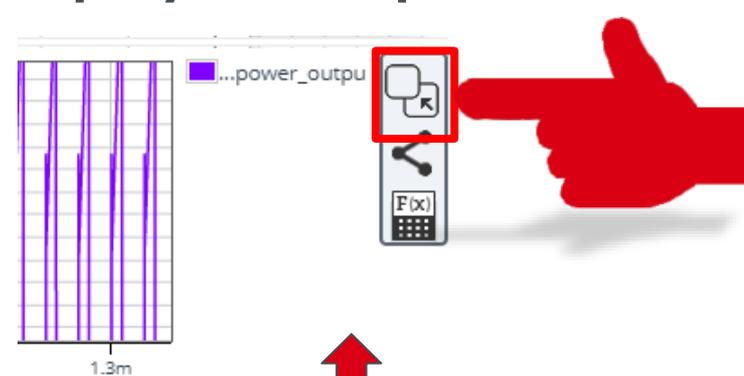
How to use Waveform Viewer

Basic operations

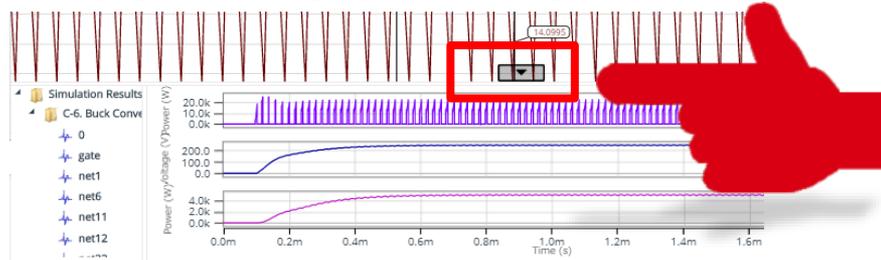
Display Waveform Viewer



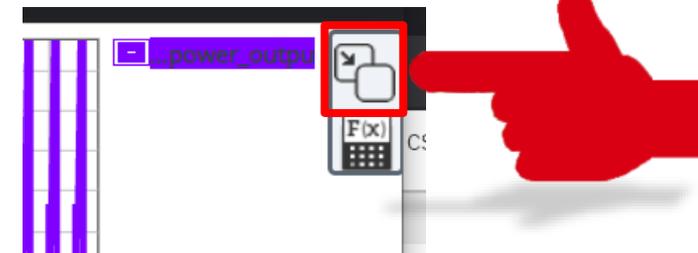
Display in a separate window



Hide Waveform Viewer



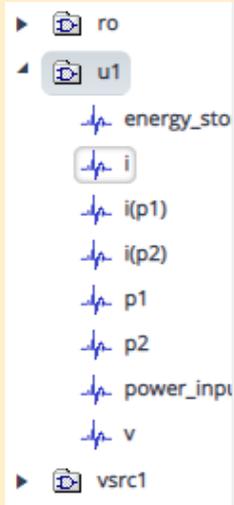
Merge viewer to the original window



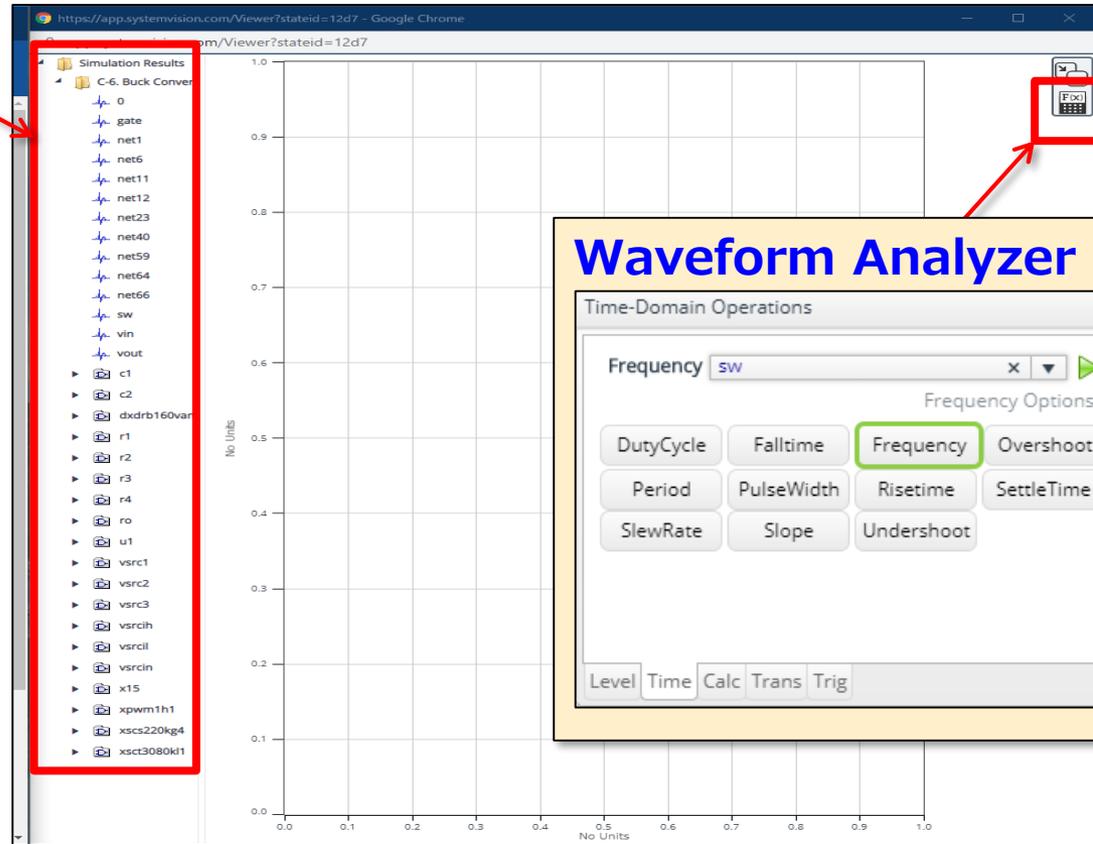
Waveform Viewer Window

Simulation Results

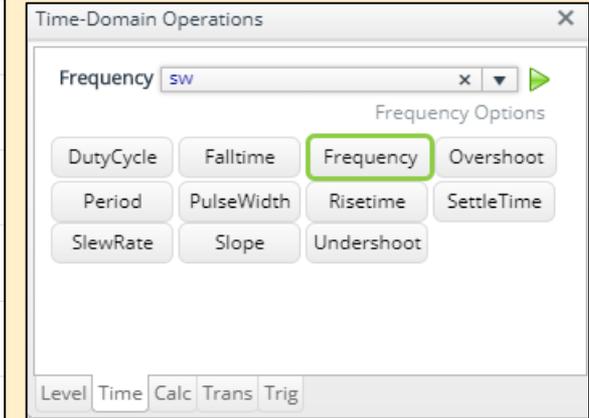
List of wires and components in the Schematics



Previous simulation data



Waveform Analyzer

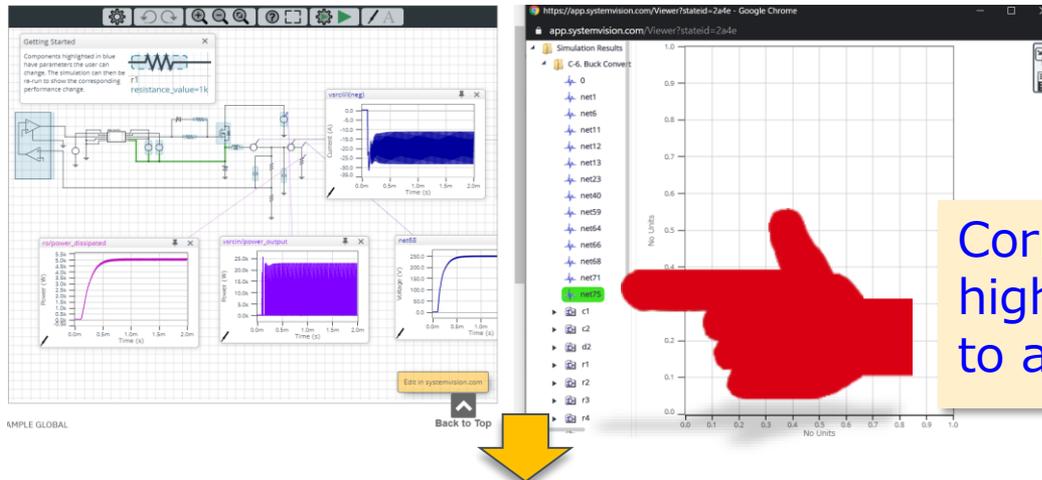


(Case #3) Display the inductor u1 current i(p1), xQ1 source voltage net75 and output voltage net68 waveforms respectively in the Waveform Viewer

- Display Waveform Viewer
- Choose the signals from Simulation Results, and display waveforms in the Waveform Viewer

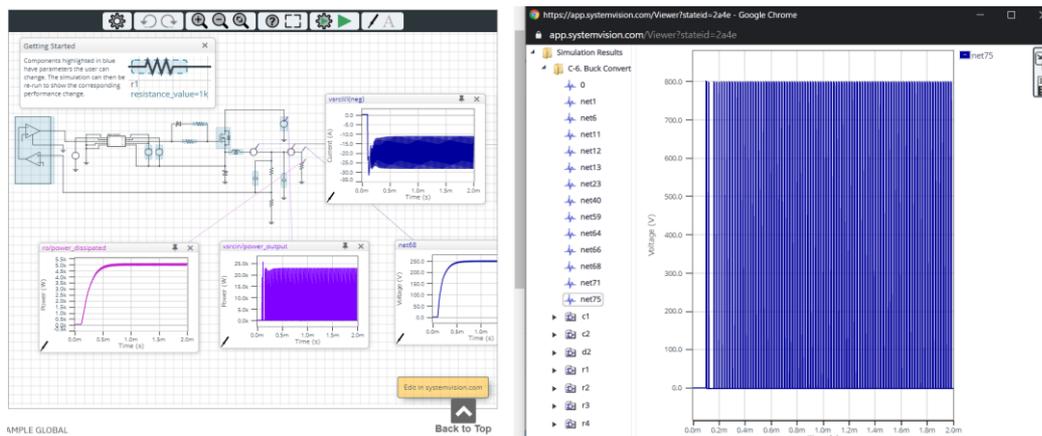
How to use Waveform Viewer (4/11)

1. Drag 'net75' signal from Simulation Result and drop it on the graph area to display the waveform.



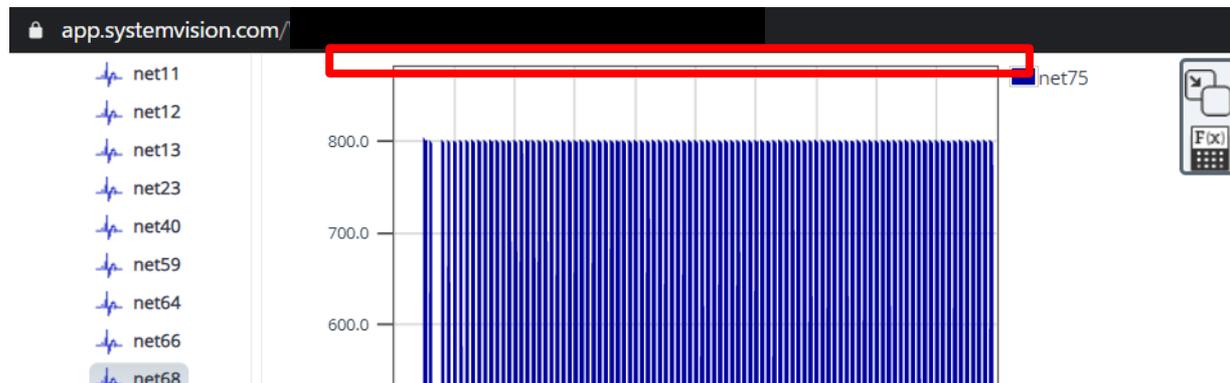
Corresponding connection is highlighted when mouse over to a signal name

2. The waveform will be displayed

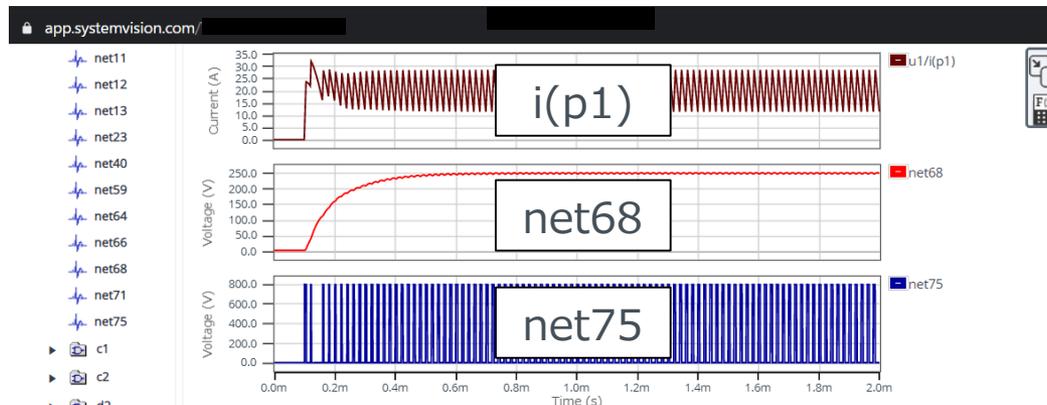


How to use Waveform Viewer (5/11)

3. Add net68 waveform. Drop the signal outside of a graph area to separate waveforms (shown below), or drop it on the designated graph area to overlay waveforms.

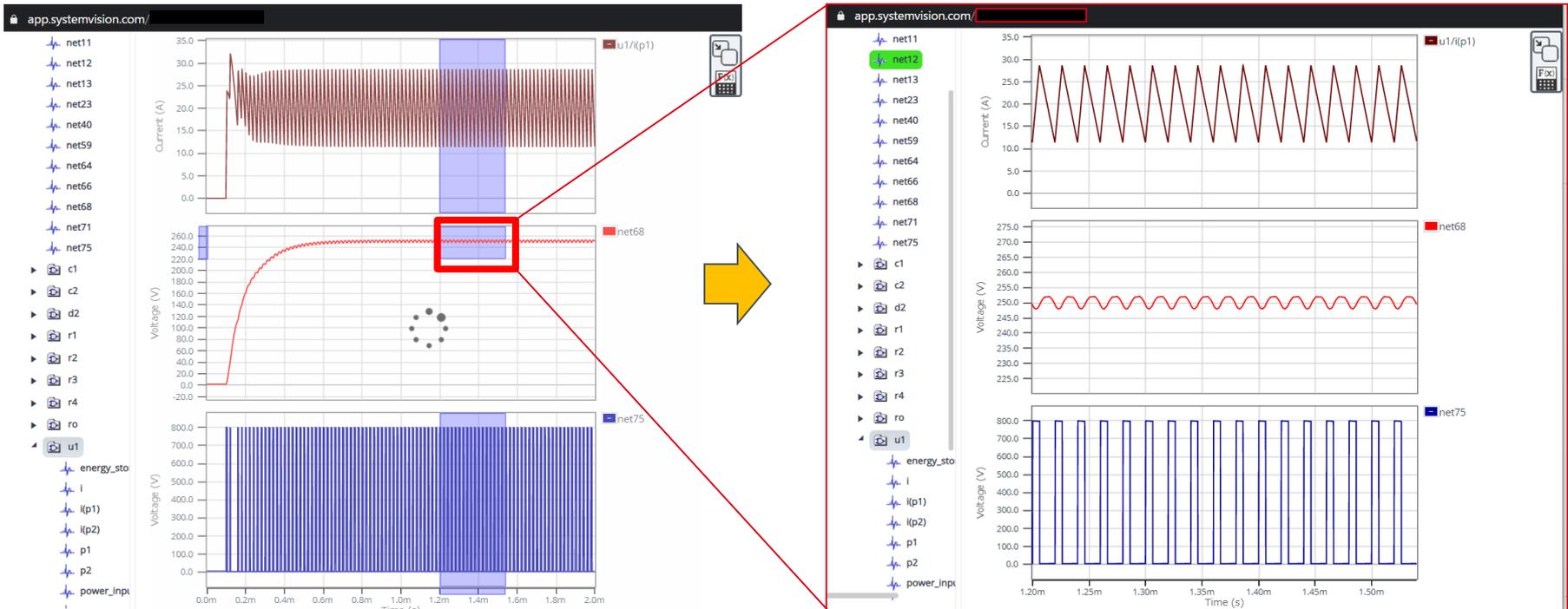


4. Add i(p1) of the Inductor u1, and display the waveforms as follows.



How to use Waveform Viewer (6/11)

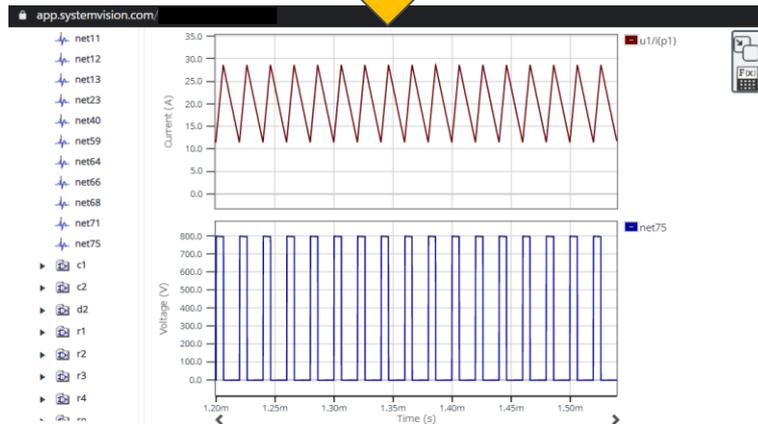
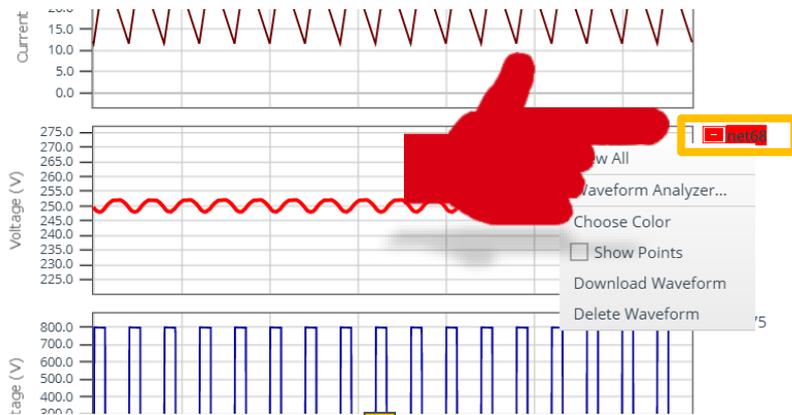
Zoom In / Zoom Out: - Same as Wavebox's operations



How to use Waveform Viewer (7/11)

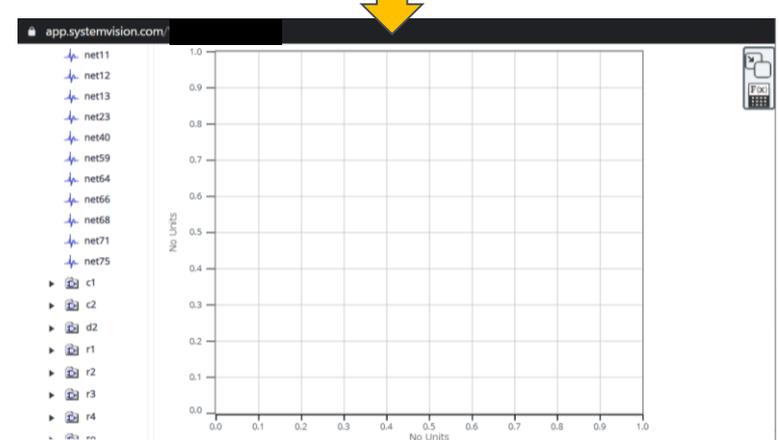
Delete a waveform

Right click on a signal name to be deleted > 'Delete Waveform'



Delete all waveforms

Right click > 'Clear Window'

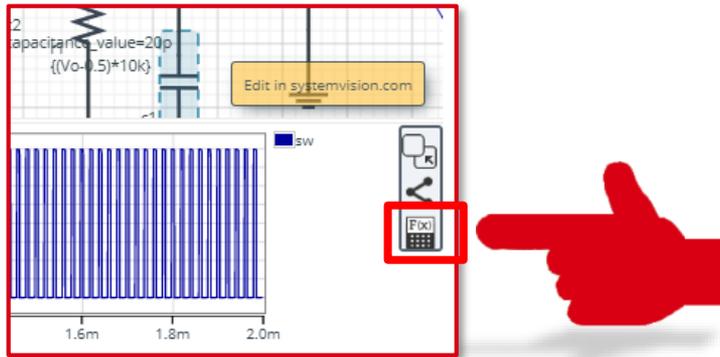


(Case #4) Measure toggle frequency of the net75 signal using Waveform Analyzer

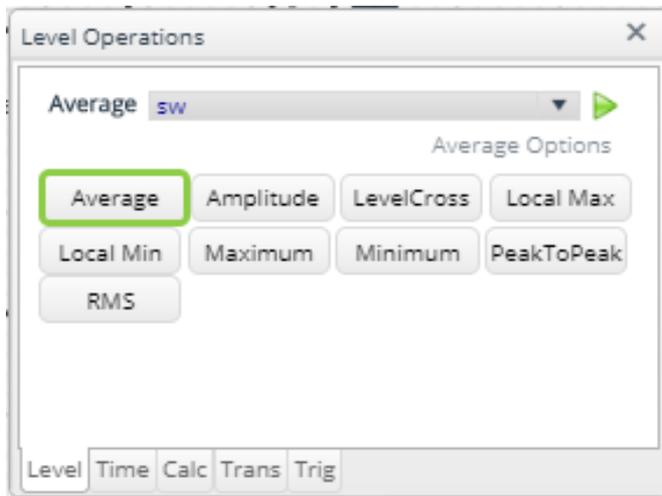
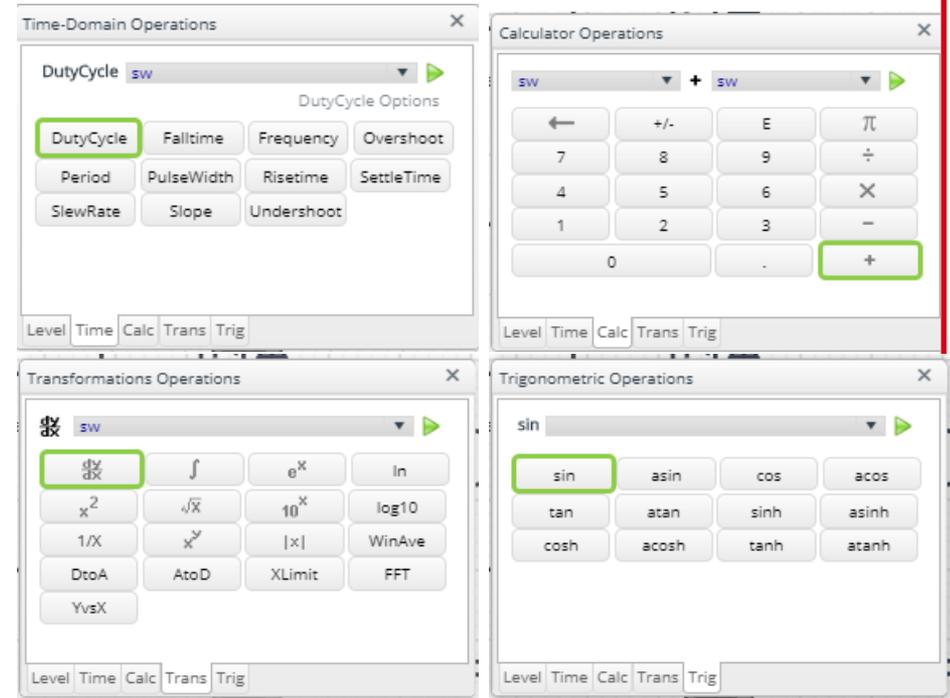
- Open Waveform Viewer
- Display net75 signal waveform
- Initiate Waveform Analyzer
- Choose 'Frequency' from 'Time' tab
- Select net75 from the drop-box and measure the frequency

Use Waveform Analyzer

- Initiate Waveform Analyzer



<Variety of analysis/calculation menu>

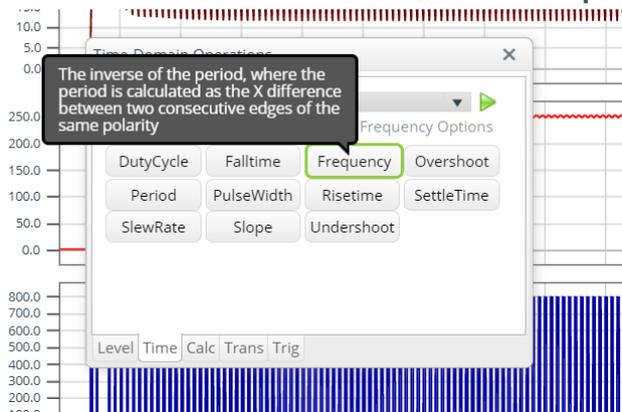


- Click x on top /right corner to end

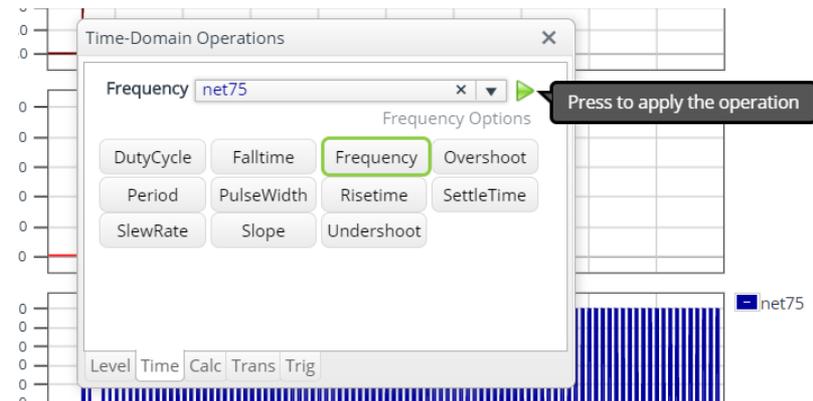
Measure signal frequency with Waveform Analyzer

1. Select function

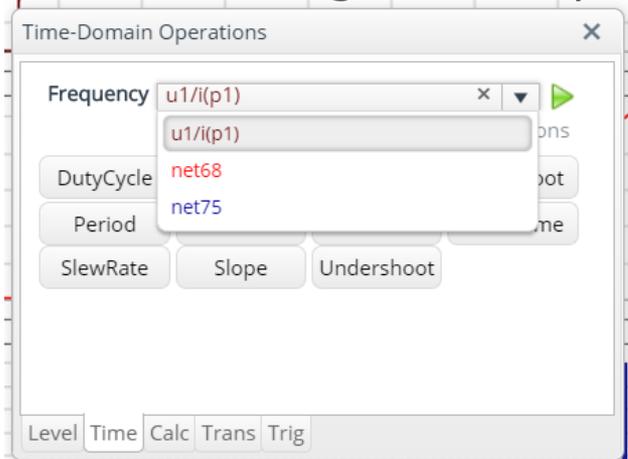
'Time' tab > 'Frequency'



3. Apply

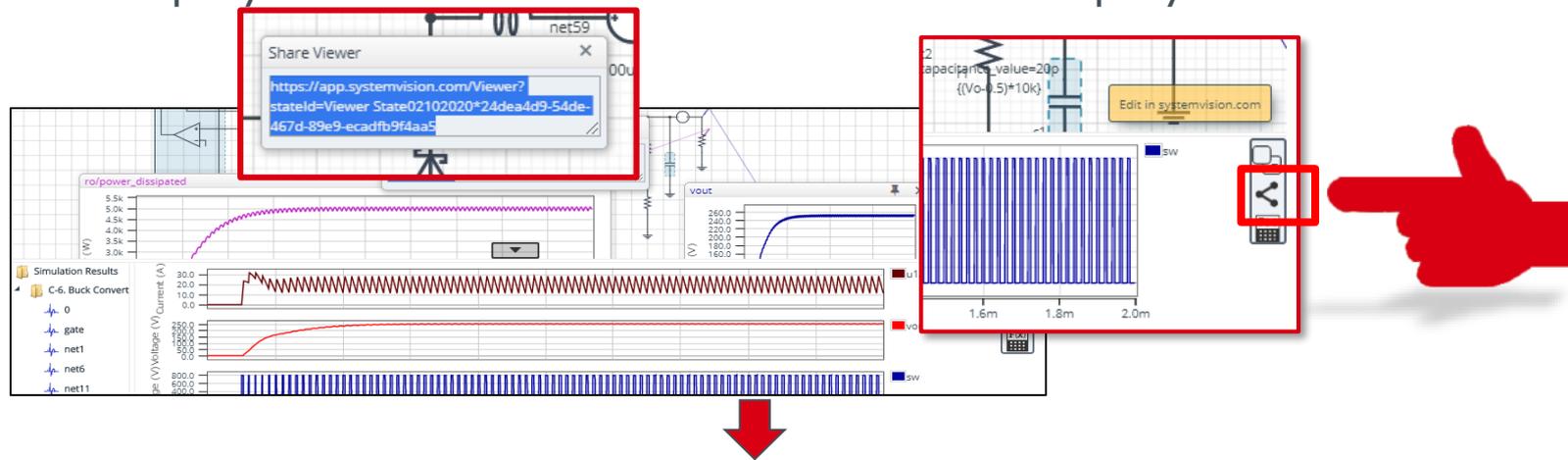


2. Select a signal from pull-down

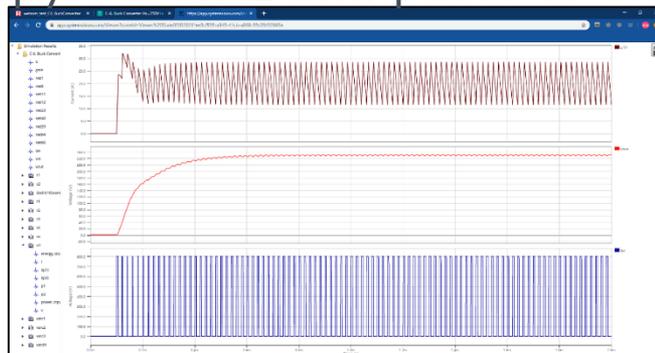


Share the Waveform Viewer to others

1. Use the Waveform Viewer in a single window
2. Display URL: Click Share Viewer icon > Display the URL



3. Copy the URL and paste to another browser



- Anyone can see the waveform with the URL

Choose Simulation Circuit

Execute Simulation

Customize Simulation

Export Schematics

Order Samples

(Case #5) Change the PWM frequency and run simulation. Compare the simulation result before/after the change.

- Change PWM-1H switching frequency (FSW) from 50KHz to 25kHz
- Run simulation
- Compare the net75 frequency using the Waveform Analyzer

Component shown in blue has variable parameters

You can run simulation with different circuit parameters

Getting Started

Components highlighted in blue have parameters the user can change. The simulation can then be re-run to show the corresponding performance change.

r1
resistance_value=1k

- You can change component properties
- You can swap power devices

xPWM1H1
fsw=50k

BM61S41RFV
x20

D2
DRB100VAM-40

r3
resistance_value=2

r4
resistance_value=5

xQ1
SCT3080KL

u1
inductance_value=200u

xD1
SCS220KG

vsrc1
voltage_level=18

vsrcil
0

vsrcin
voltage_level=800

vsrcrh
0

r2
5k

r0
(Var/lo)

c2
capacitance_value=20p
(|Vo|=5*10k)

c1
capacitance_value=10u

How to change parameters : Property Editor

Open Property Editor:

Double click a component, or
Right click on a component > 'Properties'

have parameters the user can change. The simulation can then re-run to show the corresponding performance change.

Property Editor

PWM-1H
Label xPWM1H1

FSW
50k

PHASE
0

D
0.95

TR
10n

TF
10n

VD
18

RSO
5

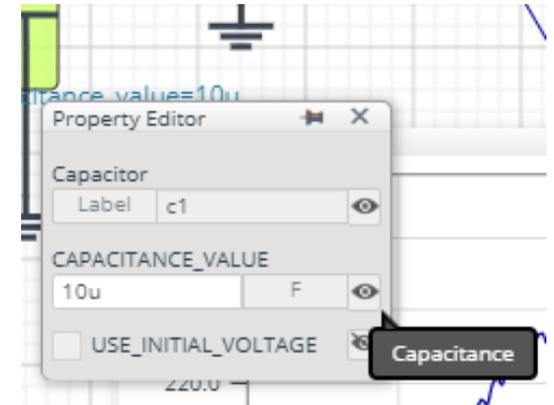
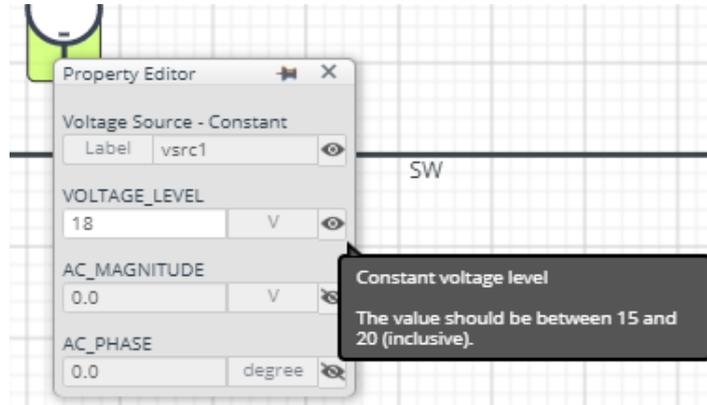
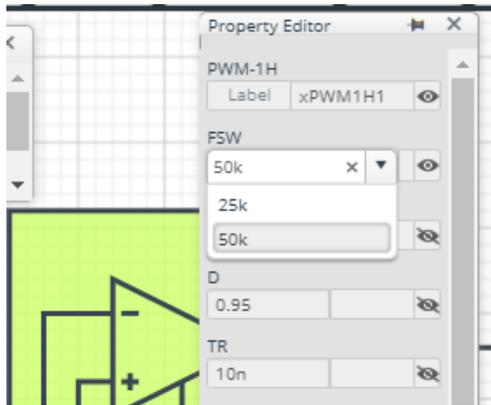
Change properties:

Properties in white can be changed.

Properties in gray cannot be changed.

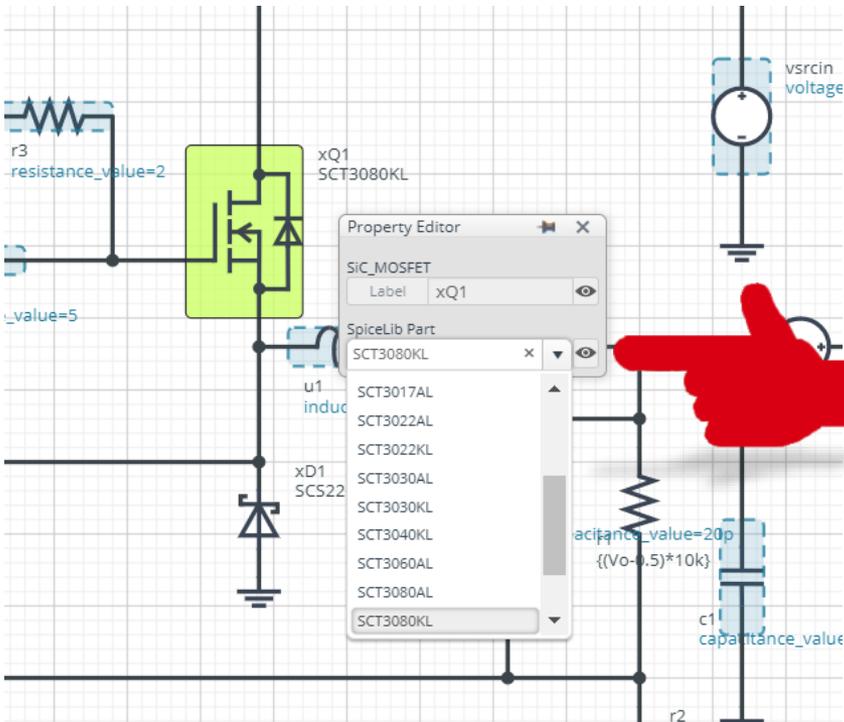
Customize Simulation (4/5)

You will see instruction how to change properties when mouseover.



How to swap power devices:

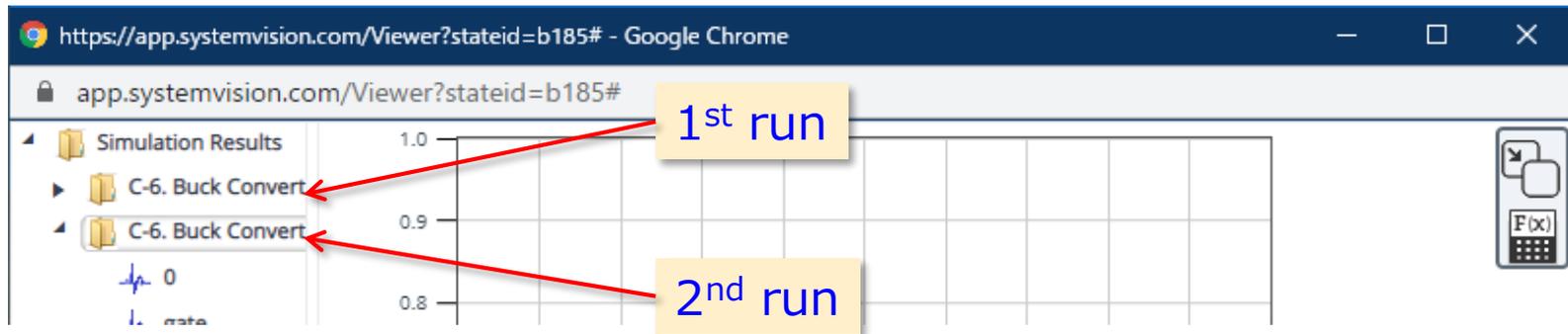
- You will find alternative choices of transistors or diodes on the property editor if available, and can easily evaluate device characteristics with the same circuit topology.



Change properties:
Select one from pull-down

Compare Simulation Results before/after

1. Change parameters
2. Run Simulation
3. Open the Waveform Viewer
4. Display net75 waveform from 1st run and 2nd run of simulation
5. Measure frequencies with the waveform analyzer



Choose Simulation Circuit

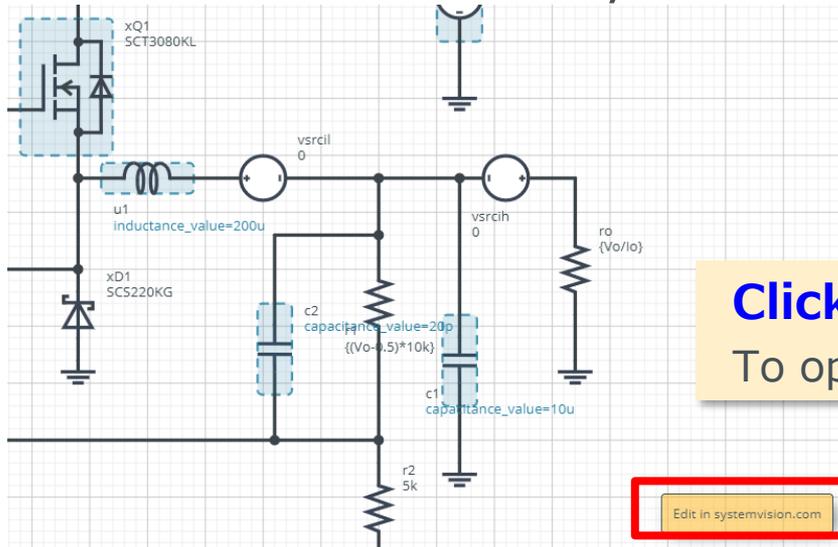
Execute Simulation

Customize Simulation

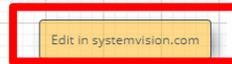
Export Schematics

Order Samples

- You will need to change the schematic connections or parameters of a given simulation circuit on the website. To do so, you can export schematics to SystemVision®Cloud, and edit schematics as you like.



Click 'Edit in systemVision.com'
To open SystemVision®Cloud



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- For more details about SystemVision®Cloud, please visit <https://www.systemvision.com>.

Export Schematics to SystemVision® Cloud (2/2)



If you have SystemVision®Cloud account, you will see the schematics in your SystemVision®cloud simulator. You can change schematic connection or device properties.

You need to save the schematic to one of your workgroups with 'SaveAs' to run simulation.

The screenshot displays the SystemVision Cloud web interface. At the top, there are navigation tabs for 'Designs', 'Groups', 'Discuss', and 'Learn', along with a search bar and logos for ROHM and SIEMENS. The main workspace shows a schematic diagram of a buck converter circuit. Five simulation plots are overlaid on the schematic:

- vsrch/(neg)**: A plot of Current (A) vs Time (s) showing a negative current pulse from 0.0m to 1.0m s, reaching approximately -25.0 A.
- vsrch/(neg)**: A plot of Current (A) vs Time (s) showing a positive current pulse from 0.0m to 1.0m s, reaching approximately 20.0 A.
- ro/power_dissipated**: A plot of Power (W) vs Time (s) showing a power pulse from 0.0m to 1.0m s, reaching approximately 5.0k W.
- vsrcin/power_output**: A plot of Power (W) vs Time (s) showing a power pulse from 0.0m to 1.0m s, reaching approximately 25.0k W.
- net68**: A plot of Voltage (V) vs Time (s) showing a voltage pulse from 0.0m to 1.0m s, reaching approximately 250.0 V.

On the right side, a sidebar shows the project details for 'Shin_1 DESIGNER', including the title 'C-6. Buck Converter Vo=250V Io=20A', the group 'ROHM Solution Simulator Work Space', and a description area with text formatting options.

Choose Simulation Circuit

Execute Simulation

Customize Simulation

Export Schematics

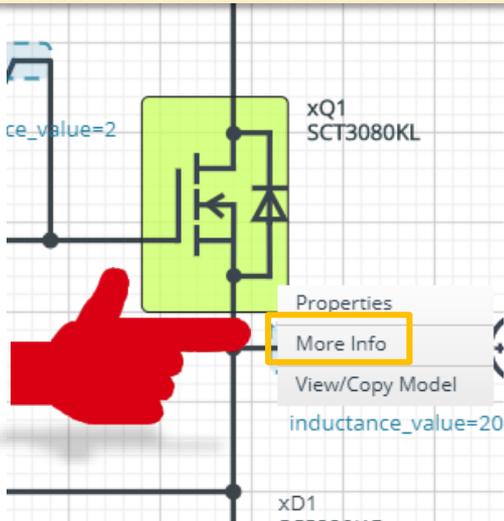
Order Samples

How to order samples:

You will find links to the corresponding product page, datasheet and the sample order page in 'More Info'

Right click > 'More Info'

More Info window will show up



SCT3080KL

Model Descriptions

Detailed Model Description:

- * sct3080kl_it.lib converted from PSpice to AMS
- * Version: AMS VX.2.5
- * Date: October 09, 2019 at 04:23 PM
- * SCT3080KL_LT
- * SiC NMOSFET model
- * 1200V 31A 80mOhm
- * Model Generated by ROHM
- * All Rights Reserved
- * Commercial Use or Resale Restricted
- * Date: 2018/07/04
- ***** D G S

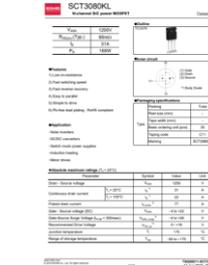
Model Links:

- [Link To Product](#)
- [Link To Datasheet](#)
- [Link To Buy](#)

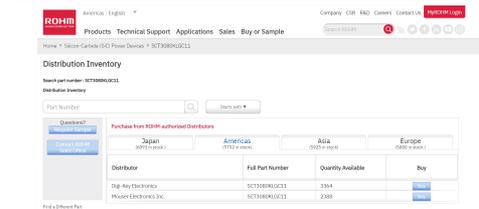
Product Page



Product Datasheet



Sample Order Page



Link to distributors:

SCT3080KL

Detailed Model Description:

- * sct3080kl.lib converted from PSpice to AMS SP
- * Version: AMS VX.2.5
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- *****D G S

Model Links:

- [Link To Product](#)
- [Link To Datasheet](#)
- [Link To Buy](#)

Click 'Link to Buy'

- Please find your distributor from the Order Sample page.

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Search part number : SCT3080KLG11

Distribution Inventory

Part Number Starts with ▼

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[Contact ROHM Sales Office](#)

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Distributor	Full Part Number	Quantity Available	Buy	Distributor	Full Part Number	Quantity Available	Buy
Digi-Key Electronics	SCT3080KLG11	3364	Buy				
Mouser Electronics Inc.	SCT3080KLG11	2388	Buy				

Find a Different Part

Rev.	Date	Changes	Comments
2	February 26 th , 2020	New release	

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