(A-021-DOT) DC-AC 3-Phase Vienna PFC (DOT247)

ROHM PLECS Simulator
Circuit Information

2026 March
68UG105E Rev.001

Simulation Parameters (Dialog)

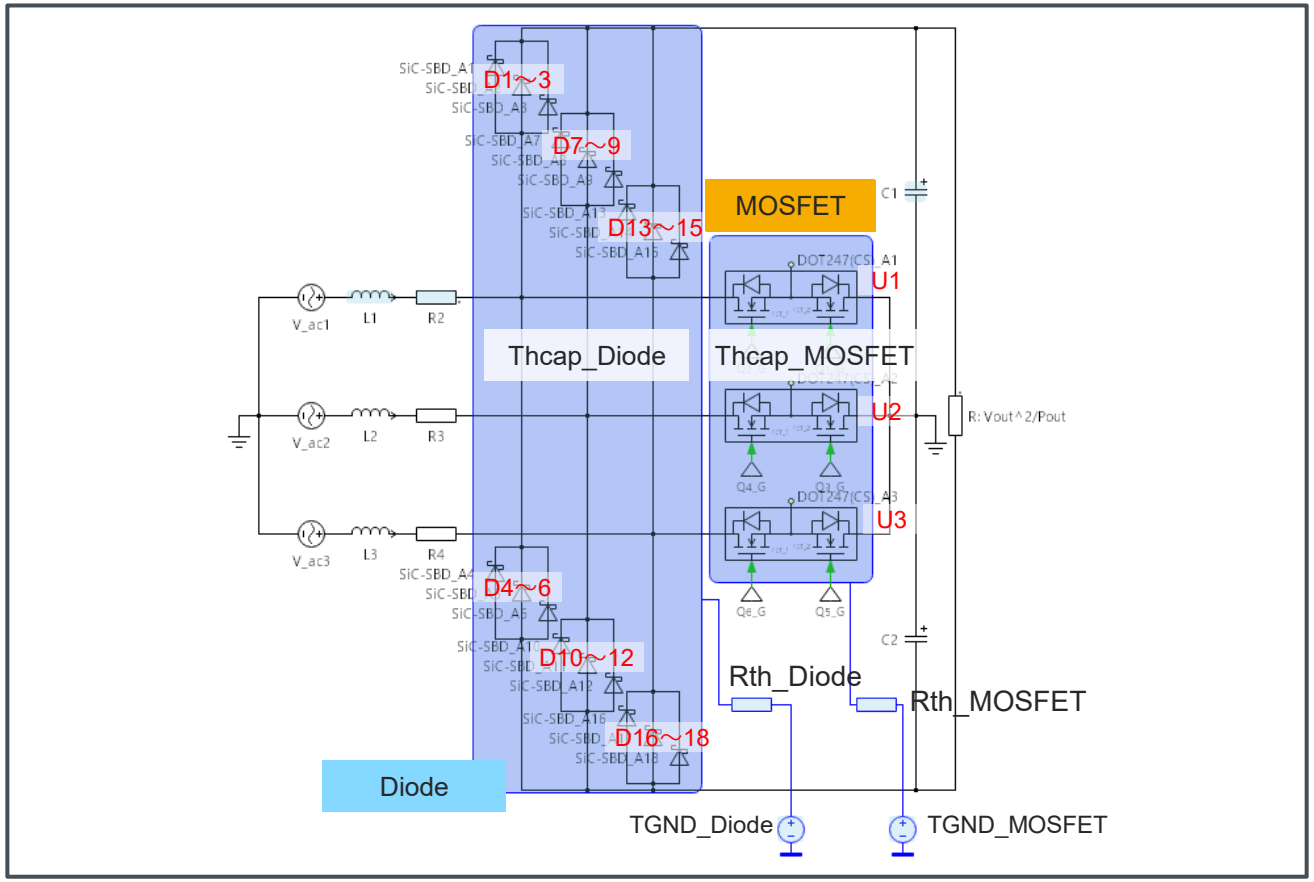
	Name	Content	unit	Default Value	Variable Range
	L1～3	Inductive Load	H	470u	1n ～ 1
	R2～4	Choke Resistance	Ω	5m	1u ～ 100m
	C1,C2	Output Capacitor Initial Voltage	F V	1m 400	1n ～ 1 0 ～ 1200
MOSFET	Thcap_MOSFET	Thermal Capacitance	J/K	0.1	1m ～ 100
MOSFET	Rth_MOSFET	Thermal Resistance	K/W	1	1m ～ 100
MOSFET	TGND_MOSFET	Thermal GND Temperature	℃	25	-40 ～ 175
Diode	Thcap_Diode	Thermal Capacitance	J/K	0.1	1m ～ 100
Diode	Rth_Diode	Thermal Resistance	K/W	1	1m ～ 100
Diode	TGND_Diode	Thermal GND Temperature	℃	25	-40 ～ 175

Simulation Parameters (Table)

Name	Content	unit	Default Value	Variable Range
Test_time	Test time in simulation	s	0.5	100u ～ 0.5
fs	Switching Frequency	Hz	12k	10k ～ 100k
Vin_ac (rms)	Input Voltage (Peak Voltage) Grid Frequency	V Hz	220 50	100 ～ 500 50 or 60
Vout_dc	Output Voltage	V	800	300 ～ 1200
Pout	Output Power	W	25000	100 ～ 33000
Rg_on*	Gate Resistance (Source)	Ω	6.8	0.1 ～ 100
Rg_off*	Gate Resistance (Sink)	Ω	4.7	0.1 ～ 100
T_init**	Initial Junction Temp.	℃	25	-40 ～ 175

*Same value for all MOSFETs　　**Same value for all devices

Simulation Circuit



Default Devices

Name	Device Type	Part No.	Specification
U1～3	SiC MOSFET Module	SCZ4004DTB	750V/ 251A/ 4mΩ/ DOT247(Common Source)
D1～18	SiC SBD*	SCS320AG	650V/ 20A/ TO-220ACGE

*SBD:Schottky Barrier Diode

Simulation Screen Overview

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Schematic window
- Dialog parameters setting
- Results display

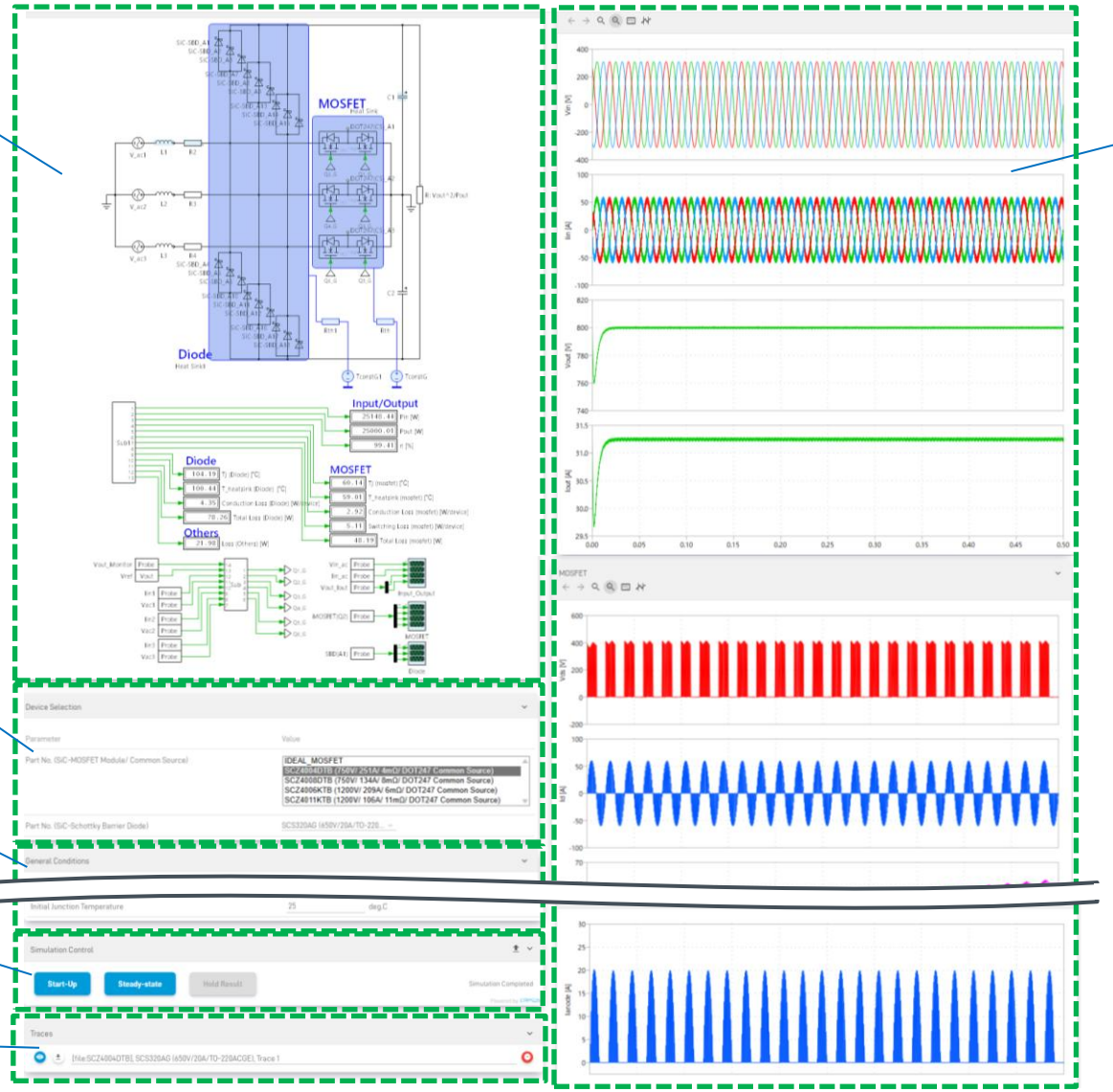
Waveforms

Device selection

Table parameters setting

Simulation control

Trace selection



Simulation Results

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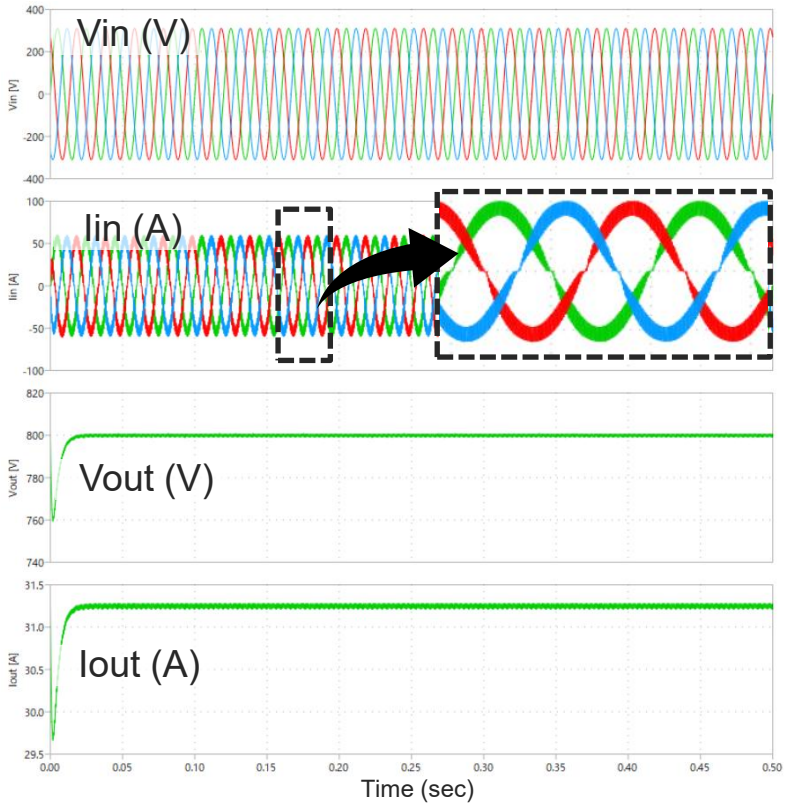
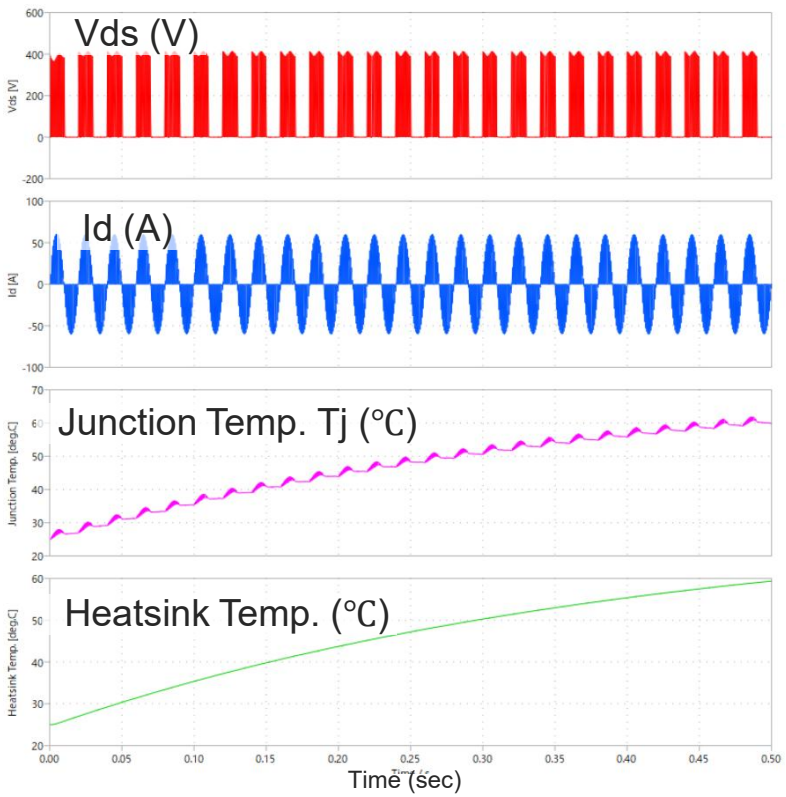
Input and Output



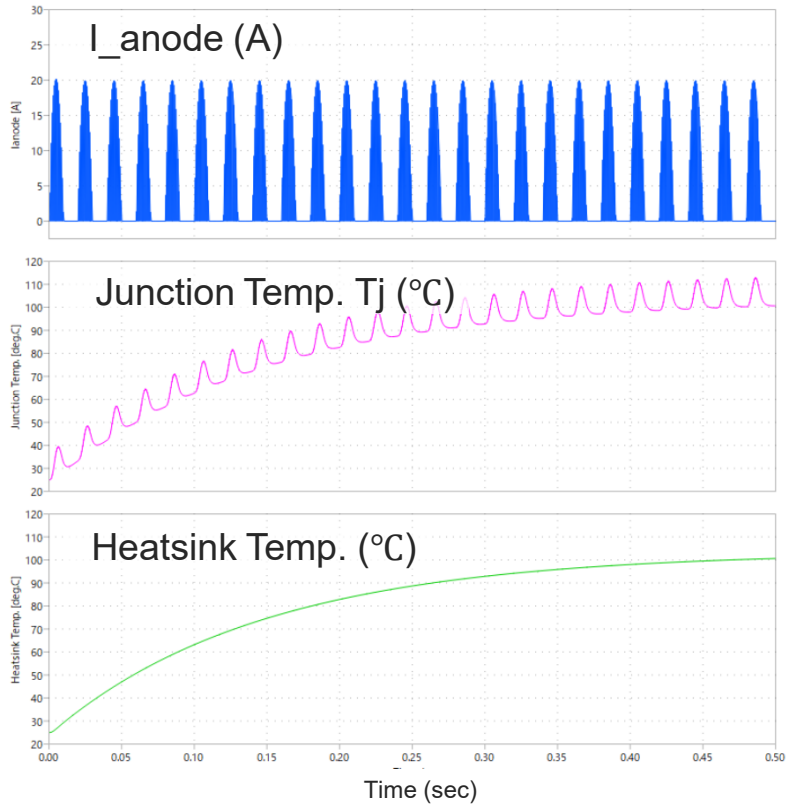
Contents	Results
Input Power : Pin	25.148 (kW)
Output Power: Pout	25.000 (kW)
Efficiency: η	99.41 (%)

MOSFET



Contents	Results
Junction Temp. Tj(mosfet)	60.14 (℃)
Heatsink Temp. T_hs(mosfet)	59.01 (℃)
Conduction Loss: Pcond(mosfet)	2.92 (W/device)
Switching Loss: Psw(mosfet)	5.11 (W/device)
Total Loss: Ptot (mosfet)	48.19 (W)

Diode



Contents	Results
Junction Temp. Tj(diode)	104.19 (℃)
Heatsink Temp. T_hs(diode)	100.44 (℃)
Conduction Loss: Pcond(diode)	4.35 (W/device)
Total Loss: Ptot(diode)	78.26 (W)

How to change the devices

The figure of “(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)” is used as an example in this page.

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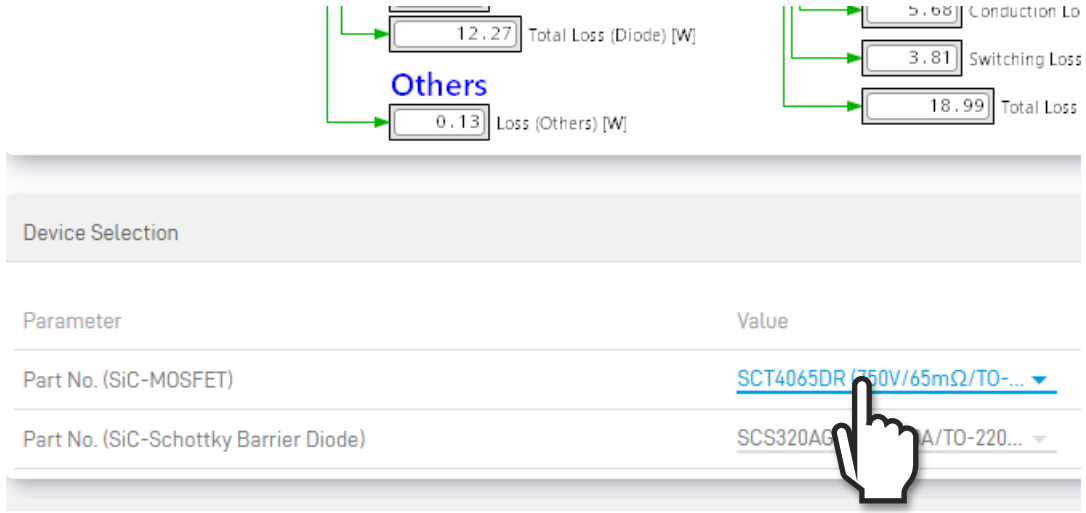
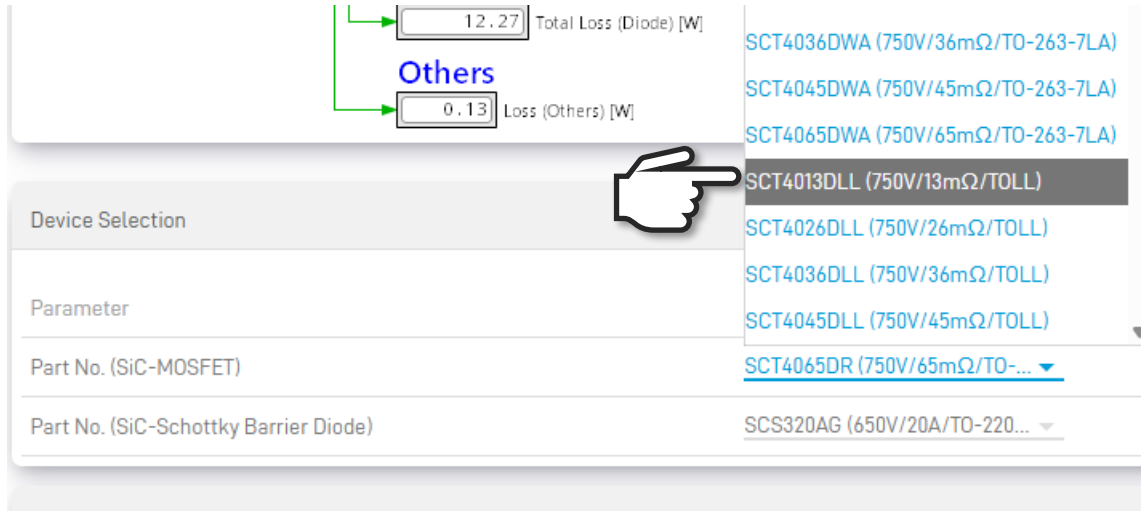
Device Selection



Over your mouse cursor to the device name that you want to change and click the left button of the mouse.



Available device lists are appeared like the above, and you can select a favorite device from these.

How to change Dialog parameters

The figure of “(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)” is used as an example in this page.

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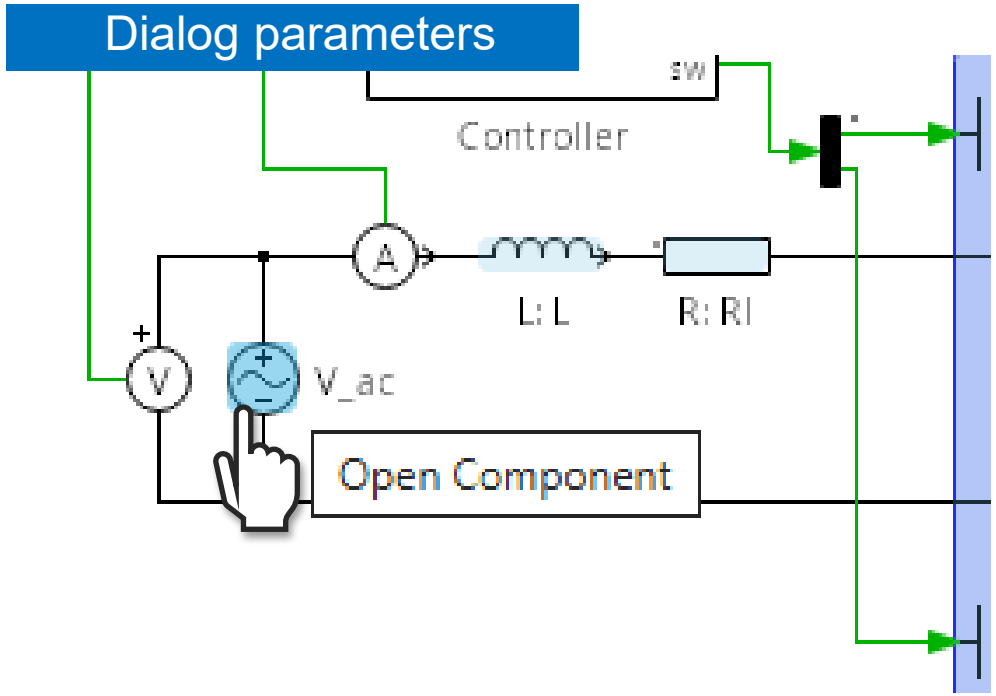
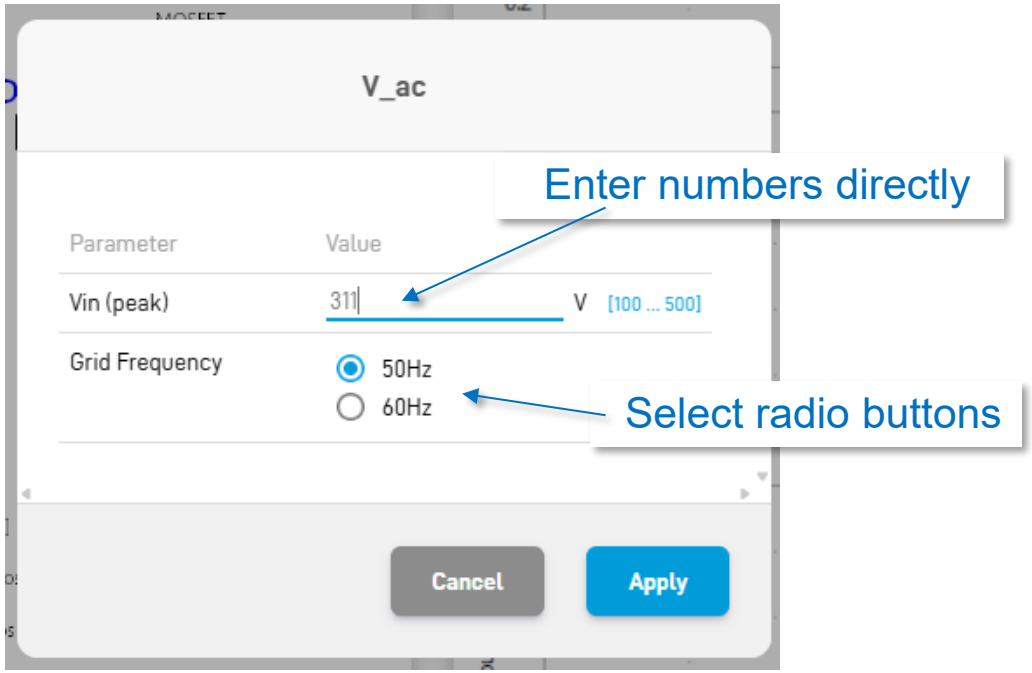
- Symbols whose parameters can be changed are colored light-blue in the circuit diagram.
- Over your mouse cursor to the symbol that you want to change the parameter and the symbol color is turned to blue (e.g. “V_ac” symbol in the below).
- Click the mouse’s left button.



- A new window like the below is opened.
- You can change the parameters by entering the value directly* or selecting radio buttons.
- Push “Apply” button after changing all parameters.



*Note: Parameters can be entered directly are limited by Min. and Max. values to avoid unexpected system errors.
(e.g. “Vin(peak)” is limited between 100 and 500V in the above.)

How to change Table parameters

The figure of “(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)” is used as an example in this page.

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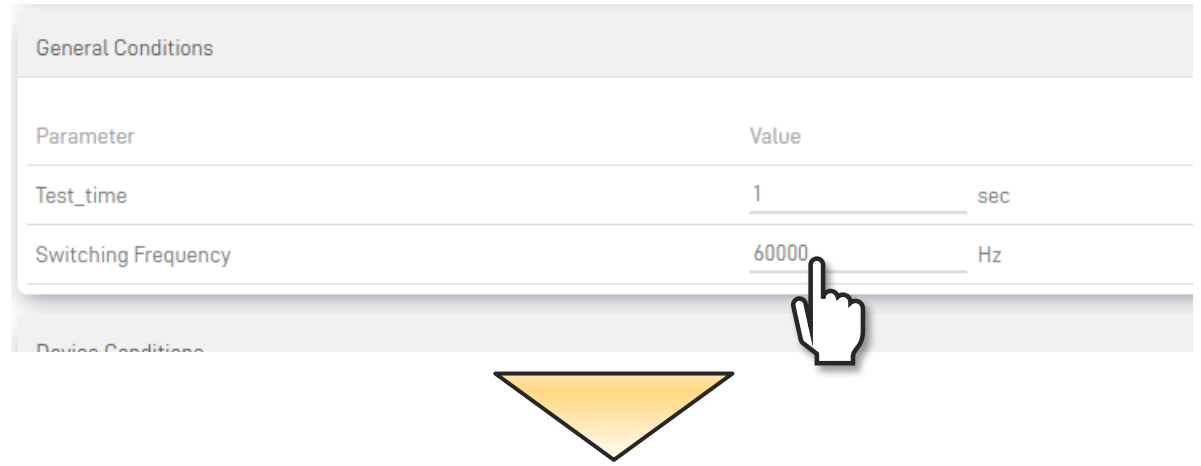
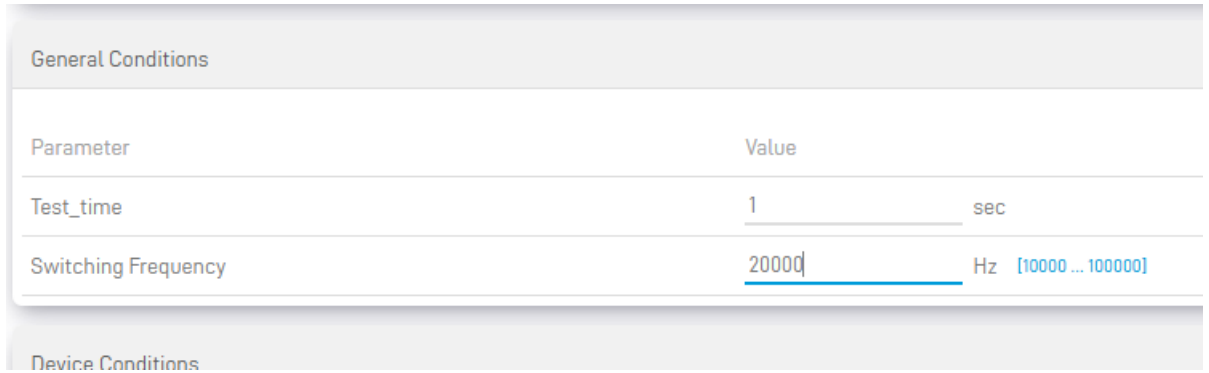
Table parameters





Choose the parameter that you want change on the parameter tables (e.g. ”60kHz” of Switching Frequency in the left figure.)

- A blue under-line and variable range of the parameter are appeared.
- Then, you can change the parameters by entering the value directly ” (e.g. “60kHz” was changed to “20kHz”).

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