(C-019-DOT) DC-DC Phase-Shift Full-Bridge Buck Converter (DOT247)

ROHM PLECS Simulator
Circuit Information

2026 March
68UG120E Rev.001

Simulation Parameters (Dialog)

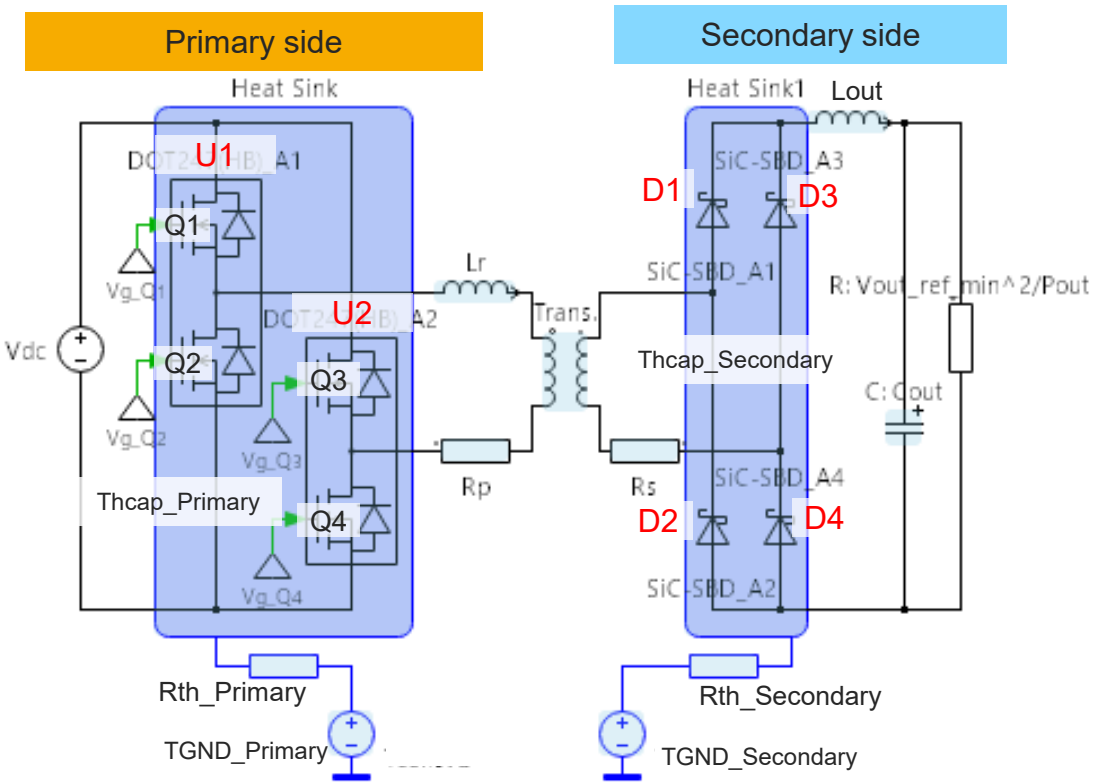
	Name	Content	unit	Default Value	Variable Range
	Transformer	Np: Primary-turns Ns: Secondary-turns Lm: Magnetizing Inductance	turns turns H	20 18 1m	1 ～ 1000 1 ～ 1000 1n～1
	Lr	Leakage Inductance	H	6.8u	1n ～ 1
	Lout	Output Inductance	H	330u	1n ～ 1
	Cout	Output Capacitance	F	47u	1n ～ 1
	Vc_init	Initial Voltage of Cout	V	300	0 ～ 1200
	Rp	Parasitic Resistance (Primary)	ohm	5m	1n ～ 100
	Rs	Parasitic Resistance (Secondary)	ohm	5m	1n ～ 100
Primary	Thcap_Primary	Thermal Capacitance	J/K	0.1	1m ～ 100
Primary	Rth_Primary	Thermal Resistance	K/W	0.3	1m ～ 100
Primary	TGND_Primary	Thermal GND Temperature	℃	25	-40 ～ 175
Secondary	Thcap_Secondary	Thermal Capacitance	J/K	0.1	1m ～ 100
Secondary	Rth_Secondary	Thermal Resistance	K/W	0.3	1m ～ 100
Secondary	TGND_Secondary	Thermal GND Temperature	℃	25	-40 ～ 175

Simulation Parameters (Table)

Name	Content	unit	Default Value	Variable Range
Test_time	Test time in simulation	s	0.15	100u ～ 0.5
fs	Switching Frequency	Hz	30k	10k ～ 100k
Vin	Input Voltage	V	400	100 ～ 1200
Vout_ref_min Vout_ref_max	Output Voltage	V	300 320	10 ～ 1200
Pout	Output Power	W	5000	100 ～ 10000
Rg_on*	Gate Resistance (Source)	Ω	10	0.1 ～ 100
Rg_off*	Gate Resistance (Sink)	Ω	2.2	0.1 ～ 100
DT	Dead Time	s	100n	0 ～1m
T_init**	Initial Junction Temp.	℃	25	-40 ～ 175

*Common for all MOSFETs　　**Common for all devices

Simulation Circuit



Default Devices

Name	Device Type	Part No.	Specification
U1, U2	SiC MOSFET module	SCZ4008DTA	750V/ 134A/ 8mΩ/ DOT247
D1～4	SiC SBD***	SCS320AG	650V/ 20A/ TO-220ACGE

*** SBD: Schottky Barrier Diode

Simulation Screen Overview

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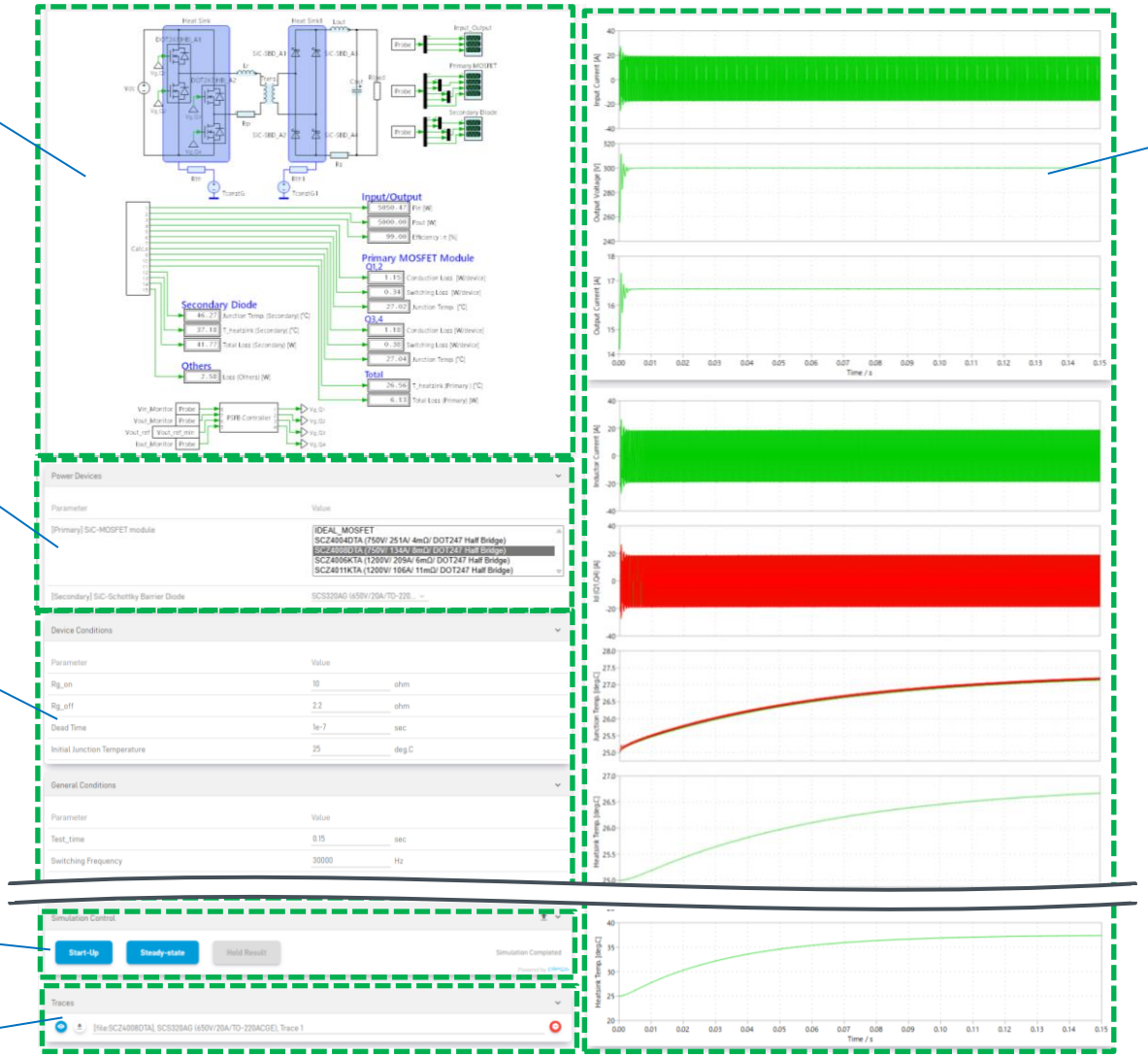
Schematic window
- Dialog parameters setting
- Results display

Device selection

Table parameters setting

Simulation control

Trace selection



Waveforms

Simulation Results 1

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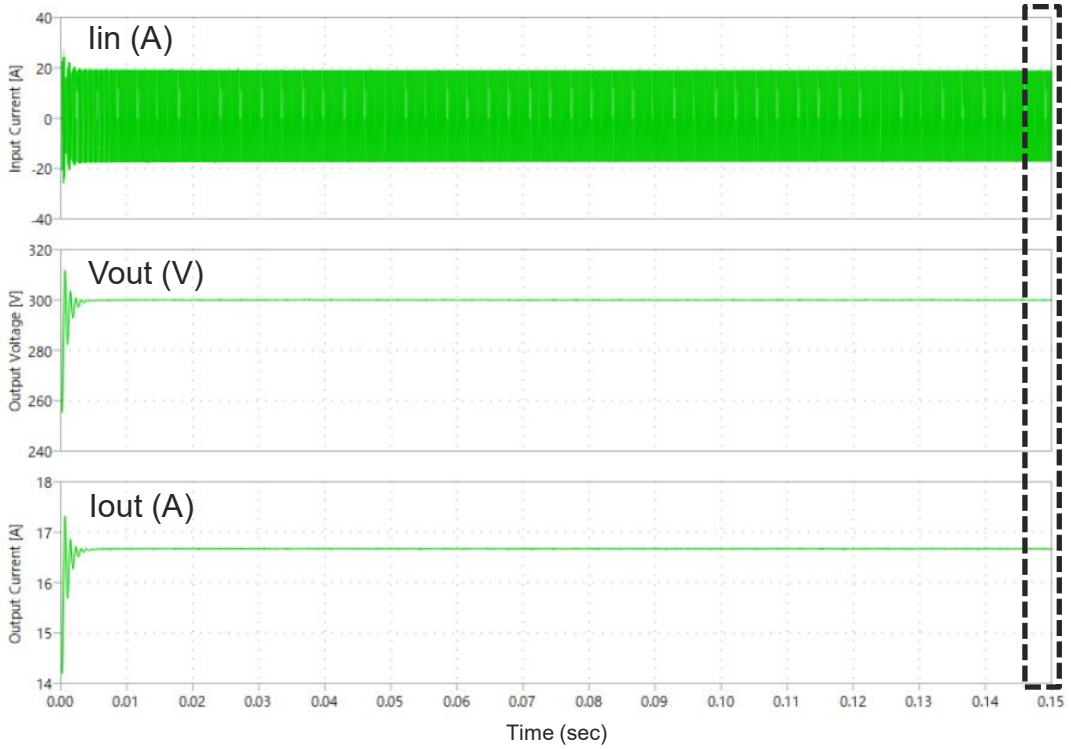
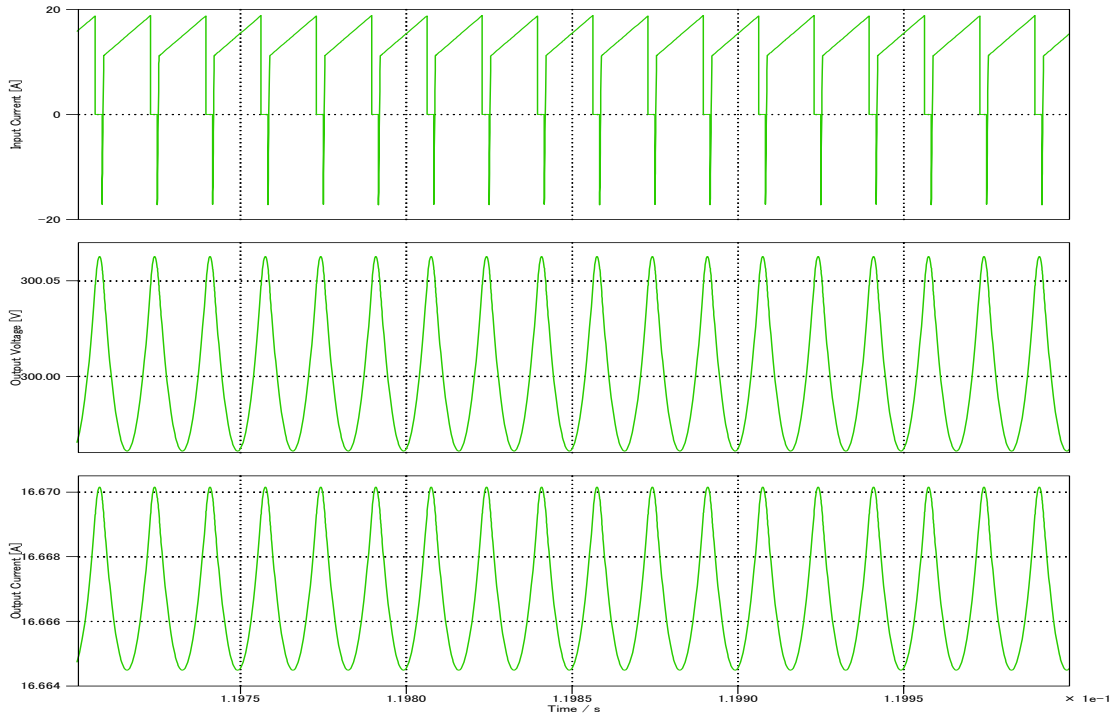
Input and Output





Contents	Results
Input Power : Pin	5.050 (kW)
Output Power: Pout	5.000 (kW)
Efficiency: η	99.00 (%)

Simulation Results 2

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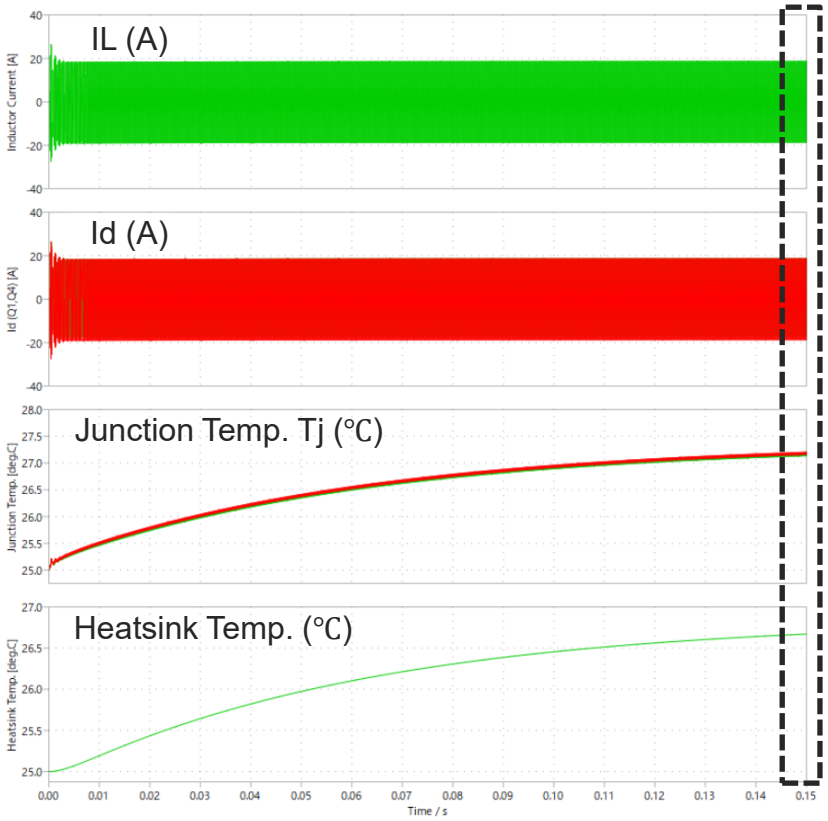
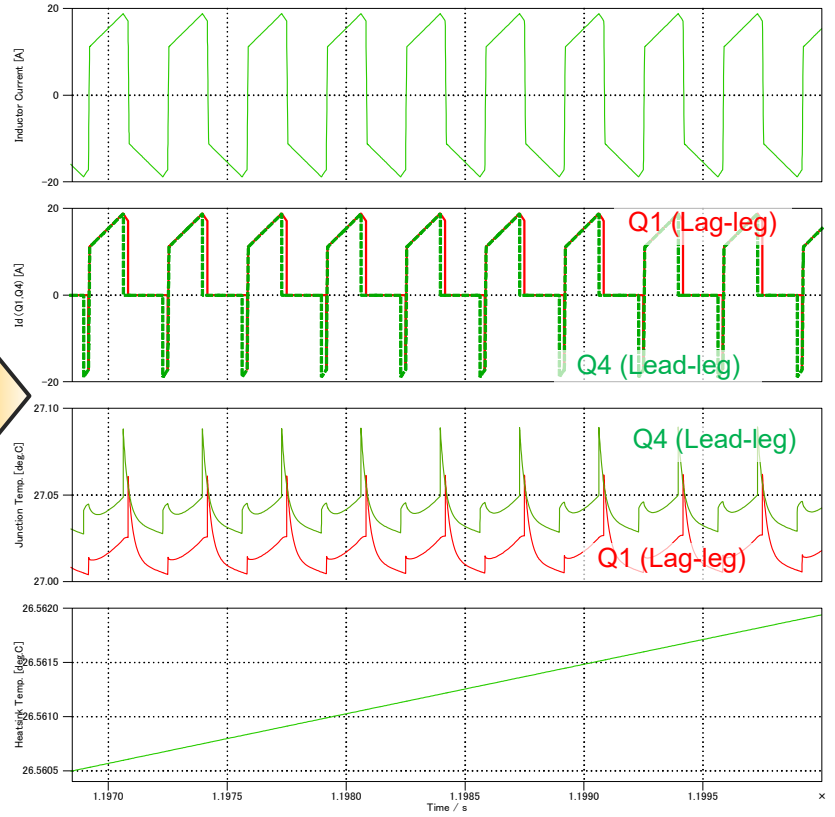
Primary side





	Contents	Results
Q4 (Lead-leg)	Conduction Loss: Pcond (Q4)	1.18 (W/device)
	Switching Loss: Psw (Q4)	0.38 (W/device)
	Junction Temp. : Tj (Q4)	27.04 (℃)
Q1 (Lag-leg)	Conduction Loss: Pcond (Q1)	1.15 (W/device)
	Switching Loss: Psw (Q1)	0.34 (W/device)
	Junction Temp. : Tj (Q1)	27.02 (℃)
	Heatsink Temp.: T_hs (primary)	26.56 (℃)
	Total Loss: Ptot (primary)	6.13 (W)

Simulation Results 3

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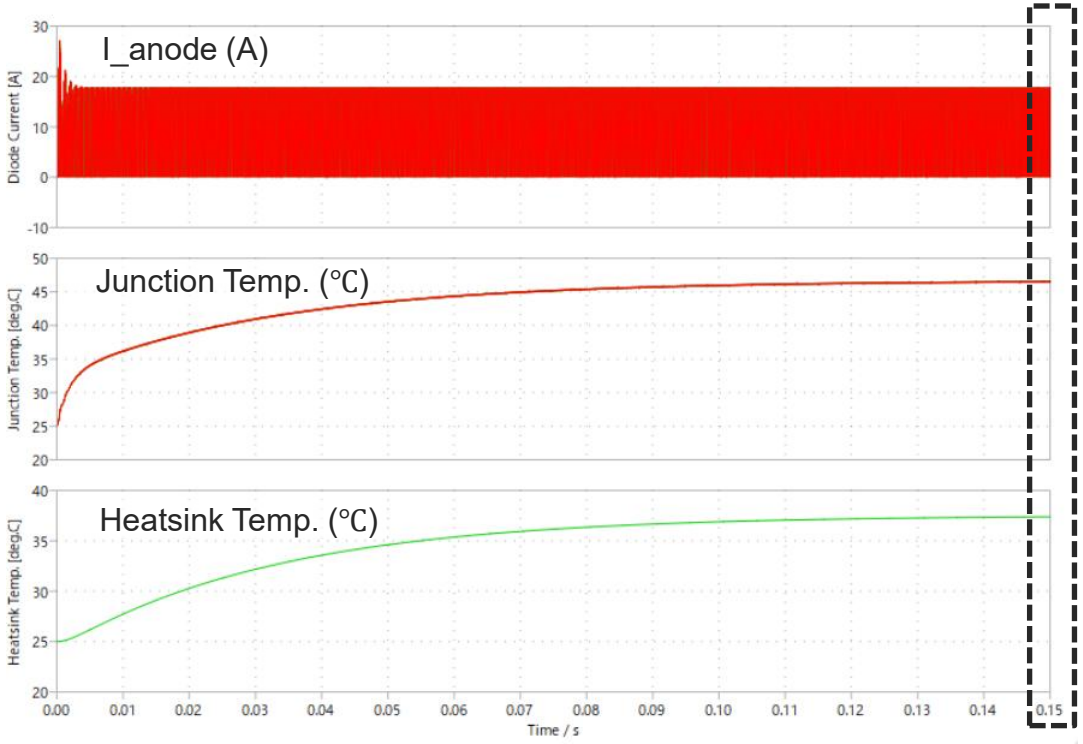
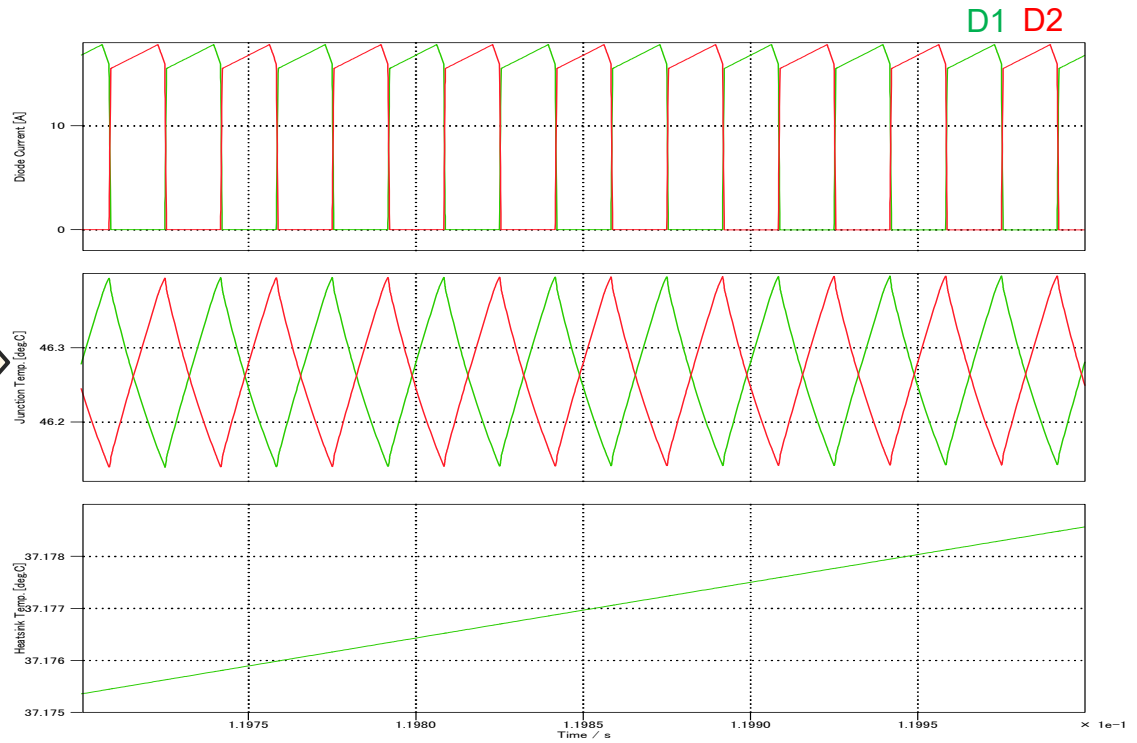
Secondary side





Contents	Results
Junction Temp. Tj (secondary D1,D2)	46.27 (℃)
Heatsink Temp. T_hs (secondary)	37.18 (℃)
Total Loss: Ptot (secondary)	41.77 (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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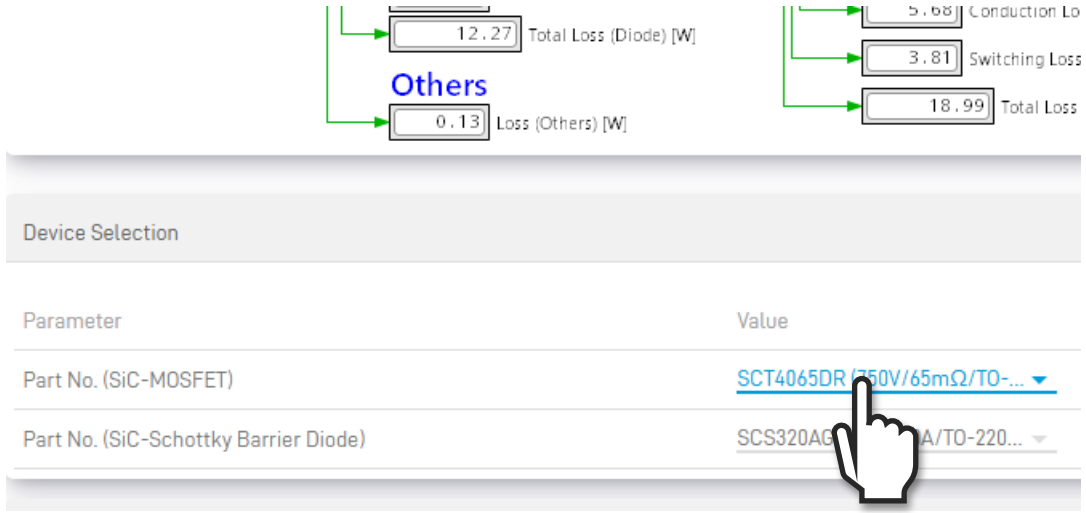
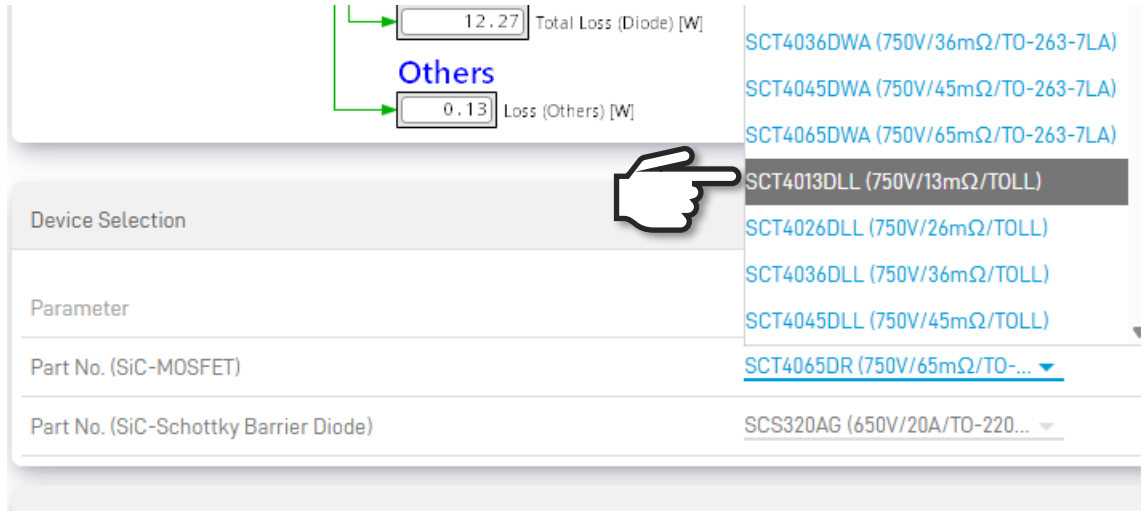
Device Selection



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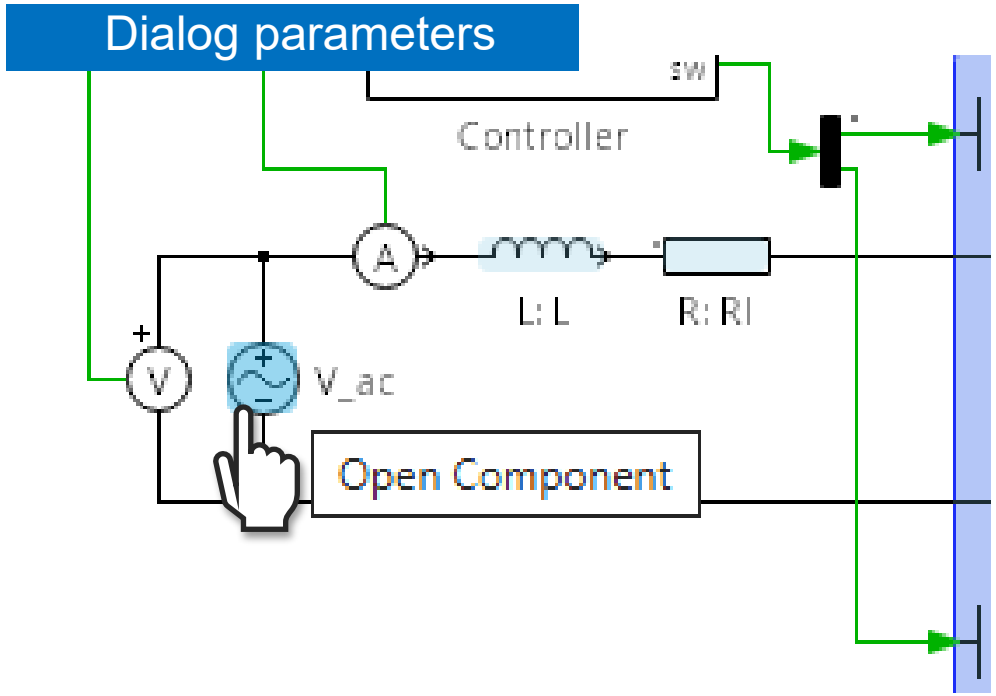
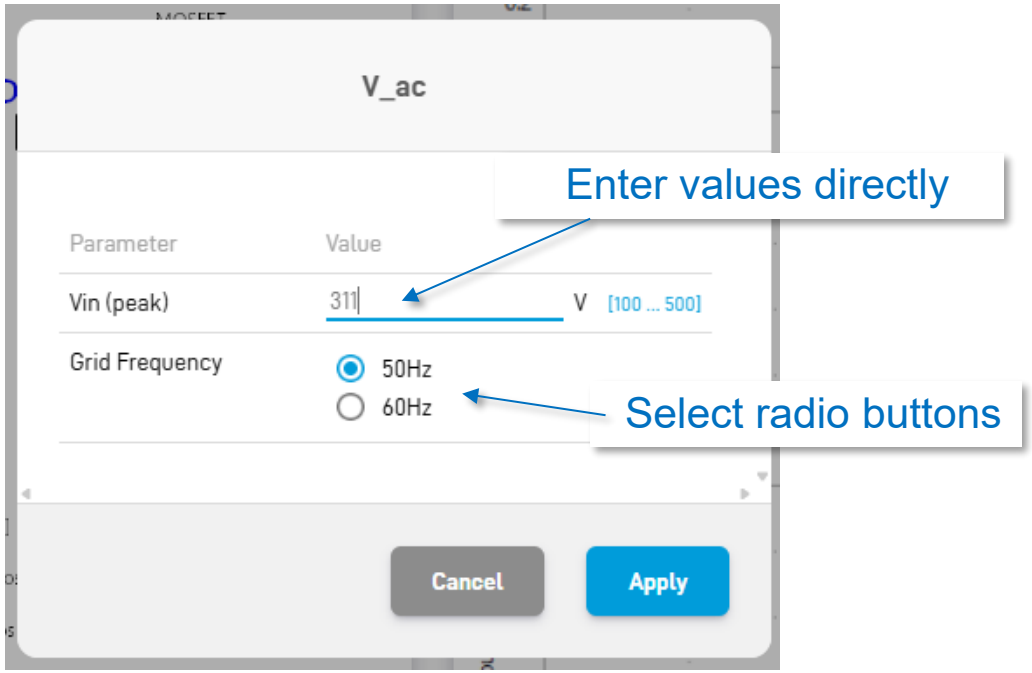
- Symbols whose parameters can be changed are colored light-blue in the circuit diagram.
- Over your mouse cursor to the symbol that you want to change the parameter and the symbol color is turned to blue (e.g. “V_ac” symbol in the below).
- Click the mouse’s left button.



- 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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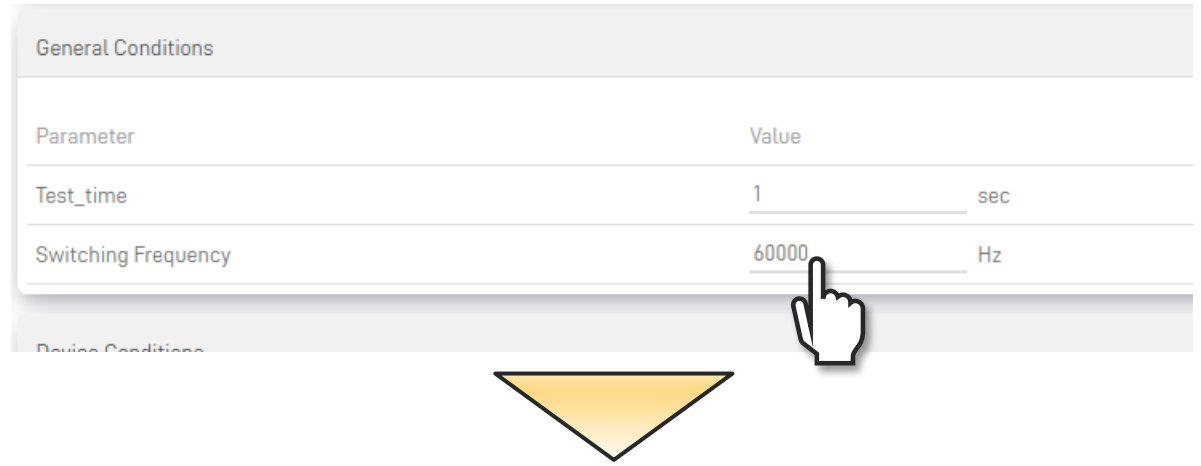
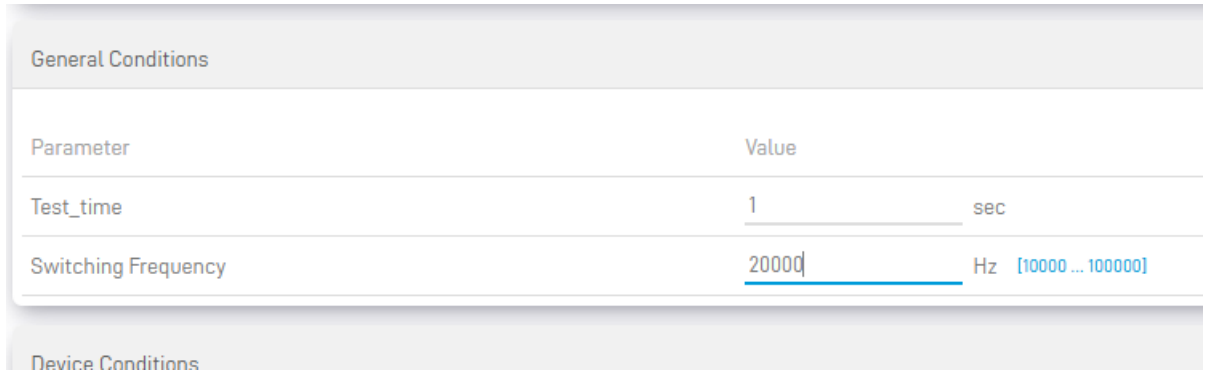
Table parameters





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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